Cymdeithas Syrfewyr Sirol Cymru

County Surveyors' Society Wales

CSSW Nationally Consistent Response

to

Code of Practice (2016)

Request for CSSW

Approval of Method

1. Purpose and Context

Purpose

CSSW commissioned the development of a nationally consistent response to the Code of Practice (2016) to developed under the CSSW HAMP project. This document summarises the results of that work and recommends that CSSW formally approve the method for use.

Background

A new code of practice for highways was published in October 2016. The code contains 37 recommendations. Some of these are covered by existing CSSW HAMP guidance, others relate to aspects of highway management beyond the scope of the HAMP project.

The most significant change from the previous code was a recommendation that authorities adopt a risk-based approach. The code is explicit in this requirement but silent on the how it may be achieved. The code stated that authorities had 2 years to respond to the code. The CSSW response focuses on the risk-based approach recommendation.

Scope

The risk-based approach distils into a need to address the following:

1. Establishing a Network Hierarchy
2. Establishing an Inspection Regime
3. Establishing a Repair Regime
4. Using Risk to influence budget allocation

The majority of authorities have existing standards and practices in place for each of these. The challenge therefore is to review these and to be able to demonstrate that the methods used are explicitly risk-based.

Adoption and Use

The benefit of adopting a national standard will only be achieved if authorities adopt and use the method. Approval of the method at CSSW Main Group level is therefore sought.

2. Current Practices

To inform the development of the method a review of current practices was undertaken. The review revealed that

Variation in Existing Practices

Authorities apply a range of standards for inspection regimes and repairs. There is commonality between many authorities but there are variances nationally. If a nationally consistent approach is to be adopted some or all authorities may need to change their standards.

Use of Risk in Current Practices

Arguably current practices are "risk based". Many for example include the use of a risk matrix. However, these rely upon inspectors to assess risk of defects. It is unclear what risks the inspector is supposed to assess and how; the risk of a fatality, of an injury to a user, of damage to property? Each of these has a different probability of occurring and different level of impact. Current methods rely almost solely on an individual's judgement and are insufficient to demonstrate the application of a risk-based approach.

Evidence to Support Current Standards

Current standards have evolved over time with little evidence of how they came into being. They are mainly based on reference to the existing code but are the result of judgement rather than rational analysis.

Tables of Current Standards

The spreadsheet supplied with this report contains details of current standards for inspection and repair as derived from copies of inspection manuals provided by the authorities.

3. Alternative Responses to Risk Based Management

Alternative Approaches

It is acknowledged that there are 2 approaches to a risk-based approach to determine defect categorisation and repair timescales:

- A fact/data-based approach; using high level risk assessment by management to set intervention criteria and target timescales (the approach adopted by this guidance) and
- A dimensionless approach; using a dimensionless system and relying on the judgement of inspectors to determine the category of defect and the required repair timescale based on a risk assessment of the individual defect (an approach adopted in some other areas of the UK)

Fact/Data Driven Approach

The approach adopted in this guidance utilises high level risk assessment. It uses asset data to determine criteria at which intervention is recommended as a minimum. It is designed to be used in conjunction with inspector's judgment. An inspector will always be able to increase the assigned response if they feel an individual defect warrants such action. The risk assessment at a high level treats all defects as being in the worst position. This method is expressly intended to create consistency and to allow risk assessments to be updated over time using the data collected.

The CSSW HAMP Risk-Based Approach method has been consciously constructed to be fact based. It is a deliberate objective of the method to reduce the reliance on individual's judgement and to use asset data as the basis for decision making.

Dimensionless Approach

The dimensionless approach places a higher burden on the inspectors. It requires inspectors to carry out a risk assessment of each observed defect. It requires a higher level of record keeping. It is an option that some authorities may wish to adopt. Should an authority wish to adopt it a higher level of competence for the inspectors will be required. Authorities adopting this approach should make their own provision for recording how inspectors carry out their individual defect risk assessments and how the competence of their inspectors is demonstrated.

Hybrid Approach

There may be options for a hybrid approach where an authority may wish to use the intervention criteria in this guidance as an investigatory level and would carry out an on-site risk assessment of any defect meeting this level. This approach could be applied to all or any of the hierarchy categories. This approach would carry with it the same need for demonstrating inspector competence as the dimensionless approach.

4. CSSW Recommended Risk Based Approach

Outline of the Method

The recommended method of responding to the code is to **carry out a risk review every 2 years**. The risk review collates appropriate data and uses it to inform refinements to hierarchy, inspection and repair regimes. It is expected that after the initial review subsequent reviews would involve refinement to the regimes rather than fundamental changes, as such the subsequent reviews should be able to be carried out with considerably less resource input than the initial review will require. The review comprises of:

Network Hierarchy

A method has been created to enable hierarchies to be established. Applying this method will provide the authority with a documented evidence of how the hierarchy was arrived at.

A key element of the hierarchy method is reference to use. Traffic volumes are used as the basis for the carriageway hierarchy reflecting the fact that the risk associated with a road carrying 20,000 vehicles a day is different to one carrying 500.

Banding have been chosen that if applied will create consistency nationally. Appendix A shows the banding adopted.

Inspection Frequencies

Based upon the levels of hierarchy recommended an analysis has been undertaken to provide a rationale for a regime of inspections. The analysis is based upon levels of use and the resulting risk exposure. Using the levels of use associated with each level of hierarchy it is

possible to compute the inspection interval that would result in the same risk exposure across the network. This provides a basis for the different frequencies of inspection.

It results in roads and footways that are used more requiring more frequent inspection than the lesser used ones. However rather than basing the interval upon perception this method uses data as the basis for creating a recommended regime. The recommended frequencies are as shown in Appendix B.

Repair Regime

A similar approach has been taken to create a recommended risk-based repair regime. The regime is predicated upon using an average 24-hour response to a potentially hazardous defect as a starting point and considering the comparative risk exposure of lesser defects.

The ability to carry out this analysis is constrained by the limited amount of detailed data available, however a rationale has been arrived at to create the minimum standard repair regime as shown in Appendix C.

Budget Allocation

Reporting the output from the risk review to the appropriate management forum or committee within the council, along with the relevant annual status and options report, will provide evidence of using risk to influence budget allocation and is considered an appropriate initial step in complying with the code.

Data Limitations

The aspiration of the method is that data will be used as the basis for all risk assessments. There are, however, current limitations on the extent to which this can be applied.

Improvements to the level of traffic data available and the detail recorded for defects will greatly enhance the extent to which future risk assessments can be fact based.

5. Resource Produced to Assists Authorities

The following resources have been made available via the CSSW HAMP project to assist authorities to apply the recommended method:

Tools

To enable task 4a to be completed the following resources are available:

1. **4RA –Highway Asset Risk Review**: A spreadsheet that authorities are recommended to use to record an risk review.
2. **Risk Based Approach: Method:** A document providing a detailed description of the approach to accompany the spreadsheet 4RA.
3. **Risk Based Approach: Method Summary:** A document providing a summary explanation of the method intended for use by authorities to brief managers, members, risk managers etc.
4. **Template Maintenance Manual Content:** A template document that authorities can use to record hierarchy and inspection and repair regimes derived using the risk-based approach and their methods of updating the same.
5. **Highway Inspection Defect Recording Manual:** A manual designed to give guidance to inspectors on what defects to record and what records should be taken about each defect. Intended to be used as the reference document for inspector training.
6. **Committee Paper Template/Report of Outcome of Highway Risk Review**
    a. A template initial paper that advises the new method, references the CoP and recommends changes to hierarchy, inspection and repair regimes.
    b. A template report paper for subsequent reviews that focuses on reporting changes to risk and resultant recommended changes to hierarchy, inspection and repair regimes
7. **National Minimum Standards:** A statement of minimum standards recommended by CSSW for intervention level and associated response times for defects.

6. Recommendations

It is recommended that CSSW approves the following actions to be the proposed method of demonstrating initial compliance with the Code of Practice using the CSSW HAMP method:

1. Complete a risk review and use the output to:
    a. **Confirm Network Hierarchy**; this will result in a documented hierarchy for each road, footway, structure etc. along with a record of how the hierarchy was arrived at
    b. **Confirm Inspection Regime;** comparison of the current regime with the recommended national regime, will result in a confirmed risk-based inspection regime that will either comply with the national regime or document where variance from it are to be used. (nb Where the variance is a **lesser** standard it is recommend that the authority documents its own risk assessment to detail why they believe this variance is appropriate in their locality/council)
    c. **Confirm Repair Regime:** comparison of the current regime with the recommended national minimum standard will result in a confirmed risk-based repair regime that will either comply with the national regime or document where variance from it are to be used. (nb Where the variance is a **lesser** standard it is recommend that the authority documents its own risk assessment to detail why they believe this variance is appropriate in their locality/council)
    d. **Report Outcome of Risk Review**: report the outcome of the risk review to the appropriate committee or management forum within the authority along with the annual status and options report
    e. **Confirm Data Improvement Actions**: review data used in the risk review and where necessary identify where improvements are desirable and ensure that use data and defects records will enable fact-based risk assessment to be used in future risk reviews. This is essential if future standards are to be genuinely risk-based rather than just a revised judgement by a different individual.

The method has been explained and presented to attendees at the CSSW HAMP workshops. Every authority has been visited by the project consultants for 2 days. During this visit the risk review task was explained and initiated. Many authorities made good progress during these days in completing the review. The items above involve making some important decisions about standards. It is recommended that all authorities to complete these tasks by the end of June 2019 and thus there will be a high level of compliance with the new code across Wales only a short period after the October 2018 deadline. Further work will be required following on from this but these tasks completed would allow authorities to state they had adopted the new codes risk-based approach.

Appendix A: Hierarchy Tables

Carriageway Hierarchy Level	**Traffic Volume Band (AADF)**
CHSR	Based on local importance rather than traffic flow but often in the range >20,000 [30,000 for calculations]
CH1	10,000 to 20,000
CH2	5,000 - 10,000
CH3	1,000 - 5,000
CH4	200 – 1000
CH5	< 200

authorities may need to make adjustment where a road has multiple lanes

Footway Hierarchy Category	**Footfall Level (AADF)**
FHVHU	> 10,000 (15,000 used for calculations)##
FH1	5,000 - 10,000
FH2	1,000 - 5,000
FH3	500 - 1,000
FH4	< 500
FH5	< 100

##heavily used pedestrian areas within city centres e.g, Cardiff, Swansea and Newport

Road Bridges, Culverts, Retaining Walls etc	
Carriageway Hierarchy	**Initial Structure Hierarchy**
CHSR	Important Structure
CH1	
CH2	
CH3	Standard Structure
CH4	
CH5	

Road Bridges, Culverts, Retaining Walls etc	
Rule	**Suggested Hierarchy**
Sole Access to community	Vital Structure
Both major traffic disruption and lengthy diversion route	Vital Structure
Either major traffic disruption or lengthy diversion route	Important Structure
Susceptible to rapid failure	Important Structure
Significant social or economic impact	Important Structure

Structure of local significance	Important Structure

Street Lighting

Street lighting hierarchies differentiate between primary and secondary lighting. It is expected that where an authority is adopting a part night lighting and/or dimming regime that such a hierarchy will be introduced as the means of deciding which lights can be turned off or dimmed. Inspection and repair regime may be dictated by the nature of the defect rather than by hierarchy considerations.

Appendix B: Minimum Inspection Regime

Carriageway Hierarchy	Minimum Inspection Interval
CHSR	Monthly
CH1	Monthly
CH2	Every 3 months
CH3	Every 6 months
CH4	Annually (poor or unknown condition) Every 2 years (good condition)
CH5	Reactive

Footway Hierarchy	Minimum Inspection Interval
FHVHU	Monthly
FH1	Monthly
FH2	3 months
FH3	6 months
FH4	Annually (poor or unknown condition) Every 2 years (good condition)
FH5	Reactive

It is expected that in future the inspection regime may be refined by reference to elements of the asset that are known to be in good condition and pose low risk. This approach is already embedded into many authorities' approach to structures inspection. It is therefore recommended that authorities implement the CSSW Visual Assessment Methods that were created for use on carriageways and footways.

Inspection Tolerances

A tolerance should be included to allow for unavoidable incidences such as bad weather, inspector sickness etc. It is recommended that the tolerance applied to each inspection frequency is 50% of the inspection interval or 3 months (whichever is the least).

Appendix C: Minimum Repair Regime

National Minimum Standard Carriageways

Defect Categories	Description	Response Time
Critical Defect	A situation where the inspecting officer considers the risk to safety high enough to require immediate action, e.g. collapsed cellar, missing utility cover, fallen tree, unprotected opening, ➢ Requiring an immediate response to make the site safe	2 Hours#
Safety Defect	Defects that pose an imminent risk of injury to road users, ➢ Requiring a response as soon as possible to remove a potential risk of injury to users	By End of Next Working Day (CHSR, CH1, CH2)
Safety Defect	Defects that pose an imminent risk of injury to road users, ➢ Requiring a response as soon as possible to remove a potential risk of injury to users	Within 5 Working Days (CH3, CH4, CH5**)
Maintenance Defect	Defects that warrant treatment to prevent them deteriorating into a safety defect prior to the next scheduled inspection, ➢ Requiring a response to prevent them becoming a safety defect	1 month (CHSR, CH1, CH2) 3 months (CH3, CH4, CH5**)
Programmed Repairs	Defects that warrant treatment, in order to prevent them deteriorating to such an extent that additional works or costs are incurred.	As per the local works programme

response time for critical defects refers to the time to attend site, make safe or repair will then be asap thereafter

**Defect triggers on CH5 roads are to be considered an <u>investigatory level</u>. An investigatory level does not automatically trigger a response. It will be incumbent upon the inspector to assign an appropriate response to each defect based upon its type, size, location and the level of use of the road. CH5 roads are low use roads and defects will frequently present low risk to users and can be responded to accordingly.

National Minimum Standard Footways

Defect Categories	Description	Response Time
Critical Defect	A situation where the inspecting officer considers the risk to safety high enough to require immediate action, e.g. collapsed cellar, missing utility cover, fallen tree, unprotected opening, ➢ Requiring an immediate response to make the site safe	2 Hours#
Safety Defect	Defects that pose an imminent risk of injury to road users, ➢ Requiring a response as soon as possible to remove a potential risk of injury to users	By End of Next Working Day (FHVHU, FH1, FH2)
Safety Defect	Defects that pose an imminent risk of injury to road users, ➢ Requiring a response as soon as possible to remove a potential risk of injury to users	Within 15 Working Days (FH3, FH4, FH5)
Maintenance Defect	Defects that warrant treatment to prevent them deteriorating into a safety defect prior to the next scheduled inspection, ➢ Requiring a response to prevent them becoming a safety defect	1 month (FHVHU, FH1, FH2) No set response time (FH3, FH4, FH5)
Programmed Repairs	Defects that warrant treatment, in order to prevent them deteriorating to such an extent that additional works or costs are incurred.	As per the local works programme

response time for critical defects refers to the time to attend site, make safe or repair will then be asap thereafter

Critical Defects

Asset Type	Defect Type	Hierarchy	Dimensional Criteria	
			Depth/Height	Extent
All	**Examples:** Carriageway / footway / cycleway collapse with high risk of accidents / loss of control; Critically unstable overhead wires, trees or structures; Exposed live wiring; Isolated standing water with high risk of loss of control; Missing or seriously defective ironwork with high probability of injury to highway users	All	Not Applicable. Critical defects are defined by their potential to cause immediate injury not by defect size.	Not Applicable. Critical defects are defined by their potential to cause immediate injury not by defect size.

the response time for a critical defect is the time until attendance on site. Once attended the site will be made safe as soon as possible, this may be achieved by closing all or part of the road or coning off the hazard. In some instance a repair may be immediately possible but in many instances the repair will occur later.

Safety Defects

Asset Type	Defect Type	Hierarchy	Dimensional Criteria	
			Depth/Height	Extent
Carriageways	Pothole	CHSR, CH1 and CH2	> 50mm	Maximum horizontal dimension greater than 150mm
	Pothole	CH3, CH4 and CH5**	>75mm	Maximum horizontal dimension greater than 150mm
Footways	Pothole, trip, rocking slab	All	> 40mm	Maximum horizontal dimension greater than 75mm

**Defect triggers on CH5 roads are to be considered an investigatory level.

Maintenance Defects

	Defect Type	Hierarchy	Dimensional Criteria	
			Depth/Height	**Extent**
Carriageways	Pothole	CHSR, CH1 and CH2	> 40mm	Maximum horizontal dimension greater than 150mm
	Pothole	CH3, CH4 and CH5**	> 50 mm	Maximum horizontal dimension greater than 150mm
	Crowning / Depression	All	> 100mm	< 2M Length
Footways	Pothole, trip or rocking slab	All	25mm - 40mm	Maximum horizontal dimension greater than 75mm
	Badly cracked or damaged ironwork	Any		N/A

****Defect triggers on CH5 roads are to be considered an investigatory level.

Programmed Repairs

A national minimum standard has not been prescribed for programmed repairs.