

Distr.: General
31 August 2018

Original: English only

Economic Commission for Europe

Inland Transport Committee

Global Forum for Road Traffic Safety

Group of Experts on Road Signs and Signals

Sixteenth session

Geneva, 4-5 September 2018

Item 2 (a) of the provisional agenda

Programme of Work: Taking Stock of National Legislation:

**Sign to communicate the need to crash through gates (barriers)
by a vehicle when trapped at a level crossing**

**Sign to communicate the need to crash through gates
(barriers) by a vehicle when trapped at a level crossing**

Submitted by Forschungsgesellschaft Strasse-Schiene-Verkehr (FSV)

This document was prepared with the aim to facilitate the discussion on the sign to communicate the need to crash through gates (barriers) by a vehicle when trapped at a level crossing.

Break barrier sign for road/rail level crossings

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0 Introduction

As decided by the United Nation's Group of Experts on Road Signs and Signals¹⁾(EGRSS) in it's 15th session (2018), a "Sign to communicate the need to crash through gates (barriers) by a vehicle when trapped at a level crossing" - should be developed. The proposed sign below constitutes an update to an earlier proposal²⁾ by the author, presented to the EGRSS at the 9th Session in 2016 in Geneva.

The proposal consists of four variations (A), (B), (C) and (D), to which the Experts of the Group are invited to take decisions in order to choose the variant(s) to be integrated in the Convention³⁾, considering the following explanations and questions posed at the end of this document.



1 General characteristics

1.1 Sign category

Category Emergency Escape- since the sign has the function of notifying on the requirement to drive through the barriers in case of entrapment on railtracks caused by closed barriers, the main colour code has to follow the internationally used convention for escape routes (white on green ISO 3861-1, from which e.g. the Convention's³⁾ G, 23 and G, 24 are derived).

1.2 Format

The height-to-width ratio of the sign is set to create a horizontal rectangular shape, in order to fit, when mounted onto the barriers, if possible without protruding beyond the dimension of a barrier in order not to create a danger of e.g. entanglement or injuries.

1.3 Conspicuity

As the sign is required to function in a situation of utmost stress imposed onto a driver due to the situation exposed to, the sign needs to be noticed immediately. Therefore a white contrast rim of sufficient dimension around the perimeter of the sign is placed to allow for maximum conspicuity⁴⁾.

1.4 Discrimination

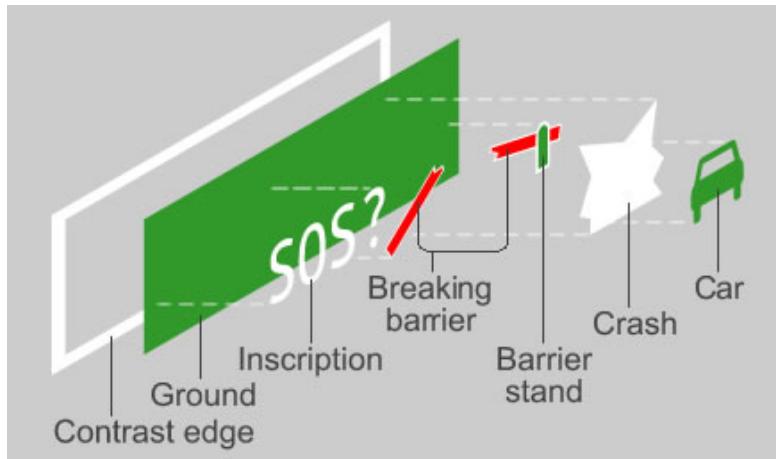
In this proposal, in order to achieve required discriminability of graphical components, a design method⁵⁾ was employed (as presented at the EGRSS' 5th session), which also allows for the precise estimation of discriminability for each graphical component in relation to visual acuity (visus) and

viewing distance. Due to this, the actual dimension of the sign can be calculated, and is proposed later on. The method additionally is in conformity with design requirements for LED-Matrix and screen displays – in case such instead of sign plates are used for display of the sign.

1.5 Comprehension

The graphical components used are chosen due to their reminiscence to symbols and meanings known from other signs in order to allow for easy and solid comprehension. To allow for comprehension of the sign's intended meaning in this stressful situation, the total number of graphical components of the sign's image content is kept as low as possible.

2 Graphical components



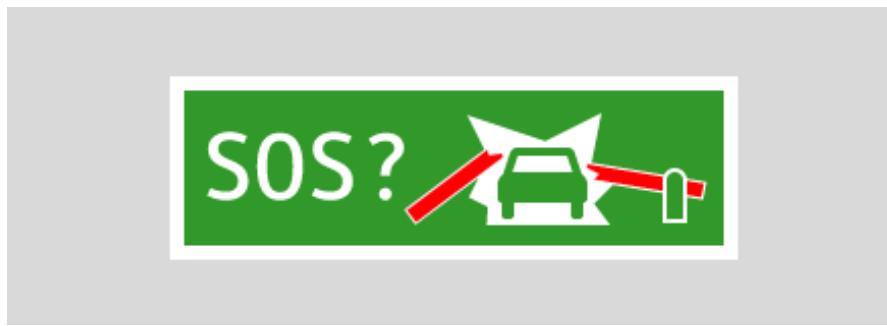
Denomination of graphical components

2.1 Inscription "SOS"

The widely used acronym S.O.S., which, in combination with symbols such as "Telephone", refers to facilities or actions needed to overcome a dangerous situation (e.g. F, 17 "Emergency telephone"). The same pattern of [if] <in danger> (and in need of escape as emphasized by the green colour) , [then] <break barrier> is used for the sign discussed here, see (B). To further emphasize the [if] - [then] pattern, in (C), a question mark is added.

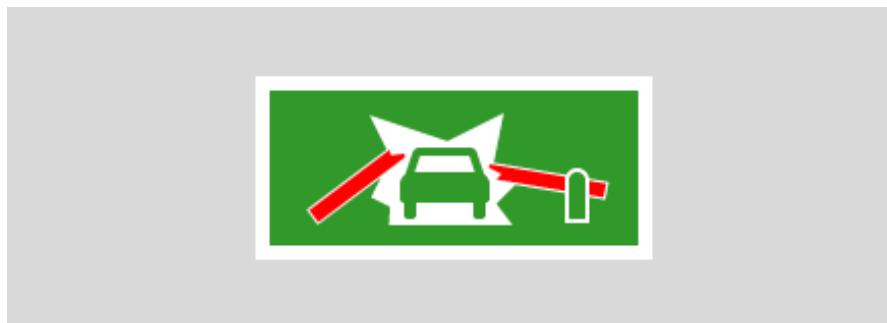


TS0164 (B)



TS0164 (C)

It might be advised that 10 years after the sign has been introduced in a country, the text should no longer be used on the sign (see A), since the sign's meaning should have been learned and known by that time of exposure to the public. The typeface used for the inscription has been tested⁶⁾ and represents latest state of the art concerning the legibility of inscriptions in road traffic conditions.



TS0162 (A)

2.2 Figure "Crash"

The concept of this figure is widely used, such as in escape route signage, where the requirement to break a window in order to escape to safety is indicated. Due to this, it is anticipated that comprehensibility of this figure is adequate in relation to the context of intended use in the Break barrier sign.

2.3 Figure "Breaking barrier"

Due to the several options a country has to colour a barrier in order to be conspicuous, it seems to be wise to choose a simplified design of the barrier for depiction in the sign (as provided in A, B, C), while this also allows for less detail in the sign in total, fostering comprehensibility. For comparison, an example showing a two-coloured barrier is provided, see (D).



TS0164 (D)

2.4 Figure "Car"

In the Convention, this often used passenger car in rear view is a device to help represent a driving situation that requires measures to be taken by a driver (as in A, 9 "Slippery road" or C, 13a "Overtaking prohibited"). In the case of the Break barrier sign, this figure is employed building on the same pattern of use: It shows, together with the figure "Crash" the action to be taken when trapped on railroad tracks between closed barriers.

2.5 Element "Barrier stand"

This component is part of the figure "Breaking barrier". Being an element of lesser importance for the understanding of the meaning of the sign, its rendering is constituted by a white outline only.

3 Dimensions

Taking into account a workable visus of 0,73 (a driver may have visus 0,5 even when wearing corrective glasses to be eligible to receive a driving licence⁷⁾) for the calculation if viewing distances, the minimum dimension of the Break barrier sign is 232,5 x 75 mm, whereas even the smallest graphical figures are discriminable from 8,4 m or less. In case the barrier is farther away, e.g. due to the tracks intersecting the level crossing at an angle, 465 x 150 mm laid out for a viewing distance of 16,7 m (or less) may be proposed. In any case, if the design method⁵⁾ is employed, viewing distances can be calculated as required. Above dimensions relate to variations (C) and (D). Sign variations with less (B) or no (A) inscription deviate from above indicated sign width by becoming less wide.

232,5 x 75 mm

Graphical components	Inscription	Breaking barrier (i)	Crash	Car	Barrier stand	Contrast strip of (i)	Contrast edge
Smallest detail (mm)	3,33	5,83	7,50	3,33	1,67	0,83	5,83
Viewing distance (m)	8,36	14,63	18,81	8,36	4,18	2,09	14,63

Viewing distances considering sign dimension 232,5 x 75 mm

465 x 150 mm

Graphical components	Inscription	Breaking barrier (i)	Crash	Car	Barrier stand	Contrast strip of (i)	Contrast edge
Smallest detail (mm)	6,67	11,67	15,00	6,67	3,33	1,67	11,67
Viewing distance (m)	16,72	29,27	37,63	16,72	8,36	4,18	29,27

Viewing distances considering sign dimension 465 x 150 mm

4 Questions

Concerning "SOS" inscription:

- i) With or without question mark: Should the inscription ("SOS") be shown without question mark (as in variation (B) or include the question mark, as in (C)?
- ii) No inscription: Should the sign bear no inscription at all, or should the inscription be omitted ten years after introduction in a country? See (A).

Concerning figure "Breaking barrier"

iii) Should the figure be of one colour, or should it be two-coloured, such as in variation (D)?

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5 Endnotes

1) Group of Experts on Road Signs and Signals (2018) Report of the Group of Experts on Road Signs and Signals on its fifteenth session. Geneva: United Nations.

<http://www.unece.org/fileadmin/DAM/trans/doc/2018/wp1/GE2/ECE-TRANS-WP1-GE2-30e.pdf>

2) Egger S (2016) Level crossing signs proposals analysis. Wien: IIIDre

<http://www.unece.org/fileadmin/DAM/trans/doc/2016/wp1/GE2/ECE-TRANS-WP1-GE2-2016-PRESENT-01e.pdf>

3) Economic Commission for Europe, Inland Transport Committee (1968/1995). Convention on Road Signs and Signals, done at Vienna on 8 November 1968. Wien: United Nations.

4) Conspicuity: Wertheim A H (1989). A quantitative conspicuity index: theoretical foundation and experimental validation of a measurement procedure. Report C-20 (in Dutch). TNO Human Factors Research Institute, Soesterberg, The Netherlands.

5) MOA Design Method: Egger S (2011). Surrounding traffic info and warning visual and audio signs. Deliverable D5.5 Safeway2school. Wien: IIID
http://www.unece.org/fileadmin/DAM/trans/doc/2015/wp1/GE2/ECE-TRANS-WP1-GE2-_2015-Presentation-01-Rev.pdf

6) Tern typeface: Smuc M, Windhager F, Siebenhandl K, Egger S (2007) Impaired Visibility Typeface Test. Wien/Krems: IIID/DUK

7) Driving licence: European Commission, Annex III of Council Directive 91/439/EEC of 29 July 1991 on driving licences requires: "Group 1 (drivers of vehicles of categories A, B and B+E and subcategory A1 and B1): (6.1.) Applicants for a driving licence or for the renewal of such a licence shall have a binocular visual acuity, with corrective lenses if necessary, of at least 0,5 when using both eyes together." Comment: Since visual acuity of 0,5 requires oversized sign dimension not applicable, visual acuity of 0,73 was adopted for use.

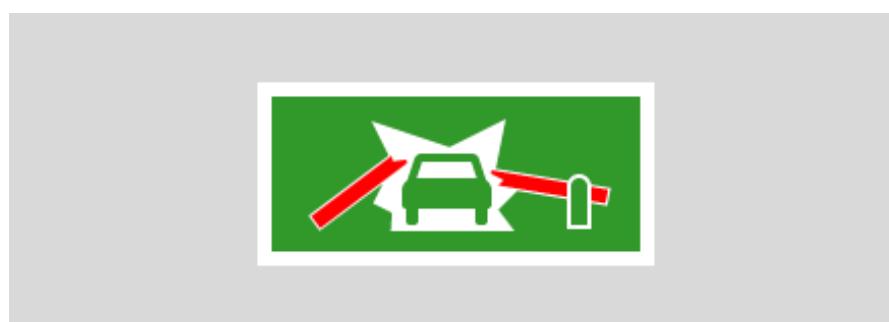
5.1 Proposal variations overview



TS0164 (C)



TS0164 (B)



TS0162 (A)



TS0164 (D)