INTERNATIONAL STANDARD

ISO 16673

Second edition
2017-09

Road vehicles — Ergonomic aspects of transport information and control systems — Occlusion method to assess visual demand due to the use of in-vehicle systems

Véhicules routiers — Aspects ergonomiques des systèmes d'information et de contrôle du transport — Méthode par occlusion pour évaluer la distraction visuelle due à l'utilisation des systèmes embarqués

Reference number
ISO 16673:2017(E)

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 39, *Ergonomics*.

This second edition cancels and replaces the first edition (ISO 16673:2007), which has been technically revised.

The main changes compared to the previous edition are as follows:

— the accessibility has been changed from “unrestrained driver” to “buckled driver” in 3.1;

— the following paragraph has been added in 4.1: “Written instructions should not be visible to the participants during task performance or they should be visible to the participants during the whole task performance, i.e. also during occluded intervals”;

— Annex B has been added.

Introduction

A wide range of information and communication devices and advanced driver assistance systems are being introduced into motor vehicles. These include navigation aids, emergency messaging systems and wireless communication including email and internet access, which are all accessible to the driver of a motor vehicle. Many of these features have associated visual information that can potentially both inform and distract. To help ensure that the use of such devices and features that are meant to be used by the driver while driving do not result in excessive visual demand, a consistent, verifiable and repeatable method to determine the visual demand imposed by such in-vehicle systems is needed.

Developing precise mathematical predictions of the risk of a crash due to driver distraction from using a particular driver interface is difficult. However, it can be reasonably stated that if drivers are not looking at the road (e.g. looking inside the vehicle to operate a control or read a display), then the probability of a crash is increased[5].

This document is not intended to preclude direct measurement of eye glances as a method to assess visual demand. Direct measurement of eye glances is always desirable. However, direct measurements of eyes-off-the-road times, i.e. glance time measurements, are typically difficult and very costly to measure. The occlusion method estimates visual demand, including resumability, of a task using a means for intermittent viewing of the in-vehicle system. Evaluation by occlusion identifies driver interfaces that are likely to take the driver's eyes away from the road for excessively long durations. Additional data collected without occlusion can be combined with occlusion data to calculate *R*, a measure believed to identify whether or not tasks can be easily resumed after the driver interrupts the task to look back at the road. This procedure does not require extensive resources and can be applied if a functioning prototype of the driver interface exists.

Road vehicles — Ergonomic aspects of transport information and control systems — Occlusion method to assess visual demand due to the use of in-vehicle systems

1 Scope

This document provides a procedure for measuring visual demand due to the use of visual or visual-manual interfaces accessible to the driver while the vehicle is in motion. It applies to both original equipment manufacturer (OEM) and after-market in-vehicle systems. It applies to both permanently installed and portable systems. It applies to any means of visual occlusion and is not dependent on one specific physical implementation.

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 terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
driver accessible
interface controls necessary to complete the *task* (3.11) that are within the reach of the buckled driver and the interface display is visible with a head movement, and the system is operable by the driver

Note 1 to entry: See ISO 3958[1] for the driver reach of the restrained driver, and SAE J1050[3] for the head movement.

Note 2 to entry: The driver interface includes the visual display and any relevant controls.

EXAMPLE A nomadic or portable device such as a PDA outside of the reach of a restrained driver is still considered driver accessible if within the reach envelope of a buckled driver.

3.2
glance duration
time from the moment at which the direction of gaze moves towards a target (e.g. the interface display) to the moment it moves away from the target

Note 1 to entry: This includes the transition time to that target as shown in Figure 1, simplified from ISO 15007-1:2014, Figure A.2[2].

Note 2 to entry: A single glance duration may also be referred to as a glance.