

Rating Grade Separations

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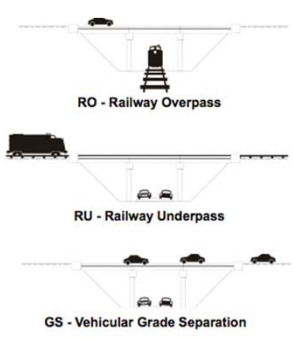
Grade Separation

The grade separation section applies to structures which have the following "Structure Usage" as classified in the BIS inventory:

- GS** - vehicular grade separation
- PS** - pedestrian grade separation
- RO** - railway overpass
- RU** - railway underpass
- SP** - stockpass or cattlepass

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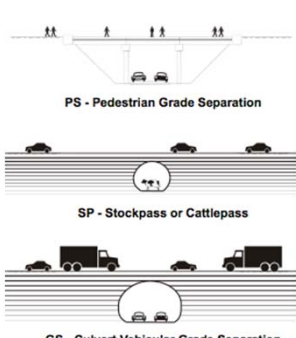
RO - Railway Overpass

RU - Railway Underpass

GS - Vehicular Grade Separation

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PS - Pedestrian Grade Separation

SP - Stockpass or Cattlepass

GS - Culvert Vehicular Grade Separation

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Grade Separation

The grade separation section of the BIM inspection form replaces the channel section for structures that are not over streams. The grade separation section is different for bridges and culverts as shown:


Bridge Section - Chapter 10

Grade Separation	Structure Usage		Explanation of Condition
	Last	Now	
Road Alignment			
Traffic Safety Features			
Type			
Slope Protection			
(Type -)			
Bank Stability			
Drainage			
Grade Separation General Rating			



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Grade Separation


Culvert Section - Section 13.8

Grade Separation	Structure Usage		Explanation of Condition
	Last	Now	
Road Alignment			
Roadway Surface			
(Type -)			
Icing (Y/N)			
Traffic Safety Features			
Type			
Lighting			
Barrel Leakage (Y/N)			
Drainage			
Structure In Use (Y/N)			
Approach Road / Embankment General Rating			



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Road Alignment

This element refers to road vert.& horiz. alignment below or through the bridge or culvert and condition of the road surface surface. The limits of evaluation are 1 km in each direction


Inspection and rating considerations include:

- vertical and horizontal alignment that may contribute to damage to the bridge
- look for indications for reduced vertical clearance
- railway alignments should be rated "X"
- alignments that can be safely driven and do not contribute to collision with the structure should be rated "5" or higher
- bridge structures include condition of road, cracks, heaves etc. that may lead to damage of the bridge.



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Traffic Safety Features

For the purposes of the BIM system this item refers to safety features such as:


- curbs or barriers
- medians
- guardrails
- energy attenuators
- vertical clearance signs
- advance warning signs

The type of safety features are to be noted on the BIM form.



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Traffic Safety Features


Inspection and rating considerations for safety features are as follows:

- do not rate standard of safety feature... rate functionality and condition as per original design
- rating should include all components of the safety feature, including connections
- if elements are missing but there is evidence that they were previously there, then rate "4" or less
- use "explanation of condition" to further describe features or to indicate concerns, maintenance required, etc.



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Slope Protection


This item refers to the slope protection system used on the headslopes of bridges to prevent erosion damage and provide an aesthetic finish (graffiti). Some considerations for inspection and rating include:

- look at abutment front for evidence of settlement
- for concrete treatments, look for cracking, surface deterioration, crushing, settlement or heaving
- look for signs of undermining at the toe or by loss of soil material below the protection system
- significant movement or settlement should be rated "4" or less
- if maintenance required it should be rated "4" or less and a description provided
- Good condition but somewhat unattractive rate 7



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Bank Stability

This refers to the stability of the headslopes and transitions. It is influenced by factors such as:


- type of backfill material
- construction techniques
- degree of compaction
- drainage system
- underlying soil stratigraphy

Consequences of instability may range from minor settlement to major structural distress .



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Bank Stability


Considerations for inspection and rating of bank stability include:

- look for evidence of damage to bridge components
- look for evidence of settlement and shifting of substructure elements
- check for evidence of soil bulging at toe of slopes
- record locations of wet and slumping areas
- instability affecting bridge elements rate "4" or less
- instability that requires monitoring rate "4" or "3"



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Drainage - Bridge G/S

This item refers to the handling of water that reaches the toe of the headslopes and its transitions. Sources of water include:

- deck drainage
- approach road drainage
- highway ditch drainage
- weep holes in abutments and concrete slabs


Considerations for inspection and rating include:

- Drainage functional not causing damage rate 5 or more
- if drainage causes safety concerns or damage, rate "4" or less
- ponding or icing causing hazard on travel lanes below rate 2 or less



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Drainage / Barrel Leakage


This item refers to disposal of water that reaches culvert roadway surface.

- Considerations for inspection
 - look for ponding in culvert
 - gutters clogged or not functioning
 - damage caused by roadway drainage
- Record "Y" if there is barrel leakage and explain
- Drainage functioning, rate 5 or more
- Ponding causing a hazard, rate 2 or less



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Roadway Surface


This item is limited to culvert structures and refers to the condition and functionality of the roadway through the structure. The purpose of the roadway surface is to provide a suitable surface for vehicular or other traffic. Considerations for inspection and rating include:

- record the type (pavement, concrete, gravel, etc.) of roadway surface on the inspection form
- evaluate the condition of the surface and its ability to function as designed
- roadway surfaces requiring maintenance to provide the required level of service should be rated "4" or less
- roadway surfaces that are hazardous due to icing should be rated "2" or less and icing should be indicated on the inspection form
- if there is leakage of water through the barrel onto the roadway, indicate "Y" and explain



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Lighting


This item refers to the lighting system used in the culvert to enhance visibility and to provide for safe passage through the culvert. Some considerations for inspection and rating include:

- if the lighting is not operational, rate "4" or less
- check guardrail and safety features for damage as this may indicate visibility problems in the culvert
- check all connections and features to determine condition and functionality
- no lighting (cattlepass) rated "X"
- inadequate lighting or no lighting and hazardous situation for the user should be rated "2" or less with "explanation of condition".



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Structure In Use

This item refers mostly to cattlepasses and stockpasses but may also apply to other uses. If there is evidence that the structure is no longer in service, then circle "N" and make a note in the "explanation of condition" regarding the circumstances.



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General Rating

The general rating of the grade separation section of the BIM inspection should reflect the significant structural and safety concerns relative to the items being inspected and rated. Governed by:

- Bridge G/S
 - road alignment
 - traffic safety features
 - bank stability
 - drainage
- Culvert G/S
 - road alignment
 - roadway surface
 - traffic safety features
 - drainage



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