

SCOTTISH DEVELOPMENT DEPARTMENT

CHIEF ROAD ENGINEER

TECHNICAL MEMORANDUM SH 4/86

SCOTTISH ROUTINE MAINTENANCE MANAGEMENT SYSTEM

Summary

This memorandum gives details of the requirements and procedures to be adopted by Agent Authorities for inventory data collection and inspections to comply with the Code of Practice for Routine Maintenance.

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1. SCOPE

1.1 The purpose of this Technical Memorandum is to advise Agent Authorities of the new requirements for routine maintenance on motorways and all purpose trunk roads, the plans for implementation of the Code and the new management procedures to be introduced.

1.2 Reasonable costs incurred by Agent Authorities in setting up the new maintenance procedures as described in Section 4 of this Memorandum will be reimbursed.

1.3 The cost of carrying out inspections and the procedures required by the Code will be reimbursable under the terms of the existing Agency Agreement: details are given in Section 6 - Funding Arrangements.

1.4 The Department have published the Code of Practice for Routine Maintenance after consultation with the County Surveyors Society (Scottish Branch). The Code takes effect from 1 April 1986.

2. INTRODUCTION

2.1 The Code of Practice is a working management aid which is intended to ensure consistency of standards and value for money. Together with an inventory of highway infrastructure and furniture the Code will provide a realistic base for resource planning and distribution of maintenance funds.

2.2 Agent Authorities are now requested to set up agreed procedures for collecting and maintaining an inventory of highway infrastructure and furniture, recording inspections and defects encountered and the remedial action taken. Where required by the Code, Agent Authorities should prepare and maintain record drawings and schedules.

2.3 The implementation of the Code will be monitored to determine whether the objectives of consistency and value for money are being achieved. The Code has been produced in ring binder format to facilitate modifications should these prove necessary.

3. SCOTTISH ROUTINE MAINTENANCE MANAGEMENT SYSTEM

3.1 The new system of routine maintenance management which Agent Authorities are now asked to adopt has three main components:

- (i) a Code of Practice which sets out inspection and reporting procedures, action to be taken and, where appropriate, standards to be met;
- (ii) an inventory of highway infrastructure and furniture, collected and stored in a consistent manner;
- (iii) a data filing/handling system which allows the interrogation and cross-referencing of the information collected as detailed in (i) and (ii) above. The system should relate to procedures for costing and programming work and allow checks to be made on performance.

3.2 A computerised inventory collection system has been developed using the Husky Hunter data capture device with data collected to be sent to the Department for direct input to CHIPS. Development of a data handling/filing system for Agent Authority use is in hand and in the first year, before the system is available Agent Authorities should follow the procedures set out in Section 4 of this Memorandum.

4. PROCEDURES FOR ROUTINE MAINTENANCE MANAGEMENT

4.1 Inventory: Data Collection and Storage

4.1.1 An inventory of trunk road infrastructure and furniture is an essential part of the Scottish Routine Maintenance Management System which is to be applied to the network. To be of maximum benefit, inventory data **MUST** be collected and stored in a consistent manner.

4.1.2 The inventory items and details to be collected and stored are set out in the list at Appendix A. This information should be stored in a computerised filing system and, until development of the system for Agent Authority use has been completed, all inventory details will be stored on the Department's CHIPS database.

4.1.3 Agent Authorities are therefore asked to collect data in accordance with the list at Appendix A. Priority should be given to the motorway network.

4.1.4 Before collecting data, Agent Authorities should discuss and agree with the Department (HQ Section) the procedures to be adopted for collection and storage of data and the timescale over which these activities are to take place. Data capture devices are to be used and the information stored in a suitable filing system which allows convenient access and has appropriate safeguards against loss of information.

4.1.5 An Inventory Collection Manual based on field-tested methods of data collection has been produced and will be issued to Agent Authorities before inventory surveys are commenced.

4.2 Inspection Reports: Data Collection Storage and Retrieval

4.2.1 In 24 areas of maintenance activity the Code calls for 2 types of inspection - Safety and Detailed -at frequencies which reflect the importance of a particular road. In addition daily safety patrols are called for on the most important motorways and trunk roads, but no special arrangements are required for these safety patrols - they should be carried out during other maintenance activities.

4.2.2 Detailed Inspections form part of the procedures necessary to establish a programme of planned maintenance. Where defects are found they should, depending on their category, either be corrected immediately or as soon as possible after inspection, or be noted as items requiring attention within a programme of planned maintenance.

4.2.3 Agent Authorities are therefore required to carry out both types of inspection and to record the type, extent and location of defects found and all subsequent action taken. Safety inspections should commence as soon as possible after 1 April 1986; detailed inspections should commence after inventory details have been collected. All records must be retained for 6 years.

4.2.4 Until the computerised handling system has been fully developed it will be necessary to adopt a conventional paper-based recording system. A record form devised for this purpose is at Appendix B. Once the computerised system is operational recording will be undertaken using data capture devices such as the Husky Hunter.

4.2.5 The Code refers to checklists of items to be inspected and defects to be recorded. Sample checklists are at Appendix C.

4.2.6 A separate form should be completed for each defect found and used to record all subsequent action taken. Nil returns should be made in respect of Detailed Inspections and a Section Summary Sheet for that purpose is at Appendix D. Nil returns, in the form of a completed Inspection Record, will only be required in respect of Safety Inspections if they are generated by reports and complaints received outside the normal inspection procedures. Suitable records will have to be kept to demonstrate that Safety Inspections are being carried out in accordance with the requirements of the Code. That will preclude the need for nil returns in respect of planned Safety Inspections.

4.2.7 Following inspections, completed records should be suitably filed.

4.2.8 The filing system should be interrogated at regular intervals to determine where maintenance work is outstanding and to prepare works programmes. Where inspections show the need for immediate action (Category 1 defect) which cannot be taken at the time of inspection the defect must be brought to the attention of those responsible with a view to their carrying out remedial action at the earliest opportunity. With a computerised data filing/handling system such notifications can be generated automatically. With a conventional paper system special action such as the immediate generation of a works order will be necessary. Inventory information is essential in the preparation of such orders, of works programmes in general and of specifications for works.

4.2.9 A flow chart illustrating the procedure for recording inspections and subsequent action taken is shown at Appendix E.

4.2.10 The Department is preparing an Inspection Manual which will be available in the near future.

4.3 AVAILABILITY OF INFORMATION

4.3.1 The Department will call for reports and make performance checks based on the data held within the systems previously described. The checks will be in the nature of spot checks with no prior warning given either to timing or to the areas to be considered.

4.3.2 The nature of the information sought would be: checks on the extent of compliance with the Code; identifying difficulties in attaining standards set out in the Code; summary

data for inclusion within a wider maintenance management system; information on individual defects which will include the time of their occurrence and the type and timing of the remedial action taken.

5. TIMETABLE FOR IMPLEMENTATION

5.1 Agent Authorities are to start working to the Code of Practice from 1 April 1986.

5.2 A change from present methods of routine maintenance management to a method based on the code will not be immediately possible, but the requirements in respect of cyclical maintenance activities and frequencies of safety inspections are to be adopted from the outset. It will not be possible to comply with the Detailed Inspection requirements of the Code until such times as the Inventory surveys have been completed and the Inspection Manual has been issued.

5.3 The procedure described in Section 4 of the Memorandum will therefore be brought into operation over a period of time. In the first year of operation Agent Authorities will be required to set up procedures for collection of inventory information and for the recording of information from inspections and subsequent action to remedy defects found.

5.4 The preparation of record drawings and schedules called for by the Code should also start during the first year of operation. In certain areas it will not be possible to complete schedules until Detailed Inspections have revealed the existence of infrastructure or furniture not immediately visible or previously known about.

5.5 Development of a computer-based Routine Maintenance Management System to take account of the Code of Practice is well in hand. This system will not be fully developed for use by all Agent Authorities in the 1986/87 financial year but it is hoped to implement a full scale trial of the system with one of the Agent Authorities during the year. The aim is to have a fully developed system available for use by all Agent Authorities in the 1987/88 financial year.

6. FUNDING ARRANGEMENTS FOR ROUTINE MAINTENANCE OPERATION

6.1 Bids for the forthcoming financial year have to be made not later than 15 November in the preceding year. It will not be possible for the bids for the 1987/88 financial year to

be based totally on any consolidated experience of working to the Code but bids made in 1987 for the 1988/89 financial year should be based on data and experience obtained in 1986/87.

6.2 In the first year of operation Agent Authorities will still be required to manage within the routine maintenance allocation issued by the Department before the start of the financial year.

6.3 In bidding for the 1987/88 financial year Agent Authorities should make every effort to take account of the requirements of the code.

6.4 Provision will be made for bids for carrying out inspections under the Code (other than Safety Patrols as described in Section 2.2 of the Code) and for assembling the collected data on a suitable filing system. Such activities will be directly reimbursable under the terms of the existing Agency Agreement.

6.5 The cost of operating the Code-based system of Scottish Routine Maintenance Management including data handling such as interrogation of inventory and inspection record data to generate works programmes, will be deemed to be included in the Agency Fee. The cost of subsequent recording of action taken and the Safety Patrols will also be deemed to be covered by the Agency Fee.

7. ENQUIRIES

7.1 Enquiries in connection with this Memorandum should be addressed to the Chief Road Engineer, Scottish Development Department, New St Andrew's House, Edinburgh EH1 3SZ, telephone 031 556 8400 Ext 5719.

J/A M MACKENZIE

9 May 1986

Chief Road Engineer
Scottish Development Department
New St Andrew's House
Edinburgh
EH1 3SZ

SCOTTISH DEVELOPMENT DEPARTMENT
CODE OF PRACTICE FOR ROUTINE MAINTENANCE

INVENTORY ITEMS AND DETAILS TO BE COLLECTED

<u>Balancing Pond</u>	link, section, date, xsect, chainage, distance
<u>Bollard</u>	link, section, date, xsect, chainage, identity no, type, diagram no, electrical ref. no.
<u>Bridge Over</u>	link, section, date, start, end, identifier, type
<u>Bridge Under</u>	link, section, date, start, end, identity no, type
<u>Carriageway</u>	link, section, date, start, end, surface, width
<u>Catchpit</u>	link, section, date, xsect, chainage
<u>Central Island</u>	link, section, date, start, end, surface, width
<u>Central Reserve</u>	link, section, date, xsect, start, end, surface, width
<u>Channel</u>	link, section, date, xsect, start, end, type
<u>Communications Cabinet</u>	link, section, date, xsect, chainage, identity code, type
<u>Counterfort Drains</u>	link, section, date, xsect, start, end
<u>Crossover</u>	link, section, date, xsect, chainage, surface, width, sweep, text
<u>Culvert</u>	link, section, date, chainage, length, diameter
<u>Cycle Track</u>	link, section, date, xsect, start, end, surface, width

<u>Ditch</u>	link, section, date, xsect, start, end, type
<u>Embankment and Cuttings</u>	link, section, date, start, end, xsect, angle, height
<u>Fences and Barriers</u>	link, section, date, xsect, start, end, type
<u>Footway</u>	link, section, date, xsect, end, start, surface, width, sweep
<u>Filter Drain</u>	link, section, date, xsect, start, end
<u>Grip</u>	link, section, date, xsect, chainage, width, length, type
<u>Gully</u>	link, section, date, xsect, chainage, type, access, locked
<u>Hardshoulder</u>	link, section, date, xsect, start, end, surface, width
<u>Hedge</u>	link, section, date, xsect, start, end
<u>Interceptor</u>	link, section, date, xsect, chainage
<u>Kerb</u>	link, section, date, xsect, start, end, material, type
<u>Lighting Point</u>	link, section, date, xsect, chainage, identity code, column type, height, supply type, position of column, installation type, mounting brackets, electrical ref. no.
<u>Lay-by</u>	link, section, date, xsect, start, end, surface, width
<u>Manhole</u>	link, section, date, xsect, chainage
<u>Pedestrian Crossing</u>	link, section, date, chainage, type, material
<u>Pedestrian Guardrail</u>	link, section, date, xsect, start, end, material
<u>Piped Grip</u>	link, section, date, xsect, chainage, length
<u>Reference Marker Point</u>	link, section, date, xsect, chainage, type, identity code

<u>Retaining Wall</u>	link, section, date, xsect, start, end, type, height, position
<u>Road Markings (Hatched)</u>	link, section, date, xsect, start, end, width, material, pattern, type of edge line
<u>Road Markings (Longitudinal)</u>	link, section, date, xsect, start, end, material, classification, colour, type, width, length, gap
<u>Road Markings (Transverse & Special)</u>	link, section, date, xsect, chainage, classification, colour, material, height
<u>Road Studs</u>	link, section, date, xsect, start, end, type, classification, spacing, colour
<u>Safety Fence</u>	link, section, date, xsect, start, end, type, shape, cross section, post
<u>Signs</u>	link, section, date, xsect, chainage, identity code, type, illuminated, diagram no, mounting height, mounting method, width, height, ownership, electrical ref no, photograph no
<u>Telephone Box</u>	link, section, date, xsect, chainage, identity code
<u>Traffic Control Barrier</u>	link, section, date, chainage, location, type, arrangement, control
<u>Traffic Signals</u>	link, section, date, xsect, chainage, identity code, mounting method, type, number of lamp units, layout no, electrical ref no
<u>Trees</u>	link, section, date, xsect, chainage, number, length
<u>Verge</u>	link, section, date, xsect, start, end, actual width, maintained width, angle, number of obstacles

NOTES

1. The range of inventory items and details collected may be expanded to meet particular local requirements.
2. Date of last inspection is to be recorded with each inventory item.
3. "Link", "section", "start", "end" all relate to the CHART system of locational referencing.
4. "Xsect" relates to cross sectional position.
5. More information on the collection of inventory is contained in the Inventory Collection Manual referred to in section 4.1.5 of the Memorandum.

GENERAL																													
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SCOTTISH DEVELOPMENT DEPARTMENT

CODE OF PRACTICE FOR ROUTINE MAINTENANCE

CHECKLIST OF ITEMS TO BE INSPECTED, ACTIVITY CODES AND DETAILS OF INSPECTION DEFECTS

ITEM	ACTIVITY CODE
Minor carriageway repairs	MC
Footways and cycle tracks	FC
Covers, gratings, frames and boxes	CG
Kerbs, edgings and preformed channels	KC
Highway drainage: Piped drainage systems	PD
Highway drainage: Gullies, Catchpits and Interceptors	GC
Highway drainage: Piped grips	PG
Highway drainage: Grips	GP
Highway drainage: Ditches	DI
Highway drainage: Filter drains	FD
Highway drainage: Culverts	CV
Highway drainage: Balancing ponds	BP
Highway drainage: Ancillary items	AI
Highway drainage: Flooding	FL
Fences and barriers	FB
Grassed areas	GA
Hedges and trees	HT
Sweeping and cleansing	SC
Roadstuds	RS
Road markings	RM
Road traffic signs	SG
Traffic signals	TS
Road Lighting	LP
Motorway communications installations	CI

DETAILS OF INSPECTION DEFECTS

MINOR CARRIAGEWAY REPAIRS

Localised cracking	LOCK	area
Localised edge deterioration	LODT	length
Surfacing joints	SRJT	length
Cracking around ironwork	CKIR	
Patch - adjacent cracking	PACK	area
Patch - loss of material	PLMT	area
Patch - diff in level	PDLV	area
Trench RI - adjacent cracking	TACK	area
Trench RI - loss of material	TLMT	area
Trench RI - diff in level	TDLV	area
Pothole	POTH	area

FOOTWAYS AND CYCLE TRACKS

Standing water	STWT	length
Slab profile - uneven/trips/gap>20mm	SLPF	area
Slab cracked	SLCK	area
Slab rocking	SROK	area
Block profile	BKPF	area
Black top - pothole>25mm	BPOT	area
Black top - local cracking	BLCK	area
Black top - extensive cracking	BECK	area
Black top - fretting	BFRT	area
Failed patch - adjacent cracking	FPCK	area
Failed patch - loss of material	FLMT	area
Failed patch - diff in level	FDLV	area
Overgrown by vegetation	OVGV	length
Adopted trench RI - adjacent cracking	RACK	area
Adopted trench RI - loss of material	RLMT	area
Adopted trench RI - diff in level	RDLV	area

COVERS, GRATINGS, FRAMES AND BOXES

Difference in level with road	IDLV	
Difference in component levels	ICLV	
Rocking under load	IRLD	
Cracked or broken	IBCK	
Missing	MISS	
Parallel gratings	PARL	
Smooth surface	SMTH	
Blockage	BLOK	percentage

KERBS, EDGING AND PREFORMED CHANNELS

Vertical projection > 20mm	EVPJ	length
Horizontal projection > 50mm	EHPJ	length
Loose/rocking	ELRK	length
Damaged	DAMG	length
Channel block alignment	CHAL	length
Missing	MISS	length
Impeded water flow (detritus)	IMWF	length

HIGHWAY DRAINAGE: PIPES DRAINAGE SYSTEMS

Blockage	BLOK	length
Other malfunction	OMAL	
Flooding	FLOD	length
Drainage damage to road/verge	DRRD	length
Flood nuisance to properties	NPRP	
Flood nuisance to services	NSER	

HIGHWAY DRAINAGE: GULLIES, CATCHPITS AND INTERCEPTORS

Damaged	DAMG	
Collapsed	COLP	
Silting	SILT	
Blockage	BLOK	

HIGHWAY DRAINAGE: PIPED GRIPS

Blockage	BLOK
Detritus	DETR
Broken	BROK

HIGHWAY DRAINAGE: GRIPS

Weed growth	WEED	
Detritus "refuse"	DETR	
Blockage	BLOK	percentage
Flooding	FLOD	

HIGHWAY DRAINAGE: DITCHES

Weed growth	WEED	length
Collapsed bank	CLBK	length
Obstruction	OBST	length
Deposited rubbish	DRUB	
Silted	SILT	length
Flooding	FLOD	length

HIGHWAY DRAINAGE: FILTER DRAINS

Weed growth	WEED	length
Filter material damaged	FMDM	length
Filter material displaced	FMDS	length
Silted	SILT	length
Flooding	FLOD	length

HIGHWAY DRAINAGE: CULVERTS

Scour	SCOR
Free flow	FRFL

HIGHWAY DRAINAGE: BALANCING PONDS

Function outfall regulating device	OUTF
Blockage of inlet	INLT
Blockage of outlets	OUTL
Silting	SILT
Erosion of banks/walls/bunds	ERSN
Surcharge	SURC

HIGHWAY DRAINAGE: ANCILLARY ITEMS

Pump function	PUMP
Sluice function	SLUI
Tidal flap function	TIDL
Headwall/apron condition	HAFL

HIGHWAY DRAINAGE: FLOODING

Flood	FLOD	Cause, length (external source of information)
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FENCES AND BARRIERS

Rotten - wood fence	RWDF	length
Rotten - wood post (fence/barrier)	RWDF	
Corroded - metal (fence/barrier)	CMTF	length
Corroded - metal post (fence/barrier)	CMTP	
Corroded - concrete fence	CCTF	length
Corroded - concrete post	CCTP	
Missing	MISS	length
Damaged/deformed	DAMM	length
Loose panels	LOSP	
Loose anchors	LOSA	
No tension (metal fence)	NTEN	length
Not stockproof	NSTK	length

GRASSED AREAS

Inadequate visibility	IVIS	length
Risk to pedestrians	RPED	length
Overgrowing footway/carriageway	OVER	length
Noxious weeds	IWED	area

HEDGES AND TREES

Unstable/overgrown	UNST	
Dead tree	DTRE	height
Dying/diseased tree	DYTR	height
Dying/dead branch	DBRA	length
Obstructed sightline	OBSL	
Obstructed sign/lamp post etc	OBSN	
Hedges not stockproof	HNST	length

SWEEPING AND CLEANSING

Excessive muck	MUCK	length
Need for herbicide	HERB	length
Debris in traffic lane	DBTL	length
Debris in hard shoulder	DBHS	length

ROADSTUDS

Loose catseye casing	LCAS	no.
Loose catseye rubber	LCAR	no.
Loose studs	LSTUD	no.
Poor reflective conspicuity/catseye	REFC	no.
Poor reflective conspicuity/stud	REFS	no.
Damaged catseye	DAMC	no.
Damaged stud	DAMS	no.
Missing catseye	MISC	no.
Missing stud	MISS	no.

ROAD TRAFFIC SIGNS

Target distance (warning/regulatory)	TRGD	length
Legibility distance (directional etc)	LEGD	
Surface luminance	SFLM	
Surface colour	SFCL	
Physical condition of fittings	COFT	
Physical condition of frame	COFR	
Lamp failures	LAMP	
Moving parts	MOVP	
Electrical condition	COEL	
Exposed wiring	EXPW	
Surface corrosion	SFCO	
Accident damage	ACCD	
Missing	MISS	
Damaged	DAMG	

TRAFFIC SIGNALS

Equipment wiring and earth condition	EQWE
Equipment cabinet condition	EQCB
Condition of base seals	CBSL
Presence of gas	PGAS
Hardware physical condition	HPCD
Condition of buttons/detectors	CBDT
Condition of reg signs/illumination	CRSI
Alignment or obscuration	ALOB
Condition of pole wiring/earth	CPWE
Condition of loop/feeder	CLOF
Audible circuits	AUDC
Damaged	DAMG

ROAD LIGHTING

Lighting failure	LFAL
PECU failure	PECU
Time switch failure	TMSW
Electrical condition	ELCN
Wiring deterioration	WDET
Exposed wiring	EXPW
Corrosion of columns	CCOR
Need for tree pruning	NTPR
Missing (door/bowl/bulb)	MISS
Damaged post/column	DAMG
Accident damage	ACCD
Physical condition of fittings	COFT
No electricity supply	NOSP

ROAD MARKINGS

Wear	WEAR	length, % rem
Spread	SPRD	length, % orig
Colour	COLR	length, %
Skid resistance	SKID	length, SFC
Retro-reflectivity	REFL	length

MOTORWAY COMMUNICATIONS INTALLATIONS

Not water tight	WTGT
Damaged	DAMG

NOTE:

Defect Codes	OTHR	text
	NONE	

are to be added to each activity code.

SECTION SUMMARY SHEET FOR DETAILED SURVEYS

Region Code
 Agent Code
 Div Code
 Inspector
 Road Number

Site Identifier (Link & Section)

Date (Y Y M M D D)
 Node A
 Node B

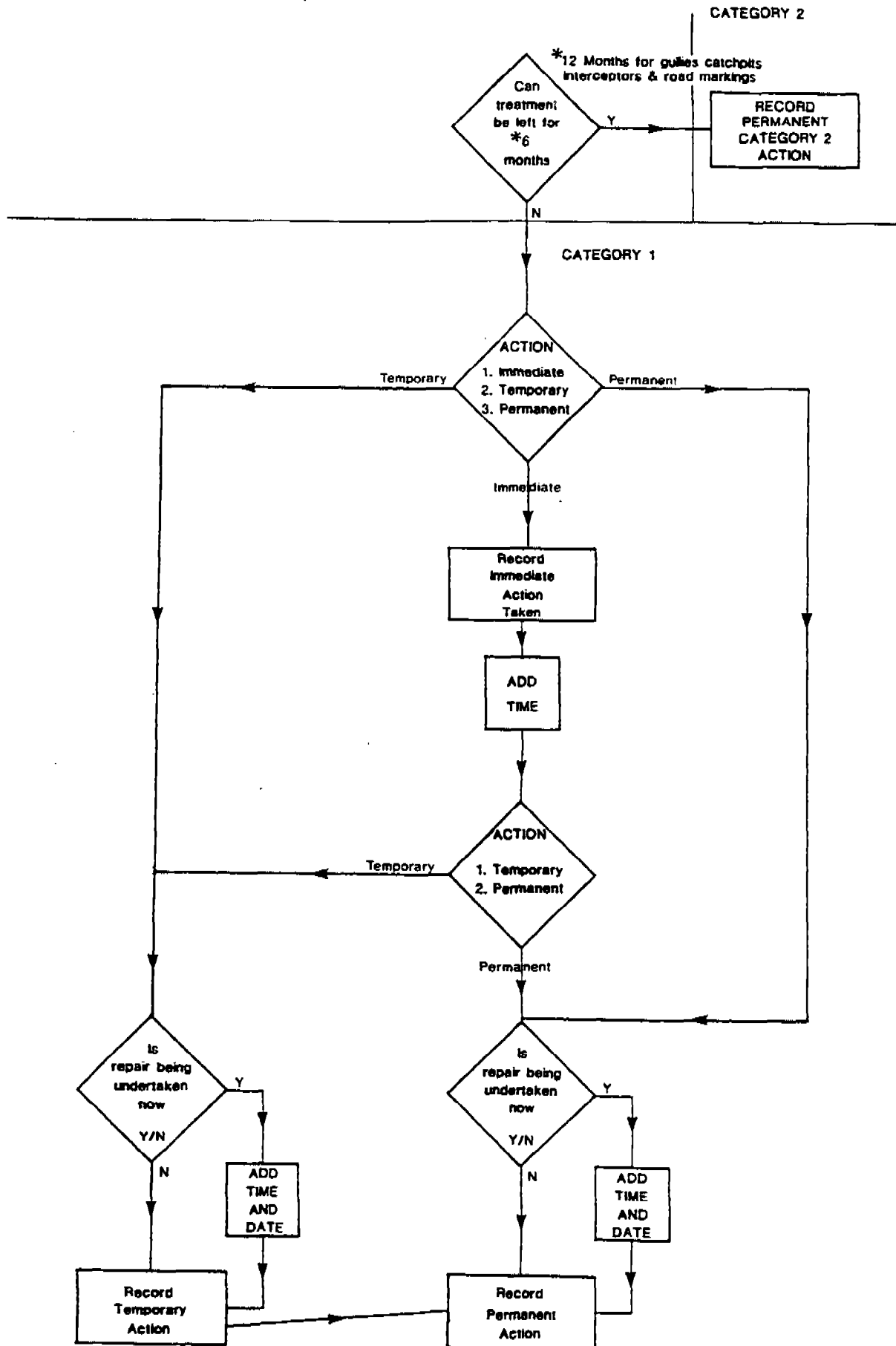
Whole Section Tick
 Part Section From To Charge

Form Serial Numbers From To

Minor repairs to the carriageway	MC	
Footways and Cycle Tracks	FC	
Covers, Gratings, Frames and Boxes	CG	
Kerbs, Edging and Preformed Channels	KC	
Highway Drainage: Piped Drainage Systems	PD	
Gullies, Catchpits and Interceptors	GC	
Piped Grips	PG	
Grips	GP	
Ditches	DI	
Filter Drains	FD	
Culverts	CV	
Balancing Ponds	BP	
Ancillary Items	AI	
Flooding	FL	
Fences and Barriers	FB	
Grassed Areas	GA	
Hedges and Trees	HT	
Sweeping and Cleansing	SC	
Roadstuds	RS	
Road Markings	RM	
Road Traffic Signs	SG	
Traffic Signals	TS	
Road Lighting	LP	
Motorway Communications Installations	CI	
OTHERS		

Signed _____

CODE OF PRACTICE FOR ROUTINE MAINTENANCE FLOW CHART FOR COMPLETION OF INSPECTION RECORD



NOTE: More information on the completion of inspection records is contained in the Inspection Manual referred to in paragraph 4.2.10 of the Manual.