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LAND SEA AIR SPACE

TECHNICAL REPORT J397a

CRITICAL ZONE FOR LABORATORY EVALUATION OF ROLL OVER PROTECTIVE STRUCTURES (ROPS) AND FALLING OBJECT PROTECTIVE STRUCTURES (FOPS) OF CONSTRUCTION AND INDUSTRIAL VEHICLES—SAE J397a

SAE Recommended Practice

Report of Construction and Industrial Machinery Technical Committee approved July 1969 and last revised January 1972.

1. Objective—To limit deflections within which the force, energy, vertical load, and impact resistance criteria of FOPS and ROPS can be met.

2. Description—The critical zone is shown in Fig. 1. It is a rectangular approximation of the normal seated position of a 74 in, 215 lb (188 cm, 963 N) operator. It is based on the seated dimensions of a 95th percentile clothed man, with hard hat, as given in SAE J833 and SAE J925.

3. Accuracy—All lengths and positions in this recommended practice shall be within ±0.5 in (13 mm) of that specified.

4. Location

4.1 The transport seat shall be adjusted to the rearmost position first and then to the lowest position. The position of seats with suspension systems shall include that static deflection of the suspension system which a seated operator of the above description would impose on the suspension system (all mechanical, hydraulic, or gas elements to be at the manufacturer's recommended settings for this size operator).

4.2 Any seat having rotational adjustment about a transverse or vertical axis shall be at the middle position possible when determining the seat reference point (SRP).

4.3 A seat reference point (SRP) and axis (SRA) shall be located as follows:

(a) The SRP shall be in the middle vertical plane which is parallel to the longitudinal axis of the seat.

(b) The SRP shall be at the intersection of the following two lines in this plane (Fig. 2):

HH—The horizontal line which is tangent to the highest point of the seat cushion in this plane.

VV—The vertical line which is tangent to the most forward point of the seatback in this plane.

(c) The SRA shall be that line which is perpendicular to the middle, vertical longitudinal plane of the seat and intersects that plane at the above defined SRP.

4.4 The critical zone (Fig. 1) shall be positioned so its SRA coincides with the SRA defined in paragraph 4.3. The critical zone shall be centered transversely in the seat, and the principal axis of the critical zone shall be parallel to lines HH and VV of Fig. 2. (This positioning takes nominal compression of the seat cushion and back into account.)

4.5 The location of the critical zone shall remain coincidental with the SRA even though that line may move during any or all of the laboratory loadings.

5. Application

5.1 Intrusion of non-ROPS elements is not a violation of the critical zone.

5.2 **FOPS Loading**—The critical zone shall not be entered by any FOPS or ROPS member.

5.3 **Side and Vertical Loading**

5.3.1 The critical zone shall not be entered by any ROPS or FOPS member.

5.3.2 Static loading shall not cause the load side planes of the critical zone (Fig. 3) to extend beyond or intersect the simulated ground plane (SGP) defined as follows:

(a) Upper member to which the load is applied.

(b) Outermost point in the end view of the above member.

(c) Vertical line through the above point.

(d) Vertical plane parallel to the vehicle's longitudinal centerline through the above line.

(e) Rotate plane described in item (d), 15 deg away from the critical zone about an axis perpendicular to the point described in item (b). This establishes the SGP.

(f) SGP is established on an unloaded ROPS and shall move with member to which load is applied.

5.4 It is not required that the included volume of a four, or more, vertical member ROPS-FOPS need entirely envelop the positioned critical zone nor intended that a simple (two-post) frame be excluded as either a FOPS or ROPS.

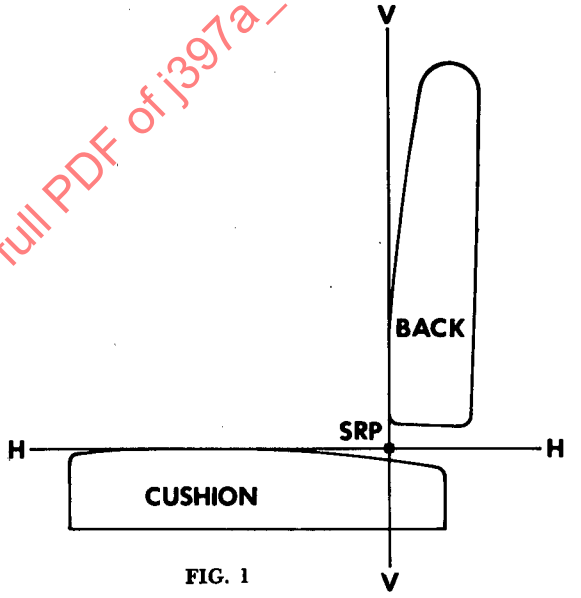

FIG. 1

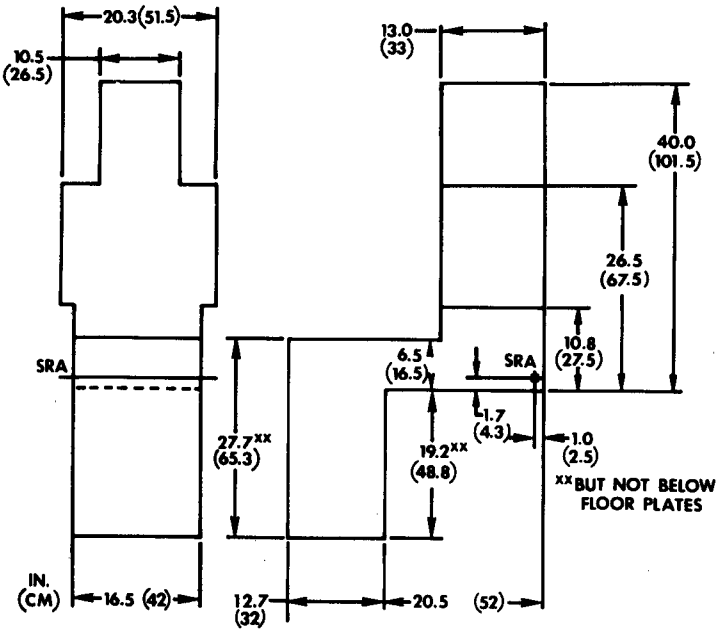

FIG. 2—SEAT REFERENCE POINT