

# Highway Asset Management Planning: Risk Based Approach: Method Summary



## Document Information

<b>Title</b>	CSSW Highways Asset Management Planning – Risk Based Approach: Method Summary
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<b>Description</b>	This document contains a summary of the risk-based approach to highway asset management as recommended by CSSW as part of the HAMP framework.

## Document History

<b>Version</b>	<b>Status</b>	<b>Date</b>	<b>Author</b>	<b>Changes from Previous Version</b>
1.0	Draft	Oct 19	exp consulting	NA, based on previous request for CSSW approval of the method

## Document Control

<b>Version</b>	<b>Status</b>	<b>Date</b>	<b>Authorised for Issue by CSSW HAMP Steering Committee</b>
1.0	Final	Oct 19	Approved by CSSW Main Group Meeting September 2019

# 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, specifically the method recommended by CSSW.

## 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 is 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 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

Most authorities have standards and practices in place for each of these. The method is to review these and 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. The method has been approved by CSSW at the Main Group meeting in September 2019.

## 2. Current Practices

To inform the development of the method a current practice was undertaken and revealed

### 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. 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” with many using a “risk matrix” approach. 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.

## 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

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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.

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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. The banding adopted are detailed in the “CSSW HAMP Risk-Based Approach – Method”.

### **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 the “CSSW HAMP Risk-Based Approach – Method”.

### **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 the Minimum Standards document

### **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.

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## 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 practice RP1 to be completed the following resources are available:

1. **RP1 –Highway Asset Risk Review:** A spreadsheet that authorities are recommended to use to record a risk review.
2. **Risk Based Approach: Method:** A document providing a detailed description of the approach to accompany the spreadsheet RP1.
3. **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.
4. **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.
5. **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
6. **National Minimum Standards:** A statement of minimum standards recommended by CSSW for intervention level and associated response times for defects.

## 6. Recommendation

CSSW recommends the following actions (as the CSSW HAMP Risk -Based Method) be used to demonstrate initial compliance with the Code of Practice:

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 report and the 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 during 2017 and 2018. Every authority has been visited by the project consultants for 2 days. During this visit the risk review activity was explained and initiated. Authority HAMP personnel should already be familiar with the method set out above as a result of this work.