



BSI Standards Publication

Road vehicles — Calculation processes for the neck injury criteria in rear impact

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National foreword

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**Road vehicles — Calculation
processes for the neck injury criteria
in rear impact**

*Véhicules routiers — Méthodes de calcul des critères lésionnels au cou
en choc arrière*





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Foreword

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ISO/TR 13330 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Passive safety crash protection systems*.

Road vehicles — Calculation processes for the neck injury criteria in rear impact

1 Scope

This Technical Report recommends calculation procedures for several neck performance criteria for low-severity rear impact that are found in the literature. This Technical Report does not recommend any particular criteria or provide injury risk curves since the mechanisms of whiplash injury are neither proven nor validated. Calculations given in this Technical Report apply to mid-size adult male dummies only.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

SAE J211-1:2003, *Instrumentation for Impact Test —Part 1: Electronic Instrumentation*

3 General recommendations

Raw data (unfiltered) must be used as input in the calculation process (including filtering as a first step) described below in this Technical Report.

Sign conventions and the reference frame are those described in SAE J211-1 and shown in [Figure 1](#).

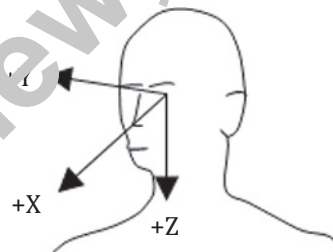


Figure 1 — Reference coordinate system

The positive x-axis will be directed forward.

The positive y-axis will be directed from the dummy's left to its right side.

The positive z-axis will be directed downward from head to toe.

For neck loads, polarities should be checked with the following manipulations:

- $F_x > 0$: head rearward, chest forward;
- $F_y > 0$: head leftward, chest rightward;
- $F_z > 0$: head upward, chest downward;
- $M_x > 0$: left ear toward left shoulder;