

Collision Deformation Classification - A Brief Review

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It has been apparent from examinations of visits to our website that many investigators/researchers are interested in the definition of the Collision Deformation Classification or CDC. So here is our brief review.

Many years ago, certainly by the 1950's when scientific analysis of motor vehicle collisions was at its infancy, researchers were looking for methods to describe the character and severity of vehicle damage. Initially they began categorizing photographs of similarly damaged vehicles and they developed a simplified coding scheme called the Vehicle Damage Index (VDI). This Index was then refined to the present day CDC.

The Collision Deformation Classification is a seven-digit alphanumeric coding such as "12FDEW-1". This coding sequence can be interpreted by examining the meaning of each set of variables that form the sum code.

For example the "12" is a clock value that defines the direction of the principal direction of force (PDOF). The "12" represents a force from the front directly rearward upon the vehicle. This force direction would occur in a typical head-on collision. A value of "06" would indicate a force directly from the rear in a forward direction. This would typically occur in a rear end impact. "03" represents an impact force from the right and "09" represents a force from the left.

The basic clock directions are then incremented by 20, 40, 60 or 80 depending on any end-shifting that might be present in the damage profile. For example a force applied at "02" to the a vehicle's front end could push the frontal structure to the left or outside of the original perimeter of the vehicle and this is called end-shifting. Such end-shifting would be described in the CDC by adding an increment such as 80 to the "02" such that the new value becomes "92".

The "F" of the CDC describes the general location of the direct damage zone, or deformation location. This direct damage could exist to the front end (F), right side (R), rear (R) or left side (L), and so on.

The "D" describes the specific longitudinal or lateral location of the direct damage within the previously specified Deformation Location. The "D" says that the damage is widely distributed across the complete front end of the vehicle. If the damage is in a narrower location then this can be changed to L, referring the left portion of the front end, C or to the centre of the front end, or R or to the right portion of the front end. So, if we had an impact to the front end from a 2 o'clock direction but only to the left third of that end, with no end-shift, then the CDC might be coded something like "02FLEW-1"

The "E" describes the general vertical position of the direct damage. The "E" represents a situation where there has been direct contact to both the bumper and grill of the vehicle or "everything below the belt line". In some instances there could be bumper over-ride for example when the bumper of a large transport tractor rides over top of a car's front bumper and the coding has to be changed to "M" meaning "Middle - top of frame to belt line or hood.

The "W" refers to the "Type of Damage Distribution". "W" would imply a wide area of damage. "N" would indicate an narrow area of damage. You could also see a coding of "E" which refers to contact to the very corner of the vehicle. A side-swipe might typically have an "E" coding assigned to it if the direct damage began at the vehicle's corner.

The "1" refers to the general extent or magnitude of the vehicle crush. For frontal impacts the distance from the centre of the vehicle's front bumper rearward to the bottom of the windshield is divided into five zones. The sixth zone would be any direct damage that penetrated as far as the windshield. Zone 7 would include any direct damage that extended beyond the windshield header (top of windshield). It would be rare to see broad frontal crush that goes as far as Zone 5. However many narrow contacts involving less than 50% of the vehicle's front end could cause deformation and direct contact into Zone 5.

The CDC is useful in examining the databases of NHTSA's NASS files or similar data gathered by Transport Canada. Presently the NASS system can be accessed directly on the internet and a fairly basic filtering page allows the analyst to select a variety of collisions of interest. It is possible to insert a CDC onto the filtering page and therefore select damage patterns of specific interest. Combining the CDC with the codings from the Occupant Injury Classification (OIC) allows the analyst a quick method of filtering to specific injury patterns matched with vehicle damage character and severity. Although the NASS files were designed to be used with the statistical analysis package called SAS, much analysis can be done through the simple filtering page.