SURFACE VEHICLE RECOMMENDED PRACTICE

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Superseding J2426 JUN2015

(R) Occupant Restraint System Evaluation - Lateral Rollover System-Level Heavy Trucks

RATIONALE

SAE J2426 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

This SAE Recommended Practice describes the test procedures for conducting simulated dynamic lateral rollover restraint system tests for heavy truck applications. Its purpose is to establish recommended test procedures that will standardize restraint system testing for heavy trucks. Descriptions of the test set-up, test instrumentation, photographic/video coverage, and the test fixtures are included.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE J211-1 Instrumentation for Impact Test - Part 1: Electronic Instrumentation

SAE J211-2 Instrumentation for Impact Test - Part 2: Photographic Instrumentation

SAE J1727 Injury Calculation Guidelines

SAE Engineering Aid 23 "Users' Manual for the 50th-Percentile Hybrid-III Test Dummy," June 1985.

SAE CRP-9 "Heavy Truck Crashworthiness (Statistics, Accident Reconstruction, Occupant Dynamics Simulation)", March 1995.

SAE CRP-13 "Heavy Truck Crashworthiness (Phase III)", April 1997.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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For more information on this standard, visit
https://www.sae.org/standards/content/J2426_202103

2.1.2 Federal Publication

Available from the Superintendent of Documents, U. S. Government Printing Office, Mail Stop: SSOP, Washington, DC 20402-9320.

Code of Federal Regulations, Title 49, Part 571.208. Occupant Crash Protection

Code of Federal Regulations, Title 49, Part 572 Anthropomorphic Test Devices

3. ANTHROPOMORPHIC TEST DEVICES

For the dynamic lateral rollover tests described in the following sections, restraint systems should be evaluated with the aid of an anthropomorphic test device (ATD). The ATD should be of a type that will closely represent the size, weight, and articulation characteristics of a 50th percentile male in a seated position. Examples of such a test device include the Hybrid-III and Euro SID2 with rib extensions, 50th percentile male ATDs. The ATD should be selected appropriately based on the orientation of the seat relative to the direction of travel and the purpose of the test. The physical characteristics, calibration and measurement capabilities of these ATD's are described in 49 CFR 572 subparts E and U."

ATDs of other sizes (i.e., 95th-percentile male, 5th-percentile female, etc.) may be used to evaluate restraint performance for various occupant sizes.

4. DYNAMIC LATERAL ROLLOVER SIMULATOR TESTS

For the simulated rollover tests, all interior cab components that are potential occupant contact surfaces shall be installed on the test fixture with the proper geometrical relationships. Wherever practicable, actual cab components should be used. If not, components with geometry and performance characteristics near those expected for production should be installed in the test fixture. Seat tethers should be set according to the manufacturer's specifications. The primary purpose of the rollover simulator tests is to evaluate restraint system performance, occupant excursion, and occupant interaction with interior components when subjected to the vehicle dynamics from a representative 90 degree lateral rollover crash.

4.1 Lateral Rollover Simulator Test Fixture

For the lateral rollover simulator test, a fixture with a single-degree-of-freedom rotational axis is required. The pivot point, through which this rotation occurs, shall represent the appropriate outboard tire/ground contact point for the roll direction being examined. All seat, restraint, and interior component hardware should be installed on the test fixture in the proper locations relative to the pivot point for a given heavy truck cab design. For this test configuration, an angular deceleration pulse is applied to the test fixture after the fixture has rotated through an angular displacement of 90 degrees. A schematic of this test fixture is presented in Figure 1. Wherever possible, the pre-deceleration roll history of the fixture should represent real-world data.

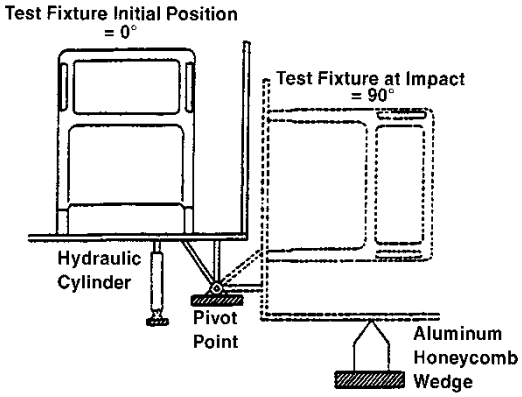

FIGURE 1 - LATERAL ROLLOVER SIMULATOR TEST SCHEMATIC

4.2 Generic Rollover Simulator Deceleration Pulse

Wherever possible, vehicle-specific deceleration pulses should be used. Vehicle-specific deceleration pulses may be used from full scale vehicle tests, provided pulse measurements were made inside the vehicle cab. If a vehicle-specific pulse is not known, then a generic angular deceleration corresponding to the following analytical expression should be used.

$$\alpha(t) = \frac{1}{2}\alpha_p\left(1 - \cos\left(\frac{2\pi}{T}t\right)\right) \quad \text{(Eq. 1)}$$

where:

α_p = 6875 degrees/s^2

T = 0.05 s

Typical angular acceleration-time and angular velocity-time curves are presented in Figure 2 and Figure 3, respectively.

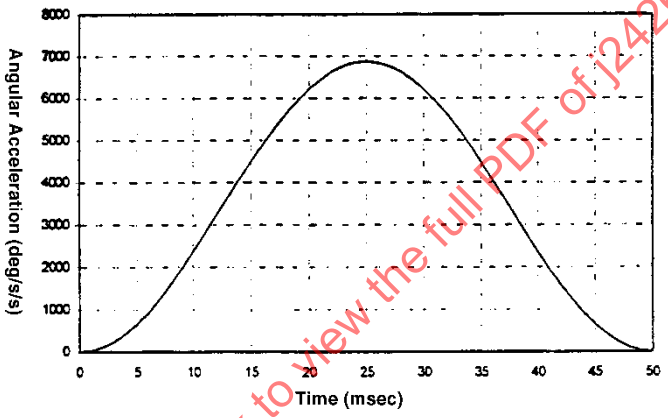

FIGURE 2 - GENERIC DECELERATION PULSE FOR LATERAL ROLLOVER SIMULATOR TEST

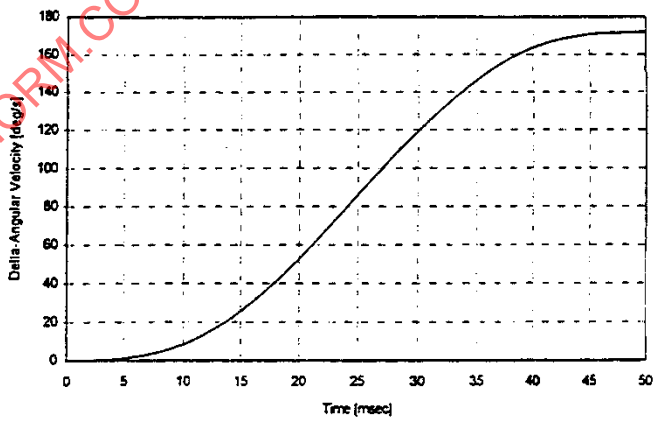

FIGURE 3 - GENERIC ANGULAR VELOCITY - TIME HISTORY FOR LATERAL SIMULATOR TEST