

Technical Newsletter

Available on-line in the EDC Library at www.edccorp.com

Feast!

There is a *feast* in New Orleans - well actually, there are several! Everyone knows about the incredible restaurant and music scene in the French Quarter. But the feast we're talking about is the incredible selection of workshops - over 30 of them - at the 2017 *HVE* Forum during the week of March 6 - 10. The venue is The Hilton New Orleans Riverside, at the end of Canal Street, just outside of the French Quarter.

The *HVE* Forum is the best way to get up to speed on all the powerful features of both *HVE* 2016 and *HVE-2D* 2016. The workshops are designed for all types of users, from beginners to the most advanced. New users will benefit from hands-on exercises and rich explanations about *HVE*'s inner workings. Long-time users benefit from the advanced workshops designed for real power users. And everyone benefits from the *HVE* White Paper Session and User's Group meetings.

Hands-on Learning

Many of the workshops, including the Advanced *HVE*, Advanced *HVE-2D* and Simulation Fundamentals, include hands-on exercises, so be sure to bring your laptop! EDC will issue temporary licenses with all program options to each attendee.

Admissibility Workshop

The Admissibility Workshop will be hosted by long-time *HVE* user Alan Powers, of 3-Axis Engineering. This workshop is an open discussion about actual user experiences and focuses on the admissibility of *HVE* results, not on the more general question of giving expert testimony. The Admissibility Workshop is a must for almost every *HVE* and *HVE-2D* user.

Users Groups

An important part of the Forum is the Users Group meetings for *HVE* and *HVE-2D*. This is an opportunity to discuss your experience with other users and to give direct feedback to EDC's developers.

**20th Annual
HVE FORUM**

Come Feast!

**Hilton New Orleans Riverside
March 6-10, 2017**

WORKSHOPS

- EDCRASH, EDSMAC4, EDV5S and EDVTS Overview
- Advanced Multi-vehicle Simulation Using SIMON
- Theoretical and Applied Vehicle Dynamics
- Multi-vehicle Collisions Using EDSMAC4
- Building Vehicles for HVE and HVE-2D
- HVE and HVE-2D User's Groups
- Powerful Tips and Techniques
- Advanced HVE
- Using DamageStudio
- Hydroplaning Simulation
- HVE White Paper Session
- Tractor-Trailer and Commercial Vehicle Simulation
- Importing 3-D Terrains from Point Clouds
- Simulating Curbs, Potholes and Soft Soils
- Brake System, ABS and ESC Simulation
- Simulating Blow-outs and Rollovers
- DyMESH 3-D Collision Model
- Creating Advanced Terrains
- Advanced HVE-2D
- Introduction to HVE-CSI
- High-Definition Video Output
- Admissibility Workshop

Animation

EDC

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Workshop Registration

Workshop schedules, descriptions and registration forms are available to view and download at www.edccorp.com/2017HVEForum. You can also call EDC Customer Service at 888-768-6216 and let us help you choose the perfect set of workshops to suit your personal needs.



Technical Session

Our Fall Technical Session introduces a new tool, the Image Tool, in the Environment Editor. The Image Tool is a complete revision in the way aerial images are managed.

Current Method

In *HVE 2016*, an aerial image is selected using a file browser, and then applied to the environment by specifying the X,Y coordinates for two opposite corners of the image, as shown in Figure 1. While it seems pretty simple, this approach requires knowledge of the X,Y earth-fixed coordinates of the scene depicted in the photograph. Sometimes this information is not explicitly known, requiring the user to do additional work. In addition, this approach inherently requires the user to know the location of the earth-fixed origin.

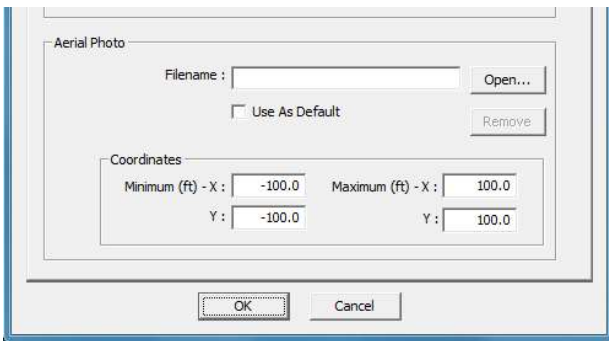


Figure 1 - Bottom portion of the Environment Information dialog, showing the current method for adding and scaling an aerial image.

New Method

The user still needs to select an aerial image using a file browser. The selected image is automatically mapped onto a default surface. The Environment Editor viewer now includes a sphere identifying the location of the earth-fixed origin. Note that this is just like the Vehicle Editor's viewer, which displays a sphere at the vehicle-fixed origin. Just like the Vehicle Editor, the user can click on the sphere in the Environment Editor. Clicking on the sphere displays the Image Tool.

The Image Tool is a three-tabbed dialog (see Figure 2) that allows the user to

- Scale the image
- Rotate the image in the X,Y plane
- Move the earth-fixed origin

Scale

The aerial image is initially mapped to a default rectangle that has a length of 100 feet in the X direction. The length in the Y direction is determined automatically by the image's aspect ratio. The actual scale is set by clicking on any two points that are a known distance apart. For example, if the lane width is known, the user can click on two pavement stripes, causing the currently scaled lane width to be displayed, as shown in Figure 2. Using the Scale tool, simply enter the actual lane width and press Apply to correctly scale the aerial image. Google Image users will know that a scale is displayed in the corner of each Google image. In this case, the user can click on ends of the scale and then enter the actual scaled distance displayed in the image.



Figure 2 - Environment Viewer showing the new method for manipulating an aerial image. Clicking on the sphere at the earth-fixed origin brings up the Image Tools.



Figure 3 - The Rotate Tool allows the user to rotate the image. In this example, the image shown in Figure 2 has been rotated 30 degrees counter-clockwise.



Figure 4 - The Origin Tool allows the user to move the earth-fixed origin to a new location. In this example, the origin initially in the middle of the intersection (see Figure 3) was moved to the intersection between two pavement stripes.

Note that the number of pixels is also displayed in the scale tool. Most Google images have the same scale, so users will have learned that the scale displayed in the image is typically 314 pixels in length. This is a great way to confirm that you have accurately scaled the image.

Rotate

The direction of the earth-fixed X axis is initially along the length of the aerial image. However, the user can rotate the image using the Rotate tool (see Figure 3). Simply drag the white arrow in the desired direction.

The user may also type in an exact angle, if known. These procedures allow the user to set the direction of the X axis according to field measurements or any other criteria.

Origin

The origin is initially located at the center of the aerial image. It may be moved to any desired location simply by clicking on that location. The Origin tool (see Figure 4) displays the distance (in X,Y coordinates) from the original origin to the new origin. The user may also type in the exact X,Y coordinates, if known.

Reset

When the Image Tool is displayed, the current scale, origin location and rotation are stored. If the user edits the scale, rotation and origin location, clicking Reset returns the aerial image to the original state.

Summary

We believe this is a significant improvement over the original method for displaying aerial images. The new method will be included in *HVE 2016*, Service Pack 4, due out in early 2017.

New Thermodynamic Model for Disc Brakes

The *HVE* Brake Designer has a new thermodynamic model developed specifically for disc brakes. The new model compliments the existing drum brake model. The purpose of these models is to calculate during a simulated brake application the increase and decrease in temperature throughout the brake rotor and pads (disc brake) or drum and linings (drum brake). Temperature affects the friction between the rotor and pads (or drum and linings), as well as the force vs. stroke relationship for drum air brakes. Therefore, temperature affects the brake torque developed at each wheel during braking.

The new thermodynamic model is used for both hydraulic (light passenger vehicles) and air (heavy trucks) brake systems.

A white paper describing this new model will be available at the 2017 *HVE* Forum; this will be followed by a technical paper submission at the 2018 SAE International Congress.

HVE 2016 Service Pack 3 Available

HVE Service Pack 3 is available for download. Service Pack 3 builds on the changes in Service Packs 1 and 2. In particular, Service Pack 3 resolves an erroneous error message displayed on some computers using the Intel Integrated graphics card. Refer to the Release Notes for a complete description of the changes.

The Service Pack 3 download requires your computer to have a working version of *HVE 2016* installed (you can also download the complete *HVE 2016* installation if necessary). Service Pack 3 does not require a new license.

To download Service Pack 3, go to www.edccorp.com and navigate to Support, Downloads. Then follow the instructions to download the appropriate version of Service Pack 3.

EDC President Named ASME Fellow

Terry D. Day, P.E., President and founder of Engineering Dynamics Corporation, has been named a Fellow of the American Society of Mechanical Engineers. He was nominated for the honor by his mentor and first boss, John A. Talbott, P.E. Day started his engineering career at Talbott Engineers, where he was first exposed to the field of accident reconstruction in 1977. Day was named a Fellow for his work in the motor vehicle safety industry. He called this accomplishment "a major highlight in his 40-year career as a mechanical engineer."

EDC Simulations Jan 30 - Feb 3, 2017 Los Angeles, CA

EDC Simulations is an extensive one-week training seminar that offers an excellent way to learn the inner workings of *EDSMAC*, *EDSMAC4*, *EDSVS* and *EDVTS*. The course focuses on the physics models, the calculations and the underlying assumptions for each simulation's major calculation procedures.

EDC Simulations is designed to be like a college physics course - a combination of morning lectures and afternoon hands-on lab exercises. The fact that this course has been presented annually for over 25 years ensures that students benefit from a well designed and well executed week of instruction.

EDC Simulations has been pre-approved for 30 ACTAR CEUs. All course materials, including a handbook, training manual, software and temporary licenses will be provided to each student.

Bring your scientific calculator and laptop computer. Lab exercises include loss-of-control simulations, parametric studies, collision simulations and setting up the pre-impact phase of a 15-second crash sequence.

Links to download your course registration form and to make your hotel reservations at the Burbank Airport Marriott hotel (Los Angeles area) are available on the EDC Simulations page in the Training section of edccorp.com. Go online or contact EDC at 888.768.6216 to sign up today!

HVE 2016 Service Pack 4

EDC will make Service Pack 4 available in early 2017. Service Pack 4 will include the following new features:

- **Image Tool** - A new tool in the Environment Editor, called the Image Tool, provides a new and improved method for manipulating aerial environment images. This is the subject of the Technical Session in this Newsletter (see page 2).
- **Disc Brakes for Heavy Trucks** - The Brake Designer has been extended to directly support air disc brakes used on heavy trucks (see Figure 5).
- **New Thermodynamic Model for Disc Brakes** - In conjunction with the new support for heavy truck air disc brakes, a new thermodynamic model has also been introduced (see page 4).
- **SIMON Update** - Minor changes to *SIMON* include a correction in the Driver Data output report for steer angle when the At Axle option is used, a logic correction that allowed the user to turn off *DyMESH* when the *DyMESH* Wheel Impact model was turned on, and a message that warns the user when a throttle table is supplied without putting a manual transmission in gear.

- **EDCRASH Update** - This update allows the user to explicitly assign a vehicle position at separation that is different from the impact position. This allows for fine-tuning of the post-impact sideslip angle and its effect on separation velocity.

Watch for an upcoming announcement. Service Pack 4 will be available for download at www.edccorp.com. A new license will be required.

HVE 2017

HVE 2017 will be a 64-bit version of *HVE 2016* Service Pack 4. The development effort on *HVE 2017* has been significant; work has been under way for almost a year.

HVE 2017 will remove memory limitations that affect maximum environment size and the length of simulations with small output time intervals. In *HVE 2017*, the maximum size of environments and simulation events is virtually unlimited.

It is expected that the beta period for *HVE 2017* will be rather lengthy, owing to the significant changes involved. Please contact EDC Customer Service if you are interested in participating in the *HVE 2017* or *HVE-2D 2017* Beta Program.

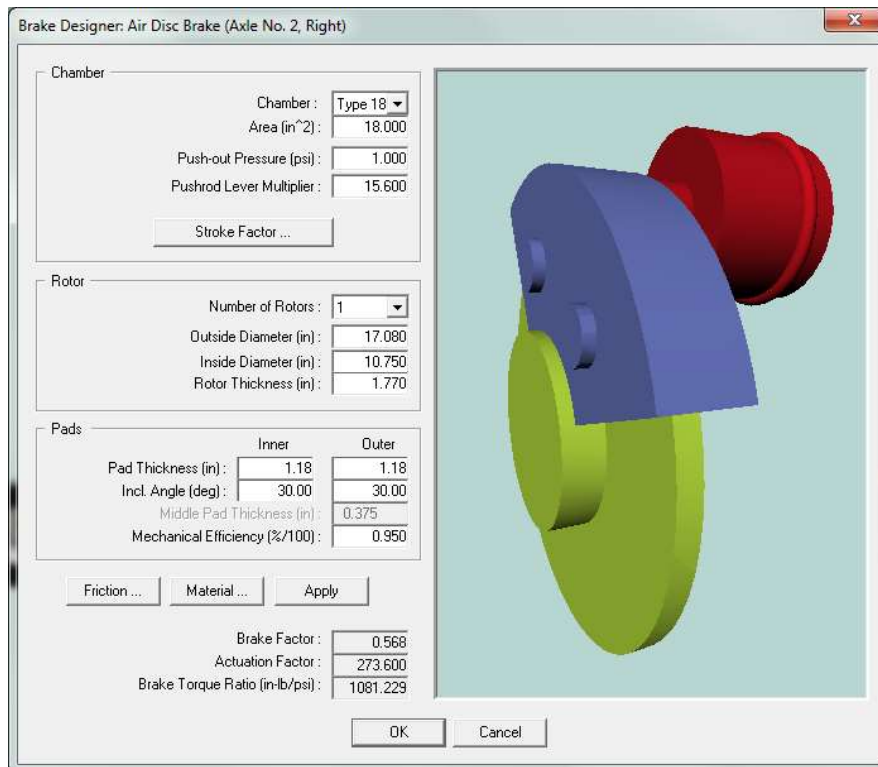


Figure 5 - New Brake Designer tool for air disc brakes used on heavy trucks..

More on the 2017 HVE Forum...

Simulations Festival

The HVE Simulations Festival returns again for the 2017 HVE Forum in New Orleans. The Simulations Festival is a way for users to showcase (a.k.a., *show off!*) their great work. Users' simulation videos will be running all week long on a large-screen display in the registration lobby. In the past, this has been a competition. But we've changed the approach this year: We simply want to provide a venue for HVE users to look at what other HVE users are doing. This is a starting point for conversations between users. The ultimate goal is to help improve the work produced by every HVE user.

To include your work in the Simulations Festival, simply submit a video to EDC before February 15, 2017. Make sure to include credits and other titles so everyone will know who made it!

HVE White Papers

All users presenting HVE White Papers at the 2017 HVE Forum should have their draft manuscript submitted to EDC for review by January 15, 2017. EDC will review and make suggestions for the final manuscript, which is due by February 15, 2017. We currently have three white papers scheduled for presentation and one written-only.

HVE and HVE-2D F.A.Q.

This section contains answers to frequently asked questions submitted to EDC Technical Support staff by HVE and HVE-2D users.

Q: How can I disable the "Do you want to allow the following program from an unknown publisher to make changes to this computer?" prompt every time I launch HVE.

A: This message is coming from your virus protection software. Different virus protection software programs all have slightly different messages and solutions, so use the following instructions as a guide.

If your company's systems administrator prohibits computer modifications, or you simply don't want to make a global change to your computer's notifications, you can right-click the HVE desktop shortcut or the HVE executable itself (HVE.exe) in the HVE installation folder and choose Properties to display the Properties

dialog. Uncheck all instances of "Run this program as an administrator" (there are 3 instances between the different tabs).

If you don't have an overly zealous systems administrator and you don't mind making a global change to your computer's anti-virus software notifications, in the "User Account Control" (or similar) warning message dialog, click "Change when these notifications appear." That opens a different "User Account Control Settings" dialog which includes a vertical slider bar, slide the selector down to "Never Notify" and then click OK.

Q: My installation of HVE works just fine in the office and at home but every time I try to work while out in the field I get a "License File Not Found. Running in Demo Mode" error when I try to run HVE. What's going on?

A: A node-locked license (i.e., a license that is locked to a single computer) may use either the computer's ethernet address or the hard disk ID. HVE's default for node-locked licenses is the ethernet address because some solid state hard drives change their ID each time the computer is restarted. In order to access the ethernet address, the computer must be connected to the internet. If you can connect to the internet, the problem is solved. Otherwise, you'll need to use an EDKEY or possibly a license locked to your computer's hard drive.

If you are stuck, and need to use HVE, please contact EDC so we can provide you with an alternative license, such as a short-term, unlocked, dated license. Also please let us know if your computer runs on a solid state drive as that requires a different license.

Q: Why does my EDSMAC4 Damage Data output report display the message "One or more vehicle meshes have exterior dimensions that differ from the vehicle overall dimensions" and the Messages output report displays "One or more vehicle(s) have mesh exterior dimensions that differ from the vehicle overall dimensions...by more than 0.5 inches. As a result, the Damage Data output report for the following vehicle(s) is subject to errors"?

A: Some vehicle geometries include side mirrors. These side mirrors affect the free space calculation in Collision Data and Damage Studio. The vehicle side dimensions are normally assigned according to the width near the B-pillar, ignoring the side mirrors. EDSMAC4 explicitly compares the dimensions defined by the red spheres in the Vehicle Editor to the dimensions associated with the geometry to help ensure accurate damage profile information in the

Collision Data report as well as in Damage Studio. The above messages occur because the mirrors are included in the geometry and project more than 0.5 inches beyond the dimensions defined in the Vehicle Editor. There is currently no solution to this problem, although the user can move the red spheres so they include the side mirrors. In this case, the free space reported in the Collision Data output report and Damage Studio should be ignored.

Q: After downloading and installing HVE (or HVE-2D) 2016 Service Pack 3, I am no longer able to import DXF environment files.

A: The initial release of *HVE & HVE-2D* 2016 Service Pack 3 included the wrong version of the translator. We sincerely apologize for this error. The *HVE & HVE-2D* 2016 Service Pack 3 installers have now been corrected. The correct download is dated December 8, 2016. Please download and reinstall this version. Again, we apologize for our mistake

Q: Is it possible to create a trailer with 6 axles?

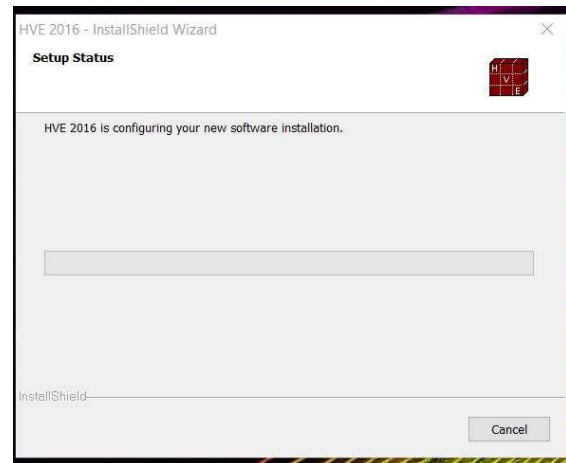
A: Sort of. Any single vehicle may have up to 3 axles. When you select a heavy trailer from the *HVE* Vehicle Database, it is actually a semi-trailer that may have up to 3 axles. If the front of the trailer is attached to a Dolly, you now have a "full trailer" with up to 6 axles (3 on the dolly and 3 on the semi-trailer).

HVE does not allow semi-trailers with more than 3 axles.

Q: After installing HVE 2016 Service Pack 0 on a new computer I can no longer display Key Results, Driver Controls or the Help, Tech Support dialog. HVE also seems to display events much slower than before. What's going on?

A: Some of the original *HVE* 2016 installation disks (essentially Service Pack 0) did not correctly register a DLL used by *HVE* dialogs that included tables (examples are cited in your question, above; there are many, many more). To resolve the problem, please go to the Support, Downloads page of edccorp.com and download the latest version.

Q: When I try to install HVE I go through the various HVE Installer dialogs, enter my user information, select my license file, etc. but when I get to the point where a progress bar is displayed and the files should start to copy over to my computer, nothing happens. The installer looks like the figure shown below, and just hangs. I eventually have to force the dialog closed via the Task Manager. What's going on?



A: Another victory for virus protection! This happens when another program or service on your computer blocks the *HVE* Installer from copying and saving files. If you are a Windows 7 user, the easiest way to get around this is to restart your computer in Safe Mode and then install *HVE*. Once *HVE* is installed, restart your computer again in regular/normal mode.

If you are a Windows 8 or Windows 10 user, please contact EDC Customer Service and request a copy of the "Windows 8 & 10 workaround for the *HVE* Installer Hang Issue" PDF instructions. By following the steps outlined in that document you'll be able to successfully install *HVE*. As always, if you have any follow up questions feel free to give us a call at 888-768-6216, we are always glad to help!

Q: I clicked on the Environment Editor's Object Information button to display the Environment Information dialog for the current environment, and then opened a different terrain file. After performing this operation, the environment was no longer displayed correctly. What happened?

A: In addition to the terrain geometry, there are numerous other attributes associated with the current environment. One or more of these original attributes was not compatible with the new terrain geometry. To resolve the problem, click on the + button (Add New Environment) to replace the entire environment.

EDC will investigate this issue further, as it does appear there is a bug that needs to be addressed.

Visit the Support section of www.edccorp.com to download software updates and to view more FAQs from the Knowledge Base.

EDC Training Courses

EDC Reconstruction & Simulations

EDC offers excellent one-week courses on the use of the *EDCRASH* reconstruction program and the *EDSMAC*, *EDSMAC4*, *EDSVS* and *EDVTS* simulation programs. The **EDC Reconstruction** and **EDC Simulations** courses are designed to fully investigate the inner workings of these *HVE*-compatible physics programs. Lectures are full of helpful hints gained from years of experience. During the course, students will use the physics programs to complete several lab exercises highlighting the capabilities of each program discussed in the course.

All users of *HVE* and *HVE-2D* agree that these courses are extremely beneficial and challenging. It's the fastest way to learn what you really need to know – how to effectively use the physics programs and get the right results. *Note: These courses focus on the physics programs, not on the HVE user interface.* For courses that focus on the *HVE*, *HVE-2D* or *HVE-CSI* user interface, check out the workshops at the *HVE* Forum.

HVE Forum

The **HVE Forum** offers over 30 workshops designed to help *HVE*, *HVE-2D* and *HVE-CSI* users improve their modeling and application skills. By participating in workshops, attendees learn new techniques and also how to use the latest advancements in the software. The *HVE* Forum is also a great opportunity to meet other users and expand your network of resources.

Engineering Dynamics Corporation Training Course Schedule

EDC Reconstruction

Miami, FL November, 2018
Los Angeles, CA January, 2018

EDC Simulations

Los Angeles, CA Jan 30 - Feb 3, 2017
Miami, FL November 6 - 10, 2017

Theoretical & Applied Vehicle Dynamics

Upon Request

2017 HVE FORUM

New Orleans, LA March 6 - 10, 2017

Vehicle Dynamics

The **Theoretical & Applied Vehicle Dynamics** course extends the scope of a general vehicle dynamics discussion by including several direct applications using the *SIMON* vehicle dynamics simulation program within *HVE* and providing a solid theoretical background for such simulations. The course is focused towards engineers and safety researchers with an interest in an understanding of vehicle dynamics and automotive chassis systems development.

Course Registration

To register for a course, download a registration form from the Training page at edccorp.com or contact EDC Customer Service at 888-768-6216 or by email to training@edccorp.com. All courses are eligible for Continuing Education Units and ACTAR credits.

HVE Training Partners

HVE, *HVE-2D* and *HVE-CSI* users looking to improve their skills, but unable to attend one of EDC's regularly scheduled courses, can contact an *HVE* Training Partner for assistance. *HVE* Training Partners are experienced *HVE* and *HVE-2D* users who offer introductory and custom training courses on the use of *HVE*, *HVE-2D*, *HVE-CSI* and *HVE*-compatible physics programs. The list of *HVE* Training Partners may be found at www.edccorp.com.

HVE Discussion Groups

Websites hosted by experienced *HVE* Users offer information about using *HVE* as well as moderated online discussions with other users. Be sure to visit:

AccidentReconOnline.com - Online training courses and also the DiscoverHVE video tutorials and discussion group hosted by Wes Grimes of Collision Engineering Associates.

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