SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
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SURFACE VEHICLE RECOMMENDED PRACTICE

An American National Standard

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Motor Vehicle Fiducial Marks and Three-dimensional Reference System

1. ***Scope—***This SAE Recommended Practice describes a procedure for locating the three-dimensional reference system on a motor vehicle as built.

1.1 **Purpose—**For complete motor vehicle dimensional checks, a method is required for locating the three-dimensional reference system on a motor vehicle so that points of interest (for example, driver eye location, seating reference point, centerline of motor vehicle, etc.) can be determined.

2. ***References—***There are no referenced publications specified herein.

3. ***Definitions***

3.1 **Three-dimensional Reference System—**The relationship of three orthogonal planes established by the manufacturers in the initial design stages of the vehicle that remain permanent (see Figure 1). The planes are used to determine dimensional relationships for components in and around the vehicle and are defined as follows:

3.1.1 ZERO "Y" PLANE—Centerline body zero plane is a vertical plane which passes through the longitudinal centerline of the car.

3.1.2 ZERO "X" PLANE—Vertical body zero plane is a plane normal to the "Y" plane. This plane is typically in front of the vehicle to eliminate the use of negative numbers.

3.1.3 ZERO "Z" PLANE—Horizontal body zero plane is a plane normal to the "X" and "Y" planes. Its relationship to the horizontal is determined by the fiducial mark. This plane is typically slightly above the ground for all loaded conditions to eliminate the use of negative numbers.

3.1.4 NEGATIVE COORDINATE—The negative direction is forward of "X" plane, left of the "Y" plane, and below "Z" plane.

3.1.5 COORDINATE DIMENSION—All points of interest are described as coordinate dimensioned from the intersection of the zero planes in the three-dimensional reference system. X, Y, Z coordinates are dimensioned to their respective planes.

3.2 **Fiducial Marks—**These are identifiable holes, surfaces, marks, or indentations, on the vehicle body, visible and accessible from outside the vehicle as described by the manufacturer.

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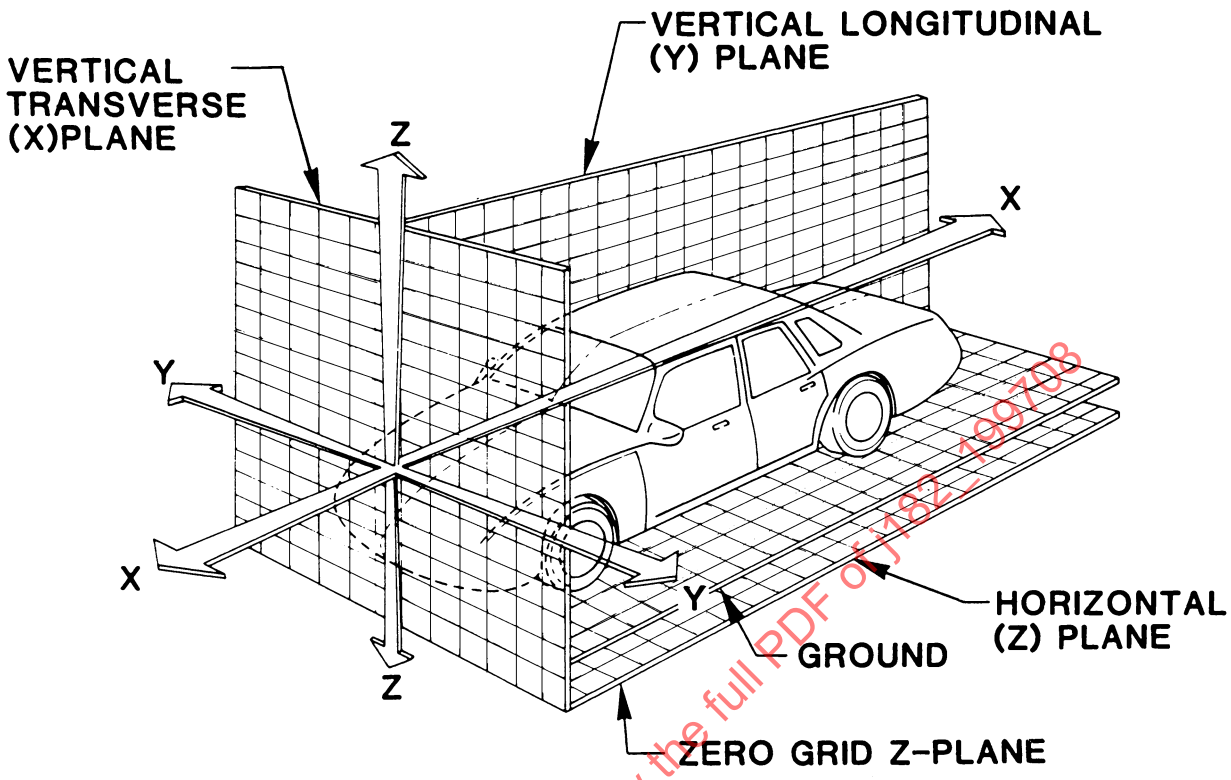

FIGURE 1—THREE DIMENSIONAL REFERENCE SYSTEM

4. ***Requirements—***The minimum of three fiducial marks shall be specified, one on each side of the "Y" plane (usually symmetrical for convenience) and an additional one forward or rearward of the first two, all as far apart as allowable and usable.

5. ***Procedure***

5.1 Position the motor vehicle on a level surface.

5.2 Adjust motor vehicle height and attitude to a ground reference plane as defined by the manufacturer according to the fiducial marks.

5.3 Locate the dimension reference system on the motor vehicle. Locations of interest can now be dimensioned in the actual motor vehicle with respect to the designed motor vehicle using coordinates in the three-dimensional reference system.

6. ***Notes***

6.1 **Marginal Indicia—**The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

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