

NRA Interim Advice Note 06/13

**Procedures for Use of Permanent Repair
Material Systems on National Roads**

October 2013

Summary:

This NRA Interim Advice Note 06/13 (NRA IAN 06/13) sets out requirements for the use of Permanent Repair Material Systems on National Roads. These systems are intended for use in the permanent repair of surface defects, patching, filling road stud cavities and core holes, filling around ironworks, trench reinstatements and utility cuttings/openings in National Roads.

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1. INTRODUCTION

General

- 1.1 The purpose of this NRA Interim Advice Note 06/13 (NRA IAN 06/13) is to set out requirements for Permanent Repair Material Systems (PRMS) for use in the permanent repair of surface defects, patching, filling road stud cavities and core holes, filling around ironworks, trench reinstatements and utility cuttings/openings in National Roads. Surface defect repairs that may be appropriate for remedial treatment with PRMS include potholes, delamination, surface cracks, joint failures and previously patched areas.
- 1.2 In order that Designers, system installers, and all other parts of the industry in Ireland understand how the system is intended to work, NRA IAN 06/13 outlines the procedures and requirements for use of PRMS.
- 1.3 NRA IAN 06/13 will explain:
 - The assessment prior to works;
 - Permitted systems for use as PRMS;
 - How the specification and notes for guidance are intended to apply;
 - The system of monitoring after installation of the PRMS;
 - Reporting procedures during monitoring;
 - How a PRMS, that has been successfully monitored, is used in future repair works; and
 - The implications of any deficiencies in performance of the PRMS within the monitoring period and any such remedial works required.
- 1.4 The Appendices of NRA IAN 06/13 contain sample flowcharts summarising the steps to be followed by the Employer/Authority and the system installer when installing a repair using PRMS.

Implementation

- 1.5 NRA IAN 06/13 should be used forthwith, as directed by the NRA, for the permanent repair of surface defects, patching, filling road stud cavities and core holes, filling around ironworks, trench reinstatements and utility cuttings/openings in National Roads.

2. ASSESSMENT

General

- 2.1 At all times it shall be kept in mind that PRMS are intended for use in the permanent repair of surface defects, patching, filling road stud cavities and core holes, filling around ironworks, trench reinstatements and utility cuttings/openings in National Roads. The Employer/Authority and (if applicable) their Designers should be aware that PRMS may not be suitable for treatment of extensive surface defects, defects such as pavement settlement/subsidence or defects within the unbound layers of the pavement structure.
- 2.2 The requirements of the NRA MCDRW Volume 1 Specification for Road Works, the NRA MCDRW Volume 2 Notes for Guidance should be used for reference and guidance. This NRA IAN 06/13 should particularly be read in conjunction with NRA IAN 08/13 Specification and Notes for Guidance on the Use of Permanent Repair Materials, which relate to the types of PRMS permitted and approximate maximum repair size. In addition, NRA IAN 07/13 Monitoring Phase Procedures for Permanent Repair Material Systems deals with procedures post-installation.
- 2.3 As NRA IAN 06/13 deals with both surface repair works and trench reinstatement, the approach taken by the Employer/Authority may vary. Preparing a cost-benefit analysis prior to any works being undertaken should provide guidance as to the most economic repair solution. This analysis should take into account the whole life cost of the repair, the budget available, the physical work to be undertaken, available resources, consultation with external Contractors and the timeframe allowed for works.
- 2.4 In some cases along the route network, specific areas may need more detailed assessment if surface defects occur or trench reinstatements are required. Examples of these locations include:
 - Areas with a history of pavement distress
 - Areas that have received emergency repairs and failed repeatedly
 - High stress sites such as
 - Approaches to roundabouts and traffic signals
 - Turning lanes within junction areas.
- 2.5 Further surveying of traffic loading, percentage of commercial vehicle usage and existing pavement material characteristics may be required in these areas before a final decision is made on the repair to be installed.
- 2.6 The assessment should conclude whether use of PRMS is appropriate or whether a full-scale repair using imported hot-mix bituminous material is required.
- 2.7 Reference should be made to the flowchart in Appendix A which demonstrates an example of how the various steps of the process interact.

Surface Repair Works

- 2.8 Once a surface defect is detected or reported, the Employer/Authority should assess the extent of the defect as soon as possible. Plans should be developed to match the level of the defect to the most suitable type of repair.

Trench Reinstatement

- 2.9 When appointing a Contractor to construct works that involve cutting trenches in existing National Roads, the Employer/Authority should consider the most suitable type of trench reinstatement at base, binder and surface course level.

3. PERMITTED SYSTEMS

General

- 3.1 The systems permitted for use as PRMS on the National Road network shall be as follows:
 - Permanent Repair Material
 - Localised Surface Repair
- 3.2 Where the 'Contractor' is referred to in other Clauses of the NRA MCDRW Volume 1 Specification for Road Works, parties using Permanent Repair Material in accordance with NRA IAN 08/13 shall be termed the 'product manufacturer' and/or 'system installer'.
- 3.3 Where the 'Contractor' is referred to in other Clauses of the NRA MCDRW Volume 1 Specification for Road Works, parties using Localised Surface Repair Systems in accordance with NRA IAN 08/13 shall be termed the 'system installer'.
- 3.4 The product manufacturer and/or system installer shall submit a method statement to the Employer's Representative prior to the works commencing which shall comply with sub-Clause 903.5. The works shall only proceed once the method statement has been approved by the Employer's Representative. Such method statements may deal with several similar repair areas or be site specific.

Permanent Repair Material

- 3.5 This material shall be a cold-lay bituminous material which shall provide a permanent repair to surface defects, road stud cavities and core holes, filling around ironworks, trench reinstatements and utility cuttings/openings.
- 3.6 The material used shall comply with all the testing requirements of NRA IAN 08/13 and NRA IAN 07/13.
- 3.7 In conducting the works the Employer/Authority may engage their own resources or a suitable external party to install the Permanent Repair Material. Inspections after the works are carried out shall be in accordance with NRA IAN 07/13.
- 3.8 When proposing to use Permanent Repair Material for the reinstatement of trenches, the reinstatement method requirements of the NRA Specification for Openings in National Roads shall also be adhered to.

Localised Surface Repair

- 3.9 This repair system is an infra-red process that reconstitutes the surfacing material in-situ providing a permanent repair to surface defects.
- 3.10 The system used shall comply with all the testing requirements of NRA IAN 08/13 and NRA IAN 07/13.
- 3.11 If required by the system installer, Permanent Repair Material may be used in Localised Surface Repair works to supplement the in-situ material such that the repair conforms to NRA IAN 08/13. Where supplementary materials are used the visual consistency of the existing surface course shall be maintained.

- 3.12 In conducting the works the Employer/Authority may engage their own resources or a suitable external party to install the Permanent Repair Material. Inspections after the works are carried out shall be in accordance with NRA IAN 07/13.

4. DOCUMENTATION

General

- 4.1 NRA IAN 06/13 complements the suite of documentation that has been prepared for the introduction of PRMS. These documents are as follows:
- NRA IAN 07/13 Monitoring Phase Procedures for Permanent Repair Material Systems
 - NRA IAN 08/13 Specification and Notes for Guidance on the Use of Permanent Repair Materials

NRA IAN 08/13 Specification and Notes for Guidance on the Use of Permanent Repair Materials

- 4.2 Systems that are proposed for use as PRMS shall be required to comply with NRA IAN 08/13. This is a performance-related specification with the onus placed on the product manufacturer/system installer to provide a repair that meets the requirements of NRA IAN 08/13 and the requirements of NRA IAN 07/13.
- 4.3 NRA IAN 08/13 requires testing of laboratory prepared specimens of Permanent Repair Material prior to installation.
- 4.4 Upon installation, the PRMS shall be tested to ensure compliance with the requirement of texture depth in accordance with the Specification.
- 4.5 Conforming to these requirements will provide a level of confidence that the system installed will perform acceptably.
- 4.6 In addition, NRA IAN 08/13 details requirements for workmanship during the preparation, installation and compaction of the permitted PRMS.
- 4.7 Once the PRMS is installed the requirements of NRA IAN 07/13 shall be followed for a one year monitoring period.
- 4.8 After one year in service, a final visual assessment, carried out by the product manufacturer/system installer and the Employer's Representative in accordance with NRA IAN 07/13, shall be carried out. Procedures to be followed whilst monitoring the PRMS are detailed in Chapter 5.

Road Type Category	Annual Average Daily Flow (AADF) [Note 1]
0	> 1100
1	500 - 1100
2a	300 - 500
2b	200 - 300
3	50 - 200
4	0 - 50

Notes:

1. *AADF Figures shall be the Daily Flow of Commercial Vehicles at time of repair works. Categories above are for total flow in one direction.*

Table 4/1: Categories of Road Type for monitoring of PRMS

4.9 NRA IAN 08/13 also includes further guidance on performance levels, record keeping, etc.

4.10 NRA IAN 08/13 advises that the maximum individual area of repair shall be approximately 2m². PRMS may prove suitable for larger areas however, at this time it is envisaged that for larger repair areas the use of hot-mix materials may be more practicable or economic.

NRA IAN 07/13 Monitoring Phase Procedures for Permanent Repair Material Systems

4.11 Visual assessments shall be carried out at intervals specified in NRA IAN 07/13 allowing for any obvious defects that may develop over time to be recorded. These procedures are discussed further in the next Chapter.

5. MONITORING PHASE PROCEDURES

After Initial System Installation

- 5.1 When a PRMS is first installed, the system installer and Employer's Representative shall monitor the performance, materials and workmanship of the system for a period of one year commencing from the date of opening the repair area to traffic. This monitoring will provide further understanding of a system's performance and durability.
- 5.2 For the first seven days after the repair area is opened to traffic, visual checks shall be carried out daily by the system installer and Employer's Representative on the repair area by the system installer to record any defects. This shall include specific checks for debonding or delamination of the PRMS from the existing surface. Approval of the PRMS at this stage shall be confirmed if no defects are noted. At the end of this seven day period a record sheet shall be completed confirming suitability of the PRMS and a copy forwarded to the Employer's Representative within three working days. Refer to procedures outlined in Chapter 3 of NRA IAN 07/13.
- 5.3 Thereafter the system installer and the Employer's Representative shall conduct inspections of the PRMS at intervals of 1 month, 3 months, 6 months and 12 months after opening to traffic. Approval of the PRMS after each inspection shall be confirmed if no defects are noted. After each inspection a record sheet shall be completed confirming suitability of the PRMS and a copy forwarded to the Employer's Representative within three working days. Refer to procedures outlined in Chapter 4 of NRA IAN 07/13.
- 5.4 At each of these visual assessments the performance of the PRMS shall be deemed suitable if the repair area does not contain any surface defects. Defects of this type shall be deemed to consist of ravelling, bleeding, rutting, bulging, surface cracking and edge breakup or edge cracking of the repair area.
- 5.5 Any defects on existing material adjacent to the repair area shall not be used to influence monitoring of the PRMS. Furthermore defects noted during monitoring of the PRMS arising from obvious oil spill, fire or vehicle collisions shall not be deemed as a defect with which the product manufacturer/system installer will have responsibility for rectifying.
- 5.6 Providing previous inspections have not noted any defects, a final visual assessment shall be carried out by the product manufacturer/system installer and the Employer's Representative in accordance with NRA IAN 07/13, after one year in service. If no defects are noted, this inspection shall confirm that the Permanent Repair Material System is suitable for further use on the same National Route road type category upon which the assessed repair was installed. The road type category shall be as defined in Table 4/1. If the PRMS is deemed to be suitable, the PRMS will also be deemed suitable for use on lower road type categories.
- 5.7 Should the PRMS be deemed suitable after the final visual assessment, any further repair areas on the same or lower road type category shall not be required to undergo the requirements of NRA IAN 07/13. However the system shall continue to meet the testing and workmanship requirements of NRA IAN 08/13.
- 5.8 Should any defects be recorded in the repair area during the Monitoring Period, the PRMS shall be deemed not suitable and shall not be permitted for further use on the road type category of the National Roads network where the defect occurred or any higher road type categories. If subsequently proposed for use on a road category which is lower than where the defect occurred, the PRMS will be required to fully comply with NRA IAN 08/13.

Further Installation of Permanent Repair Material Systems

- 5.9 Subject to the approval of the National Roads Authority Head of Standards, further use of a PRMS (that is undergoing monitoring in accordance with paragraph 5.1 above) on the National Roads network may be permitted in other locations. These locations shall be on a road type category, as defined in Table 4/1, which is the same or lower than the initial repair.
- 5.10 Use of PRMS under these conditions may only be permitted after the initial repair works has been carried out in accordance with NRA IAN 08/13 and monitored successfully for a three month period with the repair deemed suitable in compliance with the requirements of NRA IAN 07/13.
- 5.11 Until such time as the full requirements of NRA IAN 07/13 are met these further installations shall be undertaken at the risk of the product manufacturer and/or system installer.

System Failure and Remediation

- 5.12 Should the performance of the PRMS not be deemed suitable in accordance with NRA IAN 07/13, the product manufacturer and/or system installer shall be obliged to replace the repair area in accordance with sub-clause 702.10 of the NRA MCDRW Volume 1 Specification for Road Works. This shall be deemed as a PRMS failure.
- 5.13 In the event of the system failing, the system installer shall notify the Employer's Representative immediately of the failure.
- 5.14 Should the performance of the PRMS be deemed unsuitable in accordance with NRA IAN 07/13, the PRMS shall not be permitted for further use on the road category of the National Roads network where the failure occurred or any higher categories. If subsequently proposed for use on a road category which is lower than where the previous failure occurred, the PRMS will be required to fully comply with NRA IAN 08/13 Specification and Notes for Guidance on the Use of Permanent Repair Materials and the procedures in this NRA IAN 06/13. Road type categories shall be defined in accordance with Table 4/1.

6. EMERGENCY PATCHING WORKS

- 6.1 Emergency patching works are deemed to be those of temporary in nature. Such works are dictated by operational considerations and are placed with the intention of being replaced in the immediate future.
- 6.2 Emergency patching works shall not be deemed to be a repair suitable to undergo testing or monitoring in accordance with NRA IAN 08/13 at time of opening to traffic.
- 6.3 Emergency patching works shall be rectified as soon as practicably possible using:
- PRMS - by carrying out works in accordance with NRA IAN 08/13; or
 - Hot-mix materials - by carrying out works in accordance with sub-clause 702.10 of the NRA MCDRW Volume 1 Specification for Road Works.

7. RECORD KEEPING

- 7.1 Copies of all documentation relating to the PRMS shall be supplied to the Employer's Representative by the system installer after the following work stages are completed:
- Material testing prior to installation (if required)
 - Opening of repair area to traffic
 - Each monitoring inspection
 - Completion of monitoring
 - Completion of remedial works (if required)
- 7.2 Upon completion of each stage, records shall be submitted to the Employer's Representative within 7 days.
- 7.3 Records submitted shall include details of laboratory and site test results, materials used, layer thicknesses compaction methods and PRMS failures recorded.

8. REFERENCES

8.1 National Roads Authority Publications:

NRA Manual for Contract Documents for Road Works (NRA MCDRW), generally and specifically:

- NRA MCDRW Volume 1, NRA Specification for Road Works (NRA SRW) – Series 700, Clause 702

NRA IAN 07/13 Monitoring Phase Procedures for Permanent Repair Material Systems

NRA IAN 08/13 Specification and Notes for Guidance on the Use of Permanent Repair Materials

9. ENQUIRIES

- 9.1 All technical enquiries or comments on this document, or any of the documents listed as forming part of the NRA DMRB, should be sent by e-mail to infoDMRB@nra.ie, addressed to the following:

Head of Network Management, Engineering Standards & Research
National Roads Authority
St Martin's House
Waterloo Road
Dublin 4

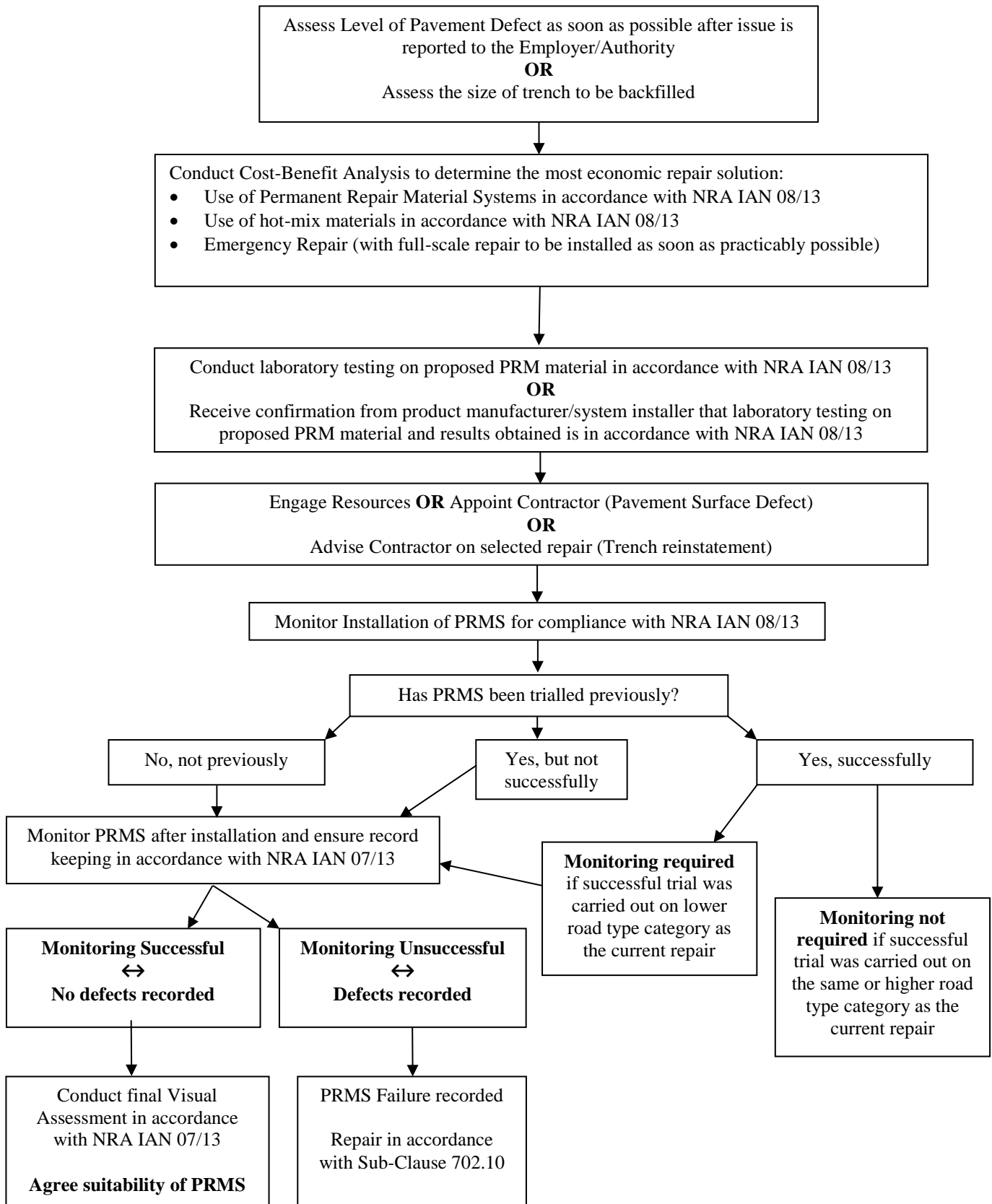


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Pat Maher
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Engineering Standards & Research

APPENDIX A: EXAMPLE APPROACHES FOR PERMANENT REPAIR MATERIAL SYSTEMS

Permanent Repair Material Systems – Sample Employer/Authority Approach

The flowchart below outlines proposed steps for the Employer/Authority to follow in assessment, preparation, monitoring, replacement (if required) and agreement of Permanent Repair Material Systems.



Permanent Repair Material Systems – Sample System Installer Approach

The flow chart below outlines proposed steps for the system installer to follow in installation, monitoring, replacement (if required) and agreement of Permanent Repair Material Systems.

