

# AUSTROADS SPECIFICATION AG:AM/S003

## SPECIFICATION FOR PAVEMENT DEFLECTION MEASUREMENT WITH A DEFLECTOGRAPH

### 1 SCOPE

This specification provides minimum equipment, calibration, validation and survey method requirements for the conduct of network level pavement deflection testing using a deflectograph.

Specific deflectograph machines may be known by proprietary names (e.g. the VicRoads designed deflectograph is known as the Pavement Strength Evaluator [PaSE]).

The specification and associated test methods have not been verified by field experience, and engineering judgement should be exercised when considering and acting upon the results obtained from the test methods, and the specified operational limits.

This specification does not address all occupational health and safety issues associated with its use. It is the responsibility of the Supplier to operate in accordance with appropriate legislation.

### 2 ROLES

Table 1 outlines the roles of different parties considered in this specification.

Table 1: Roles of different parties considered in this specification

Role	Description
Client	the organisation for whom the deflection data is being collected
Contract Supervisor	the representative of the Client organisation
Supplier	the operators of the deflectograph system and the suppliers of the resultant data

### 3 REFERENCED DOCUMENTS

Austrroads Test Method AG:AM/T007. Pavement deflection measurement with a deflectograph. March 2007.

Austrroads Test Method AG:AM/T008. Validation and repeatability checks for a deflectograph. March 2007.

### 4 EQUIPMENT

#### 4.1 Minimum equipment specification

The deflectograph equipment to be used must meet the minimum requirements in Austrroads Test Method AG:AM/T007.

## 4.2 Calibration

- (a) The deflectograph must be calibrated in accordance with the calibration procedure contained in Austrroads Test Method AG:AM/T007.
- (b) Calibrations should be carried out at least every 6 months or after 500 lane-km of testing, whichever comes first.
- (c) Calibrations must be carried out when any test system component likely to influence measurements is replaced, repaired or adjusted.

## 4.3 Validation

- (a) Deflectograph equipment must be validated in accordance with Austrroads Test Method AG:AM/T008.
- (b) At any stage during the collection of data the last successfully passed validation must be within the last 12 months or within the last 1,000 lane-km of usage, whichever occurs first.
- (c) Unless specifically otherwise directed by the Client, it is not required that the validation trials be conducted on roads within the Client's jurisdiction.

# 5 SURVEY

## 5.1 Survey roads

Refer to Annex 1 for a detailed list of the roads to be surveyed.

## 5.2 Location referencing

Data must be reported in accordance with the location referencing system documented in Annex 2.

## 5.3 Survey procedure

Survey works must be conducted in accordance with Austrroads Test Method AG:AM/T007.

## 5.4 Commencement of survey

Survey works must not commence until it has been demonstrated to the satisfaction of the Contract Supervisor that the calibration and validation requirements have been met.

## 5.5 Repeatability

The deflectograph must be calibrated in accordance with the minimum frequencies listed in 4.2, and the calibration methods contained in Test Method AG:AM/T007s.

In addition to the calibration timetable, Clients may ask that additional repeatability checks be conducted. Test Method AG:AM/T008 contains a procedure for conducting repeatability checks. The test method has not, however, been verified by field experience, and engineering judgement should be exercised when considering and acting upon the results obtained.

## 6 REPORTING

Data must be reported in accordance with the minimum reporting requirements listed in Austrroads Test Method AG:AM/T007, and be presented to the Client in accordance with the data reporting format documented in Annex 3.

# **AUSTROADS SPECIFICATION AG:AM/S003**

## **SPECIFICATION FOR PAVEMENT DEFLECTION MEASUREMENT WITH A DEFLECTOGRAPH**

### **ANNEX 1 – LIST OF ROADS TO BE SURVEYED**

## **AUSTROADS SPECIFICATION AG:AM/S003**

### **SPECIFICATION FOR PAVEMENT DEFLECTION MEASUREMENT WITH A DEFLECTOGRAPH**

#### **ANNEX 1 – LIST OF ROADS TO BE SURVEYED**

##### **GUIDANCE**

The Client must replace this page with either a detailed list of the roads to be surveyed, or a cross reference to such a list in another location within the contract documentation.

The minimum information that must be provided is as follows:

- names of road lengths to be tested
- lengths of roads
- test carriageways and lanes
- designated start and end points of each road
- identification fields used to uniquely identify the road lengths within the location reference system used by the Client (refer Annex 2).

# **AUSTROADS SPECIFICATION AG:AM/S003**

## **SPECIFICATION FOR PAVEMENT DEFLECTION MEASUREMENT WITH A DEFLECTOGRAPH**

### **ANNEX 2 – LOCATION REFERENCING SYSTEM**

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### **SPECIFICATION FOR PAVEMENT DEFLECTION MEASUREMENT WITH A DEFLECTOGRAPH**

#### **ANNEX 2 – LOCATION REFERENCING SYSTEM**

##### **GUIDANCE**

The Client must replace this page with detailed documentation of the location referencing system to be used in the reporting of data, or a cross reference to such documentation within the contract documentation.

# **AUSTROADS SPECIFICATION AG:AM/S003**

## **SPECIFICATION FOR PAVEMENT DEFLECTION MEASUREMENT WITH A DEFLECTOGRAPH**

### **ANNEX 3 – DATA FORMAT**

## **AUSTROADS SPECIFICATION AG:AM/S003**

### **SPECIFICATION FOR PAVEMENT DEFLECTION MEASUREMENT WITH A DEFLECTOGRAPH**

#### **ANNEX 3 – DATA FORMAT**

##### **GUIDANCE**

The Client must replace this page with detailed documentation of the data format(s) to be used in reporting the collected survey data, or a cross reference to such documentation within the contract documentation.

As a minimum the data format documentation must include the following:

- data file type to be used (e.g. ASCII text file, Microsoft Access database (including version), etc.)
- file header information
- for each data field:
  - name of field
  - description
  - data type
  - length of field/precision of field.

## EXAMPLE FORMAT DOCUMENTATION

### Data file definition

Data file type: Microsoft Access 2003 database  
Data fields: The following data to be reported at every test location

Database field description	Field name	Field format	
Primary key (unique) calculated as: (Road Number * 10,000,000) + (Link * 1,000) + (CH_FR) + 'Survey number' + 'Direction' + 'Data flag'	PKEY	Text	20 characters
Road number	ROAN	Number	Integer
Link number	LINK	Number	Integer
Distance from start of Link to location of test (km)	CH_LO	Number	Float (3 decimals)
Carriageway code: A: Undivided road B & C: Divided road R – Z: Ramps	CC	Text	1 character
Carriageway version (denotes how many times the Link on that carriageway has been altered): 1: original version 2: amended once 3: amended twice etc.	CWYV	Number	Integer
Lane code: Direction surveyed: P: Prescribed C: Counter	DIRN	Text	1 characters
Lane code: through lane number (starting at median lane), e.g.: 1: median lane 2: middle lane 3: kerb lane	LCODE	Text	3 characters
Contract code defined by Client	CCODE	Text	5 characters
Supplier code defined by Client	SCODE	Text	5 characters
Survey vehicle registration number	REGO	Text	10 characters
Operator's identification (initials)	OPERATOR	Text	4 characters
Survey date	DATE	Date	dd/mm/yyyy
Survey time	TIME	Time	hh:mm:ss
Survey number for Link (sequential from A to Z)	SNUM	Text	1 character
Data flag: A: Valid data L: Discrepancy in length Z: Invalid data (refer below)	DFLAG	Text	1 character
Event code (refer to following list)	ECODE	Text	1 character
Comments	COMM	Text	68 characters
Maximum deflection in the outer wheelpath (mm)	DEF_O	Number	Float (2 decimals)
Curvature Function in the outer wheelpath (mm)	CF_O	Number	Float (2 decimals)
Maximum deflection in the inner wheelpath (mm)	DEF_I	Number	Float (2 decimals)
Curvature Function in the Inner wheelpath (mm)	CF_I	Number	Float (2 decimals)
Pavement temperature (°C)	TEMP	Number	Integer

### Data Flag

Survey data is marked as invalid, and must be flagged in the database, for occurrences of the following events:

- data is collected when the equipment is not complying with the quality plan
- data is collected in localised area of contamination of the road surface, e.g. mud, debris, etc.

### Event code

Event code	Description	Extent
<b>Valid data</b>		
E	Extraordinary event	Also describe in the comments field
O	Change from the nominated lane	Each data item affected
C	Reading other than third test drop used	Each data item affected
<b>Invalid data</b>		
D	Sensor drop off exceeds specified limits	Each data item affected
U	Test conducted on bridge, culvert, filled trench, or other discontinuity	Discrete event
W	Road works (inc. sidetracks, roads under construction or repair, road opening, temporary cover, etc)	Each data item affected

## AMENDMENT RECORD

Amendment No.	Sections amended	Action <sup>1</sup>	Date
1 (Initial release)	All (Graham Foley, Graham Foley & Associates & Michael Moffatt, ARRB)	New	26 March 2007
<sup>1</sup> Key: Format            change in format Substitution      old section removed and replaced with new section New                insertion of new section Removed          old section removed			