

**INTERIM ADVICE NOTE 51/03
HINGE DECK STRUCTURES**

DRAFT LETTER TO MAINTAINING AGENTS

Hinge Deck Structures – Interim Management Strategy

Attached is a copy of Interim Advice Note 51/03, which replaces advice given in IAN 40/01 on the Highways Agency's interim strategy for the management of *Hinge Deck Structures*. These are bridges having reinforced concrete hinges within the deck of cantilever / suspended slab concrete bridges. This Interim Advice will eventually be superseded by an Advice Note published in the Design Manual for Roads & Bridges.

All Agents with structures of this type should already be actively managing bridges of this type.

Divisional Director

1. INTRODUCTION

- 1.1 This Interim Advice Note supersedes IAN 40/01 which implemented an Interim Management Strategy for *reinforced concrete hinges* in the decks of suspended span bridges. The opportunity has been taken to update the strategy, and the following issues have added or amended.
- a) The scope has been amended to include other types of bridges with hinge deck details (see 1.3).
 - b) Management of the programme will be linked to SMIS (see 3.20 and Annex D).
 - c) Further information has been included on NDT techniques (see 3.15 and 3.16).
 - d) Outline details of the research are provided (see 3.21).
 - e) Maintenance options are identified (see 3.18 and 3.19).
 - f) Timescales have been outlined (see 3.1 and 4.1).
- 1.2 The typical hinge detail (similar to that shown in Annex B) consists of a narrowing of the concrete section in flat slab or beam and slab decks to form a throat, through which steel reinforcement passes between cantilever and suspended span. There are known variations to this arrangement, with differing details of reinforcement, different types of reinforcement, skews and edge details, particularly where service bays are included. It is important to establish the reinforcement configuration and type, and if any reinforcement is misplaced. It has been found that the diagonal dowel bars are sometimes not coincident in the hinge throat and this may have implications for the performance of the hinge.
- 1.3 Structures with a different detail known as a Wichert truss (typical detail shown at Annex C) are also to be included within the scope of the strategy. These structures were used in areas subject to significant differential settlement such as mining subsidence.
- 1.4 This is a framework document, offering advice to Agents on the performance and management of hinge deck bridges. Agents are responsible for the appraisal of affected bridges within the scope of this framework, until such a time that a Future Management Strategy is implemented (see 4.1).
- 1.5 The opportunity has been taken to amplify the guidance given in IAN 40/01 based on feedback from the Agents involved, and a Hinge Deck Workshop held with all affected Agents. One significant change is that a National Structures Programme Module for the Structures Management Information System (SMIS) has been developed to allow input and management of data associated with the hinge deck strategy. This is detailed in Annex D.
- 1.6 Agents are requested to implement the guidance in consultation with Highways Agency OD Project Sponsors and local SSR TAG engineers.

2 BACKGROUND

- 2.1 Hinge joints were introduced into bridge decks as a means of simplifying the design, and standardising details on bridges having a range of span and functional requirements. The disadvantages with hinged joints are that they are not easily accessible for inspection or maintenance due to their form, and being mostly located over or under live traffic lanes. They are vulnerable to deterioration in the event of bridge deck waterproofing failure, where chloride rich seepage through the joint can cause reinforcement corrosion. This reinforcement is crucial to the integrity of the joint, and the loss of reinforcement section, or associated concrete spalling can induce higher stresses, leading to eventual failure by yielding. A particular defect noted from existing inspections of hinged joints is that the majority have cracks running through the throat, indicating that the hinge has been, or is subject to tension and may not be working as originally intended. This complicates any structural assessment of the hinge, and also brings into question the fatigue endurance of the reinforcement.
- 2.2 Bridges owned by the Highways Agency incorporating hinge joints are located on the M1, M5, M6, A6, A45 and A52 trunk roads in the Midlands. Most have already been subject to visual inspection, and have been prioritised on the basis of their external condition. This IAN sets out an Interim Management Strategy for all structures of this type, and is indicated in flow chart format in Annex A. This has been modified from that previously issued in Interim advice Note 40/01, as data capture and management has now been included in Annex D.

3 INTERIM MANAGEMENT STRATEGY

Initial Special Visual Inspection (SMIS Activities 1.1 and 1.2)

- 3.1 Hinge deck structures which have not had a Special Inspection of the hinges, shall be inspected as soon as possible. Where Special Inspections have been carried out since the issue of IAN 40/01, Agents should consider if the requirements in 3.2 and 3.3 are met, and undertake further inspection within the next three months from the underside of the deck if necessary.
- 3.2 Initial special inspections should determine whether the hinge throat is cracked, and if it is, the width of the crack. This can be attempted using a selection of feeler rods of different widths at a number of locations along the throat, and these locations marked for future reference. The range of measurements taken should be carefully interpreted and averaged to ensure that a true value for the crack width is reported. Bridge temperature should also be recorded since crack width may be influenced by seasonal temperature variation. The severity and location of any other defects such as leaching, or corrosion products leaking through the throat should also be recorded, and any relevant concrete delamination and spalling in the vicinity of the hinge. Whilst carrying out special inspection, the opportunity should be taken to install monitoring 'pips' to the soffit adjacent to the hinges, to enable periodic monitoring of future changes to crack width.

Prioritisation

- 3.3 Hinge deck structures should be initially prioritised on the basis of visual condition, and modified as further information is obtained. Although it is acknowledged that there are some shortcomings of this approach (refer to 3.6), until the Future Management Strategy is developed this is considered to be the most appropriate method. It is expected that prioritisation will be eventually based on risk (refer to 3.17). Details of a condition based approach developed by one Agent is included at Annex E.

Further Inspection (SMIS Activity 1.3)

- 3.4 Where the hinges have *significantly* cracked, (say crack widths >2mm), or there is (or has been in the past) significant seepage, the opportunity should be taken to determine the condition of the throat reinforcement. One method of doing this without significant intrusion and de-stressing of the reinforcement is to carefully drill small holes through the cracked hinge throat, and inspect bars using a borescope, although it is likely that this will only produce limited information (see 3.16). At the same time if there is significant seepage, limited concrete condition testing (chloride content, cement content etc) should be carried out at the hinge, to supplement existing data already available from earlier principal or special inspections. Particular attention should be given to the condition of the anti-bursting link reinforcement, since this is considered to contribute significantly to the integrity of the joint. It may also be possible to identify the type of reinforcement used and whether it is misplaced.
- 3.5 Agents should report this inspection information as soon as possible to HA regional office (OD and SSR TAG contacts), with recommendations for further investigation work if necessary.
- 3.6 Where there is no indication of significant cracking of the hinges, seepage, or other defects observed, no further immediate action is required, pending further advice that may be issued in due course. However, normal inspection and maintenance arrangements will apply, and Agents should ensure that information relating to the hinge is included and recorded. Attention is drawn to the information provided at 3.16 below, and as a result it is likely that further work will be required on all hinge deck structures, whether they are exhibiting defects or not, as part of the Future Management Strategy.

Monitoring (SMIS Activity 1.6)

- 3.7 There significant cracks have been observed, and there may be other deterioration, a regime of periodic monitoring and inspection may be necessary, after an appraisal assessment has been undertaken (refer to 3.8). Any monitoring should generally be based on a visual approach that will target the key factors affecting hinge performance, such as changing condition, material deterioration or bridge movements. In some cases it may be appropriate to utilise technical monitoring using strain or other movement gauges. The intervals for monitoring should be appropriate for the structure (eg. 3 months to 1 year), depending on the nature and severity of the deterioration, and the potential risk to the network. The objective of the monitoring is to determine if there is any:

- i) progressive horizontal and vertical movement at the joint,
- ii) movement due to traffic loading and,
- iii) ongoing material deterioration.
- iv) rate of deterioration

Agents should discuss and agree proposals for monitoring with HA regional office (OD and SSR TAG contacts).

Interim Appraisal Assessment (SMIS Activity 1.4)

- 3.8 Previous model tests and theoretical analysis of hinge joints in as-built condition have shown that there is a generous factor of safety in capacity over applied loading. However it is likely that capacity may have been reduced in those structures exhibiting significant deterioration. Where hinged deck structures are exhibiting significant deterioration Agents shall review existing structural assessment reports as part of the Steady State Assessment programme, and carry out new assessments as appropriate.
- 3.9 Particular attention should be paid to the method of analysis previously adopted, and whether it is still considered appropriate: any assumptions made about the condition of the hinge in the assessment, and the appropriateness of any departures from standards previously granted. It is recognised that previous assessments concentrated on the effects of the 40t assessment live load, and it may be necessary to reassess the structure in its present (ie deteriorated and cracked) condition, taking account of construction defects such as poor concrete compaction, curing and reinforcement misalignment, where known. Assessment should also consider local load effects such as verge accidental wheel loads, thermal, and differential settlement, and the presence of particular design features such as cantilever pipe bays, skew and dog-leg joints.
- 3.10 Assessment should be carried out in two parts:
 - i) To determine the range of load effects on the hinge joint;
 - ii) To calculate the capacity of the joint in its deteriorated condition. Advice on the assessment of hinges in a deteriorated condition will form the basis of the Future Management Strategy in due course, but until this is published, Agents should carry out their own initial appraisal of joint capacity.
- 3.11 One of the objectives of the assessment should be to identify a deterioration trigger point to feed into a monitoring and inspection regime, and to assist in determining when interim safeguarding measures are required. To facilitate this, a 'sensitivity' analysis should be carried out to determine the influence of variations in the condition of the structure. Defects can be categorised under loss of throat reinforcement cross-section, reinforcement yielding, misplaced reinforcement, concrete debonding, and loss of link reinforcement. A range of severity of each defect (and any other factors) should be considered, and the position of the structure within this range determined. For the sake of consistency of reporting, sensitivity should be expressed in terms of 'usage factor': the ratio of load effect to assessed joint capacity. Technical Approval procedures in accordance with BD 2 will apply to this assessment work. Further advice on sensitivity analysis will be included in the Future Management Strategy.

Invasive Inspection and Non-destructive Testing (SMIS Activity 1.5)

- 3.12 Detailed assessment requires accurate information on the condition of the hinge and its geometry, and can only be obtained by invasive inspection, testing and non-destructive methods. Where appropriate full advantage should be taken of NDT techniques, but if it is considered that there is still insufficient information about the condition of the hinge and its reinforcement for assessment purposes, further invasive testing to expose the reinforcement may be necessary. Such investigations will be subject to technical approval procedures and must be supported by a full technical appraisal, to safeguard the structure during the course of the work, and to set down the type of investigation proposed, and details of the expected outputs.
- 3.13 Consideration should be given to selecting the most appropriate bridges for invasive testing, and the most suitable test location(s) on the bridge (using the risk assessment approach based on 3.17). Where invasive testing involves de-stressing the hinge joint, the additional loading carried by the adjacent bar sets should be assessed, and the necessity and effects of propping the bridge during the work considered. In determining testing locations, concentrations of hinge loading, drainage paths and the severity of defects should be considered, together with safety, access and traffic management issues.
- 3.14 Agents should submit detailed proposals for invasive testing to OD and SSR TAG for discussion and agreement, including the method, timescale, cost, materials tests and inspection, reinstatement procedures, traffic management, noise control and contingency measures etc. Particular attention should be given to planning the reinstatement of the test areas, and the selection of materials, method of reinstatement, given the time constraints, potential weather conditions and engineering requirements. Contingency measures should be planned to take into account difficulties encountered during the invasive testing process, including the condition of the exposed hinge reinforcement, unexpected delays and weather conditions.
- 3.15 Non-destructive testing methods such as impact echo, radiography, acoustic emission, and thermography etc. may be considered to minimise the need for invasive inspection. Radiography and acoustic emission have been used on hinge decks, and appear to be useful techniques. In the case of acoustic emission some fieldwork and research has been undertaken, to assess whether the technique will detect cracking in concrete or reinforcement corrosion. Not all of this work has been related to hinge structures. Further research is underway to calibrate the technique, and verify previous fieldwork, to characterise the outputs, in order to build confidence that the technique can be used to quickly gauge condition on site. Whilst NDT methods at present are unlikely to give definitive indications of defects, they may be used to assist determination of the variations in condition along joints, and also allow coverage of large areas in a relatively short time. The results, properly interpreted and compared to known conditions at one or more locations derived by invasive inspection, should give a good indication of conditions, or point to where further invasive inspection may be necessary.
- 3.16 Recent experience of invasive inspection and testing of hinge deck structures has been gained in South Wales. This was undertaken using water-jetting techniques to create small 'pockets' for inspection. These investigations revealed that:

- i) As-built drawings are sometimes inaccurate, and there can be construction defects that significantly affect an assessment, such as: displaced joint formwork, concrete bridging across the gap, and misaligned throat reinforcement that does not cross the throat at the same location.
- ii) Leakage is not necessarily a true indicator of corrosion potential. Severe pitting corrosion can exist within outwardly 'dry' joints, where the carriageway joint filler soaks up chloride rich seepage in small but concentrated quantities. On the other hand severe leakage may dilute chlorides and wash out the joints. Even with full exposure, pitting corrosion is not easy to see and measure, and it is possible the use of a borescope alone can miss important defects.

Risk Management and Interim Measures (SMIS Activities 1.7 and 1.8)

- 3.17 Risks should be assessed considering usage factors, rates of deterioration, potential modes of failure, and network factors such as traffic volume and HGV loading over and under the bridge, bridge location and alternative routes etc. If the results of the above investigations reveal an unacceptable risk to the integrity of the structure, interim measures should be implemented to safeguard the road network, such as temporary propping and/or load reduction, or permanent repair/renewal. The procedures outlined in BA 79 'Management of Sub-standard Highway Structures' shall be instigated, and Technical Approval procedures for the temporary / permanent works will apply.

Maintenance

- 3.18 For all hinged deck bridges, high priority should be given to preventing further deterioration of hinge joints, by maintaining drainage in working order and the integrity of deck waterproofing and expansion joints, including pipe bays where appropriate. Bids for remedial works should be classified as essential maintenance. Advantage should also be taken during any planned rewaterproofing or resurfacing work to undertake inspection and concrete condition testing of hinges, and reinforcement inspection from above.
- 3.19 Remedial options will vary between minor concrete repairs, reconstruction of the hinges, safeguarding measures such as props, consideration of re-articulation of the deck and complete reconstruction. Other options such as the use of electrochemical techniques, including cathodic protection may be feasible in the future, in some circumstances, as a means to minimise future corrosion. However electrochemical techniques are currently not advised where there are sensitive structural details such as hinges (refer BA83 'Cathodic protection for use in reinforced concrete structures'), and would need very careful assessment and specialist advice before adoption. All maintenance operations measures are likely to affect the integrity of the structure and will therefore be subject to technical approval procedures. Where they are significant then independent checks will also be required, and they will be considered as Category 3.

Data management

- 3.20 As part of this Interim Strategy, the SMIS system is to be utilised to manage the programme of work on hinge joint structures. To assist HA in developing a Final

Management Strategy, it is important that Agents input the required data (refer to Annex D) when required. This will assist Agents in managing their own programmes as well as allowing the Agency to produce and assess national progress reports. It will be necessary for Agents to populate SMIS with the necessary 'historic' data, for work already completed.

Research

- 3.21 Research has been commissioned at TRL to investigate the durability of deck hinges in a deteriorated condition. The research is based on a programme of laboratory testing, supported by a theoretical study to model the behaviour of hinge deck structures. This is currently underway. The project will also publish these findings in due course, and develop an Advice Note, which will form the basis for the Future Management Strategy. Further research is also underway to assist the development of robust and reliable NDT methods which can be used to determine the condition of the steel reinforcement at and adjacent to the hinge throat.

4 FUTURE MANAGEMENT STRATEGY (SMIS Activities 2.1, 2.2 and 2.3)

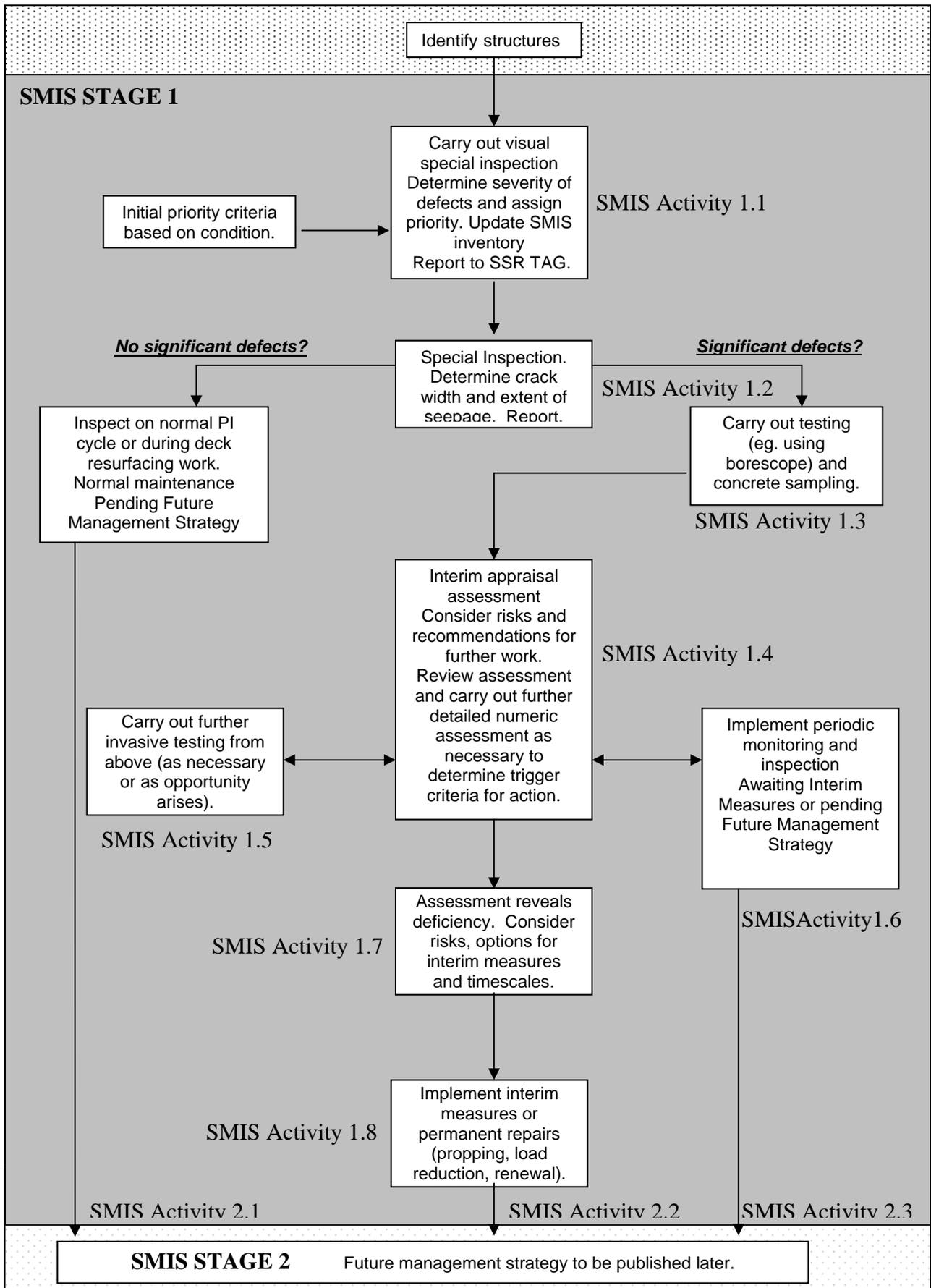
- 4.1 A Future Management Strategy is being developed for hinge deck structures, which will supersede this interim advice. This will include the results of laboratory testing and give specific information on the assessment of hinges. The strategy will also embrace inspection requirements and techniques, risk based prioritisation, analytical assessment, fatigue life, ongoing monitoring, testing, interim measures and full-scale repairs and renewal. Consideration will be given to the present condition of the structure, the rate of deterioration, the vulnerability of the hinge to further deterioration, the present use and location of the structure, any planned works, and any other strategic factors. The timescale for issue of this Strategy is expected to be about 2 years from the date of publication of this Interim Advice Note.
- 4.2 As indicated at 3.21 above the Highways Agency has commissioned research to assess the performance of and durability of hinged deck structures in a deteriorated condition. This will be used to formulate the Final Management Strategy.
- 4.3 It is expected that periodic meetings will be held to allow all affected Agents and the Highways Agency the opportunity to exchange information and coordinate the ongoing programme of work.

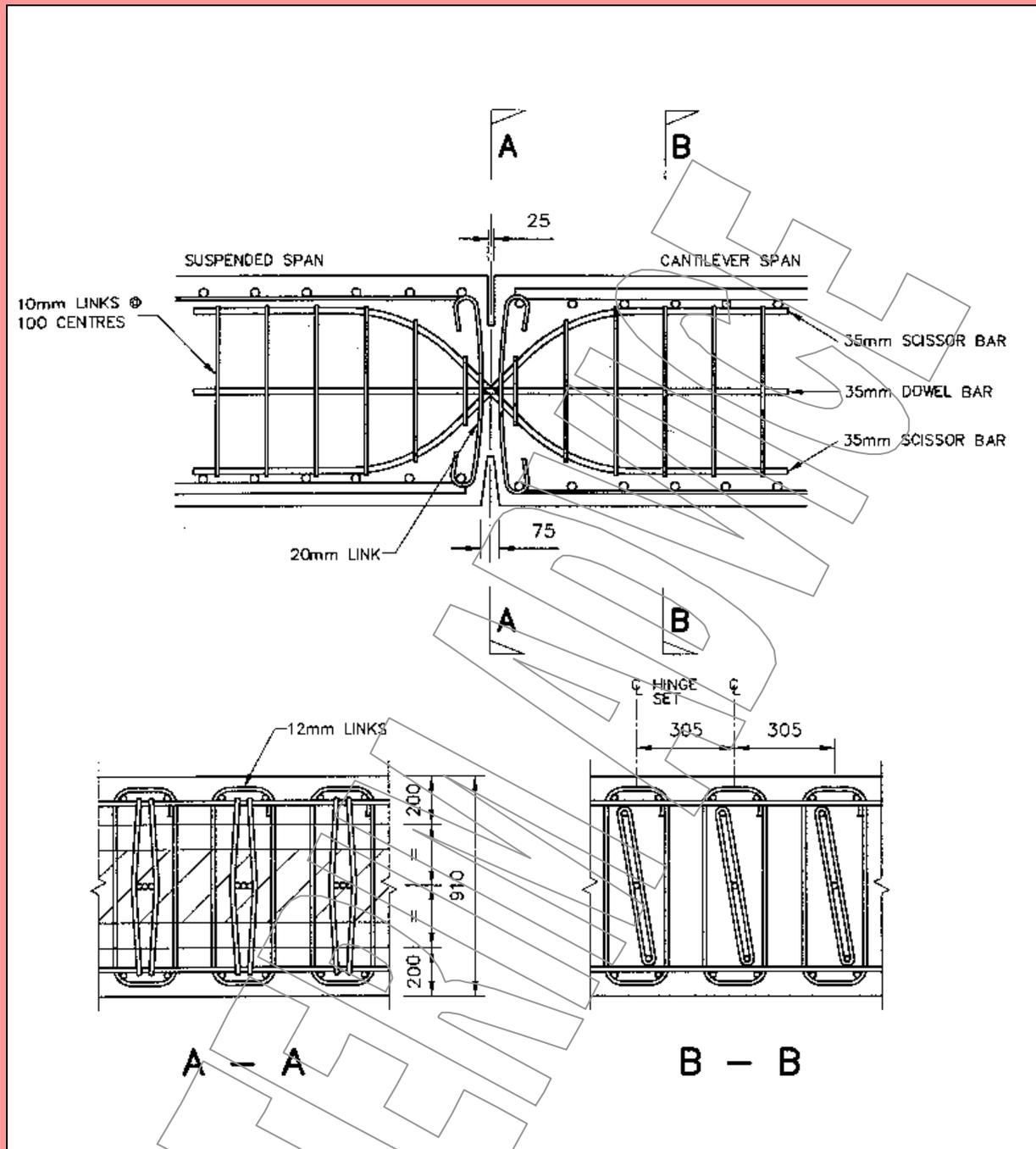
5 FURTHER INFORMATION

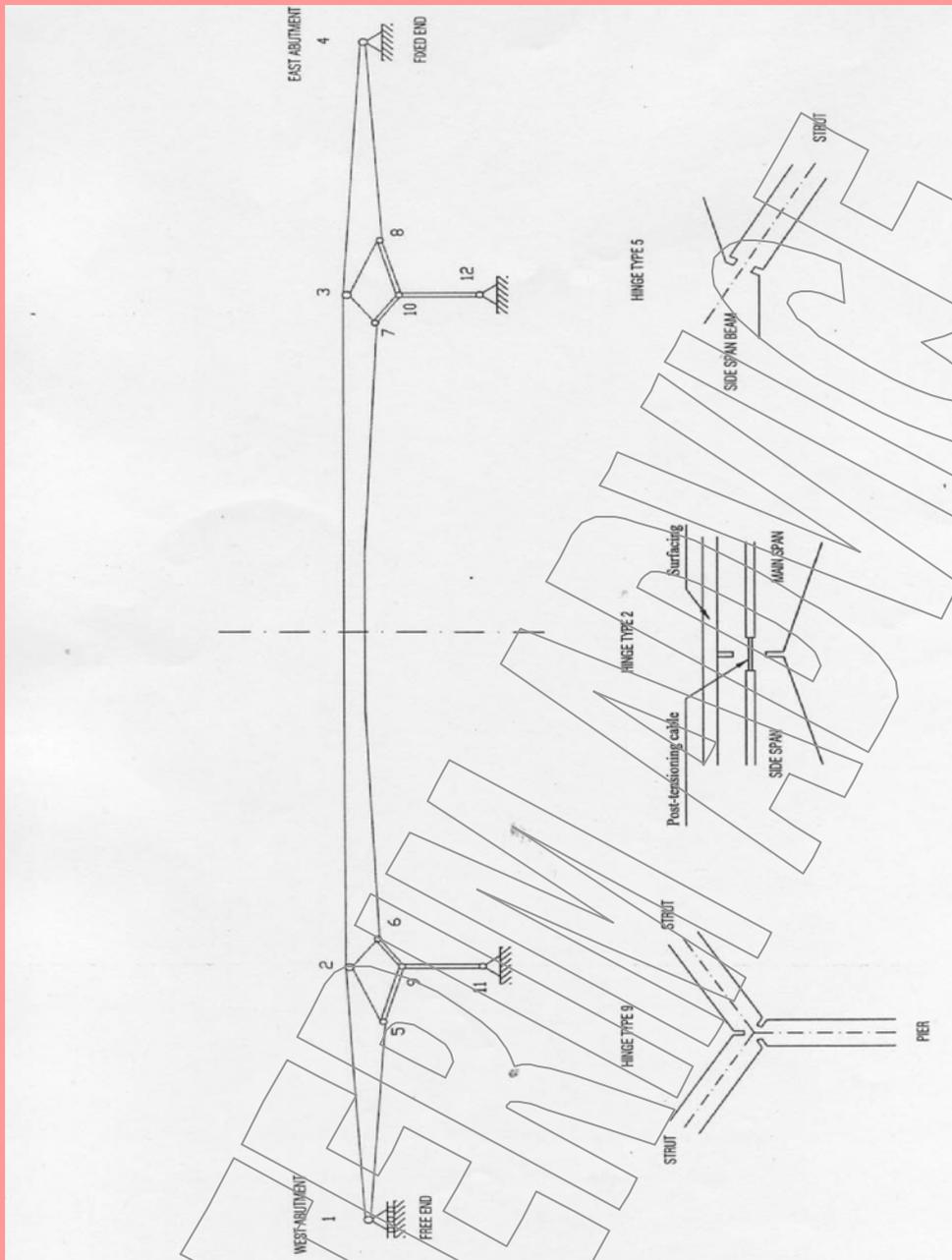
- 5.1 If you have any questions on this document please contact:

Neil Loudon, tel. 01234 796107 E-mail: neil.loudon@highways.gsi.gov.uk

- 5.2 If you have any engineering or technical queries about individual hinge deck structures please contact SSR TAG local contacts, or OD contacts regarding management, finance or programming issues.







D.1 INTRODUCTION

This annex provides guidance on how to use SMIS (Structures Management Information System) when inputting data or viewing progress reports for the Hinge Deck Strategy. It gives a summary of what is required by SMIS for each activity in the flowchart in annex A.

The annex is primarily aimed at those who will be inputting data, and it assumes a working knowledge of SMIS. The screens used adopt the general use and format of other screens in SMIS. Hence detailed instructions of how to logon, and how to use the screens are *not* included here. Instead, the annex refers to the relevant part of the online user guide. The SMIS user is recommended to read through this annex in conjunction with annex A, and the relevant parts of the SMIS online guide *before* embarking on using the system to input data.

For those who have an interest in the progress of the programme, your attention is drawn to the Progress Reporting paragraph in D.2 below.

D.2 GENERAL

Background

SMIS is a tool for managing the HA structures asset. One area of the system provides a means to capture data and organise a series of actions for programmes that are beyond the usual scope of structures renewals work. The hinge deck programme is one such example, where each structure within the programme goes through a series of steps in order to establish what needs to be done in a coordinated manner. The series of steps are given in annex A.

The advantages of such an approach is of a consistent method adopted for the problem across the network, and additionally data is captured centrally so an overview of the problem can be more easily gained.

SMIS uses the term NSP (National Structures Programme) to describe these programmes of work.

Contacts

If experiencing difficulties, use the following channels of support:

- BIS ServiceDirect, for support for accessing the system. Contact on 0113 254 1140 or email servicedirect@highways.gsi.gov.uk.
- The SMIS administrator, for support in using the system and queries on the data. Contact by email on SMIS@highways.gsi.gov.uk.
- Queries specific to the Hinge Deck programme should be referred to your HA TAG office.

Progress Reporting

Several reports are available. They can be accessed using the NSP Reports icon, which is found by clicking on the Programmes menu.

- **Structures by Stage Report.** This shows a summary snapshot, giving the numbers of structures that are currently in each stage of the programme. Currently, only stage one is defined in SMIS. Stage 2 (a future management strategy may be issued if required at a later date). A further breakdown of each activity in each stage is given in the Current Progression Report.

- **Current Progression Report.** This gives a detailed view, showing the current position of structures for each activity in the programme. It shows the current position for those activities that are not completed.
- **Programme Activity Report.** This shows a history of activities that have been assigned to structures, whether currently outstanding or completed. It shows the dates of when each activity was ‘created’ in the system and when it was completed.
- **Structures Added Report.** This shows the pattern of how structures have been added to the programme over time.

Reviewing Outstanding Activities

Use the Activity Find screen to produce a list of structures in the programme. The screen can also list the status of structures for specific activities (as per the flowchart in Annex A). This is described in the online help, in section Activities. If you have an MA/MAC user profile, then the listing will be restricted to structures in your area.

Update and input of data for these activities is done through a screen for that specific type of activity. E.g. the Inspection Schedule Find screen has the appropriate buttons for scheduling, inputting and authorising inspection findings. The appropriate screen to use is given with the descriptions for each activity below.

Note: some find screens return a maximum of 100 lines. When this happens, either use the Excel button on the screen to view the entire list, or refine your filter settings to show the information you are interested in.

Adding / Removing Structures in the Programme

You are asked to verify the list of structures as correct. To add or remove structures from this list, contact the SMIS Administrator, by email on SMIS@Highways.gsi.gov.uk. An email reply will inform you when the structures have been added or removed.

D.3 IMPLEMENTATION

At the time of issue of this document, a number of structures are already some way into the Hinge Deck programme. These structures require data to be input to SMIS retrospectively.

A suggested approach is to identify where the structure best sits in the flowchart in Annex A. Then identify relevant inspection findings etc that best support each of the previous activities, and input the data as outlined in D.4 below.

Where there is no known information for an activity, then input the appropriate details for the activity with a comment that there is no known information. The next activity will then be scheduled. Call your HA TAG office for advice if necessary.

D.4 USING SMIS FOR EACH ACTIVITY

This section looks in turn at each activity in the flowchart in Annex A.

SMIS Activity 1.1: Initial Visual Inspection

This inspection results in an initial visual evaluation of the condition of the hinges on the bridge. In addition, details of the hinges are input to SMIS and the overall priority of the structure within the hinge deck programme is set.

| What you need to do | How to do it | Where to find help |
|--|---|---|
| Locate the structure requiring this activity (if the structure key is not known) | <ul style="list-style-type: none"> Open the Activity Find screen, the icon for this is found in the 'Main Menu' Set the filter to activity name to "1.1" and NSP as "Hinge Deck Stage 1 programme". The structure(s) should be listed. | Online Guide, section Activities, topic Activity Find. |
| Locate the structure and activity in SMIS | <ul style="list-style-type: none"> Open the Inspection Schedule Find screen, the icon for this is found in the 'Inspection Menu' Input the structure key and click find and the structure should be listed. (If it does not appear, try again with the years in the date fields set to blank.) Click on the appropriate inspection line. Click on the SMIS Insp button and the Enter Observations / Defects screen appears. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |
| Input inspection details | <ul style="list-style-type: none"> Input inspection details in the top area of the screen and click save. | Online Guide, section Inspection Menu, topic Edit Observations / Defects. |
| Input hinge deck details | <ul style="list-style-type: none"> Hinge deck details need to be input before any defects can be assigned to them. Click the Go to Inventory button, and the inventory screen will appear. Rename components to correct names if appropriate. Add hinge deck components to the relevant decks. Click the Save button after inputting details. | Online Guide, section Maintaining Structures Inventory, topic New/Edit Component. |
| Input observations / defects | <ul style="list-style-type: none"> Input any observations / defects specifically relating to hinge decks. Assign the observations / defects to the appropriate components. Other defects from previous inspections may be carried forward to this inspection. Only Click the confirmed check-box if you are confirming / updating the severity and extent for those defects. Click the Close button when finished. On the Inspection Schedule Find screen, click the Complete button, so the inspection is ready to be authorised. | Online Guide, section Inspection Menu, topic Edit Observations / Defects. |
| Authorise the inspection | <ul style="list-style-type: none"> A person with access rights to authorise inspection will need to do this. Locate the structure in using the Inspection Schedule Find screen, as described above. Click the Authorise button. The next activity will be created for the structure. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |
| Set the priority | <ul style="list-style-type: none"> Open the Programme Find screen, the icon for this is found in the 'Programmes Menu' Set the Programme Name filter to "hinge" and click find. The hinge deck programme should be listed and highlighted in blue. Click the Structure Ranking button and the Structure Ranking List screen will be | Annex E. Online Guide, section Progressing and Tracking an NSP, topic Structure Ranking List. |

| What you need to do | How to do it | Where to find help |
|---------------------|--|--------------------|
| | <p>displayed.</p> <ul style="list-style-type: none">• Find the appropriate structure, and key in the priority.• Click the Save Structure Ranking button. (If not done so, your input will be lost.)• Click the close button on the Structure Ranking List screen, and then on the Programme Find screen. | |

Continue at activity 1.2.

INTERACTIVE

SMIS Activity 1.2: Detailed Inspection

This Inspection is to determine the crack width and extent of seepage.

The target date for this may depend on the priority set and other access opportunities, and the agent may prefer to set an appropriate target date to assist with inspection planning. (See the Online Guide, section Inspection Menu, topic Set Target Date.)

| What you need to do | How to do it | Where to find help |
|--|---|---|
| Locate the structure requiring this activity (if the structure key is not known) | <ul style="list-style-type: none"> Open the Activity Find screen, the icon for this is found in the 'Main Menu' Set the filter to activity name to "1.2" and NSP as "Hinge Deck Stage 1 programme". The structure(s) should be listed. | Online Guide, section Activities, topic Activity Find. |
| Locate the structure and activity in SMIS | <ul style="list-style-type: none"> Open the Inspection Schedule Find screen, the icon for this is found in the 'Inspection Menu' Input the structure key and click find and the structure should be listed. Click on the appropriate inspection line. Click on the SMIS Insp button and the Enter Observations / Defects screen appears. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |
| Input inspection details | <ul style="list-style-type: none"> Input inspection details in the top area of the screen and click save. Add or update observations as appropriate for the crack width and seepage (note measurements may be recorded in the comments field). Other defects from previous inspections may be carried forward to this inspection. Only Click the confirmed check-box if you are confirming / updating the severity and extent for those defects. Click the Close button when finished. On the Inspection Schedule Find screen, click the Complete button, so the inspection is ready to be authorised. | Online Guide, section Inspection Menu, topic Edit Observations / Defects. |
| Authorise the inspection | <ul style="list-style-type: none"> A person with access rights to authorise inspection will need to do this. Locate the structure in using the Inspection Schedule Find screen, as described above. Click the Authorise button. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |
| Choose the branch in the flowchart | <ul style="list-style-type: none"> As the activity is set to complete, you will be asked which activity is to follow. Select step 1.3 or 2.1 as appropriate. DO NOT select both steps. The next activity will be created for the structure. | Online Guide, section Progressing and Tracking an NSP, topic Choose Next Activities. (Note an incorrect choice can be corrected – see Online Guide, section Activities <i>before</i> proceeding further.) |

If activity 1.3 was selected, then continue with activity 1.3 below.

If activity 2.1 was selected, then no further action is required until the future management strategy is issued.

SMIS Activity 1.3: Invasive Testing

Testing and concrete sampling results are input to SMIS as observations, and input in the form of an inspection. Again, the target date for this may depend on the priority set and other access opportunities, and the agent may prefer to set an appropriate target date.

| What you need to do | How to do it | Where to find help |
|--|---|---|
| Locate the structure requiring this activity (if the structure key is not known) | <ul style="list-style-type: none">• Open the Activity Find screen, the icon for this is found in the 'Main Menu'• Set the filter to activity name to "1.3" and NSP as "Hinge Deck Stage 1 programme".• The structure(s) should be listed. | Online Guide, section Activities, topic Activity Find. |
| Locate the structure and activity in SMIS | <ul style="list-style-type: none">• Open the Inspection Schedule Find screen, the icon for this is found in the 'Inspection Menu'• Input the structure key and click find and the structure should be listed.• Click on the appropriate inspection line.• Click on the SMIS Insp button and the Enter Observations / Defects screen appears. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |
| Input inspection details | <ul style="list-style-type: none">• Input inspection details in the top area of the screen and click save.• Add or update observations as appropriate for the testing (use the comments field to record salient facts).• Click the Close button when finished• On the Inspection Schedule Find screen, click the Complete button, so the inspection is ready to be authorised. | Online Guide, section Inspection Menu, topic Edit Observations / Defects. |
| Authorise the inspection | <ul style="list-style-type: none">• A person with access rights to authorise inspection will need to do this.• Locate the structure in using the Inspection Schedule Find screen, as described above.• Click the Authorise button.• The next activity will be created for the structure | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |

Continue at activity 1.4.

SMIS Activity 1.4: Interim Appraisal

An interim appraisal assessment is to consider risks and recommendations for further work.

| What you need to do | How to do it | Where to find help |
|---|--|--|
| Locate the structure and activity in SMIS | <ul style="list-style-type: none"> Open the Appraisal Activity Find screen, the icon for this is found in the 'Main Menu' Set the filter to activity name to "1.4"; NSP as "Hinge Deck Stage 1 programme" and structure key if known. The activity for the structure(s) should appear. | Online Guide, section Appraisals, topic Appraisal Activity Find. |
| Input general details of the assessment | <ul style="list-style-type: none"> Select the activity click the Edit button. The appraisal screen should appear. Read the guidance. Input your name, the date and the appraisal result Click Save and then the Close buttons. | Online Guide, section Appraisals, topic Edit Activity. |
| Complete the assessment input | <ul style="list-style-type: none"> Click Save and then the Close buttons. | Online Guide, section Appraisals, topic Edit Activity. |
| Choose the branch in the flowchart | <ul style="list-style-type: none"> As the activity is set to complete, you will be asked which step to follow. The activities to select depend on the result that has been input. Follow the activity selection table below. The next activities will be created for the structure. | Online Guide, section Progressing and Tracking an NSP, topic Choose Next Activities. (Note an incorrect choice can be corrected – see Online Guide, section Activities <i>before</i> proceeding further.) |
| Set the target date for the first monitoring inspection | <p>If 1.6 was selected, the target date for the first monitoring inspection will need to be set as follows:</p> <ul style="list-style-type: none"> Open the Inspection Schedule Find screen, the icon for this is found in the 'Inspection Menu' Input the structure key and click find and the structure should be listed. Click on the appropriate inspection line. Click on the Target Date button and the Enter the Target Date for the 1st monitoring inspection in the screen that appears. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |

Activity selection table

| Result | Activities to select | | | |
|-----------------------|----------------------|---------------|------------------|------------------------|
| | | 1.5 (testing) | 1.6 (monitoring) | 1.7 (interim measures) |
| Monitoring | either | - | yes | - |
| | or | Yes | yes | - |
| | or | - | yes | yes |
| Further Investigation | | Yes | - | - |
| Interim Measures | | - | - | yes |

Note, activities 1.5 and 1.7 **must not** be selected at the same time.

Continue with activities 1.5, 1.6 or 1.7 as appropriate.

SMIS Activity 1.5: Further Invasive Testing

This records further invasive testing that is conducted as necessary, or as an opportunity arises.

| What you need to do | How to do it | Where to find help |
|--|--|---|
| Locate the structure requiring this activity (if the structure key is not known) | <ul style="list-style-type: none">• Open the Activity Find screen, the icon for this is found in the 'Main Menu'• Set the filter to activity name to "1.5" and NSP as "Hinge Deck Stage 1 programme".• The structure(s) should be listed. | Online Guide, section Activities, topic Activity Find. |
| Locate the structure and activity in SMIS | <ul style="list-style-type: none">• Open the Inspection Schedule Find screen, the icon for this is found in the 'Inspection Menu'• Input the structure key and click find and the structure should be listed.• Click on the appropriate inspection line.• Click on the SMIS Insp button and the Enter Observations / Defects screen appears. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |
| Input inspection details | <ul style="list-style-type: none">• Input inspection details in the top area of the screen and click save.• Add or update observations as appropriate for the testing (use the comments field to record salient facts).• Click the Close button when finished.• On the Inspection Schedule Find screen, click the Complete button, so the inspection is ready to be authorised. | Online Guide, section Inspection Menu, topic Edit Observations / Defects. |
| Authorise the inspection | <ul style="list-style-type: none">• A person with access rights to authorise inspection will need to do this.• Locate the structure in using the Inspection Schedule Find screen, as described above.• Click the Authorise button• The next activity (1.4) will be created for the structure | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |

Continue with activity 1.4.

SMIS Activity 1.6: Monitoring

If periodic monitoring and inspections are required, a record of each monitoring “visit” or inspection is recorded in SMIS.

| What you need to do | How to do it | Where to find help |
|--|---|--|
| Locate the structure and activity in SMIS | <ul style="list-style-type: none"> • Open the Inspection Schedule Find screen, the icon for this is found in the ‘Inspection Menu’ • Input the structure key (if known), and/ or Inspection Type of Monitoring. Click find and the structure should be listed. • Click on the appropriate inspection line. • Click on the SMIS Insp button and the Enter Observations / Defects screen appears. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |
| Input inspection details | <ul style="list-style-type: none"> • Input inspection details in the top area of the screen and click save. • Add or update observations as appropriate for the observation / defect being monitored (note measurements may be recorded in the comments field). • Click the Close button when finished. • On the Inspection Schedule Find screen, click the Complete button, so the inspection is ready to be authorised. | Online Guide, section Inspection Menu, topic Edit Observations / Defects. |
| Authorise the inspection | <ul style="list-style-type: none"> • A person with access rights to authorise inspection will need to do this. • Locate the structure in using the Inspection Schedule Find screen, as described above. • Click the Authorise button. | Online Guide, section Inspection Menu, topic Inspection Schedule Find. |
| Set the target date for the next monitoring inspection | <ul style="list-style-type: none"> • The Schedule Monitoring window will appear, complete the details and press the Save or End Monitoring buttons as appropriate. | Online Guide, section Monitoring, topic Schedule Monitoring. |
| Choose the branch in the flowchart | <ul style="list-style-type: none"> • The Choose next Activity window will now appear. • If the Save was clicked on the previous window, a further monitoring inspection will have been scheduled. In this case, select option 1.4 if the monitoring has resulted in further consideration being needed. DO NOT select 2.3. • If the End Monitoring was clicked on the previous window, no further monitoring inspection will have been scheduled. In this case, select option 1.4 or 2.3 as appropriate. DO NOT select both steps. • The next activity will be created for the structure. | Online Guide, section Progressing and Tracking an NSP, topic Choose Next Activities. (Note an incorrect choice can be corrected – see Online Guide, section Activities <i>before</i> proceeding further.) |

Continue with further monitoring (activity 1.6) and/ or a further interim appraisal (activity 1.4) as appropriate.

If activity 2.3 was selected, then no further action is required until the future management strategy is issued.

SMIS Activity 1.7: Interim Measure Appraisal

When the assessment reveals a deficiency, recommended interim measures and/ or maintenance actions (i.e. works) are input to SMIS. An appraisal activity is used to record this.

| What you need to do | How to do it | Where to find help |
|---|--|--|
| Locate the structure and activity in SMIS | <ul style="list-style-type: none">• Open the Appraisal Activity Find screen, the icon for this is found in the 'Main Menu'• Set the filter to activity name to "1.7"; NSP as "Hinge Deck Stage 1 programme" and structure key if known.• The activity for the structure(s) should appear. | Online Guide, section Appraisals, topic Appraisal Activity Find. |
| Input general details of the appraisal | <ul style="list-style-type: none">• Select the activity click the Edit button. The appraisal screen should appear.• Read the guidance.• Input your name, the date and the appraisal result.• Click Save and then the Close buttons. | Online Guide, section Appraisals, topic Edit Activity. |
| Input a maintenance action | <p>If a maintenance action is to be added then:</p> <ul style="list-style-type: none">• Click the Inventory button, and the inventory screen will appear.• Click the defects tab at the bottom left of the screen, and the defects / maintenance action summary will be displayed.• Click the Add button in the maintenance action part of the screen, and the New Maintenance Action screen will appear.• Input the fields as appropriate. Note that Origin of Work should be set to Hinge Deck Stage 1, and the Activity as this one (1.7).• When complete, click the Save and then the Close buttons. | Online Guide, section Maintenance Actions & Projects, topic New/Edit Maintenance Action. |
| Complete the appraisal input | <ul style="list-style-type: none">• Click Save and then the Close buttons. | Online Guide, section Appraisals, topic Edit Activity. |
| Complete the activity | <ul style="list-style-type: none">• On the Appraisal Activity Find screen, click Complete.• The next activity step will be created for the structure. | Online Guide, section Appraisals, topic Edit Activity. |

Continue with activity 1.8.

SMIS Activity 1.8: Confirm Interim Measure is Implemented

This is to confirm that an interim measure or maintenance action has been implemented. There may be instances where an interim measure is put in place until the maintenance action is complete. In such cases, the interim measure being implemented is recorded against this activity.

| What you need to do | How to do it | Where to find help |
|--|--|---|
| Locate the structure requiring this activity (if the structure key is not known) | <ul style="list-style-type: none"> Open the Activity Find screen, the icon for this is found in the 'Main Menu' Set the filter to activity name to "1.8" and NSP as "Hinge Deck Stage 1 programme". The structure(s) should be listed. | Online Guide, section Activities, topic Activity Find. |
| Locate the structure | <ul style="list-style-type: none"> Open the Structure Find screen, the icon for this is found in the 'Main Menu' Input the structure key and click find and the structure should be listed. Click Inventory and the structure details should be shown. | Online Guide, section Maintaining Structures Inventory, topic Structure Find. |
| Confirm an interim measure or maintenance action has been implemented | <ul style="list-style-type: none"> Click Open Event and the New Event window will appear. Complete the fields in the window and be sure to check the '1.8' activity in the list at the bottom. Then click Open New Event. | Online Guide, section Maintaining Structures Inventory, topic New Event. |
| Input an interim measure | <p>If an interim measure has been implemented:</p> <ul style="list-style-type: none"> Click the appropriate part of the component hierarchy of where the interim measure has been put in place (e.g. bridge, span or structural joint). Click the Add button and select an interim measure. Complete the details for the interim measure and then click the Save button. | Online Guide, section Maintaining Structures Inventory, topic New/Edit Component. |
| Reviewing interim measures | <ul style="list-style-type: none"> The agent is to ensure that interim measures are reviewed and updated in SMIS when they have exceeded their expected end date. | The Main Menu, icon Interim Measures Find allows interim measures that have expired to be located. Set the End Date, To field to today and click the Find button. |
| Complete the activity | <ul style="list-style-type: none"> Click Close Event. The system will validate and save your updates. (Note the checking the 1.8 activity on the Open Event is an update that is saved at this point.) | Online Guide, section Maintaining Structures Inventory, topic Inventory – Event Status Open. |
| Complete a maintenance action | <p>If a maintenance action has been completed:</p> <ul style="list-style-type: none"> Open the Project Find screen, the icon for this is found in the 'Projects Menu' Find and select the appropriate project using this screen, and click the Open button. (If the project name is not known, this can be found in the inventory details for the structure as described above, and clicking on the Projects item, when all projects associated with the structure will be listed.) Click the Set as Complete button. Confirm which maintenance actions in the project have been completed and click the Close button. | Online Guide, section Link to HAMIS for Bidding and Doing Works, topic Complete Project. |

No further activity related input is required until the future management strategy is issued. However monitoring (activity 1.6) continues if applicable, and maintenance actions are set as completed as and when projects are completed.

PRIORITY SCORING FLOWCHART

