Excel Technology Co Pty Ltd

Installation Guide
for
In-pavement
Inductive Loops

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Document: L130.1. Rev C Installation of In-pavement_Loops

Preformed Pavement Loop Installation Procedure

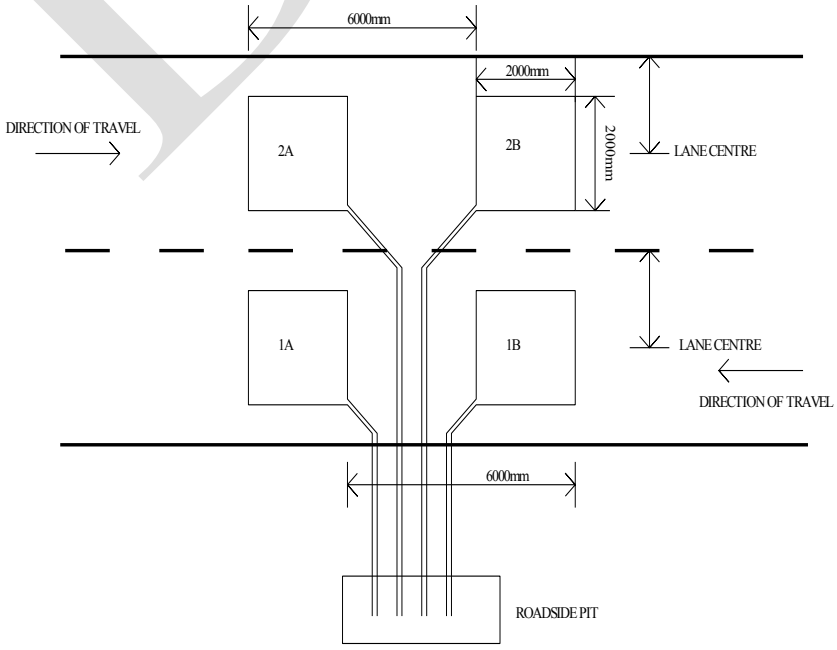
This information is intended to compliment the information provided by the preformed loop manufacturer. Where an irregularity is identified between this information and the preformed loop manufacturers information – RELY ON THE MANUFACTURERS INFORMATION.

1) The preformed pavement loops are in a semi-rigid preformed 2m x 2 m shape. The loops include a 'lead in' semi-flexible conduit which is either 4 metres or 8 metres in length allowing for kerb and far vehicle lane installation. Each loop includes a loop start wire and finish wire (denoting this is at manufacturers discretion).
2) The loops are configured typically in sets of 2 per lane at each detector outstation. Outstations are typically separated by 500 metres road travel between sites.
3) A pair of loops is installed in each vehicle lane. The distance between the leading edges of each pair of loops maybe between 3000 and 7000millmetres – providing a separation distance between 1 mt and 5mts. The leading edge is identified in respect to vehicle travel direction.
4) A permanent physical record (other than paint) should be applied to the road surface border to indicate the position of the loop edge. Refer also to "Notes on speed . . ." in relation to the significance of the accuracy of the measured distance between loop edges.
5) Subject to confirmation the loops are laid on the 'levelling course' of road base. The loops are secured with a simple rubber strap or other similar means to ensure fixed location during the laying of the road surface. MUST always be installed **on top of** steel reinforcing mesh.
6) Loop lead-ins are transferred to the roadside pit via flexible high pressure conduit. The loop tails are twisted within the conduit to minimise 'crosstalk' and are red / white in colour. The loop lead-ins are connected to the loop feeder cable in the road side pit. Long term reliability is secured by soldering connections and securing with heatshrink. The loop feeder cable is typically black / white and connections are always colour –to- colour. This maintains a uniform loop field polarity.
7) All loops have a unique serial number and have a pre-recorded inductance. The loops are supplied with an installation record document which facilitates recording the site #, loop #, road position, after installation inductance, and distance between loop edges 'x'

Typical Record Format:

Site #	Loop #	Road Position	Inductance/Res-ohms	'X' Measurement	Comment
1	12	1A	170mh / 1.8ohms		
1	16	1B	172mh / 2.0ohms	5980mm	

Typical Loop Layout – Incident Management Application

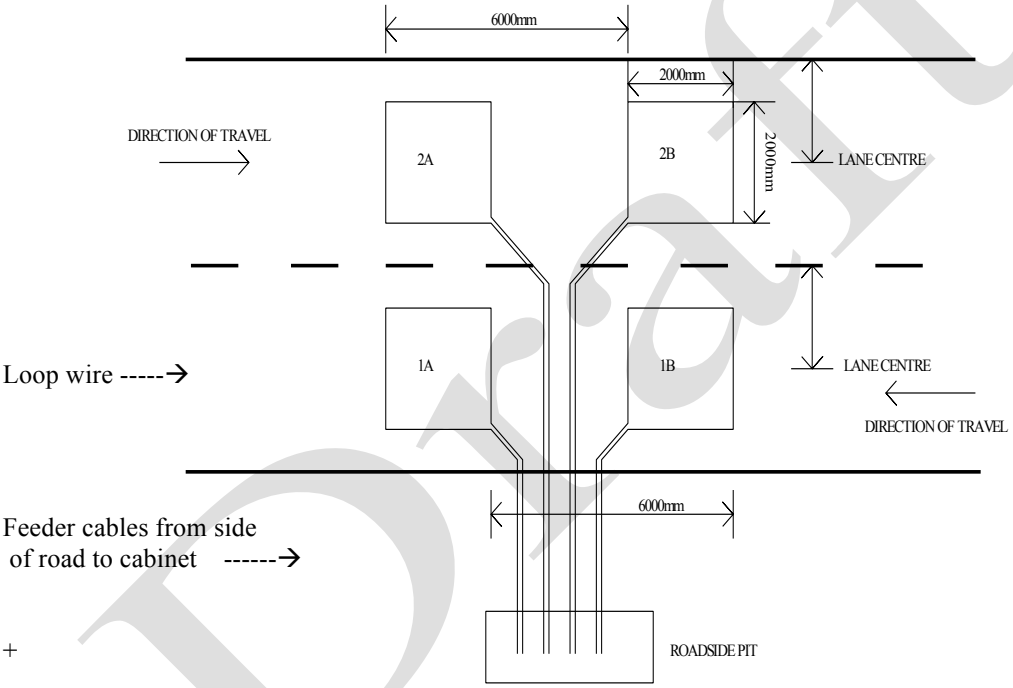


Installation procedure for incident detection loops

Pavement Loop Installation Procedure – Road Cut

1) The road is saw cut typical width 10mm and depth 40mm. The shape is determined by the loop style ie., square. Sharp corners should be avoided where possible by cutting a 30 cm corner cut across the square corner (see figure b below).
2) The leadins should be individual saw cuts for each loop to minimise 'crosstalk'
3) The wires should be wound into (inserted) in the slot using a 'rounded' piece of metal. The wires should always be wound in the same direction for each loop ie., always clockwise. Typical formats for square loops are either 4 or 5 turns. The resistance and inductance should be measured upon completion. Typical measurements for optimum performance are; resistance <2.5ohms and inductance range between 150 and 250 microhenries.
4) The loops should have a conductive insulation breakdown to earth test (usually know as a 'megger' or conduction to earth test) – the resistance to earth should be 'infinity' when tested at 250V-100Megohm scale.

Figure A Typical Loop Layout – Incident Management Application



Loop wire size: Single core insulated wire (preferably polyprolene) with a cross sectional copper diameter of 1.5mm squared

Feeder Cable: Screened, twisted balanced twin feeder cable (suitable freq 70Khz to 200Khz)
Insulation – polyproplene
Copper size 1.5mm squared
Metallic screen aluminimum or copper tape thickness .075 - .025mm
Twist or layup helical not to exceed 50mm

Figure B - cutting the corners to minimise wire insulation stress

All loops should be tested and position recorded to ensure accurate translation to the input channels of the detector. A typical record format is shown below:

Site#	Loop#	Road Position	Inductance	Resistance	Pair Spacing	Comment
1	1	1A	186µH	1.2Ω	6000mm	West bound outer lane
1	2	1B	181µH	1.2Ω		
1	3	2A	170µH	1.3Ω	5990mm	West bound inner lane
1	4	2B	193µH	1.6Ω		
…	…	…	…	…	…	…

This information is critical to the classification and incident detection performance functions of the loop detector. For further information concerning the elimination of errors please refer to the following document 100.7Publication Date 2007:07:16\100.7 Rev A ENGNOTE_ERROR_ANALYSIS

The following page details a proforma testing form that may be used for recording site loop details. Loop details are available from an LT100 or LT1000 Loop tester. The position must be recorded together with the loop pair spacing which is the edge to edge measurement.

For further information concerning placement of loops and piezos please refer to the following documents:

130.2 Publication Date 2007:05:23\130.2 Rev A ENGNOTE_INSTALLATION _LOOP&PIEZO_PLACEMENT

100.1 Publication Date 2007:06:06\100.1 Rev A ENGNOTE_Det&Clsfy_A.doc

100.3 Publication Date 2007:05:23\100.3 Rev A ENGNOTE_INDUCTIVE LOOPS_A

Outstation Record

SITE:	ADDRESS:
NO. LOOPS:	HOST BAUD:
NOTES:	

Loop	Position (lead/lag)	DC Resistance	Inductance	Loop" Q"	Pair Spacing	Comment
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
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22						
23						
24						

Test Date _____

Testing Officer _____