
**Road vehicles — Reduction of misuse
risk of child restraint systems —**

**Part 3:
Prediction and assessment of misuse
by Misuse Mode and Effect Analysis
(MMEA)**

*Véhicules routiers — Réduction du risque de mauvaise utilisation des
systèmes de retenue pour enfants —*

*Partie 3: Prédiction et évaluation des mauvaises utilisations par
MMEA (analyse des modes de mauvaise utilisation et de leurs effets)*





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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 36, *Safety and impact testing*.

This second edition cancels and replaces the first edition (ISO 13215-3:1999) which has been technically revised.

The main changes are as follows:

- added introduction;
- added references to ISO 13215-1 and ISO 13215-2;
- added coding of misuse modes;
- added references to scientific papers and other literature supporting the use of MMEA;
- revised MMEA use case;
- editorial improvements.

A list of all parts in the ISO 13215 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Whether or not adequate protection is provided to a child occupant in a vehicle crash depends not only on the inherent capability of the child restraint system to provide protection, but also on its proper installation and subsequent correct use. It is known that certain misuse configurations and interface problems can have serious consequences for child occupants in vehicle crashes.

A clear understanding of the kind and frequency of incorrect use has important implications for the design of child restraint systems and instructions for use, the vehicle in which they are used, education and loan programs, and legislation.

Reduction of misuse risk can be achieved in several ways. One effective way is to work in a systematic manner in the design phase of child restraint systems; to predict and evaluate possible misuse of the intended design, and to address possible misuse modes by an improved design. The MMEA method presented in this document has been developed to support this approach.

Road vehicles — Reduction of misuse risk of child restraint systems —

Part 3: Prediction and assessment of misuse by Misuse Mode and Effect Analysis (MMEA)

1 Scope

This document specifies a method to predict and quantify misuse of child restraint systems (CRS) called Misuse Mode and Effect Analysis (MMEA). Such misuse can degrade the performance of CRSs.

As a predictive method it is intended to be applied by CRS manufacturers at an early stage, before the CRS is put into use by consumers.

Being predictive implies the possibility of incompleteness and errors. Such errors can be reduced if the proposed method is supported by field studies (for example, according to ISO 13215-1) and panel method evaluation (for example, according to ISO 13215-2).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

child restraint system

CRS

free-standing device intended to provide child vehicle occupants with an approved restraint

Note 1 to entry: Child restraint systems comprise various categories, such as infant restraints, toddler seats, booster cushions and booster seats.

3.2

misuse

any deviation from intended application and use which might reduce the protective performance of the *child restraint system* (3.1)

3.3

ISOFIX

system for the connection of a *child restraint systems (CRS)* (3.1) to vehicles, which has two rigid anchorages in a vehicle seating position located near the seat bight, corresponding rigid attachments on the CRS, and a means to limit the pitch rotation of the CRS

Note 1 to entry: In this document, the term ISOFIX includes flexible CRS attachments (LATCH, UAS).