

CRASH2 MAINTENANCE
VOLUME II
LISTING OF TEST RUNS

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May 1981
Final Report

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U.S. Department of Transportation
National Highway Traffic Safety
Administration

CRASH2 Maintenance

Volume II—Listings of Test Runs

Tim Oppenheim

Wilson Hill Associates, Inc.
1025 Vermont Avenue, N.W., Suite 900
Washington, D.C. 20005

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
teaspoon	teaspoons	5	milliliters	ml
fl oz	fluid ounces	15	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	ac
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	st
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	36	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



* 1 in = 2.54 exactly. For other exact conversions and more detailed tables, see NBS Mon. Publ. 286, Units of Weights and Measures, Price \$2.25, SO Catalog No. C13.10-286.

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SECTION 1. INTRODUCTION

This volume contains complete computer listings for 56 test runs of several versions of the CRASH2, CRASH2A and CRASH3 programs. A separate summary of the test input data is included.

All of these runs are based on the 12 RICSAC test cases. The input data from these cases is summarized in Section 7. Some inconsistencies appear in the RICSAC final report between measurements appearing in the text and the CRASH2 listings located in Appendix B. Most of the discrepancies are in principal force angle and rolling resistance measurements. For purposes of these tests, all such differences were resolved by using the data supplied in chart form as part of the discussion of each case in Section 2.2 of Volume 4 of the RICSAC Final Report.

For some of the test runs performed at the beginning of this project, the RICSAC inputs caused execution errors due to problems in the program code. For this reason, some test runs of CRASH2 were not possible, and some of the CRASH2A results required input data which differ slightly from the original RICSAC reconstructions. Since these problems have been solved in the final version of CRASH3, the inputs to CRASH3 adhere exactly to the RICSAC measurements and the entire group of RICSAC cases has been run on CRASH3.

All of the listings reproduced here were obtained from a time sharing terminal connected to the DAC2 service at MCAUTO. The cases were executed on versions of the CRASH program maintained by MCAUTO under user number C0162. For the CRASH3 program, the source code and subsequent changes were supplied by Wilson-Hill to MCAUTO; the executable modules used for these tests were created by MCAUTO.

Section 2 contains the results of the final version of CRASH3 as released for field use by NHTSA on January 1, 1981, with some minor corrections made during the period January - March 1981,

and with the addition of a metric unit input and output option developed by MCAUTO during this period. Each run consists of an abbreviated input procedure, complete printout, rerun with trajectory simulation option, and second complete printout with the trajectory simulation results.

The cases in Section 3 reflect the output of the CRASH2 production program as installed at MCAUTO in April 1980. This group of runs was made without the trajectory simulation option. These tests were designed to confirm the similarity of results between the test cases in the RICSAC report and the then-current version of CRASH2 at MCAUTO.

Section 4 consists of the CRASH2 production program with the trajectory simulation option invoked. Several RICSAC cases are omitted from this section, since they do not execute successfully due to problems in the CRASH2 code for the trajectory simulation.

In Section 5 CRASH2A was tested as it existed in the spring of 1980. One problem, which prevented any case containing a vehicle not characterized by a skidding path from executing, was corrected by making a change to the source code in subroutine SPIN2. The correction for this problem was communicated to MCAUTO and installed in CRASH2A, in order to complete the cases in Part Four.

Section 6 contains test runs of CRASH2A with the trajectory simulation option invoked. Some changes to the rotation direction response were made to preclude execution errors on some of the cases. The code changes necessary to prevent these errors were developed during this project, and included in the final version of CRASH2A which became CRASH3 and is now in production use.

As described above, Section 7 contains a summary description of the RICSAC input data that was used for CRASH program testing.

SECTION 2
CRASH3 PRODUCTION VERSION, AS RELEASED 1/1/81

RUN CRASH3.C0162

CRASH3 14:43 MAR 16, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?RICSAC #1 CHEVELLE VS PINTO

2. CLASS/WEIGHTS?
?4 4621 2 3082

3. CDC/PDOF # 1?
?11FZEW2 -30

4. CDC/PDOF # 2?
?01RDEW3 30

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?4 2

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?-2.4 -1 -1.5 7.5 2.5 105

8. IMPACT COORDINATES?
?-10.8 1 -30 0 -5.5 90

9. ANY SLIP ANGLES? (Y/N)
?Y_NO

11. SUSTAINED CONTACT? (Y OR N)
?NO

12. SKIDDING OF # 1? (Y OR N)
?Y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?46

43. END DAMAGE DEPTH #1
?4 5.5 7 10.2 12.1 14.8

44. END DAMAGE MIDPOINT OFFSET #1
?14.3

45. SIDE DAMAGE WIDTH #2
?113.3

46. SIDE DAMAGE DEPTH #2
?5 12. 10.6 11.8 9. 4.1

47. SIDE DAMAGE MIDPOINT OFFSET #2
?21.8

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #1 CHEVELLE VS PINTO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	20.7 MPH	0.0 MPH
VEH#2	22.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.5 MPH	-16.0 MPH	9.3 MPH	-30.0 DEG.
VEH#2	27.7 MPH	-24.0 MPH	-13.9 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.2 MPH	-9.7 MPH	3.3 MPH	-18.7 DEG.
VEH#2	15.3 MPH	-11.5 MPH	-10.1 MPH	41.3 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 24981.9 FT-LB VEH#2 169219.9 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 20.7 MPH
VEH#2 11.5 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 .4 MPH
VEH#2 -19.1 MPH

CLOSING VELOCITY (LINEAR MOMENTUM) 2-3
32.1 MPH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #1 CHEVELLE VS PINTO

VEHICLE # 1

[illegible]

VEHICLE # 2

```

*****
*          *          *
*  IMPACT  *          *
*  SPEED   *  SPEED CHANGE  *
*  MPH     *  MPH           *          BASIS
*          *          *          OF
*****
*  *  *  *  *  *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS
*  *  *  *  *  *
*****
*  *  *  *  *
*  *  *  *  *
* 22.3 * 0.0 * 15.3 * -11.5 * -10.1 * SPINOUT TRAJECTORIES AND
*  *  *  *  *  * CONSERVATION OF LINEAR
*  *  *  *  *  * MOMENTUM
*  *  *  *  *  *
*****
*  *  *  *  *
*  *  *  *  *
*  *  *  *  * SPINOUT TRAJECTORIES AND
*  *  *  *  * DAMAGE
*  *  *  *  *
*****
*  *  *  *  *
* 27.7 * -24.0 * -13.9 * DAMAGE DATA ONLY
*  *  *  *  *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-10.80 FT.	0.00 FT.
IMPACT Y-POSITION	1.00 FT.	-5.50 FT.
IMPACT HEADING ANGLE	-30.00 DEG.	89.99 DEG.
REST X-POSITION	-2.40 FT.	7.50 FT.
REST Y-POSITION	-1.00 FT.	2.50 FT.
REST HEADING ANGLE	-1.50 DEG.	104.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = -10.8 FT.	XC20' = 0.0 FT.
YC10' = 1.0 FT.	YC20' = -5.5 FT.
PSI10 = -30.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

	2-5
XCS1' = -10.8 FT.	XCS2' = 0.0 FT.
YCS1' = 1.0 FT.	YCS2' = -5.5 FT.
PSIS1 = -30.0 DEG	PSIS2 = 90.0 DEG
US1 = 11.0 MPH	US2 = 10.8 MPH

VS1 = 3.3 MPH
PSISD1 = 45.3 DEG/SEC

VS2 = -10.1 MPH
PSISD2 = 48.6 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	20.7 MPH	0.0 MPH
VEH#2	22.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.5 MPH	-16.0 MPH	9.3 MPH	-30.0 DEG.
VEH#2	27.7 MPH	-24.0 MPH	-13.9 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.2 MPH	-9.7 MPH	3.3 MPH	-18.7 DEG.
VEH#2	15.3 MPH	-11.5 MPH	-10.1 MPH	41.3 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 24981.9 FT-LB VEH#2 169219.9 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 20.7 MPH

VEH#2 11.5 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 .4 MPH

VEH#2 -19.1 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
32.1 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4621.0 LBS.
CDC-----11FZEW2
L----- 46.0 IN.
C1----- 4.0 IN.
C2----- 5.5 IN.
C3----- 7.0 IN.
C4----- 10.2 IN.
C5----- 12.1 IN.
C6----- 14.8 IN.
D----- 14.3
RHO----- 1.00 *
ANG----- -30.0 DEG.
D'----- 19.1 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
WEIGHT----- 3082.0 LBS.
CDC-----01RDEW3
L----- 113.3 IN.
C1----- .5 IN.
C2----- 12.0 IN.
C3----- 10.6 IN.
C4----- 11.8 IN.
C5----- 9.0 IN.
C6----- 4.1 IN.
D----- 21.8
RHO----- 1.00 *
ANG----- 30.0 DEG.
D'----- 21.8 IN.

DIMENSIONS AND INERTIAL PROPERTIES


```

*****
*           *           *           *           *           *
*           *           *           *           * SPINOUT TRAJECTORIES AND *
*           *           *           *           * DAMAGE                      *
*           *           *           *           *                               *
*****
*           *           *           *           *
* 27.7 * -24.0 * -13.9 * DAMAGE DATA ONLY *
*           *           *           *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-10.80 FT.	0.00 FT.
IMPACT Y-POSITION	1.00 FT.	-5.50 FT.
IMPACT HEADING ANGLE	-30.00 DEG.	89.99 DEG.
REST X-POSITION	-2.40 FT.	7.50 FT.
REST Y-POSITION	-1.00 FT.	2.50 FT.
REST HEADING ANGLE	-1.50 DEG.	104.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = -10.8 FT.	XC20' = 0.0 FT.
YC10' = 1.0 FT.	YC20' = -5.5 FT.
PSI10 = -30.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = -10.8 FT.	XCS2' = 0.0 FT.
YCS1' = 1.0 FT.	YCS2' = -5.5 FT.
PSIS1 = -30.0 DEG	PSIS2 = 90.0 DEG
US1 = 4.7 MPH	US2 = 2.9 MPH
VS1 = 1.5 MPH	VS2 = -13.0 MPH
PSISD1 = 95.7 DEG/SEC	PSISD2 = 19.5 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	15.5 MPH	0.0 MPH
VEH#2	12.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.5 MPH	-13.0 MPH	9.3 MPH	-30.0 DEG.
VEH#2	27.7 MPH	-24.0 MPH	-13.9 MPH	30.0 DEG.

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	44739.0 LB-SEC**2-IN	I2	=	23537.7 LB-SEC**2-IN
M1	=	11.959 LB-SEC**2/IN	M2	=	7.976 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?RERUN

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
 (ANSWER YES OR NO)
 ?NO

QUESTION NUMBERS?
 ?32

32. TRAJECTORY SIMULATION? (Y OR N)
 ?Y

33. STEER ANGLES #1 ?
 ?0 0 0 0

34. STEER ANGLES #2 ?
 ?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
 ?N

36. BOUNDARY POINTS?
 ?

37. SECONDARY FRICTION COEF, ?
 ?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #1 CHEVELLE VS PINTO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	15.5 MPH	0.0 MPH
VEH#2	12.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.5 MPH	-16.0 MPH	9.3 MPH	-30.0 DEG.
VEH#2	27.7 MPH	-24.0 MPH	-13.9 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.9 MPH	-10.8 MPH	1.5 MPH	-7.7 DEG.
VEH#2	16.4 MPH	-10.0 MPH	-13.0 MPH	52.3 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 24981.9 FT-LB VEH#2 169219.9 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 15.5 MPH
VEH#2 6.7 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 .3 MPH
VEH#2 -11.1 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
22.2 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.9 MPH	-10.8 MPH	1.5 MPH	-7.7 DEG.
VEH#2	16.4 MPH	-10.0 MPH	-13.0 MPH	52.3 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 24981.9 FT-LB VEH#2 169219.9 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 15.5 MPH

VEH#2 6.7 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 .3 MPH

VEH#2 -11.1 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

22.2 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 DID NOT CONVERGE +++++

NRUNS(1) = 5

E1(1) = .034

E1(2) = 0.000

E1(3) = .439

E1(4) = 0.000

E1(5) = 0.000

QMIN1 = .473

NRUNS(2) = 5

E2(1) = .559

E2(2) = 0.000

E2(3) = .104

E2(4) = 0.000

E2(5) = 0.000

QMIN2 = .664

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT----- 4621.0 LBS.
 CDC-----11FZEW2
 L----- 46.0 IN.
 C1----- 4.0 IN.
 C2----- 5.5 IN.
 C3----- 7.0 IN.
 C4----- 10.2 IN.
 C5----- 12.1 IN.
 C6----- 14.8 IN.
 D----- 14.3
 RHO----- 1.00 *
 ANG----- -30.0 DEG.
 D'----- 19.1 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT----- 3082.0 LBS.
 CDC-----01RDEW3
 L----- 113.3 IN.
 C1----- .5 IN.
 C2----- 12.0 IN.
 C3----- 10.6 IN.
 C4----- 11.8 IN.
 C5----- 9.0 IN.
 C6----- 4.1 IN.
 D----- 21.8
 RHO----- 1.00 *
 ANG----- 30.0 DEG.
 D'----- 21.8 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES		A2	=	46.3 INCHES
B1	=	59.2 INCHES	2-11	B2	=	50.1 INCHES
TR1	=	61.8 INCHES		TR2	=	54.6 INCHES

I1 = 44739.0 LB-SEC**2-IN
 M1 = 11.959 LB-SEC**2/IN
 XF1 = 98.8 INCHES
 XR1 = -114.0 INCHES
 YS1 = 38.5 INCHES

I2 = 23537.7 LB-SEC**2-IN
 M2 = 7.976 LB-SEC**2/IN
 XF2 = 83.3 INCHES
 XR2 = -91.6 INCHES
 YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 23.947

#

RUN CRASH3.C0162

CRASH3 15:05 MAR 18, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC #2 CHEVELLE VS PINTO

2. CLASS/WEIGHTS?
?4 4621 2 3081

3. CDC/PDOF # 1?
?11FDEW2 -30

**** ILLEGAL CDC **** CHECK COLUMN 7

3. CDC/PDOF # 1?
?11FDEW2 -30

4. CDC/PDOF # 2?
?02RDEW4 30

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?4 2

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?11 9.4 55 23.6 12.5 134

8. IMPACT COORDINATES?
?-11.2 8.5 -30 0 0 90_0

9. ANY SLIP ANGLES? (Y/N)
?N

11. SUSTAINED CONTACT? (Y OR N)
?N

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?1. .02 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.02 .02 1. 1.4

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.5 .022 .2 .2 *DEL*
.5 .02 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.02 .02 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
Y

42. END DAMAGE WIDTH #1
75.5

43. END DAMAGE DEPTH #1
7.5 2.4 3.7 6.9 12 16.5-5

44. END DAMAGE MIDPOINT OFFSET #1
0

45. SIDE DAMAGE WIDTH #2
118.5

46. SIDE DAMAGE DEPTH #2
6.75 22.75 23.5 21.3 10 0

47. SIDE DAMAGE MIDPOINT OFFSET #2
13.7

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #2 CHEVELLE VS PINTO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	27.9 MPH	0.0 MPH
VEH#2	32.6 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.1 MPH	-27.0 MPH	15.6 MPH	-30.0 DEG.
VEH#2	46.7 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.8 MPH	-19.7 MPH	2-15 6.8 MPH	-18.9 DEG.
VEH#2	31.2 MPH	-23.5 MPH	-20.5 MPH	41.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 33958.2 FT-LB VEH#2 507858.6 FT-LB
 SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)
 VEH#1 27.7 MPH
 VEH#2 19.7 MPH
 SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
 VEH#1 3.5 MPH
 VEH#2 -26.0 MPH
 CLOSING VELOCITY (LINEAR MOMENTUM)
 47.4 MPH

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?P

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
 (ANSWER YES OR NO)
 ?N

SUMMARY OF CRASH 3 RESULTS

RICSAC #2 CHEVELLE VS PINTO

VEHICLE # 1

```

*****
*          *          *          *
*  IMPACT  *          *          *
*  SPEED   *  SPEED CHANGE *          *
*  MPH     *  MPH         *          *
*          *          *          *
*          *          *          *
*          *          *          *
*  FWD  *  LAT *  TOTAL *  LONG. *  LATERAL *  RESULTS
*  *    *    *    *    *    *
*          *          *          *
*          *          *          *
*  27.9 *  0.0 *  20.8 * -19.7 *   6.8 *  SPINOUT TRAJECTORIES AND
*          *          *          *  CONSERVATION OF LINEAR
*          *          *          *  MOMENTUM
*          *          *          *
*          *          *          *
*          *          *          *
*          *          *          *  SPINOUT TRAJECTORIES AND
*          *          *          *  DAMAGE
*          *          *          *  2-16
*          *          *          *
*****

```


XC10'	=	-11.2 FT.	XC20'	=	0.0 FT.
YC10'	=	8.5 FT.	YC20'	=	0.0 FT.
PSI10	=	-30.0 DEGREES	PSI20	=	90.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC
BETA1	=	0.0 DEGREES	BETA2	=	0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	=	-11.2 FT.	XCS2'	=	0.0 FT.
YCS1'	=	8.5 FT.	YCS2'	=	0.0 FT.
PSIS1	=	-30.0 DEG	PSIS2	=	90.0 DEG
US1	=	8.3 MPH	US2	=	9.1 MPH
VS1	=	6.8 MPH	VS2	=	-20.5 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	43.3 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	27.9 MPH	0.0 MPH
VEH#2	32.6 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.1 MPH	-27.0 MPH	15.6 MPH	-30.0 DEG.
VEH#2	46.7 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.8 MPH	-19.7 MPH	6.8 MPH	-18.9 DEG.
VEH#2	31.2 MPH	-23.5 MPH	-20.5 MPH	41.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 33958.2 FT-LB VEH#2 507858.6 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	27.7 MPH
VEH#2	19.7 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	3.5 MPH
VEH#2	-26.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

47.4 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT-----4621.0 LBS.
 CDC-----11FDEW2
 L-----75.5 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT-----3081.0 LBS.
 CDC-----02RDEW4
 L-----118.5 IN.

C1----- .5 IN.
 C2----- 2.4 IN.
 C3----- 3.7 IN.
 C4----- 6.9 IN.
 C5----- 12.0 IN.
 C6----- 16.5 IN.
 D----- 0.0
 RHO----- 1.00 *
 ANG----- -30.0 DEG.
 D'----- 15.0 IN.

C1----- 6.8 IN.
 C2----- 22.8 IN.
 C3----- 23.5 IN.
 C4----- 21.3 IN.
 C5----- 10.0 IN.
 C6----- 0.0 IN.
 D----- 13.7
 RHO----- 1.00 *
 ANG----- 30.0 DEG.
 D'----- 5.6 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	44739.0 LB-SEC**2-IN	I2	=	23530.1 LB-SEC**2-IN
M1	=	11.959 LB-SEC**2/IN	M2	=	7.974 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .50
 LF----- .02
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .02
 LF----- .02
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)

?RE

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
 (ANSWER YES OR NO)

?N

QUESTION NUMBERS?

?32

32. TRAJECTORY SIMULATION? (Y OR N)

?Y

33. STEER ANGLES #1 ?

?0 0 0 0

34. STEER ANGLES #2 ?

?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

36. BOUNDARY POINTS?
?

37. SECONDARY FRICTION COEF.?
?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #2 CHEVELLE VS PINTO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	37.4 MPH	0.0 MPH
VEH#2	52.1 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.1 MPH	-27.0 MPH	15.6 MPH	-30.0 DEG.
VEH#2	46.7 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.8 MPH	-27.4 MPH	16.0 MPH	-30.3 DEG.
VEH#2	47.6 MPH	-41.4 MPH	-23.6 MPH	29.7 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 33958.2 FT-LB VEH#2 507858.6 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 37.1 MPH

VEH#2 31.5 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 4.7 MPH

VEH#2 -41.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

68.5 MPH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

RICSAC #2 CHEVELLE VS PINTO

```

*****
*                                     *
*      IMPACT                        *                                     *
*      SPEED                        *   SPEED CHANGE                     *
*      MPH                         *   MPH                               *
*                                     *   BASIS                           *
*                                     *                                     *
*****                                OF                                  *****
*      *      *      *      *      *                                     *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS                          *
*      *      *      *      *      *                                     *
*****                                *****
*      *      *      *      *      *                                     *
*      *      *      *      *      * SPINOUT TRAJECTORIES AND          *
* 37.4 * 0.0 * 31.8 * -27.4 * 16.0 * CONSERVATION OF LINEAR             *
*      *      *      *      *      * MOMENTUM                          *
*      *      *      *      *      *                                     *
*****                                *****
*      *      *      *      *      *                                     *
*      *      *      *      *      * SPINOUT TRAJECTORIES AND          *
*      *      *      *      *      * DAMAGE                             *
*      *      *      *      *      *                                     *
*****                                *****
*      *      *      *      *      *                                     *
*      31.1 * -27.0 * 15.6 * DAMAGE DATA ONLY                       *
*      *      *      *      *      *                                     *
*****

```

* 2-21 *

SCENE INFORMATION

VEHICLE # 2

COLLISION CONDITIONS

VEHICLE # 2

SEPARATION CONDITIONS

XCS1'	=	-11.2 FT.		XCS2'	=	0.0 FT.
YCS1'	=	8.5 FT.		YCS2'	=	0.0 FT.
PSIS1	=	-30.0 DEG	2-22	PSIS2	=	90.0 DEG
US1	=	10.0 MPH		US2	=	10.7 MPH

VS1 = 16.0 MPH
PSISD1 = 0.0 DEG/SEC

VS2 = -23.6 MPH
PSISD2 = 34.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	37.4 MPH	0.0 MPH
VEH#2	52.1 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.1 MPH	-27.0 MPH	15.6 MPH	-30.0 DEG.
VEH#2	46.7 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.8 MPH	-27.4 MPH	16.0 MPH	-30.3 DEG.
VEH#2	47.6 MPH	-41.4 MPH	-23.6 MPH	29.7 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 33958.2 FT-LB VEH#2 507858.6 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 37.1 MPH

VEH#2 31.5 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 4.7 MPH

VEH#2 -41.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

68.5 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 CONVERGED O.K. +++++

NRUNS(1) = 5

NRUNS(2) = 5

E1(1) = .016

E2(1) = .011

E1(2) = 0.000

E2(2) = 0.000

E1(3) = .884

E2(3) = -.083

E1(4) = 0.000

E2(4) = 0.000

E1(5) = 0.000

E2(5) = 0.000

QMIN1 = .901

QMIN2 = .094

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT----- 4621.0 LBS.
CDC-----11FDEW2
L----- 75.5 IN.

TYPE-----CATEGORY 2
WEIGHT----- 3081.0 LBS.
CDC-----02RDEW4
L----- 118.5 IN.

C1----- .5 IN.
 C2----- 2.4 IN.
 C3----- 3.7 IN.
 C4----- 6.9 IN.
 C5----- 12.0 IN.
 C6----- 16.5 IN.
 D----- 0.0
 RHO----- 1.00 *
 ANG----- -30.0 DEG.
 D'----- 15.0 IN.

C1----- 6.8 IN.
 C2----- 22.8 IN.
 C3----- 23.5 IN.
 C4----- 21.3 IN.
 C5----- 10.0 IN.
 C6----- 0.0 IN.
 D----- 13.7
 RHO----- 1.00 *
 ANG----- 30.0 DEG.
 D'----- 5.6 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
 B1 = 59.2 INCHES
 TR1 = 61.8 INCHES
 I1 = 44739.0 LB-SEC**2-IN
 M1 = 11.959 LB-SEC**2/IN
 XF1 = 98.8 INCHES
 XR1 = -114.0 INCHES
 YS1 = 38.5 INCHES

A2 = 46.3 INCHES
 B2 = 50.1 INCHES
 TR2 = 54.6 INCHES
 I2 = 23530.1 LB-SEC**2-IN
 M2 = 7.974 LB-SEC**2/IN
 XF2 = 83.3 INCHES
 XR2 = -91.6 INCHES
 YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .50
 LF----- .02
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .02
 LF----- .02
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 18.146

#

RUN CRASH3.C0162

CRASH3 15:29 MAR 18, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
TA

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
TNO

1. TITLE?
TRICSAC #3 TORINO VS PINTO

2. CLASS/WEIGHTS?
T4 4949 2 3120

**** ENTERED DATA IS OUTLANDISH ****
CHECK MAGNITUDE OF ENTRY WITH LIMITS SPECIFIED IN MANUAL

2. CLASS/WEIGHTS?
T4 4949 2 3120

3. CDC/PDOF # 1?
T12FZEW10 0

4. CDC/PDOF # 2?
T06BZEW1 170

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
T4 2

6. REST & IMPACT? (Y OR N)
TY

7. REST COORDINATES?
T111.4 2 -4 181.5 6.4 -19

8. IMPACT COORDINATES?
T0 0 0 15 2.2 10

9. ANY SLIP ANGLES? (Y/N)
TN

11. SUSTAINED CONTACT? (Y OR N)
?N

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?N

19. SKIDDING OF # 2? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .09 .09

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .1 .1

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?30

43. END DAMAGE DEPTH #1
?2 2 1.5 1.75 2 2.25

44. END DAMAGE MIDPOINT OFFSET #1
?22

48. END DAMAGE WIDTH #2
?30

49. END DAMAGE DEPTH #2
?6.5 6.75 5.75 5 3.75 3

50. END DAMAGE MIDPOINT OFFSET # 2
?5

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?N

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #3 TORINO VS PINTO

IMPACT SPEED (TRAJECTORY AND DAMAGE)
 FORWARD LATERAL
VEH#1 18.3 MPH 0.0 MPH
VEH#2 4.8 MPH 0.0 MPH

SPEED CHANGE (DAMAGE)
 TOTAL LONG. LAT. ANG.
VEH#1 6.2 MPH -6.2 MPH 0.0 MPH .0 DEG.
VEH#2 9.8 MPH 9.7 MPH -1.7 MPH 170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 6502.7 FT-LB VEH#2 11214.3 FT-LB

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PR

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S


```

*      *      *      *      *      *
*****
*      *      *      *      *
*      9.8 *      9.7 *      -1.7 * DAMAGE DATA ONLY
*      *      *      *      *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	15.00 FT.
IMPACT Y-POSITION	0.00 FT.	2.20 FT.
IMPACT HEADING ANGLE	0.00 DEG.	10.00 DEG.
REST X-POSITION	111.40 FT.	181.50 FT.
REST Y-POSITION	2.00 FT.	6.40 FT.
REST HEADING ANGLE	-4.00 DEG.	-19.00 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	15.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	2.20 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	10.00 DEG.
DIRECTION OF ROTATION	NONE	NONE
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

	VEHICLE # 1	VEHICLE # 2
XC10'	= 0.0 FT.	XC20' = 15.0 FT.
YC10'	= 0.0 FT.	YC20' = 2.2 FT.
PSI10	= 0.0 DEGREES	PSI20 = 10.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1	= 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	= 0.0 FT.	XCS2'	= 15.0 FT.
YCS1'	= 0.0 FT.	YCS2'	= 2.2 FT.
PSIS1	= 0.0 DEG	PSIS2	= 10.0 DEG
US1	= 12.1 MPH	US2	= 14.5 MPH
VS1	= .2 MPH	VS2	= -2.2 MPH
PSISD1	= 0.0 DEG/SEC	PSISD2	= 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	18.3 MPH	0.0 MPH
VEH#2	4.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	6.2 MPH	-6.2 MPH	0.0 MPH	.0 DEG.
VEH#2	9.8 MPH	9.7 MPH	-1.7 MPH	170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 6502.7 FT-LB VEH#2 11214.3 FT-LB

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4949.0 LBS.
CDC-----12FZEW1
L----- 30.0 IN.
C1----- 2.0 IN.
C2----- 2.0 IN.
C3----- 1.5 IN.
C4----- 1.8 IN.
C5----- 2.0 IN.
C6----- 2.3 IN.
D----- 22.0
RHO----- 1.00 *
ANG----- 0.0 DEG.
D'----- 22.3 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
WEIGHT----- 3120.0 LBS.
CDC-----06BZEW1
L----- 30.0 IN.
C1----- 6.5 IN.
C2----- 6.8 IN.
C3----- 5.8 IN.
C4----- 5.0 IN.
C5----- 3.8 IN.
C6----- 3.0 IN.
D----- 5.0
RHO----- 1.00 *
ANG----- 170.0 DEG.
D'----- 3.0 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	47914.6 LB-SEC**2-IN	I2	=	23828.0 LB-SEC**2-IN
M1	=	12.808 LB-SEC**2/IN	M2	=	8.075 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
LF----- .01
RR----- .09
LR----- .09

VEHICLE # 2

RF----- .01
LF----- .01
RR----- .10
LR----- .10

MU----- .87

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?RE

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)

?NO

QUESTION NUMBERS?

?32

32. TRAJECTORY SIMULATION? (Y OR N)

?Y

33. STEER ANGLES #1 ?

?0 0 0 0

34. STEER ANGLES #2 ?

?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)

?N

36. BOUNDARY POINTS?

?

37. SECONDARY FRICTION COEF.?

?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)

?

**** SYNTAX ERROR -- ILLEGAL INPUT ****

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)

?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #3 TORINO VS PINTO

	IMPACT SPEED (TRAJECTORY AND DAMAGE)	
	FORWARD	LATERAL
VEH#1	18.3 MPH	0.0 MPH
VEH#2	5.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)				
	TOTAL	LONG.	LAT.	ANG.
VEH#1	6.2 MPH	-6.2 MPH	0.0 MPH	.0 DEG.
VEH#2	9.8 MPH	9.7 MPH	-1.7 MPH	170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 6502.7 FT-LB VEH#2 11214.3 FT-LB

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?PRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
 (ANSWER YES OR NO)
 ?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #3 TORINO VS PINTO

VEHICLE # 1

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *                                     *
*      MPH        *      MPH                *      BASIS                *
*                                     *      OF                *
*      *          *      *          *      *      RESULTS                *
* FWD * LAT * TOTAL * LONG. * LATERAL *                                     *
*      *          *      *          *      *                                     *
*****
*      *          *      *          *      *      SPINOUT TRAJECTORIES AND *
*      *          *      *          *      *      CONSERVATION OF LINEAR *
*      *          *      *          *      *      MOMENTUM                *
*      *          *      *          *      *                                     *
*****
*      *          *      *          *      *      SPINOUT TRAJECTORIES AND *
* 18.3 * 0.0 * 6.2 * -6.2 * .2 *      *      DAMAGE                *
*      *          *      *          *      *                                     *
*****
*      *          *      *          *      *      DAMAGE DATA ONLY      *
*      *          *      *          *      *                                     *
*****

```

VEHICLE # 2

```

*****
*                               *
*      IMPACT                    *
*      SPEED                     *
*      MPH                      *
*                               *
*****
*                               *
*                                *
*      FWD    LAT   TOTAL     LONG. LATERAL          *
*            *         *        *                   *
*****
*                               *
*                               *
*                               *
*                               *
*                               *
* SPINOUT TRAJECTORIES AND CONSERVATION OF LINEAR MOMENTUM
*
*****
*                               *
*      5.0    *   0.0 *   10.3 *   9.7 *   -3.7 * SPINOUT TRAJECTORIES AND DAMAGE
*            *       *       *       *       *
*            *       *       *       *       *
*****
*                               *
*           *         *         *         *
*           *   9.8 *   9.7 *   -1.7 * DAMAGE DATA ONLY
*           *       *       *       *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	15.00 FT.
IMPACT Y-POSITION	0.00 FT.	2.20 FT.
IMPACT HEADING ANGLE	0.00 DEG.	10.00 DEG.
REST X-POSITION	111.40 FT.	181.50 FT.
REST Y-POSITION	2.00 FT.	6.40 FT.
REST HEADING ANGLE	-4.00 DEG.	-19.00 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	15.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	2.20 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	10.00 DEG.
DIRECTION OF ROTATION	NONE	NONE
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= 0.0 FT.	XC20'	= 15.0 FT.
YC10'	= 0.0 FT.	YC20'	= 2.2 FT.
PSI10	= 0.0 DEGREES	PSI20	= 10.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC

2-33

BETA1 = 0.0 DEGREES BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.	XCS2'	=	15.0 FT.
YCS1'	=	0.0 FT.	YCS2'	=	2.2 FT.
PSIS1	=	0.0 DEG	PSIS2	=	10.0 DEG
US1	=	12.1 MPH	US2	=	14.7 MPH
VS1	=	.2 MPH	VS2	=	-3.7 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	18.3 MPH	0.0 MPH
VEH#2	5.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	6.2 MPH	-6.2 MPH	0.0 MPH	.0 DEG.
VEH#2	9.8 MPH	9.7 MPH	-1.7 MPH	170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 6502.7 FT-LB VEH#2 11214.3 FT-LB

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 CONVERGED O.K. ++++

++++ VEHICLE # 2 DID NOT CONVERGE ++++

NRUNS(1) =	1	NRUNS(2) =	5
E1(1) =	.047	E2(1) =	.156
E1(2) =	0.000	E2(2) =	0.000
E1(3) =	.000	E2(3) =	.000
E1(4) =	.000	E2(4) =	-.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.047	QMIN2 =	.156

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT-----4949.0 LBS.
CDC-----12FZEW1
L-----30.0 IN.
C1-----2.0 IN.
C2-----2.0 IN.
C3-----1.5 IN.
C4-----1.8 IN.
C5-----2.0 IN.
C6-----2.3 IN.
D-----22.0
RHO-----1.00 *
ANG-----0.0 DEG.

VEHICLE # 2

TYPE-----CATEGORY 2
WEIGHT-----3120.0 LBS.
CDC-----06BZEW1
L-----30.0 IN.
C1-----6.5 IN.
C2-----6.8 IN.
C3-----5.8 IN.
C4-----5.0 IN.
C5-----3.8 IN.
C6-----3.0 IN.
D-----5.0
RHO-----1.00
ANG-----170.0 DEG.

D'----- 22.3 IN.

D'----- 3.0 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	47914.6 LB-SEC**2-IN	I2	=	23828.0 LB-SEC**2-IN
M1	=	12.808 LB-SEC**2/IN	M2	=	8.075 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.09
LR-----	.09

MU----- .87

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	.10
LR-----	.10

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 58.850

#

RUN CRASH3.C0162

CRASH3 13:28 MAR 23, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?RICSAC #4 TORINO VS PINTO

2. CLASS/WEIGHTS?
?4 4980 2 3190

3. CDC/PDOF # 1?
?12FZEW30

4. CDC/PDOF # 2?
?4

3. CDC/PDOF # 1?
?12FZEW3 0

4. CDC/PDOF # 2?
?05BYEW5 170

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?4 2

6. REST & IMPACT? (Y OR N)
?YES

7. REST COORDINATES?
?42.8 54.5 137.5 63.9 62.5 88

8. IMPACT COORDINATES?
?0 0 1 16.4 3.4 10

**** NOTE TO USER ****

YOUR DIRECTIONS OF PRINCIPAL FORCE HAVE BEEN ADJUSTED
TO BE 180 DEGREES
APART.

NEW PDOF ANGLES ARE: VEH 1: ²⁻³⁶ -.51 DEG VEH2: 170.49 DEG

9. ANY SLIP ANGLES? (Y/N)
?N
11. SUSTAINED CONTACT? (Y OR N)
?N
12. SKIDDING OF # 1? (Y OR N)
?Y
13. SKIDDING STOP BEFORE REST? (Y OR N)
?Y
14. END OF SKIDDING COORDINATES?
?20 5 10
15. CURVED PATH? (Y OR N)
?N
17. ROTATION DIRECTION #1?
?CW
18. MORE THAN 360 DEG? (Y OR N)
?N
19. SKIDDING OF # 2? (Y OR N)
?Y
20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y
21. END OF SKIDDING COORDINATES?
?35 2 10
22. CURVED PATH? (Y OR N)
?N
24. ROTATION DIRECTION # 2?
?CW
25. MORE THAN 360 DEG? (Y OR N)
?N
26. TIRE-GROUND FRICTION?
?.87
27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
? .01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
? .01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
? N

38. DAMAGE DIMENSIONS? (Y OR N)
? Y

42. END DAMAGE WIDTH #1
? 41.5

43. END DAMAGE DEPTH #1
? 6.3 7.8 9.8 12.5 14.8 18.3

44. END DAMAGE MIDPOINT OFFSET #1
? 16.1

48. END DAMAGE WIDTH #2
? 41.8

49. END DAMAGE DEPTH #2
? 36 31.8 29 24 19.5 14.8

50. END DAMAGE MIDPOINT OFFSET # 2
? -9.1

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
? NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOFF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

	FORWARD	LATERAL
VEH#1	33.2 MPH	0.0 MPH
VEH#2	-5.8 MPH	0.0 MPH

	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.6 MPH	-15.6 MPH	.1 MPH	-.5 DEG.
VEH#2	24.3 MPH	24.0 MPH	-4.0 MPH	170.5 DEG.

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRIN

```

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #4 TORINO VS PINTO

```

*****
*                                     *
*      IMPACT          *                                     *
*      SPEED           *      SPEED CHANGE                 *
*      MPH             *      MPH                           *
*                     *                                     *
*                                     *      BASIS           *
*****
*                                     *      OF              *
*      *      *      *      *      *      *               *
* FWD * LAT * TOTAL * LONG. * LATERAL *      RESULTS       *
*      *      *      *      *      *                   *
*****
*      *      *      *      *      *      *               *
*      *      *      *      *      *      * SPINOUT TRAJECTORIES AND *
*      *      *      *      *      * CONSERVATION OF LINEAR        *
*      *      *      *      *      * MOMENTUM                      *

```

IMPACT X-POSITION	0.00	FT.	16.40	FT.
IMPACT Y-POSITION	0.00	FT.	3.40	FT.
IMPACT HEADING ANGLE	1.00	DEG.	10.00	DEG.
REST X-POSITION	42.80	FT.	63.90	FT.
REST Y-POSITION	54.50	FT.	62.50	FT.
REST HEADING ANGLE	137.48	DEG.	87.99	DEG.
END-OF-ROTATION X-POSITION	20.00	FT.	35.00	FT.
END-OF-ROTATION Y-POSITION	5.00	FT.	2.00	FT.
END-OF-ROTATION HEADING ANGLE	10.00	DEG.	10.00	DEG.
DIRECTION OF ROTATION	2-40	CW	CW	
AMOUNT OF ROTATION	<360		<360	

COLLISION CONDITIONS

VEHICLE # 1

XC10' = 0.0 FT.
 YC10' = 0.0 FT.
 PSI10 = 1.0 DEGREES
 PSI1D0 = 0.0 DEG/SEC
 BETA1 = 0.0 DEGREES

VEHICLE # 2

XC20' = 16.4 FT.
 YC20' = 3.4 FT.
 PSI20 = 10.0 DEGREES
 PSI2D0 = 0.0 DEG/SEC
 BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 0.0 FT.
 YCS1' = 0.0 FT.
 PSIS1 = 1.0 DEG
 US1 = 17.6 MPH
 VS1 = 4.1 MPH
 PSISD1 = 36.3 DEG/SEC

XCS2' = 16.4 FT.
 YCS2' = 3.4 FT.
 PSIS2 = 10.0 DEG
 US2 = 18.2 MPH
 VS2 = -4.6 MPH
 PSISD2 = 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	33.2 MPH	0.0 MPH
VEH#2	-5.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.6 MPH	-15.6 MPH	.1 MPH	-.5 DEG.
VEH#2	24.3 MPH	24.0 MPH	-4.0 MPH	170.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 28909.8 FT-LB VEH#2 92150.4 FT-LB

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT-----4980.0 LBS.
 CDC-----12FZEW3
 L-----41.5 IN.
 C1-----6.3 IN.
 C2-----7.8 IN.
 C3-----9.8 IN.
 C4-----12.5 IN.
 C5-----14.8 IN.
 C6-----18.3 IN.
 D-----16.1
 RHO-----1.00
 ANG------.5 DEG.
 D'-----19.7 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT-----3190.0 LBS.
 CDC-----05BYEWS
 L-----41.8 IN.
 C1-----36.0 IN.
 C2-----31.8 IN.
 C3-----29.0 IN.
 C4-----24.0 IN.
 C5-----19.5 IN.
 C6-----14.8 IN.
 D-----9.1
 RHO-----1.00
 ANG-----170.5 DEG.
 D'-----11.9 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	48214.8 LB-SEC**2-IN	I2	=	24362.6 LB-SEC**2-IN
M1	=	12.888 LB-SEC**2/IN	M2	=	8.256 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?RERUN

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

QUESTION NUMBERS?
?32

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

36. BOUNDARY POINTS?
?

37. SECONDARY FRICTION COEF.? 2-42
?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOFF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

RICSAC #4 TORINO VS PINTO

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	25.6 MPH	0.0 MPH
VEH#2	-5.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.6 MPH	-15.6 MPH	.1 MPH	-.5 DEG.
VEH#2	24.3 MPH	24.0 MPH	-4.0 MPH	170.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 28909.8 FT-LB VEH#2 92150.4 FT-LB

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRIN

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOFF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

RICSAC #4 TORINO VS. FINO

VEHICLE # 1

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED       *          SPEED CHANGE              *
*      MPH         *          MPH                      *
*               *          BASIS                        *
* ***** *          OF                               *
*      *      *      *      *      *                  *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS        *
*      *      *      *      *      *                  *
*****
*      *      *      *      *      *                  *
*      *      *      *      *      * SPINOUT TRAJECTORIES AND *
*      *      *      *      *      * CONSERVATION OF LINEAR   *
*      *      *      *      *      * MOMENTUM                 *
*      *      *      *      *      *                          *
*****
*      *      *      *      *      *                  *
* 25.6 * 0.0 * 21.5 * -15.6 * 14.8 * SPINOUT TRAJECTORIES AND *
*      *      *      *      *      * DAMAGE                   *
*      *      *      *      *      *                          *
*****
*      *      *      *      *      *                  *
*      *      *      *      *      * .1 * DAMAGE DATA ONLY    *
*      *      *      *      *      *                          *
*****

```

VEHICLE # 2

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *                                     *
*      MPH      *      SPEED CHANGE      *                                     *
*      *      *      MPH      *                                     *
*      *      *      *      BASIS      *                                     *
*****
*      *      *      *      OF      *                                     *
*      FWD * LAT * TOTAL * LONG. * LATERAL *      RESULTS      *                                     *
*      *      *      *      *      *      *                                     *
*****
*      *      *      *      *      *      *      SPINOUT TRAJECTORIES AND *
*      *      *      *      *      *      CONSERVATION OF LINEAR      *
*      *      *      *      *      *      MOMENTUM      *                                     *
*****
*      *      *      *      *      *      *      SPINOUT TRAJECTORIES AND *
*      -5.8 * 0.0 * 24.4 * 24.0 * -4.6 *      DAMAGE      *                                     *
*      *      *      *      2-44      *                                     *

```

```

*      *      *      *      *      *
*****
*      *      *      *      *
*  24.3 *  24.0 *  -4.0 *  DAMAGE DATA ONLY
*      *      *      *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	16.40 FT.
IMPACT Y-POSITION	0.00 FT.	3.40 FT.
IMPACT HEADING ANGLE	1.00 DEG.	10.00 DEG.
REST X-POSITION	42.80 FT.	63.90 FT.
REST Y-POSITION	54.50 FT.	62.50 FT.
REST HEADING ANGLE	137.48 DEG.	87.99 DEG.
END-OF-ROTATION X-POSITION	20.00 FT.	35.00 FT.
END-OF-ROTATION Y-POSITION	5.00 FT.	2.00 FT.
END-OF-ROTATION HEADING ANGLE	10.00 DEG.	10.00 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 16.4 FT.
YC10' = 0.0 FT.	YC20' = 3.4 FT.
PSI10 = 1.0 DEGREES	PSI20 = 10.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 0.0 FT.	XCS2' = 16.4 FT.
YCS1' = 0.0 FT.	YCS2' = 3.4 FT.
PSIS1 = 1.0 DEG	PSIS2 = 10.0 DEG
US1 = 10.0 MPH	US2 = 18.2 MPH
VS1 = 14.8 MPH	VS2 = -4.6 MPH
PSISD1 = 44.5 DEG/SEC	PSISD2 = 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	25.6 MPH	0.0 MPH
VEH#2	-5.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.6 MPH	-15.6 MPH	.1 MPH	-.5 DEG.
VEH#2	24.3 MPH	24.0 MPH	-4.0 MPH	170.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 28909.8 FT-LB VEH#2 92150.4 FT-LB

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 DID NOT CONVERGE +++++

NRUNS(1) =	5	NRUNS(2) =	5
E1(1) =	.385	E2(1) =	1.128
E1(2) =	.495	E2(2) =	.963
E1(3) =	.816	E2(3) =	.999
E1(4) =	-1.751	E2(4) =	-.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	2.324	QMIN2 =	2.608

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----	CATEGORY 4
WEIGHT-----	4980.0 LBS.
CDC-----	12FZEW3
L-----	41.5 IN.
C1-----	6.3 IN.
C2-----	7.8 IN.
C3-----	9.8 IN.
C4-----	12.5 IN.
C5-----	14.8 IN.
C6-----	18.3 IN.
D-----	16.1
RHO-----	1.00 *
ANG-----	-.5 DEG.
D'-----	19.7 IN.

VEHICLE # 2

TYPE-----	CATEGORY 2
WEIGHT-----	3190.0 LBS.
CDC-----	05BYEW5
L-----	41.8 IN.
C1-----	36.0 IN.
C2-----	31.8 IN.
C3-----	29.0 IN.
C4-----	24.0 IN.
C5-----	19.5 IN.
C6-----	14.8 IN.
D-----	-9.1
RHO-----	1.00 *
ANG-----	170.5 DEG.
D'-----	-11.9 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 =	54.7 INCHES	A2 =	46.3 INCHES
B1 =	59.2 INCHES	B2 =	50.1 INCHES
TR1 =	61.8 INCHES	TR2 =	54.6 INCHES
I1 =	48214.8 LB-SEC**2-IN	I2 =	24362.6 LB-SEC**2-IN
M1 =	12.888 LB-SEC**2/IN	M2 =	8.256 LB-SEC**2/IN
XF1 =	98.8 INCHES	XF2 =	83.3 INCHES
XR1 =	-114.0 INCHES	XR2 =	-91.6 INCHES
YS1 =	38.5 INCHES	YS2 =	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 92.604

#

RUN CRASH3.CO_0162

CRASH3 14:46 MAR 19, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC #5 TORINO VS CIC_VIC

2. CLASS/WEIGHTS?
?4 1_4600 1 2530

3. CDC/PDOF # 1?
?12FZEW1 0

4. CDC/PDOF # 2?
?05BDEW8 170

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?4 1

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?241.6 0. 3. 56.9 39 282

8. IMPACT COORDINATES?
?0 0 0 14.9 3.4 10

9. ANY SLIP ANGLES? (Y/N)
?N

11. SUSTAINED CONTACT? (Y OR N)
?N

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)

?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?55 23 260

22. CURVED PATH? (Y OR N)
?Y

23. POINT ON CURVE?
?40 10

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.2 .2 .01 1.

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?33.5

43. END DAMAGE DEPTH #1
?1.4 1.4 2. 2.1 2.3 2.9

44. END DAMAGE MIDPOINT OFFSET #1
?20.3

48. END DAMAGE WIDTH #2
?53

49. END DAMAGE DEPTH #2
?36 36.5 31.5 23 13.3 6

50. END DAMAGE MIDPOINT OFFSET # 2
?-1.6

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?N

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #5 TORINO VS CIVIC

	IMPACT SPEED (TRAJECTORY AND DAMAGE)	
	FORWARD	LATERAL
VEH#1	40.9 MPH	0.0 MPH
VEH#2	-2.4 MPH	0.0 MPH

	SPEED CHANGE (DAMAGE)			
	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.2 MPH	-15.2 MPH	0.0 MPH	.0 DEG.
VEH#2	27.6 MPH	27.2 MPH	-4.8 MPH	170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 7403.4 FT-LB VEH#2 109743.5 FT-LB

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO) 2-50

SUMMARY OF CRASH3 RESULTS

VEHICLE # 1

VEHICLE # 2

[illegible]

```

*          *          *          *          *          *          *
*****
*          *          *          *          *          *          *
*          *          *          *          *          * SPINOUT TRAJECTORIES AND *
*          *          *          *          *          * CONSERVATION OF LINEAR *
*          *          *          *          *          * MOMENTUM *
*          *          *          *          *          *
*****
*          *          *          *          *          *          *
* -2.4 * 0.0 * 28.1 * 27.2 * 7.1 * SPINOUT TRAJECTORIES AND *
*          *          *          *          *          * DAMAGE *
*          *          *          *          *          *
*****
*          *          *          *          *          *          *
*          *          *          *          *          *
* 27.6 * 27.2 * -4.8 * DAMAGE DATA ONLY *
*          *          *          *          *          *
*****

```

SCENE INFORMATION

VEHICLE # 1

VEHICLE # 2

IMPACT X-POSITION	0.00	FT.	14.90	FT.
IMPACT Y-POSITION	0.00	FT.	3.40	FT.
IMPACT HEADING ANGLE	0.00	DEG.	10.00	DEG.
REST X-POSITION	241.60	FT.	56.90	FT.
REST Y-POSITION	0.00	FT.	39.00	FT.
REST HEADING ANGLE	3.00	DEG.	281.97	DEG.
END-OF-ROTATION X-POSITION	0.00	FT.	55.00	FT.
END-OF-ROTATION Y-POSITION	0.00	FT.	23.00	FT.
END-OF-ROTATION HEADING ANGLE	0.00	DEG.	259.97	DEG.
DIRECTION OF ROTATION	CW		CW	
AMOUNT OF ROTATION	<360		<360	

COLLISION CONDITIONS

VEHICLE # 1

VEHICLE # 2

XC10'	=	0.0 FT.	XC20'	=	14.9 FT.
YC10'	=	0.0 FT.	YC20'	=	3.4 FT.
PSI10	=	0.0 DEGREES	PSI20	=	10.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC
BETA1	=	0.0 DEGREES	BETA2	=	0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.	XCS2'	=	14.9 FT.
YCS1'	=	0.0 FT.	YCS2'	=	3.4 FT.
PSIS1	=	0.0 DEG	PSIS2	=	10.0 DEG
US1	=	25.7 MPH	US2	=	24.8 MPH
VS1	=	0.0 MPH	VS2	=	7.1 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	246.2 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	40.9 MPH	0.0 MPH
VEH#2	-2.4 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.2 MPH	-15.2 MPH	0.0 MPH	.0 DEG.
VEH#2	27.6 MPH	27.2 MPH	-4.8 MPH	170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 7403.4 FT-LB VEH#2 109743.5 FT-LB

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT-----4600.0 LBS.
 CDC-----12FZEW1
 L-----33.5 IN.
 C1-----1.4 IN.
 C2-----1.4 IN.
 C3-----2.0 IN.
 C4-----2.1 IN.
 C5-----2.3 IN.
 C6-----2.9 IN.
 D-----20.3
 RHO-----1.00 *
 ANG-----0.0 DEG.
 D'-----22.3 IN.

VEHICLE # 2

TYPE-----CATEGORY 1
 WEIGHT-----2530.0 LBS.
 CDC-----05BDEW8
 L-----53.0 IN.
 C1-----36.0 IN.
 C2-----36.5 IN.
 C3-----31.5 IN.
 C4-----23.0 IN.
 C5-----13.3 IN.
 C6-----6.0 IN.
 D-----1.6
 RHO-----1.00 *
 ANG-----170.0 DEG.
 D'-----7.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
 B1 = 59.2 INCHES
 TR1 = 61.8 INCHES
 I1 = 44535.7 LB-SEC**2-IN
 M1 = 11.905 LB-SEC**2/IN
 XF1 = 98.8 INCHES
 XR1 = -114.0 INCHES
 YS1 = 38.5 INCHES

A2 = 45.1 INCHES
 B2 = 48.1 INCHES
 TR2 = 51.1 INCHES
 I2 = 13134.5 LB-SEC**2-IN
 M2 = 6.548 LB-SEC**2/IN
 XF2 = 76.0 INCHES
 XR2 = -83.8 INCHES
 YS2 = 30.4 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----.01
 LF-----.01
 RR-----.20
 LR-----.20

VEHICLE # 2

RF-----.20
 LF-----.20
 RR-----.01
 LR-----1.00

MU-----.87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?RERUN

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

QUESTION NUMBERS?
?32

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

36. BOUNDARY POINTS?
?

37. SECONDARY FRICTION COEF.?
?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #5 TORINO VS CIVIC

	IMPACT SPEED (TRAJECTORY AND DAMAGE)	
	FORWARD	LATERAL
VEH#1	40.4 MPH	0.0 MPH
VEH#2	1.1 MPH	0.0 MPH

2-54

*		*		*		*
* IMPACT	*			*		*
* SPEED	*	SPEED CHANGE	*			*
* MPH	*	MPH	*	BASIS		*
*	*		*			*
*****				OF		*
*	*	*	*	*		*
* FWD * LAT * TOTAL * LONG. * LATERAL *					RESULTS	*
*	*	*	*	*		*
*****						*
*	*	*	*	*		*
*	*	*	*	*	SPINOUT TRAJECTORIES AND	*
*	*	*	*	*	CONSERVATION OF LINEAR	*
*	*	*	*	*	MOMENTUM	*
*	*	*	*	*		*

*	*	*	*	*		*
* 40.4 * 0.0 * 15.2 * -15.2 * 0.0 *					SPINOUT TRAJECTORIES AND	*
*	*	*	*	*	DAMAGE	*
*	*	*	*	*		*
*****						*
	*	*	2-55	*		*
	*	15.2 * -15.2 *	0.0 *	DAMAGE DATA ONLY		*

XC10'	=	0.0 FT.	2-56	XC20'	=	14.9 FT.
YC10'	=	0.0 FT.		YC20'	=	3.4 FT.

PSI10	=	0.0 DEGREES	PSI20	=	10.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC
BETA1	=	0.0 DEGREES	BETA2	=	0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.	XCS2'	=	14.9 FT.
YCS1'	=	0.0 FT.	YCS2'	=	3.4 FT.
PSIS1	=	0.0 DEG	PSIS2	=	10.0 DEG
US1	=	25.2 MPH	US2	=	28.3 MPH
VS1	=	0.0 MPH	VS2	=	9.1 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	264.6 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	40.4 MPH	0.0 MPH
VEH#2	1.1 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.2 MPH	-15.2 MPH	0.0 MPH	.0 DEG.
VEH#2	27.6 MPH	27.2 MPH	-4.8 MPH	170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 7403.4 FT-LB VEH#2 109743.5 FT-LB

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++
 +++++ VEHICLE # 2 DID NOT CONVERGE +++++

NRUNS(1) =	5	NRUNS(2) =	5
E1(1) =	.000	E2(1) =	.076
E1(2) =	0.000	E2(2) =	.223
E1(3) =	1.000	E2(3) =	.010
E1(4) =	0.000	E2(4) =	-.074
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	1.000	QMIN2 =	.234

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT----- 4600.0 LBS.
 CDC-----12FZEW1
 L----- 33.5 IN.
 C1----- 1.4 IN.
 C2----- 1.4 IN.
 C3----- 2.0 IN.
 C4----- 2.1 IN.
 C5----- 2.3 IN.
 C6----- 2.9 IN.
 D----- 20.3

VEHICLE # 2

TYPE-----CATEGORY 1
 WEIGHT----- 2530.0 LBS.
 CDC-----05BDEW8
 L----- 53.0 IN.
 C1----- 36.0 IN.
 C2----- 36.5 IN.
 C3----- 31.5 IN.
 C4----- 23.0 IN.
 C5----- 13.3 IN.
 C6----- 6.0 IN.
 D----- -1.6

RHO----- 1.00 *
 ANG----- 0.0 DEG.
 D'----- 22.3 IN.

RHO----- 1.00 *
 ANG----- 170.0 DEG.
 D'----- -7.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	45.1 INCHES
B1	=	59.2 INCHES	B2	=	48.1 INCHES
TR1	=	61.8 INCHES	TR2	=	51.1 INCHES
I1	=	44535.7 LB-SEC**2-IN	I2	=	13134.5 LB-SEC**2-IN
M1	=	11.905 LB-SEC**2/IN	M2	=	6.548 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	76.0 INCHES
XR1	=	-114.0 INCHES	XR2	=	-83.8 INCHES
YS1	=	38.5 INCHES	YS2	=	30.4 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.20
LF-----	.01	LF-----	.20
RR-----	.20	RR-----	.01
LR-----	.20	LR-----	1.00
MU----- .87			

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 55.761

#

RUN CRASH3.C0162

CRASH3 15:05 MAR 19, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?RICSAC #6 CHEVELLE VS RABBIT

2. CLASS/WEIGHTS?
?4 4300 2 2623

3. CDC/PDOF # 1?
?11FZEW1 -30

4. CDC/PDOF # 2?
?02RDEW3 30

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?4 2

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?60 11 15 20 21 242

8. IMPACT COORDINATES?
?0 0 0 11.1 2.67 120

9. ANY SLIP ANGLES? (Y/N)
?N

11. SUSTAINED CONTACT? (Y OR N)
?N

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?54.5

43. END DAMAGE DEPTH #1
?.5 .5 1.25 1.5 1.75 2.25

44. END DAMAGE MIDPOINT OFFSET #1
?9.75

45. SIDE DAMAGE WIDTH #2
777

46. SIDE DAMAGE DEPTH #2
74 12 17.8 19.3 17. 8.25

47. SIDE DAMAGE MIDPOINT OFFSET #2
7-3.25

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
7NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #6 CHEVELLE VS RABBIT

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	24.4 MPH	0.0 MPH
VEH#2	24.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.3 MPH	-18.5 MPH	10.7 MPH	-30.0 DEG.
VEH#2	35.0 MPH	-30.3 MPH	-17.5 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	14.5 MPH	-13.6 MPH	5.1 MPH	-20.6 DEG.
VEH#2	23.8 MPH	-18.4 MPH	-15.1 MPH	39.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 10718.4 FT-LB VEH#2 249996.7 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 23.7 MPH
VEH#2 6.9 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -5.7 MPH
VEH#2 -23.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
30.7 MPH

ENTER TYPE OF CRASH RUN? 2-61
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?N

RICSAC #6 CHEVELLE VS RABBIT

```

*****
*                                     *
*      IMPACT                        *
*      SPEED                        *
*      MPH                         *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS
*     *    *    *    *    *          *
*                                     *
*                                     *
*                                     *
* 24.4 * 0.0 * 14.5 * -13.6 * 5.1 * SPINOUT TRAJECTORIES AND
*     *    *    *    *    * CONSERVATION OF LINEAR
*     *    *    *    *    * MOMENTUM
*     *    *    *    *    *
*                                     *
*     *    *    *    *    *
*     *    *    *    *    * SPINOUT TRAJECTORIES AND
*     *    *    *    *    * DAMAGE
*     *    *    *    *    *
*                                     *
*     *    *    *    *    *
*     *    *    *    *    * DAMAGE DATA ONLY
*     *    *    *    *    *
*                                     *

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*****
*                                     *
*      IMPACT      *          2-62      *
*      SPEED      *      SPEED CHANGE  *
*                                     *
*****

```

MPH	MPH	BASIS

FWD	LAT	TOTAL LONG. LATERAL

24.5	0.0	23.8 -18.4 -15.1

SPINOUT TRAJECTORIES AND CONSERVATION OF LINEAR MOMENTUM		

SPINOUT TRAJECTORIES AND DAMAGE		

35.0 -30.3 -17.5		

DAMAGE DATA ONLY		

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	11.10 FT.
IMPACT Y-POSITION	0.00 FT.	2.67 FT.
IMPACT HEADING ANGLE	0.00 DEG.	119.99 DEG.
REST X-POSITION	60.00 FT.	20.00 FT.
REST Y-POSITION	11.00 FT.	21.00 FT.
REST HEADING ANGLE	15.00 DEG.	241.97 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	
END-OF-ROTATION Y-POSITION	0.00 FT.	
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 11.1 FT.
YC10' = 0.0 FT.	YC20' = 2.7 FT.
PSI10 = 0.0 DEGREES	PSI20 = 120.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 0.0 FT.	XCS2' = 11.1 FT.
YCS1' = 0.0 FT.	YCS2' = 2.7 FT.
PSIS1 = 0.0 DEG	PSIS2 = 120.0 DEG
US1 = 10.8 MPH	US2 = 6.1 MPH
VS1 = 5.1 MPH	VS2 = -15.1 MPH
PSISD1 = 0.0 DEG/SEC	PSISD2 = 135.4 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	24.4 MPH	0.0 MPH
VEH#2	24.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.3 MPH	-18.5 MPH	10.7 MPH	-30.0 DEG.
VEH#2	35.0 MPH	-30.3 MPH	-17.5 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	14.5 MPH	-13.6 MPH	5.1 MPH	-20.6 DEG.
VEH#2	23.8 MPH	-18.4 MPH	-15.1 MPH	39.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 10718.4 FT-LB VEH#2 249996.7 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 23.7 MPH

VEH#2 6.9 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -5.7 MPH

VEH#2 -23.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

30.7 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT----- 4300.0 LBS.
 CDC-----11FZEW1
 L----- 54.5 IN.
 C1----- .5 IN.
 C2----- .5 IN.
 C3----- 1.3 IN.
 C4----- 1.5 IN.
 C5----- 1.8 IN.
 C6----- 2.3 IN.
 D----- 9.8
 RHO----- 1.00 *
 ANG----- -30.0 DEG.
 D'----- 16.4 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT----- 2623.0 LBS.
 CDC-----02RDEW3
 L----- 77.0 IN.
 C1----- 4.0 IN.
 C2----- 12.0 IN.
 C3----- 17.8 IN.
 C4----- 19.3 IN.
 C5----- 17.0 IN.
 C6----- 8.3 IN.
 D----- -3.3
 RHO----- 1.00 *
 ANG----- 30.0 DEG.
 D'----- -.5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES 2-64 A2 = 46.3 INCHES

B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	41631.2 LB-SEC**2-IN	I2	=	20032.3 LB-SEC**2-IN
M1	=	11.128 LB-SEC**2/IN	M2	=	6.788 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?REU

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
 (ANSWER YES OR NO)
 ?NO

QUESTION NUMBERS?
 ?32

32. TRAJECTORY SIMULATION? (Y OR N)
 ?YES

33. STEER ANGLES #1 ?
 ?0 0 0 0

34. STEER ANGLES #2 ?
 ?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
 ?N

36. BOUNDARY POINTS?
 ?

37. SECONDARY FRICTION COEF.?
 ?

THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?N

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #6 CHEVELLE VS RABBIT

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	26.5 MPH	0.0 MPH
VEH#2	38.6 MPH	0.0 MPH

} ✓ ENSCØZS

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.3 MPH	-18.5 MPH	10.7 MPH	-30.0 DEG.
VEH#2	35.0 MPH	-30.3 MPH	-17.5 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	19.1 MPH	-15.0 MPH	11.8 MPH	-38.1 DEG.
VEH#2	31.3 MPH	-29.1 MPH	-11.7 MPH	21.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 10718.4 FT-LB VEH#2 249996.7 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	25.8 MPH
VEH#2	10.9 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	-6.2 MPH
VEH#2	-37.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
36.7 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?N

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #6 CHEVELLE VS RABBIT

VEHICLE # 1

```

*****
*          *          *
*  IMPACT  *          *
*  SPEED   *  SPEED CHANGE  *
*  MPH     *  MPH          *          BASIS
*          *          *          *
*****          OF
*          *          *          *
*  FWD  *  LAT  *  TOTAL *  LONG. *  LATERAL *  RESULTS
*          *          *          *
*****
*          *          *          *
*          *          *          *
*  26.5 *  0.0 *  19.1 * -15.0 *  11.8 *  SPINOUT TRAJECTORIES AND
*          *          *          *  CONSERVATION OF LINEAR
*          *          *          *  MOMENTUM
*          *          *          *
*****
*          *          *          *
*          *          *          *
*          *          *          *  SPINOUT TRAJECTORIES AND
*          *          *          *  DAMAGE
*          *          *          *
*****
*          *          *          *
*          *          *          *  21.3 * -18.5 *  10.7 * DAMAGE DATA ONLY
*          *          *          *
*****

```

VEHICLE # 2

```

*****
*          *          *
*  IMPACT  *          *
*  SPEED   *  SPEED CHANGE  *
*  MPH     *  MPH          *          BASIS
*          *          *          *
*****          OF
*          *          *          *
*  FWD  *  LAT  *  TOTAL *  LONG. *  LATERAL *  RESULTS
*          *          *          *
*****
*          *          *          *
*          *          *          *
*  38.6 *  0.0 *  31.3 * -29.1 * -11.7 *  SPINOUT TRAJECTORIES AND
*          *          *          *  CONSERVATION OF LINEAR
*          *          *          *  MOMENTUM
*          *          *          *
*****
*          *          *          *  2-67 *****
*          *          *          *

```

```

*      *      *      *      *      * SPINOUT TRAJECTORIES AND *
*      *      *      *      *      * DAMAGE *
*      *      *      *      *      *
*****
*      *      *      *      *
*      *      *      *      *
*      *      *      *      *
*      *      *      *      *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	11.10 FT.
IMPACT Y-POSITION	0.00 FT.	2.67 FT.
IMPACT HEADING ANGLE	0.00 DEG.	119.99 DEG.
REST X-POSITION	60.00 FT.	20.00 FT.
REST Y-POSITION	11.00 FT.	21.00 FT.
REST HEADING ANGLE	15.00 DEG.	241.97 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	
END-OF-ROTATION Y-POSITION	0.00 FT.	
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= 0.0 FT.	XC20'	= 11.1 FT.
YC10'	= 0.0 FT.	YC20'	= 2.7 FT.
PSI10	= 0.0 DEGREES	PSI20	= 120.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC
BETA1	= 0.0 DEGREES	BETA2	= 0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	= 0.0 FT.	XCS2'	= 11.1 FT.
YCS1'	= 0.0 FT.	YCS2'	= 2.7 FT.
PSIS1	= 0.0 DEG	PSIS2	= 120.0 DEG
US1	= 11.5 MPH	US2	= 9.5 MPH
VS1	= 11.8 MPH	VS2	= -11.7 MPH
PSISD1	= 0.0 DEG/SEC	PSISD2	= 151.2 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	26.5 MPH	0.0 MPH
VEH#2	38.6 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG. 2-68	LAT.	ANG.
VEH#1	21.3 MPH	-18.5 MPH	10.7 MPH	-30.0 DEG.

VEH#2 35.0 MPH -30.3 MPH -17.5 MPH 30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)
 TOTAL LONG. LAT. ANG.
 VEH#1 19.1 MPH -15.0 MPH 11.8 MPH -38.1 DEG.
 VEH#2 31.3 MPH -29.1 MPH -11.7 MPH 21.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 10718.4 FT-LB VEH#2 249996.7 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 25.8 MPH
 VEH#2 10.9 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -6.2 MPH
 VEH#2 -37.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
 36.7 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 CONVERGED O.K. +++++

NRUNS(1) =	5	NRUNS(2) =	3
E1(1) =	.194	E2(1) =	.075
E1(2) =	0.000	E2(2) =	0.000
E1(3) =	1.040	E2(3) =	.076
E1(4) =	0.000	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	1.234	QMIN2 =	.152

076 EDS/25

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT-----4300.0 LBS.
 CDC-----11FZEW1
 L-----54.5 IN.
 C1-----.5 IN.
 C2-----.5 IN.
 C3-----1.3 IN.
 C4-----1.5 IN.
 C5-----1.8 IN.
 C6-----2.3 IN.
 D-----9.8
 RHO-----1.00 *
 ANG-----30.0 DEG.
 D'-----16.4 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT-----2623.0 LBS.
 CDC-----02RDEW3
 L-----77.0 IN.
 C1-----4.0 IN.
 C2-----12.0 IN.
 C3-----17.8 IN.
 C4-----19.3 IN.
 C5-----17.0 IN.
 C6-----8.3 IN.
 D-----3.3
 RHO-----1.00 *
 ANG-----30.0 DEG.
 D'-----4.5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES

2-69

A2 = 46.3 INCHES

B1 = 59.2 INCHES
 TR1 = 61.8 INCHES
 I1 = 41631.2 LB-SEC**2-IN
 M1 = 11.128 LB-SEC**2/IN
 XF1 = 98.8 INCHES
 XR1 = -114.0 INCHES
 YS1 = 38.5 INCHES

B2 = 50.1 INCHES
 TR2 = 54.6 INCHES
 I2 = 20032.3 LB-SEC**2-IN
 M2 = 6.788 LB-SEC**2/IN
 XF2 = 83.3 INCHES
 XR2 = -91.6 INCHES
 YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 31.322

#

RUN CRASH3.C0162

CRASH3 15:26 MAR 19, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
TA

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
TNO

1. TITLE?
TRICSAC #7 CHEVELLE VS RABBIT

2. CLASS/WEIGHTS?
T4 3700 2 1700

3. CDC/PDOF # 1?
T11FDEW1 -30

4. CDC/PDOF # 2?
T02RDEW4 30

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
T4 2

6. REST & IMPACT? (Y OR N)
TY

7. REST COORDINATES?
T84.5 18.2 16.5 22.9 41.4 262

8. IMPACT COORDINATES?
T0 0 0 10.7 3.45 120

9. ANY SLIP ANGLES? (Y/N)
TN

11. SUSTAINED CONTACT? (Y OR N)
TN

12. SKIDDING OF # 1? (Y OR N)
TN

15. CURVED PATH? (Y OR N) 2-71
TN

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?22 30 250

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 1. .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?66

43. END DAMAGE DEPTH #1
?0 1.25 2 3.75 5 6.25

44. END DAMAGE MIDPOINT OFFSET #1
74

45. SIDE DAMAGE WIDTH #2
7108.5

46. SIDE DAMAGE DEPTH #2
70 11 17.75 21 21.25 7.25

47. SIDE DAMAGE MIDPOINT OFFSET #2
7-8.5

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
7NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #7 CHEVELLE VS RABBIT

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	26.2 MPH	0.0 MPH
VEH#2	34.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	27.0 MPH	-23.4 MPH	13.5 MPH	-30.0 DEG.
VEH#2	58.7 MPH	-50.8 MPH	-29.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.0 MPH	-13.5 MPH	6.5 MPH	-25.6 DEG.
VEH#2	32.7 MPH	-27.0 MPH	-18.4 MPH	34.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 17393.5 FT-LB VEH#2 392973.8 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 24.9 MPH
VEH#2 7.3 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -8.0 MPH
VEH#2 -34.2 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
32.2 MPH

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 TPRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
 (ANSWER YES OR NO)
 ?NO

SUMMARY OF CRASH 3 RESULTS

RICSAC #7 CHEVELLE VS RABBIT

VEHICLE # 1

```

*****
*          *          *          *          *
*  IMPACT  *          *          *          *
*  SPEED   *          *  SPEED CHANGE  *          *
*  MPH     *          *  MPH           *          *
*          *          *          *          *
*****
*          *          *          *          *
*  FWD * LAT * TOTAL * LONG. * LATERAL *          *
*      *    *    *    *    *    *          *
*****
*          *          *          *          *
*          *          *          *          *
* 26.2 * 0.0 * 15.0 * -13.5 * 6.5 * SPINOUT TRAJECTORIES AND *
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *
*****
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *
*****
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *
*****
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *
*****

```

VEHICLE # 2


```

*****
*                               *
* IMPACT                        *
* SPEED                        * SPEED CHANGE
* MPH                          * MPH
*                               * BASIS
*                               *
*                               * OF
* * * * *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS
* * * * *
* * * * *
* * * * *
* 34.9 * 0.0 * 32.7 * -27.0 * -18.4 * SPINOUT TRAJECTORIES AND
* * * * * CONSERVATION OF LINEAR
* * * * * MOMENTUM
* * * * *
* * * * *
* * * * * SPINOUT TRAJECTORIES AND
* * * * * DAMAGE
* * * * *
* * * * *
* * * * *
* 58.7 * -50.8 * -29.3 * DAMAGE DATA ONLY
* * * * *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	10.70 FT.
IMPACT Y-POSITION	0.00 FT.	3.45 FT.
IMPACT HEADING ANGLE	0.00 DEG.	119.99 DEG.
REST X-POSITION	84.50 FT.	22.90 FT.
REST Y-POSITION	18.20 FT.	41.40 FT.
REST HEADING ANGLE	16.50 DEG.	261.97 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	22.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	30.00 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	249.97 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 10.7 FT.
YC10' = 0.0 FT.	YC20' = 3.5 FT.
PSI10 = 0.0 DEGREES	PSI20 = 120.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 0.0 FT.	2-75	XCS2' = 10.7 FT.
YCS1' = 0.0 FT.		YCS2' = 3.5 FT.

PSIS1 = 0.0 DEG
 US1 = 12.7 MPH
 VS1 = 6.5 MPH
 PSISD1 = 0.0 DEG/SEC

PSIS2 = 120.0 DEG
 US2 = 8.0 MPH
 VS2 = -18.4 MPH
 PSISD2 = 146.1 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	26.2 MPH	0.0 MPH
VEH#2	34.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	27.0 MPH	-23.4 MPH	13.5 MPH	-30.0 DEG.
VEH#2	58.7 MPH	-50.8 MPH	-29.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	15.0 MPH	-13.5 MPH	6.5 MPH	-25.6 DEG.
VEH#2	32.7 MPH	-27.0 MPH	-18.4 MPH	34.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 17393.5 FT-LB VEH#2 392973.8 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 24.9 MPH
 VEH#2 7.3 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -8.0 MPH
 VEH#2 -34.2 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

32.2 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT-----3700.0 LBS.
 CDC-----11FDEW1
 L-----66.0 IN.
 C1-----0.0 IN.
 C2-----1.3 IN.
 C3-----2.0 IN.
 C4-----3.8 IN.
 C5-----5.0 IN.
 C6-----6.3 IN.
 D-----4.0
 RHO-----1.00 *
 ANG-----30.0 DEG.
 D'-----15.6 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT-----1700.0 LBS.
 CDC-----02RDEW4
 L-----108.5 IN.
 C1-----0.0 IN.
 C2-----11.0 IN.
 C3-----17.8 IN.
 C4-----21.0 IN.
 C5-----21.3 IN.
 C6-----7.3 IN.
 D-----8.5
 RHO-----1.00 *
 ANG-----30.0 DEG.
 D'-----1.3 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	35822.2 LB-SEC**2-IN	I2	=	12983.2 LB-SEC**2-IN
M1	=	9.576 LB-SEC**2/IN	M2	=	4.400 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.20	RR-----	1.00
LR-----	.20	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?RERUN NORE

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
 (ANSWER YES OR NO)
 ?NO

QUESTION NUMBERS?
 ?32

32. TRAJECTORY SIMULATION? (Y OR N)
 ?Y

33. STEER ANGLES #1 ?
 ?0 0 0 0

34. STEER ANGLES #2 ?
 ?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
 ?N

36. BOUNDARY POINTS?
 ?

37. SECONDARY FRICTION COEF.? 2-77
 ?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #7 CHEVELLE VS RABBIT

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	30.1 MPH	0.0 MPH
VEH#2	54.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	27.0 MPH	-23.4 MPH	13.5 MPH	-30.0 DEG.
VEH#2	58.7 MPH	-50.8 MPH	-29.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.3 MPH	-16.8 MPH	11.5 MPH	-34.3 DEG.
VEH#2	44.2 MPH	-39.8 MPH	-19.1 MPH	25.7 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 17393.5 FT-LB VEH#2 392973.8 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 28.6 MPH
VEH#2 11.4 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -9.2 MPH
VEH#2 -53.1 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
40.0 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PR

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

RICSAC #7 CHEVELLE VS RABBIT

VEHICLE # 1

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED       *      SPEED CHANGE   *                                     *
*      MPH         *      MPH           *      BASIS                               *
*                                     *      OF                                   *
*****
*      FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS                             *
*      *    *     *        *          *      *                                  *
*****
*      *      *      *      *      *      *      SPINOUT TRAJECTORIES AND      *
*      30.1 * 0.0 * 20.3 * -16.8 * 11.5 * CONSERVATION OF LINEAR                *
*      *      *      *      *      *      MOMENTUM                            *
*      *      *      *      *      *      *                                  *
*****
*      *      *      *      *      *      *      SPINOUT TRAJECTORIES AND      *
*      *      *      *      *      *      DAMAGE                              *
*      *      *      *      *      *      *                                  *
*****
*      *      *      *      *      *      *      DAMAGE DATA ONLY            *
*      *      *      *      *      *      *                                  *
*****

```

VEHICLE # 2

```
*
* IMPACT *
* SPEED *
* MPH * SPEED CHANGE *
* * MPH * BASIS *
* * OF *
* * LAT * TOTAL * LONG. * LATERAL * RESULTS *
* * * * *
* * * * 2-79 *
* * * * SPINOUT TRAJECTORIES AND *
* 54.3 * 0.0 * 44.2 * -39.8 * -19.1 * CONSERVATION OF LINEAR *
```

```

*           *           *           *           *           * MOMENTUM           *
*           *           *           *           *           *
*****
*           *           *           *           *           *
*           *           *           *           *           * SPINOUT TRAJECTORIES AND *
*           *           *           *           *           * DAMAGE                 *
*           *           *           *           *           *
*****
*           *           *           *           *           *
* 58.7 * -50.8 * -29.3 * DAMAGE DATA ONLY
*           *           *           *           *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	10.70 FT.
IMPACT Y-POSITION	0.00 FT.	3.45 FT.
IMPACT HEADING ANGLE	0.00 DEG.	119.99 DEG.
REST X-POSITION	84.50 FT.	22.90 FT.
REST Y-POSITION	18.20 FT.	41.40 FT.
REST HEADING ANGLE	16.50 DEG.	261.97 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	22.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	30.00 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	249.97 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 10.7 FT.
YC10' = 0.0 FT.	YC20' = 3.5 FT.
PSI10 = 0.0 DEGREES	PSI20 = 120.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 0.0 FT.	XCS2' = 10.7 FT.
YCS1' = 0.0 FT.	YCS2' = 3.5 FT.
PSIS1 = 0.0 DEG	PSIS2 = 120.0 DEG
US1 = 13.3 MPH	US2 = 14.4 MPH
VS1 = 11.5 MPH	VS2 = -19.1 MPH
PSISD1 = 0.0 DEG/SEC	PSISD2 = 159.9 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	30.1 MPH	0.0 MPH
VEH#2	54.3 MPH	0.0 MPH 2-80

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	27.0 MPH	-23.4 MPH	13.5 MPH	-30.0 DEG.
VEH#2	58.7 MPH	-50.8 MPH	-29.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.3 MPH	-16.8 MPH	11.5 MPH	-34.3 DEG.
VEH#2	44.2 MPH	-39.8 MPH	-19.1 MPH	25.7 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 17393.5 FT-LB VEH#2 392973.8 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 28.6 MPH
VEH#2 11.4 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -9.2 MPH
VEH#2 -53.1 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

40.0 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 CONVERGED O.K. +++++

NRUNS(1) =	5	NRUNS(2) =	3
E1(1) =	.259	E2(1) =	.067
E1(2) =	0.000	E2(2) =	.087
E1(3) =	1.034	E2(3) =	.060
E1(4) =	0.000	E2(4) =	-.042
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	1.293	QMIN2 =	.191

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 3700.0 LBS.
CDC-----11FDEW1
L----- 66.0 IN.
C1----- 0.0 IN.
C2----- 1.3 IN.
C3----- 2.0 IN.
C4----- 3.8 IN.
C5----- 5.0 IN.
C6----- 6.3 IN.
D----- 4.0
RHO----- 1.00 *
ANG----- -30.0 DEG.
D'----- 15.6 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
WEIGHT----- 1700.0 LBS.
CDC-----02RDEW4
L----- 108.5 IN.
C1----- 0.0 IN.
C2----- 11.0 IN.
C3----- 17.8 IN.
C4----- 21.0 IN.
C5----- 21.3 IN.
C6----- 7.3 IN.
D----- -8.5
RHO----- 1.00 *
ANG----- 30.0 DEG.
D'----- -1.3 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	35822.2 LB-SEC**2-IN	I2	=	12983.2 LB-SEC**2-IN
M1	=	9.576 LB-SEC**2/IN	M2	=	4.400 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	1.00
LR-----	.20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 32.998

#

RUN CRASH3.C0162

CRASH3 15:46 MAR 19, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?RICSAC #8 CHEVELLE VS CHEVELLE

2. CLASS/WEIGHTS?
?4 4479 4 4710

3. CDC/PDOF # 1?
?12FDEW1 -45

4. CDC/PDOF # 2?
?03RYEW2 45

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?4 4

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?.-.5 12 46 6.5 21 15.41

8. IMPACT COORDINATES?
?-10.9 3.2 0 0 1.9 90

9. ANY SLIP ANGLES? (Y/N)
?N

11. SUSTAINED CONTACT? (Y OR N)
?N

12. SKIDDING OF # 1? (Y OR N)
?Y

2-83

13. SKIDDING STOP BEFORE REST? (Y OR N)

?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?73

43. END DAMAGE DEPTH #1
?2.7 3.6

44. END DAMAGE MIDPOINT OFFSET #1
?0

45. SIDE DAMAGE WIDTH #2
?84.5

46. SIDE DAMAGE DEPTH #2
?6.2 8.3 9.2 5.9 4.4 .8

47. SIDE DAMAGE MIDPOINT OFFSET #2
?15

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #8 CHEVELLE VS CHEVELLE

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)
FORWARD LATERAL
VEH#1 16.7 MPH 0.0 MPH
VEH#2 25.7 MPH 0.0 MPH

SPEED CHANGE (DAMAGE)
TOTAL LONG. LAT. ANG.
VEH#1 10.0 MPH -7.1 MPH 7.1 MPH -45.0 DEG.
VEH#2 9.5 MPH -6.8 MPH -6.8 MPH 45.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)
TOTAL LONG. LAT. ANG.
VEH#1 12.6 MPH -6.9 MPH 10.5 MPH -56.6 DEG.
VEH#2 12.0 MPH -10.0 MPH -6.6 MPH 33.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 19245.3 FT-LB VEH#2 31336.6 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 16.6 MPH
VEH#2 3.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 2.0 MPH
VEH#2 -25.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
19.7 MPH

PR

?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #8 CHEVELLE VS CHEVELLE

VEHICLE # 1

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *                                     *
*      MPH      *      MPH      *                                     *
*                                     *      BASIS      *
*                                     *                                     *
*                                     *      OF      *
*      FWD * LAT * TOTAL * LONG. * LATERAL *      RESULTS      *
*      *      *      *      *      *      *                                     *
*      *      *      *      *      *      *      SPINOUT TRAJECTORIES AND *
*      16.7 * 0.0 * 12.6 * -6.9 * 10.5 *      CONSERVATION OF LINEAR *
*      *      *      *      *      *      MOMENTUM *
*      *      *      *      *      *      *                                     *
*      *      *      *      *      *      *      SPINOUT TRAJECTORIES AND *
*      *      *      *      *      *      DAMAGE *
*      *      *      *      *      *      *                                     *
*      *      *      *      *      *      *      DAMAGE DATA ONLY *
*      *      *      *      *      *      *
*****

```

VEHICLE # 2

2-87

PSISD1 = 58.2 DEG/SEC

PSISD2 = 54.5 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	16.7 MPH	0.0 MPH
VEH#2	25.7 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-7.1 MPH	7.1 MPH	-45.0 DEG.
VEH#2	9.5 MPH	-6.8 MPH	-6.8 MPH	45.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	12.6 MPH	-6.9 MPH	10.5 MPH	-56.6 DEG.
VEH#2	12.0 MPH	-10.0 MPH	-6.6 MPH	33.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 19245.3 FT-LB VEH#2 31336.6 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 16.6 MPH
VEH#2 3.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 2.0 MPH
VEH#2 -25.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
19.7 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4479.0 LBS.
CDC-----12FDEW1
L----- 73.0 IN.
C1----- 2.7 IN.
C2----- 3.6 IN.
C3----- 0.0 IN.
C4----- 0.0 IN.
C5----- 0.0 IN.
C6----- 0.0 IN.
D----- 0.0
RHO----- 1.00 *
ANG----- -45.0 DEG.
D'----- 1.7 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT----- 4710.0 LBS.
CDC-----03RYEW2
L----- 84.5 IN.
C1----- 6.2 IN.
C2----- 8.3 IN.
C3----- 9.2 IN.
C4----- 6.0 IN.
C5----- 4.4 IN.
C6----- .8 IN.
D----- 15.0
RHO----- 1.00 *
ANG----- 45.0 DEG.
D'----- 7.8 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	54.7 INCHES
B1	=	59.2 INCHES	B2	=	59.2 INCHES
TR1	=	61.8 INCHES	TR2	=	61.8 INCHES
I1	=	43364.2 LB-SEC**2-IN	I2	=	45600.7 LB-SEC**2-IN
M1	=	11.592 LB-SEC**2/IN	M2	=	12.189 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	98.8 INCHES
XR1	=	-114.0 INCHES	XR2	=	-114.0 INCHES
YS1	=	38.5 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?RERUN

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
 (ANSWER YES OR NO)
 ?NO

QUESTION NUMBERS?
 ?32

32. TRAJECTORY SIMULATION? (Y OR N)
 ?

**** SYNTAX ERROR ****
 CHECK # OF ENTRIES, ILLEGAL CHARACTERS, ETC.

32. TRAJECTORY SIMULATION? (Y OR N)
 ?Y

33. STEER ANGLES #1 ?
 ?0 0 0 0

34. STEER ANGLES #2 ?
 ?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
 ?N

36. BOUNDARY POINTS?

?

37. SECONDARY FRICTION COEF.?

?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)

?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #8 CHEVELLE VS CHEVELLE

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	19.3 MPH	0.0 MPH
VEH#2	21.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-7.1 MPH	7.1 MPH	-45.0 DEG.
VEH#2	9.5 MPH	-6.8 MPH	-6.8 MPH	45.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.1 MPH	-15.9 MPH	8.5 MPH	-28.2 DEG.
VEH#2	17.2 MPH	-8.1 MPH	-15.1 MPH	61.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 19245.3 FT-LB VEH#2 31336.6 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	19.2 MPH
VEH#2	2.6 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	2.3 MPH
VEH#2	-21.7 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

21.7 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRINT NO

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?

$\uparrow \text{NO}$

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #8 CHEVELLE VS CHEVELLE

VEHICLE # 1

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED       *      SPEED CHANGE      *                                     *
*      MPH         *      MPH               *      BASIS      *
*                                     *      OF      *
*****
*      FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS *
*      *     *     *     *     *          *           *
*****
*      *     *     *     *     *          * SPINOUT TRAJECTORIES AND *
*      *     *     *     *     *          * CONSERVATION OF LINEAR   *
*      19.3 * 0.0 * 18.1 * -15.9 * 8.5    * MOMENTUM                  *
*      *     *     *     *     *          *                             *
*      *     *     *     *     *          *                             *
*****
*      *     *     *     *     *          * SPINOUT TRAJECTORIES AND *
*      *     *     *     *     *          * DAMAGE                     *
*      *     *     *     *     *          *                             *
*****
*      *     *     *     *     *          *
*      * 10.0 * -7.1 * 7.1 * DAMAGE DATA ONLY *
*      *     *     *     *     *          *
*****

```

VEHICLE # 2

```

*****
*                                     *
*      IMPACT          *                                     *
*      SPEED           *      SPEED CHANGE                *
*      MPH             *      MPH                          *
*                                     *      BASIS          *
*                                     *                     *
*****
*      *               *      2-91      *****         OF
*      *               *      *

```

```

* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS *
* * * * *
*****
* * * * *
* 21.8 * 0.0 * 17.2 * -8.1 * -15.1 * SPINOUT TRAJECTORIES AND *
* * * * * CONSERVATION OF LINEAR *
* * * * * MOMENTUM *
*****
* * * * *
* * * * *
* * * * * SPINOUT TRAJECTORIES AND *
* * * * * DAMAGE *
*****
* * * * *
* 9.5 * -6.8 * -6.8 * DAMAGE DATA ONLY *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-10.90 FT.	0.00 FT.
IMPACT Y-POSITION	3.20 FT.	1.90 FT.
IMPACT HEADING ANGLE	0.00 DEG.	89.99 DEG.
REST X-POSITION	-.50 FT.	6.50 FT.
REST Y-POSITION	12.00 FT.	21.00 FT.
REST HEADING ANGLE	45.99 DEG.	140.98 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= -10.9 FT.	XC20'	= 0.0 FT.
YC10'	= 3.2 FT.	YC20'	= 1.9 FT.
PSI10	= 0.0 DEGREES	PSI20	= 90.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC
BETA1	= 0.0 DEGREES	BETA2	= 0.0 DEGREES

SEPARATION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XCS1'	= -10.9 FT.	XCS2'	= 0.0 FT.
YCS1'	= 3.2 FT.	YCS2'	= 1.9 FT.
PSIS1	= 0.0 DEG	PSIS2	= 90.0 DEG
US1	= 3.4 MPH	US2	= 13.7 MPH
VS1	= 8.5 MPH	VS2	= -15.1 MPH
PSISD1	= 95.5 DEG/SEC	PSISD2	= 47.9 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	19.3 MPH	0.0 MPH

2-92

VEH#2 21.8 MPH 0.0 MPH

	SPEED CHANGE (DAMAGE)			
	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-7.1 MPH	7.1 MPH	-45.0 DEG.
VEH#2	9.5 MPH	-6.8 MPH	-6.8 MPH	45.0 DEG.

	SPEED CHANGE (LINEAR MOMENTUM)			
	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.1 MPH	-15.9 MPH	8.5 MPH	-28.2 DEG.
VEH#2	17.2 MPH	-8.1 MPH	-15.1 MPH	61.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 19245.3 FT-LB VEH#2 31336.6 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 19.2 MPH
VEH#2 2.6 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 2.3 MPH
VEH#2 -21.7 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
21.7 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE ++++
++++ VEHICLE # 2 DID NOT CONVERGE ++++

NRUNS(1) =	5	NRUNS(2) =	5
E1(1) =	.087	E2(1) =	.076
E1(2) =	0.000	E2(2) =	0.000
E1(3) =	.260	E2(3) =	-.155
E1(4) =	0.000	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.346	QMIN2 =	.231

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4479.0 LBS.
CDC-----12FDEW1
L----- 73.0 IN.
C1----- 2.7 IN.
C2----- 3.6 IN.
C3----- 0.0 IN.
C4----- 0.0 IN.
C5----- 0.0 IN.
C6----- 0.0 IN.
D----- 0.0
RHO----- 1.00 *
ANG----- -45.0 DEG. 2-93
D'----- 1.7 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT----- 4710.0 LBS.
CDC-----03RYEW2
L----- 84.5 IN.
C1----- 6.2 IN.
C2----- 8.3 IN.
C3----- 9.2 IN.
C4----- 6.0 IN.
C5----- 4.4 IN.
C6----- .8 IN.
D----- 15.0
RHO----- 1.00 *
ANG----- 45.0 DEG.
D'----- 7.8 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	54.7 INCHES
B1	=	59.2 INCHES	B2	=	59.2 INCHES
TR1	=	61.8 INCHES	TR2	=	61.8 INCHES
I1	=	43364.2 LB-SEC**2-IN	I2	=	45600.7 LB-SEC**2-IN
M1	=	11.592 LB-SEC**2/IN	M2	=	12.189 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	98.8 INCHES
XR1	=	-114.0 INCHES	XR2	=	-114.0 INCHES
YS1	=	38.5 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 26.887

#

RUN CRASH3.C0162

CRASH3 16:05 MAR 19, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?RICSAC #9 HONDA VS TORINO

2. CLASS/WEIGHTS?
?1 2256 4 4900

3. CDC/PDOF # 1?
?11FDEW2 -65

4. CDC/PDOF # 2?
?02RFEW2 25

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?1 4

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?4 35.5 104 -5 49.5 152

8. IMPACT COORDINATES?
?0 0 0 8.53 -5.89 90

9. ANY SLIP ANGLES? (Y/N)
?N

11. SUSTAINED CONTACT? (Y OR N)
?N

12. SKIDDING OF # 1? (Y OR N)

?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?18 12.5 120

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.2 .2 .01 .01

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.1 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?49.75

43. END DAMAGE DEPTH #1
75 5.75 12.5 7.5 7.5 9.5

44. END DAMAGE MIDPOINT OFFSET #1
71.63

45. SIDE DAMAGE WIDTH #2
754.5

46. SIDE DAMAGE DEPTH #2
77.75 4.6 4.75 3.3 2.75 1.5

47. SIDE DAMAGE MIDPOINT OFFSET #2
768

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
7NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #9 HONDA VS TORINO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	19.5 MPH	0.0 MPH
VEH#2	21.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.9 MPH	-9.3 MPH	19.9 MPH	-65.0 DEG.
VEH#2	10.1 MPH	-9.2 MPH	-4.3 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.4 MPH	-18.6 MPH	10.6 MPH	-29.6 DEG.
VEH#2	9.9 MPH	-4.9 MPH	-8.6 MPH	60.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 104461.7 FT-LB VEH#2 28024.8 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 16.1 MPH
VEH#2 12.2 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 11.1 MPH 2-97

VEH#2 -17.7 MPH
 CLOSING VELOCITY (LINEAR MOMENTUM)
 28.3 MPH

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?PRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
 (ANSWER YES OR NO)
 ?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #9 HONDA VS TORINO

VEHICLE # 1

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *                                     *
*      MPH        *      MPH                *      BASIS                *
*                                     *      OF                *
*****
*      *      *      *      *      *      *      *      *      *      *
* FWD * LAT * TOTAL * LONG. * LATERAL *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
* 19.5 * 0.0 * 21.4 * -18.6 * 10.6 *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *      *      *
*****

```


VEHICLE # 2

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *                                     *
*      MPH        *      MPH                *      BASIS      *                                     *
*                                     *      OF      *                                     *
*      FWD * LAT * TOTAL * LONG. * LATERAL *      RESULTS      *                                     *
*      *      *      *      *      *      *                                     *
*      *      *      *      *      *      *      SPINOUT TRAJECTORIES AND *
*      21.5 * 0.0 * 9.9 * -4.9 * -8.6 *      CONSERVATION OF LINEAR *
*      *      *      *      *      *      *      MOMENTUM *
*      *      *      *      *      *      *                                     *
*      *      *      *      *      *      *      SPINOUT TRAJECTORIES AND *
*      *      *      *      *      *      *      DAMAGE *
*      *      *      *      *      *      *                                     *
*      *      *      *      *      *      *      DAMAGE DATA ONLY *
*      *      *      *      *      *      *                                     *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	8.53 FT.
IMPACT Y-POSITION	0.00 FT.	-5.89 FT.
IMPACT HEADING ANGLE	0.00 DEG.	89.99 DEG.
REST X-POSITION	4.00 FT.	-5.00 FT.
REST Y-POSITION	35.50 FT.	49.50 FT.
REST HEADING ANGLE	103.99 DEG.	151.98 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	18.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	12.50 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	119.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 8.5 FT.
YC10' = 0.0 FT.	YC20' = -5.9 FT.
PSI10 = 0.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.	XCS2'	=	8.5 FT.
YCS1'	=	0.0 FT.	YCS2'	=	-5.9 FT.
PSIS1	=	0.0 DEG	PSIS2	=	90.0 DEG
US1	=	.9 MPH	US2	=	16.7 MPH
VS1	=	10.6 MPH	VS2	=	-8.6 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	52.5 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	19.5 MPH	0.0 MPH
VEH#2	21.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.9 MPH	-9.3 MPH	19.9 MPH	-65.0 DEG.
VEH#2	10.1 MPH	-9.2 MPH	-4.3 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.4 MPH	-18.6 MPH	10.6 MPH	-29.6 DEG.
VEH#2	9.9 MPH	-4.9 MPH	-8.6 MPH	60.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 104461.7 FT-LB VEH#2 28024.8 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 16.1 MPH
VEH#2 12.2 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 11.1 MPH
VEH#2 -17.7 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

28.3 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 1
WEIGHT----- 2256.0 LBS.
CDC-----11FDEW2
L----- 49.8 IN.
C1----- 5.0 IN.
C2----- 5.8 IN.
C3----- 12.5 IN.
C4----- 7.5 IN.
C5----- 7.5 IN.
C6----- 9.5 IN.
D----- 1.6

2-100

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT----- 4900.0 LBS.
CDC-----02RFEW2
L----- 54.5 IN.
C1----- 7.8 IN.
C2----- 4.6 IN.
C3----- 4.8 IN.
C4----- 3.3 IN.
C5----- 2.8 IN.
C6----- 1.5 IN.
D----- 68.0

RHO----- 1.00 *

ANG----- -65.0 DEG.

D'----- 2.9 IN.

RHO----- 1.00 *

ANG----- 25.0 DEG.

D'----- 62.4 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 45.1 INCHES
B1 = 48.1 INCHES
TR1 = 51.1 INCHES
I1 = 11712.0 LB-SEC**2-IN
M1 = 5.839 LB-SEC**2/IN
XF1 = 76.0 INCHES
XR1 = -83.8 INCHES
YS1 = 30.4 INCHES

A2 = 54.7 INCHES
B2 = 59.2 INCHES
TR2 = 61.8 INCHES
I2 = 47440.2 LB-SEC**2-IN
M2 = 12.681 LB-SEC**2/IN
XF2 = 98.8 INCHES
XR2 = -114.0 INCHES
YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .20
LF----- .20
RR----- .01
LR----- .01

MU----- .87

VEHICLE # 2

RF----- .10
LF----- .01
RR----- .20
LR----- .20

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?RERUN

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

QUESTION NUMBERS?
?32

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

36. BOUNDARY POINTS?

37. SECONDARY FRICTION COEF.?
?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #9 HONDA VS TORINO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	21.1 MPH	0.0 MPH
VEH#2	30.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.9 MPH	-9.3 MPH	19.9 MPH	-65.0 DEG.
VEH#2	10.1 MPH	-9.2 MPH	-4.3 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	35.4 MPH	-18.6 MPH	30.1 MPH	-58.3 DEG.
VEH#2	16.3 MPH	-13.9 MPH	-8.6 MPH	31.7 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 104461.7 FT-LB VEH#2 28024.8 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	17.4 MPH
VEH#2	17.3 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	12.0 MPH
VEH#2	-25.1 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

34.7 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PR

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
2-102

S U M M A R Y O F C R A S H 3 R E S U L T S

VEHICLE # 1

VEHICLE # 2

[illegible]

```

*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      *
*  30.5 *  0.0 *  16.3 * -13.9 *  -8.6 *  SPINOUT TRAJECTORIES AND *
*      *      *      *      *      *  CONSERVATION OF LINEAR *
*      *      *      *      *      *  MOMENTUM *
*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      *
*      *      *      *      *      *  SPINOUT TRAJECTORIES AND *
*      *      *      *      *      *  DAMAGE *
*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      *
*      *      *      *      *      *  DAMAGE DATA ONLY *
*      *      *      *      *      *
*****

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SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	8.53 FT.
IMPACT Y-POSITION	0.00 FT.	-5.89 FT.
IMPACT HEADING ANGLE	0.00 DEG.	89.99 DEG.
REST X-POSITION	4.00 FT.	-5.00 FT.
REST Y-POSITION	35.50 FT.	49.50 FT.
REST HEADING ANGLE	103.99 DEG.	151.98 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	18.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	12.50 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	119.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 8.5 FT.
YC10' = 0.0 FT.	YC20' = -5.9 FT.
PSI10 = 0.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 0.0 FT.	XCS2' = 8.5 FT.
YCS1' = 0.0 FT.	YCS2' = -5.9 FT.
PSIS1 = 0.0 DEG	PSIS2 = 90.0 DEG
US1 = 2.5 MPH	US2 = 16.7 MPH
VS1 = 30.1 MPH	VS2 = -8.6 MPH
PSISD1 = 0.0 DEG/SEC	PSISD2 = 52.5 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	21.1 MPH	0.0 MPH
VEH#2	30.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.9 MPH	-9.3 MPH	19.9 MPH	-65.0 DEG.
VEH#2	10.1 MPH	-9.2 MPH	-4.3 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	35.4 MPH	-18.6 MPH	30.1 MPH	-58.3 DEG.
VEH#2	16.3 MPH	-13.9 MPH	-8.6 MPH	31.7 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 104461.7 FT-LB VEH#2 28024.8 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	17.4 MPH
VEH#2	17.3 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	12.0 MPH
VEH#2	-25.1 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
34.7 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++
++++ VEHICLE # 2 DID NOT CONVERGE +++++

NRUNS(1) =	5	NRUNS(2) =	5
E1(1) =	.016	E2(1) =	.429
E1(2) =	0.000	E2(2) =	.600
E1(3) =	.985	E2(3) =	.040
E1(4) =	0.000	E2(4) =	-.966
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	1.001	QMIN2 =	1.252

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----	CATEGORY 1
WEIGHT-----	2256.0 LBS.
CDC-----	11FDEW2
L-----	49.8 IN.
C1-----	5.0 IN.
C2-----	5.8 IN.
C3-----	12.5 IN.
C4-----	7.5 IN.
C5-----	7.5 IN.
C6-----	9.5 IN.
D-----	1.6

2-105

VEHICLE # 2

TYPE-----	CATEGORY 4
WEIGHT-----	4900.0 LBS.
CDC-----	02RFEW2
L-----	54.5 IN.
C1-----	7.8 IN.
C2-----	4.6 IN.
C3-----	4.8 IN.
C4-----	3.3 IN.
C5-----	2.8 IN.
C6-----	1.5 IN.
D-----	68.0

RHO----- 1.00 *
 ANG----- -65.0 DEG.
 D'----- 2.9 IN.

RHO----- 1.00 *
 ANG----- 25.0 DEG.
 D'----- 62.4 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 45.1 INCHES
 B1 = 48.1 INCHES
 TR1 = 51.1 INCHES
 I1 = 11712.0 LB-SEC**2-IN
 M1 = 5.839 LB-SEC**2/IN
 XF1 = 76.0 INCHES
 XR1 = -83.8 INCHES
 YS1 = 30.4 INCHES

A2 = 54.7 INCHES
 B2 = 59.2 INCHES
 TR2 = 61.8 INCHES
 I2 = 47440.2 LB-SEC**2-IN
 M2 = 12.681 LB-SEC**2/IN
 XF2 = 98.8 INCHES
 XR2 = -114.0 INCHES
 YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .20
 LF----- .20
 RR----- .01
 LR----- .01

VEHICLE # 2

RF----- .10
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 27.729

#

RUN CRASH3.C0162

CRASH3 13:53 MAR 23, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?RICSAC #10 HONDA VS TORINO

2. CLASS/WEIGHTS?
?1 2306 4 4720

3. CDC/PDOF # 1?
?10FDEW2 -65

4. CDC/PDOF # 2?
?01RFEW2 25

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?1 4

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?5 43 87 0 99.,5 128.5 *DEL*
5 43 87 0 99.5 128.5

8. IMPACT COORDINATES?
?0 0 0 8.5 -5.9 90

9. ANY SLIP ANGLES? (Y/N)
?N

11. SUSTAINED CONTACT? (Y OR N)
?N

12. SKIDDING OF # 1? (Y OR N)
?Y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

14. END OF SKIDDING COORDINATES?
?5 25 90

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?23 19 90

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.2 .2 .02_1 .01

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?#

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.2 .2 .2 .01

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.1 .1 .01 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?47/...5

43. END DAMAGE DEPTH #1
?7 10.2 14 8.9 7. 9

44. END DAMAGE MIDPOINT OFFSET #1
?-2.75

45. SIDE DAMAGE WIDTH #2
?53 9.2 6.5 6.1 5.3 4.5 .5

**** SYNTAX ERROR ****
CHECK # OF ENTRIES, ILLEGAL CHARACTERS, ETC.

45. SIDE DAMAGE WIDTH #2
?53

46. SIDE DAMAGE DEPTH #2
?9.2 6.5 6.1 5.3 4.5 .5

47. SIDE DAMAGE MIDPOINT OFFSET #2
?66.5

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #10 HONDA VS TORINO

2-109

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	33.9 MPH	0.0 MPH
VEH#2	35.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)				
	TOTAL	LONG.	LAT.	ANG.
VEH#1	24.7 MPH	-10.4 MPH	22.3 MPH	-65.0 DEG.
VEH#2	12.0 MPH	-10.9 MPH	-5.1 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)				
	TOTAL	LONG.	LAT.	ANG.
VEH#1	33.8 MPH	-28.6 MPH	18.0 MPH	-32.2 DEG.
VEH#2	16.5 MPH	-8.8 MPH	-14.0 MPH	57.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 121515.6 FT-LB VEH#2 40176.5 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEHICLE LINE FROM CGS (LINEAR MOMENTUM)	
VEH#1	27.9 MPH
VEH#2	20.1 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 19.4 MPH
VEH#2 -29.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
48.0 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
TPR

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
PNO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #10 HONDA VS TORINO

VEHICLE # 1

```
*****  
*                                     *                                     *  
*      IMPACT          *                                     *  
*      SPEED           *      SPEED CHANGE        *  
*      MPH             *      MPH                 *      BASIS  
*                     *      2-110              *  
*****  
                                         OF
```

VEHICLE # 2

SCENE INFORMATION

VEHICLE # 2

IMPACT X-POSITION		0.00	FT.	8.50	FT.
IMPACT Y-POSITION		0.00	FT.	-5.90	FT.
IMPACT HEADING ANGLE		0.00	DEG.	89.99	DEG.
REST X-POSITION		5.00	FT.	0.00	FT.
REST Y-POSITION	2-111	43.00	FT.	99.50	FT.

REST HEADING ANGLE	86.99 DEG.	128.49 DEG.
END-OF-ROTATION X-POSITION	5.00 FT.	23.00 FT.
END-OF-ROTATION Y-POSITION	25.00 FT.	19.00 FT.
END-OF-ROTATION HEADING ANGLE	89.99 DEG.	89.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1

XC10'	=	0.0 FT.
YC10'	=	0.0 FT.
PSI10	=	0.0 DEGREES
PSI1D0	=	0.0 DEG/SEC
BETA1	=	0.0 DEGREES

VEHICLE # 2

XC20'	=	8.5 FT.
YC20'	=	-5.9 FT.
PSI20	=	90.0 DEGREES
PSI2D0	=	0.0 DEG/SEC
BETA2	=	0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.
YCS1'	=	0.0 FT.
PSIS1	=	0.0 DEG
US1	=	5.3 MPH
VS1	=	18.0 MPH
PSISD1	=	126.0 DEG/SEC

XCS2'	=	8.5 FT.
YCS2'	=	-5.9 FT.
PSIS2	=	90.0 DEG
US2	=	26.5 MPH
VS2	=	-14.0 MPH
PSISD2	=	0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	33.9 MPH	0.0 MPH
VEH#2	35.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	24.7 MPH	-10.4 MPH	22.3 MPH	-65.0 DEG.
VEH#2	12.0 MPH	-10.9 MPH	-5.1 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	33.8 MPH	-28.6 MPH	18.0 MPH	-32.2 DEG.
VEH#2	16.5 MPH	-8.8 MPH	-14.0 MPH	57.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 121515.6 FT-LB VEH#2 40176.5 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	27.9 MPH
VEH#2	20.1 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	19.4 MPH
VEH#2	-29.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

48.0 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 1
WEIGHT----- 2306.0 LBS.
CDC-----10FDEW2
L----- 47.5 IN.
C1----- 7.0 IN.
C2----- 10.2 IN.
C3----- 14.0 IN.
C4----- 8.9 IN.
C5----- 7.0 IN.
C6----- 9.0 IN.
D----- -2.8
RHO----- 1.00 *
ANG----- -65.0 DEG.
D'----- -3.8 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT----- 4720.0 LBS.
CDC-----01RFEW2
L----- 53.0 IN.
C1----- 9.2 IN.
C2----- 6.5 IN.
C3----- 6.1 IN.
C4----- 5.3 IN.
C5----- 4.5 IN.
C6----- .5 IN.
D----- 66.5
RHO----- 1.00 *
ANG----- 25.0 DEG.
D'----- 61.5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 45.1 INCHES
B1 = 48.1 INCHES
TR1 = 51.1 INCHES
I1 = 11971.6 LB-SEC**2-IN
M1 = 5.968 LB-SEC**2/IN
XF1 = 76.0 INCHES
XR1 = -83.8 INCHES
YS1 = 30.4 INCHES

A2 = 54.7 INCHES
B2 = 59.2 INCHES
TR2 = 61.8 INCHES
I2 = 45697.5 LB-SEC**2-IN
M2 = 12.215 LB-SEC**2/IN
XF2 = 98.8 INCHES
XR2 = -114.0 INCHES
YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .20
LF----- .20
RR----- .20
LR----- .01

MU----- .87

VEHICLE # 2

RF----- .10
LF----- .10
RR----- .01
LR----- .20

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?RERUN

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

QUESTION NUMBERS?

32

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 00 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

36. BOUNDARY POINTS?
?

37. SECONDARY FRICTION COEF.?
?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #10 HONDA VS TORINO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	28.2 MPH	0.0 MPH
VEH#2	35.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	24.7 MPH	-10.4 MPH	22.3 MPH	-65.0 DEG.
VEH#2	12.0 MPH	-10.9 MPH	-5.1 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	2-114 LAT.	ANG.
VEH#1	34.4 MPH	-28.6 MPH	19.2 MPH	-33.8 DEG.


```
ENERGY DISSIPATED BY DAMAGE  VEH#1 121515.6 FT-LB  VEH#2 40176.5 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)
  VEH#1 23.2 MPH
  VEH#2 20.5 MPH
SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
  VEH#1 16.1 MPH
  VEH#2 -29.5 MPH
CLOSING VELOCITY (LINEAR MOMENTUM)
  43.6 MPH
```

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

RICSAC #10 HONDA VS TORINO

[illegible]

VEHICLE # 2

XC10'	=	0.0 FT.	XC20'	=	8.5 FT.
YC10'	=	0.0 FT.	YC20'	=	-5.9 FT.
PSI10	=	0.0 DEGREES	PSI20	=	90.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC
BETA1	=	0.0 DEGREES	BETA2	=	0.0 DEGREES

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.	XCS2'	=	8.5 FT.
YCS1'	=	0.0 FT.	YCS2'	=	-5.9 FT.
PSIS1	=	0.0 DEG	PSIS2	=	90.0 DEG
US1	=	-1.4 MPH	US2	=	26.5 MPH
VS1	=	19.2 MPH	VS2	=	-14.0 MPH
PSISD1	=	142.8 DEG/SEC	PSISD2	=	0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	28.2 MPH	0.0 MPH
VEH#2	35.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	24.7 MPH	-10.4 MPH	22.3 MPH	-65.0 DEG.
VEH#2	12.0 MPH	-10.9 MPH	-5.1 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	34.4 MPH	-28.6 MPH	19.2 MPH	-33.8 DEG.
VEH#2	16.8 MPH	-9.4 MPH	-14.0 MPH	56.2 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 121515.6 FT-LB VEH#2 40176.5 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	23.2 MPH
VEH#2	20.5 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	16.1 MPH
VEH#2	-29.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
43.6 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE	++++
++++ VEHICLE # 2 DID NOT CONVERGE	++++
NRUNS(1) =	5
E1(1) =	.137
E1(2) =	.376
E1(3) =	.062
E1(4) =	.109
E1(5) =	0.000
NRUNS(2) =	5
E2(1) =	1.557
E2(2) =	.962
E2(3) =	1.242
E2(4) =	.000
E2(5) =	0.000

QMIN1 = .442

QMIN2 = 3.280

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

VEHICLE # 2

TYPE-----CATEGORY 1
 WEIGHT----- 2306.0 LBS.
 CDC-----10FDEW2
 L----- 47.5 IN.
 C1----- 7.0 IN.
 C2----- 10.2 IN.
 C3----- 14.0 IN.
 C4----- 8.9 IN.
 C5----- 7.0 IN.
 C6----- 9.0 IN.
 D----- -2.8
 RHO----- 1.00 *
 ANG----- -65.0 DEG.
 D'----- -3.8 IN.

TYPE-----CATEGORY 4
 WEIGHT----- 4720.0 LBS.
 CDC-----01RFEW2
 L----- 53.0 IN.
 C1----- 9.2 IN.
 C2----- 6.5 IN.
 C3----- 6.1 IN.
 C4----- 5.3 IN.
 C5----- 4.5 IN.
 C6----- .5 IN.
 D----- 66.5
 RHO----- 1.00 *
 ANG----- 25.0 DEG.
 D'----- 61.5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 45.1 INCHES
 B1 = 48.1 INCHES
 TR1 = 51.1 INCHES
 I1 = 11971.6 LB-SEC**2-IN
 M1 = 5.968 LB-SEC**2/IN
 XF1 = 76.0 INCHES
 XR1 = -83.8 INCHES
 YS1 = 30.4 INCHES

A2 = 54.7 INCHES
 B2 = 59.2 INCHES
 TR2 = 61.8 INCHES
 I2 = 45697.5 LB-SEC**2-IN
 M2 = 12.215 LB-SEC**2/IN
 XF2 = 98.8 INCHES
 XR2 = -114.0 INCHES
 YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

VEHICLE # 2

RF----- .20
 LF----- .20
 RR----- .20
 LR----- .01

RF----- .10
 LF----- .10
 RR----- .01
 LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)

?

RUN CRASH3.C0162

CRASH3 16:25 MAR 19, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?RICSAC #11 VEGA VS TROINO-----ORINO

2. CLASS/WEIGHTS?
?2 3041 4 4850

3. CDC/PDOF # 1?
?12FYEW3 5

4. CDC/PDOF # 2?
?12FYEW3 -5

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?2 4

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?25.6 -6.4 170 8.6 .4 0

8. IMPACT COORDINATES?
?15.7 -4 171 0 0 0

**** NOTE TO USER ****

YOUR DIRECTIONS OF PRINCIPAL FORCE HAVE BEEN ADJUSTED
TO BE 180 DEGREES
APART.

NEW PDOF ANGLES ARE: VEH 1: 4.50 DEG VEH2: -4.50 DEG

9. ANY SLIP ANGLES? (Y/N)
?N

11. SUSTAINED CONTACT? (Y OR N)

?N

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .1 .1

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?32.5

43. END DAMAGE DEPTH #1
?22 20.2 18.5 16.8 15 12.5

44. END DAMAGE MIDPOINT OFFSET #1
?-12.754_

48. END DAMAGE WIDTH #2
?32.26

49. END DAMAGE DEPTH #2
?29.5 26.25 23 18.7 14.3 11.0

50. END DAMAGE MIDPOINT OFFSET # 2
?-12.9

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOFF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

RICSAC #11 VEGA VS TORINO

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	16.9 MPH	0.0 MPH
VEH#2	16.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.8 MPH	-20.7 MPH	-1.6 MPH	4.5 DEG.
VEH#2	13.0 MPH	-13.0 MPH	1.0 MPH	-4.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 32859.4 FT-LB VEH#2 45152.4 FT-LB

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

SUMMARY OF CRASH 3 RESULTS

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOPF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

RICSAC #11 VEGA VS TORINO

VEHICLE # 1

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *                                     *
*      MPH        *      MPH                *      BASIS      *
*                                     *      OF      *
*      *          *      *          *      *      RESULTS      *
* FWD * LAT * TOTAL * LONG. * LATERAL *                                     *
*      *          *      *          *      *                                     *
*****
*      *          *      *          *      *      SPINOUT TRAJECTORIES AND *
*      *          *      *          *      *      CONSERVATION OF LINEAR  *
*      *          *      *          *      *      MOMENTUM                *
*****
*      *          *      *          *      *      SPINOUT TRAJECTORIES AND *
* 16.9 * 0.0 * 20.7 * -20.7 * .3 *      DAMAGE                          *
*      *          *      *          *      *                                     *
*****
*      *          *      *          *      *      DAMAGE DATA ONLY      *
*      *          *      *          *      *      *
*****

```

VEHICLE # 2

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *                                     *
*      MPH        *      MPH                *      BASIS      *
*                                     *      OF      *
*      *          *      *          *      *      RESULTS      *
* FWD * LAT * TOTAL * LONG. * LATERAL *                                     *
*      *          *      *          *      *                                     *
*****
*      *          *      *          *      *      2-122                  *
*****

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*          *          *          *          *          *
*****
*          *          *          *          *          *
*          *          *          *          *          *
*          *          *          *          *          *
*          *          *          *          *          *
*          *          *          *          *          *
*          *          *          *          *          *
*****
*          *          *          *          *          *
* 16.5 * 0.0 * 13.0 * -13.0 * .2 * SPINOUT TRAJECTORIES AND *
*          *          *          *          *          *
*          *          *          *          *          *
*****
*          *          *          *          *          *
*          *          *          *          *          *
*          *          *          *          *          *
*          *          *          *          *          *
*****
*          *          *          *          *          *
*          *          *          *          *          *
*          *          *          *          *          *
*          *          *          *          *          *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	15.70 FT.	0.00 FT.
IMPACT Y-POSITION	-4.00 FT.	0.00 FT.
IMPACT HEADING ANGLE	170.98 DEG.	0.00 DEG.
REST X-POSITION	25.60 FT.	8.60 FT.
REST Y-POSITION	-6.40 FT.	.40 FT.
REST HEADING ANGLE	169.98 DEG.	0.00 DEG.
END-OF-ROTATION X-POSITION	15.70 FT.	0.00 FT.
END-OF-ROTATION Y-POSITION	-4.00 FT.	0.00 FT.
END-OF-ROTATION HEADING ANGLE	170.98 DEG.	0.00 DEG.
DIRECTION OF ROTATION	CW	NONE
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 15.7 FT.	XC20' = 0.0 FT.
YC10' = -4.0 FT.	YC20' = 0.0 FT.
PSI10 = 171.0 DEGREES	PSI20 = 0.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
BETA1 = 0.0 DEGREES	BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 15.7 FT.	XCS2' = 0.0 FT.
YCS1' = -4.0 FT.	YCS2' = 0.0 FT.
PSIS1 = 171.0 DEG	PSIS2 = 0.0 DEG
US1 = -3.8 MPH	US2 = 3.5 MPH
VS1 = .3 MPH	VS2 = .2 MPH
PSISD1 = 0.0 DEG/SEC	PSISD2 = 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	16.9 MPH	0.0 MPH
VEH#2	16.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.8 MPH	-20.7 MPH	-1.6 MPH	4.5 DEG.
VEH#2	13.0 MPH	-13.0 MPH	1.0 MPH	-4.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 32859.4 FT-LB VEH#2 45152.4 FT-LB

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 2
 WEIGHT----- 3041.0 LBS.
 CDC-----12FYEW3
 L----- 32.5 IN.
 C1----- 22.0 IN.
 C2----- 20.2 IN.
 C3----- 18.5 IN.
 C4----- 16.8 IN.
 C5----- 15.0 IN.
 C6----- 12.5 IN.
 D----- -12.8
 RHO----- 1.00 *
 ANG----- 4.5 DEG.
 D'----- -14.2 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
 WEIGHT----- 4850.0 LBS.
 CDC-----12FYEW3
 L----- 32.3 IN.
 C1----- 29.5 IN.
 C2----- 26.3 IN.
 C3----- 23.0 IN.
 C4----- 18.7 IN.
 C5----- 14.3 IN.
 C6----- 11.0 IN.
 D----- -12.9
 RHO----- 1.00 *
 ANG----- -4.5 DEG.
 D'----- -15.4 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	46.3 INCHES	A2	=	54.7 INCHES
B1	=	50.1 INCHES	B2	=	59.2 INCHES
TR1	=	54.6 INCHES	TR2	=	61.8 INCHES
I1	=	23224.6 LB-SEC**2-IN	I2	=	46956.1 LB-SEC**2-IN
M1	=	7.870 LB-SEC**2/IN	M2	=	12.352 LB-SEC**2/IN
XF1	=	83.3 INCHES	XF2	=	98.8 INCHES
XR1	=	-91.6 INCHES	XR2	=	-114.0 INCHES
YS1	=	33.6 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .10
 LR----- .10

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?RE

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

QUESTION NUMBERS?
?32

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

36. BOUNDARY POINTS?
?

37. SECONDARY FRICTION COEF.?
?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOPF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

	IMPACT SPEED (TRAJECTORY AND DAMAGE)	
	FORWARD	LATERAL
VEH#1	17.0 MPH	0.0 MPH
VEH#2	17.6 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)				
	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.8 MPH	-20.7 MPH	-1.6 MPH	4.5 DEG.
VEH#2	13.0 MPH	-13.0 MPH	1.0 MPH	-4.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 32859.4 FT-LB VEH#2 45152.4 FT-LB

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRI

```

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOFF) HAVE BEEN ADJUSTED TO BE 180 DEGREES APART.

RICSAC #11 VEGA VS TORINO

VEHICLE # 1

```

*****
*                                     *
*          IMPACT                     *
*          SPEED                     *
*          MPH                       *
*                                     *
*****
*                                     *
*          SPEED CHANGE               *
*          MPH                       *
*                                     *
*****
*                                     *
*                                     *
*                                     *
*          OF                         *
*                                     *
*          RESULTS                    *
*                                     *
*****
*                                     *
*                                     *
*                                     *
*                                     *
*          SPINOUT TRAJECTORIES AND *
*          CONSERVATION OF LINEAR   *
*          MOMENTUM                  *
*                                     *
*****

```

VEHICLE # 2

SCENE INFORMATION

VEHICLE # 2

IMPACT X-POSITION	15.70	FT.	0.00	FT.
IMPACT Y-POSITION	-4.00	FT.	0.00	FT.
IMPACT HEADING ANGLE	170.98	DEG.	0.00	DEG.
REST X-POSITION	25.60	FT.	8.60	FT.
REST Y-POSITION	-6.40	FT.	.40	FT.
REST HEADING ANGLE	169.98	DEG.	0.00	DEG.
END-OF-ROTATION X-POSITION	15.70	FT.	0.00	FT.
END-OF-ROTATION Y-POSITION	-4.00	FT.	0.00	FT.
END-OF-ROTATION HEADING ANGLE	170.98	DEG.	0.00	DEG.
DIRECTION OF ROTATION	CW		NONE	
AMOUNT OF ROTATION	2-127	<360		<360

COLLISION CONDITIONS

VEHICLE # 1

XC10' = 15.7 FT.
 YC10' = -4.0 FT.
 PSI10 = 171.0 DEGREES
 PSI1D0 = 0.0 DEG/SEC
 BETA1 = 0.0 DEGREES

VEHICLE # 2

XC20' = 0.0 FT.
 YC20' = 0.0 FT.
 PSI20 = 0.0 DEGREES
 PSI2D0 = 0.0 DEG/SEC
 BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 15.7 FT.
 YCS1' = -4.0 FT.
 PSIS1 = 171.0 DEG
 US1 = -3.8 MPH
 VS1 = .5 MPH
 PSISD1 = 0.0 DEG/SEC

XCS2' = 0.0 FT.
 YCS2' = 0.0 FT.
 PSIS2 = 0.0 DEG
 US2 = 4.6 MPH
 VS2 = .5 MPH
 PSISD2 = 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	17.0 MPH	0.0 MPH
VEH#2	17.6 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.8 MPH	-20.7 MPH	-1.6 MPH	4.5 DEG.
VEH#2	13.0 MPH	-13.0 MPH	1.0 MPH	-4.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 32859.4 FT-LB VEH#2 45152.4 FT-LB

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 CONVERGED O.K. +++++

NRUNS(1)		NRUNS(2)	
E1(1)	= .080	E2(1)	= .076
E1(2)	= 0.000	E2(2)	= 0.000
E1(3)	= 1.000	E2(3)	= .000
E1(4)	= 0.000	E2(4)	= .000
E1(5)	= 0.000	E2(5)	= 0.000
QMIN1	= 1.080	QMIN2	= .076

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 2
 WEIGHT----- 3041.0 LBS.
 CDC-----12FYEW3

2-128

VEHICLE # 2

TYPE-----CATEGORY 4
 WEIGHT----- 4850.0 LBS.
 CDC-----12FYEW3

L----- 32.5 IN.
 C1----- 22.0 IN.
 C2----- 20.2 IN.
 C3----- 18.5 IN.
 C4----- 16.8 IN.
 C5----- 15.0 IN.
 C6----- 12.5 IN.
 D----- -12.8
 RHO----- 1.00 *
 ANG----- 4.5 DEG.
 D'----- -14.2 IN.

L----- 32.3 IN.
 C1----- 29.5 IN.
 C2----- 26.3 IN.
 C3----- 23.0 IN.
 C4----- 18.7 IN.
 C5----- 14.3 IN.
 C6----- 11.0 IN.
 D----- -12.9
 RHO----- 1.00 *
 ANG----- -4.5 DEG.
 D'----- -15.4 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 46.3 INCHES
 B1 = 50.1 INCHES
 TR1 = 54.6 INCHES
 I1 = 23224.6 LB-SEC**2-IN
 M1 = 7.870 LB-SEC**2/IN
 XF1 = 83.3 INCHES
 XR1 = -91.6 INCHES
 YS1 = 33.6 INCHES

A2 = 54.7 INCHES
 B2 = 59.2 INCHES
 TR2 = 61.8 INCHES
 I2 = 46956.1 LB-SEC**2-IN
 M2 = 12.552 LB-SEC**2/IN
 XF2 = 98.8 INCHES
 XR2 = -114.0 INCHES
 YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .10
 LR----- .10

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 20.523

#

RUN CRASH3.C0162

CRASH3 15:48 MAR 20, '81

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?TRICSAC #12 VEGA VS TORINO

2. CLASS/WEIGHTS?
?2 3130 4 4512

3. CDC/PDOF # 1?
?12FYEW4 5

4. CDC/PDOF # 2?
?#

3. CDC/PDOF # 1?
?12FYEW4 -15

4. CDC/PDOF # 2?
?12FYEW4-5

5. VEHICLE 1 AND VEHICLE 2 STIFFNESS CATEGORIES?
?2 4

6. REST & IMPACT? (Y OR N)
?Y

7. REST COORDINATES?
?22.3 -5.5 118 6.8 2.6 -12

8. IMPACT COORDINATES?
?15.7 -4 171 0 0 0

**** NOTE TO USER ****
YOUR DIRECTIONS OF PRINCIPAL FORCE HAVE BEEN ADJUSTED
TO BE 180 DEGREES
APART.

NEW PDOP ANGLES ARE: VEH 1: 4.50 DEG VEH2: -4.50 DEG

9. ANY SLIP ANGLES? (Y/N)
?N

11. SUSTAINED CONTACT? (Y OR N)
?N

12. SKIDDING OF # 1? (Y OR N)
?Y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?

**** SYNTAX ERROR ****
CHECK # OF ENTRIES, ILLEGAL CHARACTERS, ETC.

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CCW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CCW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)

?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?32

43. END DAMAGE DEPTH #1
?38.6 34.6 29.5 26 19.6 14.25

44. END DAMAGE MIDPOINT OFFSET #1
?2.75

48. END DAMAGE WIDTH #2
?28.25

49. END DAMAGE DEPTH #2
?39.5 33 28.75 23.75 19.2 15

50. END DAMAGE MIDPOINT OFFSET # 2
?-10.6

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOPF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

RICSAC #12 VEGA VS TORINO

IMPACT SPEED (TRAJECTORY AND DAMAGE)
VEH#1 FORWARD 17.7 MPH LATERAL 0.0 MPH
VEH#2 FORWARD 29.0 MPH LATERAL 0.0 MPH

SPEED CHANGE (DAMAGE)
VEH#1 TOTAL 26.2 MPH LONG. -26.1 MPH LAT. -2.1 MPH ANG. 4.5 DEG.
VEH#2 TOTAL 18.2 MPH LONG. -18.1 MPH LAT. 1.4 MPH ANG. -4.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 66451.0 FT-LB VEH#2 56124.4 FT-LB

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOPF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

RICSAC #12 VEGA VS TORINO

VEHICLE # 1

```
*****
* IMPACT *
* SPEED *
* MPH *
*
* SPEED CHANGE *
* MPH *
*
* BASIS *
*
* OF *
* FWD * LAT * TOTAL * LONG. * LATERAL *
*
* RESULTS *
*****
*
*
* 2-133 *
* SPINOUT TRAJECTORIES AND
```

VEHICLE # 2

SCENE INFORMATION

2-134

COLLISION CONDITIONS

VEHICLE # 1

XC10' = 15.7 FT.
 YC10' = -4.0 FT.
 PSI10 = 171.0 DEGREES
 PSI1D0 = 0.0 DEG/SEC
 BETA1 = 0.0 DEGREES

VEHICLE # 2

XC20' = 0.0 FT.
 YC20' = 0.0 FT.
 PSI20 = 0.0 DEGREES
 PSI2D0 = 0.0 DEG/SEC
 BETA2 = 0.0 DEGREES

SEPARATION CONDITIONS

XCS1' = 15.7 FT.
 YCS1' = -4.0 FT.
 PSIS1 = 171.0 DEG
 US1 = -8.4 MPH
 VS1 = .6 MPH
 PSISD1 = -106.9 DEG/SEC

XCS2' = 0.0 FT.
 YCS2' = 0.0 FT.
 PSIS2 = 0.0 DEG
 US2 = 10.9 MPH
 VS2 = 4.2 MPH
 PSISD2 = -22.4 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	17.7 MPH	0.0 MPH
VEH#2	29.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.2 MPH	-26.1 MPH	-2.1 MPH	4.5 DEG.
VEH#2	18.2 MPH	-18.1 MPH	1.4 MPH	-4.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 66451.0 FT-LB VEH#2 56124.4 FT-LB

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 2
 WEIGHT----- 3130.0 LBS.
 CDC-----12FYEW4
 L----- 32.0 IN.
 C1----- 38.6 IN.
 C2----- 34.6 IN.
 C3----- 29.5 IN.
 C4----- 26.0 IN.
 C5----- 19.6 IN.
 C6----- 14.3 IN.
 D----- 2.8
 RHO----- 1.00 *
 ANG----- 4.5 DEG.
 D'----- .4 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
 WEIGHT----- 4512.0 LBS.
 CDC-----12FYEW4
 L----- 28.3 IN.
 C1----- 39.5 IN.
 C2----- 33.0 IN.
 C3----- 28.8 IN.
 C4----- 23.8 IN.
 C5----- 19.2 IN.
 C6----- 15.0 IN.
 D----- -10.6
 RHO----- 1.00 *
 ANG----- -4.5 DEG.
 D'----- -12.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	46.3 INCHES	A2	=	54.7 INCHES
B1	=	50.1 INCHES	B2	=	59.2 INCHES
TR1	=	54.6 INCHES	TR2	=	61.8 INCHES
I1	=	23904.3 LB-SEC**2-IN	I2	=	43683.7 LB-SEC**2-IN
M1	=	8.100 LB-SEC**2/IN	M2	=	11.677 LB-SEC**2/IN
XF1	=	83.3 INCHES	XF2	=	98.8 INCHES
XR1	=	-91.6 INCHES	XR2	=	-114.0 INCHES
YS1	=	33.6 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
 ?RERUN

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
 (ANSWER YES OR NO)
 ?NO

QUESTION NUMBERS?
 ?32

32. TRAJECTORY SIMULATION? (Y OR N)
 ?Y

33. STEER ANGLES #1 ?
 ?0 0 0 0

34. STEER ANGLES #2 ?
 ?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
 ?N

36. BOUNDARY POINTS?
 ?

37. SECONDARY FRICTION COEF.?
 ?

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOPF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

RICSAC #12 VEGA VS TORINO

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	19.8 MPH	0.0 MPH
VEH#2	22.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.2 MPH	-26.1 MPH	-2.1 MPH	4.5 DEG.
VEH#2	18.2 MPH	-18.1 MPH	1.4 MPH	-4.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 66451.0 FT-LB VEH#2 56124.4 FT-LB

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?PRINT

DO YOU WANT THE PRINTOUT TO BE IN METRIC UNITS?
(ANSWER YES OR NO)
?NO

S U M M A R Y O F C R A S H 3 R E S U L T S

USER-ENTERED DIRECTIONS OF PRINCIPAL FORCE (DOPF) HAVE BEEN
ADJUSTED TO BE 180 DEGREES APART.

VEHICLE # 1

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *
*      MPH      *      MPH      *      BASIS      *
*      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *
*      FWD * LAT * TOTAL * LONG. * LATERAL *      *
*      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *
*      19.8 * 0.0 * 26.2 * -26.1 * -1.9 *      *
*      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *
*****

```

VEHICLE # 2

*							*
* IMPACT	*						*
* SPEED	*	SPEED CHANGE	*				*
* MPH	*	MPH	*				BASIS
*	*						*
*****							OF
*	*	*	*				*
* FWD * LAT	* TOTAL	* LONG.	* LATERAL				RESULTS
*	*	*	*				*
*****							*
*	*	*	*				*
*	*	*	*				SPINOUT TRAJECTORIES AND
*	*	*	*				CONSERVATION OF LINEAR
*	*	*	*				MOMENTUM
*****							*
*	*	*	*				*
* 22.9 *	* 0.0 *	* 19.9 *	* -18.1 *	* 8.2 *			SPINOUT TRAJECTORIES AND
*	*	*	*				DAMAGE
*	*	*	* 2-138				*

```

*      *      *      *      *
*  18.2 * -18.1 *    1.4 * DAMAGE DATA ONLY
*      *      *      *      *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	15.70 FT.	0.00 FT.
IMPACT Y-POSITION	-4.00 FT.	0.00 FT.
IMPACT HEADING ANGLE	170.98 DEG.	0.00 DEG.
REST X-POSITION	22.30 FT.	6.80 FT.
REST Y-POSITION	-5.50 FT.	2.60 FT.
REST HEADING ANGLE	117.99 DEG.	-12.00 DEG.
DIRECTION OF ROTATION	CCW	CCW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= 15.7 FT.	XC20'	= 0.0 FT.
YC10'	= -4.0 FT.	YC20'	= 0.0 FT.
PSI10	= 171.0 DEGREES	PSI20	= 0.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC
BETA1	= 0.0 DEGREES	BETA2	= 0.0 DEGREES

SEPARATION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XCS1'	= 15.7 FT.	XCS2'	= 0.0 FT.
YCS1'	= -4.0 FT.	YCS2'	= 0.0 FT.
PSIS1	= 171.0 DEG	PSIS2	= 0.0 DEG
US1	= -6.3 MPH	US2	= 4.8 MPH
VS1	= -1.9 MPH	VS2	= 8.2 MPH
PSISD1	= -158.6 DEG/SEC	PSISD2	= -31.2 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	19.8 MPH	0.0 MPH
VEH#2	22.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.2 MPH	-26.1 MPH	-2.1 MPH	4.5 DEG.
VEH#2	18.2 MPH	-18.1 MPH	1.4 MPH	-4.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 66451.0 FT-LB VEH#2 56124.4 FT-LB

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 DID NOT CONVERGE +++++

NRUNS(1) = 5
E1(1) = .171
E1(2) = 0.000
E1(3) = -.025
E1(4) = 0.000
E1(5) = 0.000
QMIN1 = .196

NRUNS(2) = 5
E2(1) = .201
E2(2) = 0.000
E2(3) = -.313
E2(4) = 0.000
E2(5) = 0.000
QMIN2 = .514

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 2
WEIGHT----- 3130.0 LBS.
CDC-----12FYEW4
L----- 32.0 IN.
C1----- 38.6 IN.
C2----- 34.6 IN.
C3----- 29.5 IN.
C4----- 26.0 IN.
C5----- 19.6 IN.
C6----- 14.3 IN.
D----- 2.8
RHO----- 1.00 *
ANG----- 4.5 DEG.
D'----- .4 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT----- 4512.0 LBS.
CDC-----12FYEW4
L----- 28.3 IN.
C1----- 39.5 IN.
C2----- 33.0 IN.
C3----- 28.8 IN.
C4----- 23.8 IN.
C5----- 19.2 IN.
C6----- 15.0 IN.
D----- -10.6
RHO----- 1.00 *
ANG----- -4.5 DEG.
D'----- -12.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 46.3 INCHES
B1 = 50.1 INCHES
TR1 = 54.6 INCHES
I1 = 23904.3 LB-SEC**2-IN
M1 = 8.100 LB-SEC**2/IN
XF1 = 83.3 INCHES
XR1 = -91.6 INCHES
YS1 = 33.6 INCHES

A2 = 54.7 INCHES
B2 = 59.2 INCHES
TR2 = 61.8 INCHES
I2 = 43683.7 LB-SEC**2-IN
M2 = 11.677 LB-SEC**2/IN
XF2 = 98.8 INCHES
XR2 = -114.0 INCHES
YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
LF----- .01
RR----- .20
LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
LF----- .01
RR----- .20
LR----- .20

(COMPLETE, ABBREVIATED, RERUN, PRINT, SMAC, OR END)
?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 22.071

*

SECTION 3
CRASH2 Production Version

RUN CRA2L0M,C0162

CRA2L0M 12:49 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSA1 #1 CRASH2

2. SIZE CATEGORIES?
?1 S

3. VDI, #1
?11FZEW2

4. VDI, #2
?01RDEW3

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?4621

7. WEIGHT #2
?3082

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?-2.4 -1. -1.5 7.5 2.5 105.

10. IMPACT COORDINATES?
?10.8 1. -30. 0. -5.5 90.

11. SKIDDING OF # 1? (Y OR N)
?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N) 3-1
?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
?N

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?CW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?46.

42. END DAMAGE DEPTH #1
?4. 5.5 7. 10.2 12.1 14.8

43. END DAMAGE MIDPOINT OFFSET #1
?14.3

44. SIDE DAMAGE WIDTH #2
?113.3

45. SIDE DAMAGE DEPTH #2
?.5 12. 10.6 11.8 9. 4.1

46. SIDE DAMAGE MIDPOINT OFFSET #2
?21.8

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?-30.

54. PRINCIPAL FORCE ANGLE #2?
?30.

THANK YOU VERY MUCH

VEHICLE # 1	VEHICLE # 2
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
41	41
42	42
43	43
44	44
45	45
46	46
47	47
48	48
49	49
50	50
51	51
52	52
53	53
54	54
55	55
56	56
57	57
58	58
59	59
60	60
61	61
62	62
63	63
64	64
65	65
66	66
67	67
68	68
69	69
70	70
71	71
72	72
73	73
74	74
75	75
76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
TF

RTCSAC #1 CRASH2

[illegible]

```

*****
*                                     *
*                                     *
*          SPEED CHANGE              *
*IMPACT SPEED*          MPH          *
*                                     *
*          MPH          *****      *          BASIS
*          *          3-3          *          OF
*          *          *          *          RESULTS
*          * TOTAL * LONG. * LATERAL *
*****

```


IMPACT SPEED
 ENERGY DISSIPATED BY DAMAGE
 SPEED ALONG LINE THRU CGS
 SPEED ORTHOG. TO CG LINE
 CLOSING VELOCITY

-9.7 MPH .8 MPH
 24652.4 FT-LB 169174.7 FT-LB
 4.7 MPH .4 MPH
 -8.4 MPH .7 MPH
 5.1 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----INTERMEDIATE
 WEIGHT----- 4621.0 LBS.
 VDI-----11FZEW2
 L----- 46.0 IN.
 C1----- 4.0 IN.
 C2----- 5.5 IN.
 C3----- 7.0 IN.
 C4----- 10.2 IN.
 C5----- 12.1 IN.
 C6----- 14.8 IN.
 D----- 19.1 IN.
 RHO----- 1.00 *
 ANG----- 330.0 DEG.

VEHICLE # 2

TYPE-----SUBCOMPACT
 WEIGHT----- 3082.0 LBS.
 VDI-----01RDEW3
 L----- 113.3 IN.
 C1----- .5 IN.
 C2----- 12.0 IN.
 C3----- 10.6 IN.
 C4----- 11.8 IN.
 C5----- 9.0 IN.
 C6----- 4.1 IN.
 D----- 21.8 IN.
 RHO----- 1.00 *
 ANG----- 30.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
 B1 = 59.2 INCHES
 TR1 = 61.8 INCHES
 I1 = 44739.0 LB-SEC**2-IN
 M1 = 11.959 LB-SEC**2/IN
 XF1 = 98.8 INCHES
 XR1 = -114.0 INCHES
 YS1 = 38.5 INCHES

A2 = 46.3 INCHES
 B2 = 50.1 INCHES
 TR2 = 54.6 INCHES
 I2 = 23537.7 LB-SEC**2-IN
 M2 = 7.976 LB-SEC**2/IN
 XF2 = 83.3 INCHES
 XR2 = -91.6 INCHES
 YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

?e

STOP

CRASH PROGRAM COMPLETED.

MRU= 5.043

#

RUN CRA2LOM,C0162

CRA2LOM 13:01 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC #2 CRASH2

2. SIZE CATEGORIES?
?I S

3. VDI, #1
?11FDEW2

4. VDI, #2
?02RDEW4

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?4621

7. WEIGHT #2
?3081

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?11. 9.4 55. 23.6 12.5 134.

10. IMPACT COORDINATES?
?-11.2 8.5 -30. 0. 0. 0.

11. SKIDDING OF # 1? (Y OR N)
?#

10. IMPACT COORDINATES?
?-11.2 8.5 -30. 0. 0. 90.

11. SKIDDING OF # 1? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N)
?Y
19. SKIDDING STOP BEFORE REST? (Y OR N)
?N
21. CURVED PATH? (Y OR N)
?N
23. ROTATION DIRECTION # 2?
?CW
24. MORE THAN 360 DEG? (Y OR N)
?N
25. TIRE-GROUND FRICTION?
?.87
26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1
27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?1. .02 .2 .2
28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.02 .02 1. 1.
31. TRAJECTORY SIMULATION? (Y OR N)
?N
37. DAMAGE DIMENSIONS? (Y OR N)
?Y
41. END DAMAGE WIDTH #1
?75.5
42. END DAMAGE DEPTH #1
?.5 2.4 3.7 6.9 12. 16.5
43. END DAMAGE MIDPOINT OFFSET #1
?0.
44. SIDE DAMAGE WIDTH #2
?118.5
45. SIDE DAMAGE DEPTH #2
?6.75 22.75 23.5 21.3 10. 0.
46. SIDE DAMAGE MIDPOINT OFFSET #2
?13.7
52. FORCE DIRECTIONS (Y OR N)
?Y
53. PRINCIPAL FORCE ANGLE #1?
?-30.
54. PRINCIPAL FORCE ANGLE #2?
?30.

THANK YOU VERY MUCH

RICSAC #2 CRASH2

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?P

```

RICSAC #2 CRASH2

```
*****  
*                                     *  
*                               *  
*          SPEED CHANGE              *  
*IMPACT SPEED*                    MPH      *  
*                               *  
*          3-8                      *        BASIS  
*    MPH     *****                OF
```

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	22.0 MPH	33.0 MPH
	-20.3 DEG	39.6 DEG
SPEED CHANGE (DAMAGE ONLY)	31.1 MPH	46.6 MPH
	-30.0 DEG	30.0 DEG
IMPACT SPEED	32.8 MPH	35.6 MPH
ENERGY DISSIPATED BY DAMAGE	31832.5 FT-LB	507722.9 FT-LB
SPEED ALONG LINE THRU CGS	32.4 MPH	22.2 MPH
SPEED ORTHOG. TO CG LINE	4.9 MPH	-27.8 MPH
CLOSING VELOCITY	54.6 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----INTERMEDIATE
WEIGHT----- 4621.0 LBS.
VDI-----11FDEW2
L----- 75.5 IN.
C1----- .5 IN.
C2----- 2.4 IN.
C3----- 3.7 IN.
C4----- 6.9 IN.
C5----- 12.0 IN.
C6----- 16.5 IN.
D----- 15.0 IN.
RHO----- 1.00 *
ANG----- 330.0 DEG.

VEHICLE # 2

TYPE-----SUBCOMPACT
WEIGHT----- 3081.0 LBS.
VDI-----02RDEW4
L----- 118.5 IN.
C1----- 6.8 IN.
C2----- 22.8 IN.
C3----- 23.5 IN.
C4----- 21.3 IN.
C5----- 10.0 IN.
C6----- 0.0 IN.
D----- 5.6 IN.
RHO----- 1.00 *
ANG----- 30.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
B1 = 59.2 INCHES
TR1 = 61.8 INCHES
I1 = 44739.0 LB-SEC**2-IN
M1 = 11.959 LB-SEC**2/IN
XF1 = 98.8 INCHES
XR1 = -114.0 INCHES
YS1 = 38.5 INCHES

A2 = 46.3 INCHES
B2 = 50.1 INCHES
TR2 = 54.6 INCHES
I2 = 23530.1 LB-SEC**2-IN
M2 = 7.974 LB-SEC**2/IN
XF2 = 83.3 INCHES
XR2 = -91.6 INCHES
YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- 1.00
LF----- .02
RR----- .20
LR----- .20

VEHICLE # 2

RF----- .02
LF----- .02
RR----- 1.00
LR----- 1.00

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?END

CRASH PROGRAM COMPLETED.

STOP

3-10

RUN CRA2LOM.C0162

CRA2LOM 12:24 APR 16, 1980

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM? (ANSWER YES OR NO)

?N

1. TITLE?

TRICSAC # 6 CHEVELLE VS RABBIT

2. SIZE CATEGORIES?

?I S

3. VDI, #1

?11FZEW1

4. VDI, #2

?02RDEW3 30.

5. ACTUAL WEIGHTS? (Y OR N)

?#

4. VDI, #2

?02RDEW3

5. ACTUAL WEIGHTS? (Y OR N)

?Y

6. WEIGHT #1

?4300

7. WEIGHT #2

?2623

8. REST & IMPACT? (Y OR N)

?Y

9. REST COORDINATES?

?60. 11. 15. 20. 21. 242.

10. IMPACT COORDINATES?

?0. 0. 0. 11.1 2.7 *DEL*

0. 0. 0. 11.1 2.67 120.

11. SKIDDING OF # 1? (Y OR N)

?N

14. CURVED PATH? (Y OR N)

?N

16. ROTATION DIRECTION #1?

?CW

17. MORE THAN 360 DEG? (Y OR N)

?N

18. SKIDDING OF # 2? (Y OR N)

?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)

?N

21. CURVED PATH? (Y OR N)

?N

23. ROTATION DIRECTION # 2?

?CW

24. MORE THAN 360 DEG? (Y OR N)

?N

25. TIRE-GROUND FRICTION?

? .87

26. ROLLING RESISTANCE OPTION?(1 OR 2)

?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1

? .01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2

? .01 .01 1. .2

31. TRAJECTORY SIMULATION? (Y OR N)

?N

37. DAMAGE DIMENSIONS? (Y OR N)

?Y

41. END DAMAGE WIDTH #1

?54.5

42. END DAMAGE DEPTH #1

? .5 .5 1.25 1.5 1.75 2.25

43. END DAMAGE MIDPOINT OFFSET #1

?9.75

44. SIDE DAMAGE WIDTH #2

?77.

45. SIDE DAMAGE DEPTH #2

?4. 12. 17.8 19.3 17. 8.25

46. SIDE DAMAGE MIDPOINT OFFSET #2

?-3.25

52. FORCE DIRECTIONS (Y OR N)

?Y

53. PRINCIPAL FORCE ANGLE #1?

?-30

54. PRINCIPAL FORCE ANGLE #2?

?30.


```

*****
VEHICLE # 2
*****
*                                     *
*           *                       *                                     *
*           *   SPEED CHANGE       *                                     *
*IMPACT SPEED*           MPH 3-13    *                                     *

```

SCENE INFORMATION

COLLISION CONDITIONS

SEPARATION CONDITIONS

3-14

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	12.4 MPH	20.4 MPH
	-10.8 DEG	49.2 DEG
SPEED CHANGE (DAMAGE ONLY)	21.1 MPH	34.6 MPH
	-30.0 DEG	30.0 DEG
IMPACT SPEED	24.9 MPH	20.5 MPH
ENERGY DISSIPATED BY DAMAGE	5409.2 FT-LB	249929.9 FT-LB
SPEED ALONG LINE THRU CGS	24.5 MPH	7.0 MPH
SPEED ORTHOG. TO CG LINE	-4.3 MPH	-19.3 MPH
CLOSING VELOCITY	31.5 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1		VEHICLE # 2	
TYPE-----	INTERMEDIATE	TYPE-----	SUBCOMPACT
WEIGHT-----	4300.0 LBS.	WEIGHT-----	2623.0 LBS.
VDI-----	11FZEW1	VDI-----	02RDEW3
L-----	54.5 IN.	L-----	77.0 IN.
C1-----	.5 IN.	C1-----	4.0 IN.
C2-----	.5 IN.	C2-----	12.0 IN.
C3-----	1.3 IN.	C3-----	17.8 IN.
C4-----	1.5 IN.	C4-----	19.3 IN.
C5-----	1.8 IN.	C5-----	17.0 IN.
C6-----	2.3 IN.	C6-----	8.3 IN.
D-----	16.4 IN.	D-----	.5 IN.
RHO-----	1.00 *	RHO-----	1.00 *
ANG-----	330.0 DEG.	ANG-----	30.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	41631.2 LB-SEC**2-IN	I2	=	20032.3 LB-SEC**2-IN
M1	=	11.128 LB-SEC**2/IN	M2	=	6.788 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.20	RR-----	1.00
LR-----	.20	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

TEND

CRASH PROGRAM COMPLETED.

STOP

MRU=

5.053

#

RUN CRA2LOM.C0162

CRA2LOM 12:37 APR 16, '80

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?

(ANSWER YES OR NO)

?N

1. TITLE?

?RICSAC #7

2. SIZE CATEGORIES?

?I S

3. VDI, #1

?11FDEW1

4. VDI, #2

?02RDEW2

5. ACTUAL WEIGHTS? (Y OR N)

?Y

6. WEIGHT #1

?3700

7. WEIGHT #2

?1700

8. REST & IMPACT? (Y OR N)

?T *DEL*

Y

9. REST COORDINATES?

?84.5 18.2 16.5 22.9 41.4 262.

10. IMPACT COORDINATES?

?0. 0. 0. 10.7 3.45 120.

11. SKIDDING OF # 1? (Y OR N)

?N

14. CURVED PATH? (Y OR N)

?N

16. ROTATION DIRECTION #1?

?CW

17. MORE THAN 360 DEG? (Y OR N)

?N

18. SKIDDING OF # 2? (Y OR N)

?Y

3-17

19. SKIDDING STOP BEFORE REST? (Y OR N)

?Y

20. END OF SKIDDING COORDINATES?
?22. 30. 250.

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?CW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 1. .2

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?66.

42. END DAMAGE DEPTH #1
?0. 1.25 2. 3.75 5. 6.25

43. END DAMAGE MIDPOINT OFFSET #1
?4.

44. SIDE DAMAGE WIDTH #2
?108.5

45. SIDE DAMAGE DEPTH #2
?.5 11. 17.75 21. 21.75 *DEL*
.5 11. 17.75 21. 21.25 7.25

46. SIDE DAMAGE MIDPOINT OFFSET #2
?-8.5

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?-30.

54. PRINCIPAL FORCE ANGLE #2?
?30.

THANK YOU VERY MUCH

SUMMARY OF CRASH RESULTS

RICSAC #7

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	11.6 MPH	25.3 MPH
	-16.2 DEG	43.8 DEG
SPEED CHANGE (DAMAGE ONLY)	26.8 MPH	58.3 MPH
	-30.0 DEG	30.0 DEG
IMPACT SPEED	26.2 MPH	27.1 MPH
ENERGY DISSIPATED BY DAMAGE	11494.3 FT-LB	393584.9 FT-LB
SPEED ALONG LINE THRU CGS	25.5 MPH	7.9 MPH
SPEED ORTHOG. TO CG LINE	-5.9 MPH	-26.0 MPH
CLOSING VELOCITY	33.4 MPH	

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?P

SUMMARY OF CRASH RESULTS

RICSAC #7

VEHICLE # 1					

*	*			*	*
*	*	SPEED CHANGE		*	*
IMPACT SPEED		MPH		*	*
*	*			*	
*	MPH	*****			BASIS
*	*	*	*	*	OF
*				*	RESULTS
*	*	TOTAL	LONG.	LATERAL	*
*	*	*	*	*	*

*	*	*	*	*	*
*	*	*	*	*	*SPINOUT TRAJECTORIES*
*	26.2*	11.6*	-11.1*	3.2*	AND CONSERVATION OF *
*	*	*	*	*	*LINEAR MOMENTUM
*	*	*	*	*	*

*	*	*	*	*	*
*	*	*	*	*	*SPINOUT TRAJECTORIES*
*	*	*	*	*	AND
*	*	*	*	*	DAMAGE
*	*	*	*	*	*

*	*	*	*	*	*
*	*	26.8*	-23.2*	13.4*	DAMAGE DATA ONLY *
*	*	*	*	*	*

VEHICLE # 2					

*	*			*	*
*	*	SPEED CHANGE		*	*
IMPACT SPEED		MPH		*	*
*	*			*	
*	MPH	*****			BASIS
*	*	*	*	*	OF
*				*	

* TOTAL	* LONG.	* LATERAL	* RESULTS

27.1*	25.3*	-18.2*	-17.5*

58.3*	-50.5*	-29.2*	DAMAGE DATA ONLY

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-0.77 FT.	11.10 FT.
IMPACT Y-POSITION	0.00 FT.	2.76 FT.
IMPACT HEADING ANGLE	0.00 DEG.	119.99 DEG.
REST X-POSITION	84.50 FT.	22.90 FT.
REST Y-POSITION	18.20 FT.	41.40 FT.
REST HEADING ANGLE	16.50 DEG.	261.97 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	22.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	30.00 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	249.97 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = -0.8 FT.	XC20' = 11.1 FT.
YC10' = 0.0 FT.	YC20' = 2.8 FT.
PSI10 = 0.0 DEGREES	PSI20 = 120.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
U10 = 26.2 MPH	U20 = 27.1 MPH
V10 = 0.0 MPH	V20 = 0.0 MPH

SEPARATION CONDITIONS

XCS1 = 0.0 FT.	XCS2 = 10.7 FT.
YCS1 = 0.0 FT.	YCS2 = 3.5 FT.
PSIS1 = 0.0 DEG	PSIS2 = 120.0 DEG
US1 = 15.0 MPH	US2 = 8.9 MPH
VS1 = 3.2 MPH	VS2 = -17.5 MPH
PSISD1 = 0.0 DEG/SEC	PSISD2 = 171.7 DEG/SEC

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	11.6 MPH	25.3 MPH
	-16.2 DEG	43.8 DEG
SPEED CHANGE (DAMAGE ONLY)	26.8 MPH	58.3 MPH
	-30.0 DEG	30.0 DEG
IMPACT SPEED	26.2 MPH	27.1 MPH
ENERGY DISSIPATED BY DAMAGE	11494.3 FT-LB	393584.9 FT-LB
SPEED ALONG LINE THRU CGS	25.5 MPH	7.9 MPH
SPEED ORTHOG. TO CG LINE	-5.9 MPH	-26.0 MPH
CLOSING VELOCITY	33.4 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1		VEHICLE # 2	
TYPE-----	INTERMEDIATE	TYPE-----	SUBCOMPACT
WEIGHT-----	3700.0 LBS.	WEIGHT-----	1700.0 LBS.
VDI-----	11FDEW1	VDI-----	02RDEW2
L-----	66.0 IN.	L-----	108.5 IN.
C1-----	0.0 IN.	C1-----	.5 IN.
C2-----	1.3 IN.	C2-----	11.0 IN.
C3-----	2.0 IN.	C3-----	17.8 IN.
C4-----	3.8 IN.	C4-----	21.0 IN.
C5-----	5.0 IN.	C5-----	21.3 IN.
C6-----	6.3 IN.	C6-----	7.3 IN.
D-----	15.6 IN.	D-----	-1.5 IN.
RHO-----	1.00 *	RHO-----	1.00 *
ANG-----	330.0 DEG.	ANG-----	30.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	35822.2 LB-SEC**2-IN	I2	=	12983.2 LB-SEC**2-IN
M1	=	9.576 LB-SEC**2/IN	M2	=	4.400 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.20	RR-----	1.00
LR-----	.20	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 5,044

RUN CRA2LOM.C0162

CRA2LOM 13:34 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?Y *DEL*
N

1. TITLE?
?RICSAC #8 CRASH2

2. SIZE CATEGORIES?
?I I

3. VDI, #1
?12FDEW1

4. VDI, #2
?03RYEW2

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?4479

7. WEIGHT #2
?4710

8. REST & IMPACT? (Y OR N)
?12FDEW *DEL*
Y

9. REST COORDINATES?
?-5 12. 46. 6.5 21. 141.

10. IMPACT COORDINATES?
?-10.9 3.2 0. 0. 1.9 90.

11. SKIDDING OF # 1? (Y OR N)
?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N)

?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
?N

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?CW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?73.

42. END DAMAGE DEPTH #1
?2.7 3.6

43. END DAMAGE MIDPOINT OFFSET #1
?0.

44. SIDE DAMAGE WIDTH #2
?84.5

45. SIDE DAMAGE DEPTH #2
?6.2 8.3 9.2 5.9 4.4 .8

46. SIDE DAMAGE MIDPOINT OFFSET #2
?15.

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?-45.

54. PRINCIPAL FORCE ANGLE #2?
?45.

THANK YOU VERY MUCH

```

*****
*                                     *
*                                     *
*          SPEED CHANGE              *
*IMPACT SPEED*                      *
*          MPH                       *
*                                     *
*    MPH      *****                BASIS           *
*          *            3-24         *             OF   *
*          *            *            *             RESULTS *
*                                     *
*****

```

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	11.1 MPH	10.6 MPH
3-25	-48.9 DEG	41.1 DEG
SPEED CHANGE (DAMAGE ONLY)	10.0 MPH	9.5 MPH

IMPACT SPEED
ENERGY DISSIPATED BY DAMAGE
SPEED ALONG LINE THRU CGS
SPEED ORTHOG. TO CG LINE
CLOSING VELOCITY

-45.0 DEG	45.0 DEG
19.0 MPH	25.0 MPH
18645.8 FT-LB	31217.2 FT-LB
18.7 MPH	4.4 MPH
3.3 MPH	-24.7 MPH
23.1 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----INTERMEDIATE
WEIGHT----- 4479.0 LBS.
VDI-----12FDEW1
L----- 73.0 IN.
C1----- 2.7 IN.
C2----- 3.6 IN.
C3----- 0.0 IN.
C4----- 0.0 IN.
C5----- 0.0 IN.
C6----- 0.0 IN.
D----- 1.7 IN.
RHO----- 1.00 *
ANG----- 315.0 DEG.

VEHICLE # 2

TYPE-----INTERMEDIATE
WEIGHT----- 4710.0 LBS.
VDI-----03RYEW2
L----- 64.5 IN.
C1----- 6.2 IN.
C2----- 8.3 IN.
C3----- 9.2 IN.
C4----- 5.9 IN.
C5----- 4.4 IN.
C6----- .8 IN.
D----- 7.8 IN.
RHO----- 1.00 *
ANG----- 45.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
B1 = 59.2 INCHES
TR1 = 61.8 INCHES
I1 = 43364.2 LB-SEC**2-IN
M1 = 11.592 LB-SEC**2/IN
XF1 = 98.8 INCHES
XR1 = -114.0 INCHES
YS1 = 38.5 INCHES

A2 = 54.7 INCHES
B2 = 59.2 INCHES
TR2 = 61.8 INCHES
I2 = 45600.7 LB-SEC**2-IN
M2 = 12.189 LB-SEC**2/IN
XF2 = 98.8 INCHES
XR2 = -114.0 INCHES
YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
LF----- .01
RR----- .20
LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
LF----- .01
RR----- .20
LR----- .20

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

?end

CRASH PROGRAM COMPLETED.

STOP

MRU= 5.074

#

#RUN CRA2LOM.C0162

CRA2LOM 13:12 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, PATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC # 9 CRASH2

2. SIZE CATEGORIES?
?M I

3. VDI, #1
?11FDEW2

4. VDI, #2
?02RFEW2

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?2256

7. WEIGHT #2
?4900

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?4. 35.5 104. -5. 49.5 152.

10. IMPACT COORDINATES?
?0. 0. 0. 8.53 -5.89 90.

11. SKIDDING OF # 1? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N)
?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

20. END OF SKIDDING COORDINATES?
?18. 12.5 120.

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?CW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.2 .2 .01 .01

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.1 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?49.75

42. END DAMAGE DEPTH #1
?5. 5.75 12.5 7.5 7.5 9.5

43. END DAMAGE MIDPOINT OFFSET #1
?1.63

44. SIDE DAMAGE WIDTH #2
?54.5

45. SIDE DAMAGE DEPTH #2
?7.75 4.6 4.75 3.3 2.75 1.5

46. SIDE DAMAGE MIDPOINT OFFSET #2
?68.

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?-65.

54. PRINCIPAL FORCE ANGLE #2?
?25.

THANK YOU VERY MUCH

RTCSAC # 9 CRASH2

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	24.2 MPH	11.2 MPH
	-23.9 DEG	66.1 DEG
SPEED CHANGE (DAMAGE ONLY)	19.1 MPH	8.8 MPH
	-65.0 DEG	25.0 DEG
IMPACT SPEED	23.2 MPH	22.0 MPH
ENERGY DISSIPATED BY DAMAGE	68892.3 FT-LB	31370.4 FT-LB
SPEED ALONG LINE THRU CGS	18.9 MPH	12.8 MPH
SPEED ORTHOG. TO CG LINE	13.6 MPH	-17.8 MPH
CLOSING VELOCITY	31.7 MPH	

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
7P

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SUMMARY OF CRASH RESULTS

RICSAC # 9 CRASH2

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*****
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*          SPEED CHANGE              *
* IMPACT SPEED*                    MPH *
*                                     *
*          MPH                      *   BASIS
*                                     *   OF
*                                     * RESULTS
*      TOTAL * LONG. * LATERAL *
*                                     *
*****
*                                     *
*                                     *
*          23.2*       24.2*     -22.1*    9.8* AND CONSERVATION OF
*                                     * LINEAR MOMENTUM
*                                     *
*****
*                                     *
*                                     *
*                                     *
*                                     *
* SPINOUT TRAJECTORIES
* AND
* DAMAGE
*                                     *
*****
*          19.1*       -8.1*    17.3* DAMAGE DATA ONLY
*                                     *
*****

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*****
*                                     *
*          *                         *
*          *                         *
* SPEED CHANGE                       *
* IMPACT SPEED MPH                   *
*                                     *
* MPH                               *
* *****                           *
*          *           *           *
*          * TOTAL    * LONG.3-29LATERAL *
*          *          *                 *
*****

```

SCENE INFORMATION

COLLISION CONDITIONS

SEPARATION CONDITIONS

RELATIVE VELOCITY DATA

	3-30	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)		24.2 MPH	11.2 MPH

SPEED CHANGE (DAMAGE ONLY)

IMPACT SPEED

ENERGY DISSIPATED BY DAMAGE

SPEED ALONG LINE THRU CGS

SPEED ORTHOG. TO CG LINE

CLOSING VELOCITY

-23.9 DEG

19.1 MPH

-65.0 DEG

23.2 MPH

68892.3 FT-LB 31370.4 FT-LB

18.9 MPH

13.6 MPH

31.7 MPH

66.1 DEG

8.8 MPH

25.0 DEG

22.0 MPH

12.8 MPH

-17.8 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----MINICAR
 WEIGHT----- 2256.0 LBS.
 VDI-----11FDEW2
 L----- 49.7 IN.
 C1----- 5.0 IN.
 C2----- 5.8 IN.
 C3----- 12.5 IN.
 C4----- 7.5 IN.
 C5----- 7.5 IN.
 C6----- 9.5 IN.
 D----- 2.9 IN.
 RHO----- 1.00 *
 ANG----- 295.0 DEG.

VEHICLE # 2

TYPE-----INTERMEDIATE
 WEIGHT----- 4900.0 LBS.
 VDI-----02RFEW2
 L----- 54.5 IN.
 C1----- 7.8 IN.
 C2----- 4.6 IN.
 C3----- 4.8 IN.
 C4----- 3.3 IN.
 C5----- 2.8 IN.
 C6----- 1.5 IN.
 D----- 62.4 IN.
 RHO----- 1.00 *
 ANG----- 25.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 45.1 INCHES
 B1 = 48.1 INCHES
 TR1 = 51.1 INCHES
 I1 = 11712.0 LB-SEC**2-IN
 M1 = 5.839 LB-SEC**2/IN
 XF1 = 76.0 INCHES
 XR1 = -83.8 INCHES
 YS1 = 30.4 INCHES

A2 = 54.7 INCHES
 B2 = 59.2 INCHES
 TR2 = 61.8 INCHES
 I2 = 47440.2 LB-SEC**2-IN
 M2 = 12.681 LB-SEC**2/IN
 XF2 = 98.8 INCHES
 XR2 = -114.0 INCHES
 YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .20
 LF----- .20
 RR----- .01
 LR----- .01

MU----- .87

VEHICLE # 2

RF----- .10
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

TE

CRASH PROGRAM COMPLETED.

STOP

MRU= 5.032

#

RUN CRA2LOM.C0162

CRA2LOM 13:23 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC # 10 CRASH2

2. SIZE CATEGORIES?
?M I

3. VDI, #1
?10FDEW2

4. VDI, #2
?01RFEW2

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?2306

7. WEIGHT #2
?4720

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?5. 43. 87. 0. 99.5 128.5

10. IMPACT COORDINATES?
?0. 0. 0. 8.5 -5.9 90.

11. SKIDDING OF # 1? (Y OR N)
?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

13. END OF SKIDDING COORDINATES?
?5. 25. 90.

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N) 3-32
?N

18. SKIDDING OF # 2? (Y OR N)
?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

20. END OF SKIDDING COORDINATES?
?23. 19. 90.

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?CW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.2 .2 .01 .01

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.1 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?47.5

42. END DAMAGE DEPTH #1
?7. 10.2 14. 8.9 7. 9.

43. END DAMAGE MIDPOINT OFFSET #1
?-2.75

44. SIDE DAMAGE WIDTH #2
?53.

45. SIDE DAMAGE DEPTH #2
?9.2 6.5 6.1 5.3 4.5 .5

46. SIDE DAMAGE MIDPOINT OFFSET #2
?66.5

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?-65.

54. PRINCIPAL FORCE ANGLE #2?
?25.

XCS1	=	0.0 FT.		XCS2	=	8.5 FT.
YCS1	=	0.0 FT.		YCS2	=	-5.9 FT.
PSIS1	=	0.0 DEG		PSIS2	=	90.0 DEG
US1	=	6.1 MPH		US2	=	22.3 MPH
VS1	=	19.0 MPH	3-35	VS2	=	-13.0 MPH
PSISD1	=	116.0 DEG/SEC		PSISD2	=	0.0 DEG/SEC

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	32.6 MPH	15.9 MPH
	-35.6 DEG	54.4 DEG
SPEED CHANGE (DAMAGE ONLY)	22.4 MPH	10.9 MPH
	-65.0 DEG	25.0 DEG
IMPACT SPEED	32.7 MPH	31.5 MPH
ENERGY DISSIPATED BY DAMAGE	88023.1 FT-LB	44972.8 FT-LB
SPEED ALONG LINE THRU CGS	26.4 MPH	18.6 MPH
SPEED ORTHOG. TO CG LINE	19.2 MPH	-25.5 MPH
CLOSING VELOCITY	45.0 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1		VEHICLE # 2	
TYPE-----	MINICAR	TYPE-----	INTERMEDIATE
WEIGHT-----	2306.0 LBS.	WEIGHT-----	4720.0 LBS.
VDI-----	10FDEW2	VDI-----	01RFEW2
L-----	47.5 IN.	L-----	53.0 IN.
C1-----	7.0 IN.	C1-----	9.2 IN.
C2-----	10.2 IN.	C2-----	6.5 IN.
C3-----	14.0 IN.	C3-----	6.1 IN.
C4-----	8.9 IN.	C4-----	5.3 IN.
C5-----	7.0 IN.	C5-----	4.5 IN.
C6-----	9.0 IN.	C6-----	.5 IN.
D-----	-3.8 IN.	D-----	61.5 IN.
RHO-----	1.00	RHO-----	1.00
ANG-----	295.0 DEG.	ANG-----	25.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	45.1 INCHES	A2	=	54.7 INCHES
B1	=	48.1 INCHES	B2	=	59.2 INCHES
TR1	=	51.1 INCHES	TR2	=	61.8 INCHES
I1	=	11971.6 LB-SEC**2-IN	I2	=	45697.5 LB-SEC**2-IN
M1	=	5.968 LB-SEC**2/IN	M2	=	12.215 LB-SEC**2/IN
XF1	=	76.0 INCHES	XF2	=	98.8 INCHES
XR1	=	-83.8 INCHES	XR2	=	-114.0 INCHES
YS1	=	30.4 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.20	RF-----	.10
LF-----	.20	LF-----	.01
RR-----	.01	RR-----	.20
LR-----	.01	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

Pe

STOP

MRU= 5.100

#

RUN CRA2LOM.C0162

CRA2LOM 13:45 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC # 11 CRASH2

2. SIZE CATEGORIES?
?6 I

3. VDI, #1
?12FYEW3

4. VDI, #2
?12FYEW3

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?3041

7. WEIGHT #2
?4850

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?25.6 -6.4 170. 8.6 0.4 0.0

10. IMPACT COORDINATES?
?15.7 -4. 171. 0. 0. 0.

11. SKIDDING OF # 1? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N)
?N

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .1 .1

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?32.5

42. END DAMAGE DEPTH #1
?22. 20.2 18.5 16.8 15. 12.5

43. END DAMAGE MIDPOINT OFFSET #1
?-12.75

47. END DAMAGE WIDTH #2
?32.26

48. END DAMAGE DEPTH #2
?29.5 26.25 23. 18.7 14.3 11.

49. END DAMAGE MIDPOINT OFFSET #2
?-12.9

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?5.

54. PRINCIPAL FORCE ANGLE #2?
?-5.

THANK YOU VERY MUCH

SUMMARY OF CRASH RESULTS

RICSAC # 11 CRASH2

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	21.0 MPH	13.2 MPH
	-8 DEG	-9 DEG
SPEED CHANGE (DAMAGE ONLY)	21.1 MPH	13.2 MPH
	5.0 DEG	-5.0 DEG

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
PP

RICSAAC # 11 CRASH2

```

*****
*                                     *
*          *                         *                                     *
*          *          SPEED CHANGE          *                                     *
*IMPACT SPEED*          MPH          *                                     *
*          *                         *                                     *
*          *                         *          BASIS          *
*          *          *****          *          OF          *
*          *          *          *          *          RESULTS          *
*          *          TOTAL *          LONG. *          LATERAL *          *
*          *          *          *          *          *          *
*****
*          *          *          *          *          *          *
*          *          *          *          *          *          *
*          *          *          *          *          *SPINOUT TRAJECTORIES*
*          *          *          *          *          *AND CONSERVATION OF
*          *          *          *          *          *LINEAR MOMENTUM
*          *          *          *          *          *
*****
*          *          *          *          *          *
*          *          *          *          *          *SPINOUT TRAJECTORIES*
*          *          17.2*          21.0*          -21.0*          .3*          AND
*          *          *          *          *          *          *
*          *          *          *          *          *          *          DAMAGE
*****
*          *          *          *          *          *
*          *          *          *          *          *          *
*          *          21.1*          -21.0*          -1.8*          DAMAGE DATA ONLY
*          *          *          *          *          *
*****

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[illegible]

```

*           *           *           *           *SPINOUT TRAJECTORIES*
*      18.0*      13.2*      -13.2*      .2*           AND           *
*           *           *           *           *           DAMAGE           *
*           *           *           *           *           *           *
*****
*           *           *           *           *           *           *
*           *      13.2*      -13.2*      1.2*  DAMAGE DATA ONLY  *
*           *           *           *           *           *           *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	15.70 FT.	0.00 FT.
IMPACT Y-POSITION	-4.00 FT.	0.00 FT.
IMPACT HEADING ANGLE	170.98 DEG.	0.00 DEG.
REST X-POSITION	25.60 FT.	8.60 FT.
REST Y-POSITION	-6.40 FT.	.40 FT.
REST HEADING ANGLE	169.98 DEG.	0.00 DEG.
END-OF-ROTATION X-POSITION	15.70 FT.	0.00 FT.
END-OF-ROTATION Y-POSITION	-4.00 FT.	0.00 FT.
END-OF-ROTATION HEADING ANGLE	170.98 DEG.	0.00 DEG.
DIRECTION OF ROTATION	CW	NONE
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 15.7 FT.	XC20' = 0.0 FT.
YC10' = -4.0 FT.	YC20' = 0.0 FT.
PSI10 = 171.0 DEGREES	PSI20 = 0.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
U10 = 17.2 MPH	U20 = 18.0 MPH
V10 = 0.0 MPH	V20 = 0.0 MPH

SEPARATION CONDITIONS

XCS1 = 15.7 FT.	XCS2 = 0.0 FT.
YCS1 = -4.0 FT.	YCS2 = 0.0 FT.
PSIS1 = 171.0 DEG	PSIS2 = 0.0 DEG
US1 = -3.8 MPH	US2 = 4.8 MPH
VS1 = .3 MPH	VS2 = .2 MPH
PSISD1 = 0.0 DEG/SEC	PSISD2 = 0.0 DEG/SEC

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	21.0 MPH	13.2 MPH
	-.8 DEG	-.9 DEG
SPEED CHANGE (DAMAGE ONLY)	21.1 MPH	13.2 MPH
	5.0 DEG	-5.0 DEG
IMPACT SPEED	17.2 MPH	18.0 MPH
ENERGY DISSIPATED BY DAMAGE	35274.2 FT-LB	44958.9 FT-LB
SPEED ALONG LINE THRU CGS	17.1 MPH	17.4 MPH
SPEED ORTHOG. TO CD LINE	1.6 MPH	4.4 MPH
CLOSING VELOCITY	34.5 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1		VEHICLE # 2	
TYPE-----	SUBCOMPACT	TYPE-----	INTERMEDIATE
WEIGHT-----	3041.0 LBS.	WEIGHT-----	4850.0 LBS.
VDI-----	12FYEW3	VDI-----	12FYEW3
L-----	32.5 IN.	L-----	32.3 IN.
C1-----	22.0 IN.	C1-----	29.5 IN.
C2-----	20.2 IN.	C2-----	26.3 IN.
C3-----	18.5 IN.	C3-----	23.0 IN.
C4-----	16.8 IN.	C4-----	18.7 IN.
C5-----	15.0 IN.	C5-----	14.3 IN.
C6-----	12.5 IN.	C6-----	11.0 IN.
D-----	-14.2 IN.	D-----	-15.4 IN.
RHO-----	1.00	RHO-----	1.00
ANG-----	5.0 DEG.	ANG-----	355.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	46.3 INCHES	A2	=	54.7 INCHES
B1	=	50.1 INCHES	B2	=	59.2 INCHES
TR1	=	54.6 INCHES	TR2	=	61.8 INCHES
I1	=	23224.6 LB-SEC**2-IN	I2	=	46956.1 LB-SEC**2-IN
M1	=	7.870 LB-SEC**2/IN	M2	=	12.552 LB-SEC**2/IN
XF1	=	83.3 INCHES	XF2	=	98.8 INCHES
XR1	=	-91.6 INCHES	XR2	=	-114.0 INCHES
YS1	=	33.6 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.10	RR-----	.20
LR-----	.10	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
 ?E

CRASH PROGRAM COMPLETED.

STOP

MRU= 4.995

#

RUN CRA2LOM.C0162

CRA2LOM 13:56 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC # 12 CRASHM2

2. SIZE CATEGORIES?
?S 4

**** SYNTAX ERROR ****

2. SIZE CATEGORIES?
?S I

3. VDI, #1
?I2FDEW4

4. VDI, #2
?I2FYEW4

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?3130

7. WEIGHT #2
?4512

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?22.3 -5.5 118. 6.8 2.6 -12.

10. IMPACT COORDINATES?
?15.7 -4. 171. 0. 0. 0.

11. SKIDDING OF # 1? (Y OR N)
?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CCS *DEL*
CCW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N)
?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
?N

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?CCW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?32.

42. END DAMAGE DEPTH #1
?38.6 34.6 29.5 26. 19.6 14.25

43. END DAMAGE MIDPOINT OFFSET #1
?2.75

47. END DAMAGE WIDTH #2
?28.25

48. END DAMAGE DEPTH #2
?39.5 33. 28.75 23.75 19.2 15.

49. END DAMAGE MIDPOINT OFFSET #2
?-10.6

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?5.

54. PRINCIPAL FORCE ANGLE #2?
?-5.

SUMMARY OF CRASH RESULTS

VEHICLE # 1	VEHICLE # 2
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
41	41
42	42
43	43
44	44
45	45
46	46
47	47
48	48
49	49
50	50
51	51
52	52
53	53
54	54
55	55
56	56
57	57
58	58
59	59
60	60
61	61
62	62
63	63
64	64
65	65
66	66
67	67
68	68
69	69
70	70
71	71
72	72
73	73
74	74
75	75
76	76
77	77
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
P

SUMMARY OF CRASH RESULTS

RICSAC # 12 CRASHH2

VEHICLE # 1

```

*****
*                                     *
*                               *                                     *
*                               *                                     *
*IMPACT SPEED*                     MPH                                *
*                               *                                     *
*   MPH      *****                                         BASIS          *
*               *           *           *                   OF            *
*               *    TOTAL    * LONG.  * LATERAL * RESULTS              *
*               *           *           *                   *            *
*****
*               *           *           *                   *            *
*               *           *           *                   *SPINOUT TRAJECTORIES*
*               *           *           *                   *AND CONSERVATION OF *
*               *           *           *                   *LINEAR MOMENTUM     *
*               *           *           *                   *                   *
*****
*               *           *           *                   *                   *
*               *           *           *                   *SPINOUT TRAJECTORIES*
*               *           *           *                   *                   *
*       19.8*        28.2*       -28.1*        -1.6*                AND      *
*               *           *           *                   *DAMAGE             *
*               *           *           *                   *                   *
*****
*               *           *           *                   *                   *
*               *           *           *                   *                   *
*       28.2*        -28.1*        -2.5*        DAMAGE DATA ONLY      *
*               *           *           *                   *                   *
*****

```

VEHICLE # 2

*****3-45*****

SCENE INFORMATION

COLLISION CONDITIONS

SEPARATION CONDITIONS

3-46

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	28.2 MPH	20.0 MPH
	3.1 DEG	-13.1 DEG
SPEED CHANGE (DAMAGE ONLY)	28.2 MPH	19.6 MPH
	5.0 DEG	-5.0 DEG
IMPACT SPEED	19.8 MPH	30.2 MPH
ENERGY DISSIPATED BY DAMAGE	82653.4 FT-LB	59966.1 FT-LB
SPEED ALONG LINE THRU CGS	19.7 MPH	29.3 MPH
SPEED ORTHOG. TO CG LINE	1.8 MPH	7.5 MPH
CLOSING VELOCITY	49.0 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1		VEHICLE # 2	
TYPE-----	SUBCOMPACT	TYPE-----	INTERMEDIATE
WEIGHT-----	3130.0 LBS.	WEIGHT-----	4512.0 LBS.
VDI-----	12FDEW4	VDI-----	12FYEW4
L-----	32.0 IN.	L-----	28.3 IN.
C1-----	38.6 IN.	C1-----	39.5 IN.
C2-----	34.6 IN.	C2-----	33.0 IN.
C3-----	29.5 IN.	C3-----	28.8 IN.
C4-----	26.0 IN.	C4-----	23.8 IN.
C5-----	19.6 IN.	C5-----	19.2 IN.
C6-----	14.3 IN.	C6-----	15.0 IN.
D-----	.4 IN.	D-----	-12.7 IN.
RHO-----	1.00 *	RHO-----	1.00 *
ANG-----	5.0 DEG.	ANG-----	355.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	46.3 INCHES	A2	=	54.7 INCHES
B1	=	50.1 INCHES	B2	=	59.2 INCHES
TR1	=	54.6 INCHES	TR2	=	61.8 INCHES
I1	=	23904.3 LB-SEC**2-IN	I2	=	43683.7 LB-SEC**2-IN
M1	=	8.100 LB-SEC**2/IN	M2	=	11.677 LB-SEC**2/IN
XF1	=	83.3 INCHES	XF2	=	98.8 INCHES
XR1	=	-91.6 INCHES	XR2	=	-114.0 INCHES
YS1	=	33.6 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.20	RR-----	.20
LR-----	.20	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 5.034

MCAUTO: PLEASE SELECT HOST
WDAC, WTSO, WCMS, WTSOA, WTSOB, WTSOV.
- WDAC

MCAUTO - 14:20 APR 16, '80
LOGON PLEASE: C0014C
PASSWORD

ID=131

#RUN CRA2LOM, C0162

CRA2LOM 14:20 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?TRICSAC TEST #3 CRASH2

2. SIZE CATEGORIES?
?I S

3. VDI, #1
?12FZEW1

4. VDI, #2
?06BZEW1

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?4949

7. WEIGHT #2
?3120

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?111.4

**** SYNTAX ERROR ****

9. REST COORDINATES?
?111.4 2. -4. 181.5 6.4 -19.

10. IMPACT COORDINATES?
?0. 0. 0. 15. 2.2 10.

11. SKIDDING OF # 1? (Y OR N)

N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?N

18. SKIDDING OF # 2? (Y OR N)
?N

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .09 .09

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .1 .1

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?30.

42. END DAMAGE DEPTH #1
?2. 2. 1.5 1.75 2. 2.25

43. END DAMAGE MIDPOINT OFFSET #1
?22.

47. END DAMAGE WIDTH #2
?3: *DEL*
30.

48. END DAMAGE DEPTH #2
?6.5 6.75 4 *DEL*
6.5 6.75 5.75 5. 3.75 3.

49. END DAMAGE MIDPOINT OFFSET #2
?5.

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?0.

54. PRINCIPAL FORCE ANGLE #2? 3-49
?170.

SCENE INFORMATION

COLLISION CONDITIONS

SEPARATION CONDITIONS

XCS1	=	0.0 FT.		XCS2	=	15.0 FT.
YCS1	=	0.0 FT.		YCS2	=	2.2 FT.
PSIS1	=	0.0 DEG		PSIS2	=	10.0 DEG
US1	=	12.0 MPH	3-51	US2	=	15.3 MPH
US1	=	.2 MPH		US2	=	-2.3 MPH

PSISD1 = 0.0 DEG/SEC

PSISD2 = 0.0 DEG/SEC

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	3.1 MPH	5.4 MPH
	-3.9 DEG	154.7 DEG
SPEED CHANGE (DAMAGE ONLY)	3.1 MPH	4.9 MPH
	.0 DEG	170.0 DEG
IMPACT SPEED	15.2 MPH	10.4 MPH
ENERGY DISSIPATED BY DAMAGE	2685.4 FT-LB	1795.2 FT-LB
SPEED ALONG LINE THRU CGS	15.0 MPH	-10.4 MPH
SPEED ORTHOG. TO CG LINE	-2.1 MPH	-4.4 MPH
CLOSING VELOCITY	4.6 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----INTERMEDIATE

WEIGHT----- 4949.0 LBS.

VDI-----12FZEW1

L----- 30.0 IN.

C1----- 2.0 IN.

C2----- 2.0 IN.

C3----- 1.5 IN.

C4----- 1.8 IN.

C5----- 2.0 IN.

C6----- 2.3 IN.

D----- 22.3 IN.

RHO----- 1.00 *

ANG----- 0.0 DEG.

VEHICLE # 2

TYPE-----SUBCOMPACT

WEIGHT----- 3120.0 LBS.

VDI-----06BZEW1

L----- 30.0 IN.

C1----- 6.5 IN.

C2----- 6.8 IN.

C3----- 5.8 IN.

C4----- 5.0 IN.

C5----- 3.8 IN.

C6----- 3.0 IN.

D----- 3.0 IN.

RHO----- 1.00 *

ANG----- 170.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES *
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	47914.6 LB-SEC**2-IN	I2	=	23828.0 LB-SEC**2-IN
M1	=	12.808 LB-SEC**2/IN	M2	=	8.075 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1	VEHICLE # 2
RF----- .01	RF----- .01
LF----- .01	LF----- .01
RR----- .09	RR----- .10
LR----- .09	LR----- .10
MU----- .87	

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

CRASH PROGRAM COMPLETED.

STOP

MRU= 5.105

#

RUN CRA2LOM.C0162

CRA2LOM 14:31 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC # 4 CRASH2

2. SIZE CATEGORIES?
?I S

3. VDI, #1
?12FZEW3

4. VDI, #2
?05BYEW5

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?4980

7. WEIGHT #2
?3190

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?42.8 54.5 137.5 63.9 62.5 88.

10. IMPACT COORDINATES?
?0. 0. 1. 16.4 3.4 10.

11. SKIDDING OF # 1? (Y OR N)
?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

13. END OF SKIDDING COORDINATES?
?20. 5. 10.

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N) 3-54
?N

18. SKIDDING OF # 2? (Y OR N)
 ?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
 ?Y

20. END OF SKIDDING COORDINATES?
 ?35. 2. 10.

21. CURVED PATH? (Y OR N)
 ?N

23. ROTATION DIRECTION # 2?
 ?CW

24. MORE THAN 360 DEG? (Y OR N)
 ?N

25. TIRE-GROUND FRICTION?
 ? .87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
 ?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
 ? .01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
 ? .01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
 ?N

37. DAMAGE DIMENSIONS? (Y OR N)
 ?Y

41. END DAMAGE WIDTH #1
 ?41.5

42. END DAMAGE DEPTH #1
 ?6.3 7.8 9.8 12.5 14.8 18.3

43. END DAMAGE MIDPOINT OFFSET #1
 ?16.1

47. END DAMAGE WIDTH #2
 ?41.8

48. END DAMAGE DEPTH #2
 ?36. 31.5 29. 24. 19.5 14.8

49. END DAMAGE MIDPOINT OFFSET #2
 ?-9.1

52. FORCE DIRECTIONS (Y OR N)
 ?Y

53. PRINCIPAL FORCE ANGLE #1?
 ?0.

54. PRINCIPAL FORCE ANGLE #2?
 ?170.

IMPACT SPEED*		SPEED CHANGE			RASTER	
MPH		MPH			OF	
MPH		RESULTS				
		TOTAL	LONG.	LATERAL		

SPINOUT TRAJECTORIES						
AND CONSERVATION OF						
LINEAR MOMENTUM						

SPINOUT TRAJECTORIES						
AND						
2.2*	15.5*	14.9*	-4.4*	DAMAGE		

DAMAGE DATA ONLY						

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	16.40 FT.
IMPACT Y-POSITION	0.00 FT.	3.40 FT.
IMPACT HEADING ANGLE	1.00 DEG.	10.00 DEG.
REST X-POSITION	42.80 FT.	63.90 FT.
REST Y-POSITION	54.50 FT.	62.50 FT.
REST HEADING ANGLE	137.48 DEG.	87.99 DEG.
END-OF-ROTATION X-POSITION	20.00 FT.	35.00 FT.
END-OF-ROTATION Y-POSITION	5.00 FT.	2.00 FT.
END-OF-ROTATION HEADING ANGLE	10.00 DEG.	10.00 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= 0.0 FT.	XC20'	= 16.4 FT.
YC10'	= 0.0 FT.	YC20'	= 3.4 FT.
PSI10	= 1.0 DEGREES	PSI20	= 10.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC
U10	= 32.5 MPH	U20	= 2.2 MPH
V10	= 0.0 MPH	V20	= 0.0 MPH

SEPARATION CONDITIONS

XCS1	= 0.0 FT.	XCS2	= 16.4 FT.
YCS1	= 0.0 FT.	YCS2	= 3.4 FT.
PSIS1	= 1.0 DEG	PSIS2	= 10.0 DEG
US1	= 22.8 MPH	US2	= 17.1 MPH
VS1	= 4.9 MPH	VS2	= -4.4 MPH
PSISD1	= 18.2 DEG/SEC	PSISD2	= 0.0 DEG/SEC

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	10.9 MPH	15.5 MPH
	-26.8 DEG	163.6 DEG
SPEED CHANGE (DAMAGE ONLY)	9.7 MPH	15.1 MPH
	.0 DEG	170.0 DEG
IMPACT SPEED	32.5 MPH	2.2 MPH
ENERGY DISSIPATED BY DAMAGE	23465.1 FT-LB	23467.5 FT-LB
SPEED ALONG LINE THRU CGS	31.9 MPH	-2.2 MPH
SPEED ORTHOG. TO CG LINE	-6.0 MPH	.1 MPH
CLOSING VELOCITY	29.7 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1			VEHICLE # 2		
TYPE-----	INTERMEDIATE		TYPE-----	SUBCOMPACT	
WEIGHT-----	4980.0 LBS.		WEIGHT-----	3190.0 LBS.	
VBI-----	12FZEW3		VBI-----	05RYEW5	
L-----	41.5 IN.		L-----	41.8 IN.	
C1-----	6.3 IN.		C1-----	36.0 IN.	
C2-----	7.8 IN.		C2-----	31.5 IN.	
C3-----	9.8 IN.		C3-----	29.0 IN.	
C4-----	12.5 IN.		C4-----	24.0 IN.	
C5-----	14.8 IN.		C5-----	19.5 IN.	
C6-----	18.3 IN.		C6-----	14.8 IN.	
D-----	19.7 IN.		D-----	-11.9 IN.	
RHO-----	1.00	*	RHO-----	1.00	*
ANG-----	0.0 DEG.		ANG-----	170.0 DEG.	

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	48214.8 LB-SEC**2-IN	I2	=	24362.6 LB-SEC**2-IN
M1	=	12.888 LB-SEC**2/IN	M2	=	8.256 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.20	RR-----	.20
LR-----	.20	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

?E

CRASH PROGRAM COMPLETED.

STOP

MRU= 5.124

#

RUN CRA2L0M,00162

CRA2L0M 14:42 APR 16, 80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORMAT?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC # 5 CRASH2

2. SIZE CATEGORIES?
?I M

3. VDI, #1
?12FZEW1

4. VDI, #2
?05BDEW8

5. ACTUAL WEIGHT? (Y OR N)
?Y

6. WEIGHT #1
?4600

7. WEIGHT #2
?2350

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?241.6 0. 3. 56.9 39. 282.

10. IMPACT COORDINATES?
?0. 0. 0. 14.9 3.4 10.

11. SKIDDING OF # 1? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N)
?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

20. END OF SKIDDING COORDINATE?
?55. 23. 260.

21. CURVED PATH? (Y OR N)
?Y

22. POINT ON CURVE?
?40. 10.

23. ROTATION DIRECTION # ??
?CW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.2 .2 .01 .1

31. TRAJECTORY SIMULATION? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?33.5

42. END DAMAGE DEPTH #1
?1.4 1.4 2. 2.1 2.3 2.9

43. END DAMAGE MIDPOINT OFFSET #1
?20.3

47. END DAMAGE WIDTH #2
?53.

48. END DAMAGE DEPTH #2
?36. 36.5 31.5 23. 13.3 6.

49. END DAMAGE MIDPOINT OFFSET #2
?-1, *DEL*
-1.6

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?0.

54. PRINCIPAL FORCE ANGLE #2?
?170.

THANK YOU VERY MUCH

3-63

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	7.9 MPH	15.9 MPH
	.0 DEG	163.9 DEG
SPEED CHANGE (DAMAGE ONLY)	7.9 MPH	15.5 MPH
	.0 DEG	170.0 DEG
IMPACT SPEED	33.6 MPH	9.4 MPH
ENERGY DISSIPATED BY DAMAGE	3114.8 FT-LB	30255.6 FT-LB
SPEED ALONG LINE THRU CGS	32.8 MPH	-9.4 MPH
SPEED ORTHOG. TO CG LINE	-7.5 MPH	.5 MPH
CLOSING VELOCITY	23.4 MPH	

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1			VEHICLE # 2		
TYPE-----	INTERMEDIATE		TYPE-----	MINICAR	
WEIGHT-----	4600.0 LBS.		WEIGHT-----	2350.0 LBS.	
VDI-----	12FZEW1		VDI-----	05RDEW8	
L-----	33.5 IN.		L-----	53.0 IN.	
C1-----	1.4 IN.		C1-----	36.0 IN.	
C2-----	1.4 IN.		C2-----	36.5 IN.	
C3-----	2.0 IN.		C3-----	31.5 IN.	
C4-----	2.1 IN.		C4-----	23.0 IN.	
C5-----	2.3 IN.		C5-----	13.3 IN.	
C6-----	2.9 IN.		C6-----	6.0 IN.	
D-----	22.3 IN.		D-----	-7.7 IN.	
RHO-----	1.00	*	RHO-----	1.00	*
ANG-----	0.0 DEG.		ANG-----	170.0 DEG.	

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	45.1 INCHES
B1	=	59.2 INCHES	B2	=	48.1 INCHES
TR1	=	61.8 INCHES	TR2	=	51.1 INCHES
I1	=	44535.7 LB-SEC**2-IN	I2	=	12200.1 LB-SEC**2-IN
M1	=	11.905 LB-SEC**2/IN	M2	=	6.082 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	76.0 INCHES
XR1	=	-114.0 INCHES	XR2	=	-83.8 INCHES
YS1	=	38.5 INCHES	YS2	=	-30.4 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.20
LF-----	.01	LF-----	.20
RR-----	.20	RR-----	.01
LR-----	.20	LR-----	.10
MU-----	.87		

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
 ?E

CRASH PROGRAM COMPLETED.

STOP

MRU= 5.035

#BYE

CON= 0:34 MRU= 15.265

o8C30=[^([?]]u

SECTION 4
CRASH2 PRODUCTION VERSION WITH TRAJECTORY SIMULATION

CRA210M 08:45 APR 18, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RICSAC TEST#1 WITH TRAJ SIM

2. SIZE CATEGORIES?
?I S

3. VDI, #1
?11FZEW2

4. VDI, #2
?01RDEW3

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?4621

7. WEIGHT #2
?3082

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?-2.4 -1. -1.5 7.5 2.5 105.

10. IMPACT COORDINATES?
?-10.8 1. -30. 0. -5.5 90.

11. SKIDDING OF # 1? (Y OR N)
?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N)
?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
 ?N

21. CURVED PATH? (Y OR N)
 ?N

23. ROTATION DIRECTION # 2?
 ?CW

24. MORE THAN 360 DEG? (Y OR N)
 ?N

25. TIRE-GROUND FRICTION?
 ?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
 ?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
 ? .01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
 ? .01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
 ?Y

32. STEER ANGLES #1 ?
 ?0 0 0 0

33. STEER ANGLES #2 ?
 ?0 0 0 0

34. TERRAIN BOUNDARY? (Y OR N)
 ?N

37. DAMAGE DIMENSIONS? (Y OR N)
 ?Y

41. END DAMAGE WIDTH #1
 ?46.

42. END DAMAGE DEPTH #1
 ?4. 5.5 7. 10.2 12.1 14.8

43. END DAMAGE MIDPOINT OFFSET #1
 ?14.3

44. SIDE DAMAGE WIDTH #2
 ?113.3

45. SIDE DAMAGE DEPTH #2
 ? .5 12. 10.6 11.8 9. 4.1

46. SIDE DAMAGE MIDPOINT OFFSET #2
 ?21.8

52. FORCE DIRECTIONS (Y OR N)
 ?Y

53. PRINCIPAL FORCE ANGLE #1?
 ?-30.

54. PRINCIPAL FORCE ANGLE #2?
P30.

THANK YOU VERY MUCH

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = 197.5 VS = 42.4 PSISD = .79 SSDOT = 202.0 GAMS = -.33
REST: 405.8 -225.7 -.42 END-OF-ROT: -58.2 -17.6 -.42
POINT-ON-CURVE: -129.6 12.0
ERRORS: 4.67 .29 .79 .79 0.00 Q = 6.01 T = 5.20

VEHICLE # 1 TRAJECTORY ITERATION # 2
US = 124.6 VS = 50.8 PSISD = 1.06 SSDOT = 134.6 GAMS = -.14
REST: 100.8 -74.3 -.37 END-OF-ROT: -71.2 -5.1 -.37
POINT-ON-CURVE: -129.6 12.0
ERRORS: 1.39 .41 .69 .69 0.00 Q = 2.63 T = 3.60

VEHICLE # 1 TRAJECTORY ITERATION # 3
US = 103.2 VS = 54.7 PSISD = 1.38 SSDOT = 116.8 GAMS = -.04
REST: 45.3 -39.3 -.30 END-OF-ROT: -78.2 3.4 -.30
POINT-ON-CURVE: -129.6 12.0
ERRORS: .76 .50 .56 .55 0.00 Q = 1.85 T = 3.10

VEHICLE # 1 TRAJECTORY ITERATION # 4
US = 99.7 VS = 54.3 PSISD = 1.72 SSDOT = 113.6 GAMS = -.02
REST: 46.9 -23.5 -.22 END-OF-ROT: -60.6 3.3 -.22
POINT-ON-CURVE: -129.6 12.0
ERRORS: .74 .34 .38 .38 0.00 Q = 1.48 T = 3.10

VEHICLE # 1 TRAJECTORY ITERATION # 5
US = 93.8 VS = 44.1 PSISD = 2.02 SSDOT = 103.6 GAMS = -.08
REST: 24.5 -7.4 -.14 END-OF-ROT: -9.1 -2.2 -.14
POINT-ON-CURVE: -129.6 12.0
ERRORS: .52 .21 .24 .23 0.00 Q = .97 T = 2.80

VEHICLE # 2 TRAJECTORY ITERATION # 1
US = 181.8 VS = -181.5 PSISD = .41 SSDOT = 256.9 GAMS = .79
REST: -28.3 288.0 1.86 END-OF-ROT: 41.2 70.1 1.86
POINT-ON-CURVE: 0.0 -66.0
ERRORS: 2.16 .48 -.11 -.12 0.00 Q = 2.57 T = 4.40

SUMMARY OF CRASH RESULTS

RICSAC TEST#1 WITH TRAJ SIM

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	9.7 MPH	14.6 MPH
	-14.9 DEG	45.1 DEG
SPEED CHANGE (DAMAGE ONLY)	18.5 MPH	27.7 MPH
	-30.0 DEG	30.0 DEG
IMPACT SPEED	14.7 MPH	20.6 MPH
ENERGY DISSIPATED BY DAMAGE	24652.4 FT-LB	169174.7 FT-LB
SPEED ALONG LINE THRU CGS	14.7 MPH	11.9 MPH
SPEED ORTHOG. TO CG LINE	1.3 MPH	-16.9 MPH
CLOSING VELOCITY	26.5 MPH	

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

P

KICSAC TEST#1 WITH TRA 1 SIM

[illegible]

```

*****
*                                     *
*           *                       *                                     *
*           *               SPEED   CHANGE                             *
*IMPACT SPEED*                   MPH                                   *
*           *                       *                                     *
*    MPH     *****                                                         BASIS                               *
*           *           *           *           OF                     *
*           * TOTAL   * LONG.   * LATERAL * RESULTS                    *
*           *           *           *           *                      *
*****
*           *           *           *                                     *
*           *           *           *                                     *
*           *           *           * SPINOUT TRAJECTORIES*          *
*    20.6*      14.6*      -10.3*      -10.3*AND CONSERVATION OF *
*           *           *           * LINEAR MOMENTUM                *
*           *           *           *                                     *
*****
*           *           *           *                                     *
*           *           *           * SPINOUT TRAJECTORIES*          *
*           *           *           * AND                            *
*           *           *           * DAMAGE                        *
*****
*           *           *           *                                     *
*           *       27.7*      -24.0*      -13.9* DAMAGE DATA ONLY *
*           *           *           *                                     *
*****

```

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-11.55 FT.	-1.00 FT.
IMPACT Y-POSITION	1.43 FT.	-6.71 FT.
IMPACT HEADING ANGLE	-30.00 DEG.	89.99 DEG.
REST X-POSITION	-2.40 FT.	7.50 FT.
REST Y-POSITION	-1.00 FT.	2.50 FT.
REST HEADING ANGLE	-1.50 DEG.	104.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= -11.5 FT.	XC20'	= -1.0 FT.
YC10'	= 1.4 FT.	YC20'	= -6.7 FT.
PSI10	= -30.0 DEGREES	PSI20	= 90.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC
U10	= 14.7 MPH	U20	= 20.6 MPH
V10	= 0.0 MPH	V20	= 0.0 MPH

SEPARATION CONDITIONS

XCS1	= -10.8 FT.	XCS2	= 0.0 FT.
YCS1	= 1.0 FT.	YCS2	= -5.5 FT.
PSIS1	= -30.0 DEG	PSIS2	= 90.0 DEG
US1	= 5.3 MPH	US2	= 10.3 MPH
VS1	= 2.5 MPH	VS2	= -10.3 MPH
PSISD1	= 115.7 DEG/SEC	PSISD2	= 23.4 DEG/SEC

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	9.7 MPH	14.6 MPH
	-14.9 DEG	45.1 DEG
SPEED CHANGE (DAMAGE ONLY)	18.5 MPH	27.7 MPH
	-30.0 DEG	30.0 DEG
IMPACT SPEED	14.7 MPH	20.6 MPH
ENERGY DISSIPATED BY DAMAGE	24652.4 FT-LB	169174.7 FT-LB
SPEED ALONG LINE THRU CGS	14.7 MPH	11.9 MPH
SPEED ORTHOG. TO CG LINE	1.3 MPH	-16.9 MPH
CLOSING VELOCITY	26.5 MPH	

TRAJECTORY SIMULATION RESULTS

```

++++ VEHICLE # 1 DID NOT CONVERGE ++++
++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS ++++
NRUNS(1) = 5 NRUNS(2) = 1
E1(1) = .516 E2(1) = 2.157
E1(2) = .212 E2(2) = .480
E1(3) = .238 E2(3) = -.114
E1(4) = .226 E2(4) = -.117
E1(5) = 0.000 E2(5) = 0.000
QMIN1 = .973 QMIN2 = 2.569

```

SUMMARY OF DAMAGE DATA

(*) INDICATES DEPENDENT VARIABLE

VEHICLE # 1

TYPE-----INTERMEDIATE
 WEIGHT-----4621.0 LBS.
 VDI-----11F/EW2
 L-----46.0 IN.
 C1-----4.0 IN.
 C2-----5.5 IN.
 C3-----7.0 IN.
 C4-----10.2 IN.
 C5-----12.1 IN.
 C6-----14.8 IN.
 D-----19.1 IN.
 RHO-----1.00 *
 ANG-----330.0 DEG.

VEHICLE

TYPE-----STRUCTURAL
 WEIGHT-----4000.0 LBS.
 VDI-----OTHER
 L-----11.5 IN.
 C1-----1.0 IN.
 C2-----1.0 IN.
 C3-----1.0 IN.
 C4-----11.5 IN.
 C5-----9.0 IN.
 C6-----4.0 IN.
 D-----21.0 IN.
 RHO-----1.00 *
 ANG-----30.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
T1	=	44739.0 LB-SEC**2-IN	I2	=	23537.7 LB-SEC**2-IN
M1	=	11.959 LB-SEC**2/IN	M2	=	12.976 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	85.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	32.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----.01
 LF-----.01
 RR-----.20
 LR-----.20

VEHICLE # 2

RF-----.01
 LF-----.01
 RR-----.20
 LR-----.20

MU-----.87

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

TE

CRASH PROGRAM COMPLETED.

STOP

MRU= 10.369

#

UN CRA2LOM.C0162

CRA2LOM 10:26 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?NO

1. TITLE?
?RICSAC #2 WITH TRAJ TEST SIM

2. SIZE CATEGORIES?
?4-2

**** SYNTAX ERROR ****

2. SIZE CATEGORIES?
??

2. ENTER SIZE CATEGORIES FOR VEHICLE # 1 AND VEHICLE # 2
LEGAL CATEGORIES: MINICAR SUBCOMPACT COMPACT INTERMEDIATE
FULLSIZE LARGE RIGID BARRIER
SAMPLE: FULLSIZE MINI (ABBREVIATIONS ARE OK)
?I S

3. VDI, #1
?11FDEW2

4. VDI, #2
?02RDEW4

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?4621

7. WEIGHT #2
?3081

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?11. 9.4 55. 23.6 12.5 134.

10. IMPACT COORDINATES?
?-11.2 8.5 -30. 0. 0. 90.

11. SKIDDING OF # 1? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?N

18. SKIDDING OF # 2? (Y OR N)
?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
?N

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?CW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?1. .02 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.02 .02 1. 1.

31. TRAJECTORY SIMULATION? (Y OR N)
?Y

32. STEER ANGLES #1 ?
?0 0 0 0

33. STEER ANGLES #2 ?
?0 0 0 0

34. TERRAIN BOUNDARY? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?75.5

42. END DAMAGE DEPTH #1
?.5 2.4 3.7 6.9 12. 16.5

43. END DAMAGE MIDPOINT OFFSET #1
?0.

44. SIDE DAMAGE WIDTH #2
?118.5

45. SIDE DAMAGE DEPTH #2
?6.75 22.75 23.5 21.3 10. 0.

46. SIDE DAMAGE MIDPOINT OFFSET #2
?13.7

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
7-30.

54. PRINCIPAL FORCE ANGLE #27
730.

THANK YOU VERY MUCH

SUMMARY OF CRASH RESULTS

RICSAC #2 WITH TRAJ TEST SIM

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	22.0 MPH	33.0 MPH
	-20.3 DEG	39.6 DEG
SPEED CHANGE (DAMAGE ONLY)	31.1 MPH	46.6 MPH
	-30.0 DEG	30.0 DEG
IMPACT SPEED	32.8 MPH	35.6 MPH
ENERGY DISSIPATED BY DAMAGE	31832.5 FT-LB	507722.9 FT-LB
SPEED ALONG LINE THRU CGS	32.4 MPH	22.2 MPH
SPEED ORTHOG. TO CG LINE	4.9 MPH	-27.8 MPH
CLOSING VELOCITY	54.6 MPH	

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
7F

```

SUMMARY OF CRASH RESULTS

RICSAC #2 WITH TRAJ TEST SIM

VEHICLE # 1					

*	*			*	*
*	*	SPEED CHANGE		*	*
IMPACT SPEED		MPH		*	*
*	*			*	*
*	MPH	*****			BASIS
*	*	*	*	*	OF
*	*	TOTAL	LONG.	LATERAL	RESULTS
*	*	*	*	*	*

*	*	*	*	*	*
*	*	*	*	*	*
*	32.8*	22.0*	-20.7*	7.7*	*SPINOUT TRAJECTORIES*
*	*	*	*	*	*AND CONSERVATION OF
*	*	*	*	*	*LINEAR MOMENTUM
*	*	*	*	*	*

*	*	*	*	*	*
*	*	*	*	*	*SPINOUT TRAJECTORIES*
*	*	*	*	*	*
*	*	*	*	*	AND
*	*	*	*	*	DAMAGE
4-9					

```

*          *          *          *          *
*          *          31.1*          -26.0*          14.1*          DAMAGE DATA ONLY
*          *          *          *          *
*****

```

VEHICLE # 2

```

*****
*          *          *          *          *
*          *          SPEED CHANGE          *
*IMPACT SPEED*          MPH          *
*          *          *          *          *
*          *          *          *          *          BASIS
*          *          *          *          *          OF
*          *          *          *          *          RESULTS
*          *          *          *          *
*          *          *          *          *
*****
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *          *SPINOUT TRAJECTORIES*
*          *          *          *          *          *AND CONSERVATION OF *
*          *          *          *          *          *LINEAR MOMENTUM          *
*          *          *          *          *          *
*****
*          *          *          *          *
*          *          *          *          *          *SPINOUT TRAJECTORIES*
*          *          *          *          *          *AND
*          *          *          *          *          *DAMAGE
*          *          *          *          *          *
*****
*          *          *          *          *
*          *          *          *          *
*          *          *          *          *          *DAMAGE DATA ONLY
*          *          *          *          *          *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-11.62 FT.	-0.00 FT.
IMPACT Y-POSITION	8.74 FT.	-0.52 FT.
IMPACT HEADING ANGLE	-30.00 DEG.	89.99 DEG.
REST X-POSITION	11.00 FT.	23.60 FT.
REST Y-POSITION	9.40 FT.	12.50 FT.
REST HEADING ANGLE	54.99 DEG.	133.98 DEG.
END-OF-ROTATION X-POSITION	-11.20 FT.	
END-OF-ROTATION Y-POSITION	8.50 FT.	
END-OF-ROTATION HEADING ANGLE	-30.00 DEG.	
DIRECTION OF ROTATION	NONE	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= -11.6 FT.	XC20'	= -0.0 FT.
YC10'	= 8.7 FT.	YC20'	= -0.5 FT.
PSI10	= -30.0 DEGREES	PSI20	= 90.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC
U10	= 32.8 MPH	U20	= 35.6 MPH
V10	= 0.0 MPH	V20	= 0.0 MPH

4-10

SEPARATION CONDITIONS

XCS1	=	-11.2 FT.	XCS2	=	0.0 FT.
YCS1	=	8.5 FT.	YCS2	=	0.0 FT.
PSIS1	=	-30.0 DEG	PSIS2	=	90.0 DEG
US1	=	12.1 MPH	US2	=	10.2 MPH
VS1	=	7.7 MPH	VS2	=	-21.1 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	45.1 DEG/SEC

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	22.0 MPH	33.0 MPH
	-20.3 DEG	39.6 DEG
SPEED CHANGE (DAMAGE ONLY)	31.1 MPH	46.6 MPH
	-30.0 DEG	30.0 DEG
IMPACT SPEED	32.8 MPH	35.6 MPH
ENERGY DISSIPATED BY DAMAGE	31832.5 FT-LB	50772.9 FT-LB
SPEED ALONG LINE THRU CGS	32.4 MPH	22.2 MPH
SPEED ORTHOG. TO CG LINE	4.9 MPH	-27.8 MPH
CLOSING VELOCITY	54.6 MPH	

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 TIMED OUT AT 10 SECONDS ++++

++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS ++++

NRUNS(1) =	0	NRUNS(2) =	0
F1(1) =	0.000	E2(1) =	0.000
E1(2) =	0.000	E2(2) =	0.000
E1(3) =	0.000	E2(3) =	0.000
F1(4) =	0.000	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	0.000	QMIN2 =	0.000

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1			VEHICLE # 2		
TYPE-----	INTERMEDIATE		TYPE-----	SUBCOMPACT	
WEIGHT-----	4621.0 LBS.		WEIGHT-----	3081.0 LBS.	
VOL-----	11FDFW2		VOL-----	Q2RDEW4	
L-----	75.5 IN.		L-----	118.5 IN.	
C1-----	1.5 IN.		C1-----	6.8 IN.	
C2-----	2.4 IN.		C2-----	22.8 IN.	
C3-----	3.7 IN.		C3-----	23.5 IN.	
C4-----	6.9 IN.		C4-----	21.3 IN.	
C5-----	12.0 IN.		C5-----	10.0 IN.	
C6-----	14.5 IN.		C6-----	0.0 IN.	
D-----	15.0 IN.		D-----	5.6 IN.	
RHO-----	1.00	*	RHO-----	1.00	*
ANG-----	330.0 DEG		ANG-----	30.0 DEG.	

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	44.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	44739.0 LB-SEC**2-IN	I2 4-11	=	23530.1 LB-SEC**2-IN
M1	=	11.959 LB-SEC**2-IN	M2	=	7.974 LB-SEC**2-IN

XF1	=	98.8 INCHES	YF1	=	83.3 INCHES
XR1	=	114.6 INCHES	YR1	=	91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	1.00
LF-----	.02
RR-----	.20
LR-----	.20

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.02
LF-----	.02
RR-----	1.00
LR-----	1.00

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

END

CRASH PROGRAM COMPLETED.

STOP

MRU= 7.859

#

RUN CRASHOM.C0162

CRA2LOM 08:57 APR 18 1980

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?
(ANSWER YES OR NO)
?N

1. TITLE?
?RCSAC TEST # 8 WITH TRAJ SIM (CRASH2)

2. SIZE CATEGORIES?
?I 1

3. VDI, #1
?12FDEW1

4. VDI, #2
?03RYEW3

5. ACTUAL WEIGHTS? (Y OR N)
?#

4. VDI, #2
?03RYEW2

5. ACTUAL WEIGHTS? (Y OR N)
?Y

6. WEIGHT #1
?4479

7. WEIGHT #2
?4'10

8. REST & IMPACT? (Y OR N)
?Y

9. REST COORDINATES?
?-0.5 11. 46. 6.5 21. 141.

10. IMPACT COORDINATES?
?#

9. REST COORDINATES?
?-0.5 12. 46. 6.5 21. 141.

10. IMPACT COORDINATES?
?-10.9 3.2 0. 0. 1.9 90.

11. SKIDDING OF # 1? (Y OR N)
?1

**** SYNTAX ERROR ****

4-13

11. SKIDDING OF # 1? (Y OR N)

?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)
?N

14. CURVED PATH? (Y OR N)
?N

16. ROTATION DIRECTION #1?
?CW

17. MORE THAN 360 DEG? (Y OR N)
?N

18. SKIDDING OF # 2? (Y OR N)
?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)
?N

21. CURVED PATH? (Y OR N)
?N

23. ROTATION DIRECTION # 2?
?CW

24. MORE THAN 360 DEG? (Y OR N)
?N

25. TIRE-GROUND FRICTION?
?.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)
?N *DEL*
Y

32. STEER ANGLES #1 ?
?0 0 0 0

33. STEER ANGLES #2 ?
?0 0 0 0

34. TERRAIN BOUNDARY? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?73.

42. END DAMAGE DEPTH #1
?2.7 3.6

43. END DAMAGE MIDPOINT OFFSET #1
?0.

44. SIDE DAMAGE WIDTH #2
784.5

45. SIDE DAMAGE DEPTH #2
75.2 8.3 9.2 5.9 4.4 .8

46. SIDE DAMAGE MIDPOINT OFFSET #2
215.

52. FORCE DIRECTIONS (Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?-45.

54. PRINCIPAL FORCE ANGLE #2?
?45.

THANK YOU VERY MUCH

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = 205.6 VS = 147.4 PSISD = 1.02 SSDOT = 253.0 GAMS = .62
REST: 587.5 286.7 .32 END-OF-ROT: 10.2 96.5 .32
POINT-ON-CURVE: -130.8 38.4
ERRORS: 3.73 .31 .60 .60 0.00 Q = 4.79 T = 6.50

VEHICLE # 1 TRAJECTORY ITERATION # 2
US = 93.3 VS = 136.7 PSISD = 1.29 SSDOT = 165.5 GAMS = .97
REST: 66.7 141.9 .42 END-OF-ROT: -65.7 87.3 .41
POINT-ON-CURVE: -130.8 38.4
ERRORS: .45 .50 .48 .48 0.00 Q = 1.42 T = 3.40

VEHICLE # 1 TRAJECTORY ITERATION # 3
US = 72.5 VS = 156.7 PSISD = 1.56 SSDOT = 172.7 GAMS = 1.14
REST: 37.6 168.5 .56 END-OF-ROT: -77.6 100.4 .57
POINT-ON-CURVE: -130.8 38.4
ERRORS: .31 .51 .30 .29 0.00 Q = 1.01 T = 3.30

VEHICLE # 1 TRAJECTORY ITERATION # 4
US = 80.4 VS = 163.6 PSISD = 1.78 SSDOT = 182.3 GAMS = 1.11
REST: 77.6 216.5 .64 END-OF-ROT: -63.4 116.2 .64
POINT-ON-CURVE: -130.8 38.4
ERRORS: .68 .39 .20 .20 0.00 Q = 1.17 T = 3.80

VEHICLE # 1 TRAJECTORY ITERATION # 5
US = 83.5 VS = 148.6 PSISD = 1.95 SSDOT = 170.4 GAMS = 1.06
REST: 79.0 213.8 .64 END-OF-ROT: -62.4 113.9 .64
POINT-ON-CURVE: -130.8 38.4
ERRORS: .67 .39 .21 .21 0.00 Q = 1.18 T = 3.80

VEHICLE # 2 TRAJECTORY ITERATION # 1
US = 300.6 VS = -122.3 PSISD = .95 SSDOT = 324.5 GAMS = 1.18
REST: -442.8 599.6 2.48 END-OF-ROT: -74.5 312.4 2.48
POINT-ON-CURVE: 0.0 22.8
ERRORS: 2.59 .68 -.02 -.02 0.00 Q = 2.95 T = 6.50

SUMMARY OF CRASH RESULTS

RICSAC TEST # 8 WITH TRAJ SIM (CRASH2) 4-15

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, PERUN, PRINT, BATCH, SMAC, OR END)
?P

```

```

*****
*                                     *
*                                     *
*          SPEED CHANGE              *
*IMPACT SPEED*                MPH    *
*                                     *
*          MPH                      *      BASIS
*          *****                  *      OF
*          *           *             * RESULTS
*          * TOTAL   * LONG.  * LATERAL *
*          *         *       *        *
*****
*****                               4-16 *****
*                                     *

```


SPEED OF TRUCK 10.00 MPH
CLOSING VELOCITY

2.5 MPH
12.8 MPH

10.00 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS +++++

NRUNS(1) =	5	NRUNS(2) =	1
E1(1) =	.306	E2(1) =	.586
E1(2) =	.513	E2(2) =	.378
E1(3) =	.299	E2(3) =	.019
E1(4) =	.294	E2(4) =	.012
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	1.008	QMIN2 =	0.952

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----INTERMEDIATE
WEIGHT----- 4479.0 LBS.
V01-----12F0EW1
L----- 73.0 IN.
C1----- 2.7 IN.
C2----- 3.6 IN.
C3----- 0.0 IN.
C4----- 0.0 IN.
C5----- 0.0 IN.
C6----- 0.0 IN.
D----- 1.7 IN.
RHO----- 1.00 *
ANG----- 315.0 DEG.

VEHICLE # 2

TYPE-----INTERMEDIATE
WEIGHT----- 4710.0 LBS.
V01-----03PYEW2
L----- 84.5 IN.
C1----- 6.2 IN.
C2----- 8.3 IN.
C3----- 9.2 IN.
C4----- 5.9 IN.
C5----- 4.4 IN.
C6----- 1.8 IN.
D----- 7.9 IN.
RHO----- 1.00 *
ANG----- 45.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1 =	54.7 INCHES	A2 =	54.7 INCHES
B1 =	59.2 INCHES	B2 =	59.2 INCHES
TR1 =	61.8 INCHES	TR2 =	61.8 INCHES
I1 =	43364.2 LB-SEC**2-IN	I2 =	45600.7 LB-SEC**2-IN
M1 =	11.592 LB-SEC**2/IN	M2 =	12.189 LB-SEC**2/IN
XF1 =	98.8 INCHES	XF2 =	98.8 INCHES
XR1 =	-114.0 INCHES	XR2 =	-114.0 INCHES
YS1 =	38.5 INCHES	YS2 =	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
LF----- .01
RR----- .20
LR----- .20

VEHICLE # 2

RF----- .01
LF----- .01
RR----- .20
LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, REFIN, PRINT, BATCH, SNAC, OR END)

?E

CRASH PROGRAM COMPLETION

STOP

MEUR 11090

#

END PROGRAM LOT

CRASHOM 09114 APR 18 1980

ENTER TYPE OF CRASH RUN?
(COMPLETE=ABBREVIATED=REFUN=PRINT=KATH=SP=) OR 0 FOR
PA

WILL THE INPUT FOR THIS RUN BE IN MODEL FORM?
(ANSWER YES OR NO)
Y

1. TITLE?
PHIDEAL TEST #10 WITH TRAJ SIM (CRASH?)

2. SIZE CATEGORIES?
Y01

3. UOI: #1
K10F0E0?

4. UOI: #2
K01K0E0?

5. ACTUAL WEIGHT? (Y OR N)
Y

6. WEIGHT #1
2230A

7. WEIGHT #2
22720

8. REST & IMPACT? (Y OR N)
Y

9. REST COORDINATES?
Y5. 43. 87. 0. 99.5 128.5

10. IMPACT COORDINATES?
Y0. 0. 0. 8.5 -5.0 90.

11. SKIDDING OF # 1? (Y OR N)
Y

12. SKIDDING STOP BEFORE REST? (Y OR N)
Y

13. END OF SKIDDING COORDINATES?
Y5. 25. 90.

14. CURVED PATH? (Y OR N)
Y

15. ROTATION DIRECTION #1?
Y00

17. MORE THAN 360 DEG? (Y OR N)
Y

18. SKIDDING OF # 2? (Y OR N)

?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)

?Y

20. END OF SKIDDING COORDINATES?

?23, 19, 90.

21. CURVED PATH? (Y OR N)

?N

23. ROTATION DIRECTION # 2?

?CW

24. MORE THAN 360 DEG? (Y OR N)

?N

25. TIRE-GROUND FRICTION?

?1.87

26. ROLLING RESISTANCE OPTION? (1 OR 2)

?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1

?-2 .2 .01 .01

28. ROLL. RESISTANCES, INDIV. WHEELS # 2

?-1 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)

?Y

32. STEER ANGLES #1 ?

?0

**** SYNTAX ERROR ****

32. STEER ANGLES #1 ?

?0

**** SYNTAX ERROR ****

32. STEER ANGLES #1 ?

?0 0 0 0

33. STEER ANGLES #2 ?

?0 0 0 0

34. TERRAIN BOUNDARY? (Y OR N)

?N

37. DAMAGE DIMENSIONS? (Y OR N)

?Y

41. END DAMAGE WIDTH #1

?47.5

42. END DAMAGE DEPTH #1

?7, 10.2 14, 8.9 7, 9.

43. END DAMAGE MIDPOINT OFFSET #1

?-2.75

44. SIDE DAMAGE WIDTH #2

45. SIDE DAMAGE DEPTH #1

29.7 2.5 5.5 *DEL*

9.2 6.5 6.1 5.3 4.5 3.5

46. SIDE DAMAGE MIDPOINT OFFSET #2

266.5

52. FORCE DIRECTIONS (Y OR N)

22

53. PRINCIPAL FORCE ANGLE #1?

265.

54. PRINCIPAL FORCE ANGLE #2?

225.

THANK YOU VERY MUCH

VEHICLE # 1

TRAJECTORY ITERATION # 1

US = 108.0 VS = 334.1 PSISD = 2.07 SSDDT = 351.1 GAMS = 1.76

REST: 529.8 897.4 1.00 END-OF-ROT: 113.6 214.7 1.02

POINT-ON-CURVE: 0.0 0.0

ERRORS: 1.16 .33 .34 .35 0.00 Q = 1.85 T = 7.00

VEHICLE # 1

TRAJECTORY ITERATION # 2

US = -18.5 VS = 296.2 PSISD = 2.35 SSDDT = 296.7 GAMS = 1.63

REST: 115.6 515.7 1.29 END-OF-ROT: 20.3 191.9 1.29

POINT-ON-CURVE: 0.0 0.0

ERRORS: .11 .38 .15 .18 0.00 Q = .53 T = 5.10

VEHICLE # 1

TRAJECTORY ITERATION # 3

US = -32.5 VS = 319.1 PSISD = 2.53 SSDDT = 320.7 GAMS = 1.62

REST: 78.6 665.3 1.34 END-OF-ROT: 7.4 217.4 1.42

POINT-ON-CURVE: 0.0 0.0

ERRORS: .29 .32 .11 .10 0.00 Q = .81 T = 5.90

VEHICLE # 1

TRAJECTORY ITERATION # 4

US = -15.2 VS = 314.7 PSISD = 2.66 SSDDT = 315.0 GAMS = 1.62

REST: 101.2 695.7 1.36 END-OF-ROT: 18.6 219.0 1.40

POINT-ON-CURVE: 0.0 0.0

ERRORS: .35 .30 .10 .11 0.00 Q = .65 T = 6.00

VEHICLE # 1

TRAJECTORY ITERATION # 5

US = -9.1 VS = 304.3 PSISD = 2.79 SSDDT = 304.4 GAMS = 1.60

REST: 103.8 678.9 1.38 END-OF-ROT: 17.9 195.7 1.40

POINT-ON-CURVE: 0.0 0.0

ERRORS: .32 .37 .09 .11 0.00 Q = .66 T = 5.90

SUMMARY OF CRASH RESULTS

RICSAC TEST #10 WITH TRAJ SIM (CRASH2)

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	31.4 MPH	15.3 MPH
	-32.4 DEG	57.6 DEG
SPEED CHANGE (DAMAGE ONLY)	22.4 MPH	10.9 MPH
	-65.0 DEG	25.0 DEG
IMPACT SPEED	25.5 MPH	30.5 MPH

ENERGY DISSIPATED BY DAMAGE
SPEED ALONG LINE THRU CG
SPEED METHOD TO CG LINE
CLOSING VELOCITY

88624 1 1 1 1 4492 2 2 2 2 2
25.5 MPH 15.3 MPH
15.3 MPH 15.3 MPH
15.3 MPH 15.3 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, REPEAT, PRINT, BATCH, MACRO, OR END)
PE

SUMMARY OF CRASH RESULTS

RIGSAC TEST #10 WITH TRAJ SIM (CRASH)

VEHICLE # 1

```
*****
*                                     *
*                                     *
*          SPEED CHANGE              *
* IMPACT SPEED*                     *
*                                     *
*      MPH      *                   *
*                                     *
*          TOTAL * LONG. * LATERAL *
*                                     *
*****
*                                     *
*                                     *
*                                     *
*          25.5*   31.4*   -26.5*   16.8*
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*          22.4*   -9.4*   20.3*
*                                     *
*****
```

VEHICLE # 2

```
*****
*                                     *
*                                     *
*          SPEED CHANGE              *
* IMPACT SPEED*                     *
*                                     *
*      MPH      *                   *
*                                     *
*          TOTAL * LONG. * LATERAL *
*                                     *
*****
*                                     *
*                                     *
*                                     *
*          30.5*   15.3*   -8.2*   -13.0*
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*                                     *
*          4-23 *
*                                     *
```

```

*          *          *          *          *          ANTI          *
*          *          *          *          *          DAMAGE          *
*          *          *          *          *          *          *
*****
*          *          *          *          *          *          *
*          *          *          *          *          *          *
*          *          *          *          *          *          *
*          *          *          *          *          *          *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-1.12 FT.	8.50 FT.
IMPACT Y-POSITION	0.00 FT.	-7.23 FT.
IMPACT HEADING ANGLE	0.00 DEG.	89.99 DEG.
REST X-POSITION	5.00 FT.	0.00 FT.
REST Y-POSITION	43.00 FT.	99.50 FT.
REST HEADING ANGLE	84.99 DEG.	128.49 DEG.
END-OF-ROTATION X-POSITION	5.00 FT.	23.00 FT.
END-OF-ROTATION Y-POSITION	25.00 FT.	19.00 FT.
END-OF-ROTATION HEADING ANGLE	89.99 DEG.	89.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = -1.1 FT.	XC20' = 8.5 FT.
YC10' = 0.0 FT.	YC20' = -7.2 FT.
PSI10 = 0.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC
U10 = 25.5 MPH	U20 = 30.5 MPH
V10 = 0.0 MPH	V20 = 0.0 MPH

SEPARATION CONDITIONS

XCS1 = 0.0 FT.	XCS2 = 8.5 FT.
YCS1 = 0.0 FT.	YCS2 = -5.9 FT.
PSIS1 = 0.0 DEG	PSIS2 = 90.0 DEG
US1 = -1.1 MPH	US2 = 22.3 MPH
VS1 = 16.8 MPH	VS2 = -13.0 MPH
PSISD1 = 134.5 DEG/SEC	PSISD2 = 0.0 DEG/SEC

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. ONLY)	31.4 MPH	15.3 MPH
	-32.4 DEG	57.6 DEG
SPEED CHANGE (DAMAGE ONLY)	22.4 MPH	10.9 MPH
	-65.0 DEG	25.0 DEG
IMPACT SPEED	25.5 MPH	30.5 MPH
ENERGY DISSIPATED BY DAMAGE	88023.1 FT-LB	44972.8 FT-LB
SPEED ALONG LINE THRU CGS	20.4 MPH	18.3 MPH
SPEED ORTHOG. TO CG LINE	15.3 MPH	-24.4 MPH
CLOSING VELOCITY	4-24 38.7 MPH	

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT COMPLETE +++++

++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS +++++

NRUNS(1) =	0	NRUNS(2) =	0
E1(1) =	.107	E2(1) =	0.000
E1(2) =	.377	E2(2) =	0.000
E1(3) =	.149	E2(3) =	0.000
E1(4) =	.176	E2(4) =	0.000
E1(5) =	0.000	E1(5) =	0.000
OMIN1 =	.532	OMIN2 =	0.000

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----MINICAR
 WEIGHT-----2306.0 LBS.
 VDI-----10FDEW2
 L-----47.5 IN.
 C1-----7.0 IN.
 C2-----10.2 IN.
 C3-----14.0 IN.
 C4-----8.9 IN.
 C5-----7.0 IN.
 C6-----9.0 IN.
 D-----3.8 IN.
 RHO-----1.00 *
 ANG-----295.0 DEG.

VEHICLE # 2

TYPE-----INTERMEDIATE
 WEIGHT-----4720.0 LBS.
 VDI-----01FFEB2
 L-----53.0 IN.
 C1-----9.2 IN.
 C2-----4.5 IN.
 C3-----6.1 IN.
 C4-----5.3 IN.
 C5-----4.5 IN.
 C6-----5.5 IN.
 D-----61.5 IN.
 RHO-----1.00 *
 ANG-----25.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1 =	45.1 INCHES	A2 =	54.7 INCHES
B1 =	48.1 INCHES	B2 =	59.2 INCHES
TR1 =	51.1 INCHES	TR2 =	61.8 INCHES
I1 =	11971.6 LB-SEC**2-IN	I2 =	45697.5 LB-SEC**2-IN
M1 =	5.968 LB-SEC**2/IN	M2 =	12.215 LB-SEC**2/IN
XF1 =	76.0 INCHES	XF2 =	98.8 INCHES
XR1 =	-83.8 INCHES	XR2 =	-114.0 INCHES
YS1 =	30.4 INCHES	YS2 =	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----.20
 LF-----.20
 RR-----.01
 LR-----.01

VEHICLE # 2

RF-----.10
 LF-----.01
 RP-----.20
 LP-----.20

MU-----.87

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, PERUN, PRINT, BATCH, SMAC, OR END)

?E

CRASH PROGRAM COMPLETED 4-25

STOP

REF: L1-442

#

PASSWORD

ID-131

#RUN CRAZLDM.C0162

CRAZLDM 09:28 APR 18 1980

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, PERUN, PRINT, BATCH, SHAD, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?

(ANSWER YES OR NO)
?N

1. TITLE?

?RICSAC TEST # 12 WITH TRAJ SIM (CRASH2)

2. SIZE CATEGORIES?

?S J

3. VDI, #1

?12FDEW4

4. VDI, #2

?12FYEW4

5. ACTUAL WEIGHTS? (Y OR N)

?Y

6. WEIGHT #1

?3130

7. WEIGHT #2

?4512

8. REST & IMPACT? (Y OR N)

?Y

9. REST COORDINATES?

?22, -5.5 118, 6.8 2.6 -12,

10. IMPACT COORDINATES?

?15.7 -4, 171, 0, 0, 0,

11. SKIDDING OF # 1? (Y OR N)

?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)

?N

14. CURVED PATH? (Y OR N)

?N

16. ROTATION DIRECTION #1?

?CCW

17. MORE THAN 360 DEG? (Y OR N)

?N

18. SKIDDING OF # ?? (Y OR N)

?Y

19. SKIDDING STOP BEFORE RESIT? (Y OR N)

?N

21. CURVED PATH? (Y OR N)

?N

23. ROTATION DIRECTION # ??

?CCW

24. MORE THAN 360 DEG? (Y OR N)

?N

25. TIRE-GROUND FRICTION?

?1.87

26. ROLLING RESISTANCE OPTION?(1 OR 2)

?1

27. ROLL. RESISTANCES+ INDIV. WHEELS # 1

? .01 .01 .2 .2

28. ROLL. RESISTANCES+ INDIV. WHEELS # 2

? .01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)

?Y

32. STEER ANGLES #1 ?

?0 0 0 0

33. STEER ANGLES #2 ?

?0 0 0 0

34. TERRAIN BOUNDARY? (Y OR N)

?N

37. DAMAGE DIMENSIONS? (Y OR N)

?Y

41. END DAMAGE WIDTH #1

?32.

42. END DAMAGE DEPTH #1

?38.6 34.6 29.5 26. 19.6 14.25

43. END DAMAGE MIDPOINT OFFSET #1

?2.75

47. END DAMAGE WIDTH #2

?28.25

48. END DAMAGE DEPTH #2

?39.5 33. 28.75 23.75 19.2 15.

49. END DAMAGE MIDPOINT OFFSET #2

?-10.8

52. FORCE DIRECTIONS (Y OR N)

?1

37. DAMAGE DIMENSIONS? (Y OR N)

Y

41. END DAMAGE WIDTH #1
732.

42. END DAMAGE DEPTH #1
738.6 34.6 29.5 26. 19.6 14.25

43. END DAMAGE MIDPOINT OFFSET #1
72.75

47. END DAMAGE WIDTH #2
728.25

48. END DAMAGE DEPTH #2
739.5 33. 28.75 23.75 19.2 15.

49. END DAMAGE MIDPOINT OFFSET #2
7-10.6

52. FORCE DIRECTIONS (Y OR N)
7Y

53. PRINCIPAL FORCE ANGLE #1?
75.

54. PRINCIPAL FORCE ANGLE #2?
7-5, *DEL*
-5.

THANK YOU VERY MUCH

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = -139.8 VS = -27.4 PSISD = -1.92 SSDOT = 142.5 GAMS = .04
REST: 373.7 -148.6 2.51 END-OF-ROT: 346.6 -128.6 2.51
POINT-ON-CURVE: 188.4 -48.0
ERRORS: 1.77 1.33 .49 .49 0.00 Q = 3.16 T = 3.30

VEHICLE # 2 TRAJECTORY ITERATION # 1
US = 188.3 VS = 80.4 PSISD = -.39 SSDOT = 204.7 GAMS = .40
REST: 490.4 -43.2 -.12 END-OF-ROT: 88.3 7.4 -.12
POINT-ON-CURVE: 0.0 0.0
ERRORS: 4.76 .28 .43 .43 0.00 Q = 5.54 T = 5.20

VEHICLE # 2 TRAJECTORY ITERATION # 2
US = 87.3 VS = 89.8 PSISD = -.47 SSDOT = 125.3 GAMS = .80
REST: 95.3 .6 -.15 END-OF-ROT: 43.5 10.3 -.15
POINT-ON-CURVE: 0.0 0.0
ERRORS: .38 .50 .29 .27 0.00 Q = 1.06 T = 2.20

VEHICLE # 2 TRAJECTORY ITERATION # 3
US = 64.9 VS = 122.2 PSISD = -.53 SSDOT = 138.3 GAMS = 1.08
REST: 42.4 20.8 -.24 END-OF-ROT: 33.9 21.8 -.23
POINT-ON-CURVE: 0.0 0.0
ERRORS: .46 .56 -.13 -.08 0.00 Q = .92 T = 1.40

VEHICLE # 2 TRAJECTORY ITERATION # 4
US = 112.0 VS = 157.6 PSISD = -.56 SSDOT = 193.3 GAMS = .95
REST: 122.0 16.6 -.29 END-OF-ROT: 68.2 34.0 -.29
POINT-ON-CURVE: 0.0 0.0
ERRORS: .49 .16 -.40 -.37 0.00 Q = 1.16 T = 2.40

4-29

VEHICLE # 2 TRAJECTORY ITERATION # 5

US = 84.6 US = 156.1 PSTSD = 1.00 XSPRT = 1.00 GADP = 1.07
 REST: 74.3 39.0 -1.21 END-OF-RUN 45.1 44.7 1.1
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .08 .42 -1.01 .01 0.00 0.00 1.07 1.00

SUMMARY OF CRASH RESULTS

RICSAC TEST # 12 WITH TRAJ SIM (CRASH2)

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	28.2 MPH	21.5 MPH
	4.1 DEG	-24.8 DEG
SPEED CHANGE (DAMAGE ONLY)	28.2 MPH	19.5 MPH
	5.0 DEG	-5.0 DEG
IMPACT SPEED	20.2 MPH	24.3 MPH
ENERGY DISSIPATED BY DAMAGE	87653.4 FT-LB	59968.1 FT-LB
SPEED ALONG LINE THRU CGS	20.1 MPH	23.6 MPH
SPEED ORTHOG. TO CG LINE	1.9 MPH	6.0 MPH
CLOSING VELOCITY	43.7 MPH	

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
 ?P

SUMMARY OF CRASH RESULTS

RICSAC TEST # 12 WITH TRAJ SIM (CRASH2)

VEHICLE # 1				

* IMPACT SPEED *	* SPEED CHANGE *		* BASIS *	
* MPH *	* MPH *		* DEG *	
* TOTAL *	* LONG *	* LATERAL *	* RESULTS *	

* * *	* * *	* * *	* SPINOUT TRAJECTORIES *	
* * *	* * *	* * *	* AND CONSERVATION OF *	
* * *	* * *	* * *	* LINEAR MOMENTUM *	

* * *	* * *	* * *	* SPINOUT TRAJECTORIES *	
* * *	* * *	* * *	* AND *	
* * *	* * *	* * *	* DAMAGE *	

* * *	* * *	* * *	* DAMAGE DATA ONLY *	

SCENE INFORMATION

COLLISION CONDITIONS

SEPARATION CONDITIONS

4-31

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. & DAMAGE)	96.7 MPH	21.4 MPH
	6.1 DEG	-24.4 DEG
SPEED CHANGE (DAMAGE ONLY)	28.2 MPH	19.6 MPH
	5.0 DEG	-5.0 DEG
IMPACT SPEED	20.0 MPH	25.3 MPH
ENERGY DISSIPATED BY DAMAGE	6753.8 FT-LB	59946.1 FT-LB
SPEED ALONG LINE THRU CGS	20.1 MPH	23.6 MPH
SPEED ORTHOG. TO CG LINE	1.9 MPH	6.0 MPH
CLOSING VELOCITY	44.7 MPH	

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 TIMED OUT AT 10 SECONDS ++++

++++ VEHICLE # 2 DID NOT CONVERGE ++++

NRUNS(1) =	1	NRUNS(2) =	5
E1(1) =	.1767	E2(1) =	.084
E1(2) =	1.334	E2(2) =	.422
E1(3) =	.487	E2(3) =	-.014
E1(4) =	.487	E2(4) =	.013
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	3.164	QMIN2 =	.316

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1			VEHICLE # 2		
TYPE-----	SUBCOMPACT		TYPE-----	INTERMEDIATE	
WEIGHT-----	3130.0 LBS.		WEIGHT-----	4512.0 LBS.	
VDI-----	12FDFW4		VDT-----	12FYEW4	
L-----	32.0 IN.		L-----	28.3 IN.	
C1-----	38.6 IN.		C1-----	39.5 IN.	
C2-----	34.6 IN.		C2-----	33.0 IN.	
C3-----	29.5 IN.		C3-----	28.8 IN.	
C4-----	26.0 IN.		C4-----	23.8 IN.	
C5-----	19.6 IN.		C5-----	19.2 IN.	
C6-----	14.3 IN.		C6-----	15.0 IN.	
D-----	.4 IN.		D-----	-12.7 IN.	
RHO-----	1.00	*	RHO-----	1.00	*
ANG-----	5.0 DEG.		ANG-----	355.0 DEG.	

DIMENSIONS AND INERTIAL PROPERTIES

A1 =	46.3 INCHES	A2 =	54.7 INCHES
B1 =	50.1 INCHES	B2 =	59.2 INCHES
TR1 =	54.6 INCHES	TR2 =	61.8 INCHES
I1 =	23904.3 LB-SEC**2-IN	I2 =	43683.7 LB-SEC**2-IN
M1 =	8.100 LB-SEC**2/IN	M2 =	11.677 LB-SEC**2/IN
XF1 =	83.3 INCHES	XF2 =	98.8 INCHES
XR1 =	-91.6 INCHES	XR2 =	-114.0 INCHES
YS1 =	33.6 INCHES	YS2 =	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	4-32 RF-----	.01
LF-----	.01	LF-----	.01

RR----- .20
LR----- .20

RR----- .20
LR----- .20

NU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, PATCH, SNAP, OR END)
TE

STOP CRASH PROGRAM COMPLETED.

MRU= 9.346

#

RUN CRA2LOH.C0162

CRA2LOH 09:40 APR 18, '80

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?

(ANSWER YES OR NO)
?N

1. TITLE?

TRICSAC TEST # 3 WITH TRAJ SIM (CRASH2)

2. SIZE CATEGORIES?

?1 8

3. VDI, #1

?12FZEW1

4. VDI, #2

?06BZEW1

5. ACTUAL WEIGHTS? (Y OR N)

?Y

6. WEIGHT #1

?4949

7. WEIGHT #2

?3120

8. REST & IMPACT? (Y OR N)

?Y

9. REST COORDINATES?

?111.4 2. -4. 181.5 6.4 -19.

10. IMPACT COORDINATES?

?0. 0. 0. 15. 2.2 10.

11. SKIDDING OF # 1? (Y OR N)

?N

14. CURVED PATH? (Y OR N)

?N

16. ROTATION DIRECTION #1?

?N

18. SKIDDING OF # 2? (Y OR N)

?N

21. CURVED PATH? (Y OR N)

?N

23. ROTATION DIRECTION # 2?

?N

25. COEFFICIENT OF FRICTION?
1.37

26. ROLLING RESISTANCE OPTION? (1 OR 2)
1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1
1.01 .01 .09 .09

28. ROLL. RESISTANCES, INDIV. WHEELS # 2
1.01 .01 .1 .1

31. TRAJECTORY SIMULATION? (Y OR N)
?N *DEL*
Y

32. STEER ANGLES #1 ?
?Y *DEL*
0 0 0 0

33. STEER ANGLES #2 ?
?0 0 0 0

34. TERRAIN BOUNDARY? (Y OR N)
?N

37. DAMAGE DIMENSIONS? (Y OR N)
?Y

41. END DAMAGE WIDTH #1
?30.

42. END DAMAGE DEPTH #1
?2. 2. 1.5 1.75 2. 2.25

43. END DAMAGE MIDPOINT OFFSET #1
?22.

47. END DAMAGE WIDTH #2
?30.

48. END DAMAGE DEPTH #2
?6.5 6.75 5.75 5. 3.75 3.

49. END DAMAGE MIDPOINT OFFSET #2
?5.

52. FORCE DIRECTIONS-(Y OR N)
?Y

53. PRINCIPAL FORCE ANGLE #1?
?0.

54. PRINCIPAL FORCE ANGLE #2?
?170.

THANK YOU VERY MUCH

RICSAC TEST # 3 WITH TRAJ SIM (CRASH)

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	5.7 MPH	5.9 MPH
	-3.9 DEG	154.2 DEG
SPEED CHANGE (DAMAGE ONLY)	3.1 MPH	4.2 MPH
	.0 DEG	170.0 DEG
IMPACT SPEED	15.2 MPH	10.2 MPH
ENERGY DISSIPATED BY DAMAGE	2685.4 FT-LB	1795.7 FT-LB
SPEED ALONG LINE THRU CGS	15.0 MPH	-10.5 MPH
SPEED ORTHOG. TO CG LINE	-2.1 MPH	-7.4 MPH
CLOSING VELOCITY	4.5 MPH	

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)

70

SUMMARY OF CRASH RESULTS

RICSAC TEST # 3 WITH TRAJ SIM (CRASH2)

VEHICLE # 1

[illegible]

VEHICLE # 2

```

*****
*                                     *
*                                     *
*                                     *
* IMPACT SPEED*                      * MPH *
*                                     *
* MPH *                               * BASIS OF RESULTS
*                                     *
* TOTAL * LONG. * LATERAL *
*                                     *
*****

```

	VEHICLE # 1	VEHICLE # 2
4-37		
SPEED CHANGE (TRAJ. + DAMAGE)	3.1 MPH	5.4 MPH

SPEED CHANGE (DAMAGE ONLY)	-3.9 DEG	154.7 DEG
	7.1 MPH	4.7 MPH
	0 DEG	170.0 DEG
IMPACT SPEED	15.0 MPH	10.4 MPH
ENERGY DISSIPATED BY DAMAGE	2855.4 FT-LB	1795.2 FT-LB
SPEED ALONG LINE THRU CGS	15.0 MPH	-10.4 MPH
SPEED ORTHOG. TO CG LINE	-2.1 MPH	-3.4 MPH
CLOSING VELOCITY	4.6 MPH	

TRAJECTORY SIMULATION RESULTS

```

++++ VEHICLE # 1 TIMED OUT AT 10 SECONDS ++++
++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS ++++
NRUNS(1) =      0          NRUNS(2) =      0
E1(1)    =    0.000        E2(1)    =    0.000
E1(2)    =    0.000        E2(2)    =    0.000
E1(3)    =    0.000        E2(3)    =    0.000
E1(4)    =    0.000        E2(4)    =    0.000
E1(5)    =    0.000        E2(5)    =    0.000
QMIN1    =    0.000        QMIN2    =    0.000

```

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1		VEHICLE # 2	
TYPE-----	INTERMEDIATE	TYPE-----	SUBCOMPACT
WEIGHT-----	4949.0 LBS.	WEIGHT-----	3120.0 LBS.
VDI-----	12FZEW1	VDI-----	06BZEW1
L-----	30.0 IN.	L-----	30.0 IN.
C1-----	2.0 IN.	C1-----	6.5 IN.
C2-----	2.0 IN.	C2-----	6.8 IN.
C3-----	1.5 IN.	C3-----	5.8 IN.
C4-----	1.8 IN.	C4-----	5.0 IN.
C5-----	2.0 IN.	C5-----	3.8 IN.
C6-----	2.3 IN.	C6-----	3.0 IN.
D-----	22.3 IN.	D-----	3.0 IN.
RHO-----	1.00 *	RHO-----	1.00 *
ANG-----	0.0 DEG.	ANG-----	170.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	47914.6 LB-SEC**2-IN	I2	=	23828.0 LB-SEC**2-IN
M1	=	12.808 LB-SEC**2/IN	M2	=	8.075 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.4 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.09	RR-----	.10
LR-----	.09	LR-----	.10
MLI-----	.87		

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
?E

STOP

CRASH PROGRAM COMPLETED.

MRU= 7.637

#

RUN CRA2LDM.C0162

CRA2LDM 09:51 APR 19 '80

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, PERUN, PRINT, BATCH, SMAC, OR END)

?A

WILL THE INPUT FOR THIS RUN BE IN METRIC FORM?

(ANSWER YES OR NO)

?N

1. TITLE?

?RICSAC TEST # 4 WITH TRAJ SIM (CRASH2)

2. SIZE CATEGORIES?

?I S

3. VDI, #1

?12FZEW3

4. VDI, #2

?05BYEW5

5. ACTUAL WEIGHTS? (Y OR N)

?Y

6. WEIGHT #1

?4980

7. WEIGHT #2

?3190

8. REST & IMPACT? (Y OR N)

?Y

9. REST COORDINATES?

?42.8 54.5 137.5 63.9 62.5 88.

10. IMPACT COORDINATES?

?0. 0. 1. 16.4 3.4 10.

11. SKIDDING OF # 1? (Y OR N)

?Y

12. SKIDDING STOP BEFORE REST? (Y OR N)

?Y

13. END OF SKIDDING COORDINATES?

?20. 5. 10.

14. CURVED PATH? (Y OR N)

?N

16. ROTATION DIRECTION #1?

?CCW *DEL*

CW

4-40

17. MORE THAN 360 DEG? (Y OR N)

?N

18. SKIDDING OF # 2? (Y OR N) ?

?Y

19. SKIDDING STOP BEFORE REST? (Y OR N)

?Y

20. END OF SKIDDING COORDINATES?

?35. 2. 10.

21. CURVED PATH? (Y OR N)

?N

23. ROTATION DIRECTION # 2?

?CW

24. MORE THAN 360 DEG? (Y OR N)

?N

25. TIRE-GROUND FRICTION?

? .87

26. ROLLING RESISTANCE OPTION?(1 OR 2)

?1

27. ROLL. RESISTANCES, INDIV. WHEELS # 1

? .01 .01 .2 .2

28. ROLL. RESISTANCES, INDIV. WHEELS # 2

? .01 .01 .2 .2

31. TRAJECTORY SIMULATION? (Y OR N)

?Y

32. STEER ANGLES #1 ?

?Y

**** SYNTAX ERROR ****

32. STEER ANGLES #1 ?

?41. *DEL*

0 0 0 0

33. STEER ANGLES #2 ?

?0 0 0 0

34. TERRAIN BOUNDARY? (Y OR N)

?N

37. DAMAGE DIMENSIONS? (Y OR N)

?Y

41. END DAMAGE WIDTH #1

?41.5

42. END DAMAGE DEPTH #1

?6.3 7.8 9.8 12.5 14.8 18.3

43. END DAMAGE MIDPOINT OFFSET #1

?16.1

47. END DAMAGE WIDTH #2

?41.8

48. END DAMAGE DEPTH #2

VEHICLE # 1									

SPEED		CHANGE							
IMPACT SPEED		MPH							
						BASIS			
MPH		*****		*****		OF			
						RESULTS			
		TOTAL		LONG.		LATERAL			

						*SPINOUT TRAJECTORIES			
						*AND CONSERVATION OF			
						*LINEAR MOMENTUM			

XC10	=	0.0 FT.	XC20	=	16.4 FT.
YC10	=	0.0 FT.	YC20	=	6.4 FT.
PSI10	=	1.0 DEG/SEC	PSI20	=	10.0 DEG/SEC
PSI100	=	0.0 DEG/SEC	PSI200	=	0.0 DEG/SEC
U10	=	32.5 MPH	U20	=	7.7 MPH
V10	=	0.0 MPH	V20	=	0.0 MPH

SEPARATION CONDITIONS

XCS1	=	0.0 FT.	XCS2	=	16.4 FT.
YCS1	=	0.0 FT.	YCS2	=	6.4 FT.
PSIS1	=	1.0 DEG	PSIS2	=	10.0 DEG
US1	=	32.8 MPH	US2	=	17.1 MPH
VS1	=	4.9 MPH	VS2	=	-4.4 MPH
PSISD1	=	18.2 DEG/SEC	PSISD2	=	0.0 DEG/SEC

RELATIVE VELOCITY DATA

	VEHICLE # 1	VEHICLE # 2
SPEED CHANGE (TRAJ. + DAMAGE)	10.9 MPH	15.5 MPH
	-26.8 DEG	163.7 DEG
SPEED CHANGE (DAMAGE ONLY)	9.7 MPH	15.1 MPH
	0.0 DEG	170.0 DEG
IMPACT SPEED	32.5 MPH	7.2 MPH
ENERGY DISSIPATED BY DAMAGE	23465.1 FT-LB	23572.5 FT-LB
SPEED ALONG LINE THRU CGS	31.9 MPH	-2.2 MPH
SPEED ORTHOG. TO CG LINE	-6.0 MPH	1.1 MPH
CLOSING VELOCITY	29.7 MPH	

TRAJECTORY SIMULATION RESULTS

```

++++ VEHICLE # 1 TIMED OUT AT 10 SECONDS ++++
++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS ++++
NRUNS(1) = 0 NRUNS(2) = 0
E1(1) = 0.000 E2(1) = 0.000
E1(2) = 0.000 E2(2) = 0.000
E1(3) = 0.000 E2(3) = 0.000
E1(4) = 0.000 E2(4) = 0.000
E1(5) = 0.000 E2(5) = 0.000
QMIN1 = 0.000 QMIN2 = 0.000

```

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1		VEHICLE # 2
TYPE-----	INTERMEDIATE	SURCOMPACT
WEIGHT-----	4980.0 LBS.	3190.0 LBS.
VDI-----	12FZEW3	05BYEW5
L-----	41.5 IN.	41.8 IN.
C1-----	6.3 IN.	36.0 IN.
C2-----	7.8 IN.	31.8 IN.
C3-----	9.8 IN.	29.0 IN.
C4-----	12.5 IN.	24.0 IN.
C5-----	14.8 IN.	19.5 IN.
C6-----	18.3 IN.	14.8 IN.
D-----	19.7 IN.	-11.9 IN.
RHO-----	1.00 *	1.00 *
ANG-----	0.0 DEG.	170.0 DEG.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.1 INCHES
R1	=	59.2 INCHES	R2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	48214.8 LB-SEC**2-IN	I2	=	24362.6 LB-SEC**2-IN
M1	=	12.888 LB-SEC**2/IN	M2	=	8.256 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	43.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, BATCH, SMAC, OR END)
 ?E

CRASH PROGRAM COMPLETED.

STOP

MRU= 7.913

*

SECTION 5
CRASH2A-SPRING 1980

run y3lom,c0162

Y3LOM 14:48 MAR 26, '80

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

?a

1. TITLE?

?ricsac test # 1 chevelle vs. pinto

2. CLASS/WEIGHTS?

?4 4621 2 3082

3. VDI/PDOF # 1?

?11fzew2 -30.

4. VDI/PDOF # 2?

?01rdew3 30.

5. REST

IMPACT? (Y OR N)

?y

6. REST COORDINATES?

?-2.4 -1. -1.5 7.5 2.5 105.

7. IMPACT COORDINATES?

?10.8 1. -30. 0. -5.5 90.

12. SKIDDING OF # 1? (Y OR N)

?y

13. SKIDDING STOP BEFORE REST? (Y OR N)

?N

15. CURVED PATH? (Y OR N)

?n

17. ROTATION DIRECTION #1?

?cw

18. MORE THAN 360 DEG? (Y OR N)

?n

19. SKIDDING OF # 2? (Y OR N)

?y

20. SKIDDING STOP BEFORE REST? (Y OR N)

?n

22. CURVED PATH? (Y OR N)

?n

24. ROTATION DIRECTION # 2?

?cw

25. MORE THAN 360 DEG? (Y OR N)

?n

26. TIRE-GROUND FRICTION?

? .87

27. ROLLING RESISTANCE OPTION?(1 OR 2)

?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1

? .01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2

? .01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)

?N

38. DAMAGE DIMENSIONS? (Y OR N)

?Y

42. END DAMAGE WIDTH #1

?46

43. END DAMAGE DEPTH #1

?4. 5.5 7. 10.2 12.1 14.8

44. END DAMAGE MIDPOINT OFFSET #1
714.3

45. SIDE DAMAGE WIDTH #2
7113.3

46. SIDE DAMAGE DEPTH #2
7.5 12. 10.6 11.8 9. 4.1

47. SIDE DAMAGE MIDPOINT OFFSET #2
721.8

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H R E S U L T S

RICSAC TEST # 1 CHEVELLE VS. PINTO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	-8.3 MPH	0.0 MPH
VEH#2	1.1 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.5 MPH	-16.0 MPH	9.2 MPH	-30.0 DEG.
VEH#2	27.7 MPH	-24.0 MPH	-13.9 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-1.9 MPH	-9.8 MPH	79.1 DEG.
VEH#2	15.0 MPH	11.3 MPH	-9.8 MPH	139.1 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 24650.7 FT-LB VEH#2 169221.4 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 4.0 MPH
VEH#2 .6 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -7.3 MPH
VEH#2 1.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
4.6 MPH

21

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 1 CHEVELLE VS. PINTO

VEHICLE # 1

```
*
* IMPACT *
* SPEED * SPEED CHANGE *
* MPH * MPH * BASIS
* OF
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS
* -8.3 * 0.0 * 10.0 * -1.9 * -9.8 * SPINOUT TRAJECTORIES AND
* CONSERVATION OF LINEAR
* MOMENTUM
* SPINOUT TRAJECTORIES AND
* DAMAGE
* 18.5 * -16.0 * 9.2 * DAMAGE DATA ONLY
```

VEHICLE # 2

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *
*      MPH      *      MPH      5-4      *      BASIS      *
*****

```



```

*                                     *                                     *
*****                                     OF                                     *
*                                     *                                     *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS *
*                                     *                                     *
*****
*                                     *                                     *
*                                     * SPINOUT TRAJECTORIES AND *
* 1.1 * 0.0 * 15.0 * 11.3 * -9.8 * CONSERVATION OF LINEAR *
*                                     * MOMENTUM *
*                                     *
*****
*                                     * SPINOUT TRAJECTORIES AND *
*                                     * DAMAGE *
*                                     *
*****
*                                     *
* 27.7 * -24.0 * -13.9 * DAMAGE DATA ONLY *
*                                     *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	10.80 FT.	0.00 FT.
IMPACT Y-POSITION	1.00 FT.	-5.50 FT.
IMPACT HEADING ANGLE	-30.00 DEG.	89.99 DEG.
REST X-POSITION	-2.40 FT.	7.50 FT.
REST Y-POSITION	-1.00 FT.	2.50 FT.
REST HEADING ANGLE	-1.50 DEG.	104.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

	VEHICLE # 1	VEHICLE # 2
XC10'	= 10.8 FT.	XC20' = 0.0 FT.
YC10'	= 1.0 FT.	YC20' = -5.5 FT.
PSI10	= -30.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	= 10.8 FT.	XCS2' = 0.0 FT.
YCS1'	= 1.0 FT.	YCS2' = -5.5 FT.
PSIS1	= -30.0 DEG	PSIS2 = 90.0 DEG
US1	= -10.2 MPH	US2 = 12.5 MPH
VS1	= -9.8 MPH	VS2 = -9.8 MPH
PSISD1	= 38.3 DEG/SEC	PSISD2 = 48.6 DEG/SEC

SUMMARY OF RESULTS

	FORWARD	LATERAL
VEH#1	-8.3 MPH	0.0 MPH
VEH#2	1.1 MPH	0.0 MPH

	SPEED CHANGE (DAMAGE)			
	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.5 MPH	-16.0 MPH	9.2 MPH	-30.0 DEG.
VEH#2	27.7 MPH	-24.0 MPH	-13.9 MPH	30.0 DEG.

	SPEED CHANGE (LINEAR MOMENTUM)			
	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-1.9 MPH	-9.8 MPH	79.1 DEG.
VEH#2	15.0 MPH	11.3 MPH	-9.8 MPH	139.1 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 24650.7 FT-LB VEH#2 169221.4 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 4.0 MPH

VEH#2 .6 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -7.3 MPH

VEH#2 1.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

4.6 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT----- 4621.0 LBS.
 VDI-----11FZEW2
 L----- 46.0 IN.
 C1----- 4.0 IN.
 C2----- 5.5 IN.
 C3----- 7.0 IN.
 C4----- 10.2 IN.
 C5----- 12.1 IN.
 C6----- 14.8 IN.
 D----- 14.3
 RHO----- 1.00 *
 ANG----- -30.0 DEG.
 D'----- 19.1 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT----- 3082.0 LBS.
 VDI-----01RDEW3
 L----- 113.3 IN.
 C1----- .5 IN.
 C2----- 12.0 IN.
 C3----- 10.4 IN.
 C4----- 11.8 IN.
 C5----- 9.0 IN.
 C6----- 4.1 IN.
 D----- 21.8
 RHO----- 1.00 *
 ANG----- 30.0 DEG.
 D'----- 21.8 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
 B1 = 59.2 INCHES
 TR1 = 61.8 INCHES
 I1 = 44739.0 LB-SEC**2-IN
 M1 = 11.959 LB-SEC**2/IN
 XF1 = 98.8 INCHES
 XR1 = -114.0 INCHES

5-6

A2 = 46.3 INCHES
 B2 = 50.1 INCHES
 TR2 = 54.6 INCHES
 I2 = 23537.7 LB-SEC**2-IN
 M2 = 7.976 LB-SEC**2/IN
 XF2 = 83.3 INCHES
 XR2 = -91.6 INCHES

YS1 = 38.5 INCHES

YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
LF----- .01
RR----- .20
LR----- .20

VEHICLE # 2

RF----- .01
LF----- .01
RR----- .20
LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 3.736

#

MCAUTO: PLEASE SELECT HOST
WDAC, WTSO, WCMS, WTSOA, WTSOB, WTSOV,
- WDAC

MCAUTO - 07:49 APR 14, '80
LOGON PLEASE: C0014C
PASSWORD
■■■■■■■■

IO=126

#RUN Y3LOM.C0162

Y3LOM 07:50 APR 14, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC TEST # 2

2. CLASS/WEIGHTS?
?4 4621 2 3081

5-8

3. VDI/PDOF # 1?

?11FDEW2 -30.

4. VDI/PDOF # 2?
?02RDEW4 30.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?11. 9.4 55. 3 *DEL*
11. 9.4 55. 23.6 12.5 134.

7. IMPACT COORDINATES?
?-11.2 8.5 -30. 0. 0. 90.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1

?1. .02 .2 .2

29. ROLL. RESISTANCES. INDIV. WHEELS # 2
?.02 .02 1. 1.

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?75.5

43. END DAMAGE DEPTH #1
?.5 2.4 3.7 6.9 12. 16.5

44. END DAMAGE MIDPOINT OFFSET #1
?0.

45. SIDE DAMAGE WIDTH #2
?118.5

46. SIDE DAMAGE DEPTH #2
?6.75 22.75 23.5 21.3 10. 0.

47. SIDE DAMAGE MIDPOINT OFFSET #2
?13.7

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 2

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	31.7 MPH	0.0 MPH
VEH#2	36.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG. 5-10	LAT.	ANG.
VEH#1	31.1 MPH	-26.9 MPH	15.5 MPH	-30.0 DEG.
VEH#2	46.6 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

```

*****
*                                     *
*      IMPACT                        *                                     *
*      SPEED                         *      SPEED CHANGE                *
*      MPH                          *      MPH                           *      BASIS
*                                     *                                     *
*****
*                                     *      OF
*      *      *      *      *      *      *      *      *      *      *      *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS
*      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      * SPINOUT TRAJECTORIES AND
* 31.7 * 0.0 * 23.2 * -21.6 * 8.6 * CONSERVATION OF LINEAR
*      *      *      *      *      *      * MOMENTUM
*      *      *      *      *      *      *
*****
*      *      *      *      *      *      *
*      *      *      *      *      *      *
*      *      *      *      *      *      * 5-11
*      *      *      *      *      *      * SPINOUT TRAJECTORIES AND
*      *      *      *      *      *      * DAMAGE
*****

```

 * 31.1 * -24.9 * 15.5 * DAMAGE DATA ONLY *

VEHICLE # 2

 * IMPACT *
 * SPEED *
 * MPH *
 * SPEED CHANGE *
 * MPH *
 * BASIS *
 * OF *
 * FWD * LAT * TOTAL * LONG. * LATERAL *
 * RESULTS *
 * SPINOUT TRAJECTORIES AND *
 * CONSERVATION OF LINEAR *
 * MOMENTUM *
 * SPINOUT TRAJECTORIES AND *
 * DAMAGE *
 * DAMAGE DATA ONLY *

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-11.20 FT.	0.00 FT.
IMPACT Y-POSITION	8.50 FT.	0.00 FT.
IMPACT HEADING ANGLE	-30.00 DEG.	89.99 DEG.
REST X-POSITION	11.00 FT.	23.60 FT.
REST Y-POSITION	9.40 FT.	12.50 FT.
REST HEADING ANGLE	54.99 DEG.	133.98 DEG.
END-OF-ROTATION X-POSITION	-11.20 FT.	
END-OF-ROTATION Y-POSITION	8.50 FT.	
END-OF-ROTATION HEADING ANGLE	-30.00 DEG.	
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1

5-12

VEHICLE # 2

XC10'	=	-11.2 FT.	XC20'	=	0.0 FT.
YC10'	=	8.5 FT.	YC20'	=	0.0 FT.
PSI10	=	-30.0 DEGREES	PSI20	=	90.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	=	-11.2 FT.	XCS2'	=	0.0 FT.
YCS1'	=	8.5 FT.	YCS2'	=	0.0 FT.
PSIS1	=	-30.0 DEG	PSIS2	=	90.0 DEG
US1	=	10.1 MPH	US2	=	9.1 MPH
VS1	=	8.6 MPH	VS2	=	-21.6 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	45.1 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	31.7 MPH	0.0 MPH
VEH#2	36.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.1 MPH	-26.9 MPH	15.5 MPH	-30.0 DEG.
VEH#2	46.6 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	23.2 MPH	-21.6 MPH	8.6 MPH	-21.6 DEG.
VEH#2	34.8 MPH	-27.3 MPH	-21.6 MPH	38.3 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 31830.3 FT-LB VEH#2 507862.9 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 31.4 MPH
VEH#2 21.9 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 4.0 MPH
VEH#2 -28.9 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

53.4 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4621.0 LBS.
VDI-----11FDEW2
L----- 75.5 IN.

5-13

VEHICLE # 2

TYPE-----CATEGORY 2
WEIGHT----- 3081.0 LBS.
VDI-----02RDEW4
L----- 118.5 IN.

C1-----	.5 IN.	
C2-----	2.4 IN.	
C3-----	3.7 IN.	
C4-----	6.9 IN.	
C5-----	12.0 IN.	
C6-----	16.5 IN.	
D-----	0.0	
RHO-----	1.00	*
ANG-----	-30.0 DEG.	
D'-----	15.0 IN.	

C1-----	6.8 IN.	
C2-----	13.8 IN.	
C3-----	23.5 IN.	
C4-----	21.5 IN.	
C5-----	10.0 IN.	
C6-----	0.0 IN.	
D-----	15.7	
RHO-----	1.00	↓
ANG-----	30.0 DEG.	
D'-----	5.6 IN.	

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	45.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
IR1	=	61.8 INCHES	TR2	=	58.6 INCHES
I1	=	44739.0 LB-SEC**2-IN	I2	=	23530.1 LB-SEC**2-IN
M1	=	11.959 LB-SEC**2/IN	M2	=	7.974 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.5 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	1.00
LF-----	.02
RR-----	.20
LR-----	.20

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.02
LF-----	.02
RR-----	1.00
LR-----	1.00

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 4.879

#

RUN Y3L0M,C0162

Y3L0M 08:03 APR 14, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SHAC, OR END)
?A

1. TITLE?
TRICSAC TEST # 6 CHEVELLE VS. RABBIT

2. CLASS/WEIGHTS?
?A 4300 2 2623

3. VDI/PDOF # 1?
?11FZEW1 -30.

4. VDI/PDOF # 2?
?02RDEW3 30.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?60. 11. 15. 20. 21. 242.

7. IMPACT COORDINATES?
?0. 0. 0. 11.1 2.67 120.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 1. .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?54.5

43. END DAMAGE DEPTH #1
?.5 .5 1.25 1.5 1.75 2.25

44. END DAMAGE MIDPOINT OFFSET #1
?9.75

45. SIDE DAMAGE WIDTH #2
?77.

46. SIDE DAMAGE DEPTH #2
?4. 12. 17.8 19.3 17. 8.25

47. SIDE DAMAGE MIDPOINT OFFSET #2
?-3.25

THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 6 CHEVELLE VS. RABBIT

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	24.8 MPH	0.0 MPH
VEH#2	25.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.1 MPH	-18.3 MPH	10.6 MPH	-30.0 DEG.
VEH#2	34.6 MPH	-30.0 MPH	-17.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	14.9 MPH	-14.0 MPH	5.1 MPH	-20.0 DEG.
VEH#2	24.5 MPH	-18.8 MPH	-15.7 MPH	39.9 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 5408.8 FT-LB VEH#2 249998.8 FT-LB

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 24.1 MPH

VEH#2 7.2 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -5.8 MPH

VEH#2 -24.2 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

31.3 MPH

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

?P

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 6 CHEVELLE VS. RABBIT



SCENE INFORMATION

VEHICLE # 1

VEHICLE # 2

IMPACT X-POSITION	0.00	FT.	11.10	FT.
IMPACT Y-POSITION	0.00	FT.	2.67	FT.
IMPACT HEADING ANGLE	0.00	DEG.	119.99	DEG.
REST X-POSITION	60.00	FT.	20.00	FT.
REST Y-POSITION	11.00	FT.	21.00	FT.
REST HEADING ANGLE	15.00	DEG.	241.97	DEG.
END-OF-ROTATION X-POSITION	0.00	FT.		
END-OF-ROTATION Y-POSITION	0.00	FT.		
END-OF-ROTATION HEADING ANGLE	0.00	DEG.		
DIRECTION OF ROTATION	CW		CW	
AMOUNT OF ROTATION	<360		<360	

COLLISION CONDITIONS

VEHICLE # 1

VEHICLE # 2

XC10'	=	0.0	FT.	XC20'	=	11.1	FT.
YC10'	=	0.0	FT.	YC20'	=	2.7	FT.
PSI10	=	0.0	DEGREES	PSI20	=	120.0	DEGREES
PSI1D0	=	0.0	DEG/SEC	PSI2D0	=	0.0	DEG/SEC

SEPARATION CONDITIONS

XCS1'	=	0.0	FT.	XCS2'	=	11.1	FT.
YCS1'	=	0.0	FT.	YCS2'	=	2.7	FT.
PSIS1	=	0.0	DEG	PSIS2	=	120.0	DEG
US1	=	10.8	MPH	US2	=	6.5	MPH
VS1	=	5.1	MPH	VS2	=	-15.7	MPH
PSISD1	=	0.0	DEG/SEC	PSISD2	=	137.6	DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	24.8 MPH	0.0 MPH
VEH#2	25.3 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.1 MPH	-18.3 MPH	10.6 MPH	-30.0 DEG.
VEH#2	34.6 MPH	-30.0 MPH	-17.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	14.9 MPH	-14.0 MPH	5.1 MPH	-20.0 DEG.
VEH#2	24.5 MPH	-18.8 MPH	-15.7 MPH	39.9 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 5408.8 FT-LB VEH#2 249998.8 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)
 VEH#1 24.1 MPH
 VEH#2 7.2 MPH
 SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
 VEH#1 -5.8 MPH
 VEH#2 -24.2 MPH
 CLOSING VELOCITY (LINEAR MOMENTUM)
 31.3 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1		VEHICLE # 2	
TYPE-----	CATEGORY 4	TYPE-----	CATEGORY 2
WEIGHT-----	4300.0 LBS.	WEIGHT-----	2623.0 LBS.
VDI-----	11FZEW1	VDI-----	02RDEW3
L-----	54.5 IN.	L-----	77.0 IN.
C1-----	.5 IN.	C1-----	4.0 IN.
C2-----	.5 IN.	C2-----	12.0 IN.
C3-----	1.3 IN.	C3-----	17.8 IN.
C4-----	1.5 IN.	C4-----	19.3 IN.
C5-----	1.8 IN.	C5-----	17.0 IN.
C6-----	2.3 IN.	C6-----	8.3 IN.
D-----	9.8	D-----	-3.3
RHO-----	1.00 *	RHO-----	1.00
ANG-----	-30.0 DEG.	ANG-----	30.0 DEG.
D'-----	16.4 IN.	D'-----	-5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	41631.2 LB-SEC**2-IN	I2	=	20032.3 LB-SEC**2-IN
M1	=	11.128 LB-SEC**2/IN	M2	=	6.788 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.20	RR-----	1.00
LR-----	.20	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
END

STOP

CRASH PROGRAM COMPLETED.

MRU= 4.931

#

RUN Y3LOM.C0162

Y3LOM 08:15 APR 14, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC TEST # 7 CHEVELLE VS. RABBIT

2. CLASS/WEIGHTS?
?4 3700 2 1700

3. VDI/PDOF # 1?
?11FDEW1 -30.

4. VDI/PDOF # 2?
?02RDEW2 30.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?84.5 18.2 16.5 22.9 41.4 262.

7. IMPACT COORDINATES?
?0. 0. 0. 10.7 3.45 120.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?Y *DEL*
N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?22. 30. 250.

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 / *DEL*
.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 1. .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?66.

43. END DAMAGE DEPTH #1
?0. 1.25 2. 3.75 5. 6.25

44. END DAMAGE MIDPOINT OFFSET #1
?4.

45. SIDE DAMAGE WIDTH #2
?108.5

46. SIDE DAMAGE DEPTH #2
?.5 11. 17.75 21. 21.25 7.25

47. SIDE DAMAGE MIDPOINT OFFSET #2
7-8.5

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 7 CHEVELLE VS. RABBIT

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	25.9 MPH	0.0 MPH
VEH#2	34.7 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.8 MPH	-23.2 MPH	13.4 MPH	-30.0 DEG.
VEH#2	58.3 MPH	-50.5 MPH	-29.2 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	14.8 MPH	-13.3 MPH	6.5 MPH	-26.1 DEG.
VEH#2	32.1 MPH	-26.7 MPH	-17.9 MPH	33.9 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 11493.5 FT-LB VEH#2 393693.4 FT-LB

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 24.7 MPH
VEH#2 7.3 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -8.0 MPH
VEH#2 -33.9 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

31.9 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?P

S U M M A R Y O F C R A S H 3 R E S U L T S


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*      *      *      *      *
*  58.3 * -50.5 * -29.2 * DAMAGE DATA ONLY
*      *      *      *      *
*****

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SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	10.70 FT.
IMPACT Y-POSITION	0.00 FT.	3.45 FT.
IMPACT HEADING ANGLE	0.00 DEG.	119.99 DEG.
REST X-POSITION	84.50 FT.	22.90 FT.
REST Y-POSITION	18.20 FT.	41.40 FT.
REST HEADING ANGLE	16.50 DEG.	261.97 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	22.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	30.00 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	249.97 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 10.7 FT.
YC10' = 0.0 FT.	YC20' = 3.5 FT.
PSI10 = 0.0 DEGREES	PSI20 = 120.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1' = 0.0 FT.	XCS2' = 10.7 FT.
YCS1' = 0.0 FT.	YCS2' = 3.5 FT.
PSIS1 = 0.0 DEG	PSIS2 = 120.0 DEG
US1 = 12.7 MPH	US2 = 8.0 MPH
VS1 = 6.5 MPH	VS2 = -17.9 MPH
PSISD1 = 0.0 DEG/SEC	PSISD2 = 171.7 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	25.9 MPH	0.0 MPH
VEH#2	34.7 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.8 MPH	-23.2 MPH	13.4 MPH	-30.0 DEG.
VEH#2	58.3 MPH	-50.5 MPH	-29.2 MPH	30.0 DEG.

5-26

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
--	-------	-------	------	------

VEH#1	14.8 MPH	-13.3 MPH	6.5 MPH	-26.1 DEG.
VEH#2	32.1 MPH	-26.7 MPH	-17.9 MPH	33.9 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 11493.5 FT-LB VEH#2 393693.4 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	24.7 MPH
VEH#2	7.3 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	-8.0 MPH
VEH#2	-33.9 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

31.9 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----	CATEGORY 4
WEIGHT-----	3700.0 LBS.
VDI-----	11FDEW1
L-----	66.0 IN.
C1-----	0.0 IN.
C2-----	1.3 IN.
C3-----	2.0 IN.
C4-----	3.8 IN.
C5-----	5.0 IN.
C6-----	6.3 IN.
D-----	4.0
RHO-----	1.00 *
ANG-----	-30.0 DEG.
D'-----	15.6 IN.

VEHICLE # 2

TYPE-----	CATEGORY 2
WEIGHT-----	1700.0 LBS.
VDI-----	02RDEW2
L-----	108.5 IN.
C1-----	.5 IN.
C2-----	11.0 IN.
C3-----	17.8 IN.
C4-----	21.0 IN.
C5-----	21.3 IN.
C6-----	7.3 IN.
D-----	-8.5
RHO-----	1.00
ANG-----	30.0 DEG.
D'-----	-1.5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	35822.2 LB-SEC**2-IN	I2	=	12983.2 LB-SEC**2-IN
M1	=	9.576 LB-SEC**2/IN	M2	=	4.400 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.20
LR-----	.20

5-27

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	1.00
LR-----	.20

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 5.023

#

run y3lom.c0162

Y3LOM 15:13 MAR 26, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMALL, OR FPU)
?a

1. TITLE?
Tricsac test # 8 chevelle vs. chevelle

2. CLASS/WEIGHTS?
?4 4479 4 4710

3. VDI/PDOF # 1?
?12fdew1 -45.

4. VDI/PDOF # 2?
?03r9ew2 45.

5. REST
IMPACT? (Y OR N)
?y

6. REST COORDINATES?
?-5 12. 46. 6.5 21. 141.

7. IMPACT COORDINATES?
?-10.9 3.2 0. 0. 1.9 90.

12. SKIDDING OF # 1? (Y OR N)
?y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?n

15. CURVED PATH? (Y OR N)
?n

17. ROTATION DIRECTION #1?
?cw

18. MORE THAN 360 DEG? (Y OR N)
?n

19. SKIDDING OF # 2? (Y OR N)
?y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?n

22. CURVED PATH? (Y OR N)
?n

24. ROTATION DIRECTION # 2?
?cw

25. MORE THAN 360 DEG? (Y OR N)
?n

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?n

38. DAMAGE DIMENSIONS? (Y OR N)
?y

42. END DAMAGE WIDTH #1
?73

43. END DAMAGE DEPTH #1
?2.7 3.6

44. END DAMAGE MIDPOINT OFFSET #1
?0.

45. SIDE DAMAGE WIDTH #2
?84.5

46. SIDE DAMAGE DEPTH #2
?6.2 8.3 9.2 5.9 4.4 .8

47. SIDE DAMAGE MIDPOINT OFFSET #2
?15.

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 8 CHEVELLE VS. CHEVELLE

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	16.7 MPH	0.0 MPH
VEH#2	25.7 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-7.1 MPH	7.0 MPH	-45.0 DEG.
VEH#2	9.5 MPH	-6.7 MPH	-6.7 MPH	45.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	12.6 MPH	-6.9 MPH	10.5 MPH	-56.6 DEG.
VEH#2	12.0 MPH	-10.0 MPH	-6.6 MPH	33.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 18442.4 FT-LB VEH#2 31224.0 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 16.6 MPH

VEH#2 3.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 2.0 MPH

VEH#2 -25.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

19.7 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
??

S U M M A R Y O F C R A S H 3 R E S U L T S

1

```

*****
*           *           *           *           *
*   9.5 *   -6.7 *   -6.7 * DAMAGE DATA ONLY
*           *           *           *
*****

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SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-10.90 FT.	0.00 FT.
IMPACT Y-POSITION	3.20 FT.	1.90 FT.
IMPACT HEADING ANGLE	0.00 DEG.	89.99 DEG.
REST X-POSITION	-5.50 FT.	6.50 FT.
REST Y-POSITION	12.00 FT.	21.00 FT.
REST HEADING ANGLE	45.99 DEG.	140.98 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = -10.9 FT.	XC20' = 0.0 FT.
YC10' = 3.2 FT.	YC20' = 1.9 FT.
PSI10 = 0.0 DEGREES	PSI20 = 90.0 DEGREES
PSI100 = 0.0 DEG/SEC	PSI200 = 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1' = -10.9 FT.	XCS2' = 0.0 FT.
YCS1' = 3.2 FT.	YCS2' = 1.9 FT.
PSIS1 = 0.0 DEG	PSIS2 = 90.0 DEG
US1 = 9.8 MPH	US2 = 15.7 MPH
VS1 = 10.5 MPH	VS2 = -6.6 MPH
PSISD1 = 58.2 DEG/SEC	PSISD2 = 54.5 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	16.7 MPH	0.0 MPH
VEH#2	25.7 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-7.1 MPH	7.0 MPH	-45.0 DEG.
VEH#2	9.5 MPH	-6.7 MPH	-6.7 MPH	45.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	12.6 MPH	-6.9 MPH	10.5 MPH	-56.6 DEG.
VEH#2	12.0 MPH	-10.0 MPH	-6.6 MPH	33.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 18642.4 FT-LB VEH#2 31224.0 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 16.6 MPH

VEH#2 3.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 2.0 MPH

VEH#2 -25.5 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

19.7 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4479.0 LBS.
VDI-----12FDEW1
L----- 73.0 IN.
C1----- 2.7 IN.
C2----- 3.6 IN.
C3----- 0.0 IN.
C4----- 0.0 IN.
C5----- 0.0 IN.
C6----- 0.0 IN.
D----- 0.0
RHO----- 1.00 *
ANG----- -45.0 DEG.
D'----- 1.7 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT----- 4710.0 LBS.
VDI-----03RYEW2
L----- 84.5 IN.
C1----- 6.2 IN.
C2----- 8.3 IN.
C3----- 9.2 IN.
C4----- 5.9 IN.
C5----- 4.4 IN.
C6----- .8 IN.
D----- 15.0
RHO----- 1.00 *
ANG----- 45.0 DEG.
D'----- 7.3 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
B1 = 59.2 INCHES
TR1 = 61.8 INCHES
I1 = 43364.2 LB-SEC**2-IN
M1 = 11.592 LB-SEC**2/IN
XF1 = 98.8 INCHES
XR1 = -114.0 INCHES
YS1 = 38.5 INCHES

A2 = 54.7 INCHES
B2 = 59.2 INCHES
TR2 = 61.8 INCHES
I2 = 45600.7 LB-SEC**2-IN
M2 = 12.189 LB-SEC**2/IN
XF2 = 98.8 INCHES
XR2 = -114.0 INCHES
YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
LF----- .01
RR----- .20
LR----- .20

VEHICLE # 2

RF----- .01
LF----- .01
RR----- .20
LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?end

CRASH PROGRAM COMPLETED.

STOP

MRU= 3.853

#

run y3lom.c0162

Y3LOM 15:26 MAR 26, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SNAC, OR END)
?a

1. TITLE?
?ricsac test # 9 honda vs. torino

2. CLASS/WEIGHTS?
?1 2256 4 4900

3. VDI/PDOF # 1?
?11fdew2 -65.

4. VDI/PDOF # 2?
?02rfew2 25.

5. REST
IMPACT? (Y OR N)
?y

6. REST COORDINATES?
?4. 35.5 104. -5. 49.5 152.

7. IMPACT COORDINATES?
?0. 0. 0. 8.53 -5.89 90.

12. SKIDDING OF # 1? (Y OR N)
?n

15. CURVED PATH? (Y OR N)
?n

17. ROTATION DIRECTION #1?
?cw

18. MORE THAN 360 DEG? (Y OR N)
?n

19. SKIDDING OF # 2? (Y OR N)
?y

20. SKIDDING STOP BEFORE REST? (Y OR N)

?y

21. END OF SKIDDING COORDINATES?
?18. 12.5 120.

22. CURVED PATH? (Y OR N)
?n

24. ROTATION DIRECTION # 2?
?cw

25. MORE THAN 360 DEG? (Y OR N)
?n

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.2 .2 .01 .01

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.1 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?n

39. DAMAGE DIMENSIONS? (Y OR N)
?y

42. END DAMAGE WIDTH #1
?49.75

43. END DAMAGE DEPTH #1
?5. 5.75 12.5 7.5 7.5 9.5

44. END DAMAGE MIDPOINT OFFSET #1
?1.63

45. SIDE DAMAGE WIDTH #2
?54.5

46. SIDE DAMAGE DEPTH #2
?7.75 4.6 4.75 3.3 2.75 1.5

47. SIDE DAMAGE MIDPOINT OFFSET #2
?68.

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 9 HONDA VS. TORINO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)
 FORWARD LATERAL
VEH#1 20.1 MPH 0.0 MPH
VEH#2 18.0 MPH 0.0 MPH

SPEED CHANGE (DAMAGE)
 TOTAL LONG. LAT. ANG.
VEH#1 19.1 MPH -8.1 MPH 17.3 MPH -65.0 DEG.
VEH#2 8.8 MPH -8.0 MPH -3.7 MPH 25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)
 TOTAL LONG. LAT. ANG.
VEH#1 20.1 MPH -20.1 MPH 0.0 MPH 0.0 DEG.
VEH#2 9.2 MPH 0.0 MPH -9.2 MPH 90.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 68853.8 FT-LB VEH#2 31379.7 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

 VEH#1 16.5 MPH
 VEH#2 10.2 MPH
SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
 VEH#1 11.4 MPH
 VEH#2 -14.8 MPH
CLOSING VELOCITY (LINEAR MOMENTUM)
 26.7 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
P

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 9 HONDA VS. TORINO

VENTICLE # 1

IMPACT									
SPEED		SPEED CHANGE							
MPH		MPH				BASTS			

FWD		LAT		TOTAL		LONG.		LATERAL	
								RESULTS	

20.1		0.0		20.1		-20.1		0.0	

VEHICLE # 2

IMPACT		SPEED		SPEED CHANGE		BASIS		OF	
MPH		MPH		MPH		RESULTS		RESULTS	
FWD	LAT	TOTAL	LONG	LATERAL					
18.0	0.0	9.2	0.0	-9.2					
SPINOUT TRAJECTORIES AND CONSERVATION OF LINEAR MOMENTUM									

SPINOUT TRAJECTORIES AND DAMAGE									

8.8 -8.0 -3.7 DAMAGE DATA ONLY									
5-39									

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	8.53 FT.
IMPACT Y-POSITION	0.00 FT.	-5.89 FT.
IMPACT HEADING ANGLE	0.00 DEG.	89.99 DEG.
REST X-POSITION	4.00 FT.	-5.00 FT.
REST Y-POSITION	35.50 FT.	49.50 FT.
REST HEADING ANGLE	103.99 DEG.	151.98 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	18.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	12.50 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	119.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 8.5 FT.
YC10' = 0.0 FT.	YC20' = -5.9 FT.
PSI10 = 0.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC

SEPARATION CONDITIONS

XC51' = 0.0 FT.	XC52' = 8.5 FT.
YC51' = 0.0 FT.	YC52' = -5.9 FT.
PSIS1 = 0.0 DEG	PSIS2 = 90.0 DEG
US1 = 0.0 MPH	US2 = 18.0 MPH
VS1 = 0.0 MPH	VS2 = -9.2 MPH
PSISD1 = 0.0 DEG/SEC	PSISD2 = 54.7 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	20.1 MPH	0.0 MPH
VEH#2	18.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	19.1 MPH	-8.1 MPH	17.3 MPH	-65.0 DEG.
VEH#2	8.8 MPH	-8.0 MPH	-3.7 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.1 MPH	-20.1 MPH	0.0 MPH	.0 DEG.
VEH#2	9.2 MPH	.0 MPH	-9.2 MPH	90.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 68853.8 FT-LB VEH#2 31379.7 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 16.5 MPH

VEH#2 10.2 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 11.4 MPH

VEH#2 -14.8 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

26.7 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

VEHICLE # 2

TYPE-----CATEGORY 1

WEIGHT----- 2256.0 LBS.

VDI-----11FDEW2

L----- 49.7 IN.

C1----- 5.0 IN.

C2----- 5.8 IN.

C3----- 12.5 IN.

C4----- 7.5 IN.

C5----- 7.5 IN.

C6----- 9.5 IN.

D----- 1.6

RHO----- 1.00 *

ANG----- -65.0 DEG.

D'----- 2.9 IN.

TYPE-----CATEGORY 4

WEIGHT----- 4900.0 LBS.

VDI-----02RFEW2

L----- 54.5 IN.

C1----- 7.8 IN.

C2----- 4.6 IN.

C3----- 4.8 IN.

C4----- 3.3 IN.

C5----- 2.8 IN.

C6----- 1.5 IN.

D----- 68.0

RHO----- 1.00 *

ANG----- 25.0 DEG.

D'----- 62.4 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 45.1 INCHES

B1 = 48.1 INCHES

TR1 = 51.1 INCHES

I1 = 11712.0 LB-SEC**2-IN

M1 = 5.839 LB-SEC**2/IN

XF1 = 76.0 INCHES

XR1 = -83.8 INCHES

YS1 = 30.4 INCHES

A2 = 54.7 INCHES

B2 = 59.2 INCHES

TR2 = 61.8 INCHES

I2 = 47440.2 LB-SEC**2-IN

M2 = 12.681 LB-SEC**2/IN

XF2 = 98.8 INCHES

XR2 = -114.0 INCHES

YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .20

LF----- .20

RR----- .01

LR----- .01

VEHICLE # 2

RF----- .10

LF----- .01

RR----- .20

LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?end

CRASH PROGRAM COMPLETED.

STOP

MRU= 3.774

#

run y3lom.c0162

Y3LOM 15:41 MAR 26, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?a

1. TITLE?
?ricsac test # 10 honda vs. torino

2. CLASS/WEIGHTS?
?1 2306 4 4720

3. VDI/PDOF # 1?
?10fdew2 -65.

4. VDI/PDOF # 2?
?01rfew2 25.

5. REST
IMPACT? (Y OR N)
?y

6. REST COORDINATES?
?5. 43. 87. 0. 99.5 128.5

7. IMPACT COORDINATES?
?0. 0. 0. 8.5 -5.9 90.

12. SKIDDING OF # 1? (Y OR N)
?y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?y

14. END OF SKIDDING COORDINATES?
?5. 25. 90.

15. CURVED PATH? (Y OR N)
?n

17. ROTATION DIRECTION #1?
?cw

18. MORE THAN 360 DEG? (Y OR N)
?n

19. SKIDDING OF # 2? (Y OR N)
?y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?y

21. END OF SKIDDING COORDINATES?
?23. 19. 90.

22. CURVED PATH? (Y OR N)
?n

24. ROTATION DIRECTION # 2?
?cw

25. MORE THAN 360 DEG? (Y OR N)
?n

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.2 .2 .01 .01

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.1 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?n

38. DAMAGE DIMENSIONS? (Y OR N)
?y

42. END DAMAGE WIDTH #1
?47.5

43. END DAMAGE DEPTH #1
?7. 10.2 14. 8.9 7. 9.

44. END DAMAGE MIDPOINT OFFSET #1
7-2.75

45. SIDE DAMAGE WIDTH #2
753.

46. SIDE DAMAGE DEPTH #2
79.2 6.5 6.1 5.3 4.5 .5

47. SIDE DAMAGE MIDPOINT OFFSET #2
766.5

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H R E S U L T S

RICSAC TEST # 10 HONDA VS. TORINO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	33.2 MPH	0.0 MPH
VEH#2	34.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	22.4 MPH	-9.5 MPH	20.3 MPH	-65.0 DEG.
VEH#2	10.9 MPH	-9.9 MPH	-4.6 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	33.4 MPH	-28.2 MPH	17.8 MPH	-32.1 DEG.
VEH#2	16.3 MPH	-8.7 MPH	-13.8 MPH	57.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 87973.8 FT-LB VEH#2 44986.2 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 27.3 MPH
VEH#2 19.7 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 18.9 MPH
VEH#2 -28.3 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
46.9 MPH

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	33.2 MPH	0.0 MPH
VEH#2	34.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	22.4 MPH	-9.5 MPH	20.3 MPH	-65.0 DEG.
VEH#2	10.9 MPH	-9.9 MPH	-4.6 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	33.4 MPH	-28.2 MPH	17.8 MPH	-32.1 DEG.
VEH#2	16.3 MPH	-8.7 MPH	-13.8 MPH	57.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 87973.8 FT-LB VEH#2 44986.2 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 27.3 MPH
VEH#2 19.7 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 18.9 MPH
VEH#2 -28.3 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

46.9 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 1
WEIGHT-----2306.0 LBS.
VDI-----10FDEW2
L-----47.5 IN.
C1-----7.0 IN.
C2-----10.2 IN.
C3-----14.0 IN.
C4-----8.9 IN.
C5-----7.0 IN.
C6-----9.0 IN.
D-----2.8
RHO-----1.00 *
ANG-----65.0 DEG.
D'-----3.8 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT-----4720.0 LBS.
VDI-----01RFEW2
L-----53.0 IN.
C1-----9.2 IN.
C2-----6.5 IN.
C3-----6.1 IN.
C4-----5.3 IN.
C5-----4.5 IN.
C6-----.5 IN.
D-----66.5
RHO-----1.00
ANG-----25.0 DEG.
D'-----61.5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	45.1 INCHES	A2	=	54.7 INCHES
B1	=	48.1 INCHES	B2	=	59.2 INCHES
TR1	=	51.1 INCHES	TR2	=	61.8 INCHES
I1	=	11971.6 LB-SEC**2-IN	I2	=	45697.5 LB-SEC**2-IN
M1	=	5.968 LB-SEC**2/IN	M2	=	12.215 LB-SEC**2/IN

XF1	=	76.0 INCHES	XF2	=	98.8 INCHES
XR1	=	-83.8 INCHES	XR2	=	-114.0 INCHES
YS1	=	30.4 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.20
LF-----	.20
RR-----	.01
LR-----	.01

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.10
LF-----	.01
RR-----	.20
LR-----	.20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, PATCH, SMAC, OR END)
 ?end.

CRASH PROGRAM COMPLETED.

STOP

MRU= 3.804

#

run y3lom.c0162

Y3LOM 15:54 MAR 26, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR FND)
?a

1. TITLE?
?ricsac test # 11 vesa vs. torino

2. CLASS/WEIGHTS?
?2 3041 4 4850

3. VDI/PDOF # 1?
?12f9ew3 5.

4. VDI/PDOF # 2?
?12f9ew3 -5.

5. REST
IMPACT? (Y OR N)
?y

6. REST COORDINATES?
?25.6 -6.4 170. -8.6 0.4 0.0

7. IMPACT COORDINATES?
?15.7 -4. 171. 0. 0. 0.

12. SKIDDING OF # 1? (Y OR N)
?n

15. CURVED PATH? (Y OR N)
?n

17. ROTATION DIRECTION #1?
?cw

18. MORE THAN 360 DEG? (Y OR N)
?n

19. SKIDDING OF # 2? (Y OR N)
?n

22. CURVED PATH? (Y OR N)
?n

24. ROTATION DIRECTION # 2?
?n

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION? (1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .1 .1

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?n

38. DAMAGE DIMENSIONS? (Y OR N)
?y

42. END DAMAGE WIDTH #1
?32.5

43. END DAMAGE DEPTH #1
?22. 20.2 18.5 16.8 15. 12.5

44. END DAMAGE MIDPOINT OFFSET #1
?-12.75

48. END DAMAGE WIDTH #2
?32.26

49. END DAMAGE DEPTH #2
?29.5 26.25 23. 18.7 14.3 11.

50. END DAMAGE MIDPOINT OFFSET # 1
?-12.9

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

SUMMARY OF CRASH 4 RESULTS

RICSAC TEST # 11 VEGA VS. TORINO

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	22.1 MPH	-22.1 MPH	1.7 MPH	-4.5 DEG.
VEH#2	13.9 MPH	-13.5 MPH	3.2 MPH	-13.5 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	0.0 MPH	.0 MPH	0.0 MPH	-180.0 DEG.
VEH#2	0.0 MPH	.0 MPH	0.0 MPH	-180.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 35223.1 FT-LB VEH#2 47201.7 FT-LB

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	0.0 MPH
VEH#2	0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	0.0 MPH
VEH#2	0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

0.0 MPH

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

??

SUMMARY OF CRASH 3 RESULTS

RICSAC TEST # 11 VEGA VS. TORINO

VEHICLE # 1


```

*****
*                               *
*   IMPACT                       *
*   SPEED                       *
*   MPH                         *
*                               *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   FWD * LAT * TOTAL * LONG. * LATERAL *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   22.1 * -1.7 * 22.1 * -22.1 * 1.7 *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*****

```

VEHICLE # 2

```

*****
*                               *
*   IMPACT                       *
*   SPEED                       *
*   MPH                         *
*                               *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   FWD * LAT * TOTAL * LONG. * LATERAL *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   13.5 * -3.2 * 13.9 * -13.5 * 3.2 *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *
*****

```

SCENE INFORMATION

VEHICLE # 1

VEHICLE # 2

IMPACT X-POSITION	15.70	FT.	0.00	FT.
IMPACT Y-POSITION	-4.00	FT.	0.00	FT.
IMPACT HEADING ANGLE	170.98	DEG.	0.00	DEG.
REST X-POSITION	25.60	FT.	8.60	FT.
REST Y-POSITION	-6.40	FT.	.40	FT.
REST HEADING ANGLE	169.98	DEG.	0.00	DEG.
END-OF-ROTATION X-POSITION	15.70	FT.	0.00	FT.
END-OF-ROTATION Y-POSITION	-4.00	FT.	0.00	FT.
END-OF-ROTATION HEADING ANGLE	170.98	DEG.	0.00	DEG.
DIRECTION OF ROTATION	CW		NONE	
AMOUNT OF ROTATION	<360		<360	

COLLISION CONDITIONS

VEHICLE # 1

XC10'	=	15.7 FT.
YC10'	=	-4.0 FT.
PSI10	=	171.0 DEGREES
PSI1D0	=	0.0 DEG/SEC

VEHICLE # 2

XC20'	=	0.0 FT.
YC20'	=	0.0 FT.
PSI20	=	0.0 DEGREES
PSI2D0	=	0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	=	15.7 FT.
YCS1'	=	-4.0 FT.
PSIS1	=	171.0 DEG
US1	=	0.0 MPH
VS1	=	0.0 MPH
PSISD1	=	0.0 DEG/SEC

XCS2'	=	0.0 FT.
YCS2'	=	0.0 FT.
PSIS2	=	0.0 DEG
US2	=	0.0 MPH
VS2	=	0.0 MPH
PSISD2	=	0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	22.1 MPH	-22.1 MPH	1.7 MPH	-4.5 DEG.
VEH#2	13.9 MPH	-13.5 MPH	3.2 MPH	-13.5 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	0.0 MPH	.0 MPH	0.0 MPH	-180.0 DEG.
VEH#2	0.0 MPH	.0 MPH	0.0 MPH	-180.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 35223.1 FT-LB VEH#2 47201.7 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH
 VEH#2 0.0 MPH
 SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
 VEH#1 0.0 MPH
 VEH#2 0.0 MPH
 CLOSING VELOCITY (LINEAR MOMENTUM)
 0.0 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 2
 WEIGHT-----3041.0 LBS.
 VDI-----12FYEW3
 L-----32.5 IN.
 C1-----22.0 IN.
 C2-----20.2 IN.
 C3-----18.5 IN.
 C4-----16.8 IN.
 C5-----15.0 IN.
 C6-----12.5 IN.
 D-----12.8
 RHO-----1.00 *
 ANG-----4.5 DEG.
 D'-----14.2 IN.

VEHICLE # 2

TYPE-----CATEGORY 4
 WEIGHT-----4850.0 LBS.
 VDI-----12FYEW3
 L-----32.3 IN.
 C1-----29.5 IN.
 C2-----26.3 IN.
 C3-----23.0 IN.
 C4-----18.7 IN.
 C5-----14.3 IN.
 C6-----11.0 IN.
 D-----12.9
 RHO-----1.00 *
 ANG-----13.5 DEG.
 D'-----15.4 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	46.3 INCHES	A2	=	54.7 INCHES
B1	=	50.1 INCHES	B2	=	59.2 INCHES
TR1	=	54.6 INCHES	TR2	=	61.8 INCHES
I1	=	23224.6 LB-SEC**2-IN	I2	=	46956.1 LB-SEC**2-IN
M1	=	7.670 LB-SEC**2/IN	M2	=	12.552 LB-SEC**2/IN
XF1	=	83.3 INCHES	XF2	=	98.8 INCHES
XR1	=	-91.6 INCHES	XR2	=	-114.0 INCHES
YS1	=	33.6 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----0.01
 LF-----0.01
 RR-----0.10
 LR-----0.10

VEHICLE # 2

RF-----0.01
 LF-----0.01
 RR-----0.20
 LR-----0.20

MU-----0.87

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 ?end

STOP

CRASH PROGRAM COMPLETED.

MRU= 3.731

#

run y3lom,c0162

Y3LOM 16:07 MAR 26, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?a

1. TITLE?
?ricsac test # 12 vesa vs. torino

2. CLASS/WEIGHTS?
?2 3130 4 4512

3. VDI/PDOF # 1?
?12fdew4 5.

4. VDI/PDOF # 2?
?12fsew4 -5.

5. REST
IMPACT? (Y OR N)
?y

6. REST COORDINATES?
?22.3 -5.5 118. 6.8 2.6 -12.

7. IMPACT COORDINATES?
?15.7 -4. 171. 0. 0. 0.

12. SKIDDING OF # 1? (Y OR N)
?y

13. SKIDDING STOP BEFORE REST? (Y OR N)?
?n

15. CURVED PATH? (Y OR N)
?n

17. ROTATION DIRECTION #1?
?ccw

18. MORE THAN 360 DEG? (Y OR N)
?n

19. SKIDDING OF # 2? (Y OR N)
 ?y

20. SKIDDING STOP BEFORE REST? (Y OR N)
 ?n

22. CURVED PATH? (Y OR N)
 ?n

24. ROTATION DIRECTION # 2?
 ?ccw

25. MORE THAN 360 DEG? (Y OR N)
 ?n

26. TIRE-GROUND FRICTION?
 ? .87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
 ?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
 ? .01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
 ? .01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
 ?n

38. DAMAGE DIMENSIONS? (Y OR N)
 ?y

42. END DAMAGE WIDTH #1
 ?32.

43. END DAMAGE DEPTH #1
 ?38.6 34.6 29.5 26. 19.6 14.25

44. END DAMAGE MIDPOINT OFFSET #1
 ?2.75

48. END DAMAGE WIDTH #2
 ?28.25

49. END DAMAGE DEPTH #2
739.35 1.5

**** SYNTAX ERROR ****
CHECK # OF ENTRIES, ILLEGAL CHARACTERS, ETC.

49. END DAMAGE DEPTH #2
739.5 33. 28.75 23.75 19.2 15.

50. END DAMAGE MIDPOINT OFFSET # 1
7-10.6

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 12: VEGA VS. TORINO

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	28.4 MPH	-28.4 MPH	-.7 MPH	1.4 DEG.
VEH#2	19.7 MPH	-19.5 MPH	2.6 MPH	-7.6 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	8.5 MPH	-8.4 MPH	.6 MPH	-3.7 DEG.
VEH#2	11.6 MPH	10.9 MPH	4.2 MPH	-159.1 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 82074.3 FT-LB VEH#2 60580.2 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
0.0 MPH


```

*****
*           *           *           *           *           *           *           *           *           *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS *
*           *           *           *           *           *           *           *           *           *
*****
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*****
* 30.4 * 1.5 * 19.7 * -19.5 * 2.6 * SPINOUT TRAJECTORIES AND *
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*****
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*****
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*           *           *           *           *           *           *           *           *           *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	15.70 FT.	0.00 FT.
IMPACT Y-POSITION	-4.00 FT.	0.00 FT.
IMPACT HEADING ANGLE	170.98 DEG.	0.00 DEG.
REST X-POSITION	22.30 FT.	-6.80 FT.
REST Y-POSITION	-5.50 FT.	2.60 FT.
REST HEADING ANGLE	117.99 DEG.	-12.00 DEG.
DIRECTION OF ROTATION	CCW	CCW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= 15.7 FT.	XC20'	= 0.0 FT.
YC10'	= -4.0 FT.	YC20'	= 0.0 FT.
PSI10	= 171.0 DEGREES	PSI20	= 0.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC

SEPARATION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XCS1'	= 15.7 FT.	XCS2'	= 0.0 FT.
YCS1'	= -4.0 FT.	YCS2'	= 0.0 FT.
PSIS1	= 171.0 DEG	PSIS2	= 0.0 DEG
US1	= -8.4 MPH	US2	= 10.9 MPH
VS1	= .6 MPH	VS2	= 4.2 MPH
PSISD1	= -106.9 DEG/SEC	PSISD2	= -22.4 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)
 FORWARD LATERAL 5-61

VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)				
	TOTAL	LONG.	LAT.	ANG.
VEH#1	28.4 MPH	-28.4 MPH	-7 MPH	1.4 DEG.
VEH#2	19.7 MPH	-19.5 MPH	2.6 MPH	-7.6 DEG.

SPEED CHANGE (LINEAR MOMENTUM)				
	TOTAL	LONG.	LAT.	ANG.
VEH#1	8.5 MPH	-8.4 MPH	.6 MPH	-3.7 DEG.
VEH#2	11.6 MPH	10.9 MPH	4.2 MPH	-159.1 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 82074.3 FT-LB VEH#2 60580.2 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH

VEH#2 0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 0.0 MPH

VEH#2 0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

0.0 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----	CATEGORY 2
WEIGHT-----	3130.0 LBS.
VDI-----	12FDEW4
L-----	32.0 IN.
C1-----	38.6 IN.
C2-----	34.6 IN.
C3-----	29.5 IN.
C4-----	26.0 IN.
C5-----	19.6 IN.
C6-----	14.3 IN.
D-----	2.8
RHO-----	1.00 *
ANG-----	1.4 DEG.
D'-----	.4 IN.

VEHICLE # 2

TYPE-----	CATEGORY 4
WEIGHT-----	4512.0 LBS.
VDI-----	12FYEW4
L-----	28.3 IN.
C1-----	39.5 IN.
C2-----	33.0 IN.
C3-----	28.8 IN.
C4-----	23.8 IN.
C5-----	19.2 IN.
C6-----	15.0 IN.
D-----	-10.6
RHO-----	1.00 *
ANG-----	-7.6 DEG.
D'-----	-12.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	46.3 INCHES	A2	=	54.7 INCHES
B1	=	50.1 INCHES	B2	=	59.2 INCHES
TR1	=	54.6 INCHES	TR2	=	61.8 INCHES
I1	=	23904.3 LB-SEC**2-IN	I2	=	43683.7 LB-SEC**2-IN
M1	=	8.100 LB-SEC**2/IN	M2	=	11.677 LB-SEC**2/IN
XF1	=	93.3 INCHES	XF2	=	98.8 INCHES
XR1	=	-91.6 INCHES	XR2	=	-114.0 INCHES
YS1	=	33.6 INCHES	YS2	=	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 End

STOP

CRASH PROGRAM COMPLETED.

MRU= 3.796

#

run 93lom.c016w *DEL*
run 93lom.c0162

Y3LOM 16:22 MAR 26, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?a

1. TITLE?
?ricsac test # 3 torino vs. pinto

2. CLASS/WEIGHTS?
?4 4949 2 3120

3. VDI/PDOF # 1?
?12fzew1 0.

4. VDI/PDOF # 2?
?06bzew1 170.

5. REST
IMPACT? (Y OR N)
?y

6. REST COORDINATES?
?111.4 2. -4. 181.5 6.4 -19.

7. IMPACT COORDINATES?
?0. 0. 0. 15. 2.2 10.

12. SKIDDING OF # 1? (Y OR N)
?n

15. CURVED PATH? (Y OR N)
?n

17. ROTATION DIRECTION #1?
?n

19. SKIDDING OF # 2? (Y OR N)
?n

22. CURVED PATH? (Y OR N)
?n

24. ROTATION DIRECTION # 2?
?n

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .09 .09

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .1 .1

32. TRAJECTORY SIMULATION? (Y OR N)
?n

38. DAMAGE DIMENSIONS? (Y OR N)
?y

42. END DAMAGE WIDTH #1
?30.

43. END DAMAGE DEPTH #1
?2. 2. 1.5 1.75 2. 2.25

44. END DAMAGE MIDPOINT OFFSET #1
?22.

48. END DAMAGE WIDTH #2
?30.

49. END DAMAGE DEPTH #2
?6.5 6.75 5.75 5. 3.75 3.

50. END DAMAGE MIDPOINT OFFSET # 1
?5.

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

SUSTAINED CONTACT SOLUTION FORM

RICSAC TEST # 3 TORINO VS. PINTO

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	7.5 MPH	-7.5 MPH	0.0 MPH	.0 DEG.
VEH#2	11.9 MPH	11.7 MPH	-2.1 MPH	170.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	12.3 MPH	12.3 MPH	.2 MPH	-179.0 DEG.
VEH#2	15.0 MPH	14.8 MPH	-2.2 MPH	171.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 2685.4 FT-LB VEH#2 24200.4 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
0.0 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
??

S U M M A R Y O F C R A S H 3 R E S U L T S

SUSTAINED CONTACT SOLUTION FORM

RICSAC TEST # 3 TORINO VS. PINTO

VEHICLE # 1

VEHICLE # 1

VEHICLE # 2

IMPACT X-POSITION	0.00	FT.	15.00	FT.
IMPACT Y-POSITION	0.00	FT.	2.20	FT.
IMPACT HEADING ANGLE	0.00	DEG.	10.00	DEG.
REST X-POSITION	111.40	FT.	181.50	FT.
REST Y-POSITION	2.00	FT.	6.40	FT.
REST HEADING ANGLE	-4.00	DEG.	-19.00	DEG.
END-OF-ROTATION X-POSITION	0.00	FT.	15.00	FT.
END-OF-ROTATION Y-POSITION	0.00	FT.	2.20	FT.
END-OF-ROTATION HEADING ANGLE	0.00	DEG.	10.00	DEG.
DIRECTION OF ROTATION	NONE		NONE	
AMOUNT OF ROTATION	<360		<360	

COLLISION CONDITIONS

VEHICLE # 1

VEHICLE # 2

XC10'	=	0.0 FT.	XC20'	=	15.0 FT.
YC10'	=	0.0 FT.	YC20'	=	2.2 FT.
PSI10	=	0.0 DEGREES	PSI20	=	10.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.	XCS2'	=	15.0 FT.
YCS1'	=	0.0 FT.	YCS2'	=	2.2 FT.
PSIS1	=	0.0 DEG	PSIS2	=	10.0 DEG
US1	=	12.3 MPH	US2	=	14.8 MPH
VS1	=	.2 MPH	VS2	=	-2.2 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	7.5 MPH	-7.5 MPH	0.0 MPH	0.0 DEG.
VEH#2	11.9 MPH	11.7 MPH	-2.1 MPH	170.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	12.3 MPH	12.3 MPH	.2 MPH	-179.0 DEG.
VEH#2	15.0 MPH	14.8 MPH	-2.2 MPH	171.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 2685.4 FT-LB VEH#2 24200.4 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)
 VEH#1 0.0 MPH
 VEH#2 0.0 MPH
 SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
 VEH#1 0.0 MPH
 VEH#2 0.0 MPH
 CLOSING VELOCITY (LINEAR MOMENTUM)
 0.0 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT-----4949.0 LBS.
 VDI-----12FZEW1
 L-----30.0 IN.
 C1-----2.0 IN.
 C2-----2.0 IN.
 C3-----1.5 IN.
 C4-----1.8 IN.
 C5-----2.0 IN.
 C6-----2.3 IN.
 D-----22.0
 RHO-----1.00 *
 ANG-----0.0 DEG.
 D'-----22.3 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT-----3120.0 LBS.
 VDI-----06BZEW1
 L-----30.0 IN.
 C1-----6.5 IN.
 C2-----6.8 IN.
 C3-----5.8 IN.
 C4-----5.0 IN.
 C5-----3.8 IN.
 C6-----3.0 IN.
 D-----5.0
 RHO-----1.00 *
 ANG-----170.0 DEG.
 D'-----3.0 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	47914.6 LB-SEC**2-IN	I2	=	23828.0 LB-SEC**2-IN
M1	=	12.808 LB-SEC**2/IN	M2	=	8.075 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----.01
 LF-----.01
 RR-----.09
 LR-----.09

VEHICLE # 2

RF-----.01
 LF-----.01
 RR-----.10
 LR-----.10

MU-----.87

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, PATCH, SMAU, OR END)
?end

CRASH PROGRAM COMPLETED.

STOP

MRU= 3.733

#

RUN Y3L0M.C0162

Y3L0M 07:16 APR 02, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC TEST # 4 TORINO VS. PINTO

2. CLASS/WEIGHTS?
?4 4980 2 3190

3. VDI/PDOF # 1?
?12FZEW3 0.

4. VDI/PDOF # 2?
?05BYEW5 170.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?42.8 54.5 137.5 63.9 62.5 88.

7. IMPACT COORDINATES?
?0. 0. 1. 16.4 3.4 10.

12. SKIDDING OF # 1? (Y OR N)
?Y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

14. END OF SKIDDING COORDINATES?
?20. 5. 10.

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N) 5-71

YN

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?35. 2. 10.

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?41.5

43. END DAMAGE DEPTH #1
?6.3 7.8 9.8 12.5 14.8 18.3

44. END DAMAGE MIDPOINT OFFSET #1
?16.1

48. END DAMAGE WIDTH #2
?41.8

49. END DAMAGE DEPTH #2
736. 31.5 29. 24. 19.5 14.8

50. END DAMAGE MIDPOINT OFFSET # 1
7-9.1

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 4 TORINO VS. PINTO

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)
FORWARD LATERAL
VEH#1 43.9 MPH .4 MPH
VEH#2 -21.4 MPH 7.4 MPH

SPEED CHANGE (DAMAGE)
TOTAL LONG. LAT. ANG.
VEH#1 26.5 MPH -26.3 MPH 3.6 MPH -7.8 DEG.
VEH#2 41.4 MPH 39.6 MPH -12.0 MPH 163.1 DEG.

SPEED CHANGE (LINEAR MOMENTUM)
TOTAL LONG. LAT. ANG.
VEH#1 26.5 MPH -26.3 MPH 3.6 MPH -7.8 DEG.
VEH#2 41.4 MPH 39.6 MPH -12.0 MPH 163.1 DEG.

ENERGY DISSIPATED BY DAMAGE, VEH#1 23914.7 FT-LB VEH#2 316363.2 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 43.1 MPH
VEH#2 21.4 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -8.2 MPH
VEH#2 -.6 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
64.5 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
7P

S U M M A R Y O F C R A S H 3 R E S U L T S



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*****
*                                     *
*      IMPACT      *                   *
*      SPEED       *   SPEED CHANGE   *
*      MPH         *           MPH     *          BASIS
*                 *                   *
*****                                OF
*      *           *           *           *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS
*      *           *           *           *
*****
*      *           *           *           *
*      *           *           *           * SPINOUT TRAJECTORIES AND
* -21.4 * 7.4 * 41.4 * 39.6 * -12.0 * CONSERVATION OF LINEAR
*      *           *           *           * MOMENTUM
*      *           *           *           *
*****

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*      *      *      *      *      *      *
*      *      *      *      *      * SPINOUT TRAJECTORIES AND *
*      *      *      *      *      * DAMAGE                      *
*      *      *      *      *      *
*****
*      *      *      *      *
*  41.4 * 39.6 * -12.0 * DAMAGE DATA ONLY
*      *      *      *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	16.40 FT.
IMPACT Y-POSITION	0.00 FT.	3.40 FT.
IMPACT HEADING ANGLE	1.00 DEG.	10.00 DEG.
REST X-POSITION	42.80 FT.	63.90 FT.
REST Y-POSITION	54.50 FT.	62.50 FT.
REST HEADING ANGLE	137.48 DEG.	87.99 DEG.
END-OF-ROTATION X-POSITION	20.00 FT.	35.00 FT.
END-OF-ROTATION Y-POSITION	5.00 FT.	2.00 FT.
END-OF-ROTATION HEADING ANGLE	10.00 DEG.	10.00 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

	VEHICLE # 1	VEHICLE # 2
XC10'	= 0.0 FT.	XC20' = 16.4 FT.
YC10'	= 0.0 FT.	YC20' = 3.4 FT.
PSI10	= 1.0 DEGREES	PSI20 = 10.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	= 0.0 FT.	XCS2' = 16.4 FT.
YCS1'	= 0.0 FT.	YCS2' = 3.4 FT.
PSIS1	= 1.0 DEG	PSIS2 = 10.0 DEG
US1	= 17.6 MPH	US2 = 18.2 MPH
VS1	= 4.1 MPH	VS2 = -4.6 MPH
PSISD1	= 36.3 DEG/SEC	PSISD2 = 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	43.9 MPH	.4 MPH
VEH#2	-21.4 MPH	7.4 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG. 5-75	LAT.	ANG.
VEH#1	26.5 MPH	-26.3 MPH	3.6 MPH	-7.8 DEG.

VEH#2 41.4 MPH 39.6 MPH -12.0 MPH 163.1 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.5 MPH	-26.3 MPH	3.6 MPH	-7.8 DEG.
VEH#2	41.4 MPH	39.6 MPH	-12.0 MPH	163.1 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 23914.7 FT-LB VEH#2 316363.2 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 43.1 MPH

VEH#2 21.4 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -8.2 MPH

VEH#2 -.6 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

64.5 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4980.0 LBS.
VDI-----12FZEW3
L----- 41.5 IN.
C1----- 6.3 IN.
C2----- 7.8 IN.
C3----- 9.8 IN.
C4----- 12.5 IN.
C5----- 14.8 IN.
C6----- 18.3 IN.
D----- 16.1
RHO----- 1.00 *
ANG----- -7.9 DEG.
D'----- 19.7 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
WEIGHT----- 3190.0 LBS.
VDI-----05BYEW5
L----- 41.8 IN.
C1----- 36.0 IN.
C2----- 31.5 IN.
C3----- 29.0 IN.
C4----- 24.0 IN.
C5----- 19.5 IN.
C6----- 14.8 IN.
D----- -9.1
RHO----- 1.00 *
ANG----- 163.1 DEG.
D'----- -11.9 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
B1 = 59.2 INCHES
TR1 = 61.8 INCHES
I1 = 48214.8 LB-SEC**2-IN
M1 = 12.888 LB-SEC**2/IN
XF1 = 98.8 INCHES
XR1 = -114.0 INCHES
YS1 = 38.5 INCHES

A2 = 46.3 INCHES
B2 = 50.1 INCHES
TR2 = 54.6 INCHES
I2 = 24362.6 LB-SEC**2-IN
M2 = 8.256 LB-SEC**2/IN
XF2 = 83.3 INCHES
XR2 = -91.6 INCHES
YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

5-76

VEHICLE # 2

RF----- .01
LF----- .01
RR----- .20
LR----- .20

RF----- .01
LF----- .01
RR----- .20
LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 3.787

#BYE

CON= 0:36 MRU= 11.263

run 93lom.c0162

Y3LOM 16:35 MAR 26, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?a

1. TITLE?
?ricsac test # 5 torino vs. civic

2. CLASS/WEIGHTS?
?4 4600 1 2350

3. VDI/PDOF # 1?
?12fzew1 0.

4. VDI/PDOF # 2?
?05bdew8 170.

5. REST
IMPACT? (Y OR N)
?y

6. REST COORDINATES?
?241.6 0. 3. 56.9 39. 282.

7. IMPACT COORDINATES?
?0. 0. 0. 14.9 3.4 10.

12. SKIDDING OF # 1? (Y OR N)
?n

15. CURVED PATH? (Y OR N)
?n

17. ROTATION DIRECTION #1?
?cw

18. MORE THAN 360 DEG? (Y OR N)
?n

19. SKIDDING OF # 2? (Y OR N)
?y

20. SKIDDING STOP BEFORE REST? (Y OR N)
 ?y

21. END OF SKIDDING COORDINATES?
 ?55. 23. 260.

22. CURVED PATH? (Y OR N)
 ?y

23. POINT ON CURVE?
 ?40. 10.

24. ROTATION DIRECTION # 2?
 ?cw

25. MORE THAN 360 DEG? (Y OR N)
 ?n

26. TIRE-GROUND FRICTION?
 ? .87

27. ROLLING RESISTANCE OPTION? (1 OR 2)
 ?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
 ? .01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
 ? .2 .2 .01 .1

32. TRAJECTORY SIMULATION? (Y OR N)
 ?n

38. DAMAGE DIMENSIONS? (Y OR N)
 ?y

42. END DAMAGE WIDTH #1
 ?33.5

43. END DAMAGE DEPTH #1
 ?1.4 1.4 2. 2.1 2.3 2.9

44. END DAMAGE MIDPOINT OFFSET #1
 ?20.3

48. END DAMAGE WIDTH #2
?53.

49. END DAMAGE DEPTH #2
?36. 36.5 31.5 23. 13.3 6.

50. END DAMAGE MIDPOINT OFFSET # 1
?-1.6

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 5 TORINO VS. CIVIC

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	29.3 MPH	-29.3 MPH	0.0 MPH	.0 DEG.
VEH#2	57.4 MPH	56.5 MPH	-10.0 MPH	170.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	0.0 MPH	.0 MPH	0.0 MPH	-180.0 DEG.
VEH#2	23.2 MPH	22.8 MPH	-4.1 MPH	169.9 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 3114.8 FT-LB VEH#2 407873.3 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
0.0 MPH

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

?P

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	29.3 MPH	-29.3 MPH	0.0 MPH	0 DEG.
VEH#2	57.4 MPH	56.5 MPH	-10.0 MPH	170.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	0.0 MPH	0 MPH	0.0 MPH	-180.0 DEG.
VEH#2	23.2 MPH	22.8 MPH	-4.1 MPH	169.9 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 3114.8 FT-LB VEH#2 407873.3 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
0.0 MPH

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT-----4600.0 LBS.
VDI-----12FZEW1
L-----33.5 IN.
C1-----1.4 IN.
C2-----1.4 IN.
C3-----2.0 IN.
C4-----2.1 IN.
C5-----2.3 IN.
C6-----2.9 IN.
D-----20.3
RHO-----1.00 *
ANG-----0.0 DEG.
D'-----22.3 IN.

VEHICLE # 2

TYPE-----CATEGORY 1
WEIGHT-----2350.0 LBS.
VDI-----05BDEW8
L-----53.0 IN.
C1-----36.0 IN.
C2-----36.5 IN.
C3-----31.5 IN.
C4-----23.0 IN.
C5-----13.3 IN.
C6-----6.0 IN.
D-----1.6
RHO-----1.00 *
ANG-----170.0 DEG.
D'-----7.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
B1 = 59.2 INCHES
TR1 = 61.8 INCHES
I1 = 44535.7 LB-SEC**2-IN
M1 = 11.905 LB-SEC**2/IN
XF1 = 98.8 INCHES

A2 = 45.1 INCHES
B2 = 48.1 INCHES
TR2 = 51.1 INCHES
I2 = 12200.1 LB-SEC**2-IN
M2 = 6.082 LB-SEC**2/IN
XF2 = 76.0 INCHES

XR1 = -114.0 INCHES
YS1 = 38.5 INCHES

XR2 = -83.8 INCHES
YS2 = 30.4 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
LF----- .01
RR----- .20
LR----- .20

MU----- .87

VEHICLE # 2

RF----- .20
LF----- .20
RR----- .01
LR----- .10

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?end

CRASH PROGRAM COMPLETED.

STOP

MRU= 3.844

#

SECTION 6
CRASH2A WITH TRAJECTORY SIMULATION-SPRING 1980

MCAUTO: PLEASE SELECT HOST
WDAC, WTSO, WCMS, WTSOA, WTSOB, WTSOV.
- wdar

MCAUTO - 08:53 MAR 28, '80
LOGON PLEASE: c0014c
PASSWORD

ID=330

#run y3lom.c0162

Y3LOM 08:54 MAR 28, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?a

1. TITLE?
?ricsac #1 with traj sim

2. CLASS/WEIGHTS?
?4 4621 2 3082

3. VDI/PDOF # 1?
?11fzew2 -30.

4. VDI/PDOF # 2?
?01rdew3 30.

5. REST

IMPACT? (Y OR N)

?y

6. REST COORDINATES?

?-2.4 -1. -1.5 7.5 2.5 105.

7. IMPACT COORDINATES?

?10.8 1. -30. 0. -5.5 90.

12. SKIDDING OF # 1? (Y OR N)

?y

13. SKIDDING STOP BEFORE REST? (Y OR N)

?n

15. CURVED PATH? (Y OR N)

?n

17. ROTATION DIRECTION #1?

?cw

18. MORE THAN 360 DEG? (Y OR N)

?n

19. SKIDDING OF # 2? (Y OR N)

?y

20. SKIDDING STOP BEFORE REST? (Y OR N)

?n

22. CURVED PATH? (Y OR N)

?n

24. ROTATION DIRECTION # 2?

?cw

25. MORE THAN 360 DEG? (Y OR N)

?n

26. TIRE-GROUND FRICTION?

? .87

27. ROLLING RESISTANCE OPTION?(1 OR 2)

?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1

? .01 .01 .2 .2

29. ROLL RESISTANCES, INDIV. WHEELS # 2
2.01 1.1 2.2

32. TRAJECTORY SIMULATION? (Y OR N)
Y

33. STEER ANGLES #1 ?
70 0 0 0

34. STEER ANGLES #2 ?
70 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
Y

38. DAMAGE DIMENSIONS? (Y OR N)
Y

42. END DAMAGE WIDTH #1
746.

43. END DAMAGE DEPTH #1
74. 5.5 7. 10.2 12.1 14.8

44. END DAMAGE MIDPOINT OFFSET #1
714 3

45. SIDE DAMAGE WIDTH #2
7113.3

46. SIDE DAMAGE DEPTH #2
7.5 12. 10.6 11.8 9. 4.1

47. SIDE DAMAGE MIDPOINT OFFSET #2
721.8

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) =	2.8558	0.0000	.4343	0.0000
0.0000				

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

6-3

VEHICLE # 1
US = 179.7 VS = -173.0 PSISD = .67 SSDOT = 249.4 GAMS = -2.90
TRAJECTORY ITERATION # 1

REST: -462.2 134.6 6.04 END-OF-ROT: 23.2 14.7 6.04
 POINT-ON-CURVE: 129.6 12.0
 ERRORS: 2.86 0.00 .43 0.00 0.00 Q = 3.29 T = 5.80

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -179.727 -172.955 .668 249.430
 -2.899 3.290

ADJ1,ADJ2,ADJ3 = .6766 1.1318 .2363
 SSDOTP,PSISDP,GAMSP = 168.758 .756 -2.663
 USP,VSP = -90.821 -142.235

E(1),E(2),E(3),E(4),E(5) = .3179 0.0000 .4205 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
 US = -90.8 VS = -142.2 PSISD = .76 SSDOT = 168.8 GAMS = -2.66
 REST: -52.4 33.1 6.05 END-OF-ROT: 72.9 3.1 6.05
 POINT-ON-CURVE: 129.6 12.0
 ERRORS: .32 0.00 .42 0.00 0.00 Q = .74 T = 3.13

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -90.821 -142.235 .756 168.758
 -2.663 .738

ADJ1,ADJ2,ADJ3 = .9567 1.1279 .1771
 SSDOTP,PSISDP,GAMSP = 161.445 .853 -2.485
 USP,VSP = -61.555 -149.250

E(1),E(2),E(3),E(4),E(5) = .2797 0.0000 .2963 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 3
 US = -61.6 VS = -149.3 PSISD = .85 SSDOT = 161.4 GAMS = -2.49
 REST: 12.3 5.9 6.11 END-OF-ROT: 80.1 -5.9 6.11
 POINT-ON-CURVE: 129.6 12.0
 ERRORS: .28 0.00 .30 0.00 0.00 Q = .58 T = 2.43

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -61.555 -149.250 .853 161.445
 -2.485 .576

ADJ1,ADJ2,ADJ3 = 1.1118 1.0924 .0658
 SSDOTP,PSISDP,GAMSP = 179.499 .932 -2.420
 USP,VSP = -57.381 -170.080

E(1),E(2),E(3),E(4),E(5) = .1519 0.0000 .1419 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 4
US = -57.4 VS = -170.1 PSISD = .93 SSDOT = 179.5 GAMS = -2.42
REST: -5.0 -7.1 6.19 END-OF-ROT: 72.6 -14.6 6.18
POINT-ON-CURVE: 129.6 12.0
ERRORS: .15 0.00 .14 0.00 0.00 0 = .29 T = 2.60
US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -57.381 -170.080 .932 179.499
-2.420 .294

ADJ1,ADJ2,ADJ3 = 1.0571 1.0457 .0061
SSDOTP,PSISDP,GAMSP = 189.756 .974 -2.414
USP,VSP = -59.568 -180.163

E(1),E(2),E(3),E(4),E(5) = .0146 0.0000 .0667 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 5
US = -59.6 VS = -180.2 PSISD = .97 SSDOT = 189.8 GAMS = -2.41
REST: -26.6 -12.9 6.22 END-OF-ROT: 66.3 -18.4 6.22
POINT-ON-CURVE: 129.6 12.0
ERRORS: .01 0.00 .07 0.00 0.00 0 = .08 T = 2.83
US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -59.568 -180.163 .974 189.756
-2.414 .081

E(1),E(2),E(3),E(4),E(5) = 2.1363 0.0000 -1.9370 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
US = 219.7 VS = -172.7 PSISD = .85 SSDOT = 279.5 GAMS = .90
REST: -104.6 232.8 2.34 END-OF-ROT: 23.0 100.7 2.34
POINT-ON-CURVE: 0.0 -66.0
ERRORS: 2.14 0.00 -1.94 0.00 0.00 0 = 4.07 T = 4.20
US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 219.729 -172.749 .848 279.506
.904 4.073
6-5

ADJ1,ADJ2,ADJ3 = .7631 .4000 -.7266
SSDOTP,PSISDP,GAMSP = 213.293 .339 .178
USP,VSP = 37.745 -209.927

E(1),E(2),E(3),E(4),E(5) = .6425 0.0000 .2095 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 2
US = 37.7 VS = -209.9 PSISD = .34 SSDOT = 213.3 GAMS = .18
REST: 66.8 -51.3 1.78 END-OF-ROT: 66.8 -51.3 1.78
POINT-ON-CURVE: 0.0 -66.0
ERRORS: .64 0.00 .21 0.00 0.00 Q = .85 T = .68

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 37.745 -209.927 .339 213.293
.178 .852

ADJ1,ADJ2,ADJ3 = 1.2583 1.0665 .4005
SSDOTP,PSISDP,GAMSP = 268.378 .362 .578
USP,VSP = 146.727 -224.717

E(1),E(2),E(3),E(4),E(5) = .8685 0.0000 -.1491 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 3
US = 146.7 VS = -224.7 PSISD = .36 SSDOT = 268.4 GAMS = .58
REST: 43.9 134.6 1.87 END-OF-ROT: 74.9 34.4 1.87
POINT-ON-CURVE: 0.0 -66.0
ERRORS: .87 0.00 -.15 0.00 0.00 Q = 1.02 T = 3.20

ADJ1,ADJ2,ADJ3 = .8670 .9483 -.3585
SSDOTP,PSISDP,GAMSP = 232.697 .343 .220
USP,VSP = 50.774 -227.090

E(1),E(2),E(3),E(4),E(5) = .5633 0.0000 .1029 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

US = 50.8 VS = -227.1 PSISD = .34 SSDOT = 232.7 GAMS = .22
 REST: 78.3 -43.2 1.81 END-OF-ROT: 78.3 -43.2 1.81
 POINT-ON-CURVE: 0.0 -66.0
 ERRORS: .56 0.00 .10 0.00 0.00 R = .67 T = .75

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 50.774 -227.090 .343 232.697
 .220 .666

ADJ1,ADJ2,ADJ3 = 1.1800 1.0335 .3562
 SSDOTP,PSISDP,GAMSP = 274.589 .354 .576
 USP,VSP = 149.611 -230.251

E(1),E(2),E(3),E(4),E(5) = .9099 0.0000 -.1561 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 5
 US = 149.6 VS = -230.3 PSISD = .35 SSDOT = 274.6 GAMS = .58
 REST: 46.6 141.6 1.87 END-OF-ROT: 79.1 36.9 1.87
 POINT-ON-CURVE: 0.0 -66.0
 ERRORS: .91 0.00 -.16 0.00 0.00 Q = 1.07 T = 3.25

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #1 WITH TRAJ SIM

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	.6 MPH	0.0 MPH
VEH#2	-7.4 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.5 MPH	-16.0 MPH	9.2 MPH	-30.0 DEG.
VEH#2	27.7 MPH	-24.0 MPH	-13.9 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	11.0 MPH	-4.0 MPH	-10.2 MPH	68.5 DEG.
VEH#2	16.5 MPH	10.3 MPH	-12.9 MPH	128.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 24650.7 FT-LB VEH#2 169221.4 FT-LB
 SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 -.3 MPH

VEH#2 -3.8 MPH

6-7

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?P

```

RICSAC #1 WITH TRAJ SIM

```

*****
*                                     *
*      IMPACT          *                                     *
*      SPEED           *      SPEED CHANGE                *
*      MPH             *      MPH                          *
*                                     *      BASIS         *
*                                     *                     *
*****
*                                     *      OF            *
*      FWD   *    LAT   *    TOTAL * LONG. * LATERAL *      RESULTS     *
*      *      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *
*      .6 *    0.0 *    11.0 * -4.0 * -10.2 * SPINOUT TRAJECTORIES AND *
*      *      *      *      *      *      * CONSERVATION OF LINEAR *
*      *      *      *      *      *      * MOMENTUM                 *
*      *      *      *      *      *      *      *      *
*****
*      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *
*      *      *      *      *      *      * SPINOUT TRAJECTORIES AND *
*      *      *      *      *      *      * DAMAGE                   *
*****
*      *      *      *      *      *      *      *      *
*      *      *      *      *      *      *      *      *
*      18.5 * -16.0 *      9.2 * DAMAGE DATA ONLY *
*      *      *      *      *      *      *      *      *
*****

```

6-8

6-9

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	.6 MPH	0.0 MPH
VEH#2	-7.4 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.5 MPH	-16.0 MPH	9.2 MPH	-30.0 DEG.
VEH#2	27.7 MPH	-24.0 MPH	-13.9 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	11.0 MPH	-4.0 MPH	-10.2 MPH	68.5 DEG.
VEH#2	16.5 MPH	10.3 MPH	-12.9 MPH	128.5 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 24650.7 FT-LB VEH#2 169221.4 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 -.3 MPH
VEH#2 -3.8 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 .6 MPH
VEH#2 -6.3 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

-4.1 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 CONVERGED O.K. ++++

++++ VEHICLE # 2 DID NOT CONVERGE ++++

NRUNS(1) =	5	NRUNS(2) =	5
E1(1) =	.015	E2(1) =	.563
E1(2) =	0.000	E2(2) =	0.000
E1(3) =	.067	E2(3) =	.103
E1(4) =	0.000	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.081	QMIN2 =	.666

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4621.0 LBS.
VDI-----11FZEW2
L----- 46.0 IN.
C1----- 4.0 IN.
C2----- 5.5 IN.

6-10

VEHICLE # 2

TYPE-----CATEGORY 2
WEIGHT----- 3082.0 LBS.
VDI-----01RDEW3
L----- 113.3 IN.
C1----- .5 IN.
C2----- 12.0 IN.

C3----- 7.0 IN.
 C4----- 10.2 IN.
 C5----- 12.1 IN.
 C6----- 14.8 IN.
 D----- 14.3
 RHO----- 1.00
 ANG----- -30.0 DEG.
 D'----- 19.1 IN.

C3----- 10.6 IN.
 C4----- 11.8 IN.
 C5----- 9.0 IN.
 C6----- 4.1 IN.
 D----- 21.8
 RHO----- 1.00
 ANG----- 30.0 DEG.
 D'----- 21.8 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
 B1 = 59.2 INCHES
 TR1 = 61.8 INCHES
 I1 = 44739.0 LB-SEC**2-IN
 M1 = 11.959 LB-SEC**2/IN
 XF1 = 98.8 INCHES
 XR1 = -114.0 INCHES
 YS1 = 38.5 INCHES

A2 = 46.3 INCHES
 B2 = 50.1 INCHES
 TR2 = 54.6 INCHES
 I2 = 23537.7 LB-SEC**2-IN
 M2 = 7.976 LB-SEC**2/IN
 XF2 = 83.3 INCHES
 XR2 = -91.6 INCHES
 YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 Tend

STOP

CRASH PROGRAM COMPLETED.

MRU= 21.326

#

MCAUTO: PLEASE SELECT HOST
WDAC, WTSO, WCMS, WTSOA, WTSOB, WTSOV.
- WDAC

MCAUTO - 09:12 APR 16, '80
LOGON PLEASE: C0014C
PASSWORD
■■■■■■■■

ID=127

#RUN Y3LOM.C0162
ILLEGAL OPTION
#RUN Y3LOM.C0162

Y3LOM 09:13 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?TRICSAC #2 WITH TRAJ SIM, NO ROT

2. CLASS/WEIGHTS?
?A 4621 2 3081

3. VDI/PDOF # 1?
?11FDEW2 -30.

6-12

4. VDI/PDOF # 2?

?02RDEW4 30.

5. REST

IMPACT? (Y OR N)

?Y

6. REST COORDINATES?

?11. 9.4 55. 23.6 12.5 134.

7. IMPACT COORDINATES?

?-11.2 8.5 -30. 0. 0. 90.

12. SKIDDING OF # 1? (Y OR N)

?N

15. CURVED PATH? (Y OR N)

?N

17. ROTATION DIRECTION #1?

?N

19. SKIDDING OF # 2? (Y OR N)

?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)

?N

22. CURVED PATH? (Y OR N)

?N

24. ROTATION DIRECTION # 2?

?CW

25. MORE THAN 360 DEG? (Y OR N)

?N

26. TIRE-GROUND FRICTION?

? .87

27. ROLLING RESISTANCE OPTION?(1 OR 2)

?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1

?1. .02 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2

? .02 .02 1. 1.

32. TRAJECTORY SIMULATION? (Y OR N) 6-13

?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?Y *DEL*
0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?75.5

43. END DAMAGE DEPTH #1
?1.5 2.4 3.7 6.9 12. 16.5

44. END DAMAGE MIDPOINT OFFSET #1
?0.

45. SIDE DAMAGE WIDTH #2
?118.5

46. SIDE DAMAGE DEPTH #2
?6.75 22.75 23.5 21.3 10. 0.

47. SIDE DAMAGE MIDPOINT OFFSET #2
?13.7

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) = .4555 .0477 -.4797 -.0008
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = 178.3 VS = 150.6 PSISD = 0.00 SSDOT = 233.3 GAMS = .18
REST: 16.8 74.3 5.93 END-OF-ROT: -128.7 103.0 5.76
POINT-ON-CURVE: -134.4 102.0
ERRORS: .46 .05 -.48 -.00 0.00 Q = .96 T = 1.55

6-14

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 178.263 150.570 0.000 233.343

.178 .959

ADJ1,ADJ2,ADJ3 = .9113 .8141 .0914
SSDOTP,PSISDF,GAMSP = 212.654 0.000 .269
USP,VSP = 149.261 151.469

E(1),E(2),E(3),E(4),E(5) = .5794 .0434 -.4063 -.0007
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
US = 149.3 VS = 151.5 PSISD = 0.00 SSDOT = 212.7 GAMS = .27
REST: -20.7 89.5 5.90 END-OF-ROT: -129.3 103.3 5.76
POINT-ON-CURVE: -134.4 102.0
ERRORS: .58 .04 -.41 -.00 0.00 Q = 1.01 T = 1.30

ADJ1,ADJ2,ADJ3 = 1.0512 .8469 .0134
SSDOTP,PSISDF,GAMSP = 223.546 0.000 .283
USP,VSP = 154.765 161.308

E(1),E(2),E(3),E(4),E(5) = .5389 .0456 -.4444 -.0007
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 3
US = 154.8 VS = 161.3 PSISD = 0.00 SSDOT = 223.5 GAMS = .28
REST: -9.9 90.3 5.91 END-OF-ROT: -129.1 103.5 5.76
POINT-ON-CURVE: -134.4 102.0
ERRORS: .54 .05 -.44 -.00 0.00 Q = 1.01 T = 1.38

ADJ1,ADJ2,ADJ3 = 1.0068 .8301 -.0019
SSDOTP,PSISDF,GAMSP = 225.057 0.000 .281
USP,VSP = 156.114 162.108

E(1),E(2),E(3),E(4),E(5) = .5317 .0460 -.4497 -.0007
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 4
US = 156.1 VS = 162.1 PSISD = 0.00 SSDOT = 225.1 GAMS = .28
REST: -7.9 89.9 5.92 END-OF-ROT: -129.1 103.5 5.76
POINT-ON-CURVE: -134.4 102.0 6-15

ERRORS: .53 .05 -.45 -.00 0.00 0 = 1.00 T = 1.38

ADJ1,ADJ2,ADJ3 = .9990 .8277 -.0004
SSDOTP,PSISDP,GAMSP = 224.839 0.000 .280
USP,VSP = 156.027 161.889

E(1),E(2),E(3),E(4),E(5) = .5325 .0459 -.4491 -.0007
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 5
US = 156.0 VS = 161.9 PSISD = 0.00 SSDOT = 224.8 GAMS = .28
REST: -8.1 89.9 5.92 END-OF-ROT: -129.1 103.5 5.76
POINT-ON-CURVE: -134.4 102.0
ERRORS: .53 .05 -.45 -.00 0.00 0 = 1.00 T = 1.38

E(1),E(2),E(3),E(4),E(5) = .1996 0.0000 -.2511 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
US = 159.4 VS = -380.0 PSISD = .79 SSDOT = 412.0 GAMS = .40
REST: 238.5 104.2 2.53 END-OF-ROT: 238.2 104.4 2.53
POINT-ON-CURVE: 0.0 0.0
ERRORS: .20 0.00 -.25 0.00 0.00 0 = .45 T = 1.43

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 159.359 -379.975 .788 412.039
.397 .451

ADJ1,ADJ2,ADJ3 = 1.0731 .9103 .0501
SSDOTP,PSISDP,GAMSP = 442.139 .717 .447
USP,VSP = 191.202 -398.659

E(1),E(2),E(3),E(4),E(5) = .0672 0.0000 -.2529 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 2
US = 191.2 VS = -398.7 PSISD = .72 SSDOT = 442.1 GAMS = .45
REST: 264.6 139.1 2.53 END-OF-ROT: 264.5 139.1 2.53
POINT-ON-CURVE: 0.0 0.0 6-16
ERRORS: .07 0.00 -.25 0.00 0.00 0 = .32 T = 1.48

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 191.202 -398.659 .717 442.139
 .447 .320

ADJ1,ADJ2,ADJ3 = 1.0236 .9096 .0021
 SSDOTP,PSISDP,GAMSP = 452.562 .652 .449
 USP,VSP = 196.576 -407.640

E(1),E(2),E(3),E(4),E(5) = .0267 0.0000 -.1815 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 3
 US = 196.6 VS = -407.6 PSISD = .65 SSDOT = 452.6 GAMS = .45
 REST: 274.8 148.5 2.48 END-OF-ROT: 274.8 148.5 2.48
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .03 0.00 -.18 0.00 0.00 Q = .21 T = 1.48

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 196.576 -407.640 .652 452.562
 .449 .208

ADJ1,ADJ2,ADJ3 = 1.0086 .9365 -.0057
 SSDOTP,PSISDP,GAMSP = 456.459 .611 .443
 USP,VSP = 195.936 -412.267

E(1),E(2),E(3),E(4),E(5) = .0124 0.0000 -.1243 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 4
 US = 195.9 VS = -412.3 PSISD = .61 SSDOT = 456.5 GAMS = .44
 REST: 279.2 150.5 2.43 END-OF-ROT: 279.2 150.5 2.43
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .01 0.00 -.12 0.00 0.00 Q = .14 T = 1.48

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 195.936 -412.267 .611 456.459
 .443 .137

ADJ1,ADJ2,ADJ3 = 1.0034 .9572 -.0048
 SSDOTP,PSISDP,GAMSP = 458.015 .585 .439
 USP,VSP = 194.611 -414.613

E(1),E(2),E(3),E(4),E(5) = .0068 0.0000 -.0856 0.0000
 0.0000

•

... ..

...

RICSAC #2 WITH TRAJ SIM,NO ROT

```

*****
*                               *                               *
* IMPACT                        *                               *
* SPEED                         * SPEED CHANGE                *
* MPH                           * MPH                          *
*                               *                               *
***** OF
* FWD   LAT TOTAL LONG LATERAL RESULTS
*       *      *     *        *           *                   *
*****
*       *      *     *        *           * SPINOUT TRAJECTORIES AND
* 33.2 *    0.0 * 24.6 * -23.1 *    8.6 * CONSERVATION OF LINEAR
*       *      *     *        *           * MOMENTUM
*       *      *     *        *           *
*****
*       *      *     *        *           * SPINOUT TRAJECTORIES AND
*       *      *     *        *           * DAMAGE
*****
*                               *
*          *             *              *
*       31.1 * -26.9 *    15.5 * DAMAGE DATA ONLY
*          *             *              *
*****

```

[illegible]

6-20

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.1 MPH	-26.9 MPH	15.5 MPH	-30.0 DEG.
VEH#2	46.6 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	24.6 MPH	-23.1 MPH	8.6 MPH	-20.3 DEG.
VEH#2	36.9 MPH	-28.4 MPH	-23.6 MPH	39.6 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 31830.3 FT-LB VEH#2 507862.9 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	32.9 MPH
VEH#2	23.8 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	4.2 MPH
VEH#2	-31.4 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

56.8 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE ++++
 ++++ VEHICLE # 2 CONVERGED O.K. ++++

NRUNS(1) =	5	NRUNS(2) =	5
E1(1) =	.456	E2(1) =	.007
E1(2) =	.048	E2(2) =	0.000
E1(3) =	-.480	E2(3) =	-.086
E1(4) =	-.001	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.959	QMIN2 =	.092

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----	CATEGORY 4
WEIGHT-----	4621.0 LBS.
VDI-----	11FDEW2
L-----	75.5 IN.
C1-----	.5 IN.
C2-----	2.4 IN.
C3-----	3.7 IN.
C4-----	6.9 IN.
C5-----	12.0 IN.
C6-----	16.5 IN.
D-----	0.0
RHO-----	1.00
ANG-----	-30.0 DEG.
D'-----	15.0 IN.

*

VEHICLE # 2

TYPE-----	CATEGORY 2
WEIGHT-----	3081.0 LBS.
VDI-----	02RDEW4
L-----	118.5 IN.
C1-----	6.8 IN.
C2-----	22.8 IN.
C3-----	23.5 IN.
C4-----	21.3 IN.
C5-----	10.0 IN.
C6-----	0.0 IN.
D-----	13.7
RHO-----	1.00
ANG-----	30.0 DEG.
D'-----	5.6 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	44739.0 LB-SEC**2-IN	I2	=	23530.1 LB-SEC**2-IN
M1	=	11.959 LB-SEC**2/IN	M2	=	7.974 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	1.00
LF-----	.02
RR-----	.20
LR-----	.20

MU-----	.87
---------	-----

VEHICLE # 2

RF-----	.02
LF-----	.02
RR-----	1.00
LR-----	1.00

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

?

end

STOP

CRASH PROGRAM COMPLETED.

MRU= 14.096

#

RUN Y3LOM.C0162

Y3LOM 09:30 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SNAP, OR PAID)
?A

1. TITLE?
?PRCSAC #2 WITH TRAJ SIM, SKID, ROT

2. CLASS/WEIGHTS?
?4 4621 2 3081

3. VDI/PDOF # 1?
?11FDEW2 -30.

4. VDI/PDOF # 2?
?02RDEW4 30.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?11. 9.4 55. 23.6 12.5 134.

7. IMPACT COORDINATES?
?-11.2 8.5 -30. 0. 0. 90.

12. SKIDDING OF # 1? (Y OR N)
?Y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)

?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?1. .02 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.02 .02 1. 1.

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?75.5

43. END DAMAGE DEPTH #1
?.5 2.4 3.7 6.9 12. 16.5

44. END DAMAGE MIDPOINT OFFSET #1
?0. 6-24

45. SIDE DAMAGE WIDTH #2
?118.5

46. SIDE DAMAGE DEPTH #2
?6.75 22.75 23.5 21.3 10. 0.

47. SIDE DAMAGE MIDPOINT OFFSET #2
?13.7

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) = .3939 0.0000 .5335 0.0

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = 259.9 VS = 166.2 PSISD = 1.52 SSDOT = 308.5 GAMS = .05
REST: 236.1 126.8 6.45 END-OF-ROT: 77.2 104.5 6.39
POINT-ON-CURVE: -134.4 102.0
ERRORS: .39 0.00 .53 0.00 0.00 0 = .93 T = 2.45

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 259.918 166.248 1.523 308.538
.046 .927

ADJ1,ADJ2,ADJ3 = .8982 1.1589 -.0175
SSDOTP,PSISDP,GAMSP = 277.142 1.765 .028
USP,VSP = 236.051 145.216

E(1),E(2),E(3),E(4),E(5) = .1690 0.0000 .5368 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
US = 236.1 VS = 145.2 PSISD = 1.76 SSDOT = 277.1 GAMS = .03
REST: 175.5 124.6 6.45 END-OF-ROT: 46.3 106.1 6.39
POINT-ON-CURVE: -134.4 102.0
ERRORS: .17 0.00 .54 0.00 0.00 0 = .71 T = 2.23

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 236.051 145.216 1.765 277.142
.028 .706

ADJ1,ADJ2,ADJ3 = .9509 1.1598 -.0215

SSDOTP,PSISDP,GAMSP = 263.535 2.047 .007
 USP,VSP = 227.381 133.224

E(1),E(2),E(3),E(4),E(5) = .1116 0.0000 .5068 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 3
 US = 227.4 VS = 133.2 PSISD = 2.05 SSDOT = 263.5 GAMS = .01
 REST: 154.8 131.9 6.49 END-OF-ROT: 38.9 109.8 6.44
 POINT-ON-CURVE: -134.4 102.0
 ERRORS: .11 0.00 .51 0.00 0.00 Q = .62 T = 2.18

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 227.381 133.224 2.047 263.535
 .007 .618

ADJ1,ADJ2,ADJ3 = .9718 1.1517 -.0418
 SSDOTP,PSISDP,GAMSP = 256.095 2.357 -.035
 USP,VSP = 226.176 120.120

E(1),E(2),E(3),E(4),E(5) = .1121 0.0000 .4295 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 4
 US = 226.2 VS = 120.1 PSISD = 2.36 SSDOT = 256.1 GAMS = -.04
 REST: 136.8 142.3 6.61 END-OF-ROT: 42.0 112.3 6.56
 POINT-ON-CURVE: -134.4 102.0
 ERRORS: .11 0.00 .43 0.00 0.00 Q = .54 T = 2.10

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 226.176 120.120 2.357 256.095
 -.035 .542

ADJ1,ADJ2,ADJ3 = .9908 1.1304 -.0713
 SSDOTP,PSISDP,GAMSP = 253.736 2.665 -.107
 USP,VSP = 232.005 102.740

E(1),E(2),E(3),E(4),E(5) = .1945 0.0000 .1601 0.0
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 5
 US = 232.0 VS = 102.7 PSISD = 2.66 SSDOT = 253.7 GAMS = -.11
 REST: 87.2 138.9 2.01 END-OF-ROT: 64.3 112.9 6.99
 POINT-ON-CURVE: -134.4 102.0
 ERRORS: .19 0.00 .16 0.00 0.00 Q = .35 T = 1.95

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 232.005 102.740 2.665 253.736
 -.107 .355

E(1),E(2),E(3),E(4),E(5) = .1868 0.0000 -.2772 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
 US = 181.4 VS = -370.0 PSISD = .79 SSDOT = 412.0 GAMS = .46
 REST: 229.5 123.6 2.55 END-OF-ROT: 229.4 123.7 2.55
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .19 0.00 -.28 0.00 0.00 Q = .46 T = 1.40

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 181.381 -369.969 .788 412.039
 .456 .464

ADJ1,ADJ2,ADJ3 = 1.0726 .9001 -.0047
 SSDOTP,PSISDP,GAMSP = 441.936 .709 .451
 USP,VSP = 192.693 -397.715

E(1),E(2),E(3),E(4),E(5) = .0683 0.0000 -.2431 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 2
 US = 192.7 VS = -397.7 PSISD = .71 SSDOT = 441.9 GAMS = .45
 REST: 263.3 140.7 2.52 END-OF-ROT: 263.2 140.8 2.52
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .07 0.00 -.24 0.00 0.00 Q = .31 T = 1.48

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 192.693 -397.715 .709 441.936
 .451 .311

ADJ1,ADJ2,ADJ3 = 1.0240 .9133 -.0025
 SSDOTP,PSISDP,GAMSP = 452.535 .648 .448
 USP,VSP = 196.302 -407.743

E(1),E(2),E(3),E(4),E(5) = .0270 0.0000 -.1742 0.0000
 0.0000

US2,US2,PSISD2,SSDOT2,GAMS2,QMIN2
.438 .090

194.4 A -414.702

-R3 458.038

SUMMARY OF CRASH 3 RESULTS

RICSAC #2 WITH TRAJ SIM, SKID,ROT

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	34.7 MPH	0.0 MPH
VEH#2	34.7 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.1 MPH	-26.9 MPH	15.5 MPH	-30.0 DEG.
VEH#2	46.6 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	22.3 MPH	-21.5 MPH	5.8 MPH	-15.2 DEG.
VEH#2	33.4 MPH	-23.7 MPH	-23.6 MPH	44.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 31830.3 FT-LB VEH#2 507862.9 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	34.4 MPH
VEH#2	21.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	4.3 MPH
VEH#2	-27.7 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
55.4 MPH

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
PF

SUMMARY OF CRASH 3 RESULTS

RICSAC #2 WITH TRAJ SIM, SKID,ROT

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-11.20 FT.	0.00 FT.
IMPACT Y-POSITION	8.50 FT.	0.00 FT.
IMPACT HEADING ANGLE	-30.00 DEG.	89.99 DEG.
REST X-POSITION	11.00 FT.	23.60 FT.
REST Y-POSITION	9.40 FT.	12.50 FT.
REST HEADING ANGLE	54.99 DEG.	133.98 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = -11.2 FT.	XC20' = 0.0 FT.
YC10' = 8.5 FT.	YC20' = 0.0 FT.
PSI10 = -30.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1' = -11.2 FT.	XCS2' = 0.0 FT.
YCS1' = 8.5 FT.	YCS2' = 0.0 FT.
PSIS1 = -30.0 DEG	PSIS2 = 90.0 DEG
US1 = 13.2 MPH	US2 = 11.0 MPH
VS1 = 5.8 MPH	VS2 = -23.6 MPH
PSISD1 = 152.7 DEG/SEC	PSISD2 = 33.4 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	34.7 MPH	0.0 MPH
VEH#2	34.7 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	31.1 MPH	-26.9 MPH	15.5 MPH	-30.0 DEG.
VEH#2	46.6 MPH	-40.4 MPH	-23.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	22.3 MPH	-21.5 MPH	5.8 MPH	-15.2 DEG.
VEH#2	33.4 MPH	-23.7 MPH	-23.6 MPH	44.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 31830.3 FT-LB VEH#2 507862.9 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)
 VEH#1 34.4 MPH
 VEH#2 21.0 MPH
 SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
 VEH#1 4.3 MPH
 VEH#2 -27.7 MPH
 CLOSING VELOCITY (LINEAR MOMENTUM)
 55.4 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE ++++
 ++++ VEHICLE # 2 CONVERGED O.K. ++++

NRUNS(1) =	5	NRUNS(2) =	5
E1(1) =	.194	E2(1) =	.007
E1(2) =	0.000	E2(2) =	0.000
E1(3) =	.160	E2(3) =	-.084
E1(4) =	0.000	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.355	QMIN2 =	.090

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT-----4621.0 LBS.
 VDI-----11FDEW2
 L-----75.5 IN.
 C1-----.5 IN.
 C2-----2.4 IN.
 C3-----3.7 IN.
 C4-----6.9 IN.
 C5-----12.0 IN.
 C6-----16.5 IN.
 D-----0.0
 RHO-----1.00 *
 ANG-----30.0 DEG.
 D'-----15.0 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT-----3081.0 LBS.
 VDI-----O2RHEW4
 L-----118.5 IN.
 C1-----6.8 IN.
 C2-----22.8 IN.
 C3-----23.5 IN.
 C4-----21.3 IN.
 C5-----10.0 IN.
 C6-----0.0 IN.
 D-----13.7
 RHO-----1.00 *
 ANG-----30.0 DEG.
 D'-----5.6 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 =	54.7 INCHES	A2 =	46.3 INCHES
B1 =	59.2 INCHES	B2 =	50.1 INCHES
TR1 =	61.8 INCHES	TR2 =	54.6 INCHES
I1 =	44739.0 LB-SEC**2-IN	I2 =	23530.1 LB-SEC**2-IN
M1 =	11.959 LB-SEC**2/IN	M2 =	7.974 LB-SEC**2/IN
XF1 =	98.8 INCHES	XF2 =	83.3 INCHES
XR1 =	-114.0 INCHES	XR2 =	-91.6 INCHES
YS1 =	38.5 INCHES	YS2 =	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

VEHICLE # 2

RF-----	1.00
LF-----	.02
RR-----	.20
LR-----	.20

RF-----	.02
LF-----	.02
RR-----	1.00
LR-----	1.00

MU-----	.87
---------	-----

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 END

CRASH PROGRAM COMPLETED.

STOP

MRU= 15.947

#

RUN Y3LOM.C0162

Y3LOM 09:47 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC #6 WITH TRAJ SIM, NO ROT OF V1

2. CLASS/WEIGHTS?
?4 4300 2 2623

3. VDI/PDOF # 1?
?11FZEW1 -30.

4. VDI/PDOF # 2?
?02RDEW3 30.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?60. 11. 15. 20. 21. 242.

7. IMPACT COORDINATES?
?0. 0. 0. 11.1 2.67 120.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?N

22. CURVED PATH? (Y OR N)

PN

24. ROTATION DIRECTION # 23
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES. INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES. INDIV. WHEELS # 2
?.01 .01 1. .2

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 00 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?54.5

43. END DAMAGE DEPTH #1
?.5 .5 1.25 1.5 1.75 2.25

44. END DAMAGE MIDPOINT OFFSET #1
?9.75

45. SIDE DAMAGE WIDTH #2
?77.

46. SIDE DAMAGE DEPTH #2
?4. 12. 17.8 19.3 17. 8.25

47. SIDE DAMAGE MIDPOINT OFFSET #2
7-3.25

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) = .3075 .0432 .0054 .0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = 189.9 VS = 90.2 PSISD = 0.00 SSDOT = 210.3 GAMS = .44
REST: 529.4 12.1 -.00 END-OF-ROT: 4.7 2.2 -.00
POINT-ON-CURVE: 0.0 0.0
ERRORS: .31 .04 .01 .00 0.00 Q = .33 T = 5.45

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 189.947 90.195 0.000 210.274
.443 .335

ADJ1,ADJ2,ADJ3 = .8171 1.0018 -.0365
SSDOTP,PSISDP,GAMSP = 171.819 0.000 .407
USP,VSP = 157.792 67.995

E(1),E(2),E(3),E(4),E(5) = .5136 .0352 .0030 .0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
US = 157.8 VS = 68.0 PSISD = 0.00 SSDOT = 171.8 GAMS = .41
REST: 365.3 7.2 -.00 END-OF-ROT: 3.9 1.6 -.00
POINT-ON-CURVE: 0.0 0.0
ERRORS: .51 .04 .00 .00 0.00 Q = .53 T = 4.50

ADJ1,ADJ2,ADJ3 = .9769 1.0010 -.0206
SSDOTP,PSISDP,GAMSP = 167.848 0.000 .386
USP,VSP = 155.484 63.228

E(1),E(2),E(3),E(4),E(5) = .5278 .0344 .0026 .0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1
 US = 155.5 VS = 63.2 PSISD = 0.00 SSDOT = 147.8 GAMS = .39
 REST: 354.7 6.2 -.00 END-OF-ROT: 3.9 1.5 -.00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .53 .03 .00 .00 0.00 Q = .55 T = 4.43

ADJ1,ADJ2,ADJ3 = .9910 1.0009 -.0122
 SSDOTP,PSISDP,GAMSP = 166.329 0.000 .374
 USP,VSP = 154.828 60.776

E(1),E(2),E(3),E(4),E(5) = .5318 .0341 .0024 .0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1
 US = 154.8 VS = 60.8 PSISD = 0.00 SSDOT = 166.3 GAMS = .37
 REST: 351.7 5.8 -.00 END-OF-ROT: 3.9 1.4 -.00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .53 .03 .00 .00 0.00 Q = .55 T = 4.40

ADJ1,ADJ2,ADJ3 = .9950 1.0008 -.0073
 SSDOTP,PSISDP,GAMSP = 165.506 0.000 .367
 USP,VSP = 154.500 59.346

E(1),E(2),E(3),E(4),E(5) = .5338 .0340 .0022 .0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1
 US = 154.5 VS = 59.3 PSISD = 0.00 SSDOT = 165.5 GAMS = .37
 REST: 350.3 5.6 -.00 END-OF-ROT: 3.9 1.4 -.00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .53 .03 .00 .00 0.00 Q = .55 T = 4.40

E(1),E(2),E(3),E(4),E(5) = .2695 0.0000 .1820 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

6-37

VEHICLE # 2
 US = 114.6 VS = -276.6 PSISD = 2.40 SSDOT = 299.4 GAMS = .92
 REST: 284.8 203.6 3.84 END-OF-ROT: 247.8 172.4 3.85

POINT-ON-CURVE: 133.2 32.0
 ERRORS: .27 0.00 .18 0.00 0.00 0 = .45 T = 2.03

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 114.648 -276.583 2.401 299.404
 .916 .451

ADJ1,ADJ2,ADJ3 = 1.0223 1.0581 .1809
 SSDOTF,PSISDF,GAMSF = 306.080 2.541 1.097
 USP,VSP = 166.173 -257.044

E(1),E(2),E(3),E(4),E(5) = .0585 0.0000 .0733 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 2
 US = 166.2 VS = -257.0 PSISD = 2.54 SSDOT = 306.1 GAMS = 1.10
 REST: 242.2 237.9 4.07 END-OF-ROT: 217.5 204.6 4.08
 POINT-ON-CURVE: 133.2 32.0
 ERRORS: .06 0.00 .07 0.00 0.00 0 = .13 T = 2.03

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 166.173 -257.044 2.541 306.080
 1.097 .132

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #6 WITH TRAJ SIM, NO ROT OF V1

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	24.0 MPH	0.0 MPH
VEH#2	27.6 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.1 MPH	-18.3 MPH	10.6 MPH	-30.0 DEG.
VEH#2	34.6 MPH	-30.0 MPH	-17.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	14.2 MPH	-13.2 MPH	5.1 MPH	-21.1 DEG.
VEH#2	23.3 MPH	-18.1 MPH	-14.6 MPH	38.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 5408.8 FT-LB VEH#2 249998.8 FT-LB
 SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 23.4 MPH 6-38

VEH#2 7.8 MPH
 SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
 VEH#1 -5.6 MPH
 VEH#2 -26.4 MPH
 CROSSING VELOCITY (LINEAR MOMENTUM)
 31.2 MPH

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 Pp

SUMMARY OF CRASH 3 RESULTS

RICSAC #6 WITH TRAJ SIM, NO ROT OF V1

VEHICLE # 1

```

*****
*                                     *
* IMPACT                             *                                     *
* SPEED                             *                                     *
* MPH                               *                                     *
*                                     *                                     *
*                                     *                                     *
* FWD * LAT * TOTAL * LONG. * LATERAL * BASIS * OF * RESULTS *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* 24.0 * 0.0 * 14.2 * -13.2 * 5.1 * SPINDOUT TRAJECTORIES AND *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* 21.1 * -18.3 * 10.6 * DAMAGE DATA ONLY *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

```


XCS1'	=	0.0 FT.	XCS2'	=	11.1 FT.
YCS1'	=	0.0 FT.	YCS2'	=	2.7 FT.
PSIS1	=	0.0 DEG	PSIS2	=	120.0 DEG
US1	=	10.8 MPH	US2	=	9.4 MPH
VS1	=	5.1 MPH	VS2	=	-14.6 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	145.6 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	24.0 MPH	0.0 MPH
VEH#2	27.6 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	21.1 MPH	-18.3 MPH	10.6 MPH	-30.0 DEG.
VEH#2	34.6 MPH	-30.0 MPH	-17.3 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	14.2 MPH	-13.2 MPH	5.1 MPH	-21.1 DEG.
VEH#2	23.3 MPH	-18.1 MPH	-14.6 MPH	38.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 5408.8 FT-LB VEH#2 249998.8 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 23.4 MPH
VEH#2 7.8 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -5.6 MPH
VEH#2 -26.4 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

31.2 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 CONVERGED O.K. +++++

NRUNS(1) =	5	NRUNS(2) =	2
E1(1) =	.308	E2(1) =	.059
E1(2) =	.043	E2(2) =	0.000
E1(3) =	.005	E2(3) =	.073
E1(4) =	.000	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.335	QMIN2 =	.132

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

VEHICLE # 2

TYPE-----CATEGORY 4
 WEIGHT----- 4300.0 LBS.
 VDI-----11FZEW1
 L----- 54.5 IN.
 C1----- .5 IN.
 C2----- .5 IN.
 C3----- 1.3 IN.
 C4----- 1.5 IN.
 C5----- 1.8 IN.
 C6----- 2.3 IN.
 D----- 9.8
 RHO----- 1.00 *
 ANG----- -30.0 DEG.
 D'----- 16.4 IN.

TYPE-----CATEGORY 2
 WEIGHT----- 2623.0 LBS.
 VDI-----02RDEW3
 L----- 77.0 IN.
 C1----- 4.0 IN.
 C2----- 12.0 IN.
 C3----- 17.8 IN.
 C4----- 19.3 IN.
 C5----- 17.0 IN.
 C6----- 8.3 IN.
 D----- -3.3
 RHO----- 1.00 *
 ANG----- 30.0 DEG.
 D'----- -5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	41631.2 LB-SEC**2-IN	I2	=	20032.3 LB-SEC**2-IN
M1	=	11.128 LB-SEC**2/IN	M2	=	6.788 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES
XR1	=	-114.0 INCHES	XR2	=	-91.6 INCHES
YS1	=	38.5 INCHES	YS2	=	33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1		VEHICLE # 2	
RF-----	.01	RF-----	.01
LF-----	.01	LF-----	.01
RR-----	.20	RR-----	1.00
LR-----	.20	LR-----	.20
MU-----	.87		

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 21.189

#

RUN Y3LOM.C0162

Y3LOM 10:11 APR 16, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC #7 WITH TRAJ SIM NO ROT OF V1

2. CLASS/WEIGHTS?
?4 3700 2 1700

3. VDI/PDOF # 1?
?11FDEW1 -30.

4. VDI/PDOF # 2?
?02RDEW2 30.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?84.5 18.2 16.5 22.9 41.4 262.

7. IMPACT COORDINATES?
?0.0. *DEL*
0. 0. 0. 10.7 3.45 120/ *DEL*
0. 0. 0. 10.7 3.45 120.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?22. 30. 250.

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?, *DEL*
.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 1. .2

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?66.

43. END DAMAGE DEPTH #1
?0. 1.25 2. 3.75 5. 6.25

44. END DAMAGE MIDPOINT OFFSET #1
?4.

45. SIDE DAMAGE WIDTH #2
7108.5

46. SIDE DAMAGE DEPTH #2
7.5 11. 17.75 21. 21.25 7.25

47. SIDE DAMAGE MIDPOINT OFFSET #2
7-8.5

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) = .3369 .0515 .0088 .0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = 222.7 VS = 114.3 PSISD = 0.00 SSDOT = 250.3 GAMS = .47
REST: 727.5 13.4 -.00 END-OF-ROT: 5.6 2.9 -.00
POINT-ON-CURVE: 0.0 0.0
ERRORS: .34 .05 .01 .00 0.00 Q = .37 T = 6.49

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 222.494 114.284 0.000 250.306
.474 .371

ADJ1,ADJ2,ADJ3 = .8293 1.0029 -.0288
SSDOTP,PSISDP,GAMSP = 207.569 0.000 .445
USP,VSP = 187.324 89.413

E(1),E(2),E(3),E(4),E(5) = .5209 .0426 .0054 .0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
US = 187.3 VS = 89.4 PSISD = 0.00 SSDOT = 207.6 GAMS = .45
REST: 514.8 11.7 -.00 END-OF-ROT: 4.7 2.1 -.00
POINT-ON-CURVE: 0.0 0.0
ERRORS: .52 .04 .01 .00 0.00 Q = .55 T = 5.35

ADJ1,ADJ2,ADJ3 = .9795 1.0018 -.0163
SSDOTP,PSISDP,GAMSP = 203.317 0.000 .429
USP,VSP = 184.892 84.575

6-45

E(1),E(2),E(3),E(4),E(5) = .5331 .0418 .0051 .0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1
 US = 184.9 VS = 84.6 PSISD = 0.00 SSDOT = 203.3 GAMS = .43
 REST: 501.7 10.5 -.00 END-OF-ROT: 4.6 2.0 -.00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .53 .04 .01 .00 0.00 Q = .56 T = 5.30

ADJ1,ADJ2,ADJ3 = .9919 1.0017 -.0096
 SSDOTP,PSISDF,GAMSP = 201.661 0.000 .419
 USP,VSP = 184.180 82.126

E(1),E(2),E(3),E(4),E(5) =
 0.0000 .5367 .0414 .0046 .0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1
 US = 184.2 VS = 82.1 PSISD = 0.00 SSDOT = 201.7 GAMS = .42
 REST: 497.8 10.0 -.00 END-OF-ROT: 4.6 1.9 -.00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .54 .04 .00 .00 0.00 Q = .56 T = 5.28

ADJ1,ADJ2,ADJ3 = .9956 1.0015 -.0057
 SSDOTP,PSISDF,GAMSP = 200.767 0.000 .414
 USP,VSP = 183.828 80.712

E(1),E(2),E(3),E(4),E(5) =
 0.0000 .5386 .0412 .0044 .0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1
 US = 183.8 VS = 80.7 PSISD = 0.00 SSDOT = 200.8 GAMS = .41
 REST: 495.8 9.7 -.00 END-OF-ROT: 4.6 1.9 -.00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .54 .04 .00 .00 0.00 Q = .56 T = 5.25

E(1),E(2),E(3),E(4),E(5) =
 0.0000 .3277 .3709 .1654 .0776

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
 US = 141.1 VS = -315.5 PSISD = 3.00 SSDOT = 345.6 GAMP = .94
 REST: 334.0 351.6 4.16 END-OF-ROT: 262.8 231.6 4.19
 POINT-ON-CURVE: 128.4 41.4
 ERRORS: .33 .37 .17 .08 0.00 0 = .72 T = 2.68

 US2,VS2,PSISD2,SSDOT2,GAMP2,QMIN2 = 141.071 -315.498 .997 345.401
 .944 .717

 ADJ1,ADJ2,ADJ3 = 1.1623 1.0657 .2537
 SSDOTP,PSISDP,GAMPSP = 401.687 3.194 1.197
 USP,VSP = 250.743 -313.816

 E(1),E(2),E(3),E(4),E(5) = .0868 .1224 -.0362 -.144
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 2
 US = 250.7 VS = -313.8 PSISD = 3.19 SSDOT = 401.7 GAMP = 1.20
 REST: 233.6 501.9 4.66 END-OF-ROT: 227.7 338.2 4.69
 POINT-ON-CURVE: 128.4 41.4
 ERRORS: .09 .12 -.04 -.14 0.00 0 = .26 T = 2.98

 US2,VS2,PSISD2,SSDOT2,GAMP2,QMIN2 = 250.743 -313.816 3.194 401.687
 1.197 .257

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #7 WITH TRAJ SIM NO ROT OF V1

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	25.9 MPH	0.0 MPH
VEH#2	40.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.8 MPH	-23.2 MPH	13.4 MPH	-30.0 DEG.
VEH#2	58.3 MPH	-50.5 MPH	-29.2 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

IMPACT SPEED MPH	SPEED CHANGE MPH	BASIS OF RESULTS
FWD	TOTAL	LONG. LATERAL
25.9	0.0	14.7 -13.2 6.5
SPINOUT TRAJECTORIES AND CONSERVATION OF LINEAR MOMENTUM		
6-48		
26.8	-23.2	13.4
DAMAGE DATA ONLY		

* * * * *

VEHICLE # 2

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*****
*                                     *
*      IMPACT      *                                     *
*      SPEED      *      SPEED CHANGE      *                                     *
*      MPH        *      MPH                *      BASIS      *
*                                     *      OF      *
*      *          *      *          *      *      *      *
*      FWD * LAT * TOTAL * LONG. * LATERAL *      RESULTS      *
*      *      *      *      *      *      *      *      *
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*      *          *      *          *      *      *      *
*      *          *      *          *      *      *      *
*      40.8 * 0.0 * 32.0 * -26.6 * -17.8 * SPINOUT TRAJECTORIES AND *
*      *      *      *      *      *      * CONSERVATION OF LINEAR *
*      *      *      *      *      *      * MOMENTUM      *
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SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	10.70 FT.
IMPACT Y-POSITION	0.00 FT.	3.45 FT.
IMPACT HEADING ANGLE	0.00 DEG.	119.99 DEG.
REST X-POSITION	84.50 FT.	22.90 FT.
REST Y-POSITION	18.20 FT.	41.40 FT.
REST HEADING ANGLE	16.50 DEG.	261.97 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.	22.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.	30.00 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.	249.97 DEG.
DIRECTION OF ROTATION	NONE	EW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 10.7 FT.
YC10' = 0.0 FT.	YC20' = 3.5 FT.

PSI10	=	0.0 DEGREES	PSI20	=	120.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.	XCS2'	=	10.7 FT.
YCS1'	=	0.0 FT.	YCS2'	=	3.5 FT.
PSIS1	=	0.0 DEG	PSIS2	=	120.0 DEG
US1	=	12.7 MPH	US2	=	14.2 MPH
VS1	=	6.5 MPH	VS2	=	-17.8 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	183.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	25.9 MPH	0.0 MPH
VEH#2	40.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.8 MPH	-23.2 MPH	13.4 MPH	-30.0 DEG.
VEH#2	58.3 MPH	-50.5 MPH	-29.2 MPH	30.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	14.7 MPH	-13.2 MPH	6.5 MPH	-26.2 DEG.
VEH#2	32.0 MPH	-26.6 MPH	-17.8 MPH	33.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 11493.5 FT-LB VEH#2 393693.4 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	24.6 MPH
VEH#2	8.6 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	-7.9 MPH
VEH#2	-39.9 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

33.2 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 CONVERGED O.K. +++++

NRUNS(1) =	5	NRUNS(2) =	2
E1(1) =	.337	E2(1) =	.087
E1(2) =	.051	E2(2) =	.122
E1(3) =	.009	E2(3) =	-.036
E1(4) =	.000	E2(4) =	-.145
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.371	QMIN2 =	.257

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----CATEGORY 4
 WEIGHT----- 3700.0 LBS.
 VDI-----11FDEW1
 L----- 66.0 IN.
 C1----- 0.0 IN.
 C2----- 1.3 IN.
 C3----- 2.0 IN.
 C4----- 3.8 IN.
 C5----- 5.0 IN.
 C6----- 6.3 IN.
 D----- 4.0
 RHO----- 1.00 *
 ANG----- -30.0 DEG.
 D'----- 15.6 IN.

VEHICLE # 2

TYPE-----CATEGORY 2
 WEIGHT----- 1700.0 LBS.
 VDI-----02RDEW2
 L----- 108.5 IN.
 C1----- .5 IN.
 C2----- 11.0 IN.
 C3----- 17.8 IN.
 C4----- 21.0 IN.
 C5----- 21.3 IN.
 C6----- 7.3 IN.
 D----- -8.5
 RHO----- 1.00 *
 ANG----- 30.0 DEG.
 D'----- -1.5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 54.7 INCHES
 B1 = 59.2 INCHES
 TR1 = 61.8 INCHES
 I1 = 35822.2 LB-SEC**2-IN
 M1 = 9.576 LB-SEC**2/IN
 XF1 = 98.8 INCHES
 XR1 = -114.0 INCHES
 YS1 = 38.5 INCHES

A2 = 46.3 INCHES
 B2 = 50.1 INCHES
 TR2 = 54.6 INCHES
 I2 = 12983.2 LB-SEC**2-IN
 M2 = 4.400 LB-SEC**2/IN
 XF2 = 83.3 INCHES
 XR2 = -91.6 INCHES
 YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- 1.00
 LR----- .20

MU----- .87.

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 24.577

run w3lom.c0162

Y3LOM 09:10 MAR 28, '80

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

?a

1. TITLE?

?bIXz`>-U&k8u`@

F)~

MCAUTO: PLEASE SELECT HOST

WDAC, WTSO, WCMS, WTSOA, WTSOB, WTSOV.

- wdac

MCAUTO - 09:13 MAR 28, '80

LOGON PLEASE: c0014c

PASSWORD

#####

ID=325

#run w3lom.c0162

Y3LOM 09:13 MAR 28, '80

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

?a

1. TITLE?

?ricsac # 8 with traj sim

2. CLASS/WEIGHTS?

?4 4479 4 4710

3. VDI/PDOF # 1?

?12fdew1 -45.

4. VDI/PDOF # 2?

?03rvew2 45.

5. REST

IMPACT? (Y OR N)

?y

6. REST COORDINATES?
?- .5 12. 46. 6.5 21. 141.

7. IMPACT COORDINATES?
?-10.9 3.2 0. 0. 1.9 90.

12. SKIDDING OF # 1? (Y OR N)
?y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?n

15. CURVED PATH? (Y OR N)
?n

17. ROTATION DIRECTION #1?
?cw

18. MORE THAN 360 DEG? (Y OR N)
?n

19. SKIDDING OF # 2? (Y OR N)
?y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?n

22. CURVED PATH? (Y OR N)
?n

24. ROTATION DIRECTION # 2?
?cw

25. MORE THAN 360 DEG? (Y OR N)
?n

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?y

33. STEER ANGLES #1 ?
70 0 0 0

34. STEER ANGLES #2 ?
70 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
Tn

38. DAMAGE DIMENSIONS? (Y OR N)
Y

42. END DAMAGE WIDTH #1
773

43. END DAMAGE DEPTH #1,
22.7 3.6

44. END DAMAGE MIDPOINT OFFSET #1
PO.

45. SIDE DAMAGE WIDTH #2
84.5

46. SIDE DAMAGE DEPTH #2
6.2 8.3 9.2 5.9 4.4 .8

47. SIDE DAMAGE MIDPOINT OFFSET #2
15.

CRASH INPUT COMPLETED
THANK YOU VERY MUCH.

E(1),E(2),E(3),E(4),E(5) =	2.9428	0.0000	.5050	0.0000
0.0000				

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

```

VEHICLE # 1                                TRAJECTORY ITERATION # 1
VS = 172.9 VS = 184.7 PSISD = 1.02 SSDOT = 253.0 GAMS = .82
REST: 448.1 302.9 .40 END-OF-ROT: -35.3 100.1 .39
POINT-ON-CURVE: -130.8 38.4
ERRORS: 2.94 0.00 .50 0.00 0.00 0 = 3.45 T = 5.95

```

S1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 172.920 184.678 1.016 252.996
 .818 3.448 6-54

ADJ1,ADJ2,ADJ3 = .6712 1.1512 .1825
 SSDOT,PSISDP,GAMSP = 169.814 1.169 1.001
 USP,VSP = 91.642 142.963

E(1),E(2),E(3),E(4),E(5) = .4068 0.0000 .5030 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
 US = 91.6 VS = 143.0 PSISD = 1.17 SSDOT = 169.8 GAMS = 1.00
 REST: 60.4 140.9 .40 END-OF-ROT: -82.7 80.6 .40
 POINT-ON-CURVE: -130.8 38.4
 ERRORS: .41 0.00 .50 0.00 0.00 Q = .91 T = 3.40

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 91.642 142.963 1.169 169.814
 1.001 .910

ADJ1,ADJ2,ADJ3 = .9120 1.1507 .1401
 SSDOT,PSISDP,GAMSP = 154.871 1.345 1.141
 USP,VSP = 64.556 140.775

E(1),E(2),E(3),E(4),E(5) = .1188 0.0000 .4196 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 3
 US = 64.6 VS = 140.8 PSISD = 1.35 SSDOT = 154.9 GAMS = 1.14
 REST: -9.7 124.9 .47 END-OF-ROT: -94.8 82.1 .46
 POINT-ON-CURVE: -130.8 38.4
 ERRORS: .12 0.00 .42 0.00 0.00 Q = .54 T = 2.78

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 64.556 140.775 1.345 154.871
 1.141 .538

ADJ1,ADJ2,ADJ3 = 1.0320 1.1276 .0546
 SSDOT,PSISDP,GAMSP = 159.830 1.517 1.195
 USP,VSP = 58.601 148.699

E(1),E(2),E(3),E(4),E(5) = .0319 0.0000 .3194 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 4
 US = 58.6 VS = 148.7 PSISD = 1.52 SSDOT = 159.8 GAMS = 1.20
 REST: -10.2 141.0 .55 END-OF-ROT: -95.9 88.7 .54
 POINT-ON-CURVE: -130.8 38.4
 ERRORS: .03 0.00 .32 0.00 0.00 Q = .35 T = 2.88

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 58.601 148.699 1.517 159.830
 1.195 .351

ADJ1,ADJ2,ADJ3 = 1.0108 1.0991 -.0017
 SSDOTP,PSISDP,GAMSP = 161.564 1.667 1.194
 USP,VSP = 59.492 150.212

E(1),E(2),E(3),E(4),E(5) = .0859 0.0000 .2602 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 5
 US = 59.5 VS = 150.2 PSISD = 1.67 SSDOT = 161.6 GAMS = 1.19
 REST: -.1 156.7 .59 END-OF-ROT: -93.6 93.4 .59
 POINT-ON-CURVE: -130.8 38.4
 ERRORS: .09 0.00 .26 0.00 0.00 Q = .35 T = 3.03

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 59.492 150.212 1.667 161.564
 1.194 .346

E(1),E(2),E(3),E(4),E(5) = 2.3341 0.0000 .1331 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
 US = 276.9 VS = -115.9 PSISD = .95 SSDOT = 300.2 GAMS = 1.17
 REST: -367.3 599.9 2.34 END-OF-ROT: -30.4 252.7 2.34
 POINT-ON-CURVE: 0.0 22.8
 ERRORS: 2.33 0.00 .13 0.00 0.00 Q = 2.47 T = 6.25

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 276.890 -115.894 .952 300.166
 1.174 2.467

ADJ1,ADJ2,ADJ3 = .7299 1.0430 -.5965
 SSDOTP,PSISDP,GAMSP = 219.102 .993 .578
 USP,VSP = 119.679 -183.529

E(1),E(2),E(3),E(4),E(5) = .6681 0.0000 .2098
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 2
US = 119.7 VS = -183.5 PSISD = .99 SSDOT = 219.1 GAMS =
REST: 49.1 92.8 2.27 END-OF-ROT: 54.0 87.4 2.27
POINT-ON-CURVE: 0.0 22.8
ERRORS: .67 0.00 .21 0.00 0.00 Q = .88 T = 1.4

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 119.679 -183.529 .992 219.117
.578 .878

ADJ1,ADJ2,ADJ3 = 1.4550 1.0666 .1888
SSDOTP,PSISDP,GAMSP = 318.787 1.059 .766
USP,VSP = 221.146 -229.608

E(1),E(2),E(3),E(4),E(5) = .2720 0.0000 .0004 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 3
US = 221.1 VS = -229.6 PSISD = 1.06 SSDOT = 318.8 GAMS =
REST: 71.6 186.5 2.73 END-OF-ROT: 80.8 182.6 2.73
POINT-ON-CURVE: 0.0 22.8
ERRORS: .27 0.00 -.30 0.00 0.00 Q = .57 T = 1.9

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 221.146 -229.608 1.059 318.787
.766 .571

ADJ1,ADJ2,ADJ3 = 1.1094 .8914 .0563
SSDOTP,PSISDP,GAMSP = 353.674 .944 .823
USP,VSP = 259.293 -240.526

E(1),E(2),E(3),E(4),E(5) = .1375 0.0000 .3156 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 4
US = 259.3 VS = -240.5 PSISD = .94 SSDOT = 353.7 GAMS =
REST: 44.8 249.5 2.74 END-OF-ROT: 77.8 235.5 2.74
POINT-ON-CURVE: 0.0 22.8 6-57

ERRORS: .14 0.00 -.32 0.00 0.00

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 259.794 -140.7 2.11 13.676
.823 .453

ADJ1,ADJ2,ADJ3 = 1.0157 .8849 -1.0887
SSDOTP,PSISDP,GAMSP = 359.232 .835
USP,VSP = 240.718 -266.651

E(1),E(2),E(3),E(4),E(5) = .0784 0.0000 0.0000 0.0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
US = 240.7 VS = -266.7 PSISD = .84 SSDOT = 359.232
REST: 82.4 233.6 2.60 END-OF-ROT: 105.6 140.7 2.60
POINT-ON-CURVE: 0.0 20.8
ERRORS: .08 0.00 -.15 0.00 0.00 Q = .83 T = 2.48

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 240.718 -266.651 .835 359.232
.734 .233

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC # 8 WITH TRAJ SIM

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	19.3 MPH	0.0 MPH
VEH#2	21.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-7.1 MPH	7.0 MPH	-45.0 DEG.
VEH#2	9.5 MPH	-6.7 MPH	-6.7 MPH	45.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG	LAT.	ANG.
VEH#1	18.1 MPH	-15.9 MPH	8.5 MPH	-78.0 DEG.
VEH#2	17.2 MPH	-8.1 MPH	-15.2 MPH	41.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 18642.4 FT-LB #2 31228.0 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 19.2 MPH
VEH#2 2.6 MPH

APPLIED METHOD, TO CG LINE (LINEAR MOMENTUM)

VF H#1 0.3 MFH

UFH#? -21.6 MFH

CLOSING VELOCITY (LINEAR MOMENTUM)

21. / MFH

ENTER TYPE OF CRASH RUN?

ENTER TYPE OF CRASH RUN:
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

२६

SUMMARY OF CRASH RESULTS

RICSAC # 8 WITH TRAJ SIM

VEHICLE # 1

[illegible]

VEHICLE # 23

```

*****
*                               *
* IMPACT                        *
* SPEED                        * SPEED CHANGE
* MPH                         MPH
*                               *
*                               * OF
*                               *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS
* * * * *
*****
* * * * *
* * * * * SPINOUT TRAJECTORIES AND
* 21.8 * 0.0 * 17.2 * -8.1 * -15.2 * CONSERVATION OF LINEAR
* * * * * MOMENTUM
* * * * *
*****
* * * * * SPINOUT TRAJECTORIES AND
* * * * * DAMAGE
* * * * *
*****
* * * * *
* 9.5 * -6.7 * -6.7 * DAMAGE DATA ONLY
* * * * *
*****

```

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	-10.90 FT.	0.00 FT.
IMPACT Y-POSITION	3.20 FT.	1.90 FT.
IMPACT HEADING ANGLE	0.00 DEG.	90.00 DEG.
REST X-POSITION	-5.50 FT.	4.50 FT.
REST Y-POSITION	12.00 FT.	11.00 FT.
REST HEADING ANGLE	45.99 DEG.	140.98 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= -10.9 FT.	XC20'	= 0.0 FT.
YC10'	= 3.2 FT.	YC20'	= 1.9 FT.
PSI10	= 0.0 DEGREES	PSI20	= 90.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	= -10.9 FT.	XCS2'	= 0.0 FT.
YCS1'	= 3.2 FT.	YCS2'	= 1.9 FT.
PSIS1	= 0.0 DEG	PSIS2	= 90.0 DEG
US1	= 3.4 MPH	US2	= 13.7 MPH
VS1	= 8.5 MPH	VS2	= -15.2 MPH

PS1SD1 = 95.5 DEG/SEC

PS1SD2

95.5 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	19.3 MPH	0.0 MPH
VEH#2	21.8 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	10.0 MPH	-7.1 MPH	7.0 MPH	-45.0 DEG.
VEH#2	9.5 MPH	-6.7 MPH	-6.7 MPH	45.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	18.1 MPH	-15.9 MPH	8.5 MPH	-28.2 DEG.
VEH#2	17.2 MPH	-8.1 MPH	-15.2 MPH	61.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 18642.4 FT-LB VEH#2 9721.6 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 19.2 MPH
VEH#2 2.6 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 2.3 MPH
VEH#2 -21.6 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

21.7 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 DID NOT CONVERGE +++++

NRUNS(1) = 5

E1(1) = .086

E1(2) = 0.000

E1(3) = .260

E1(4) = 0.000

E1(5) = 0.000

QMIN1 = .346

NRUNS(2) =

E2(1) =

E2(2) =

E2(3) =

E2(4) =

E2(5) =

QMIN2 =

SUMMARY OF DAMAGE DATA

(* INDICATES DAMAGED VALUES)

VEHICLE # 1

TYPE-----CATEGORY 4
WEIGHT----- 4479.0 LBS.
VDI-----12FDEW1
L----- 73.0 IN.
C1----- 2.7 IN.

6-61

VEHICLE # 2

TYPE-----CATEGORY 4
WEIGHT----- 4479.0 LBS.
VDI-----12FDEW1
L----- 73.0 IN.
C1----- 2.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

ROLLING RESISTANCE

非自同构的群

RF		.01
LF		.01
RR		.20
LR		.20

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, %MAC, OR END)
?end

```

CRASH PROGRAM COMPLETED.

STOP

✱

王太康命田氏改葬于墓

RUN Y3LOM.C0162

Y3LOM 15:44 APR 15, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
TA

1. TITLE?
?TRICSAC #9 WITH TRAJ SIM, NO ROT

2. CLASS/WEIGHTS?
?1 2256 4 4900

3. VDI/PDOF # 1?
?11FDEW2 -65.

4. VDI/PDOF # 2?
?02RFEW2 25.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?4. 35.5 104. -5. 49.5 152.

7. IMPACT COORDINATES?
?0. 0. 0. 8.53 -5.89 90.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?NONE

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?18. 12.5 120.

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.2 .2 .01 .01

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.1 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?49.75

43. END DAMAGE DEPTH #1
?5. 5.75 12.5 7.5 7.5 9.5

44. END DAMAGE MIDPOINT OFFSET #1
?1.63

45. SIDE DAMAGE WIDTH #2
?54.5

46. SIDE DAMAGE DEPTH #2
 77.75 4.6 4.75 3.3 2.75 1.5

47. SIDE DAMAGE MIDPOINT OFFSET #2
 768.

CRASH INPUT COMPLETED
 THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) = .8785 .0379 -.0077
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 1
 US = 14.5 VS = 186.4 PSISD = 0.00 SSDOT = 187.0 GAMS = 1.49
 REST: 5.2 51.8 .00 END-OF-ROT: .4 4.6 .00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .88 .04 -.01 -.00 0.00 Q = .91 T = .55

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 14.530 186.447 0.000 187.013
 1.493 .905

ADJ1,ADJ2,ADJ3 = 1.9458 .9974 -.5057
 SSDOTP,PSISDP,GAMSP = 363.887 0.000 .987
 USP,VSP = 200.472 303.685

E(1),E(2),E(3),E(4),E(5) = 1.3721 .0747 -.0900 -.000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
 US = 200.5 VS = 303.7 PSISD = 0.00 SSDOT = 363.9 GAMS = .99
 REST: 568.4 151.7 .03 END-OF-ROT: 5.0 7.5 .00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: 1.37 .07 -.09 -.00 0.00 Q = 1.50 T = 5.48

ADJ1,ADJ2,ADJ3 = .6024 .9693 .4711
 SSDOTP,PSISDP,GAMSP = 219.221 0.000 1.458
 USP,VSP = 24.576 217.839

E(1),E(2),E(3),E(4),E(5) = .8327 .0446 -.0227 -.000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 3
 US = 24.6 VS = 217.8 PSISD = 0.00 SSDOT = 219.2 GAMS = 1.45
 REST: 10.8 71.0 .01 END-OF-ROT: .6 5.3 .00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .83 .04 -.02 -.00 0.00 Q = .88 T = .70

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 24.574 217.839 0.000 219.251
 1.458 .878

ADJ1,ADJ2,ADJ3 = 1.6623 .9924 -.4597
 SSDOTP,PSISDP,GAMSP = 364.413 0.000 .999
 USP,VSP = 197.274 306.398

E(1),E(2),E(3),E(4),E(5) = 1.3338 .0748 -.0910 -.0001
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 4
 US = 197.3 VS = 306.4 PSISD = 0.00 SSDOT = 364.4 GAMS = 1.00
 REST: 550.9 153.9 .03 END-OF-ROT: 4.9 7.6 .00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: 1.33 .07 -.09 -.00 0.00 Q = 1.46 T = 5.38

ADJ1,ADJ2,ADJ3 = .6105 .9689 .4596
 SSDOTP,PSISDP,GAMSP = 222.465 0.000 1.458
 USP,VSP = 24.969 221.060

E(1),E(2),E(3),E(4),E(5) = .8277 .0453 -.0219 -.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 5
 US = 25.0 VS = 221.1 PSISD = 0.00 SSDOT = 222.5 GAMS = 1.46
 REST: 11.1 73.1 .01 END-OF-ROT: .6 5.4 .00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .83 .05 -.02 -.00 0.00 Q = .87 T = .70

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 24.969 221.060 0.000 222.465
 1.458 .872

E(1),E(2),E(3),E(4),E(5) = .4706 .6127 -.0413 -1.136
 0.0000

6-67

	SPEED CHANGE (DAMAGE)			ANG.
	TOTAL	LONG.	LAT.	
VEH#1	19.1 MPH	-8.1 MPH	17.3 MPH	-65.0 DEG.
VEH#2	8.8 MPH	-8.0 MPH	-3.7 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)				ANG.
	TOTAL	LONG.	LAT.	
VEH#1	39.7 MPH	-37.7 MPH	12.6 MPH	-18.4 DEG.
VEH#2	18.3 MPH	-5.8 MPH	-17.3 MPH	71.6 DEG.

VEH#2 18.5 MPH VEH#1 68853.8 FT-LB VEH#2 31379.7 FT-LB
ENERGY DISSIPATED BY DAMAGE VEH#1 68853.8 FT-LB VEH#2 31379.7 FT-LB
ONE TURN CCS (LINEAR MOMENTUM)

ENERGY DISSIPATED BY DAMAGED VENTS
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	32.2 MPH
VEH#2	11.3 MPH

VEH#2 11.3 MPH
SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)
CG 2 MPH

VEH#1	22.2 MPH
VEH#2	-16.4 MPH

VEH#2 -18.4 MPH
CLOSING VELOCITY (LINEAR MOMENTUM)
43.5 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
TP

SUMMARY OF CRASH3 RESULTS

RICSAC #9 WITH TRAJ SIM, NO ROT

VEHICLE # 1

```

*****
*                                     *
* IMPACT                               SPEED CHANGE                      BASIS
*   SPEED                               MPH                                OF
*   MPH                                *                                 *
*                                     *                                 *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS
*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
*****
*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
* 39.1 * 0.0 * 39.7 * -37.7 * 12.6 * SPINOUT TRAJECTORIES AND
*                                     * CONSERVATION OF LINEAR
*                                     * MOMENTUM

```

```

*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      * SPINOUT TRAJECTORIES AND
*      *      *      *      *      * DAMAGE
*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      * 19.1 * -8.1 * 17.3 * DAMAGE DATA ONLY
*      *      *      *      *      *
*****

```

VEHICLE # 2

```

*****
*      *      *      *      *      *
*      *      *      *      *      *
*      *      *      *      *      * IMPACT SPEED SPEED CHANGE BASIS
*      *      *      *      *      * MPH MPH OF
*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      * FWD * LAT * TOTAL * LONG. * LATERAL RESULTS
*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      * 19.9 * 0.0 * 18.3 * -5.8 * -17.3 * SPINOUT TRAJECTORIES AND
*      *      *      *      *      * CONSERVATION OF LINEAR
*      *      *      *      *      * MOMENTUM
*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      * SPINOUT TRAJECTORIES AND
*      *      *      *      *      * DAMAGE
*      *      *      *      *      *
*****
*      *      *      *      *      *
*      *      *      *      *      * 8.8 * -8.0 * -3.7 * DAMAGE DATA ONLY
*      *      *      *      *      *
*****

```

SCENE INFORMATION

VEHICLE # 1

VEHICLE # 2

IMPACT X-POSITION	0.00	FT.	8.53	FT.
IMPACT Y-POSITION	0.00	FT.	-5.89	FT.
IMPACT HEADING ANGLE	0.00	DEG.	89.99	DEG.
REST X-POSITION	4.00	FT.	-5.00	FT.
REST Y-POSITION	35.50	FT.	49.50	FT.
REST HEADING ANGLE	103.99	DEG.	151.98	DEG.
END-OF-ROTATION X-POSITION	0.00	FT.	18.00	FT.
END-OF-ROTATION Y-POSITION	0.00	FT.	12.50	FT.
END-OF-ROTATION HEADING ANGLE	0.00	DEG.	119.99	DEG.
DIRECTION OF ROTATION	6-69	NONE	CW	
AMOUNT OF ROTATION		<360	<360	

COLLISION CONDITIONS

VEHICLE # 1

VEHICLE # 2

XC10'	=	0.0 FT.	XC20'	=	8.5 FT.
YC10'	=	0.0 FT.	YC20'	=	-5.9 FT.
PSI10	=	0.0 DEGREES	PSI20	=	90.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	=	0.0 FT.	XCS2'	=	8.5 FT.
YCS1'	=	0.0 FT.	YCS2'	=	-5.9 FT.
PSIS1	=	0.0 DEG	PSIS2	=	90.0 DEG
US1	=	1.4 MPH	US2	=	14.2 MPH
VS1	=	12.6 MPH	VS2	=	-17.3 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	37.5 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	39.1 MPH	0.0 MPH
VEH#2	19.9 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	19.1 MPH	-8.1 MPH	17.3 MPH	-65.0 DEG.
VEH#2	8.8 MPH	-8.0 MPH	-3.7 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	39.7 MPH	-37.7 MPH	12.6 MPH	-18.4 DEG.
VEH#2	18.3 MPH	-5.8 MPH	-17.3 MPH	71.6 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 68853.8 FT-LB VEH#2 31379.7 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 32.2 MPH
VEH#2 11.3 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 22.2 MPH
VEH#2 -16.4 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

43.5 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE ++++ 6-70
++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS ++++
NRUNS(1) = 5 NRUNS(2) = 2

E1(1) = .828
 E1(2) = .045
 E1(3) = -.022
 E1(4) = -.000
 E1(5) = -0.000
 QMIN1 = .872

E2(1) = .765
 E2(2) = .124
 E2(3) = .146
 E2(4) = -.761
 E2(5) = -0.000
 QMIN2 = 1.353

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

VEHICLE # 2

TYPE-----CATEGORY 1
 WEIGHT----- 2256.0 LBS.
 VDI-----11FDEW2
 L----- 49.7 IN.
 C1----- 5.0 IN.
 C2----- 5.8 IN.
 C3----- 12.5 IN.
 C4----- 7.5 IN.
 C5----- 7.5 IN.
 C6----- 9.5 IN.
 D----- 1.6
 RHO----- 1.00 *
 ANG----- -65.0 DEG.
 D'----- 2.9 IN.

TYPE-----CATEGORY 4
 WEIGHT----- 4900.0 LBS.
 VDI-----02RFEW2
 L----- 54.5 IN.
 C1----- 7.8 IN.
 C2----- 4.6 IN.
 C3----- 4.8 IN.
 C4----- 3.3 IN.
 C5----- 2.8 IN.
 C6----- 1.5 IN.
 D----- 68.0
 RHO----- 1.00 *
 ANG----- 25.0 DEG.
 D'----- 62.4 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 45.1 INCHES
 B1 = 48.1 INCHES
 TR1 = 51.1 INCHES
 I1 = 11712.0 LB-SEC**2-IN
 M1 = 5.839 LB-SEC**2/IN
 XF1 = 76.0 INCHES
 XR1 = -83.8 INCHES
 YS1 = 30.4 INCHES

A2 = 54.7 INCHES
 B2 = 59.2 INCHES
 TR2 = 61.8 INCHES
 I2 = 47440.2 LB-SEC**2-IN
 M2 = 12.681 LB-SEC**2/IN
 XF2 = 98.8 INCHES
 XR2 = -114.0 INCHES
 YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

VEHICLE # 2

RF----- .20
 LF----- .20
 RR----- .01
 LR----- .01

RF----- .10
 LF----- .01
 RR----- .20
 LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 21.711

#BYE

CON= 0:46 MRU= 61.166

VIX

RUN Y3LOM,C0162

Y3LOM 13:09 APR 01, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC TEST # 10 WITH TRAJ SIM

2. CLASS/WEIGHTS?
?1 2306 4 4720

3. VDI/PDOF # 1?
?10FDEW2 -65.

4. VDI/PDOF # 2?
?01RFEW2 25.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?5. 43. 87. 0. 99.5 128.5

7. IMPACT COORDINATES?
?0. 0. 0. 8.5 -5.9 90.

12. SKIDDING OF # 1? (Y OR N)
?Y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

14. END OF SKIDDING COORDINATES?
?5. 25. 90.

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)

19. SKIDDING OF # 2? (Y OR N)
 ?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
 ?Y

21. END OF SKIDDING COORDINATES?
 ?23. 19. 90.

22. CURVED PATH? (Y OR N)
 ?N

24. ROTATION DIRECTION # 2?
 ?CW

25. MORE THAN 360 DEG? (Y OR N)
 ?N

26. TIRE-GROUND FRICTION?
 ? .87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
 ?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
 ? .2 .2 .01 .01

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
 ? .1 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
 ?Y

33. STEER ANGLES #1 ?
 ?0 0 0 0

34. STEER ANGLES #2 ?
 ?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
 ?N

38. DAMAGE DIMENSIONS? (Y OR N)
 ?Y

42. END DAMAGE WIDTH #1
 ?47.5

43. END DAMAGE DEPTH #1
77. 10.2 14. 8.9 7. 9.

44. END DAMAGE MIDPOINT OFFSET #1
7-2.75

45. SIDE DAMAGE WIDTH #2
753.

46. SIDE DAMAGE DEPTH #2
79.2 6.5 6.1 5.3 4.5 .5

47. SIDE DAMAGE MIDPOINT OFFSET #2
766.5

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) = .8052 .4677 .3329 .3584
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = 87.5 VS = 312.8 PSISD = 2.02 SSDOT = 324.8 GAMS = 1.30
REST: 425.2 720.0 1.01 END-OF-ROT: 73.9 157.6 1.01
POINT-ON-CURVE: 0.0 0.0
ERRORS: .81 .47 .33 .36 0.00 Q = 1.55 I = 6.60

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = 87.495 312.788 2.025 324.795
1.298 1.551

ADJ1,ADJ2,ADJ3 = .9674 1.1582 .3587
SSDOTP,PSISDP,GAMSP = 314.212 2.345 1.657
USP,VSP = -26.974 313.052

E(1),E(2),E(3),E(4),E(5) = .1710 .4491 .1170 .1487
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
US = -27.0 VS = 313.1 PSISD = 2.34 SSDOT = 314.2 GAMS = 1.66
REST: 105.5 592.3 1.34 END-OF-ROT: 7.2 173.1 1.34
POINT-ON-CURVE: 0.0 0.0 6-75

ERRORS: .17 .45 .12 .15 0.00 Q = .59 T = 5.53

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -26.974 313.052 2.345 314.212
1.657 .587

ADJ1,ADJ2,ADJ3 = 1.0624 1.0619 -.0116
SSDOTP,PSISDP,GAMSP = 333.818 2.490 1.645
USP,VSP = -24.798 332.896

E(1),E(2),E(3),E(4),E(5) = .4504 .3936 .0731 .1065
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 3
US = -24.8 VS = 332.9 PSISD = 2.49 SSDOT = 333.8 GAMS = 1.65
REST: 100.0 746.5 1.41 END-OF-ROT: 8.3 191.2 1.40
POINT-ON-CURVE: 0.0 0.0
ERRORS: .45 .39 .07 .11 0.00 Q = .77 T = 6.23

ADJ1,ADJ2,ADJ3 = .9751 1.0413 -.0397
SSDOTP,PSISDP,GAMSP = 325.494 2.593 1.605
USP,VSP = -11.287 325.298

E(1),E(2),E(3),E(4),E(5) = .4581 .4085 .0842 .1173
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 4
US = -11.3 VS = 325.3 PSISD = 2.59 SSDOT = 325.5 GAMS = 1.61
REST: 117.6 746.9 1.39 END-OF-ROT: 14.8 183.5 1.39
POINT-ON-CURVE: 0.0 0.0
ERRORS: .46 .41 .08 .12 0.00 Q = .81 T = 6.25

ADJ1,ADJ2,ADJ3 = .9824 1.0465 -.0120
SSDOTP,PSISDP,GAMSP = 319.750 2.713 1.594
USP,VSP = -7.263 319.668

E(1),E(2),E(3),E(4),E(5) = .4604 .4122 .0741 .1076
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 5
 US = -7.3 VS = 319.7 PSISD = 2.71 SSDOT = 319.8 GAMS = 1.59
 REST: 110.9 749.7 1.41 END-OF-ROT: 15.8 181.9 1.40
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .46 .41 .07 .11 0.00 Q = .79 T = 6.28

SUMMARY OF CRASH 3 RESULTS

RICSAC TEST # 10 WITH TRAJ SIM

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	26.7 MPH	0.0 MPH
VEH#2	34.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	22.4 MPH	-9.5 MPH	20.3 MPH	-65.0 DEG.
VEH#2	10.9 MPH	-9.9 MPH	-4.6 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	33.4 MPH	-28.2 MPH	17.8 MPH	-32.2 DEG.
VEH#2	16.3 MPH	-8.7 MPH	-13.8 MPH	57.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 87973.8 FT-LB VEH#2 44986.2 FT-LB
 SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 21.9 MPH
 VEH#2 19.7 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 15.2 MPH
 VEH#2 -28.3 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
 41.6 MPH

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

7P

SUMMARY OF CRASH 3 RESULTS

IMPACT		SPEED CHANGE				BASIS			
SPEED		MPH							
MPH									

								OF	
FWD		LAT		TOTAL		LONG.		LATERAL	

26.7		0.0		33.4		-28.2		17.8	

IMPACT		SPEED		SPEED CHANGE		BASIS			
MPH		MPH							

								OF	
FWD	LAT	TOTAL	LONG.	LATERAL	RESULTS				

34.5	0.0	16.3	-8.7	-13.8	SPINOUT TRAJECTORIES AND CONSERVATION OF LINEAR MOMENTUM				

					SPINOUT TRAJECTORIES AND DAMAGE				

				6-78					
				10.9	-9.9	-4.6	DAMAGE DATA ONLY		

* * * * *

SCENE INFORMATION

	VEHICLE # 1	VEHICLE # 2
IMPACT X-POSITION	0.00 FT.	8.50 FT.
IMPACT Y-POSITION	0.00 FT.	-5.90 FT.
IMPACT HEADING ANGLE	0.00 DEG.	89.99 DEG.
REST X-POSITION	5.00 FT.	0.00 FT.
REST Y-POSITION	43.00 FT.	99.50 FT.
REST HEADING ANGLE	86.99 DEG.	128.49 DEG.
END-OF-ROTATION X-POSITION	5.00 FT.	23.00 FT.
END-OF-ROTATION Y-POSITION	25.00 FT.	19.00 FT.
END-OF-ROTATION HEADING ANGLE	89.99 DEG.	89.99 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1	VEHICLE # 2
XC10' = 0.0 FT.	XC20' = 8.5 FT.
YC10' = 0.0 FT.	YC20' = -5.9 FT.
PSI10 = 0.0 DEGREES	PSI20 = 90.0 DEGREES
PSI1D0 = 0.0 DEG/SEC	PSI2D0 = 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1' = 0.0 FT.	XCS2' = 8.5 FT.
YCS1' = 0.0 FT.	YCS2' = -5.9 FT.
PSIS1 = 0.0 DEG	PSIS2 = 90.0 DEG
US1 = -1.5 MPH	US2 = 25.8 MPH
VS1 = 17.8 MPH	VS2 = -13.8 MPH
PSISD1 = 134.4 DEG/SEC	PSISD2 = 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	26.7 MPH	0.0 MPH
VEH#2	34.5 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	22.4 MPH	-9.5 MPH	20.3 MPH	-65.0 DEG.
VEH#2	10.9 MPH	-9.9 MPH	-4.6 MPH	25.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM) 6-79

	TOTAL	LONG.	LAT.	ANG.
VEH#1	33.4 MPH	-28.2 MPH	17.8 MPH	-32.2 DEG.
VEH#2	16.3 MPH	-8.7 MPH	-13.8 MPH	57.8 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 87973.8 FT-LB VEH#2 44986.2 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 21.9 MPH

VEH#2 19.7 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 15.2 MPH

VEH#2 -28.3 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

41.6 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS +++++

NRUNS(1) =	5	NRUNS(2) =	0
E1(1) =	.171	E2(1) =	0.000
E1(2) =	.449	E2(2) =	0.000
E1(3) =	.117	E2(3) =	0.000
E1(4) =	.149	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.587	QMIN2 =	0.000

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----	CATEGORY 1
WEIGHT-----	2306.0 LBS.
VDI-----	10FDEW2
L-----	47.5 IN.
C1-----	7.0 IN.
C2-----	10.2 IN.
C3-----	14.0 IN.
C4-----	8.9 IN.
C5-----	7.0 IN.
C6-----	9.0 IN.
D-----	-2.8
RHO-----	1.00 *
ANG-----	-65.0 DEG.
D'-----	-3.8 IN.

VEHICLE # 2

TYPE-----	CATEGORY 4
WEIGHT-----	4720.0 LBS.
VDI-----	01RFEW2
L-----	53.0 IN.
C1-----	9.2 IN.
C2-----	6.5 IN.
C3-----	6.1 IN.
C4-----	5.3 IN.
C5-----	4.5 IN.
C6-----	.5 IN.
D-----	66.5
RHO-----	1.00
ANG-----	25.0 DEG.
D'-----	61.5 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 =	45.1 INCHES	A2 =	54.7 INCHES
B1 =	48.1 INCHES	B2 =	59.2 INCHES
TR1 =	51.1 INCHES	TR2 =	61.8 INCHES
I1 =	11971.6 LB-SEC**2-IN	I2 =	45697.5 LB-SEC**2-IN
M1 =	5.968 LB-SEC**2/IN	M2 =	12.215 LB-SEC**2/IN
XF1 =	76.0 INCHES	XF2 =	98.8 INCHES
XR1 =	-83.8 INCHES	XR2 =	-114.0 INCHES
YS1 =	30.4 INCHES	YS2 =	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .20
 LF----- .20
 RR----- .01
 LR----- .01

MU----- .87

VEHICLE # 2

RF----- .10
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 26.824

#

RUN Y3LOM.C0162

Y3LOM 15:14 APR 15, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC #11 WITH TRAJ SIM, NO ROT

2. CLASS/WEIGHTS?
?2 3041 4 4850

3. VDI/PDOF # 1?
?12FYEW3 5.

4. VDI/PDOF # 2?
?12FYEW3 -5.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?25.6 -6.4 170. 8.6 0.4 0.0

7. IMPACT COORDINATES?
?15.7 -4. 171 *DEL*

15.7 -4. 171. 0. 0. 0.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?N

19. SKIDDING OF # 2? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .1 .1

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH .1
?32.5

43. END DAMAGE DEPTH #1
?22. 20.2 18.5 16.8 15. 12.5

44. END DAMAGE MIDPOINT OFFSET #1
?-12.9

48. END DAMAGE WIDTH #2
?#

44. END DAMAGE MIDPOINT OFFSET #1
?-12.75

48. END DAMAGE WIDTH #2
?32.26

49. END DAMAGE DEPTH #2
?29.5 26.25 23. 18.7 14.3 11.

50. END DAMAGE MIDPOINT OFFSET # 1
?-12.9

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) = .1173 .0143 .0000 .0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 1
US = -69.0 VS = 5.5 PSISD = 0.00 SSDOT = 69.3 GAMS = 6.05
REST: 319.2 -68.9 2.98 END-OF-ROT: 190.1 -48.4 2.98
POINT-ON-CURVE: 188.4 -48.0
ERRORS: .12 .01 .00 .00 0.00 Q = .12 T = 3.58

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -69.031 5.548 0.000 69.253
6.045 .124

ADJ1,ADJ2,ADJ3 = .6738 1.0000 .0162
SSDOTP,PSISDP,GAMSP = 46.663 0.000 6.062
USP,VSP = -46.568 2.985

E(1),E(2),E(3),E(4),E(5) = .5133 .0096 -.0010 .0000
0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 2
 US = -46.6 VS = 3.0 PSISD = 0.00 SSDOT = 46.7 GAMS = 6.06
 REST: 247.6 -57.2 2.98 END-OF-ROT: 189.5 -48.2 2.98
 POINT-ON-CURVE: 188.4 -48.0
 ERRORS: .51 .01 -.00 .00 0.00 Q = .52 T = 2.33

ADJ1,ADJ2,ADJ3 = .9856 .9997 .0061
 SSDOTP,PSISDP,GAMSP = 45.993 0.000 6.068
 USP,VSP = -45.916 2.662

E(1),E(2),E(3),E(4),E(5) = .5264 .0095 .0000 .0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 3
 US = -45.9 VS = 2.7 PSISD = 0.00 SSDOT = 46.0 GAMS = 6.07
 REST: 246.0 -57.0 2.98 END-OF-ROT: 189.5 -48.2 2.98
 POINT-ON-CURVE: 188.4 -48.0
 ERRORS: .53 .01 .00 .00 0.00 Q = .53 T = 2.30

ADJ1,ADJ2,ADJ3 = .9989 1.0000 .0056
 SSDOTP,PSISDP,GAMSP = 45.940 0.000 6.073
 USP,VSP = -45.877 2.402

E(1),E(2),E(3),E(4),E(5) = .5281 .0095 .0000 .0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 4
 US = -45.9 VS = 2.4 PSISD = 0.00 SSDOT = 45.9 GAMS = 6.07
 REST: 245.8 -56.9 2.98 END-OF-ROT: 189.5 -48.2 2.98
 POINT-ON-CURVE: 188.4 -48.0
 ERRORS: .53 .01 .00 .00 0.00 Q = .53 T = 2.28

ADJ1,ADJ2,ADJ3 = 1.0006 1.0000 .0045
 SSDOTP,PSISDP,GAMSP = 45.968 0.000 6.078
 USP,VSP = -45.916 2.196

E(1),E(2),E(3),E(4),E(5) = .5264 .0095 .0000 .0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 5
 US = -45.9 VS = 2.2 PSISD = 0.00 SSDOT = 46.0 GAMS = 6.08
 REST: 246.0 -57.0 2.98 END-OF-ROT: 189.5 -48.2 2.98
 POINT-ON-CURVE: 188.4 -48.0
 ERRORS: .53 .01 .00 .00 0.00 0 = .53 T = 2.30

E(1),E(2),E(3),E(4),E(5) = .0481 .0172 .0000 .0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
 US = 83.3 VS = 3.9 PSISD = 0.00 SSDOT = 83.4 GAMS = .05
 REST: 101.6 .1 -.00 END-OF-ROT: 2.1 .1 -.00
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .05 .02 .00 .00 0.00 0 = .06 T = 2.30

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 83.300 3.874 0.000 83.390
 .046 .057

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #11 WITH TRAJ SIM, NO ROT

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.0 MPH	-19.5 MPH	-4.4 MPH	12.5 DEG.
VEH#2	12.5 MPH	-12.5 MPH	-.8 MPH	3.5 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	3.9 MPH	-3.9 MPH	.3 MPH	-4.6 DEG.
VEH#2	4.7 MPH	4.7 MPH	.2 MPH	-177.3 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 36749.5 FT-LB VEH#2 44789.0 FT-LB

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH

VEH#2 0.0 MPH

6-86

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
TE

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RICSAC #11 WITH TRAJ SIM, NO ROT

[illegible]

6-87

PSIS1	=	171.0 DEG	PSIS2	=	0.0 DEG
US1	=	-3.9 MPH	US2	=	4.7 MPH
VS1	=	.3 MPH	VS2	=	.2 MPH
PSISD1	=	0.0 DEG/SEC	PSISD2	=	0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	20.0 MPH	-19.5 MPH	-4.4 MPH	12.5 DEG.
VEH#2	12.5 MPH	-12.5 MPH	-.8 MPH	3.5 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	3.9 MPH	-3.9 MPH	.3 MPH	-4.6 DEG.
VEH#2	4.7 MPH	4.7 MPH	.2 MPH	-177.3 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 36749.5 FT-LB VEH#2 44789.0 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH

VEH#2 0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 0.0 MPH

VEH#2 0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

0.0 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE ++++

++++ VEHICLE # 2 CONVERGED O.K. ++++

NRUNS(1) =	5	NRUNS(2) =	1
E1(1) =	.117	E2(1) =	.048
E1(2) =	.014	E2(2) =	.017
E1(3) =	.000	E2(3) =	.000
E1(4) =	.000	E2(4) =	.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.124	QMIN2 =	.057

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

VEHICLE # 2

TYPE-----CATEGORY 2
WEIGHT----- 3041.0 LBS.

6-89

TYPE-----CATEGORY 4
WEIGHT----- 4850.0 LBS.

VDI-----12FYEW3

L----- 32.5 IN.
 C1----- 22.0 IN.
 C2----- 20.2 IN.
 C3----- 18.5 IN.
 C4----- 16.8 IN.
 C5----- 15.0 IN.
 C6----- 12.5 IN.
 D----- -12.8
 RHO----- 1.00 *
 ANG----- 12.6 DEG.
 D'----- -14.2 IN.

VDI-----12FYEW3

L----- 32.5 IN.
 C1----- 22.0 IN.
 C2----- 20.2 IN.
 C3----- 18.5 IN.
 C4----- 16.8 IN.
 C5----- 15.0 IN.
 C6----- 12.5 IN.
 D----- -12.8
 RHO----- 1.00 *
 ANG----- 12.6 DEG.
 D'----- -14.2 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 = 46.3 INCHES
 B1 = 50.1 INCHES
 TR1 = 54.6 INCHES
 I1 = 23224.6 LB-SEC**2-IN
 M1 = 7.870 LB-SEC**2/IN
 XF1 = 83.3 INCHES
 XR1 = -91.6 INCHES
 YS1 = 33.6 INCHES

A2 = 54.7 INCHES
 B2 = 59.2 INCHES
 TR2 = 61.8 INCHES
 I2 = 46956.1 LB-SEC**2-IN
 M2 = 12.552 LB-SEC**2/IN
 XF2 = 98.8 INCHES
 XR2 = -114.0 INCHES
 YS2 = 38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
 LF----- .01
 RR----- .10
 LR----- .10

MU----- .87

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

ENTER TYPE OF CRASH RUN?
 (COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR, END)
 ?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 14.218

#

RUN Y3LOM.C0162

Y3LOM 13:32 APR 01, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?TRICSAC TEST # 12 WITH TRAJ SIM

2. CLASS/WEIGHTS?
?2 3130 4 4512

3. VDI/PDOF # 1?
?12FDEW4 5.

4. VDI/PDOF # 2?
?12FYEW4 -5.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?22.3 -5.5 118. 6.8 2.6 -12.

7. IMPACT COORDINATES?
?15.7 -4. 171. 0. 0. 0.

12. SKIDDING OF # 1? (Y OR N)
?Y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CCW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)

?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)

?N

22. CURVED PATH? (Y OR N)

?N

24. ROTATION DIRECTION # 2?

?CCW

25. MORE THAN 360 DEG? (Y OR N)

?N

26. TIRE-GROUND FRICTION?

? .87

27. ROLLING RESISTANCE OPTION?(1 OR 2)

?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1

? .01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2

? .01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)

?Y

33. STEER ANGLES #1 ?

?0 0 0 0

34. STEER ANGLES #2 ?

?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)

?N

38. DAMAGE DIMENSIONS? (Y OR N)

?Y

42. END DAMAGE WIDTH #1

?32.

43. END DAMAGE DEPTH #1

?38.6 34.6 29.5 26. 19.6 14.25

44. END DAMAGE MIDPOINT OFFSET #1 6-92

?2.75

48. END DAMAGE WIDTH #2
?28.25

49. END DAMAGE DEPTH #2
739.5 33. 28.75 23.75 19.2 15.

50. END DAMAGE MIDPOINT OFFSET # 1
7-10.6

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

E(1),E(2),E(3),E(4),E(5) =	2.8123	0.0000	.6084	0.0000
0.0000				

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

```

VEHICLE # 1
US = -148.6 VS = 9.8 PSISD = -1.87 SSDOT = 148.9 GAMS = -.22
REST: 460.7 -188.0 2.62 END-OF-ROT: 248.2 -66.6 2.63
POINT-ON-CURVE: 188.4 -48.0
ERRORS: 2.81 0.00 .61 0.00 0.00 Q = 3.42 T = 4.10

```

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 =	-148.572	9.795	-1.865	148.895
-.223 3.421				

ADJ1,ADJ2,ADJ3 =	.6767	1.1788	.1676
SSDOTF,PSISDF,GAMSP =	100.756	-2.199	-.056
USP,VSP =	-100.234	-10.236	

E(1),E(2),E(3),E(4),E(5) =	0.0000	.4659	0.0000	.4448	0.0000
----------------------------	--------	-------	--------	-------	--------

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

```

VEHICLE # 1                                TRAJECTORY ITERATION # 2
US = -100.2  VS = -10.2  PSISD = -2.20  SSDOT = 100.8  GAMS = -.06
REST: 284.5  -98.8  2.47  END-OF-ROT: 234.0  -57.2  2.47
POINT-ON-CURVE: 188.4  -48.0
ERRORS: .47  0.00  .44  0.00  0.00  Q = .91  T = 2.40

```

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -100.234 -10.236 -2.199 100.756
 -.056 .911

ADJ1,ADJ2,ADJ3 = .9049 1.134/ .1692
 SSDOTP,PSISDP,GAMSP = 91.174 -2.495 .113
 USP,VSP = -87.847 -24.405

E(1),E(2),E(3),E(4),E(5) = .2747 0.0000 .2581 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 3
 US = -87.8 VS = -24.4 PSISD = -2.49 SSDOT = 91.2 GAMS = .11
 REST: 245.3 -66.0 2.30 END-OF-ROT: 230.6 -49.3 2.30
 POINT-ON-CURVE: 188.4 -48.0
 ERRORS: .27 0.00 .26 0.00 0.00 Q = .53 T = 1.63

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -87.847 -24.405 -2.495 91.174
 .113 .533

ADJ1,ADJ2,ADJ3 = 1.1111 1.0811 .0552
 SSDOTP,PSISDP,GAMSP = 101.307 -2.697 .169
 USP,VSP = -95.965 -32.461

E(1),E(2),E(3),E(4),E(5) = .3137 0.0000 .0798 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 4
 US = -96.0 VS = -32.5 PSISD = -2.70 SSDOT = 101.3 GAMS = .17
 REST: 243.7 -57.3 2.13 END-OF-ROT: 237.5 -47.2 2.13
 POINT-ON-CURVE: 188.4 -48.0
 ERRORS: .31 0.00 .08 0.00 0.00 Q = .39 T = 1.43

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -95.965 -32.461 -2.697 101.307
 .169 .393

ADJ1,ADJ2,ADJ3 = 1.1359 1.0261 -.0384
 SSDOTP,PSISDP,GAMSP = 115.074 -2.767 .130
 USP,VSP = -110.342 -32.658

E(1),E(2),E(3),E(4),E(5) = .1715 0.0000 -.0250 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 1 TRAJECTORY ITERATION # 5
 US = -110.3 VS = -32.7 PSISD = -2.77 SSDOT = 115.1 GAMS = .13
 REST: 253.7 -64.7 2.04 END-OF-ROT: 247.0 -50.9 2.04
 POINT-ON-CURVE: 188.4 -48.0
 ERRORS: .17 0.00 -.03 0.00 0.00 Q = .29 T = 1.60

US1,VS1,PSISD1,SSDOT1,GAMS1,QMIN1 = -110.342 -32.658 -2.767 115.074
 .130 .197

E(1),E(2),E(3),E(4),E(5) = 4.9893 0.0000 .4777 0.000
 0.0000

++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
 US = 191.2 VS = 73.1 PSISD = -.39 SSDOT = 204.7 GAMS = .37
 REST: 511.5 -40.6 -.11 END-OF-ROT: 64.2 8.1 -.10
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: 4.99 0.00 .48 0.00 0.00 Q = 5.47 T = 5.35

ADJ1,ADJ2,ADJ3 = .6084 1.1437 .2963
 SSDOTP,PSISDP,GAMSP = 124.550 -.448 .661
 USP,VSP = 98.282 76.506

E(1),E(2),E(3),E(4),E(5) = .6588 0.0000 .4170 0.0000
 0.0000

++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 2
 US = 98.3 VS = 76.5 PSISD = -.45 SSDOT = 124.5 GAMS = .66
 REST: 128.2 -2.5 -.12 END-OF-ROT: 31.5 9.3 -.12
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .66 0.00 .42 0.00 0.00 Q = 1.08 T = 2.60

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 98.282 76.506 -.448 124.550
 .661 1.076

ADJ1,ADJ2,ADJ3 = .8835 1.1269 .2566
 SSDOTP,PSISDP,GAMSP = 110.041 -.505 .918
 USP,VSP = 66.840 87.415

E(1),E(2),E(3),E(4),E(5) = .4189 0.0000 .2726 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 3
 US = 66.8 VS = 87.4 PSISD = -.50 SSDOT = 110.0 GAMS = .92
 REST: 53.7 7.5 -.15 END-OF-ROT: 21.6 12.4 -.15
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .42 0.00 .27 0.00 0.00 Q = .69 T = 1.63

 US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 66.840 87.415 -.505 110.041
 .918 .691

ADJ1,ADJ2,ADJ3 = 1.1793 1.0854 .1514
 SSDOTP,PSISDP,GAMSP = 129.767 -.548 1.069
 USP,VSP = 62.372 113.795

E(1),E(2),E(3),E(4),E(5) = .5099 0.0000 -.0183 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 4
 US = 62.4 VS = 113.8 PSISD = -.55 SSDOT = 129.8 GAMS = 1.07
 REST: 39.4 16.9 -.21 END-OF-ROT: 23.2 20.6 -.21
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .51 0.00 -.02 0.00 0.00 Q = .53 T = 1.33

 US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 62.372 113.795 -.548 129.767
 1.069 .528

ADJ1,ADJ2,ADJ3 = 1.2848 .9939 -.0269
 SSDOTP,PSISDP,GAMSP = 166.728 -.544 1.043
 USP,VSP = 84.036 144.001

E(1),E(2),E(3),E(4),E(5) = .2002 0.0000 -.3112 0.0000
 0.0000

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 5
 US = 84.0 VS = 144.0 PSISD = -.54 SSDOT = 166.7 GAMS = 1.04
 REST: 65.6 24.1 -.27 END-OF-ROT: 37.8 32.0 -.27
 POINT-ON-CURVE: 0.0 0.0
 ERRORS: .20 0.00 -.31 0.00 0.00 Q = .51 T = 1.75

 US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 84.036 144.001 -.544 166.728
 1.043 .511

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 12 WITH TRAJ SIM

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	21.0 MPH	0.0 MPH
VEH#2	23.7 MPH	6.5 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	28.2 MPH	-28.1 MPH	-2.2 MPH	4.5 DEG.
VEH#2	19.6 MPH	-19.5 MPH	1.5 MPH	-4.5 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	27.4 MPH	-27.3 MPH	-1.9 MPH	3.9 DEG.
VEH#2	19.0 MPH	-18.9 MPH	1.7 MPH	-5.1 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 82533.6 FT-LB VEH#2 59879.2 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	21.0 MPH
VEH#2	23.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	1.9 MPH
VEH#2	5.8 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
43.9 MPH

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
PF

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 12 WITH TRAJ SIM

VEHICLE # 1

VEHICLE # 2

IMPACT X-POSITION	15.70 FT.	0.00 FT.
IMPACT Y-POSITION	-4.00 FT.	0.00 FT.
IMPACT HEADING ANGLE	170.98 DEG.	0.00 DEG.
REST X-POSITION	22.30 FT.	6.80 FT.
REST Y-POSITION	-5.50 FT.	2.60 FT.
REST HEADING ANGLE	117.99 DEG.	-12.00 DEG.
DIRECTION OF ROTATION	CCW	CCW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1

VEHICLE # 2

XC10'	=	15.7 FT.	XC20'	=	0.0 FT.
YC10'	=	-4.0 FT.	YC20'	=	0.0 FT.
PSI10	=	171.0 DEGREES	PSI20	=	0.0 DEGREES
PSI1D0	=	0.0 DEG/SEC	PSI2D0	=	0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	=	15.7 FT.	XCS2'	=	0.0 FT.
YCS1'	=	-4.0 FT.	YCS2'	=	0.0 FT.
PSIS1	=	171.0 DEG	PSIS2	=	0.0 DEG
US1	=	-6.3 MPH	US2	=	4.8 MPH
VS1	=	-1.9 MPH	VS2	=	8.2 MPH
PSISD1	=	-158.6 DEG/SEC	PSISD2	=	-31.2 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	21.0 MPH	0.0 MPH
VEH#2	23.7 MPH	6.5 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	28.2 MPH	-28.1 MPH	-2.2 MPH	4.5 DEG.
VEH#2	19.6 MPH	-19.5 MPH	1.5 MPH	-4.5 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	27.4 MPH	-27.3 MPH	-1.9 MPH	3.9 DEG.
VEH#2	19.0 MPH	-18.9 MPH	1.7 MPH	-5.1 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 82533.6 FT-LB VEH#2 59879.2 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	21.0 MPH
VEH#2	23.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 1.9 MPH

VEH#2 5.8 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

43.9 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 DID NOT CONVERGE +++++

++++ VEHICLE # 2 DID NOT CONVERGE +++++

NRUNS(1) =	5	NRUNS(2) =	5
E1(1) =	.171	E2(1) =	.200
E1(2) =	0.000	E2(2) =	0.000
E1(3) =	-.025	E2(3) =	-.311
E1(4) =	0.000	E2(4) =	0.000
E1(5) =	0.000	E2(5) =	0.000
QMIN1 =	.197	QMIN2 =	.511

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----	CATEGORY 2
WEIGHT-----	3130.0 LBS.
VDI-----	12FDEW4
L-----	32.0 IN.
C1-----	38.6 IN.
C2-----	34.6 IN.
C3-----	29.5 IN.
C4-----	26.0 IN.
C5-----	19.6 IN.
C6-----	14.3 IN.
D-----	2.8
RHO-----	1.00 *
ANG-----	4.5 DEG.
D'-----	.4 IN.

VEHICLE # 2

TYPE-----	CATEGORY 4
WEIGHT-----	4512.0 LBS.
VDI-----	12FYEW4
L-----	28.3 IN.
C1-----	39.5 IN.
C2-----	33.0 IN.
C3-----	28.8 IN.
C4-----	23.8 IN.
C5-----	19.2 IN.
C6-----	15.0 IN.
D-----	-10.6
RHO-----	1.00 *
ANG-----	-4.5 DEG.
D'-----	-12.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 =	46.3 INCHES	A2 =	54.7 INCHES
B1 =	50.1 INCHES	B2 =	59.2 INCHES
TR1 =	54.6 INCHES	TR2 =	61.8 INCHES
I1 =	23904.3 LB-SEC**2-IN	I2 =	43683.7 LB-SEC**2-IN
M1 =	8.100 LB-SEC**2/IN	M2 =	11.677 LB-SEC**2/IN
XF1 =	83.3 INCHES	XF2 =	98.8 INCHES
XR1 =	-91.6 INCHES	XR2 =	-114.0 INCHES
YS1 =	33.6 INCHES	YS2 =	38.5 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF-----	.01
LF-----	.01
RR-----	.20

6-100

VEHICLE # 2

RF-----	.01
LF-----	.01
RR-----	.20

LR----- .20

LR----- .20

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
TEND

STOP

CRASH PROGRAM COMPLETED.

MRU= 18.318

#

RUN Y3LOM.C0162

Y3LOM 13:54 APR 01, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC TEST # 3 WITH TRAJ SIM

2. CLASS/WEIGHTS?
?4 4949 2 3120

3. VDI/PDOF # 1?
?12FZEW1 0.

4. VDI/PDOF # 2?
?06BZEW1 170.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?111.4 2. -4. 181.5 6.4 -19.

7. IMPACT COORDINATES?
?0. 0. 0. 15. 2.2 10.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?N

19. SKIDDING OF # 2? (Y OR N)
?N

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .09 .09

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.01 .01 .1 .1

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?30.

43. END DAMAGE DEPTH #1
?2. 2. 1.5 1.75 2. 2.25

44. END DAMAGE MIDPOINT OFFSET #1
?22.

48. END DAMAGE WIDTH #2
?30.

49. END DAMAGE DEPTH #2
?6.5 6.75 5.75 5. 3.75 3.

50. END DAMAGE MIDPOINT OFFSET # 1
?5.

THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

SUSTAINED CONTACT SOLUTION FORM

RICSAC TEST # 3 WITH TRAJ SIM

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	7.5 MPH	-7.5 MPH	0.0 MPH	.0 DEG.
VEH#2	11.9 MPH	11.7 MPH	-2.1 MPH	170.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	12.3 MPH	12.3 MPH	.2 MPH	-179.0 DEG.
VEH#2	15.0 MPH	14.8 MPH	-2.2 MPH	171.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 2685.4 FT-LB VEH#2 24200.4 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 0.0 MPH
VEH#2 0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
0.0 MPH

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?P

S U M M A R Y O F C R A S H 3 R E S U L T S

SUSTAINED CONTACT SOLUTION FORM

VEHICLE # 1

```

*****
*                                     *
*          IMPACT                     *
*      SPEED                         *
*          MPH                       *
*                                     *
*****
*                                     *
*          OF                         *
* FWD   LAT   TOTAL LONG. LATERAL    *
*          *           *              *
*****
*                                     *
*          *           *              *
*          *           *              *
*          *           *              *
*          *           *              *
*          *           *              *
*****
*                                     *
*          *           *              *
* 19.8 * .2 * 7.5 * -7.5 * 0.0 * SPINOUT TRAJECTORIES AND *
*          *           *              *
*          *           *              *
*****
*                                     *
*          *           *              *
*          *           *              *
*          *           *              *
*          *           *              *
*****

```

VEHICLE # 2

```

*****
*                                     *
*      IMPACT      *                                     *
*      SPEED       *      SPEED CHANGE    *                                     *
*      MPH         *      MPH             *      BASIS                       *
*                  *                      *      OF                           *
*****
*      *           *           *           *           *      OF               *
* FWD * LAT * TOTAL * LONG. * LATERAL *      RESULTS                     *
*      *           *           *           *           *                               *
*****
*      *           *           *           *           *                               *
*      *           *           *           *           * SPINOUT TRAJECTORIES AND *
*      *           *           *           *           * CONSERVATION OF LINEAR   *
*      *           *           *           *           * MOMENTUM                 *
*      *           *           *           *           *                               *
*****
*      *           *           *           *           *                               *
*      3.1 * -.2 * 11.9 * 11.7 * -2.1 * SPINOUT TRAJECTORIES AND *
*      *           *           *           *           * DAMAGE                   *
*      *           *           *           *           *                               *
*****
*6-105
*****

```

```

*           *           *           *
*  11.9 *  11.7 *  -2.1 *  DAMAGE DATA ONLY
*           *           *           *
*****

```

SCENE INFORMATION

	VEHICLE # 1		VEHICLE # 2
IMPACT X-POSITION	0.00 FT.		15.00 FT.
IMPACT Y-POSITION	0.00 FT.		2.20 FT.
IMPACT HEADING ANGLE	0.00 DEG.		10.00 DEG.
REST X-POSITION	111.40 FT.		181.50 FT.
REST Y-POSITION	2.00 FT.		6.40 FT.
REST HEADING ANGLE	-4.00 DEG.		-19.00 DEG.
END-OF-ROTATION X-POSITION	0.00 FT.		15.00 FT.
END-OF-ROTATION Y-POSITION	0.00 FT.		2.20 FT.
END-OF-ROTATION HEADING ANGLE	0.00 DEG.		10.00 DEG.
DIRECTION OF ROTATION	NONE		NONE
AMOUNT OF ROTATION	<360		<360

COLLISION CONDITIONS

	VEHICLE # 1		VEHICLE # 2
XC10'	= 0.0 FT.	XC20'	= 15.0 FT.
YC10'	= 0.0 FT.	YC20'	= 2.2 FT.
PSI10	= 0.0 DEGREES	PSI20	= 10.0 DEGREES
PSI100	= 0.0 DEG/SEC	PSI200	= 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	= 0.0 FT.	XCS2'	= 15.0 FT.
YCS1'	= 0.0 FT.	YCS2'	= 2.2 FT.
PSIS1	= 0.0 DEG	PSIS2	= 10.0 DEG
US1	= 12.3 MPH	US2	= 14.8 MPH
VS1	= .2 MPH	VS2	= -2.2 MPH
PSISD1	= 0.0 DEG/SEC	PSISD2	= 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND DAMAGE)

	FORWARD	LATERAL
VEH#1	0.0 MPH	0.0 MPH
VEH#2	0.0 MPH	0.0 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	7.5 MPH	-7.5 MPH	0.0 MPH	.0 DEG.
VEH#2	11.9 MPH	11.7 MPH	-2.1 MPH	170.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM) 6-106

	TOTAL	LONG.	LAT.	ANG.
--	-------	-------	------	------

VEH#1	12.3 MPH	12.3 MPH	.2 MPH	-179.0 DEG.
VEH#2	15.0 MPH	14.8 MPH	-2.2 MPH	171.4 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 2685.4 FT-LB VEH#2 24200.4 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 0.0 MPH

VEH#2 0.0 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 0.0 MPH

VEH#2 0.0 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

0.0 MPH

TRAJECTORY SIMULATION RESULTS

++++ VEHICLE # 1 CONVERGED O.K. ++++

++++ VEHICLE # 2 CONVERGED O.K. ++++

NRUNS(1) = 0

E1(1) = 0.000

E1(2) = 0.000

E1(3) = 0.000

E1(4) = 0.000

E1(5) = 0.000

QMIN1 = 0.000

NRUNS(2) = 0

E2(1) = 0.000

E2(2) = 0.000

E2(3) = 0.000

E2(4) = 0.000

E2(5) = 0.000

QMIN2 = 0.000

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

TYPE-----	CATEGORY 4
WEIGHT-----	4949.0 LBS.
VDI-----	12FZEW1
L-----	30.0 IN.
C1-----	2.0 IN.
C2-----	2.0 IN.
C3-----	1.5 IN.
C4-----	1.8 IN.
C5-----	2.0 IN.
C6-----	2.3 IN.
D-----	22.0
RHO-----	1.00 *
ANG-----	0.0 DEG.
D'-----	22.3 IN.

VEHICLE # 2

TYPE-----	CATEGORY 2
WEIGHT-----	3120.0 LBS.
VDI-----	06BZEW1
L-----	30.0 IN.
C1-----	6.5 IN.
C2-----	6.8 IN.
C3-----	5.8 IN.
C4-----	5.0 IN.
C5-----	3.8 IN.
C6-----	3.0 IN.
D-----	5.0
RHO-----	1.00 *
ANG-----	170.0 DEG.
D'-----	3.0 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1	=	54.7 INCHES	A2	=	46.3 INCHES
B1	=	59.2 INCHES	B2	=	50.1 INCHES
TR1	=	61.8 INCHES	TR2	=	54.6 INCHES
I1	=	47914.6 LB-SEC**2-IN	I2	=	23828.0 LB-SEC**2-IN
M1	=	12.808 LB-SEC**2/IN	M2	=	8.075 LB-SEC**2/IN
XF1	=	98.8 INCHES	XF2	=	83.3 INCHES

XR1 = -114.0 INCHES
YS1 = 38.5 INCHES

XR2 = -91.6 INCHES
YS2 = 33.6 INCHES

ROLLING RESISTANCE

VEHICLE # 1

RF----- .01
LF----- .01
RR----- .09
LR----- .09

MU----- .87

VEHICLE # 2

RF----- .01
LF----- .01
RR----- .10
LR----- .10

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 3.833

#

#RUN Y3LOM.CO162

Y3LOM 10:12 APR 02, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC TEST # 4 WITH TRAJ SIM

2. CLASS/WEIGHTS?
?4 4980 2 3190

3. VDI/PDOF # 1?
?12FZEW3 0.

4. VDI/PDOF # 2?
?05BYE5 170.

**** ILLEGAL VDI **** CHECK COLUMN 6

4. VDI/PDOF # 2?
?05BYEW5 170.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?42, *DEL*
42.8 54.5 137.5 63.9 62.5 88.

7. IMPACT COORDINATES?
?0. 0. 1. 16.4 3.4 10.

12. SKIDDING OF # 1? (Y OR N)
?Y

13. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

14. END OF SKIDDING COORDINATES?
?20. 5. 10.

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?CW

18. MORE THAN 360 DEG? (Y OR N)
?N

19. SKIDDING OF # 2? (Y OR N)
?Y

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?35. 2. 10.

22. CURVED PATH? (Y OR N)
?N

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

287. ROLL, RESISTANCES, INDIV. WHEELS # 1

? .01 .01 .2 .2

29. ROLL, RESISTANCES, INDIV. WHEELS # 2

? .01 .01 .2 .2

32. TRAJECTORY SIMULATION? (Y OR N)

? Y

33. STEER ANGLES #1 ?

? 0 0 0 0

34. STEER ANGLES #2 ?

? 0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)

? N

38. DAMAGE DIMENSIONS? (Y OR N)

? Y

42. END DAMAGE WIDTH #1

? 41.5

43. END DAMAGE DEPTH #1

? 6.3 7.8 9.8 12.5 14.8 18.3

44. END DAMAGE MIDPOINT OFFSET #1

? 16.1

48. END DAMAGE WIDTH #2

? 41.8

49. END DAMAGE DEPTH #2

? 36. 31.5 29. 24. 19.5 14.8

50. END DAMAGE MIDPOINT OFFSET # 1

? -9.1

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 4 WITH TRAJ SIM

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	43.9 MPH	.4 MPH
VEH#2	-21.4 MPH	7.4 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.5 MPH	-26.3 MPH	3.6 MPH	-7.8 DEG.
VEH#2	41.4 MPH	39.6 MPH	-12.0 MPH	163.1 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.5 MPH	-26.3 MPH	3.6 MPH	-7.8 DEG.
VEH#2	41.4 MPH	39.6 MPH	-12.0 MPH	163.1 DEG.

ENERGY DISSIPATED BY DAMAGE. VEH#1 23914.7 FT-LB VEH#2 316363.2 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 43.1 MPH

VEH#2	21.4 MPH
-------	----------

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -8.2 MPH

VEH#2 - 6 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)
64.5 MPH

ENTER TYPE OF CRASH RUN?

ENTER TYPE OF CRASH RUN:
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)

27

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC TEST # 4 WITH TRAJ SIM

VEHICLE # 1

```

*****
*                                     *
*          IMPACT          *                                     *
*          SPEED          *          SPEED CHANGE          *
*          MPH          *          MPH          *          BASIS
*                                     *
*                                     *
*****
*          *          *          *          6-112          *
*          *          *          *          *          *

```



```

* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS *
* * * * *
*****
* * * * *
* * * * * SPINOUT TRAJECTORIES AND *
* 43.9 * .4 * 26.5 * -26.3 * 3.6 * CONSERVATION OF LINEAR *
* * * * * MOMENTUM *
* * * * *
*****
* * * * *
* * * * * SPINOUT TRAJECTORIES AND *
* * * * * DAMAGE *
* * * * *
*****
* * * * *
* 26.5 * -26.3 * 3.6 * DAMAGE DATA ONLY *
* * * * *
*****

```

VEHICLE # 2

```

*****
* * * * *
* IMPACT * * * * *
* SPEED * SPEED CHANGE * * * * *
* MPH * MPH * BASIS *
* * * * *
* * * * * OF *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS *
* * * * *
*****
* * * * *
* * * * * SPINOUT TRAJECTORIES AND *
* -21.4 * 7.4 * 41.4 * 39.6 * -12.0 * CONSERVATION OF LINEAR *
* * * * * MOMENTUM *
* * * * *
*****
* * * * *
* * * * * SPINOUT TRAJECTORIES AND *
* * * * * DAMAGE *
* * * * *
*****
* * * * *
* 41.4 * 39.6 * -12.0 * DAMAGE DATA ONLY *
* * * * *
*****

```

SCENE INFORMATION

VEHICLE # 1

VEHICLE # 2

IMPACT X-POSITION	0.00	FT.	16.40	FT.
IMPACT Y-POSITION	0.00	FT.	3.40	FT.
IMPACT HEADING ANGLE	1.00	DEG.	10.00	DEG.
REST X-POSITION	42.80	FT.	63.90	FT.
REST Y-POSITION	6-113 54.50	FT.	62.50	FT.
REST HEADING ANGLE	137.48	DEG.	87.99	DEG.

END-OF-ROTATION X-POSITION	20.00 FT.	35.00 FT.
END-OF-ROTATION Y-POSITION	5.00 FT.	2.00 FT.
END-OF-ROTATION HEADING ANGLE	10.00 DEG.	10.00 DEG.
DIRECTION OF ROTATION	CW	CW
AMOUNT OF ROTATION	<360	<360

COLLISION CONDITIONS

VEHICLE # 1		VEHICLE # 2	
XC10'	= 0.0 FT.	XC20'	= 16.4 FT.
YC10'	= 0.0 FT.	YC20'	= 3.4 FT.
PSI10	= 1.0 DEGREES	PSI20	= 10.0 DEGREES
PSI1D0	= 0.0 DEG/SEC	PSI2D0	= 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1'	= 0.0 FT.	XCS2'	= 16.4 FT.
YCS1'	= 0.0 FT.	YCS2'	= 3.4 FT.
PSIS1	= 1.0 DEG	PSIS2	= 10.0 DEG
US1	= 17.6 MPH	US2	= 18.2 MPH
VS1	= 4.1 MPH	VS2	= -4.6 MPH
PSISD1	= 36.3 DEG/SEC	PSISD2	= 0.0 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	43.9 MPH	.4 MPH
VEH#2	-21.4 MPH	7.4 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.5 MPH	-26.3 MPH	3.6 MPH	-7.8 DEG.
VEH#2	41.4 MPH	39.6 MPH	-12.0 MPH	163.1 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	26.5 MPH	-26.3 MPH	3.6 MPH	-7.8 DEG.
VEH#2	41.4 MPH	39.6 MPH	-12.0 MPH	163.1 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 23914.7 FT-LB VEH#2 316363.2 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1	43.1 MPH
VEH#2	21.4 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1	-8.2 MPH
VEH#2	-6 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

64.5 MPH

TRAJECTORY SIMULATION RESULTS

```

++++ VEHICLE # 1 TIMED OUT AT 10 SECONDS ++++
++++ VEHICLE # 2 TIMED OUT AT 10 SECONDS ++++
NRUNS(1) =      0
E1(1)    =    0.000
E1(2)    =    0.000
E1(3)    =    0.000
E1(4)    =    0.000
E1(5)    =    0.000
QMIN1    =    0.000

```

```

NRUNS(2) =      0
E2(1)    =    0.000
E2(2)    =    0.000
E2(3)    =    0.000
E2(4)    =    0.000
E2(5)    =    0.000
QMIN2    =    0.000

```

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

```

TYPE-----CATEGORY 4
WEIGHT----- 4980.0 LBS.
VDI-----12FZEW3
L----- 41.5 IN.
C1----- 6.3 IN.
C2----- 7.8 IN.
C3----- 9.8 IN.
C4----- 12.5 IN.
C5----- 14.8 IN.
C6----- 18.3 IN.
D----- 16.1
RHO----- 1.00      *
ANG----- -7.9 DEG.
D'----- 19.7 IN.

```

VEHICLE # 2

```

TYPE-----CATEGORY 2
WEIGHT----- 3190.0 LBS.
VDI-----05BYEWS
L----- 41.8 IN.
C1----- 36.0 IN.
C2----- 31.5 IN.
C3----- 29.0 IN.
C4----- 24.0 IN.
C5----- 19.5 IN.
C6----- 14.8 IN.
D----- -9.1
RHO----- 1.00      *
ANG----- 163.1 DEG.
D'----- -11.9 IN.

```

DIMENSIONS AND INERTIAL PROPERTIES

```

A1    =    54.7 INCHES
B1    =    59.2 INCHES
TR1   =    61.8 INCHES
I1    = 48214.8 LB-SEC**2-IN
M1    = 12.888 LB-SEC**2/IN
XF1   =    98.8 INCHES
XR1   = -114.0 INCHES
YS1   =    38.5 INCHES

```

```

A2    =    46.3 INCHES
B2    =    50.1 INCHES
TR2   =    54.6 INCHES
I2    = 24362.6 LB-SEC**2-IN
M2    =  8.256 LB-SEC**2/IN
XF2   =    83.3 INCHES
XR2   =   -91.6 INCHES
YS2   =    33.6 INCHES

```

ROLLING RESISTANCE

VEHICLE # 1

```

RF----- .01
LF----- .01
RR----- .20
LR----- .20

```

VEHICLE # 2

```

RF----- .01
LF----- .01
RR----- .20
LR----- .20

```

```

MU----- .87

```

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, REPUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?END

STOP

CRASH PROGRAM COMPLETED.

MRU= 13.386

#

RUN Y3LOM.C0162

Y3LOM 15:29 APR 15, '80

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?A

1. TITLE?
?RICSAC #5 WITH TRAJ SIM, NO ROT

2. CLASS/WEIGHTS?
?4 4600 1 2350

3. VDI/PDOF # 1?
?12FZEW10.

4. VDI/PDOF # 2?
?#

3. VDI/PDOF # 1?
?12FZEW1 0.

4. VDI/PDOF # 2?
?05BDEW8 170.

5. REST
IMPACT? (Y OR N)
?Y

6. REST COORDINATES?
?241.6 0. 3. 56.9 39. 282.

7. IMPACT COORDINATES?
?0. 0. 0. 14.9 3.4 10.

12. SKIDDING OF # 1? (Y OR N)
?N

15. CURVED PATH? (Y OR N)
?N

17. ROTATION DIRECTION #1?
?N

6-117

19. SKIDDING OF # 2? (Y OR N)

20. SKIDDING STOP BEFORE REST? (Y OR N)
?Y

21. END OF SKIDDING COORDINATES?
?55. 23. 260.

22. CURVED PATH? (Y OR N)
?Y

23. POINT ON CURVE?
?40. 10.

24. ROTATION DIRECTION # 2?
?CW

25. MORE THAN 360 DEG? (Y OR N)
?N

26. TIRE-GROUND FRICTION?
?.87

27. ROLLING RESISTANCE OPTION?(1 OR 2)
?1

28. ROLL. RESISTANCES, INDIV. WHEELS # 1
?.01 .01 .2 .2

29. ROLL. RESISTANCES, INDIV. WHEELS # 2
?.2 .2 .01 .1

32. TRAJECTORY SIMULATION? (Y OR N)
?Y

33. STEER ANGLES #1 ?
?0 0 0 0

34. STEER ANGLES #2 ?
?0 0 0 0

35. TERRAIN BOUNDARY? (Y OR N)
?N

38. DAMAGE DIMENSIONS? (Y OR N)
?Y

42. END DAMAGE WIDTH #1
?33.5

43. END DAMAGE DEPTH #1
?1.4 1.4 2. 2.1 2.3 2.9

44. END DAMAGE MIDPOINT OFFSET #1
?20.3

48. END DAMAGE WIDTH #2
?53.

49. END DAMAGE DEPTH #2
?36. 36.5 31.5 23. 13.3 6.

50. END DAMAGE MIDPOINT OFFSET # 1
?-1.6

CRASH INPUT COMPLETED
THANK YOU VERY MUCH

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 1
US = 434.6 VS = -77.7 PSISD = 4.20 SSDOT = 441.5 GAMS = 6.28
REST: 1097.2 355.7 3.65 END-OF-ROT: 614.1 89.8 3.63
POINT-ON-CURVE: 481.2 60.0
ERRORS: .65 .36 .27 .21 .19 Q = 1.25 T = 6.40

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 434.628 -77.669 4.200 441.513
6.281 1.248

ADJ1,ADJ2,ADJ3 = .9321 1.1167 .3386
SSDOTP,PSISDP,GAMSP = 411.555 4.690 6.619
USP,VSP = 406.183 66.281

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 2
US = 406.2 VS = 66.3 PSISD = 4.69 SSDOT = 411.6 GAMS = 6.62
REST: 944.2 451.5 3.71 END-OF-ROT: 527.0 192.3 3.69
POINT-ON-CURVE: 463.8 162.3
ERRORS: .40 .29 .26 .19 .15 Q = .93 T = 5.98

US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 406.183 66.281 4.690 411.555
6.619 .933

ADJ1,ADJ2,ADJ3 = .9809 1.1115 .1121
SSDOTP,PSISDP,GAMSP = 403.706 5.213 6.732
USP,VSP = 388.660 109.188

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 3
 US = 388.7 VS = 109.2 PSISD = 5.21 SSDOT = 403.7 GAMS = 6.73
 REST: 836.8 612.9 4.01 END-OF-ROT: 524.0 245.0 4.00
 POINT-ON-CURVE: 444.9 186.5
 ERRORS: .32 .26 .19 .12 .24 Q = .76 T = 6.03
 US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 388.660 109.188 5.213 403.700
 6.732 .763

ADJ1,ADJ2,ADJ3 = .9723 1.0809 -.0648
 SSDOTP,PSISDP,GAMSP = 392.531 5.635 6.667
 USP,VSP = 383.981 81.479

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 4
 US = 384.0 VS = 81.5 PSISD = 5.63 SSDOT = 392.5 GAMS = 6.67
 REST: 556.6 530.2 4.67 END-OF-ROT: 544.2 284.3 4.66
 POINT-ON-CURVE: 455.8 166.2
 ERRORS: .21 .22 .05 -.03 .17 Q = .43 T = 5.08
 US2,VS2,PSISD2,SSDOT2,GAMS2,QMIN2 = 383.981 81.479 5.635 392.531
 6.667 .431

ADJ1,ADJ2,ADJ3 = 1.0509 1.0130 -.1822
 SSDOTP,PSISDP,GAMSP = 412.493 5.708 6.485
 USP,VSP = 412.343 11.094

+++++ RESULTS OF TRAJECTORY SIMULATION +++++

VEHICLE # 2 TRAJECTORY ITERATION # 5
 US = 412.3 VS = 11.1 PSISD = 5.71 SSDOT = 412.5 GAMS = 6.48
 REST: 586.4 196.5 5.81 END-OF-ROT: 586.4 196.5 5.81
 POINT-ON-CURVE: 479.3 114.3
 ERRORS: .44 .20 -.19 -.29 .02 Q = .88 T = 2.08

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #5 WITH TRAJ SIM, NO ROT

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)
 LATERAL 6-120

VEH#2 -34.6 MPH 14.6 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	29.3 MPH	-29.3 MPH	0.0 MPH	.0 DEG.
VEH#2	57.4 MPH	56.5 MPH	-10.0 MPH	170.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	29.2 MPH	-29.2 MPH	0.0 MPH	.0 DEG.
VEH#2	57.2 MPH	56.4 MPH	-9.9 MPH	170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 3114.8 FT-LB VEH#2 407873.3 FT-LB
SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 53.6 MPH

VEH#2 34.5 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -12.2 MPH

VEH#2 -1.7 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

88.1 MPH

ENTER TYPE OF CRASH RUN?

(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?P

S U M M A R Y O F C R A S H 3 R E S U L T S

RICSAC #5 WITH TRAJ SIM, NO ROT

VEHICLE # 1

```
*****
*                                     *
* IMPACT *                               *
* SPEED * SPEED CHANGE *                               *
* MPH * MPH *                               *
*                                     *
*                                     * BASIS *
*                                     * OF *
* FWD * LAT * TOTAL * LONG. * LATERAL * RESULTS *
* * * * * * * * * * * * * * * * * * * * *
* * * * * * * * * * * * * * * * * * * * *
* * * * * * * * * * * * * * * * * * * * *
* 55.0 * 0.0 * 29.2 * -29.2 * 0.0 * 6-121 * SPINOUT TRAJECTORIES AND *
* CONSERVATION OF LINEAR *
*****
```

6-122

POINT-ON-CURVE Y-POSITION

10.00 FT.

DIRECTION OF ROTATION

NONE

CW

AMOUNT OF ROTATION

<360

<360

COLLISION CONDITIONS

VEHICLE # 1

XC10' = 0.0 FT.
YC10' = 0.0 FT.
PSI10 = 0.0 DEGREES
PSI100 = 0.0 DEG/SEC

VEHICLE # 2

XC20' = 14.9 FT.
YC20' = 3.4 FT.
PSI20 = 10.0 DEGREES
PSI200 = 0.0 DEG/SEC

SEPARATION CONDITIONS

XCS1' = 0.0 FT.
YCS1' = 0.0 FT.
PSIS1 = 0.0 DEG
US1 = 25.7 MPH
VS1 = 0.0 MPH
PSISD1 = 0.0 DEG/SEC

XCS2' = 14.9 FT.
YCS2' = 3.4 FT.
PSIS2 = 10.0 DEG
US2 = 21.8 MPH
VS2 = 4.6 MPH
PSISD2 = 322.9 DEG/SEC

SUMMARY OF RESULTS

IMPACT SPEED (TRAJECTORY AND CONSERVATION OF LINEAR MOMENTUM)

	FORWARD	LATERAL
VEH#1	55.0 MPH	0.0 MPH
VEH#2	-34.6 MPH	14.6 MPH

SPEED CHANGE (DAMAGE)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	29.3 MPH	-29.3 MPH	0.0 MPH	.0 DEG.
VEH#2	57.4 MPH	56.5 MPH	-10.0 MPH	170.0 DEG.

SPEED CHANGE (LINEAR MOMENTUM)

	TOTAL	LONG.	LAT.	ANG.
VEH#1	29.2 MPH	-29.2 MPH	0.0 MPH	.0 DEG.
VEH#2	57.2 MPH	56.4 MPH	-9.9 MPH	170.0 DEG.

ENERGY DISSIPATED BY DAMAGE VEH#1 3114.8 FT-LB VEH#2 407873.3 FT-LB

RELATIVE VELOCITY DATA

SPEED ALONG LINE THRU CGS (LINEAR MOMENTUM)

VEH#1 53.6 MPH
VEH#2 34.5 MPH

SPEED ORTHOG. TO CG LINE (LINEAR MOMENTUM)

VEH#1 -12.2 MPH
VEH#2 -1.7 MPH

CLOSING VELOCITY (LINEAR MOMENTUM)

88.1 MPH

++++ VEHICLE # 1 TIMED OUT AT 10 SECONDS +++++

++++ VEHICLE # 2 DID NOT CONVERGE +++++

NRUNS(1) =	0	NRUNS(2) =	5
E1(1) =	0.000	E2(1) =	.213
E1(2) =	0.000	E2(2) =	.217
E1(3) =	0.000	E2(3) =	.054
E1(4) =	0.000	E2(4) =	-.027
E1(5) =	0.000	E2(5) =	.167
QMIN1 =	0.000	QMIN2 =	.431

SUMMARY OF DAMAGE DATA

(* INDICATES DEFAULT VALUE)

VEHICLE # 1

VEHICLE # 2

TYPE-----CATEGORY 4
 WEIGHT----- 4600.0 LBS.
 VDI-----12FZEW1
 L----- 33.5 IN.
 C1----- 1.4 IN.
 C2----- 1.4 IN.
 C3----- 2.0 IN.
 C4----- 2.1 IN.
 C5----- 2.3 IN.
 C6----- 2.9 IN.
 D----- 20.3
 RHO----- 1.00 *
 ANG----- 0.0 DEG.
 D'----- 22.3 IN.

TYPE-----CATEGORY 1
 WEIGHT----- 2350.0 LBS.
 VDI-----05BDEW8
 L----- 53.0 IN.
 C1----- 36.0 IN.
 C2----- 36.5 IN.
 C3----- 31.5 IN.
 C4----- 23.0 IN.
 C5----- 13.3 IN.
 C6----- 6.0 IN.
 D----- -1.6
 RHO----- 1.00 *
 ANG----- 170.0 DEG.
 D'----- -7.7 IN.

DIMENSIONS AND INERTIAL PROPERTIES

A1 =	54.7 INCHES	A2 =	45.1 INCHES
B1 =	59.2 INCHES	B2 =	48.1 INCHES
TR1 =	61.8 INCHES	TR2 =	51.1 INCHES
I1 =	44535.7 LB-SEC**2-IN	I2 =	12200.1 LB-SEC**2-IN
M1 =	11.905 LB-SEC**2/IN	M2 =	6.082 LB-SEC**2/IN
XF1 =	98.8 INCHES	XF2 =	76.0 INCHES
XR1 =	-114.0 INCHES	XR2 =	-83.8 INCHES
YS1 =	38.5 INCHES	YS2 =	30.4 INCHES

ROLLING RESISTANCE

VEHICLE # 1

VEHICLE # 2

RF----- .01
 LF----- .01
 RR----- .20
 LR----- .20

RF----- .20
 LF----- .20
 RR----- .01
 LR----- .10

MU----- .87

ENTER TYPE OF CRASH RUN?
(COMPLETE, ABBREVIATED, RERUN, PRINT, DOCUMENT, BATCH, SMAC, OR END)
?END

CRASH PROGRAM COMPLETED.

STOP

MRU= 25.236

+

SECTION 7. SUMMARIES OF CRASH INPUT FROM RICSAC TEST CASES

This section contains summary descriptions of the RICSAC input data that was used for CRASH program testing.

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 1

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Chevelle	Pinto
SIZE CLASS		4	2
WEIGHT	LBS.	4621	3082
CDC		11FZEW2	01RDEW3
PDOF ANGLE	DEG.	-30	30
STIFFNESS CLASS		4	2
REST POSITION	FT., FT., DEG.	-2.4, -1, -1.5	7.5, 2.5, 105
IMPACT POSITION	FT., FT., DEG.	-10.8, 1, -30	0, -5.5, 90
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		YES	YES
SKIDDING STOPPED PRIOR TO REST?		NO	NO
E.O.R. POSITION	FT., FT., DEG.		
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	CW
ROTATION $> 360^{\circ}$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .2, .2	.01, .01, .2, .2
DAMAGE AREA WIDTH	IN.	46	113.3
DAMAGE AREA DEPTH	IN.	4.0, 5.5, 7.0, 10.2, 12.1, 14.8	.5, 12.0, 10.6 11.8, 9.0, 4.1
DAMAGE AREA MIDPOINT OFFSET	IN.	14.3	21.8

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 2

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Chevelle	Pinto
SIZE CLASS		4	2
WEIGHT	LBS.	4621	3081
CDC		11FDEW2	02RDEW4
PDOF ANGLE	DEG.	-30	30
STIFFNESS CLASS		4	2
REST POSITION	FT., FT., DEG.	11, 9.4, 55	23.6, 12.5, 134
IMPACT POSITION	FT., FT., DEG.	-11.2, 8.5, -30	0, 0, 90
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		NO	YES
SKIDDING STOPPED PRIOR TO REST?			NO
E.O.R. POSITION	FT., FT., DEG.		
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	CW
ROTATION $> 360^{\circ}$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.5, .2, .3, .2	.02, .2, .3, .2
DAMAGE AREA WIDTH	IN.	75.5	118.5
DAMAGE AREA DEPTH	IN.	.5, 2.4, 3.7, 6.9, 12.0, 16.5	6.75, 22.75, 23.5 21.3, 10.0, 0.0
DAMAGE AREA MIDPOINT OFFSET	IN.	0.0	13.7

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 3

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Torino	Pinto
SIZE CLASS		4	2
WEIGHT	LBS.	4949	3120
CDC		12FZEW1	06B2EW1
PDOF ANGLE	DEG.	0	170
STIFFNESS CLASS		4	2
REST POSITION	FT., FT., DEG.	111.4, 2.0, -4	181.5, 6.4, -19
IMPACT POSITION	FT., FT., DEG.	0, 0, 0	15, 2.2, 10
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		NO	NO
SKIDDING STOPPED PRIOR TO REST?			
E.O.R. POSITION	FT., FT., DEG.		
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		NONE	NONE
ROTATION $> 360^{\circ}$?			
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .09, .09	.01, .01, .1, 1.0
DAMAGE AREA WIDTH	IN.	30.0	30.0
DAMAGE AREA DEPTH	IN.	2.0, 2.0, 1.5, 1.75, 2.0, 2.25	6.5, 6.75, 5.75, 5.0, 3.75, 3.0
DAMAGE AREA MIDPOINT OFFSET	IN.	22.0	5.0

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 4

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Torino	Pinto
SIZE CLASS		4	2
WEIGHT	LBS.	4980	3190
CDC		12FZEW3	05BYEW5
PDOF ANGLE	DEG.	0	170
STIFFNESS CLASS		4	2
REST POSITION	FT., FT., DEG.	42.8, 54.5, 137.5	63.9, 62.5, 88.
IMPACT POSITION	FT., FT., DEG.	0, 0, 1	16.4, 3.4, 10.0
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		YES	YES
SKIDDING STOPPED PRIOR TO REST?		YES	YES
E.O.R. POSITION	FT., FT., DEG.	20, 5, 10	35, 2, 10
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	CW
ROTATION $>360^{\circ}$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .2, .2	.01, .01, .2, .2
DAMAGE AREA WIDTH	IN.	41.5	41.8
DAMAGE AREA DEPTH	IN.	6.3, 7.8, 9.8, 12.5, 14.8, 18.3	36.0, 31.8, 29.0, 24.0, 19.5, 14.0
DAMAGE AREA MIDPOINT OFFSET	IN.	16.1	-9.1

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 5

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Torino	Civic
SIZE CLASS		4	1
WEIGHT	LBS.	4600	2530
CDC		12FZEW1	05BDEW8
PDOF ANGLE	DEG.	0	170
STIFFNESS CLASS		4	1
REST POSITION	FT., FT., DEG.	241.6, 0, 0	56.9, 39.0, 282
IMPACT POSITION	FT., FT., DEG.	0, 0, 0	14.9, 3.4, 10
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		NO	YES
SKIDDING STOPPED PRIOR TO REST?			YES
E.O.R. POSITION	FT., FT., DEG.		55, 23, 260
CURVED PATH?		NO	YES
POINT ON CURVE	FT., FT.		40, 10
ROTATION DIRECTION		CW	CW
ROTATION $>360^{\circ}$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .2, .2	.2, .2, .01, 1.0
DAMAGE AREA WIDTH	IN.	33.5	53.0
DAMAGE AREA DEPTH	IN.	1.4, 1.4, 2.0, 2.1, 2.3, 2.9	36.0, 36.5, 31.5, 23.0, 13.3, 6.0
DAMAGE AREA MIDPOINT OFFSET	IN.	20.3	-1.6

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 6

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Chevelle	Rabbit
SIZE CLASS		4	2
WEIGHT	LBS.	4300	2623
CDC		11FZEW1	O2RDEW3
PDOF ANGLE	DEG.	-30	30
STIFFNESS CLASS		4	2
REST POSITION	FT., FT., DEG.	60, 11, 15	20, 21, 242
IMPACT POSITION	FT., FT., DEG.	0, 0, 0	11.1, 2.67, 12
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		NO	YES
SKIDDING STOPPED PRIOR TO REST?			NO
E.O.R. POSITION	FT., FT., DEG.		
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	CW
ROTATION $>360^{\circ}$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .2, .2	.01, .01, .2, .2
DAMAGE AREA WIDTH	IN.	54.5	77.0
DAMAGE AREA DEPTH	IN.	.5, .5, 1.25, 1.5, 1.75, 2.25	4.0, 12.0, 17.8, 19.3, 17.0, 8.25
DAMAGE AREA MIDPOINT OFFSET	IN.	9.75	-3.25

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 7

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Chevelle	Rabbit
SIZE CLASS		4	2
WEIGHT	LBS.	3700	1700
CDC		11FDEW1	02RDEW4
PDOF ANGLE	DEG.	-30	30
STIFFNESS CLASS		4	2
REST POSITION	FT., FT., DEG.	84.5, 18.2, 16.5	22.9, 41.4, 262
IMPACT POSITION	FT., FT., DEG.	0, 0, 0	10.7, 3.45, 120
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		YES	YES
SKIDDING STOPPED PRIOR TO REST?		NO	NO
E.O.R. POSITION	FT., FT., DEG.		
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	CW
ROTATION $> 360^\circ$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .2, .2	.01, .01, 1.0, .2
DAMAGE AREA WIDTH	IN.	66.0	108.5
DAMAGE AREA DEPTH	IN.	0.0, 1.25, 2.0, 3.75, 5.0, 6.25	0.0, 11.0, 17.75, 21, 21.25, 7.25
DAMAGE AREA MIDPOINT OFFSET	IN.	4.0	-8.5

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 8

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Chevelle	Chevelle
SIZE CLASS		4	4
WEIGHT	LBS.	4479	4710
CDC		12FDEW1	02RYEW2
PDOF ANGLE	DEG.	-45	45
STIFFNESS CLASS		4	4
REST POSITION	FT., FT., DEG.	-.5, 11, 46	6.5, 21, 141
IMPACT POSITION	FT., FT., DEG.	-10.9, 3.2, 0	0, 1.9, 90
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		YES	YES
SKIDDING STOPPED PRIOR TO REST?		NO	NO
E.O.R. POSITION	FT., FT., DEG.		
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	CW
ROTATION $> 360^{\circ}$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .2, .2	.01, .01, .2,
DAMAGE AREA WIDTH	IN.	73	84.5
DAMAGE AREA DEPTH	IN.	2.7, 3.6	6.2, 8.3, 9.2, 5.9, 4.4, .8
DAMAGE AREA MIDPOINT OFFSET	IN.	0.0	15.0

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 9

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Civic	Torino
SIZE CLASS		1	4
WEIGHT	LBS.	2256	4900
CDC		11FDEW2	02RFEW2
PDOF ANGLE	DEG.	25	-65
STIFFNESS CLASS		1	4
REST POSITION	FT., FT., DEG.	4, 35.5, 104	-5, 49.5, 152
IMPACT POSITION	FT., FT., DEG.	0, 0, 0	8.53, -5.89, 90
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		NO	YES
SKIDDING STOPPED PRIOR TO REST?			YES
E.O.R. POSITION	FT., FT., DEG.		18, 12.5, 120
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	CW
ROTATION $> 360^\circ$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.2, .2, .01, .01	.1, .01, .2, .2
DAMAGE AREA WIDTH	IN.	49.75	54.5
DAMAGE AREA DEPTH	IN.	5.0, 5.75, 12.5 7.5, 7.5, 9.5	7.75, 4.6, 4.75, 3.3, 2.75, 1.5
DAMAGE AREA MIDPOINT OFFSET	IN.	1.63	68.0

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 10

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Civic	Torino
SIZE CLASS		1	4
WEIGHT	LBS.	2306	4720
CDC		10FDEW2	01RFEW2
PDOF ANGLE	DEG.	-65	25
STIFFNESS CLASS		1	4
REST POSITION	FT., FT., DEG.	5, 43, 87	0, 99.5, 128.5
IMPACT POSITION	FT., FT., DEG.	0, 0, 0	8.5, -5.9, 90
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		YES	YES
SKIDDING STOPPED PRIOR TO REST?		YES	YES
E.O.R. POSITION	FT., FT., DEG.	5, 25, 90	23, 19, 90
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	CW
ROTATION $> 360^{\circ}$?		NO	NO
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.2, .2, .2, .01	.1, .1, .01, .2
DAMAGE AREA WIDTH	IN.	47.5	53.0
DAMAGE AREA DEPTH	IN.	7.0, 10.2, 14, 8.9, 7, 9	9.2, 6.5, 6.1, 5.3, 4.5, 0.5
DAMAGE AREA MIDPOINT OFFSET	IN.	-2.75	66.5

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 11

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Vega	Torino
SIZE CLASS		2	4
WEIGHT	LBS.	3041	4850
CDC		12FYEW3	12FYEW3
PDOF ANGLE	DEG.	5	-5
STIFFNESS CLASS		2	4
REST POSITION	FT., FT., DEG.	25.6, -6.4, 170	8.6, .4, 0
IMPACT POSITION	FT., FT., DEG.	15.7, -4, 171	0, 0, 0
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		NO	NO
SKIDDING STOPPED PRIOR TO REST?			
E.O.R. POSITION	FT., FT., DEG.		
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CW	NONE
ROTATION $> 360^{\circ}$?		NO	
TIRE/GROUND FRICTION		.87	.87
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .1, .1	.01, .01, .2, .2
DAMAGE AREA WIDTH	IN.	32.5	32.26
DAMAGE AREA DEPTH	IN.	22, 20.2, 18.5, 16.8, 15, 12.5	29.5, 26.25, 23, 18.7, 14.3, 11
DAMAGE AREA MIDPOINT OFFSET	IN.	-12.75	-12.9

SUMMARY OF CRASH INPUT FROM RICSAC TEST CASE # 12

ITEM	UNITS	VEHICLE 1	VEHICLE 2
MAKE OR MODEL		Vega	Torino
SIZE CLASS		2	4
WEIGHT	LBS.	3130	4512
CDC		12FDEW4	12FYEW4
PDOF ANGLE	DEG.	5	-5
STIFFNESS CLASS		2	4
REST POSITION	FT., FT., DEG.	22.3, -5.5, 118	6.8, 2.6, -12
IMPACT POSITION	FT., FT., DEG.	15.7, -4, 171	0, 0, 0
SIDESLIPPING?		NO	NO
SIDESLIP ANGLE	DEG.		
SKIDDING?		YES	YES
SKIDDING STOPPED PRIOR TO REST?		NO	NO
E.O.R. POSITION	FT., FT., DEG.		
CURVED PATH?		NO	NO
POINT ON CURVE	FT., FT.		
ROTATION DIRECTION		CCW	CCW
ROTATION $> 360^{\circ}$?		NO	NO
TIRE/GROUND FRICTION			
ROLLING RESISTANCES (RF, LF, RR, LR)		.01, .01, .2, .2	.01, .01, .2, .2
DAMAGE AREA WIDTH	IN.	32	28.25
DAMAGE AREA DEPTH	IN.	38.6, 34.6, 29.5, 26, 19.6, 14.25	39.5, 33, 28.75, 23.75, 19.2, 15
DAMAGE AREA MIDPOINT OFFSET	IN.	2.75	-10.6

