

TRANSPORT SCOTLAND (Agency of the Scottish Executive)
TRUNK ROAD NETWORK MANAGEMENT (Bridges)
TS INTERIM AMENDMENT No 29 - Identification of 'Particularly at Risk' Supports

1 Background

This Transport Scotland Interim Amendment (TS IA) provides advice on the identification of 'particularly at risk' supports and where protection or strengthening works are considered to provide best value in the light of experience to date. The principles are also applicable to trunk road maintenance schemes to identify supports requiring strengthening or protection.

The release of revised BD48 – The Assessment and Strengthening of Highway Bridge Supports has been delayed for the foreseeable future whilst the document is reviewed against the wider risk assessment approach for asset management that is being developed. This advice is required in the interim period to ensure Operating Companies (OCs) developing their forward programmes adopt a consistent approach.

The present guidance available to define a 'particularly at risk' support is limited, which has the potential to promote projects which do not provide best value and which impose unnecessary disruption on the Network.

2 Scope

This TS IA is to be applied to bridge supports on trunk road bridges only to ensure consistency in the identification of such 'particularly at risk' supports and to give guidance on the action required. This guidance augments and partially supersedes the requirements for assessment, strengthening and protection given in Section 4 of BD48/93 and helps in developing future programmes of works relating to Piers and Supports.

Railway bridges are not included. Any issues regarding these structures shall be referred back to the Railway Infrastructure Authority by Transport Scotland Network Management Bridges Section (TS).

3 Actions Required

Supports are to be categorised into one of the following 3 groups:-
(Also refer to the Flow Chart at the end of this TS IA for the categorisation process)

3.1 Group 1 – Particularly at Risk Supports

For a support to be considered 'Particularly at Risk' the following criteria must be considered:

- I. Road adjacent to the support has a combined two way flow of >3,000 AADT for heavy goods vehicles, with a traffic speed limit adjacent to the support of 50mph or above.
- II. Support carries a highly trafficked road (combined two way flow >25,000 AADT) or has very heavy use by non-motorised users.

- III. Having applied engineering judgement it is reasonable to deduce that collapse of the support or a column, if the support consists of more than one column, will result in collapse of a bridge span. This excludes structures where considerable damage would occur and repair or reconstruction may be required, but span collapse is not anticipated. Structures with 4 or more columns in a line at a support location will normally be excluded.
- IV. Containment assessed to be less than 50% of the collision loading as given in Section 2 of BD48/93;

The support shall be considered as 'Particularly at Risk' Group 1 and be included in the forward programme for further assessment / strengthening / protection, if:

- i) It meets all the Group 1 criteria above and
- ii) It meets some but not **all** of the Group 1 criteria above, but it has less than 25% capacity together with a combined two-way flow over the structure of more than 10,000 AADT.

Supports in this Group 1 will be divided into two subgroups. Group 1a supports with an assessed capacity of less than 25% of the standard impact loading should be considered as soon as funds are available. Group 1b supports with an assessed capacity of between 25% and 50% of the collision loading as given in Section 2 of BD48/93 should be considered for further assessment / strengthening / protection, but only as part of the next suitable maintenance project that allows this activity to be carried-out without significantly delaying the project or disrupting the network.

The supports as described in IV ii) above should be considered as Group 1b.

3.2 Group 2 – 'At Risk' Supports

For a support to be considered 'At Risk' it must fall outside the criteria defined in Group 1, have a containment of less than 67% of the standard impact loading and have protection measures to a lower standard than given in [Section 7 of TS IA 29](#). Structural analysis will only be agreed by TS if deemed necessary (see [Section 6 of TS IA 29](#)) and shall only be carried out when a suitable maintenance scheme has been confirmed within the forward programme.

'At Risk' supports should be placed in the forward programme to be protected but **only** as part of the next suitable maintenance scheme when the existing vehicle restraint system is planned for renewal, to minimize the disruption to the network.

The required vehicle restraint containment levels adjacent to supports need to be reviewed as part of any planned vehicle restraint replacement scheme.

3.3 Group 3 – 'Low Risk' Supports

For a support to be considered 'Low Risk' it must fall outside the criteria defined in Group 1 or Group 2. Confirmation of Group 3 categorisation shall be recorded in SMS with supporting information attached in the documents section of SMS.

4 Interim Protection and Temporary Protection during Road Works

Interim protection and temporary protection need only be considered where there are exceptional circumstances, subject to agreement with TS. (Note that this guidance augments and partially supersedes the guidance provided in TD 19/06 clauses 8.4 and 8.28)

5 Variations

In exceptionally unusual circumstances where the application of this guidance gives particular cause for concern, details are to be referred to TS.

6 BD48 Impact Assessments

The Operating Companies are required to determine which structures have already been assessed to BD 48/93 and categorise these structures into Group 1 and 2. For all the structures that have not been assessed, the Operating Companies should develop a programme for their assessment and categorisation and have it agreed by the relevant Unit Bridge Manager.

Group 1a and 1b Supports

If structural analysis has not yet been carried out, a programme should be developed to determine capacities of the Group 1a and 1b supports and agreed with the relevant Unit Bridge Manager. All assessments shall be subject to technical approval.

Group 2 Supports

BD 48 assessments should be undertaken, where agreed with TS as necessary, but only when a suitable maintenance scheme has been identified and included in the forward programme. Category 2 technical approval shall apply for the majority of assessments. Assessments for this Group will be limited to quantifying the capacity of the support to resist collision loading.

7 Requirements for Protection / Strengthening

The following guidance relates to the protection of supports. Alternative strengthening proposals will be considered on a case by case basis taking account of the economic or aesthetic justification presented and the effect on traffic.

Group 1a and 1b Supports

Supports may be protected in accordance with one of the two options described below:

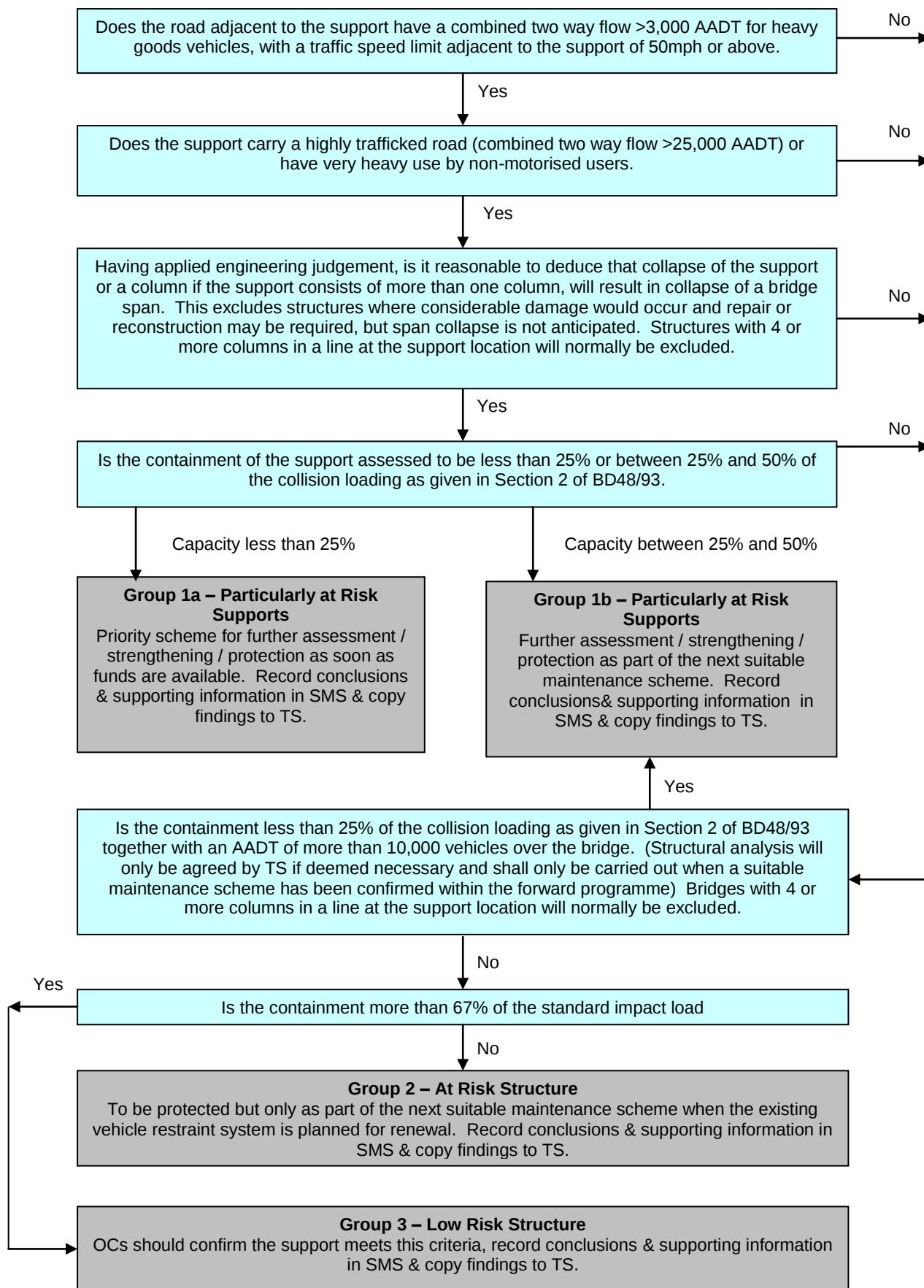
- a) Provide a very high containment level barrier (H4a) with full working width.
- b) Provide a very high containment level concrete rigid barrier (H4a) without full working width. This may be accepted subject to a departure from standard. The support must be capable of resisting the residual load component specified in BD60.

Group 2 Supports

Supports may be protected in accordance with one of the two options described below:

- a) Provide a higher containment level barrier (H1 or H2) with full working width.
- b) Provide a higher containment level concrete rigid barrier (H1 or H2) without full working width. This may be accepted subject to a departure from standard. The support must be capable of resisting the residual load component specified in BD60.

Flow Chart – Categorisation into Groups



Note: For Group 1a and 1b supports, strengthening or protection with a very high containment barrier shall only be provided if it can be demonstrated by assessment (BD2, Category 2) that collapse of one or more spans will occur following the application of the collision loading. If collapse cannot be confirmed the structure shall be moved into Group 2.