

Title: **Rules & Guidance for the Use of Warning Triangles to highlight points of unusual and unmitigated hazards on Engineering Drawings.**

SbD

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1.0 Procedure Summary

After review and discussion by industry groups, under the banner of Network Rail's initiative, "Safe by Design", it has been determined that there should be a consistent description for the appearance of the Hazard Warning Triangles used by designers on engineering drawings, and accompanying guidance on the use of such symbols to highlight hazards.

2.0 Scope

This procedure is intended to apply to all Network Rail infrastructure contracts that produce engineering drawings.

3.0 Definitions / Abbreviations

Hazard Warning Triangle	A symbol or picture that is recognisable as an ISO warning of a hazard.
Engineering Drawing	A drawing that is intended to be used in the construction of rail infrastructure by all functions – civil, electrical, mechanical, signalling, or track.
SHE Box	Boxes used on drawings to communicate information on safety, health and environmental hazards.
DRA	Designers Risk Assessment
CSM	Common Safety Method
ISO	International Organization for Standardization

4.0 Rules

4.1 Symbol

Only the symbol shown below will be used on all prints/plots:



For use on all prints/plots
(Not to Scale)

4.2 Size

The triangle will be 10mm high (perpendicular to the base) when printed at A3.

4.3 Usage

The triangle will only be used to indicate the presence of perceived hazards that are significant or unusual and where a designer would not expect a competent contractor to immediately recognise the hazard. The notification of the hazards shall be irrespective of any perceived risk associated with the hazard. It is anticipated that warning triangles would appear on General Arrangement drawings rather than detail drawings; unless the hazard was specific to the detail and the drawing was designed to be used as a construction drawing by a contractor.

4.4 Hazard Description

The nature of the **Hazard** can be described either:

- i. with reference to a SHE box
- or
- i. immediately adjacent to the triangle

The notes / SHE box should direct the reader to further information provided in the DRA and/or CSM Hazard Log.

4.5 Positioning

The triangle and SHE box reference / description will be positioned adjacent to the location of the hazard - as close as possible, but neither conflicting with other drawing information, nor being unrecognisable because of the proximity of other information.

In all cases the need for clarity outweighs the method used.

5.0 Guidance

5.1 Usage

The triangle will only be used where a designer would not expect a competent contractor to immediately recognise the hazard.

Industry guidance states that, significant hazard to be communicated in design are those:

<i>Not likely to be obvious to a competent contractor or designer</i>	<p><i>such as:</i></p> <ul style="list-style-type: none"> • <i>potential asset instability</i> • <i>contact with materials with a health risk e.g.:</i> <ul style="list-style-type: none"> ▪ <i>fragile roofs</i> ▪ <i>asbestos</i> ▪ <i>lead paint</i> ▪ <i>contaminated land / substances.</i>
<i>Difficult to manage</i>	<p><i>These may be common hazards but be in awkward situations, such as:</i></p> <ul style="list-style-type: none"> • <i>working near electrified railway lines (now or in the future)</i> • <i>transporting or manoeuvring fabricated structural components on site (uncertainty around centre of gravity in temporary state)</i>

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Unusual	<ul style="list-style-type: none"> • demolition / construction sequence • access issues • working over / under water <p><i>These may be 'common' hazards but occurring in unusual circumstances, or unusual because of the nature of the construction or site, including:</i></p> <ul style="list-style-type: none"> • structural stability attained through arching action • obstructing signal sighting • temporary works • clearance issues
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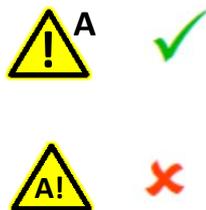
Below are some specific examples of where the use of a hazard triangle might be expected; although this list is by no means definitive.

- Where an engineering function's General Arrangement drawing does not have other discipline(s) work information shown.
- Where a buried service is believed to exist but no proof is available; and therefore cannot be shown on a drawing. This should not apply where services are known to exist and are depicted on information supplied to a contractor.
- Where pollution from an adjacent site external to the railway infrastructure may affect the construction methodology. This would only be valid where the pollution was sporadic and may not be seen on site-inspections.
- Where pollution from, or interface with, an adjacent work-site or contract is expected during construction but will not be apparent until the construction phase.
- Further examples are contained within the table above.

5.2 Examples

5.2.1 Warning Triangle with reference to SHE Box

Reference should be given in the form of a letter (or a number) as shown below. The SHE Box should contain any stage and mitigation measure.



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION			
THE FOLLOWING NOTES HIGHLIGHT SIGNIFICANT RESIDUAL HAZARDS IDENTIFIED BY THE DESIGNER. TYPICAL HAZARDS THAT SHOULD BE IDENTIFIED BY A COMPETENT CONTRACTOR ARE NOT INCLUDED. THE CONTRACTOR SHALL CARRY OUT THE WORKS USING AN APPROVED SAFE SYSTEM OF WORK. FURTHER INFORMATION ON HAZARDS CAN BE FOUND IN THE DRA AND / OR CSM HAZARD LOG.			
REF.	HAZARD	STAGE	MITIGATING MEASURE
A	FRAGILE ROOF LIGHTS ARE PRESENT ON THE ROOF OF THE WAREHOUSE	C	CRAWLING BOARDS OR OTHER METHOD REQUIRED TO BE IN PLACE WHEN CARRYING OUT WORKS
B	...		

5.2.2 Warning Triangle with text immediately adjacent to location of hazard

The text immediately adjacent to the location of the hazard should only identify the hazard as shown below:

	<p><i>Fragile roof lights are present on the roof of the warehouse</i></p>	<p><i>This note identifies the hazard only.</i></p>	
	<p><i>Fragile roof lights are present on the roof of the warehouse and the contractor will need to provide crawling boards</i></p>	<p><i>This note goes further and offers a method of working with the hazard.</i></p>	
	<p><i>Fragile roof lights are present</i></p>	<p><i>This note does not identify the specific hazard area</i></p>	

5.3 Depiction

The triangle will be depicted as above, with reference to SHE box or a description of the hazard adjacent to the symbol. The designer should review a draft print or plot of their drawing to determine the effect of the warning notification and ensure that it stands out from the general information, but does not suppress it.

5.4 Triangle relevance to drawing Status

The triangle(s) should be relevant to the status of the drawing with only residual hazards remaining. (E.g. construction hazards are to be removed from As-Built drawings).

6.0 References and useful documents

6.1 Network Rail Safe by Design Briefing Note: No.01 on Design Risk assessment

6.2 The Construction (Design and Management) Regulations 2015 - Industry Guidance for Designers (ISBN: 978-1-85751-329-9)

Footnote:

This is a B&C Working Group proposal for review by Steering Group.