

SEVENTH FRAMEWORK PROGRAMME
SUSTAINABLE SURFACE TRANSPORT (SST)-2008-RTD-1



Integrated system for safe transportation of children to school

Title **Survey on school bus- and school bus stop pictograms in use**

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Summary The following collection of signs/symbols/pictograms is based on a survey which was conducted to find examples of signs in use, bearing pictograms to identify/signal school buses and school bus stops. The aim of this paper is to provide sufficient background knowledge to derive insights for the planned development of a school bus- and school bus stop pictogram.

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1. Introduction

The following collection of signs/symbols/pictograms is based on a survey which was conducted to find examples of signs in use, bearing pictograms to identify/signal school buses and school bus stops. The aim of this paper is to provide sufficient background knowledge to derive insights for the development of a school bus- and school bus stop pictogram. These are planned to be enhanced for comprehension (understanding) and early discrimination/long distance “legibility”. Furthermore, the pictograms are to be prepared to serve with optimum functionality, regardless if used on a conventional sign plate, LED display (VMS) or screen (e.g. of an in-car navigation device).

Due to indications, for instance, found in the Austrian practice, being that the school bus signs (and often, the school bus stop signs) visual content relate to the depiction of juveniles in the danger warning sign “children” employed in the same country, it is obvious that the scope had to be widened to additionally accommodate these signs from as many cultures as possible.

Moreover, to complete a holistic view on the issue, several pictograms of prominent standards and systems were compiled to illuminate state of the art methods to graphically represent the concepts of “children”, “running” and “bus”.

As a first preliminary result it can be stated that the graphical representation of “children” varies strongly from country to country, even from province to province, and that in the development of these pictograms visual aspects of comprehension, discrimination and conspicuity were not considered adequately.

2. Definitions

Adapted from (sources, 95) and extended to meet the needs of this document.

Comprehension	Understanding of the underlying meaning of a sign.
Discrimination	See legibility.
Detail, graphical	Attachments to graphical elements, mainly found in silhouette shaped graphical figures, as to exhibit aspects usually not relevant for conveying its meaning.
Element, graphical	Parts constituting (belonging to) a graphical figure, eg an arm, leg or head.
Enclosure	Part of a sign to enclose a pictogram. Shapes of enclosures, as eg used in the road signage system (sources, 38) are to convey additional information, classifying the meaning of a pictogram and constituting a message- for instance, a triangle is to convey warning of a danger specified by the pictogram.
Example	One of the signs compiled in this document.
Figure, graphical	A visual figure, eg the black “bus” of example 84. One or more graphical figures constitute the image content of a pictogram, such as the two children of example 65.
Image content	All elements of a pictogram and their relative disposition.
Legibility	The property of characters and symbols which enables one to be to be discriminated from the other.
LED	Light Emitting Diodes
Pictogram	A visually perceptible representation of a particular meaning in pictorial, symbolic form
Sign	A configuration of a pictogram and its enclosure – produced to convey a given message, e.g. a road sign.
VMS	Variable Message Sign, employing LED technology

3. Discussion

Reviewing the examples collected, several aspects are to be fulfilled by the visual content of an appropriate school bus- and school bus stop pictogram, to secure its enhancing effect on the safety of children on their way to school.

3.1 Emphasis on danger

A more dynamic visualization of the concept of running children underlines the danger of the situation. Examples for less appropriate designs showing slowly and carefully progressing children are given in section 6: 0–4, 6, 8–13, 16, 18–25, 28, 32–46, 48–50, 52–54, 56, 59, 61–64, 68, 70, 72–92. Conveying danger by more dynamic, vigorous movement depiction: 5, 7, 14, 15, 17, 26, 27, 31, 47, 51, 55, 57, 58, 60, 66, 67, 69, 71. Very important here is the nature of the shown movement, which is deemed to be even more successful in conveying the “danger” aspect, if the motion appears as seemingly under little control by the figures shown. This attribute is found in examples: 15, 31, 47, 55, 58, 66, 69, as they display either very fast movement and/or a forward-leaning position as if a stumble or fall is imminent, and/or the two figures depicted do not provide support to each other, as to be unable to prevent a fall, or pull back in case of a car crossing their path. Now, as 15, 31 and 58 bear the same image content, 47, 55, 58, 66 and 69 remain for further examination.

Concerning the collected school bus stop sign pictograms (examples 27 to 37), only number 31 is capable of conveying this aspect.

3.2 Clarity of the graphical content of a symbol

Pictogram “children”: Details found in collected examples, such as female attributes like a pony tail hairstyle (sometimes complete with ribbon) or a skirt, or male ones like shorts obscure the clarity (discrimination) of a pictogram, if perceived from great distance while moving at considerable speed (as a driver of an approaching car would). Accessories, such as carried bags do the same- all these details virtually blend into one another if the rule of visual distance (elements that belong to one figure should be closer to one another to separate it from another figure) is not obeyed. As the space available for a pictogram can not be increased to prevent details from blending, everything which is not essential for the recognition of a symbol should be omitted. Transferring this to the symbol examples, 47, 55 and 66 remain for investigation.

For the school bus stop sign, it is clear that most examples found rely mainly on the depiction of a bus, as it is regulated in the Vienna Convention (sources, 38), sign E, 15 “Bus Stop”. As the meaning of the bus figure (side view) is learned in driving school, and has also been evaluated for comprehension in its form as shown in examples 84 and 85, this graphical figure should be considered.

The reasoning of the following is supported by ISO/TC145/SC1 and Preis, K. (sources, 96 & 95):

3.3 In favor of a reduced number of graphical elements

To symbolize the content to be conveyed, 47, the Estonian example for “children” has to be excluded from further review, despite its ability to convey the wildness of the children’s dash. Too many elements of almost equal weight will blend into one another if seen from great distance. Arms and legs act unintentionally as connections between the two figures, obscuring clearly distinguishable shapes.

55, the example from India, employs only one figure – one pupil in side view, running – to reduce the number of elements. Still, two factors stand against this example: if this pictogram undergoes a necessary graphical improvement for a reduction of details, the concept of the “child” can not be conveyed. A missing second figure shown in different size (representing a younger or older child) would help the observer to properly comprehend the intended meaning.

Bus: as they are the most reduced exponents of this graphical figure, examples 84 and 85 show the lowest count of elements.

4. Conclusion

4.1 Pictogram “children”

The example found in Portugal (66) represents the pictogram proposed for further development, fulfilling all prerequisites stated above. Moreover, it has the advantage of closely relating to the existing school bus symbol and attention children warning sign, as in general, they share the same image content. Therefore, traffic participants are expected to recognize it, understand its meaning with ease, and connect it to the underlying regulations governing the behavior towards a vehicle bearing such a sign.

4.2 Pictogram “bus”

For the school bus stop pictogram, the graphical figure of the “bus”, as in examples 27, 28, 30–37, 84 and 85 might be of value. Four out of eight examples collected prefer a bus in frontal view, while another four are in

favor of the bus being seen from the side, following the symbol “E, 15” standardized in the Vienna Convention (sources, 38) to signal a bus stop. The front view bus has its advantage in its dense dimensions, making it easy to compose a concise pictogram, the side view is accounted for in terms of understanding in examples 84 and 85. Therefore, 85 should be considered for further development.

5. Further research

5.1 Relevant regulations

As it is of highest importance to harmonize the rules of behavior attached to the encounter of the signs in question throughout Europe, the related regulations of all EU countries should be collected and compared for the school bus sign, the school bus stop sign, bus stop sign and the “children” danger warning sign. There are indications on differences, as e.g. the Dutch regulations (see sources, 61) identifies the “children” sign as “J21, School crossing”, which conflicts with its prescription in the Vienna Convention (sources, 38): “(a) Warning of a section of road frequented by children, such as the exit from a school or playground shall be given by symbol A, 13”. Regulations for the other mentioned signs might differ as well between countries.

5.2 Sign combinations

As shown, many countries rightly employ the Vienna Convention’s Sign “E, 15” to signal a bus stop. However, in that document there is no behavior prescribed to be followed by a car driver when confronted with this sign- this is deemed to be found in the national laws of each country applying the Vienna Convention’s statutes. Research is to be carried out on this matter- nevertheless, the meaning of “E, 15” is well known since it is being taught in driving schools, and the “bus” figure is standardized in ISO 7001 (sources, 85). To improve the warning character of a bus stop, nothing stands against the employment of an additional sign to give warning on the possibility of children in close vicinity on the respective signpost. A method as proposed would, according to the Vienna Convention, look like the following coarse montage:



94 Bus stop and warning children sign

Through this reasoning, further questions arise:

If the “bus stop” sign does not imply, due to its backing regulations, more safety for school children, should it be used? And if so, can the danger warning sign “children” (in rural areas) substitute the “bus stop” sign, and be the only sign on a signpost to inform about the possible presence of children nearby? In urban surroundings, it could be the symbol to be added to a given bus stop sign.

5.3 Related project: Bus signage trial in Aberdeenshire, Scotland

<http://www.aberdeenshire.gov.uk/news/release.asp?newsID=1398>

Excerpt: “The trial will run on Meldrum Academy services until the 2010 summer holidays, enabling the effectiveness of the signs to be tested in a range of daylight conditions by a range of methods.”

It is advised to contact the proprietors of this trial to exchange information on recent developments, and share results.



6. Sign collection

6.1 School bus sign



0 UNECE



1 Austria



2 Austria



3 Austria



4 Belgium



5 Bulgaria



6 Czech Rep.



No Symbol
Denmark



7 Estonia



8 Finland



9 France



10 Germany



11 Great Britain



No Symbol
Greece



12 Hungary



13 India



14 Israel



15 Italy



16 Japan



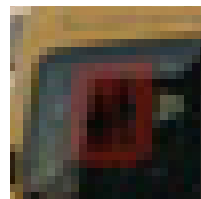
17 Latvia

No Symbol
The Netherlands

No Symbol
Norway



18 Poland



19 Portugal



20 Romania



21 Slovakia



22 Slovenia



23 Spain



24 Sweden



25 Sweden LED



26 Switzerland

No Icon used for
In-Car systems
TomTom

Sign used on LED
displays requested
SwarcoFutrit

6. Sign collection

6.2 School bus stop sign



27 Australia

No school bus stop sign
Austria

No school bus stop sign
Belgium

No school bus stop sign
Bulgaria



28 Canada

Regular bus line stops with additional writing „School Bus“
Czech Rep.

No school bus stop sign
Denmark

No school bus stop sign
Estonia

No school bus stop sign
Finland

Regular Bus stop sign
France



29 Germany

No school bus stop sign
Great Britain

No school bus stop sign
Greece

No school bus stop sign
Hungary



30 India



31 Italy

No school bus stop sign
Japan

No school bus stop sign
Latvia



32 Luxembourg

No school bus stop sign
The Netherlands



33 New Zealand

Regular Bus stop sign
Norway



34 Poland

Regular Bus stop sign
Portugal



35 Slovakia



36 Sweden

No school bus stop sign
Switzerland



37 USA

6. Sign collection

6.3 Danger warning sign "children"



38 Vienna Conv.



39 Australia



40 Austria



41 Belgium



42 Bulgaria



43 Canada



44 Chile



45 Czech Rep.



46 Denmark



47 Estonia



48 Finland



49 France



50 Germany old



51 Germany



52 Great Britain



53 Greece



54 Hungary



55 India



56 Ireland



57 Italy old



58 Italy



59 Japan



60 Latvia



61 The Netherlands



62 New Zealand



63 Norway



64 Norway



65 Poland



66 Portugal



67 Romania



68 Slovakia



69 Spain



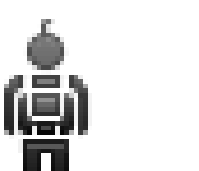
70 Sweden



71 Switzerland

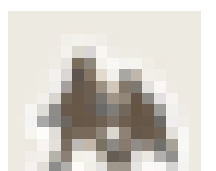


72 USA



73 TomTom

Sign used on LED displays requested SwarcoFuturit



74 Googlemaps

6. Sign collection

6.4 Representations of “running”, “children” and “bus”
 – as provided in standards
 – from best practice examples



75 ANSI



76 SID



77 In-Safety



78 ISO



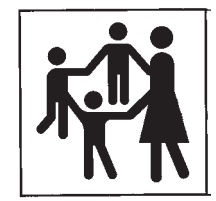
79 ÖBB



80 ÖBB



81 ÖBB



82 Ö Norm



83 Unknown



84 In-Safety



85 ISO



86 Austria



87 Austria



88 Czech Rep.



89 Germany



90 Germany



91 DB



92 DB



93 Slovenia

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