
**VOLUME 3 HIGHWAY STRUCTURES:
INSPECTION AND
MAINTENANCE**

SECTION 1 INSPECTION

PART 4

BD 63/07

**INSPECTION OF HIGHWAY
STRUCTURES**

SUMMARY

This Standard sets out the Overseeing Organisations requirements for inspection of its highway structures.

INSTRUCTIONS FOR USE

1. Remove Contents pages from Volume 3 and insert new Contents dated February 2007.
2. Remove BD 63/94 from Volume 3, Section 1 which is superseded by this new Standard and archive as appropriate.
3. Remove BA 63/94 from Volume 3, Section 1 which is withdrawn and archive as appropriate.
4. Insert BD 63/07 into Volume 3, Section 1.
5. Please archive this sheet as appropriate.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from The Stationery Office Ltd.



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Inspection of Highway Structures

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REGISTRATION OF AMENDMENTS

Amend No	Page No	Signature & Date of incorporation of amendments	Amend No	Page No	Signature & Date of incorporation of amendments

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1. INTRODUCTION

Mandatory Requirements

1.1 Paragraphs of this Standard that are highlighted by being contained in a box are mandatory. The remainder of the document contains advice and guidance.

General

1.2 This Standard describes the inspection and reporting requirements for highway structures on motorways and other trunk roads or in Northern Ireland all designated roads, but should be read in conjunction with BD 53 (DMRB 3.1.6) – Inspection and Records for Road Tunnels, when dealing with tunnels.

1.3 This Standard supersedes BD 63/94 (DMRB 3.1.4) – Inspection of Highway Structures and BA 63/94 (DMRB 3.1.5) – Inspection of Highway Structures, which are hereby withdrawn. Information previously contained in BA 63/94 can now be found in the Annexes detailing Special Requirements for the Overseeing Organisations or in the Inspection Manual for Highway Structures.

1.4 This Standard covers the use of the Inspection Manual for Highway Structures and should be read in conjunction with BD 62/07 (DMRB 3.2.1) – As Built, Operational and Maintenance Records for Highway Structures.

1.5 Consideration should also be given to the guidance contained in Management of Highway Structures: A Code of Practice.

Background

1.6 The inspection requirements described in this Standard are based on the following overarching principles:

- a. To detect in good time any defect that may cause an unacceptable safety or serviceability risk or a serious maintenance requirement in order to safeguard the public, the structure and the environment and to enable appropriate remedial action to be taken.

- b. To provide information that enables the management and maintenance of a stock of structures to be planned on a rational basis in a systematic manner.
- c. To ensure that inspections are undertaken by suitably experienced and competent staff.

1.7 These overarching principles align with Management of Highway Structures: A Code of Practice.

Definitions

1.8 The following definitions apply in this Standard:

- **Agent** – a party appointed by the Overseeing Organisation to manage highway assets on their behalf, e.g. Maintaining Agent, Managing Agent, Managing Agent Contractor, Trunk Road Agent, Concessionaire, Service Provider or Operating Company. Where the Overseeing Organisation manages the highway assets internally, the Agent will be the branch or section to which the duties have been delegated.
- **Supervising Engineer** – the engineer within the Agent who supervises the inspection programme and is ultimately responsible for inspections of highway structures.
- **Contractor** – the organisation contracted by the Overseeing Organisation or the Agent to undertake construction works on its behalf.
- **Designer** – the organisation responsible for the overall design including proprietary components.
- **Defects Liability Period** – the period, as specified in the contract, following completion of the project during which the Contractor will be liable for defects in their work. This may also be referred to as the Defects Correction Period, Period of Maintenance or Prescriptive Period. In general, and in the absence of an express provision to the contrary, the Defects Liability Period provisions are in addition to, and not in substitution for, the common law rights.

Implementation

1.9 This Standard must be used forthwith for the inspection of highway structures on motorways and other trunk roads or in Northern Ireland all designated roads. Specific requirements for the four Overseeing Organisations in England, Scotland, Wales, and Northern Ireland are given in Annexes A to D respectively of this Standard.

1.10 The programme for inspection of structures must be agreed between the Agent and the Overseeing Organisation.

Quality Assurance and Audit

1.11 Agents must amend, if necessary, their Quality Assurance system to reflect the requirements of this Standard.

1.12 The Overseeing Organisation reserves the right to audit Agents against this Standard, including but not restricted to, inspector competence and training, inspection regimes and Health and Safety arrangements.

Feedback

1.13 Any feedback on the use of this Standard must be provided in accordance with HD 34/03 (DMRB 5.3.1) Implementation and Use of the Standard Improvement System.

2. SCOPE

2.1 This Standard applies to highway structures over, under or alongside motorways and other trunk roads or in Northern Ireland all designated roads.

2.2 Some special types of structures, for example, cable stayed bridges, may require different inspection regimes to those described in this Standard. It is the responsibility of the Agent to identify these structures. The Overseeing Organisation, based on their knowledge of the structures stock, may also inform the Agent of structures that require special consideration.

2.3 The Agent must determine an appropriate inspection regime for special structures and agree it with the Overseeing Organisation before proceeding.

2.4 Table 1 suggests the scope of highway structures that should be considered for inspection. The specific requirements of each Overseeing Organisation are provided in the Annexes.

2.5 The scope described in Table 1 does not negate the inspector's duty of care under Health and Safety legislation to report any safety hazards they encounter that are outside the scope of their inspection. Inspectors should be careful to note any deficiencies at or near the structure which, in their opinion, may constitute a significant safety hazard. They should report these to the Supervising Engineer at the earliest possible opportunity.

Table 1 Highway Structures to be Considered for Inspection

Structure Type	Definition	Scope (see Note 1)
Bridge, buried structure, subway underpass, culvert and any other similar structure	A structure supporting the highway as it crosses an obstacle (e.g. river, valley or flood plain) or a service (e.g. local road, railway or canal) OR A structure supporting the passage of a service (e.g. local road, railway, canal) over the highway	All structures with a clear span or internal diameter greater than 0.9m (0.9m or greater in Scotland)
Earth retaining structure	A structure associated with the highway where the dominant function is to retain earth	All structures with an effective retained height, i.e. the level of fill at the back of the structure above the finished ground level at the front of the structure, of 1.5m or greater
Reinforced/strengthened soil/fill structure with hard facings	A structure associated with the highway where the dominant function is to stabilise the slope and/or retain earth	All structures with an effective retained height of 1.5m or greater
Sign and/or signal gantry (see Notes 2 and 3)	Portal and cantilever gantries that support signs and/or signals	Structural aspects of all sign/signal gantries

Structure Type	Definition	Scope (see Note 1)
Mast (see Note 3)	Cantilever mast for traffic signal	Structural aspects of all cantilever masts
	High mast for lighting	Structural aspects of all lighting masts of 20m or greater, i.e. the vertical distance from top of post to bottom of flange
	Mast for camera, radio, speed camera and telecommunication transmission equipment	Structural aspects of all masts
	Catenary lighting support system	Structural aspects of all catenary support systems
	Highway signs on posts	As agreed by the Overseeing Organisation
Access gantry (see Note 4)	A moveable structure providing access to a highway asset, typically for bridge inspection and maintenance	All moveable access gantries
Tunnels	An enclosed length of road of 150m or more	Structural aspects of all tunnels (refer to BD 53 for other criteria relevant to tunnels, e.g. M&E requirements)
Other structures	Other structures that are within the footprint of the highway, e.g. service/utility crossings	Structures providing service only crossings either above or below the carriageway
	Other structures not in above subgroup as agreed with Overseeing Organisation	As agreed by the Overseeing Organisation
Third Party structures	Any of the above categories but owned by others, e.g. private owners or utility companies	As agreed with the Overseeing Organisation

Notes for Table 1:

- Highway structures which are marginally outside these dimensions, especially those which are subject to hydraulic action, may be included within the scope of this Standard by agreement with the Overseeing Organisation. Also see the Annexes for specific requirements.
- Where sign/signal gantries are also subject to separate Electrical and Mechanical inspections, the Agent should ensure that staff undertaking any inspection are instructed to be vigilant at all times and report defects of any nature considered to require urgent attention.
- Signs/signal gantries and masts – structural aspects should include foundations, columns, beams, arms and any structural connections between these. The inspection should also give due consideration to any significant attachments and their connections.
- All access gantries should be subject to inspections in accordance with The Institution of Structural Engineers publication *The Operation and Maintenance of Bridge Access Gantries and Runways*.

2.6 Where other owners have structures within the footprint of the Overseeing Organisation's highway, they are responsible for ensuring the safety, integrity and adequacy of those structures. In certain cases the Overseeing Organisation can be reasonably confident on the basis of available information that other owners are acting responsibly and have an adequate regime of inspections in place. Where this conclusion cannot be justified the Overseeing Organisation, or their Agent if instructed, will liaise with the other owner, in the wider interest of public safety, to understand their regime of inspections. However, this does not negate the responsibility of the Agent to check all structures within the footprint of the highway during Safety Inspections (3.10 to 3.17) in the wider interest of public safety.

3. MAINTENANCE INSPECTIONS

Introduction

Inspection Types

3.1 This section describes the five types of maintenance inspection that should be used for highway structures; these are:

- a. Safety Inspection;
- b. General Inspection;
- c. Principal Inspection;
- d. Special Inspection;
- e. Inspection for Assessment.

3.2 The overall purpose and format of each type of inspection are described. The required frequency of inspection and/or initiating event is also described.

Competence of Inspection Staff

3.3 All maintenance inspections must be undertaken by personnel that are judged by the Agent/Supervising Engineer to satisfy the minimum health, experience and, where appropriate, qualification requirements for the particular inspection type.

3.4 Personnel supervising and/or undertaking inspections must also comply with any requirement set down by the Overseeing Organisation.

3.5 The Agent must agree the minimum requirements with the Overseeing Organisation.

3.6 When defining the minimum requirements the Agent/Supervising Engineer should:

- comply with any Overseeing Organisation requirements; and
- give due consideration to the requirements described in the Inspection Manual for Highway Structures and any developments in regional and national inspector training courses.

3.7 The Supervising Engineer should be a Chartered Civil or Structural Engineer with a background in design, construction or maintenance of highway structures.

3.8 Dependent on the inspection type and structure characteristics, the appropriate personnel may be judged by the Agent/Supervising Engineer to be an inspector, engineer, specialist staff or a team that comprises some combination of these, subject to the requirements of paragraph 3.4.

Immediate Risk to Public Safety

3.9 The Agent must establish a procedure, common to all maintenance inspections, whereby inspection staff have a clearly defined duty to inform the Supervising Engineer or designated staff, at the earliest possible opportunity, of any defect that may represent an immediate risk to public safety and/or structural stability.

Safety Inspection

3.10 The purpose of a Safety Inspection is to identify obvious deficiencies which represent, or might lead to, a danger to the public and, therefore, require immediate or urgent attention.

3.11 Safety Inspections are not specific to highway structures and generally cover all fixed assets on the highway network, including carriageways, footways, structures, drainage, verges and lighting. Safety Inspections are normally carried out by trained highway maintenance staff from a slow moving vehicle, although alternatives may be acceptable to the Overseeing Organisation. In certain circumstances staff may need to proceed on foot either to confirm suspected defects or to complete the inspection. For example, some bridges may require a weekly or monthly walkover.

3.12 Safety Inspections should be undertaken at frequencies which ensure the timely identification of safety related defects and reflect the importance of a particular route or asset. Safety inspections may also be as a result of notification of a defect by a third party, e.g. police or public.

3.13 As such, a Safety Inspection only provides a cursory check of those parts of a highway structure that are visible from the highway with the aim of identifying any obvious deficiencies or signs of damage and deterioration that may require urgent attention or may lead to accidents or high maintenance costs, e.g. collision damage to superstructure or bridge supports, damage to parapets, spalling concrete and insecure expansion joint plates.

3.14 Safety Inspections for highway structures must be carried out at frequencies which ensure the timely identification of safety related defects and reflect the importance of a particular route or asset. The frequencies must adhere to any specific requirements set down by the Overseeing Organisation and also give due regard to any special considerations, for example, does the structure form, material, usage or location influence the required frequency.

3.15 In addition to planned Safety Inspections, Agents have a corporate responsibility to safety that requires all staff to report anything on the network needing urgent attention, including defects on highway structures. To facilitate this, Agents must encourage their staff to be vigilant at all times when moving around the network.

3.16 Should any Safety Inspection, or other source, reveal a possible defect requiring urgent attention, including defects that may represent a hazard to road, rail and other users, the Agent must immediately take such action as is required to safeguard the public and/or sustain structural functionality. The Overseeing Organisation and any other owner of the structure must be informed without delay.

3.17 Appropriate follow-up action for a highway structure in response to a concern raised by a Safety Inspection normally includes a “call-out” whereby a member of the highway structures team will visit the site to determine whether or not further action is required, e.g. close structure to traffic, carry out a Special Inspection, undertake detailed testing, and schedule remedial works. Details of Special Inspections are provided in paragraphs 3.39 to 3.49.

General Inspection

3.18 The purpose of a General Inspection is to provide information on the physical condition of all visible elements on a highway structure.

3.19 A General Inspection comprises a visual inspection of all parts of the structure that can be inspected without the need for special access equipment or traffic management arrangements. This should include adjacent earthworks and waterways where relevant to the behaviour or stability of the structure. Riverbanks, for example, in the vicinity of a bridge should be examined for evidence of scour or flooding or for conditions, such as the deposition of debris or blockages to the waterway, which could lead to scour of bridge supports or flooding.

3.20 Prior to undertaking a General Inspection, the inspector should review the structure records to familiarise themselves with the characteristics of the structure, the condition at the time of the last inspection and any significant maintenance/modifications since the last inspection. A method statement should be prepared, and agreed by the Supervising Engineer, before undertaking the inspection. The Inspection Manual for Highway Structures provides details of a suitable review and method statement for a General Inspection.

3.21 General Inspections must be scheduled for 24 month intervals and carried out at the scheduled dates. When a General Inspection coincides with a due Principal Inspection only the latter is undertaken. Tolerance on the scheduled date may be permitted in accordance with paragraphs 3.51 and 3.52 or the agreed programme.

3.22 The programme of General Inspections must be agreed with the Overseeing Organisation.

3.23 In certain circumstances more frequent inspections may be required, for example, when a structure is known or suspected to be subject to a rapid change in condition or circumstances. In such circumstances the Supervising Engineer should supplement the General Inspection with other inspections/activities, for example:

- **Special Inspections** – may be appropriate where specific parts of the structure require more frequent inspection to ascertain condition, e.g. bridge piers situated in a fast flowing river. Further details on Special Inspections are given in paragraphs 3.39 to 3.49.
- **Monitoring** – periodic or continuous monitoring may be appropriate to check against a specific problem from worsening, e.g. crack growth and deformations.

3.24 Supplementary inspections/activities must be agreed by the Overseeing Organisation before being implemented by the Agent. The agreed inspections/activities and the reasons for adopting them must be fully documented.

Principal Inspection

3.25 The purpose of a Principal Inspection is to provide information on the physical condition of all inspectable parts of a highway structure. A Principal Inspection is more comprehensive and provides more detailed information than a General Inspection.

3.26 A Principal Inspection comprises a close examination, within touching distance, of all inspectable parts of a structure. This should include adjacent earthworks and waterways where relevant to the behaviour or stability of the structure. A Principal Inspection should utilise as necessary suitable inspection techniques, access and/or traffic management works. Suitable inspection techniques that should be considered for a Principal Inspection include hammer tapping to detect loose concrete cover and paint thickness measurements. Testing is not a requirement for a Principal Inspection.

3.27 The Agent may use appropriate alternatives to close examination for areas of difficult or dangerous access, e.g. obscured parts of a structure and confined spaces. Closed circuit television may be an appropriate alternative in some circumstances.

3.28 Alternatives to close examination must be agreed with the Overseeing Organisation before being used by the Agent. The Agent must fully document the reasons for adopting the alternative approach. Alternatives must provide comparable quality of inspection information to close examination.

3.29 When planning Principal Inspections the Agent should seek to identify opportunities that make effective use of resources, i.e. combining a Principal Inspection with other activities in order to share special access equipment and/or traffic management works. For example, a Principal Inspection may be combined with a Special Inspection, monitoring activities, detailed testing work or routine/planned maintenance, when appropriate.

3.30 BA 35/90 (DMRB 3.3.2) provides guidance on limited site testing that may be undertaken as part of a Special Inspection for concrete structures, i.e. half-cell potential, chloride level, covermeter and depth of carbonation. Agents may find it appropriate to combine these Special Inspection activities with a Principal Inspection in some circumstances.

3.31 Prior to undertaking a Principal Inspection, the inspector/engineer should review all the structure records. A method statement should be prepared, and agreed by the Supervising Engineer, before undertaking the inspection. The Inspection Manual for Highway Structures provides details of a suitable review and method statement for a Principal Inspection.

3.32 Principal Inspections must be carried out at six year nominal intervals, as a replacement of a General Inspection due in accordance with 3.21. Variations on this six year period are permitted by paragraphs 3.34 to 3.38. Tolerance on the agreed nominal period may be permitted in accordance with paragraphs 3.51 and 3.52 or the agreed programme.

3.33 The programme of Principal Inspections must be agreed with the Overseeing Organisation.

3.34 In certain circumstances more frequent Principal Inspections may be required and justifiable, for example, when a structure is known or suspected to be subject to a rapid change in condition or circumstances

and a General Inspection is not sufficient to provide the access/information required. However, only part of the structure may be of concern and a more efficient approach may be to supplement the Principal Inspection with other activities, e.g. Special Inspections or monitoring. This approach can be used to provide the necessary information and make more efficient use of resources.

3.35 A shorter Principal Inspection interval and/or supplementary inspections/activities must be agreed by the Overseeing Organisation before being implemented by the Agent. The agreed interval and/or inspections/activities and the reasons for adopting it/them must be fully documented.

3.36 A longer Principal Inspection interval is permitted provided a risk assessment is undertaken. The risk assessment should give due consideration to all the element types on the structure.

3.37 A longer Principal Inspection interval must be agreed by the Overseeing Organisation before being implemented by the Agent. The risk assessment and interval must be fully documented and agreed by the Overseeing Organisation.

3.38 Principal Inspection intervals determined through risk assessment must not exceed twelve years.

Special Inspection

3.39 The purpose of a Special Inspection is to provide detailed information on a particular part, area or defect that is causing concern, or inspection of which is beyond the requirements of the General/Principal Inspection regime.

3.40 A Special Inspection may comprise a close visual inspection, testing and/or monitoring and may involve a one-off inspection, a series of inspections or an ongoing programme of inspections. As such, Special Inspections are tailored to specific needs. Refer to BD 79/06 (DMRB 3.4.18) for monitoring associated with the management of substandard structures.

3.41 Special Inspections are carried out when a need is identified. For example, based on the specific characteristics of the structure, identified by a General, Principal or Safety Inspection, to follow certain events, or to consider parts of the structure more closely or at a more frequent interval than the normal General/Principal Inspection regime. Examples are provided in paragraph 3.44.

3.42 All Special Inspections must be agreed by the Overseeing Organisation.

3.43 A “call-out” site visit as described in paragraph 3.17 is not categorised as a Special Inspection and as such the Agent is not required to agree this activity with the Overseeing Organisation. However, paragraph 3.16 requires the Agent to inform the Overseeing Organisation and other parties.

3.44 Special Inspections should be considered for, but not restricted to, the following:

- a. Cast iron structures, at intervals not exceeding six months.
- b. Structures strengthened by the use of bonded plates, at intervals of six months for the first two years and thereafter in accordance with the intervals prescribed in the maintenance records.
- c. Structures that have weight restrictions, or other forms of restriction to reduce traffic loading, at intervals not exceeding six months or as agreed by the Overseeing Organisation.
- d. Structures that have to carry an abnormal heavy load. The structure should be inspected before, during and after the passage of the load if either:
 - an assessment has indicated that the margin of safety is below that which would be provided for a design to current Standards; or
 - similar loads are not known to have been carried.
- e. Structures in areas of mineral extraction, when subsidence occurs.

- f. Structures if settlement is observed greater than that allowed for in the design. The cause should be identified and steps taken to monitor the rate of settlement and to assess the urgency of remedial measures.
- g. Structures involved in a major accident, chemical spillage or fire. The inspection should investigate the damage to the structure.
- h. Probing of river bridge foundations after flooding. Where probing indicates the possibility of scour, further Underwater Inspection should be carried out (see paragraphs 3.46 to 3.49).
- i. Permanent access gantries prior to use and at intervals in accordance with The Institution of Structural Engineers report on *The Operation and Maintenance of Bridge Access Gantries and Runways*.
- j. Hoists, winches and associated cables. They should be inspected in accordance with the relevant chapters of the Factories Act.
- k. Post tensioned concrete bridges as described in BA 50/93 (DMRB 3.1.3).

3.45 Further examples of when Special Inspections should be considered are provided in the Inspection Manual for Highway Structures.

Underwater Inspection

3.46 An Underwater Inspection is a specific type of Special Inspection concerned with parts of highway structures that are below water level.

3.47 In addition to 3.44(h), a programme of Underwater Inspections must be implemented for structures where the foundations and parts of the structure are below water level. The inspection must record the condition below water level, the existing stream bed profiles and any evidence of scour.

3.48 The programme for Underwater Inspections must be agreed with the Overseeing Organisation.

3.49 For further guidance see the Inspection Manual for Highway Structures. Also see BA 74/06 (DMRB 3.4.21) which provides guidance on inspections for highway bridges subject to scour.

Inspection for Assessment

3.50 The purpose of an Inspection for Assessment is to provide information required to undertake a structural assessment. BD 21/01 (DMRB 3.4.3) provides guidance on undertaking an Inspection for Assessment and recommends that these be done in conjunction with a Principal Inspection.

Scheduling Inspections

3.51 Inspections should be scheduled to make the most efficient use of resources and to minimise disturbance to the public, e.g. schedule inspections to take advantage of traffic management measures planned for other reasons.

3.52 General and Principal Inspections should ideally be scheduled in accordance with paragraphs 3.21 and 3.32, although a rational schedule that takes account of the stock characteristics should be developed. It might be appropriate, for example, to undertake all inspections along a particular route or in a particular area at the same time. In such circumstances the scheduled date of an inspection may be varied by up to ± 6 months provided the Supervising Engineer is satisfied that any marginally increased inspection interval is acceptable. The timing of the following General or Principal inspection should remain as per the original schedule, and should not be changed to accommodate the altered timing of this inspection.

3.53 The ± 6 month variation does not apply in circumstances where a shorter or longer inspection interval has been agreed by the Overseeing Organisation (see paragraphs 3.23, 3.24, 3.34 and 3.38).

4. RECORDS FOR MAINTENANCE INSPECTIONS

Introduction

4.1 Inspection records provide important information for identifying, assessing, quantifying and prioritising maintenance in a systematic manner. This section describes the core records that should be created as a result of each type of maintenance inspection. Annexes A to D describe additional requirements for each Overseeing Organisation and provide specific details of how their respective management systems deal with maintenance inspection records.

4.2 Inspection information must be recorded in the format set down by the Overseeing Organisation (see Annexes A to D).

4.3 Where a format is not specified the Agent must produce records that are appropriate to the scope and detail of the inspection type and that give a clear and accurate indication of the structure's condition.

4.4 Where a format is not specified by the Overseeing Organisation the Agent should, where possible, seek to develop and use Standardised formats for inspection records. The format should be clear, follow a logical sequence and incorporate all the necessary information. This format should be relatively consistent from one inspection cycle to the next in order to assist and streamline maintenance planning and management.

4.5 In addition to the information described below, inspection records must also contain the date of the inspection, those responsible for undertaking the inspection, general information about the structure (e.g. name, reference and location) and details of the prevailing weather conditions at the time of the inspection.

Immediate Risk to Public Safety

4.6 The procedure described in 3.9 must result in a record of the defect identified and/or safety concern raised, including times and dates, and the subsequent action planned/taken.

Safety Inspection

4.7 Records for safety inspections must be created and maintained in accordance with the requirements of the Overseeing Organisation.

4.8 When urgent action is required the procedure described in 3.9 and 4.6 must be followed.

General Inspection

4.9 The records created by a General Inspection must include as a minimum an indication of the location, severity, extent and type of any defects.

4.10 Specific requirements for the Overseeing Organisations are given in Annexes A to D.

Principal Inspection

4.11 A Principal Inspection must include a review of the completeness and accuracy of the inventory records (see Annexes A to D for additional requirements). Any deficiencies in the records should be rectified as part of the Principal Inspection.

4.12 The records created/updated by a Principal Inspection must include the following as a minimum:

- a. The location, severity, extent and type of all defects on the structure, including, where appropriate, detailed descriptions and/or photographs (or sketches) of the defects that clearly identify their location and illustrate the severity/extent of damage.
- b. For bridges over roads the relevant headroom information based on measurements taken during the inspection.
- c. Any significant change (e.g. works carried out or deterioration) since the last Principal Inspection.
- d. Any information relevant to the integrity and stability of the structure.
- e. The scope and timing of any remedial or other actions required before the next inspection.
- f. The need for a Special Inspection, additional investigations and/or monitoring.
- g. A description of any testing that was undertaken, details of the information collected and an interpretation of the information.

- d. A description of any testing that was undertaken, details of the information collected and an interpretation of the information.
- e. Any information relevant to the integrity and stability of the structure.
- f. The scope and timing of any remedial or other actions required before the next inspection.
- g. The need for any additional investigations and/or monitoring.
- h. All aspects identified and/or required by the Monitoring Specification for structures managed in accordance with BD 79.

Inspection for Assessment

4.15 BD 21/01 (DMRB 3.4.3) provides guidance on the information required from an Inspection for Assessment which would be recorded as part of the Assessment Report.

4.13 Specific requirements for the Overseeing Organisations are given in Annexes A to D.

Special Inspection

4.14 The records created by a Special Inspection must include the following as a minimum:

- a. Background and reasons for the Special Inspection.
- b. A detailed description of the condition of those parts of the structure that have been inspected including, where appropriate, photographs and/or sketches.
- c. Any significant change (e.g. works carried out or deterioration) since the last maintenance inspection to those parts of the structure that have been inspected.

5. ACCEPTANCE INSPECTIONS

General

5.1 A successful Acceptance Inspection requires liaison and cooperation between the Overseeing Organisation, the current occupier and/or owner, Agent and Contractor, as well as within the Overseeing Organisation. Contact details for the Overseeing Organisations are provided in the Annexes.

Introduction

5.2 In general, the purpose of an Acceptance Inspection is to provide a formal mechanism for exchanging information and documenting and agreeing the current status of, and outstanding work on, a structure prior to changeover of responsibility for operation, maintenance and safety from one party to another. This includes an inspection after changeover, e.g. at the end of the Defects Liability Period (DLP). An Acceptance Inspection is mainly for the benefit of the party taking over responsibility for the structure.

5.3 The format, content and timing of an Acceptance Inspection depends on its specific purpose. Three types of Acceptance Inspection are generally used: Pre Opening Inspection (POI), a Defects Liability Inspection (DLI) and a Transfer Inspection. These Acceptance Inspections are described in this Standard.

5.4 A POI and a DLI must be undertaken for new structures, reconstructions, and major modifications prior to changeover of responsibility and the end of DLP respectively. A Transfer Inspection relates to existing structures and occurs either at transfer of responsibility or ownership of the structure, or at handback of the structure at the end of a concession period. For the purpose of this Standard, transfer of responsibility does not include the transfer of structures between Agents during or at the start/end of their contract unless agreed by the Overseeing Organisation.

5.5 The term “major modification” in paragraph 5.4 must include any bridge widening, strengthening, replacement of structural members and/or major refurbishments. The need for Acceptance Inspections on other major modifications must be agreed by the Overseeing Organisation.

5.6 An Acceptance Inspection is normally carried out or organised by the party taking over responsibility in liaison with the current occupier and/or owner who should be notified and given the opportunity to attend. The inspection should be carried out by the party taking over responsibility but accompanied by representatives of the current owner/occupier to facilitate agreement, together with any other party considered appropriate. Accepted variations to this are set out in the relevant clauses of this Section. Table 2 provides guidance on the parties that should be notified of an Acceptance Inspection.

5.7 The whole structure must be inspected in an Acceptance Inspection.

Pre Opening Inspection

5.8 Upon receipt of the Contractor’s notification that works are complete a POI must be carried out. The POI may take the form of a General or Principal Inspection, as agreed with the Overseeing Organisation.

5.9 The inspection must be carried out by the Agent, or other party designated by the Overseeing Organisation, about one month before the issue of the completion documentation or the opening/re-opening of the structure to the public.

5.10 Wherever possible the opportunity should be taken to make use of existing traffic management and access arrangements and/or to combine the POI, if appropriate, with inspections/checks schedule under the construction contract.

5.11 The Agent should be aware that the responsibility for checking and accepting the works on any structure and what this entails will depend on the form of contract and the wording included therein. Under normal contractual arrangements and existing Standards, it is the responsibility of the Contractor and/or Designer to carry out checks/inspections during construction and, in collaboration with the Overseeing Organisation, or other party designated by the Overseeing Organisation, produce a snagging list prior to completion. These inspections/checks facilitate the issue of completion documentation.

5.12 Responsibility for arranging a POI lies with the Overseeing Organisation, or other party designated by the Overseeing Organisation, and must include notifying the Contractor and other interested parties (see Table 2). The Contractor's approval must be obtained before undertaking the inspection as they retain responsibility for the site until completion of the changeover.

5.13 In normal circumstances the Contractor would be expected to facilitate the inspection with the provision of access equipment as they retain responsibility for the site.

5.14 The POI must record any defects or work outstanding under the contract and any works that must be completed prior to the Agent taking responsibility for the maintenance of the structure.

5.15 Following the POI, the Agent, or other party designated by the Overseeing Organisation, must produce a POI report/record informing the Overseeing Organisation of all defects/work outstanding identified during the inspection. The report/record must be in accordance with paragraphs 5.35 to 5.39.

5.16 The Overseeing Organisation must inform the Contractor, in the way laid down in the contract, of all the defects/work outstanding and agree those that need to be completed prior to road opening.

5.17 The Overseeing Organisation, or party designated by the Overseeing Organisation, must check that all necessary certification has been supplied prior to the issue of the completion documentation in accordance with the contract.

5.18 Once the Overseeing Organisation has accepted that the structure can be handed over, they must arrange for the Agent and other necessary parties to be formally notified.

5.19 The records to be created/transferred as part of a POI are referred to in paragraphs 5.35 to 5.39.

Defects Liability Inspection

5.20 It is normal for a construction contract to include a DLP during which the Contractor will be liable for defects in their work. The DLP is also referred to as a Defects Correction Period, Period of Maintenance or Prescriptive Period. The DLP usually commences upon practical completion of the works and runs for the period specified in the contract.

5.21 The scope of defects the Contractor is liable for is set out in the contract. The Contractor's liability normally includes the responsibility for making good any latent defects or developing problems that appear.

5.22 In general, and in the absence of an express provision to the contrary, the DLP provisions are in addition to, and not in substitution for, the common law rights.

5.23 The Agent, or other party designated by the Overseeing Organisation, must undertake maintenance inspections in accordance with this Standard, or as agreed with the Overseeing Organisation, during the DLP. This must include an inspection, General or Principal as appropriate, prior to the completion of the DLP to check that all latent defects and developing problems are detected before the expiry of contractual obligations. Any latent defects/developing problems identified must be set down and agreed with the Contractor as specified by the contract, and the outcome communicated to the Overseeing Organisation.

5.24 The timing of the inspection will depend upon the length of the DLP, but should be sufficient to allow any agreed work to be undertaken by the Contractor before the end of the DLP and, if necessary, enforcement of contractual obligations.

5.25 A DLI must be carried out in the final months of the DLP to confirm that all defects identified and agreed by the aforementioned inspection have been rectified. The outcome of the DLI must be communicated to the Overseeing Organisation.

Transfer Inspections

5.26 Circumstances where the responsibility for an existing structure changes from one party to another include transfer of structures (e.g. trunking and detrunking) and handback of structures (e.g. after a PFI or PPP concession period). For both transfer and handback it is the duty of the Overseeing Organisation, or their representative, to arrange the inspection, and this should include notifying the current owner/occupier and other interested parties and giving them the opportunity to attend.

Transfer of Existing Structures

5.27 An inspection must be carried out prior to the transfer of responsibilities.

5.28 This should generally be a Principal Inspection, but a General Inspection may be used where appropriate to the structure type and size. When the results of a recent Principal Inspection are deemed to be relevant and sufficient then these may be used in place of a Transfer Inspection.

5.29 The timing of the inspection should be sufficient to allow any agreed work to be undertaken by the current owner/occupier before transfer.

5.30 The records to be created/transferred as part of a transfer are referred to in paragraphs 5.35 to 5.39.

Handback of Structures

5.31 An inspection must be carried out prior to handback at the end of a concession period.

5.32 The inspection should enable the comparison of the current condition and performance of the structure against the measures specified in the contract. This should include a Principal Inspection unless the results of a recent Principal Inspection are deemed to be relevant and sufficient. The outstanding work to be completed would be based on the measures specified in the contract.

5.33 The timing of the inspection should be sufficient to allow any agreed outstanding work to be undertaken by the Contractor before the end of the concession period and, if necessary, enforcement of contractual obligations.

5.34 The records to be created/transferred as part of a handback are referred to in paragraphs 5.35 to 5.39 and 5.41.

Acceptance Inspection Records

5.35 All Acceptance Inspections (except the DLI which is dealt with in paragraph 5.40) are forms of either a General or a Principal Inspection. Records should therefore comply as a minimum with the relevant requirements set down in this Standard for those inspections, and in addition with paragraphs 5.36 through 5.41.

5.36 The information and records created and/or transferred as part of an Acceptance Inspection should be commensurate with the circumstances and scope of the inspection.

5.37 As a minimum, a POI and Transfer Inspection must facilitate the identification, documentation and agreement of the following; refer to paragraph 5.40 for the DLI:

- a. Any defects to be rectified before changeover. This should include, as appropriate, the identification of developing problems and work outstanding and securing agreement on any works to be completed before changeover.

- b. Any permanent access provisions and features affecting general safety and security of the structure. These must be discussed in detail and agreement reached before changeover.
- c. Any outstanding responsibilities the Contractor/existing owner retains after transfer; these must be made clear to the Contractor/existing owner and the party taking over responsibility.
- d. Any Special Inspection requirements.
- e. The date on which the changeover of responsibility occurs.

5.38 An Acceptance Inspection must also facilitate the identification and handover of all the necessary records (electronic and/or hard copies), which have an impact on the current and future management of the structure. Details of appropriate records for highway structures are provided in BD 62/07 (DMRB 3.2.1).

5.39 The above information/records should be supplemented with any other information considered relevant to the current and future management of the structure.

Defects Liability Inspection

5.40 The DLI must confirm that all defects identified and agreed by the DLP inspections have been rectified. Any defects that have not been rectified must be reported to the Overseeing Organisation. If latent defects/developing problems are identified during the DLI, which were not previously identified as per paragraph 5.23, then these must be reported to the Overseeing Organisation.

Handback of Structures

5.41 The Acceptance Inspection for handback must also facilitate the comparison of the current condition and performance of the structure against the measures specified in the contract.

Efficient use of Inspection Resources

5.42 Acceptance and Maintenance Inspections must be combined or aligned where appropriate in order to make efficient use of resources.

Combining Inspections

5.43 The POI should not be seen as a replacement for inspections/checks carried out as part of the construction contract, since the latter must comply with the appropriate contract requirements. However, they may be combined when agreed by all parties.

Aligning Inspections

5.44 When a structure has only had minor modifications a PI should be substituted for the first programmed GI if there has not been a PI on the original structure in the last 3 years. Where the work involved major modifications the POI should include both the existing structure and new works (see paragraph 5.7).

Table 2 Summary of Acceptance Inspections

Event	Carried out by	Notified (see Note 1)	Outcomes	Time
Pre Opening Inspection (POI)	Overseeing Organisations representative and/or Agent	Contractor, TAA, Overseeing Organisation (or their representative) and/or Local Authority, Network Rail, British Waterways etc as appropriate	Inspection records including any additions to the defects/snagging list (see Note 2), and facilitation of the identification and transfer of information and records identified in paragraph 5.37	About one month before the issue of completion documentation or the opening/re-opening of the structure to the public
Defects Liability Inspection (DLI)	Overseeing Organisations representative and/or Agent	Contractor, Overseeing Organisation (or their representative) and/or Local Authority, Network Rail, British Waterways etc as appropriate	Confirmation of all defects rectified and any latent defects and developing problems that were not previously reported	Just prior to end of the DLP – timing should be sufficient to allow any agreed outstanding work to be undertaken by the Contractor before the end of the DLP and, if necessary, enforcement of contractual obligations
Transfer Inspection	Party taking over responsibility	Current owner and Agent and/or Local Authority, Network Rail, British Waterways etc as appropriate	Principal or General Inspection records (identify and agree any defects to be rectified before transfer or handback) Facilitate the identification and transfer of information and records identified in paragraph 5.37	Prior to transfer – timing should be sufficient to allow any agreed work to be undertaken by the current owner/occupier before transfer
Handback Inspection	Party taking over responsibility	Current Owner and Agent and/or Local Authority, Network Rail, British Waterways etc as appropriate	Principal Inspection records (identify and agree any defects to be rectified before transfer or handback) Facilitate the identification and transfer of information and records identified in paragraph 5.37	Prior to handback – timing should be sufficient to allow any agreed outstanding work to be undertaken by the Contractor before the end of the concession period and, if necessary, enforcement of contractual obligations

Notes for Table 2:

1. The party carrying out the inspection should notify the parties listed. It is at the discretion of the notified party as to whether they attend the inspection or not.
2. The defects/snagging list should have originated from the inspections/checks carried out during the construction period.

6. HEALTH AND SAFETY

Introduction

6.1 Inspections of highway structures, including any testing, must be managed to comply with general statutory and other relevant health and safety requirements and any associated Regulations and Approved Codes of Practice and guidance documents that amplify these requirements. Agents must comply with these requirements and the Overseeing Organisations internal safety procedures when planning and undertaking inspections of highway structures.

6.2 Health and Safety requirements that should be given particular regard in relation to the inspection of highway structures include, but are not restricted to:

- **Confined space inspection** – a risk assessment should be used to identify those structures that constitute confined space hazards. Staff undertaking confined space inspection should be provided with appropriate Personal Protective Equipment and Safety Equipment, work permits and training in diseases such as Leptospirosis. Staff should familiarise themselves with equipment prior to carrying out an inspection and undertake periodic checks to ensure it is functioning correctly.
- **Encountering toxic mould** – wherever mould growth is encountered in a box girder, it should be treated as toxic, and all inspection work ceased until the level of toxicity has been established as being within safe limits. Advice on safety should be sought from the appropriate Health and Safety Executive (see Annexes) and the Overseeing Organisation kept informed.
- **Working near/on railways** – inspections near or on railways should be arranged with, and carried out in full accordance with the requirements of, the relevant railway body.
- **Diving operations for underwater inspections** – all diving operations in the UK are covered by health and safety requirements and associated Regulations and approved Codes of Practice. All divers involved in commercial operations are required to hold valid medical certificates, a completed log book and a Health and Safety approved diving qualification.
- **Presence of Asbestos** – Agents should have an Asbestos Management System in accordance with the Control of Asbestos at Work Regulations 2002 (CAWR) and any requirements set down by the Overseeing Organisation. The Asbestos Management System should enable the inspector to check for the presence of asbestos containing materials prior to the inspection, thereby enabling appropriate action, in accordance with the Asbestos Management System, to be taken when asbestos is present.

6.3 More comprehensive information on health and safety requirements that should be considered when carrying out inspections is provided in the Inspection Manual for Highway Structures.

7. REFERENCES

Design Manual for Roads and Bridges

- BD 21 The Assessment of Highway Bridges and Structures (DMRB 3.4.3)
- BD 53 Inspection and Records for Road Tunnels (DMRB 3.1.6)
- BD 62 As Built, Operational and Maintenance Records for Highway Structures (DMRB 3.2.1)
- BD 79 The Management of Sub-Standard Highway Structures (DMRB 3.4.18)
- HD 34 Implementation and Use of the Standards Improvement System (DMRB 5.3.1)
- BA 35 Inspection and Repair of Concrete Structures (DMRB 3.3.2)
- BA 50 Post-tensioned Concrete Bridges: Planning, Organisation and Methods for Carrying Out Special Inspections (DMRB 3.1.3)
- BA 74 Assessment of Scour at Highway Bridges (DMRB 3.4.21)

Other Publications

Management of Highway Structures: A Code of Practice, The Stationery Office, 2005, ISBN 0 11 552642 0

Inspection Manual for Highway Structures, The Stationery Office, 2007

Institution Guide: The Operation and Maintenance of Bridges Access Gantries and Runways, The Institution of Structural Engineers, 2007

Control of Asbestos at Work Regulations 2002 (CAWR), The Stationary Office, 2002, ISBN 0 11 042918 4

8. ENQUIRIES

All technical enquiries or comments on this Standard should be sent in writing as appropriate to:

Chief Highway Engineer
The Highways Agency
123 Buckingham Palace Road
London
SW1W 9HA

G CLARKE
Chief Highway Engineer

Chief Road Engineer
Transport Scotland
Trunk Roads and Professional Services
8th Floor, Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

J HOWISON
Chief Road Engineer

Chief Highway Engineer
Transport Wales
Welsh Assembly Government
Cathays Parks
Cardiff
CF10 3NQ

M J A PARKER
Chief Highway Engineer
Transport Wales

Director of Engineering (Acting)
The Department for Regional Development
Roads Service
Clarence Court
10-18 Adelaide Street
Belfast BT2 8GB

R J M CAIRNS
Director of Engineering (Acting)

ANNEX A SPECIAL REQUIREMENTS: ENGLAND

A.1 Requirements for the inspection of trunk road highways structures in England by Agents are set out in the Highways Agency's Network Management Manual (NMM) Part 2, under "Records and Inspection of Highway Structures". These requirements supersede those of IAN 38/02, IAN 45/02, IAN 62/05 and IAN 67/05.

A.2 Agents must comply with the NMM, and compliance with NMM "Records and Inspection of Highway Structures" is deemed to represent compliance with BD 63/07 (DMRB 3.1.4).

ANNEX B SPECIAL REQUIREMENTS: SCOTLAND

Introduction

B.1 The requirements in this Annex only relate to highway structures on motorways and trunk roads in Scotland. These requirements are in addition to those contained in the main body (Sections 1 to 6) of this Standard.

B.2 The appropriate contact, in Scotland, with regard to this Standard is:

Bridges Section
Trunk Road Network Management Division
Transport Scotland
Buchanan House
58 Port Dundas Road
Glasgow, G4 0HF

Tel: 0141 272 7100
e-mail: www.transportscotland.gov.uk

Scope

B.3 The scope of structures to be inspected by Agents to Transport Scotland is as described in Table 1 subject to the amendments shown in Table 3.

Table 3 Scope of Inspections

Structure Type	Scope of Structures to be Inspected
Bridge, buried structure, subway underpass, culvert and any other similar structure	<ul style="list-style-type: none"> • All structures greater than or equal to 3 meters spans • Culverts 2 to 3 meters span, or multi-cell culverts where the cumulative span is greater than or equal to 5 meters • Corrugated metal culverts 0.9 metres or more in span • Pedestrian subways
Earth retaining structure	As per Table 1 but greater than 1.5m
Reinforced/strengthened soil/fill structure with hard facings	As per Table 1 but greater than 1.5m
Sign and/or signal gantry	Structural aspects of large sign/signal gantries and large Variable Matrix Signs (VMS) signs
Masts	As per Table 1 Highway signs and posts greater than 7m in height
Access gantry	As per Table 1
Tunnels	As per Table 1
Other structures	As per Table 1
Third Party structures	As per Table 1

Maintenance Inspections

B.4 Safety, General and Principal Inspections must include the inspection of all approach and departure safety fences, transitions and connections.

Safety Inspections

B.5 Safety Inspections must be carried out in accordance with contract requirements.

B.6 In accordance with paragraph 3.16, any instances of structural deterioration or behaviours likely to indicate a reduction in carrying capacity or safety must be reported to Bridges Section.

Principal Inspection

B.7 Principal Inspections must be carried out in accordance with the *Guidance Note: Trunk Road Structures: Principal Inspections for Maintenance Works Prioritisation*.

B.8 The scope of a Principal Inspection must be extended to include concrete investigations where this is recommended by the Agent and agreed with the Overseeing Organisation.

B.9 Where they exist for a structure, the records described in BD 62/07 (DMRB 3.2.1) are a relevant consideration that must be referred to prior to carrying out a Principal Inspection.

B.10 When carrying out a Principal Inspection the Agent must check, amend and update the information held in the Transport Scotland Bridge Management System (TSBMS).

B.11 Assistance with this task is provided within the TSBMS by the provision of a facility to view and/or print a full inventory report of any structure. These reports should be called up and studied prior to and during Principal Inspections so that errors and omissions can be spotted and rectified. Confidence in the TSBMS relies on full and accurate data and responsibility for achieving this rests with personnel carrying out the Principal Inspections.

B.12 Bridges Section have developed procedures for Principal Inspections which allow Agents to use the

TSBMS to report defects in structures by description and location, and give severity ratings with recommendations and estimates of repair costs.

B.13 Input of missing data and correction or errors in the TSBMS must be carried out during the Principal Inspection.

B.14 By this means a complete and reliable record of all the structures will be ensured over future years.

Special Inspections

B.15 The extent of the detailed investigations, the methods to be used and reporting requirements must be agreed with the Bridges Section.

Inspection Records

All Inspections

B.16 Where defects are to be prioritised for inclusion in a maintenance programme the costs must be included in the inspection records.

B.17 Records must include comments on defects reported in the previous General or Principal Inspection report and any works carried out since the last inspection.

Safety Inspections

B.18 Safety Inspections must be recorded in accordance with contract requirements.

General Inspections

B.19 The BE 11 Form, as included in this Annex, must be used for General Inspections.

B.20 The Agent must ensure that the date of the last General Inspection is recorded in TSBMS.

Principal Inspection

B.21 The findings of concrete investigations (paragraph B.8) must be submitted with Principal Inspection records to the Bridges Section. The year

of an initial concrete investigation or the year of the most recent concrete monitoring investigation must be recorded in the TSBMS by the Agent when the Principal Inspections are carried out.

B.22 Information, in addition to paragraph 4.12, which must be recorded during a Principal Inspection, includes a current General Arrangement (GA) drawing showing the location of the photographs and the headroom measurements and date measured. The GA should include a plan, elevation and cross section.

B.23 The Agent must ensure the date of the last Principal Inspection is recorded in the TSBMS.

Programming Inspections

B.24 The two year and six year cyclic programme for General and Principal Inspections are held in the TSBMS. The Agent must enter the proposed and actual date of the General and Principal Inspections.

B.25 The TSBMS provides reports on annual programmes, showing any backlog from previous years.

Acceptance Inspections

B.26 Issues relating to Acceptance Inspections should be referred to Bridges Section. The Joint Inspection at the end of the DLP shall constitute the equivalent of an initial Principal Inspection.

Health and Safety

B.27 The appropriate Health and Safety Executive in Scotland is:

Scotland East Area
Belford House
59 Belford Road
Edinburgh
EH4 3UE

Telephone: 0131 247 2000

Scotland West Area
375 West George Street
Glasgow
G2 4LW

Telephone: 0141 275 3000

Form BE 11

B.28 An example of a blank and completed Form BE 11 is attached to this Annex. The following provides details of the fields included on the form and how they should be filled out.

General

Structure No.	Enter the agreed number for the structure.
Grid Ref.	Enter the 10 figure grid reference.
Agent Code	Enter the Agent code.
Agent Name	Enter the Agent Name.
Structure Name	Enter the structure name.
From/to span	This applies to bridges, retaining walls and high mast and catenary lighting and is to cater for the situation where there is a wide variation in condition within spans, panels or lighting columns. The intention is to allow for a more realistic description of the condition of the structure to be made. For example, when there is a large area of spalling on one span only of a multi-span bridge which requires immediate repair, a separate report should be made for the defective span.
Date of Inspection	Enter the date in the form of 15-Jul-2006.
Inspected by	Enter the inspectors name.
Type of Inspection	Tick the box which corresponds to the type of inspection (using G for General, P for Principal and S for Special).
Overall	The overall assessment of the condition is to be inserted in this field, using G for good, F for fair and P for poor. This should not take into account factors such as age.

Estimated Costs, Extent, Severity, Work, Priority

B.29 The Estimated Costs, Extent, Severity, Work and Priority columns are to be completed using the following scales. Only one entry is permitted in the extent/severity/work recommended and priority fields for a given item for example, H/M in the priority field or R/C in the work recommended field are unacceptable.

Estimated Cost	This should be given for each item of Work Recommended as a rough guide to the cost involved. It should be given in pounds and should not include Traffic Management Costs and Administration Fee.
Extent	A No significant defect. B Slight, not more than 5% of length or area affected. C Moderate, 5% - 20% affected. D Extensive, more than 20% affected.
Severity	1 No significant defects. 2 Minor defects of a non-urgent nature. 3 Defects which shall be included for attention within the next annual maintenance programme 4 Severe defects where urgent action is needed.
Work	A Add (new items to be provided e.g. waterproofing). B Item present but not inspected. C Change (e.g. replacement of a defective bearing or parapet). P Paint. N No action at present, monitor only. R Repair/maintain (repair to concrete, clean grease, rod etc). S Silane impregnation.

Investigation Types	<ol style="list-style-type: none"> 1 Alkali-Silica reaction. 2 Chloride contamination. 3 Carbonation. 4 Corrosion of reinforcement/prestressing cables. 5 Structural steel paintwork. 6 Accidental damage. 7 Spalling of masonry, brick or concrete. 8 Chloride ion levels in reinforced concrete decks before waterproofing or on re-waterproofing. <p>Investigation codes should only be used when actual work is not recommended at this stage. If it is not possible to give a realistic estimate of the costs at this stage, a nominal figure of 1.00 should be entered.</p>
Priority	<p>H High; work should be done during the next financial year to ensure the safety of the public or safeguard structural integrity or avoid a high cost penalty.</p> <p>M Medium; work should be done during the next financial year; postponement carries some cost penalty.</p> <p>L Low; work should be done within the next two financial years.</p>
PD	Used for the identification of premature defects, and 'F' should be inserted against any item number where the condition is inferior to that which might be expected from normal wear and tear.
Comments	Enter any comments that will assist the interpretation of the defect codes and the planning of maintenance actions.

B.30 The combinations in Table 4 are the only ones which are valid and suitable for data input. Combinations such as 'A2' for Extent and Severity, or 'C3' for Extent and Severity with a 'L' Priority are unacceptable. In the first example, the 'A' for extent (no significant defect) is inconsistent with '2' for severity (minor defects of a non-urgent nature). The correct codes should have been either 'A1' or 'B2'. (With appropriate codes in the other fields.) In the second example, the correct codes should have been either 'C2' for Extent and Severity with 'L' for Priority or 'C3' for Extent and Severity with 'M' or 'H' for priority.

Table 4 Acceptable Combinations

Estimated Cost	Extent	Severity	Work Recorded	Priority
BLANK or 0	BLANK	BLANK	BLANK or S or B	BLANK
BLANK or 0	A	1	BLANK	BLANK
>0	BLANK	BLANK	A	L or M or H
BLANK or 0	B or C or D	2	N	BLANK
>0	B or C or D	2	R or C or P or 1-8	L
>0	B or C or D	3	R or C or P or 1-8	H or M
>0	B or C	4	R or C or P or 1-8	H

Trunk Road/Motorway Structure Inspection Report

BE11/07

Structure No.

Grid Ref

Agent Code

Agent Name

Structure Name

From Span To Span

Date of Inspection
 (e.g. 0 1 J U N 2 0 0 6)

Inspected By

Type of Inspection* G P S

Overall Assessment* G F P

*Please tick

Defect Assessment

Defect Assessment	Estimated Cost (£)	Extent	Severity	Work	Priority	PD	Comments
1. Foundations							
2. Inverts and Aprons							
3. Fenders							
4. Piers and Columns							
5. Abutments							
6. Wing Walls							
7. Retaining Walls and Revetments							
8. Approach Embankments							
9. Bearings							
10. Main Beams / Tunnel Portals / Mast							
11. Transverse Beams / Catenary Cables							
12. Diaphragms or Bracings							
13. Concrete Slab							
14. Metal Deck Plates / Tunnel Linings							

BE11/07

Defect Assessment (cont)

	Estimated Cost (£)	Extent	Severity	Work	Priority	PD	Comments
15. Jack Arches							
16. Arch Ring / Corrugated Metal							
17. Spandrels							
18. Tie Rods							
19. Drainage Systems							
20. Waterproofing							
21. Surfacing							
22. Service Ducts							
23. Expansion Joints							
24. Parapets / Handrails / Safety Fencing*							
25. Access Gantries or Walkways							
26. Machinery							
32. Dry Stone Walls							
33. Troughing							

*including Transitions and Connections

Was the remedial work recommended at previous inspection satisfactorily completed? Please tick. YES NO

If 'NO' please comment and indicate any remedial work recommended and priority

Reasons for Priority Allocation

Signed

Name

Date

Trunk Road/Motorway Structure Inspection Report

BE11/07

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0	1	J	U	N	2	0	0	6													
A. N. Inspector																					
Type of Inspection* G <input checked="" type="checkbox"/> P <input type="checkbox"/> S <input type="checkbox"/>	Overall Assessment* G <input type="checkbox"/> F <input checked="" type="checkbox"/> P <input type="checkbox"/> *Please tick																				

Defect Assessment	Estimated Cost (£)	Extent	Severity	Work	Priority	PD	Comments
1. Foundations	-	A	1	-	-	-	No signs of distress in the structure due to the foundations
2. Inverts and Aprons							
3. Fenders							
4. Piers and Columns	-	A	1	-	-	-	
5. Abutments	-	B	2	N	-	-	Minor cracks in north abutment
6. Wing Walls							
7. Retaining Walls and Revetments							
8. Approach Embankments							
9. Bearings	11,000	C	4	C	H	-	Sliding bearing on Pier 2 rusted and seized
10. Main Beams / Tunnel Portals / Mast	25,000	B	3	P	M	-	Corrosion of main steel beams
11. Transverse Beams / Catenary Cables							
12. Diaphragms or Bracings							
13. Concrete Slab	-	A	1	-	-	-	
14. Metal Deck Plates / Tunnel Linings							

Defect Assessment (cont)

	Estimated Cost (£)	Extent	Severity	Work	Priority	PD	Comments
15. Jack Arches							
16. Arch Ring / Corrugated Metal							
17. Spandrels							
18. Tie Rods							
19. Drainage Systems	5,000	B	3	R	H	-	Clear blocked drains on abutments and piers
20. Waterproofing	30,000	C	3	A	L	-	Renew waterproofing
21. Surfacing	40,000	B	2	C	L	-	If item 20 is carried out
22. Service Ducts							
23. Expansion Joints	2,000	B	2	C	L	-	Replace the rubber sealant
24. Parapets / Handrails / Safety Fencing*	-	A	1	-	-	-	
25. Access Gtries or Walkways							
26. Machinery							
32. Dry Stone Walls							
33. Troughing							

*including Transitions and Connections

Was the remedial work recommended at previous inspection satisfactorily completed? Please tick. YES NO

If 'NO' please comment and indicate any remedial work recommended and priority

Work recommended for bearings (Item 9) at last inspection was not undertaken, this has resulted in current poor condition and high priority work

Reasons for Priority Allocation

*9. Bearings on pier 2 need urgent replacement – H
 19. Clear drains before next winter – H
 10. Steelwork painting already programmed in 06/07 budget – M
 20, 21 and 23 – early actions will reduce whole life costs - L*

Signed

Arthur N Inspector

Name A. N. INSPECTOR

Date 14 September 2006

ANNEX C SPECIAL REQUIREMENTS: WALES

General

C.1 The specific requirements of Transport Wales with respect to this Standard are set down in Advice Note: Transport Wales Supplement to BD 62/07 (DMRB 3.2.1) and BD 63/07 (DMRB 3.1.4), these only relate to highway structures on motorways and trunk roads in Wales. These requirements are in addition to those contained in this Annex and in the main body (Sections 1 to 6) of this Standard.

C.2 Agents, Designers and Contractors must follow the requirements set down in the Advice Note and check they are working to the latest version of the Advice Note.

C.3 The appropriate contact, in Wales, with regard to this Standard and the Advice Note is:

Chief Bridge Engineer
Transport Wales
Welsh Assembly Government
Cathays Park
Cardiff, CF10 3NQ

Scope

C.4 The scope of structures to be inspected by Agents to Transport Wales is as described in Table 1 in Section 2 of this Standard.

Maintenance Inspections

C.5 Safety, General and Principal Inspections must include the inspection of all approach and departure safety fences, transitions and connections.

Safety Inspections

C.6 Safety Inspections must be carried out and recorded in accordance with the requirements set down in the Trunk Road Maintenance Manual (TRMM).

General Inspections

C.7 The inspection procedures defined in this Standard and the Inspection Manual for Highway Structures must be used.

Principal Inspections

C.8 The inspection procedures defined in this Standard and the Inspection Manual for Highway Structures must be used.

C.9 Previous General and Principal Inspection records must be reviewed before the forthcoming inspection to identify any long standing issues.

C.10 Where they exist for a structure, the records described in BD 62/07 (DMRB 3.2.1) are a relevant consideration that must be referred to prior to carrying out a Principal Inspection.

Special Inspections

C.11 The inspection procedures defined in this Standard and the Inspection Manual for Highway Structures must be used.

C.12 The extent of the detailed investigations, the methods to be used and reporting requirements must be agreed with the Overseeing Organisation.

Inspection Records

C.13 Inspections must be recorded in accordance with procedures described in this Standard and the Inspection Manual for Highway Structures.

General Inspections

C.14 A summary of the findings of a General Inspection must be reported on Form BE 11, see Advice Note.

Principal Inspections

C.15 The Principal Inspection report must include an updated Form ROADS 277 together with appropriate structure database data as required by Transport Wales, see Advice Note.

C.16 A written report of the observations, findings, causes and any recommended remedies must be produced, see paragraphs C.20 to C.48 for guidance on the outline contents of a Principal Inspection Report. One copy of the final report must be submitted to Transport Wales and summarised on Form BE 11 together with one additional updated copy of Form ROADS 277.

Special Inspections

C.17 A written report of the observations, findings, causes and any recommended remedies must be produced; see paragraphs C.20 to C.48 for guidance on the outline contents of a Special Inspection Report. One copy of the final report must be submitted to Transport Wales summarised on Form BE 11.

C.18 Where relevant, a Diving Report must be submitted, see Advice Note.

Health and Safety

C.19 The appropriate Health and Safety Executive in Wales is:

Government Buildings
Phase 1
Ty Glas
Llanishen
CARDIFF CF14 5SH

Tel: 029 2026 3000
Fax: 029 2026 3120

Outline Contents of Principal and Special Inspection Reports

Title Sheet and Location Plans

C.20 A Title Sheet should be provided.

C.21 Location Plans – location of the structure should be indicated on OS 1:50,000 and 1:2,500 plans.

General Arrangement

C.22 Include A4 size copy of the GA, or if it is not available, a sketch showing the form of construction. Basic data on the location, type and materials can be covered in the report by inclusion of a copy of Form ROADS 277, photo-reduced to A4 size, provided that it is legible.

Description of Structure

C.23 General Description – stating number of spans, skew, width, minimum headroom, highway carried, highway or other obstacle crossed and approximate date of construction.

C.24 Deck Description – form of construction for main deck, service duct, beams, etc.

C.25 End Supports – abutments, wing walls, movement/construction joints, type of foundation, treatment of embankment slopes.

C.26 Intermediate Supports – details of piers and foundations.

C.27 Bearings and Articulation – sketch helpful.

C.28 Deck Ancillaries – surfacing details and finishes, deck expansion joints, waterproofing membrane, parapet, safety fence, fascia panels, etc.

C.29 Drainage System – details of the deck and sub-structure/retaining wall system and outlet type.

C.30 Protective systems.

C.31 Permanent Access Equipment.

Maintenance History

C.32 Details of maintenance works which have been undertaken since the last Principal Inspection.

Description of Inspection

C.33 Previous Inspections. Note the type and date of the last inspection and summarise the findings.

C.34 Name of Inspecting Engineer and Assistant, Date(s) of Inspection and Weather conditions.

C.35 Description of how inspection was undertaken – on foot, telescopic hoist, scaffolding, etc.

C.36 List areas not inspected – e.g. buried surfaces.

Reports

C.37 Comment upon the condition of each element. Record all defects and if none are observed then this should be stated. All members and location must be clearly referenced. Photographs or sketches could show the location and extent of defects, superimposed on an elevation or plan of the element.

C.38 The size of the report will vary according to the size, complexity and condition of the structure. For example, a small, recently constructed R.C. box culvert may require a BE 11 with a short report including photographs; a medium span bridge in fair condition might have a report some 10 pages long; a large span girder bridge in poor condition may require some 100 pages of text, diagrams, photographs etc to give an adequate picture.

C.39 In complex cases, preliminary discussions with the Overseeing Organisation should be held. It may also be useful to submit a preliminary outline or draft for approval.

C.40 Where a Consulting Engineer is employed to carry out the inspection, all the foregoing should be taken to be equally applicable. The Agent should indicate that the report is acceptable and confirm agreement to the recommendations.

C.41 A separate sub-report should be included for moveable bridges, where specialist inspectors are used (whether in-house or not).

C.42 There should also be an individual sub-report prepared for each Permanent Access Gantry. These should be treated as separate structures, even though there may be several such gantries per bridge.

Photographs

C.43 A good colour photograph may save a good deal of intricate and tedious description. If there are several photographs, a sketch plan or elevation, with arrows showing where the photographs were taken may also be clearer than many words.

Forms

C.44 For every inspection, a BE 11 form must be included to show the Extent and Severity of any defects; the type of action required; its priority and approximate cost. This should be in addition to the copy for the Agent if they are not the organisation carrying out the inspection.

C.45 A description of condition of each of the items on the Inspection Form may need to be further subdivided, as for example, each of the 10 main beams of a beam-and-slab deck.

C.46 Trunk Road Database Sheets as detailed in the Advice Note.

Testing

C.47 Limited testing is required for reinforced concrete structures as described in BA 35/90 (DMRB 3.3.2) and BD 43/03 (DMRB 2.4.2). The results of this testing work should be incorporated in the Report. Should it be necessary to employ specialist consultants for non-destructive testing, their report should be included. Similarly, any laboratory or chemical or other analyses should be added with chloride concentrations, carbonation depths, half cell potentials, concrete core test results etc. as appropriate.

Test Results

C.48 Cover meter reading, half cell, crack widths, chloride or carbonation results etc., and their locations and any key reference dimensions or levels should be recorded if they are to be monitored. The areas which have been subject to silane treatment should be given in the form of a simple sketch or elevation.

ANNEX D SPECIAL REQUIREMENTS: NORTHERN IRELAND

Introduction

D.1 The requirements in this Annex only relate to designated roads in Northern Ireland. These requirements are in addition to those contained in the main body (Sections 1 to 6) of this Standard.

D.2 The appropriate contact, in Northern Ireland, with regard to this Standard is:

The Director of Engineering
Roads Service Headquarters
Clarence Court
10 to 18 Adelaide Street
Belfast, BT2 8GB

D.3 References in this Standard to organisations, and legislation etc. will be deemed to refer to the Northern Ireland equivalent where appropriate.

D.4 This Standard supersedes Director of Engineering Memo 70/04, which is hereby withdrawn.

Scope

D.5 The scope of structures to be inspected by Agents to the Roads Service is as described in Table 1 subject to the amendments shown in Table 5.

Table 5 Scope of Inspections

Structure Type	Scope of structures to be inspected
Bridge, buried structure, subway underpass, culvert and any other similar structure	<ol style="list-style-type: none"> 1. All structures of span 3 metres and greater 2. Bridges/Culverts 1.8 to 3 metres span if cover to road surface is less than 1 metre 3. Multi-span Bridges/Culverts where the cumulative span is greater than or equal to 5 metres, if cover to road surface is less than 1 metre 4. Corrugated metal culverts 0.9 metres or more in span 5. Pedestrian subways
Earth retaining structure	As per Table 1 but greater than 1.5m
Reinforced/strengthened soil/fill structure with hard facings	As per Table 1 but greater than 1.5m
Sign and/or signal gantry	As per Table 1
Masts (see Note 1)	As per Table 1
Access gantry	As per Table 1
Tunnels	As per Table 1
Other structures	As per Table 1
Third Party structures	As per Table 1

Notes:

1. For third party masts for camera, radio, speed camera and telecommunication transmission equipment etc. refer to Third Party structures and paragraph 2.6.

Maintenance Inspections

Safety Inspections

D.6 Safety Inspections are undertaken as part of the highway safety inspection regime.

General Inspections

D.7 The inspection procedures defined in this Standard and the Inspection Manual for Highway Structures must be used.

D.8 General Inspections must include approach/ departure safety fences and connections.

Principal Inspections

D.9 The inspection procedures defined in this Standard and the Inspection Manual for Highway Structures must be used.

D.10 Previous General and Principal Inspection records must be reviewed before the forthcoming inspection to identify any long standing issues.

D.11 Principal Inspections must include approach/ departure safety fences and connections.

Inspection Records

D.12 Where a longer Principal Inspection interval has been agreed in accordance with paragraph 3.37 the relevant information must be recorded on the Roads Service Bridge Management System (RSBMS).

D.13 Inspections must be recorded in accordance with procedures described in the Inspection Manual for Highway Structures.

Safety Inspections

D.14 No formal documentation required.

D.15 In accordance with paragraph 3.16, any instances of structural deterioration or behaviours likely to indicate a reduction in carrying capacity or safety must be reported to the Roads Service Divisional Office.

General Inspections

D.16 The current reporting format for General Inspections can be obtained from the Overseeing Organisation.

Principal Inspection

D.17 Where they exist for a structure, the records described in the Structure/Maintenance Manual or as described in BD 62/07 (DMRB 3.2.1) are a relevant consideration that must be referred to prior to carrying out a Principal Inspection.

D.18 When carrying out a Principal Inspection the Agent must check the information held in the RSBMS. The Agent must ensure the RSBMS is updated for errors identified and/or missing data following the inspection.

D.19 Additional information that must be recorded during a Principal Inspection includes any significant change or deterioration since the last Principal Inspection.

D.20 The current reporting format for Principal Inspections can be obtained from the Overseeing Organisation.

Acceptance Inspections

D.21 Issues relating to Acceptance Inspections should be referred to the contact provided in paragraph D.2.

Health and Safety

D.22 The appropriate Health and Safety Executive in Northern Ireland is:

Health and Safety Executive (NI)
83 Ladas Drive
Belfast
BT6 9FR

Tel: 028 9024 3249
Fax: 028 9023 5383