

**Review, ranking and improvement of traffic signs at bridges at risk of bridge strikes**

Date of Signing Review:	Report Date:
Highway/Road Authority:	
Name of Bridge Strike Champion: e-mail address:	
Number of bridges with headroom over the carriageway/s less than 16'6" (signed and unsigned)	
Number of bridges: improvements to traffic signs identified	
Number of new and changed traffic signs to be erected	
Number of bridges: improvements to traffic signs completed	
Number of new and changed traffic signs erected	
Additional comments:	

## Rail Bridges Over Roads

Factor	Existing Mitigation and Hazards	Score
1 See Note A	<p><b>Existing traffic signs per elevation and road markings</b></p> <ul style="list-style-type: none"> <li>• Score 1 for single chord markers with road markings under arch</li> <li>• Score 1 for roundel traffic sign showing height restriction on arch bridge or triangular warning sign on flat soffit bridge</li> <li>• Score 2 for arch chord markers only, no LGV road markings</li> <li>• Score 2 for one or no traffic signs showing height restriction on posts near bridge</li> <li>• Score 4 for no arch chord markings and no LGV road markings</li> <li>• Score 4 for no information signs showing height restriction in advance of bridge</li> <li>• Score 8 for no route direction signs in advance of bridge</li> <li>• Score 12 for: <ul style="list-style-type: none"> <li>– each continuous white line under an arch</li> <li>– no traffic sign on bridge showing height restriction but minimum bridge headroom less than 16 feet 6 inches</li> <li>– traffic sign for the bridge shows a height restriction more than the measured headroom</li> </ul> </li> </ul>	
2 See Note B	<p><b>Annual number of reported bridge strikes</b></p> <ul style="list-style-type: none"> <li>• Score 1 for no reported bridge strikes</li> <li>• For 3 or less reported bridge strikes score the number of strikes plus 1</li> <li>• For number of reported bridge strikes <math>\geq 4</math> and <math>\leq 9</math> score the number of strikes plus 5</li> <li>• For number of reported bridge strikes <math>\geq 10</math> score the number of reported bridge strikes plus 10</li> </ul>	
3	<p><b>Existing signed height</b></p> <ul style="list-style-type: none"> <li>• Score 1 for <math>\geq 16</math> feet or <math>&lt; 10</math> feet</li> <li>• Score 4 for <math>\leq 16</math> feet and <math>\geq 15</math> feet 3 inches</li> <li>• Score 10 for <math>\leq 15</math> feet and <math>\geq 12</math> feet 6 inches</li> <li>• Score 4 for <math>\leq 12</math> feet 3 inches and <math>\geq 10</math> feet</li> <li>• Score 12 for: <ul style="list-style-type: none"> <li>– no traffic signs showing height restriction but minimum bridge headroom less than 16 feet 6 inches</li> <li>– traffic sign for the bridge shows a height restriction more than the measured headroom (not otherwise as above)</li> </ul> </li> </ul>	
4	<p><b>Road alignment (horizontal)</b></p> <ul style="list-style-type: none"> <li>• Score 10 for straight road with carriageway <math>\geq 7.3</math>m</li> <li>• Score 7 for straight with <math>&lt; 7.3</math>m carriageway or curved <math>\geq 7.3</math>m carriageway</li> <li>• Score 5 if road with carriageway <math>&lt; 7.3</math>m is restricted by an arch bridge</li> <li>• Score 3 for flat soffit bridge over curved road with <math>&lt; 7.3</math>m carriageway</li> <li>• Score 1 for flat soffit bridge over reverse curves with <math>&lt; 7.3</math>m carriageway</li> </ul>	
5	<p><b>Road Alignment (Vertical)</b></p> <ul style="list-style-type: none"> <li>• Score 1 for level or negligible slope</li> <li>• Score 2 for slight but noticeable longitudinal slope</li> <li>• Score 4 for significant longitudinal slope</li> <li>• Score 6 for rising longitudinal slopes at exit from under bridge on both elevations</li> </ul>	
6	<p><b>Estimated maximum (not signed) speed of approaching road traffic</b></p> <ul style="list-style-type: none"> <li>• Score 2 for <math>\leq 20</math>mph</li> <li>• Score 3 for <math>\geq 21</math> mph <math>\leq 30</math>mph</li> <li>• Score 5 for <math>\geq 31</math> mph <math>\leq 50</math>mph</li> <li>• Score 7 for <math>\geq 51</math> mph <math>\leq 70</math>mph</li> <li>• Score 9 for <math>&gt; 70</math>mph</li> </ul>	
7 See Note D	<p><b>Volume of road traffic</b></p> <ul style="list-style-type: none"> <li>• Score 1 for <math>\leq 10</math> LGVs (<math>&lt; 200</math> vehicles)/day (green lane or farm access)</li> <li>• Score 2 for 11 to 100 LGVs (<math>&lt; 2,000</math> vehicles)/day (unclassified)</li> <li>• Score 3 for 101 to 500 LGVs (<math>&lt; 7,150</math> vehicles)/day (C or B class)</li> <li>• Score 4 for 501 to 1,000 LGVs (<math>&lt; 12,500</math> vehicles)/day ('Other Strategic' roads)</li> <li>• Score 5 for over 1,000 LGVs (<math>&gt; 12,500</math> vehicles)/day ('Primary Routes')</li> </ul>	

## Rail Bridges Over Roads

Factor	Existing Mitigation and Hazards	Score
8 See Note A	<b>Traffic sign visibility and condition</b> <ul style="list-style-type: none"> <li>Score 2 for each traffic sign showing height restriction with visibility obscured or reduced by: <ul style="list-style-type: none"> <li>vegetation</li> <li>dirt and/or grime or graffiti</li> <li>faded numbers</li> </ul> </li> <li>Score 3 for each non-illuminated traffic sign on street with system of street lighting</li> <li>Score 4 for each bridge elevation with incomplete, inverted or missing black and yellow hazard marking</li> <li>Score 5 for each advertising hoarding in the vicinity of the bridge</li> </ul>	
9 See Note C	<b>Site specific hazards increasing event consequences - skew</b> <ul style="list-style-type: none"> <li>Score 1 for skew angle of bridge &lt; 15°</li> <li>Score 2 for skew ≥ 15° and &lt; 25°</li> <li>Score 5 for skew ≥ 25° and &lt; 35°</li> <li>Score 7 for skew ≥ 35° and &lt; 45°</li> <li>Score 10 for skew ≥ 45°</li> </ul>	
10	<b>Site specific hazards increasing event consequences - supports</b> <ul style="list-style-type: none"> <li>Score 2 for masonry or concrete pier</li> <li>Score 5 for concrete and metallic columns filled with concrete</li> <li>Score 7 for steel columns</li> <li>Score 10 for cast iron hollow columns</li> <li>Score 10 for exposed gas, chemical or other pipeline attached to bridge elevation</li> </ul>	
11	<b>Robustness of bridge</b> <ul style="list-style-type: none"> <li>Score 1 for bridge protected by collision protection beams</li> <li>Score 1 for masonry arch</li> <li>Score 1 for concrete bridge</li> <li>Score 1 for multi track metallic structure</li> <li>Score 2 for double track metallic structure</li> <li>Score 4 for single track metallic structure(s)</li> <li>Score 10 for cast iron arches</li> <li>For composite form use highest score accordingly to bridge form</li> </ul>	
12 See Note E	<b>Volume of rail traffic</b> <ul style="list-style-type: none"> <li>Score 1 for seldom used route (fewer than 500 trains/year)</li> <li>Score 3 for lightly used route (501 to 3,000 trains/year)</li> <li>Score 5 for medium used route (3,001 to 10,000 trains/year)</li> <li>Score 8 for heavily used route (10,001 to 50,000 trains/year)</li> <li>Score 12 for very heavily used route (&gt;50,000 trains/year)</li> </ul>	
13 See Notes E and F	<b>Type of rail traffic</b> <ul style="list-style-type: none"> <li>Score 1 for Non-Dangerous Goods Freight</li> <li>Score 3 for Loco-Hauled stock</li> <li>Score 5 for Multiple Units (up to 100mph) or Dangerous Goods Freight</li> <li>Score 7 for Multiple Units (over 100 mph)</li> <li>Score 11 for Light Rail</li> </ul>	
14 See Note E	<b>Permissible line speed</b> <ul style="list-style-type: none"> <li>Score 1 for straight track &lt; 45mph</li> <li>Score 4 for straight track ≤ 75mph or curved &lt; 45mph</li> <li>Score 8 for straight track ≤ 90mph or curved ≤ 75mph</li> <li>Score 12 for straight track ≤ 100mph or curved up to ≤ 90mph</li> <li>Score 16 for straight track ≤ 125 mph or curved ≤ 100mph</li> <li>Score 20 for straight track ≤ 140 mph or curved ≤ 125mph</li> <li>Score 24 for straight track &gt; 140 mph or curved &gt; 125mph</li> </ul>	

## Notes for Rail Bridges Over Roads

- a) Score should be the total of all that are applicable. For example if there is a roundel only on a flat soffit bridge, score 2 (one or no traffic signs showing height restriction on posts near bridge) plus score 4 (no information signs showing height restriction in advance of bridge) and score 8 (no route direction signs in advance of bridge) =  $14 \times 2$  (2 elevations) = 28
- b) Data of number of reported bridge strikes at railway bridges to be provided by the Rail Authority
- c) Angle of skew is measured from the perpendicular to centre line of road. For example a bridge perpendicular to the road centre line has a skew angle of 0°.
- d) Equivalent traffic flows for all vehicle types may be substituted, depending upon the units of measurement used by the relevant Highway Authority. 'Large Goods Vehicles' includes vehicles with crane attachments and low loaders.
- If the road leads to an industrial complex or similar and is thereby used by a higher LGV traffic volume than average for the class of road, the score should be based on the LGV traffic volume and not the road classification.
- e) Data for rail traffic to be provided by the Rail Authority
- f) Light Rail includes lightweight passenger trains, Tramways and non-main Line railways. Light Rail does not include preserved railways operating under a Light Railway Order.

## Road Bridges Over Roads

Factor	Existing Mitigation and Hazards	Score
1 See Note A	<p>Existing traffic signs per elevation and road markings on road passing under bridge</p> <ul style="list-style-type: none"> <li>• Score 1 for single chord markers with road markings under arch</li> <li>• Score 1 for roundel traffic sign showing height restriction on arch bridge or triangular warning sign on flat soffit bridge</li> <li>• Score 2 for arch chord markers only, no LGV road markings</li> <li>• Score 2 for one or no traffic signs showing height restriction on posts near bridge</li> <li>• Score 4 for no arch chord markings and no LGV road markings</li> <li>• Score 4 for no information signs showing height restriction in advance of bridge</li> <li>• Score 8 for no route direction signs in advance of bridge</li> <li>• Score 12 for: <ul style="list-style-type: none"> <li>– each continuous white line under an arch</li> <li>– no traffic sign on bridge showing height restriction but minimum bridge headroom less than 16 feet 6 inches</li> <li>– traffic sign for the bridge shows a height restriction more than the measured headroom</li> </ul> </li> </ul>	
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7 See Note D	<p><b>Volume of road traffic to pass under bridge</b></p> <ul style="list-style-type: none"> <li>• Score 1 for <math>\leq 10</math> LGVs (<math>&lt; 200</math> vehicles)/day (green lane or farm access)</li> <li>• Score 2 for 11 to 100 LGVs (<math>&lt; 2,000</math> vehicles)/day (unclassified)</li> <li>• Score 3 for 101 to 500 LGVs (<math>&lt; 7,150</math> vehicles)/day (C or B class)</li> <li>• Score 4 for 501 to 1,000 LGVs (<math>&lt; 12,500</math> vehicles)/day ('Other Strategic' roads)</li> <li>• Score 5 for over 1,000 LGVs (<math>&gt; 12,500</math> vehicles)/day ('Primary Routes')</li> </ul>	

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12	<b>Type of road carried on the bridge</b> <ul style="list-style-type: none"> <li>Score 1 for C or U road</li> <li>Score 3 for B road</li> <li>Score 4 for principal road</li> <li>Score 6 for primary road</li> <li>Score 8 for motorway or trunk road</li> </ul>	
13	<b>Principal type of road traffic</b> <ul style="list-style-type: none"> <li>To allow for this factor use score from factor 12.</li> <li>Where it is known that a non principal road is used by high sided vehicles disproportionately to the class of road, consider increasing score to 4 or 6 as appropriate.</li> </ul>	
14	<b>Permitted speed of approaching road traffic to pass over bridge</b> <ul style="list-style-type: none"> <li>Score 0 for pedestrian bridge</li> <li>Score 2 for 20mph</li> <li>Score 3 for 30mph</li> <li>Score 4 for 40mph</li> <li>Score 5 for 50mph</li> <li>Score 6 for 60mph</li> <li>Score 7 for 70mph</li> </ul>	

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