

UK Pavement Management System



Technical Note 26 (2003/04)

*Production of the Report for DfT Best Value Performance Indicator 96 -
Condition of Principal Roads (UKPMS Visual Survey Option)*

Document Number 008

September 2003



Document Information

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| Title (Sub Title) | Technical Note 26/2002 Production of the Report for DfT Best Value Performance Indicator 96 - Condition of Principal Roads (UKPMS Visual Survey Option) |
| Product Number | 008 |
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| Description | Specification for the 2003/04 Version of the UKPMS Visual Survey based BV96. |

Document History

| Version No | Status | Author | Date | Changes from Previous Version |
|-------------------|---------------|---------------|-------------|--|
| 2003/04 | Draft | AP | 30/09/03 | Changes to dates for to reflect 2003/04 Survey Requirements. |

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Introduction

In April 2002 the DfT published a revised instruction on Performance Indicators for Best Value which included Condition of Principal Roads¹ - BV96 to measure the proportion of the network where strengthening should be considered.

There are three alternative indicators;

- The percentage of the network with negative residual life as calculated from Deflectograph data, which is outside the scope of this document
- An indicator based on Tracs-Type Survey (TTS) Data
- An indicator using the UKPMS Structural Condition Index (SCI) based on UKPMS Visual Inspections.

The format approved by the DfT for reporting of the latter (the "PI Report") from a UKPMS Accredited system is attached.

This note is intended for both System Developers and Users, and it should be borne in mind that some parts may not apply to all readers. **System Developers** are encouraged to provide the PI Report, as this has become one of the top priorities for end users. It is intended that this report will become required UKPMS functionality as part of the first annual "Health Check" test. This standard report has been accepted by DfT if produced as output from a system that has successfully undergone UKPMS testing, and that has been configured to use rule set RP3.02 or later of the current UKPMS Default Rules and Parameters. These notes are intended to assist developers and to ensure that the important PI statistics produced for such a report are calculated in a consistent manner. This note does not address the Deflectograph-based indicator, which should be calculated separately, or the TTS-based indicator, which is described in UKPMS Technical Note 30.

Summary of Changes from Previous Versions

1. "Deemed Coverage" is no longer allowed
2. Variable Length or "Method 3" merging is to be used when running the Automatic Pass for the production of the performance indicator
3. All types of Carriageway surfaces are included
4. Visual Surveys are to be carried out in accordance with the provisions of the UKPMS Visual Survey Manual Version 1.0 together with relevant errata and addenda as issued on the UKPMS Web Site (www.ukpms.com)
5. Machine Surveys of Rutting may be used as an alternative to the visual assessment of rutting.²

¹ All "A" Roads that are not the responsibility of the Highways Agency

² This has not been mandated since this is the last year of the indicator in this format, with TTS surveys superseding visual surveys as the basis for the BVPI on Principal Roads in future years.



6. If DVI is used as an alternative to CVI for the production of the performance indicator, it should be converted to a CVI-equivalent survey using the UKPMS Conversion Software (Version 2.0 or later)³ which will allow processing using the CVI rules.
7. Only fully-accredited (i.e. Tranches 1, 2 and 3) UKPMS systems are to be used in the production of the performance indicator
8. UKPMS Rules and Parameters Version RP3.02 or later are to be used for the production of the report.

Scope and Survey Requirements

The surveys and the required indicator apply to Principal Road Carriageways. The whole of the principal should have been surveyed during or since April 2002. Surveys carried out since April 2002 are eligible.

Users are now instructed by the DfT to carry out road condition surveys in the approved manner in order to ensure consistency of PI's.

The Instructions from DfT allow some flexibility in terms of the surveys input to UKPMS that may be acceptable in producing the Visual Survey-based Performance Indicator;

- the 'default' PI is derived from a UKPMS CVI, or
- an alternative PI will be permitted based on UKPMS DVI converted to a CVI-equivalent survey using Version 2.0 or later of the UKPMS Conversion Software prior to loading into a UKPMS system and processed using the Rules and Parameters for CVI surveys (see below)
- Machine-measured Rutting may be used, in accordance with the provisions of the revised Appendix 11 to the UKPMS Visual Survey Manual. The revised Appendix 11 is available from the UKPMS Web Site. If Machine Collected rutting is used, it should be loaded to and processed in the UKPMS System using the CRUT (Machine Measured Rutting for CVI) survey type.

Only one of the input survey types (CVI or DVI) should be used for the calculation of each network Performance Indicator, i.e. survey types should not be mixed for the purpose of UKPMS automatic pass processing. If, however, DVI is used in conjunction with CVI, the DVI data must be converted to the CVI-equivalent survey using version 2.0 or later of the UKPMS Conversion Software. DVI surveys should use the standard 20m aggregation length.

The indicator must be derived from surveys carried out since 31 March 2002.

³ See www.ukpms.com for more details.

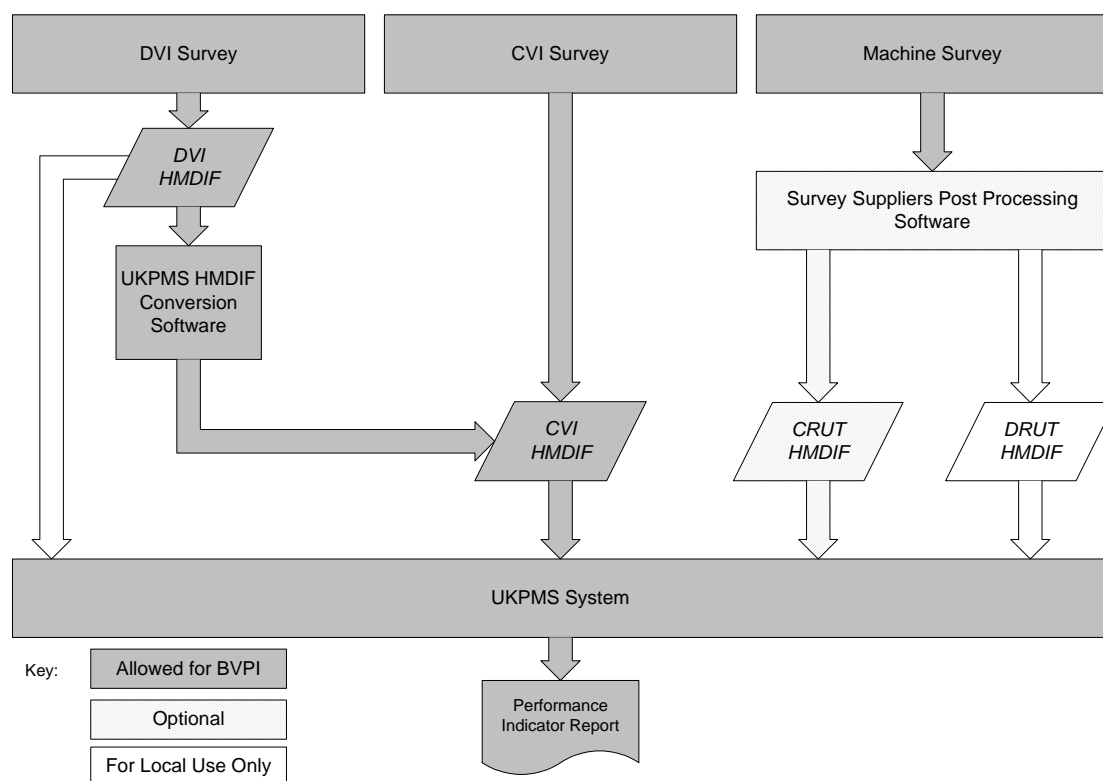


Figure 1. Allowable Survey Options

Figure 1 shows the allowable survey options for the production of best value performance indicators. Note the following:

- If machine measured rutting is to be used for the production of the performance indicator, it should always be loaded as the “CRUT” (Machine Measured Rutting for CVI) survey type, although the more detailed “DRUT” survey type may be loaded and used locally for treatment identification, for example.
- If DVI data is to be used for the production of the performance indicator, it should be converted to a CVI survey prior to loading to the UKPMS system, although an authority will also want to load the DVI survey directly to their UKPMS for local operational use, for example for treatment identification.



Calculation of the Performance Indicator

The Performance Indicator based on UKPMS Visual Inspections is essentially an exception report of the percentage (by length) of the network in question over which the SCI is equal to or greater than 70. The basic run parameters for the automatic pass to produce a PI report are as follows;

1. The latest version of the Default UKPMS Rules and Parameters Rule set (currently RP3.02) must be used for both the specification of the defects that comprise the UKPMS Visual Inspection survey and for the automatic pass processing.
2. The Method 3 (Variable Length) merging method to be used, using a condition index tolerance of 12 and a percentage tolerance of 10%.
3. Selective report by Feature - for Carriageway only
4. CVI and - optionally - CRUT survey types should be selected

The selection of treatments and the calculation of their associated cost estimates are NOT required by the DfT. However, some authorities may wish to see cost estimates on an extension of the same report, and this could be an 'optional extra' to the PI report.

Since UKPMS Visual Surveys may use either 'full' or 'minimal' cross-sectional positions, the potential survey length on the network, the actual length surveyed and the length over which the SCI exceeds the threshold value (70) must be calculated with caution. Although the Audit Commission and DfT have stated that 'all of the principal road length' must have been surveyed in the year, clearly in practice this will not be 100% of the full lane-length possible to be surveyed. In order to reliably assess the length covered by valid UKPMS Visual Inspection data, it is assumed that the "Not Assessed" defect is recorded for chainage and cross section position lengths where assessment has not taken place. This could happen where, for example, works are taking place, or where parked cars prevent surveying.

'Excluded Lengths' are those that cannot physically be surveyed due to special circumstances, identified by recording "Not Assessed".

CVI survey should be the only survey type allowed for the production of performance indicators, although the source of a CVI survey may be a DVI survey.



Calculation of Reported Values

Part 1. Background Information

Note: All calculations are performed only for the 'carriageway' feature.

A. Total length of Selected Network i.e. Principal Roads (in Carriageway-km)

Simply, the sum of all Section Lengths on Principal Road converted to km (i.e. divided by 1000) and displayed to three decimal places. These Sections are identified either as having a DoT Classification of "3", or as having the Funding Organisation of "DfT" (or equivalent codes). Users should be advised to ensure that whichever criterion is used, it is used only for Principal Roads and that it is populated for the whole of the Principal Road Network in question.

B. Total Possible Survey Length, in Lane-km

The sum of all Section Lengths on Principal Roads with an 'On Carriageway Referencing Method' of "M" (Minimal), plus the sum of all Section Lengths multiplied by the number of lanes⁴ on the section for sections with an 'On Carriageway Referencing Method' of "F" (Full). This figure to be reported in lane km (i.e. divided by 1000) and displayed to three decimal places.

C. Length Surveyed In Survey Period (all lanes covered, on all XSPs applicable)

The sum of Section Lengths on Principal Roads, for sections with survey records, where the 'On Carriageway Referencing Method' is "M" plus the sum of all Section lengths multiplied by the number of lanes on the section for sections survey records where the 'On Carriageway Referencing Method' is "F". The chainage/cross section position lengths of "Not Assessed" defects are then deducted from the combined length to derive the total length surveyed. Note that this assumes that "Not Assessed" defects are accurately recorded and that lengths where no defects are recorded are implicitly "Not Defective". The length surveyed should be broken down by survey type, plus the total length, although DVI length should always equal zero.

⁴ Looked up on the Number of Lanes for the Road Type of the Section. 'Number of Lanes' is an additional (non-mandatory) attribute of 'Road Type' added to the UKPMS Data Model to support this report. If developers choose not to adopt this, they can achieve the same result by decoding of the road type code.



Part 2. - Performance Data

D. Processed Network Length within structural CI band

Calculated as the Sum of Defect Lengths converted to km, within each band for the structural CI of the defect length.

Note that although the only figure of direct relevance to the Performance Indicator is the '70 and over' band, it has been suggested that three other bands are presented in the DfT approved report for information purposes. The definition of the extent of these bands may change in future, so developers would be wise to make the banding easily re-configurable. Lengths with a condition index of zero should be reported as a separate band, and should be calculated by subtracting the sum of the lengths in the other bands from the total length surveyed. Taking this approach allows the user flexibility in deciding whether to explicitly record "not defective" observations, or to rely on the assumption those lengths without defects, including lengths without the "not assessed" defect, are implicitly "not defective".

Mean Structural Condition Index within CI Band

The mean structural CI is length-weighted, on the lengths processed; i.e. the sum of (the length of each defect length * CI value for that defect length) for all defect lengths, divided by (total length of all defect lengths). This is another item of data which, while not required for the calculation of the PI, is presented in the DfT approved report for information purposes.

E. Percentage Length Where Strengthening Should Be Considered

This is the PI itself, and is calculated as the sum of all defect lengths in SCI band 70 and over, divided by Length Surveyed in Survey Period ("C" above), multiplied by 100 (and rounded to two decimal places).

$$PI = \left[\left(\sum \text{Defect Lengths exceeding threshold} \right) \times 100 \right] \div \text{Total Length Surveyed}$$



UKPMS Performance Indicators Report

Report Title: Network Performance Report for 2003-2003

Part 1: Background Information

| | |
|-----------------------------|------------------------------|
| Network: | <i>County Roads [rev. B]</i> |
| Owner: | <i>Oldshire CC</i> |
| Road Class selected: | <i>Principal</i> |

| |
|--|
| Run Details: |
| Automatic Pass Run Reference: <i>2002 PI Run 1a</i> |
| Automatic Pass Run Date: <i>19th November 2003</i> |
| Treatment Selection Rule Set: <i>RP4.0</i> |
| Estimating Rule Set: <i>not applicable</i> |
| Pavement Type(s): <i>All</i> |
| Feature: <i>Carriageway</i> |
| Selected Merging Method: <i>Method 3 – Variable</i> |
| Condition Index Merge Tolerance: <i>12</i> |
| Percentage Merge Tolerance: <i>10</i> |
| Inventory Used: <i>Default</i> |
| Structural CI Exception Level: <i>70</i> |

| |
|---|
| Survey Input Processed: |
| Valid Survey Period <i>1st April 2002</i> <i>to</i> <i>31st March</i> <i>2003</i> |



| | | | |
|---|------------------------|---------------|------------------|
| Total Length of Selected Network (carriageway-km): | | 203.560k | |
| | | m | |
| Total Possible Survey Length (XSP-km): | | 350.400k | |
| | | m | |
| | <u>Selected Survey</u> | <u>Length</u> | <u>% network</u> |
| | <u>Type</u> | <u>(km)</u> | |
| Length surveyed in Survey Period (XSP-km): | CVI | 320.279 | 91.4% |
| Un-surveyed length (XSP-km): | | 30.121 | 8.6% |
| | | | 100.0% |



Part 2: Performance Data

| Structural Condition Index Band | Processed Network Length within Structural CI band (km) | Mean Structural Condition Index within CI band | PERFORMANCE INDICATOR Percentage Length where strengthening should be considered |
|---------------------------------|---|--|---|
| 70 and over | 28.560 | 73 | 8.92% |
| 50 to 70 | 92.285 | 59 | |
| 30 to 50 | 91.300 | 41 | |
| > 0 up to 30 | 78.134 | 22 | |
| = 0 | 30.000 | 0 | |
| <i>All Surveyed</i> | 320.279 | 56 | |

Footnotes;

1. *Costs are not required for the BVPI's, and cost rates are not included in the UKPMS Default Rules and Parameters. However, it is expected that local costs rates will be set up and used by Authorities when producing the maintenance section of Local Transport Plans using the UKPMS-based performance indicator.*
2. *Structural Condition Index Bands (other than the '70 and over' row) are optional*