pcis
Pavement Condition Information Systems

the ukpms user manual

Volume 2

Visual Data Collection for UKPMS
Chapter 4: QA & Audit

Document Information

Title (Sub Title)	The UKPMS User Manual Volume 2: Visual Data Collection for UKPMS Chapter 4 QA & Audit
Product Number	UKPMS Manual July 2009
Author	James Wallis
Description	Auditing is recommended to ensure that data are of the highest accuracy and reject any data which are not of the required standard. Data audit confirms the quality of data is suitable for use in asset management. This document describes the best practice in carrying out audits.

Document History

Version No	***Status***	***Author***	***Date***	***Changes from Previous Version***
01	Draft	JW	July 2009	First release for internal review
02	Revised	JW	September 2009	Release version
03	Revised	KAG	October 2009	Revised following external review
04	Final	ME	30 October 2009	Final

PCIS Support Contractor
TRL
Crowthorne House
Nine Mile Ride
Wokingham
Berkshire
RG40 3GA

www.pcis.org.uk

Email: support@ukpms.com
Phone: +44 (0)1344 770480
Fax: +44 (0)1344 770356

Contents

1 UKPMS Audits

This chapter is intended to provide users of UKPMS data with the information required to conduct audits of UKPMS visual surveys in an accurate and consistent manner.

Managers and Engineers with responsibility for procuring and programming UKPMS visual surveys should also make reference to this chapter within any visual survey tender documentation

2 Introduction

Improvements in the accuracy and consistency of UKPMS visual surveys have been achieved through the introduction of requirements for inspector and software accreditation. Further information is provided in Chapter 2 *Inspector Accreditation* and Chapter 3 *DCD Software and Accreditation* in Volume 2 of this UKPMS User Manual.

UKPMS data is used in the production of performance reporting, benchmarking and asset valuation etc.; UKPMS users have recognised the importance of this information and have noted a number of issues they have encountered, including:

- Incorrect recording of defects.
- Errors in the estimation and/or recording of defect extents.
- Use of the wrong cross sectional position codes.
- Recording surveys against the wrong road section.
- Apparent improvements in road condition data even though no maintenance treatments have been carried out.

Such errors create a misrepresentation of the condition of a road network. They can adversely affect the rating systems used by Local Authorities and lead to inappropriate allocation of scheme funding and the design of ineffective treatments. Audits are therefore seen as essential to ensure the integrity of supplied data.

At present, visual survey data can be the subject of two separate audit regimes; the survey contractor's and the Local Authority's. This chapter is intended to make recommendations and to support local authorities who do not have an audit regime in place. Where an audit regime is in place this chapter does not take precedence, although there may be benefits in adopting some of the items within this chapter.

It is recommended that those undertaking audits of UKPMS surveys be accredited in accordance with Chapter 2 *Inspector Accreditation* in Volume 2 of this UKPMS User Manual. As a minimum the auditor should have the "Inspector Accreditation – Auditor" certificate.

3 Survey Specification

In the experience of the PCIS Support Team, many of the problems experienced during a visual survey audit can be attributed to the way in which the original survey was procured, specified and managed. It is important that these surveys are specified correctly, further information on survey procurement is available from the PCIS web site. This information will also be of relevance to organisations that conduct their surveys internally.

4 Audit Procedure

An audit is a review of a system, document, organisation (or other entity) that is usually conducted by an independent third party. Visual survey data audits are intended to verify that a survey was completed according to the requirements of this Volume 2 of the UKPMS User Manual and any subsequent updates, amendments or Technical Guidance Notes.

5 Audit Team

The audit team should consist of accredited UKPMS visual survey inspectors who shall meet the following minimum criteria:

- They should be independent of the other parties and have an unbiased view.
- They will be experienced practitioners in the type of survey under audit.
- They should, as a minimum, be accredited in auditing
- They must be dedicated to assisting the inspector by providing guidance and advice.

6 Desk Top Study

It is recommended that a preliminary desk-top study is undertaken to determine which inspectors have collected the data and the weather conditions at the time of the surveys.

7 Inspectors

A record in the HMDIF file includes the inspector's initials. It is important that the audit includes a representative cross-section of the survey data collected by all inspectors. This will enable consistency issues across the network to be highlighted.

The survey data under audit is required to be carried out by an accredited inspector. If the inspector is not accredited then the section will be automatically "Rejected".

8 Weather

Weather conditions at the time of a survey can influence the accuracy of the recorded data. Consideration needs to be given to the original weather conditions when undertaking an audit. A record in the HMDIF file includes the date on which the survey was conducted. Historical weather records[1] can then be referenced to determine the conditions at the time of the survey. Table 1 shows the type of data normally included within the audit report.

Road Section	Date Inspected	Inspector	Weather Conditions	
			Original Survey	Audit Survey
A123456/00	20/06/05	JW	Warm Sunny	Warm Sunny

Table 1 Weather records for audit report

9 General Considerations

The initial stages of the audit will determine whether the correct documentation is being used and that the required accreditations are in place; i.e.:

- The surveyor being audited is accredited. Further information is provided in Chapter 2 *Inspector Accreditation* in Volume 2 of this UKPMS User Manual.
- The inspector carrying out the audits is accredited. Further information is provided in Chapter 2 *Inspector Accreditation* in Volume 2 of this UKPMS User Manual.
- The surveyor being audited has used accredited software. Further information is provided in Chapter 3 *DCD Software and Accreditation* in Volume 2 of this UKPMS User Manual. (This can be checked on the PCIS website www.pcis.org.uk)
- The inspector is aware of the requirements of Volume 2 of the UKPMS User Manual (including the requirements of this Chapter).
- The inspector is aware of the permitted tolerances in survey accuracy.

10 Audit Procedure Flow Chart

The major component of the survey audit is the site visit. Figure 1 shows the logic to be followed by the audit team. Permitted tolerances in the accuracy of recorded defects (i.e. X and Y in Figure 1) are described in Section 11.

An audit report will be produced at the end of the process. This is addressed in Section 13 below.

[1] The following website provides historic weather records (other websites are also available):-
www.bbc.co.uk/weather/ukweather/year_review

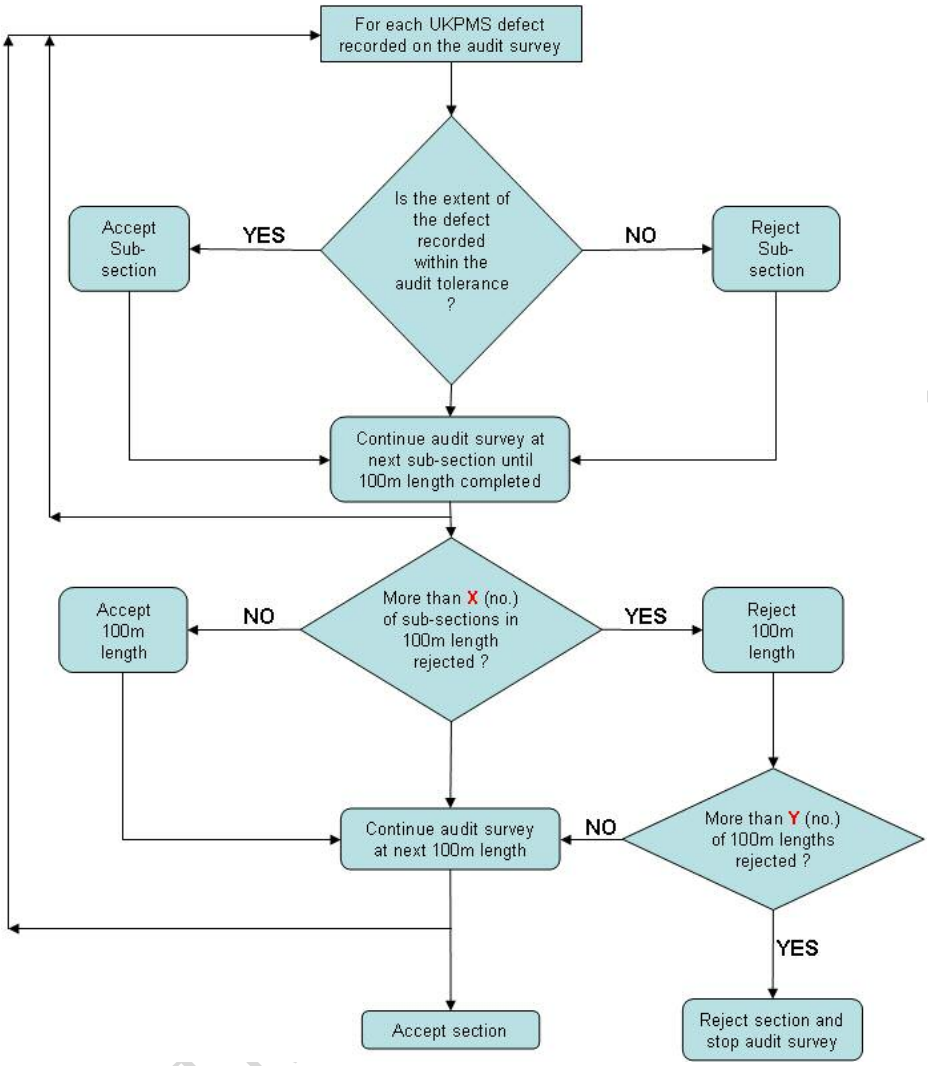

Figure 1 Audit procedure

11 Audit Specification

The X and Y tolerances in Figure 1 will vary according to road category and require input from individual Local Authorities. Table 2 provides a typical structure into which values for X and Y can be input. It should be noted that tolerances will differ according to the type of survey under audit. You may wish not to break the defects into groups at all; this is left to local needs.

The "Key" defects for CVI & DVI surveys are:

- Wheel track cracking (CVI & DVI)
- Wearing coarse deterioration (CVI)
- Settlement/subsidence (CVI & DVI)
- Whole carriageway major cracking (DVI)

Defect Group	Discrepancy	Sub-Section Tolerance X	Section Tolerance Y
"Key" defects CVI & DVI	Defect recorded in audit survey but missing from original survey	***	***
	Defect recorded in original survey but not encountered in audit survey	***	***
	Differences in measured attributes (Area, Length, Depth)	***	***
Other Carriageway Defects CVI & DVI	Defect recorded in audit survey but missing from original survey	***	***
	Defect recorded in original survey but not encountered in audit survey	***	***
	Differences in measured attributes (Area, Length, Depth)	***	***
Off-Carriageway Defects CVI, FNS & DVI	Defect recorded in audit survey but missing from original survey	***	***
	Defect recorded in original survey but not encountered in audit survey	***	***
	Differences in measured attributes (Area, Length, Depth)	***	***
Key:- ****** ***Local Authority to specify***			

Table 2 Permitted tolerances for survey audit

12 CVI Lateral Extents

Chapter 7 in Volume 2 of this UKPMS User Manual provides guidance on the recording of the lateral extent of ("Area") defects encountered during CVI surveys. The definitions are:

'Full'	Affects whole width of carriageway or lane.
'¾'	Affects approximately three-quarters of the width of the carriageway or lane.
'½'	Affects approximately one half of the width of the carriageway or lane.
'¼'	Affects approximately one quarter of the width of the carriageway or lane.
'Single'	Less than 0.5m in width.

At the time of the original survey, the inspector will have recorded the start and end chainage of a particular defect and will have estimated the lateral extent according to the above. From this information it is possible to estimate the percentage area of the carriageway (or lane) that is affected by a particular defect. When the raw data is processed within UKPMS these percentages are calculated and summarised by describing the extent as being either 'Local', 'Partial' or 'General' according to the following category bands:

'Local' Defect extends over 5 to 20% of the carriageway area
'Partial' Defect extends over 20 to 40% of the carriageway area
'General' Defect extends over more than 40% of the carriageway area

It is likely the audit team will review processed data only. Their assessment of the accuracy of the recorded extent will therefore be based upon the above categories.

13 Audit Report

The audit of an individual section results in the survey data being "Accepted" or "Rejected" according to the criteria provided in Section 10 above. An audit report will be produced and agreed by the audit team before being made available to all parties. The survey contractor will have the opportunity to comment on the report and to discuss any factual inaccuracies with the audit team.

It is recommended that a simple audit summary report is produced in a similar format to that shown in Table 3. Further details will be required if sections have failed. Site notes should be retained and a brief paragraph should be written explaining the findings from the audit, an example is shown in Figure 2.

Road Section	Survey Satisfactory	Comments
A123456/10	×	See Notes
A123456/15	✓	See Notes some minor mistakes

Table 3 Sample audit summary report

A123456/10	*The auditor has noted minor fretting in localised areas throughout the section and some transverse cracking at chainage 1050 – 1250.* *The inspector has recorded wheel track cracking, major fretting and transverse cracking throughout the section.* *The auditor understands why the contractor has recorded Major fretting but cannot explain why there is so much wheel track cracking and reflective cracking.* *Due to this the auditor has rejected this section.*

Figure 2 Sample notes