The Engineering Society For Advancing Mobility Land Sea Air and Space®

A Product of the Cooperative Engineering Program

SAE J397 APR88

Deflection Limiting Volume — ROPS/FOPS Laboratory Evaluation

SAE Standard
Revised April 1988

Submitted for Recognition as an American National Standard

SAE The Engineering Society For Advancing Mobility Land Sea Air and Space ®
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OFF-HIGHWAY MACHINERY STANDARD

Submitted for recognition as an American National Standard

SAE J397

Issued July 1969
Revised April 1988

Superseding J397 FEB86

Ø DEFLECTION LIMITING VOLUME - ROPS/FOPS LABORATORY EVALUATION

1. INTRODUCTION:

This standard is technically similar to ISO 3164-1979. Portions relating to acceptance criteria have been moved to SAE J1040 APR88.

2. PURPOSE/SCOPE:

To establish limits on deflection permissible during laboratory evaluations of certain operator protective structures, such as ROPS and FOPS, as defined in other SAE reports including SAE J1040 APR88, J231 JAN81, and J1043 APR85.

3. DEFINITION:

The Deflection Limiting Volume (DLV) is an orthogonal approximation of a large, seated, male operator wearing normal clothing and a hard hat (see Fig. 1).

4. ACCURACY:

In practice, all lengths and positions shall be within ±13 mm of those specified or determined herein.

5. LOCATION OF DLV:

5.1 The seat shall be adjusted to the rearmost position first and then to the lowest position possible in the rearmost position. The position of seats with suspension systems shall include that static deflection a 100 kg seated operator would impose on the suspension system (all mechanical, hydraulic, or gas elements to be at the manufacturer's recommended settings for this size operator).

5.2 For machines, which have multiple seat positions, either rotatable or multiple locations, the seat location for mobile operation shall be used.

5.3 A locating point (LP) and locating axis (LA) shall be determined as follows:

5.3.1 The LP shall be in the middle vertical plane, which is parallel to the longitudinal axis of the seat.

5.3.2 The LP shall be at the intersection of the following two lines in this plane (see 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 seat back in this plane.

5.3.3 The LA shall be that line, which is perpendicular to the middle, vertical longitudinal plane of the seat and intersects that plane at the above defined LP.

5.4 The DLV shall be positioned so its LA coincides with the LA defined in paragraph 5.3. The DLV shall be centered transversely at the seat location, and its principal axes shall be parallel to lines HH and VV of Fig. 2. (This positioning takes nominal compression of the seat cushion and back into account.)

5.5 The location of the DLV shall remain coincidental with the LA even though that line may move during any or all of the laboratory loadings.

The phi (Ø) symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

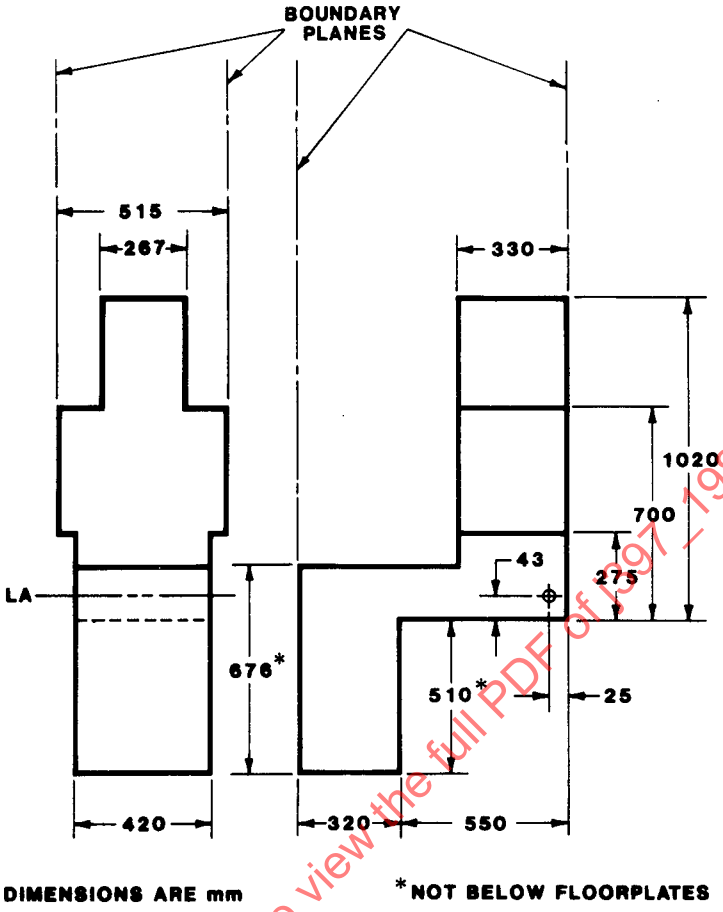

FIGURE 1 - Deflection Limiting Volume

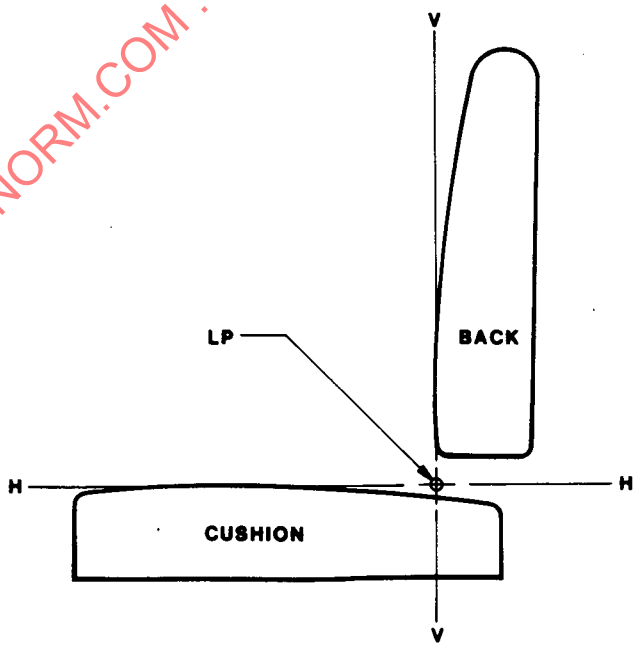

FIGURE 2 - Determination of Locating Point (LP)

RATIONALE:

This report is being revised in conjunction with SAE J1040. In essence, it will now describe only the DLV and its location. All acceptance criteria were essentially redundant with those in SAE J231, J1040 and J1043; therefore, they have been deleted from J397.

A clarification has been added for DLV orientation on machines having rotationally adjustable seats. This is to ensure that the position selected is usable (and the one most likely to be used) when the machine is in its transport or mobile mode.

One should recognize that ISO 3449 (FOPS), SAE J1043 and proposed revisions to SAE J231 require the FOPS to completely cover the vertical projection of the DLV. Therefore, paragraph 5.4 of J397b has been deleted.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

This standard is technically similar to ISO 3164-1979.

REFERENCE SECTION:

SAE J231 JAN81, Minimum Performance Criteria for Falling Object Protective Structure (FOPS)

SAE J1040 APR88, Performance Criteria for Rollover Protective Structures (ROPS) for Construction, Earthmoving, Forestry, and Mining Machines

SAE J1043 APR85, Performance Criteria for FOPS on General Purpose Industrial Machines

APPLICATION:

To establish limits on deflection permissible during laboratory evaluations of certain operator protective structures, such as ROPS and FOPS, as defined in other SAE reports including SAE J1040, J231, and J1043.

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