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**Road vehicles — Side impact testing of  
child restraint systems — Review of  
background data and test methods, and  
conclusions from the ISO work as of  
November 2005**

*Véhicules routiers — Essais de choc latéral pour systèmes de retenue  
pour enfants — Revue des données de référence et des méthodes  
d'essai, et conclusions du travail de l'ISO jusqu'en novembre 2005*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 14646 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Passive safety crash protection systems*.

## Introduction

ISO/TC 22/SC 12/WG 1 has been working on the definition of a side impact test procedure for child restraint systems. After meeting the deadline for finalisation of a third DIS version and with disapprovals (by a small margin) of the previous two DIS votings, it was decided to finalise the current project with a Technical Report and to restart the process of developing an international standard.

The aim of this Technical Report is to summarise the work done within ISO, and to compile additional relevant information to form a solid base for the restarted project.

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# Road vehicles — Side impact testing of child restraint systems — Review of background data and test methods, and conclusions from the ISO work as of November 2005

## 1 Scope

This Technical Report summarises the work within ISO to define a side impact test method for child restraint systems (CRS). It presents the main background data, and experiences from crash tests carried out during the process of development. Additional relevant data are also presented.

## 2 Accident statistics

The severity of injuries in side impacts depends on the seating position. It can be noticed that the severity of injuries is much higher for children sitting on the struck side than sitting on the non-struck side. The share of injuries on the non-struck side is comparable to frontal impacts, while the injury probability is much higher in struck side accidents, see Figure 1.

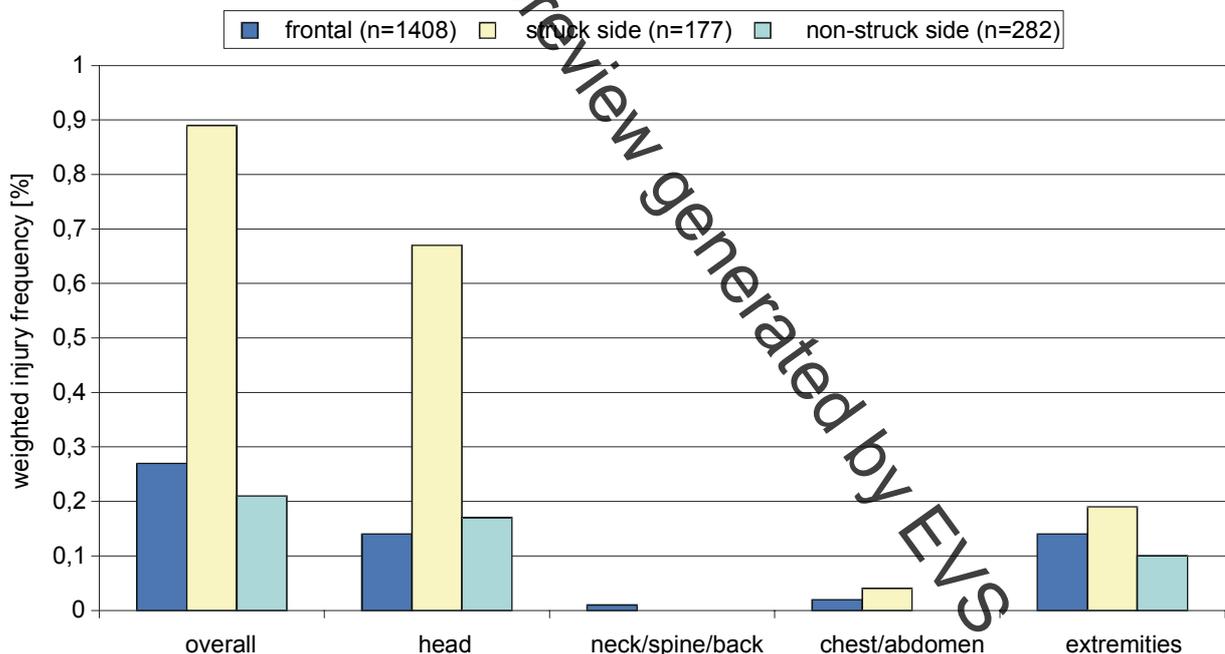


Figure 1 — Injury frequency depending on the impact direction [Arbogast, 2004]

Even when analysing all lateral impact accidents the relative number of children suffering MAIS 2+ injuries is much higher than for other impact directions, see Figure 2.