

To: All HVE Version 8.2 EDSMAC4 Users
From: EDC Customer Service
Date: November 8, 2011

A lot has been learned since we introduced the CollisionData output report and DamageStudio for EDSMAC4. Although we performed a significant amount of internal and beta testing, applying these tools to users' real-world cases has revealed some shortcomings. Here's what we've found:

1. For most basic collisions, the CollisionData results and DamageStudio are performing well.
2. Having a proper setup is very important in achieving good results using CollisionData and DamageStudio (hereafter CD-DS). The following steps help to ensure good results.
3. The results displayed in the CollisionData report are calculated at each collision integration timestep (typically, 0.001 sec) while the simulation is executing in the Event Editor. DamageStudio essentially repeats the same calculations in the Playback Editor. HOWEVER, DamageStudio uses output track data to perform the calculations. Since output track data exist at each output timestep (typically 0.02 seconds; see Options, Simulation Controls dialog), which may be different from the integration timestep, there will normally be a small difference in the results. If you wish to duplicate the results in CollisionData and DamageStudio, simply set the output time interval and playback interval equal to the collision integration timestep.
4. If the vehicle exterior dimensions are not matched closely to the exterior dimensions of the vehicle geometry (established by the red spheres in the Vehicle Editor; see Figure 1), the CDC and damage profile calculations suffer, perhaps significantly, depending on the difference between the rectangle dimensions and the mesh. Acceleration and delta-V calculations may also suffer, especially if there is pre-impact speed change not associated with collision (i.e., from throttle or braking).

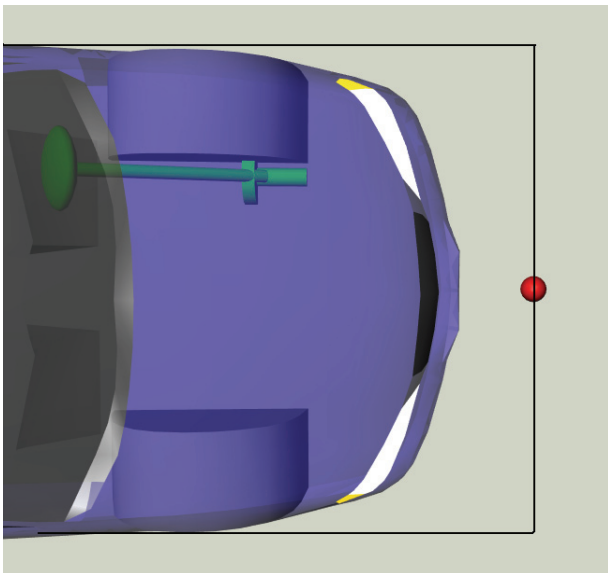


Figure 1 – Vehicle exterior dimensions are defined by red spheres in the Vehicle Editor.

5. EDSMAC4 uses the dimensions defined by the vehicle rectangle (see Figure 1) when its collision model calculates collision forces. CD-DS uses the actual vehicle mesh. Thus, it is possible for CD-DS to sense the start of a collision several timesteps AFTER the collision started. Because CD-DS uses the initial contact period to establish the primary contact surface (e.g., Front, Right, Back or Left), the primary contact surface may not get set. If this occurs, it is not possible to generate a CDC or damage profile for the vehicle.

6. CD-DS uses the exterior vehicle dimensions (again, see Figure 1) to sense that a collision is eminent. This, in turn, starts the acceleration and delta-V calculations. This approach works fine when the force is calculated using a mesh (as it is in SIMON/DyMESH), as there is almost always at least one timestep before the collision. However, when the force and resulting speed change are based on the vehicle rectangle (as it is in EDSMAC4), the simulation time accumulated before impact gets included into the delta-V and acceleration calculations. Thus, the delta-V and acceleration displayed by CD-DS may be too large (the error is dependent upon the length of simulation time and the change in speed before collision).

7. The traditional EDSMAC4 Damage Data output report uses the direction of the *peak acceleration* vector during a collision to calculate the PDOF. CD-DS uses the direction of the *peak collision force* vector. This latter approach has two significant advantages: First, the direction of the acceleration is affected by tire forces; thus, for relatively minor collisions wherein tire forces are a significant portion of the total force, CD-DS produces a more accurate value for PDOF. Second, for multiple, simultaneous impacts, there are multiple PDOFs. It is not possible to assign multiple PDOFs for a simultaneous impact based on the vehicle's acceleration. The difference in the traditional and CD-DS methods may result in slightly different PDOFs. However, the CD-DS approach is considered superior for the above reasons.

There is no question that the new CollisionData approach to calculating delta-V (that which replaces the traditional SMAC/EDSMAC approach) is far superior to the traditional approach (refer to the Summer 2006 Technical Newsletter which describes issues with the traditional approach that are all resolved using the new method). However, if you suspect any problem with CD-DS, you can still choose the traditional method for the Damage Data output report (see Calculation Options, Damage Data Format).

The above issues are complex and not easy to explain. We understand that, and we apologize. However, we have worked to shore up all of these anomalies, and all of the above issues have been resolved. A patch is expected for EDSMAC4 on November 14th. You can download the patch and receive a new license to run the patch for your HVE Version 8.2 software (the patch is for EDSMAC4; there are no changes to the HVE Version 8.2 system software).

As always, please call EDC Technical Support at 888.768.6216 or email support@edccorp.com if you have any questions or need assistance.