Scottish Road Works Commissioner

SERVICE LIFE OF REINSTATEMENTS

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EXECUTIVE SUMMARY

Following a review of road works legislation, Scottish Ministers have pledged to extend the current reinstatement guarantee period from the existing 2 or 3 years to 6 years for all road openings. This research study has been commissioned by the Scottish Road Works Commissioner (SRWC) to support the introduction of the extended guarantee and contribute to the ongoing improvement and quality of road reinstatements. The study includes an assessment of the service life of a representative sample of reinstatements completed in Scotland over the past 20 years, and the development of a simple methodology for assessing the condition of reinstatements after 6 years in service.

In order to estimate the typical service life of a reinstatement, the study utilised a visual assessment approach that was used in a previous study conducted in 2012. A clear advantage of using this approach was that any newly collected data could be compared with the previous study. It also provided performance data that extended over 20 years. In consultation with the SRWC, data was collected from local authorities in and around the central belt of Scotland. In a similar fashion to the 2012 survey, the information was used to identify reinstatements that had complied with the Specification for the Reinstatement of Openings in Roads (SROR), in terms of materials, depths and compaction levels. The data was processed to select a range of reinstatements in terms of age and road category. A survey team inspected the selected reinstatements in July 2022.

A comparison of the 2012 and 2022 results shows that the general condition of reinstatements has improved since 2012, with a subsequent increase in estimated service life. Data collected on all road category types in 2022 suggested that the majority of reinstatements that comply with the SROR specification, will not require maintenance until they have been in service for 10-12 years. This compares to an estimate of approximately 6-7 years, previously made for heavily trafficked sites in 2012. Several observations were made during the 2022 survey. The best performing reinstatements were typically surfaced with hot rolled asphalt. The majority of reinstatements (77%) were judged to exhibit an open joint. It was estimated that around 15% of the 2022 reinstatements were located in carriageways that were considered to be in poor or substandard condition.

The information collected from both surveys was used to develop a simplified six year assessment method. A broad definition for the service life of a reinstatement was adopted, i.e. a reinstatement is regarded to be at the end of its service life, requiring remedial treatment, if it possesses a serious fault or faults that are regarded to compromise road safety. The proposed assessment method utilises a flowchart with detailed step-by-step guidance to assess whether a reinstatement should pass or fail a six year guarantee period.

A small one-day workshop was held in September 2022 to invite comments on the proposal from representatives of two utility companies, two local authorities and the SRWC. Initial indications were that workshop attendees were sceptical that the draft proposal would work in practice. Barriers to the success of the proposal were seen to relate to several areas, including conflicting attitudes

towards the assessment of fair wear and tear, inadequate training and poor communication between the stakeholders involved.

The report recommends that in order to develop a future assessment process that is acceptable and consistent, consideration should be given to establishing a requirement for inspectors and managers to hold a qualification as part of a national certification scheme.

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INTRODUCTION

1 INTRODUCTION

1.1 BACKGROUND

Following excavation of roads to install or maintain utility services, reinstatements are required to conform to national standards. The Specification for the Reinstatement of Openings in Roads (SROR[1]) is an approved Code of Practice which provides detailed guidance and requirements for the reinstatement of openings in roads, footways and verges following road works. It is issued by Scottish Ministers and compliance with the specification is mandatory under Section 130 of the New Roads and Streetworks Act 1991 (NRSWA).

Following a review of road works legislation, Scottish Ministers have pledged to extend the current reinstatement guarantee period from the existing 2 years (or 3 years for deep openings) to 6 years for all openings. It is likely that this change will be introduced in 2023 with application to all reinstatements carried out after the implementation date.

1.2 PROJECT BRIEF

The Scottish Road Works Commissioner (SRWC), with support from the Scottish Road Research Board (SRRB), have commissioned WSP to conduct a research study that will support the introduction of an extended guarantee and contribute to the ongoing improvement and quality of road reinstatements. The study involves collecting information on the performance of road reinstatements to provide some measure of the effectiveness of the policy changes.

The study brief recommended that an approach used in previous study, conducted in 2012[2], could be developed for the purposes of assessing the service life of reinstatements. One benefit of using this approach is that the previous study could be used a baseline assessment which the current study could be compared to. The key deliverables for the study include:

- A definition of service life based upon the time beyond which remedial works would be necessary.
- An assessment of the service life of a representative sample of reinstatements completed in Scotland in the past 20 years.
- Development of a simple methodology for inspection of reinstatements at year 6 which takes account of natural deterioration. The inspection methodology should be able to be applied by roads authorities to give a fair assessment of whether the reinstatement ‘passes’ or ‘fails’ and what remedial measures will be required.

[1] The Specification for the Reinstatement of Openings in Roads, Fourth Edition (2019)[Link]
[2] McHale M J (2013). Long term damage to roads caused by utility reinstatements [Link].

2

METHODOLOGY

2 METHODOLOGY

2.1 ASSESSING THE CONDITION OF REINSTATEMENTS

The study utilises a visual assessment approach which was originally developed by TRL in the 1950s. The approach typically includes a panel of engineers that assign a mark from a seven point scale that makes use of defect suffixes. The marks are combined to calculate an average score or Panel Mark. The method was modified in 2012 to include reinstatements and marks are applied to an area or 'zone of influence' as shown in Figure 2-1. The area assessed includes approximately 0.5-1.0m of the carriageway on each side of a reinstatement.

Figure 2-1 - Zone of influence

The assessment of a reinstatement is slightly more complex than assessing a road pavement surface as the latter is normally uniform in appearance. Owing to the nature of a reinstatement, it can comprise a different type of material from the existing pavement in terms of age and material composition. In assessing the serviceability of the reinstatement and adjacent carriageway, the presence of faults associated with the reinstatement and carriageway are considered and applied to the basic marking. It is important to think about whether the reinstatement has or has not caused localised deterioration to the road pavement.

A clear advantage of using this approach is that any newly collected data can be compared with previous data collected in 2012. The method used for carrying out reinstatement inspections, including a description of fault suffixes and basic marks, is described in Appendix A.

2.2 SITE SELECTION

In consultation with the SRWC, data from the 2013, 2016 and 2019 National Coring Programme (NCP) was collected from local authorities in and around the central belt of Scotland. The information was used to identify reinstatements that had complied with the SROR specification, in terms of materials, depths and compaction levels. The gathered coring programme information typically included a unique LA Reference Number, GPS co-ordinates, road category, reinstatement dimensions and core extraction dates. The LA reference number permitted the installation date of each reinstatement to be determined.

The data was processed to select a range of reinstatements in terms of age and road category. The SROR road categorises are based on the expected traffic, in millions of standard axles (msa), to be carried by each road over the next 20 years. Each local authority categorises its roads into five types as shown in Table 2-1.

Table 2-1 – SROR road categories

Road Category	Traffic capacity
Type 0	Roads carrying over 30 up to 125 msa
Type 1	Roads carrying over 10 up to 30 msa
Type 2	Roads carrying over 2.5 up to 10 msa
Type 3	Roads carrying over 0.5 up to 2.5 msa
Type 4	Roads carrying up to up 0.5 msa

The SRWC provided information on the proportion of reinstatements found on each road category across Scotland, e.g. it was estimated that 86% of all reinstatements are located on Type 4 roads. Following various checks to ensure the collected data for each reinstatement was complete, 135 sites were selected. Figure 2-2 shows the distribution of selected reinstatements with respect to road category.

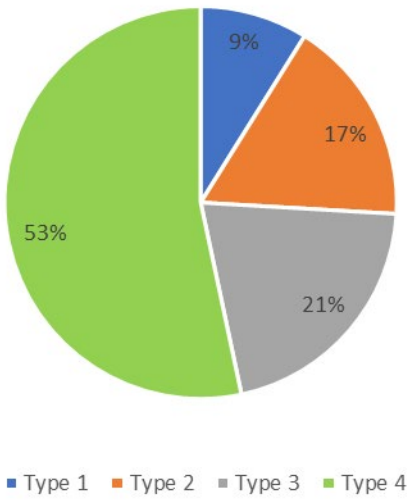

Figure 2-2 - Proportion of reinstatements selected in each road category

The sample size of 135 was selected to be similar to the 2012 survey which include 127 sites. Some additional sites were selected to allow for reinstatements that may have been replaced owing to maintenance work. A pre-survey of the sites was undertaken utilising Google Street View. In many instances the reinstatements and core locations could be identified, but owing to the date of some of the video surveys it was not possible to determine whether maintenance work had been carried out, i.e. recent video coverage was not available for some locations.

2.3 VISUAL ASSESSMENT SURVEYS

Figure 2-3 shows the approximate location of reinstatement sites selected for assessment. The sites were visited over four days, week commencing 25 July 2022. The survey team comprised three experienced engineers, two from WSP and one from Transport Scotland.

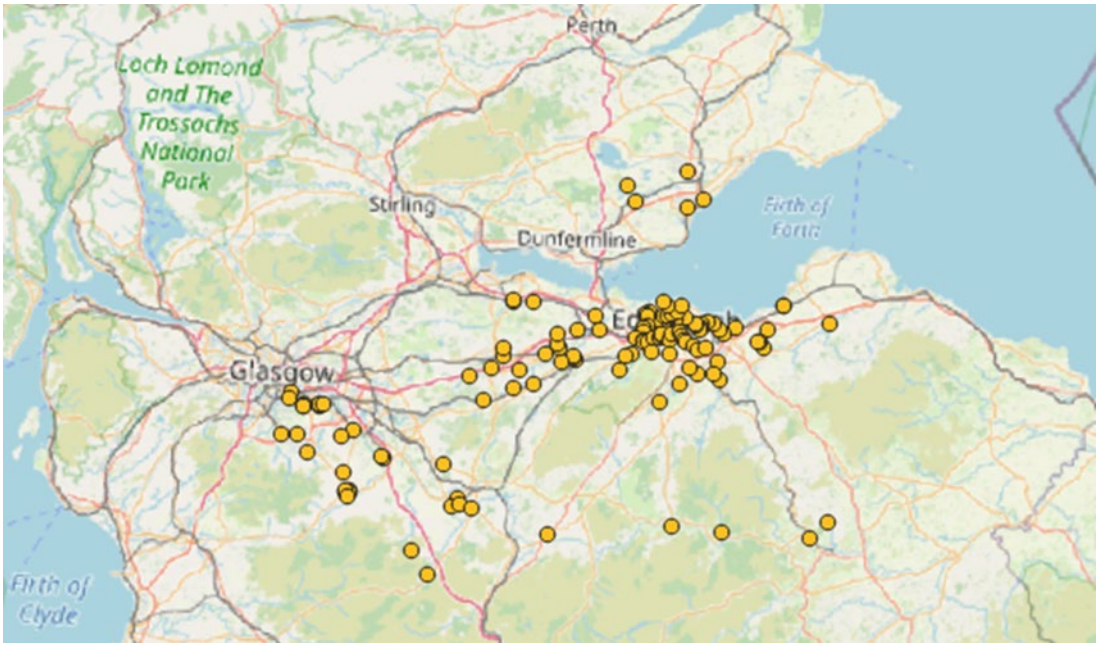

Figure 2-3 - Approximate location of reinstatements

3

SURVEY RESULTS

3 SURVEY RESULTS

3.1 VISUAL CONDITION RESULTS

Figure 3-1 shows the average panel mark for each reinstatement plotted against its age. Each data point is also colour coded to show the road category for the reinstatement. The full panel marks and associated defects are provided in Appendix B, Table B-1 & Table B-2. Each site was allocated an acronym (RIP 1.01, RIP 1.02, etc) to retain anonymity and these are used throughout the report for ease of reference. In total, 106 assessments were carried out. This was slightly less than the previous 2013 study which assessed 127 reinstatements. The main reason for the reduced number of sites was due to an expectedly higher number of sites where the reinstatement had been replaced or removed owing to road maintenance works, e.g. resurfacing.

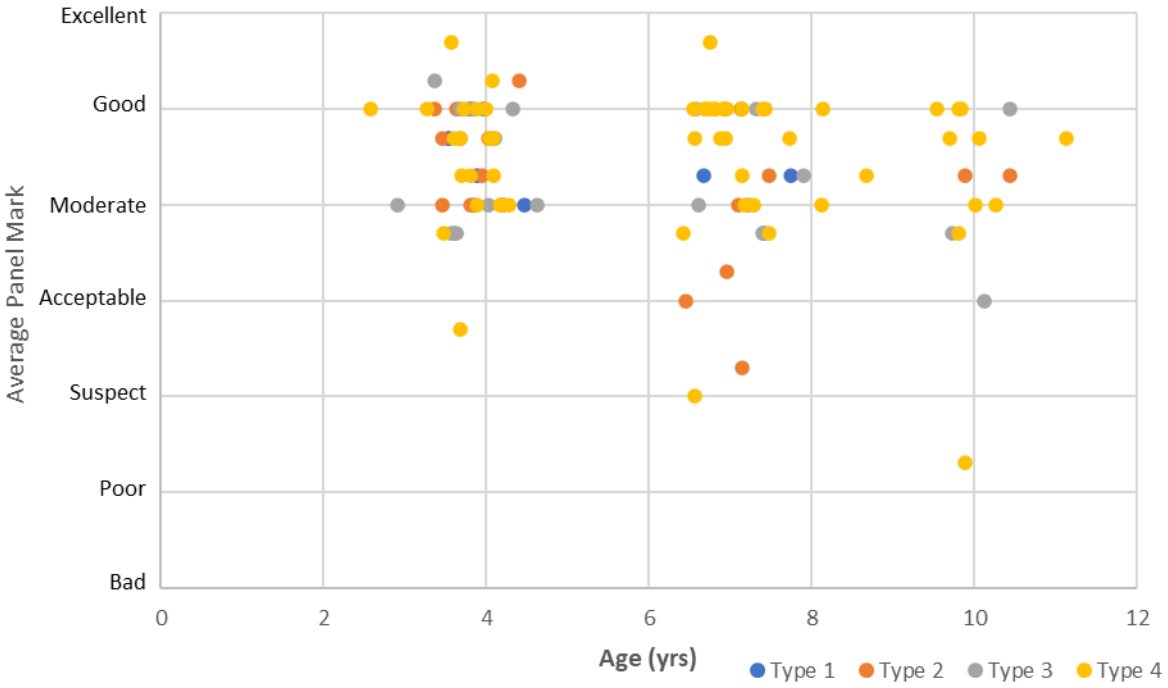

Figure 3-1 – Reinstatement condition versus age

The three data clusters reflect the fact that the information on the reinstatements was taken from the 2013, 2016 and 2019 NCP, i.e. coring exercises were three years apart. For example, the data points clustered to the right of Figure 3-1 are based on reinstatements that were cored in 2013. These represent the oldest reinstatements assessed as part of the study. Using the unique LA reference number associated with these reinstatements, the actual installation date or age of the reinstatement was determined. The youngest reinstatement in this cluster was 9.5 years old and the oldest was 11.1 years old.

3.2 ROAD CATEGORY

The average panel marks for road categories Type 1, Type 2, Type 3 and Type 4 are shown in Figure 3-2, Figure 3-3, Figure 3-4 and Figure 3-5, respectively. It can be seen that there is considerable scatter in the results. Trend lines representing a simple linear relationship between

condition and age have been used to broadly indicate the rate of deterioration with time. It can be seen that the gradient of these trend lines is steeper for Type 1 and Type 2 when compared to Type 3 and Type 4. In general, the data shows that the reinstatements deteriorate with time and this is more marked in areas where trafficking is higher.

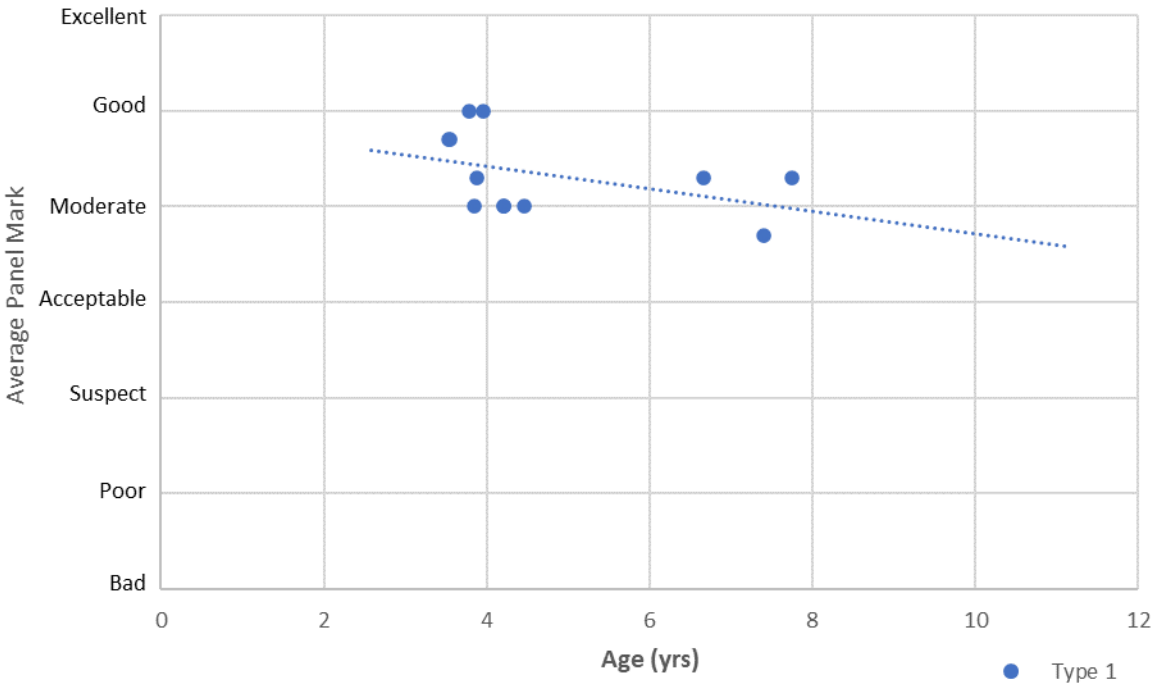

Figure 3-2 - Road category Type 1

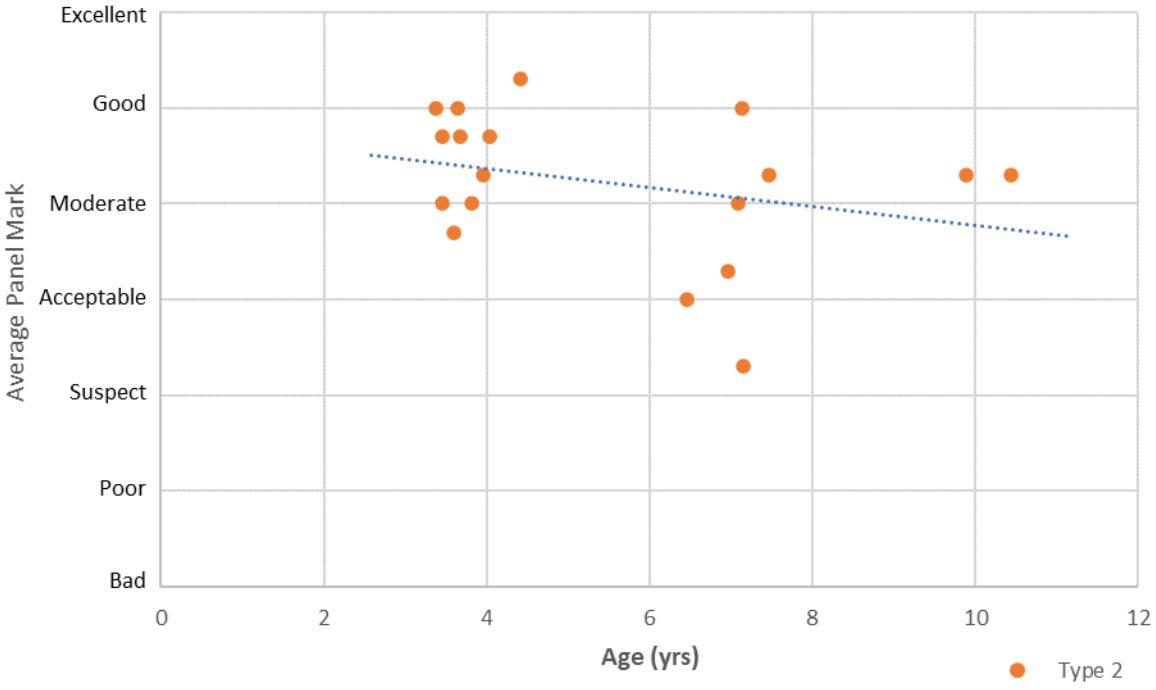

Figure 3-3 - Road category Type 2

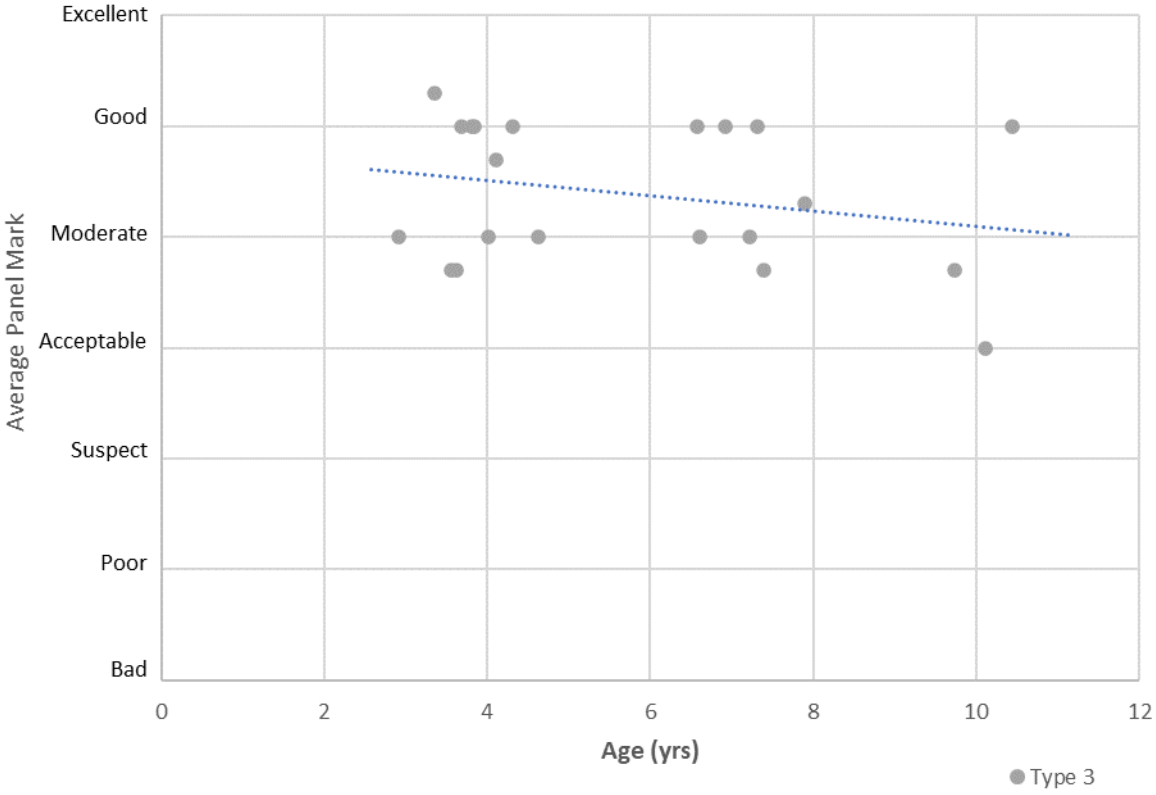

Figure 3-4 - Road category Type 3

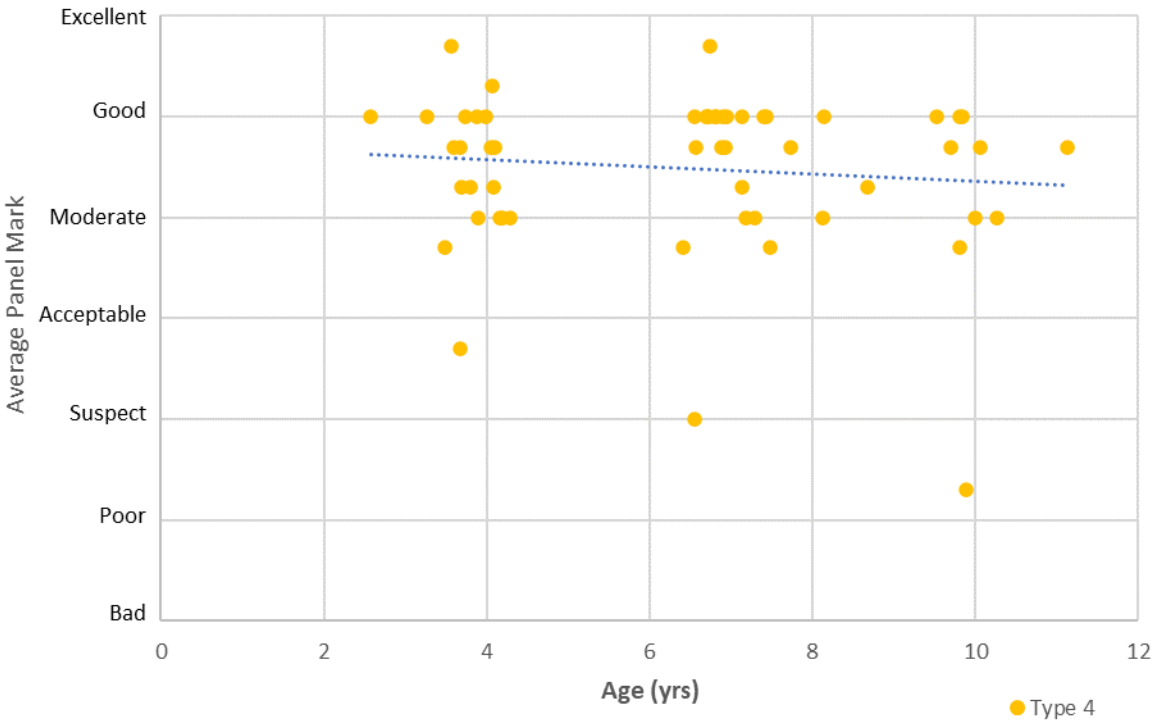

Figure 3-5 - Road category Type 4

3.3 COMPARISON WITH 2012 SURVEY

The previous 2012 TRL study selected sites based on council areas representing rural, semi-urban, urban and city environments. The study did not use road categories, but characterised sites using a system that apportioned a high, medium or low stress level dependant on the location and trafficking experienced at each site. It was therefore not possible to compare the two surveys based on road categories. However, it was considered that they could still be compared in broad terms as they shared several similarities, including:

- Both surveys included reinstatements located in rural, semi-urban, urban and city environments.
- Reinstatement age range was similar, i.e. 2 to 10 years in 2012 and 2.6 to 11.1 years in 2022.
- Survey sample size was 127 in 2012 and 106 in 2022.

3.3.1 IMPROVEMENT IN VISUAL CONDITION

A comparison of the 2012 and 2022 results showed that the general condition of reinstatements had improved since 2012, with an expected increase in service life. A comparison of the panel marks showed that the 2022 survey only considered six sites, or 6% of the sample size, to be unsatisfactory in terms of serviceability. This compared to 27 sites, or 21% of the 2012 reinstatements, which were assessed at or below the *Acceptable* marking. A comparison of the average condition marks for the two surveys is shown in Figure 3-6

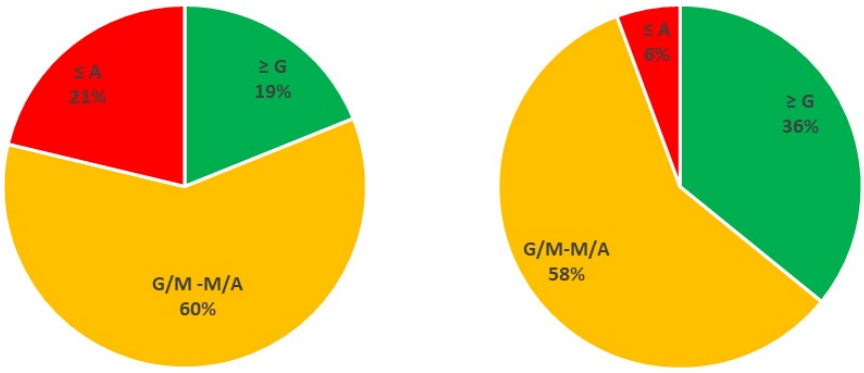

Figure 3-6 - Comparison of average condition marks for 2012 and 2022 surveys

3.3.2 HEAVILY TRAFFICKED SITES

The 2012 survey attempted to fit linear regression lines to the collected data, but low R-squared values highlighted that the regression equation could not account for, or explain the variability in the data in terms of providing a model to predict deterioration. Part of the explanation for this is that

many reinstatements, particularly smaller openings, are not located in areas that receive heavy traffic loading. The clearest deterioration trend from the 2012 survey was observed when the average markings from sites categorised as heavily stressed were used.

In an attempt to examine this finding using the 2022 data, the average markings from the most heavily trafficked sites were selected. The location of each Type 1 reinstatement was reviewed and where it was considered that it was not in a trafficked area the mark was not used. A comparison of the survey data for heavily trafficked reinstatements is shown in Figure 3-7.

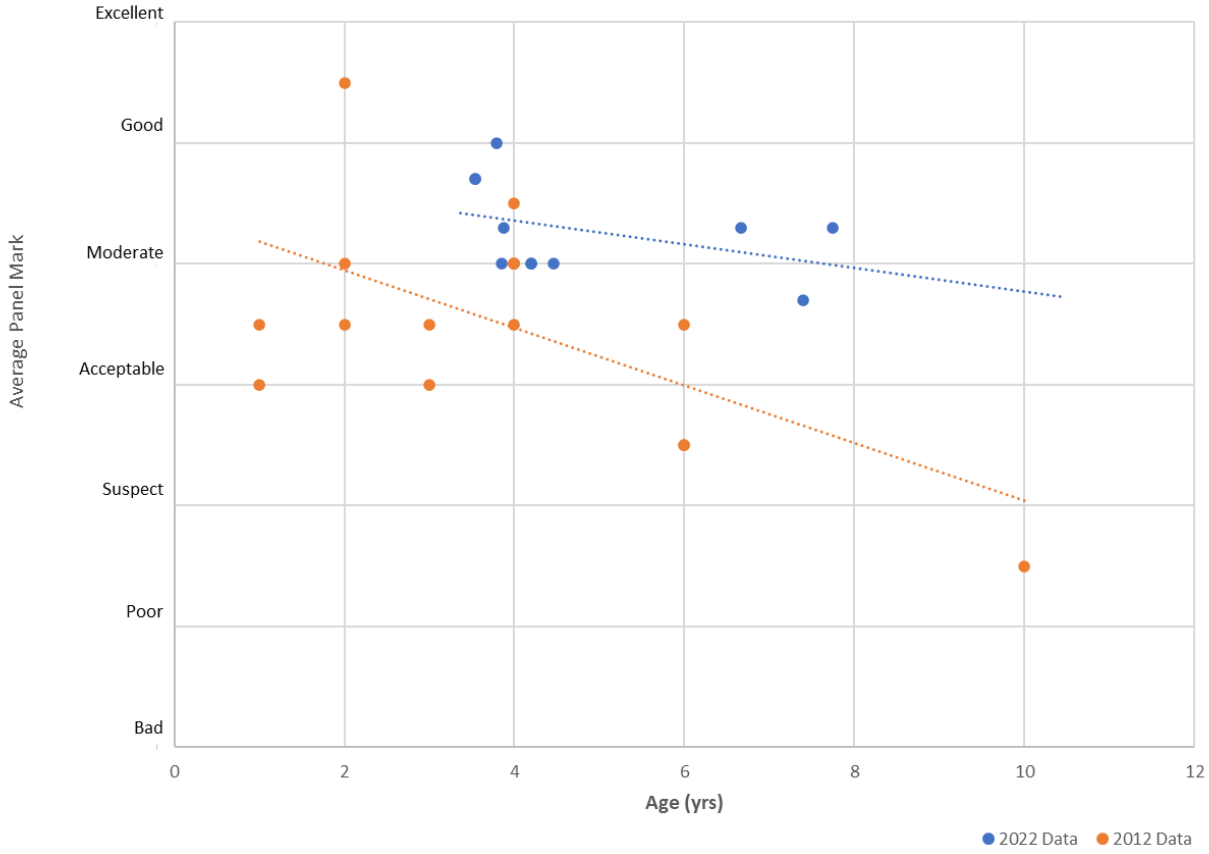

Figure 3-7 - Comparison of average condition markings for heavily trafficked sites

It can be seen that the 2022 data generally sits above the 2012 data, which reflects the higher condition markings allocated by the 2022 survey team. Based on the 2012 survey data for heavily stressed sites, it was estimated that reinstatements located in these areas would require maintenance after approximately 6-7 years in service. There was a smaller amount of data collected on highly stressed sites in 2022, but it is likely that the reinstatements will not require maintenance until they have been in service for 10-12 years.

4

OBSERVATIONS

4 OBSERVATIONS

4.1 GOOD PERFORMANCE

The best performing reinstatements were typically surfaced with hot rolled asphalt (HRA). Figure 4-1 shows examples of reinstatements that had been in service for 7.3 to 9.5 years, and were assessed as *Good* by the inspection panel. With the exception of showing some areas where the joint was slightly open, these reinstatements were considered to be defect free.

Site RIP 3.02: marked G $_{Jo}$; age 7.3 yrs; Type 3

Site RIP 3.19: marked G $_{Jo}$; age 6.8 yrs; Type 4

Site RIP 4.03: marked G; age 9.5 yrs; Type 4

Site RIP 4.24: marked G $_{Jo}$; age 7.4 yrs; Type 2

Figure 4-1 - Examples of reinstatements assessed as *Good*

4.2 POOR PERFORMANCE

Only four of the 2022 sites were assessed below the *Acceptable* level. The sites ranged in age between 3.7 and 9.9 years and are shown in Figure 4-2

Site RIP 1.05: marked S/P Jo Conc Dr; age 9.9 yrs; Type 4

Site RIP 1.11: marked S Jo Jf -r Conv Cr Dr; age 6.6 yrs; Type 4

Site RIP 2.25: marked A/S Jo Cr Dr; age 7.1 yrs; Type 2

Site RIP 1.17: marked A/S Jo -r Cr Dr; age 3.7 yrs; Type 4

Figure 4-2 – Reinstatements that were assessed below *Acceptable*

4.3 JOINTS

A major finding of the previous 2012 survey was that poor joint construction was found to be endemic. The 2012 survey assessed 127 sites and the survey team considered 81% of the reinstatements to exhibit an open or fretted joint. Although the 2022 survey observed some good joints, the majority (77%) were judged to exhibit an open joint. Figure 4-3 shows an example of a

good quality joint and an open joint which was more representative of the reinstatements assessed. Both reinstatements were around four years old.

Good joint at 3.4 years

Typical open joint at 4 years

Figure 4-3 - Examples of joint construction

4.4 EXTENT OF REINSTATEMENTS

The 2012 survey highlighted issues associated with the density of reinstatements, particularly in city environments. Around 20% of the 2022 reinstatement tracks were observed to cut across other reinstatements, were located within other reinstatements or close to other reinstatements. In some instances this was observed to affect the profile of the road, which will increase the dynamic loading from passing vehicles. The high number of joints is also likely to increase the probability of water seeping into the pavement resulting in further damage to the pavement layers. Figure 4-4 provides some examples where multiple reinstatements were encountered.

Site RIP 1.34

Site RIP 2.35

Figure 4-4 - Examples of density of reinstatements

4.5 SUBSTANDARD CARRIAGEWAY CONDITION

In addition to sites where there was a high number of reinstatements, it was also observed that several of the sites comprised carriageways that were in poor structural condition. Based on photographic records, it was estimated that around 15% of the 2022 carriageways were considered to be in poor condition. The latest Alarm survey[3], which is based on funding information collected in England and Wales, estimates the average frequency for all classes of road resurfacing stands at once every 70 years. Although this estimate is not based on information collected in Scotland, it provides an indication of the effects of funding and maintenance levels on the condition of the local road network.

Figure 4-5 shows two examples of where the carriageway clearly require maintenance. Site RIP 1.20 exhibited structural rutting and Site RIP 2.35 displayed extensive 'alligator' cracking which is symptomatic of a pavement that is unable to carry loads owing to the underlying supporting structure. Where the existing road is in a poor condition it will present technical challenges during the installation of reinstatements. For example, an uneven or heavily cracked surface will make it difficult to tie-in the surface of the reinstatement to the surrounding surface levels and to create a tight and durable joint.

Site RIP 1.20

Site RIP 2.35

Figure 4-5 - Examples of poor carriageway condition

[3] AIA Alarm survey 2022 [Link]

5

ASSESSING CONDITION AT THE END OF THE GUARANTEE PERIOD

5 ASSESSING CONDITION AT THE END OF THE GUARANTEE PERIOD

5.1 GUARANTEE PERIOD

Scottish Ministers have pledged to extend the current reinstatement guarantee period to 6 years for all openings. The most recent data collected on performance suggests that if reinstatements comply with the SROR specification then their condition around six years is likely to be assessed as *Good* or *Moderate*. The results for road category Type 4 (Figure 3-5), which is estimated to account for 86% of reinstatements located on the road network, showed that only three sites, or 5% of the sample (55 sites), were assessed to be unsatisfactory in terms of serviceability.

5.1.1 CURRENT SROR GUARANTEE REQUIREMENTS

The current reinstatement guarantee period is 2 years, or 3 years for deep openings. The primary consideration is one of maintaining safety and intervention limits are specified to ensure that the surface profile of the reinstatement is reasonably flat and flush with the surrounding adjacent surfaces. Three surface profile limits are specified in the SROR: edge depressions that create a vertical step or trip; surface depression or crowning based on the width of the reinstatement; and a combination of the aforementioned defects. Performance requirements are also specified for skid resistance and repairing cracks associated with reinstatements throughout the maintenance period. The specification notes that if a reinstatement has not been constructed to specification, i.e. appropriate material, depth or air voids requirement, then the Undertaker remains liable even after the end of the guarantee period.

5.2 DEVELOPING A SIMPLIFIED 6 YEAR ASSESSMENT METHOD

5.2.1 SERVICE LIFE

When the term ‘service life’ is applied to a product it generally relates to its period of use in service. It can be regarded as a measure of durability and typically refers to a time period where there is no need for maintenance. Typically the end of service life is associated with failure or expensive repair. In the context of reinstatements, the end of service life will be associated with not meeting performance requirements that are required to maintain road safety.

5.2.2 SERVICE LIFE OF REINSTATEMENTS

The degree to which a reinstatement will deteriorate in service will be influenced by several factors, including:

- Environmental effects – high and low temperatures, rainfall, etc
- Location and size – reinstatements situated in or along the trafficking zone will receive more loading, particularly in areas which experience braking and turning.
- Traffic loading - road category type will determine the number and type of load applications.
- Existing pavement condition – substandard carriageway construction or existing condition may make it difficult to install a reinstatement that meets the current performance requirements.

The data collected during both the 2012 and 2022 survey suggests that reinstatements located on roads that carry high levels of traffic are likely to deteriorate quicker than those that carry low levels or no trafficking. However, the most recent survey showed that most reinstatements, including

Type 1, were assessed as *Moderate* or above after six years in service. The term 'Moderate' describes reinstatements that possess some faults, but that the faults are not regarded to be serious enough to warrant intervention or maintenance.

5.2.3 END OF SERVICE LIFE DEFINITION

In broad terms, the above discussion could be used as a basis to develop a definition for the service life of a reinstatement:

> "A reinstatement is regarded to be at the end of its service life, requiring remedial treatment, if it possesses a serious fault or faults that are regarded to compromise road safety."

As a reinstatement is likely to show some indications of wear and tear after six years, guidance will be required to describe and identify the type and severity of defects, particularly those that could be considered to represent a serious fault.

5.3 GUIDANCE ON ASSESSING CONDITION

The flowchart shown in Figure 5-1 is intended to manage the process of assessing whether a reinstatement has passed or failed the six year guarantee period. This section provides guidance that should be considered when a decision is required as part of the process. Each defect is described with a view to determining whether the severity of the defect warrants remedial treatment or is considered as fair wear and tear for a six-year-old reinstatement.

5.3.1 JOINTS

Good construction of edge joints is desirable to prevent water ingress and optimise long-term performance. Ideally, joints should be tight and well-sealed. However, a reinstatement should not be assessed to fail the six year guarantee if this is the only defect present. There is evidence from visual condition surveys that if a reinstatement exhibits a slightly open joint with no other defects present, it is likely to remain serviceable for several years.

There are some valid reasons why a joint may be slightly open after six years in service, particularly if the existing road was in a substandard condition at the point of installation. An uneven or heavily cracked carriageway will present technical challenges with matching the surface level of the reinstatement with the surrounding carriageway.

For a joint to be assessed as severe it is likely to be associated with other defects such as aggregate loss, cracking and possibly edge depression. Figure 5-2 provides examples of an acceptable and unacceptable joint.

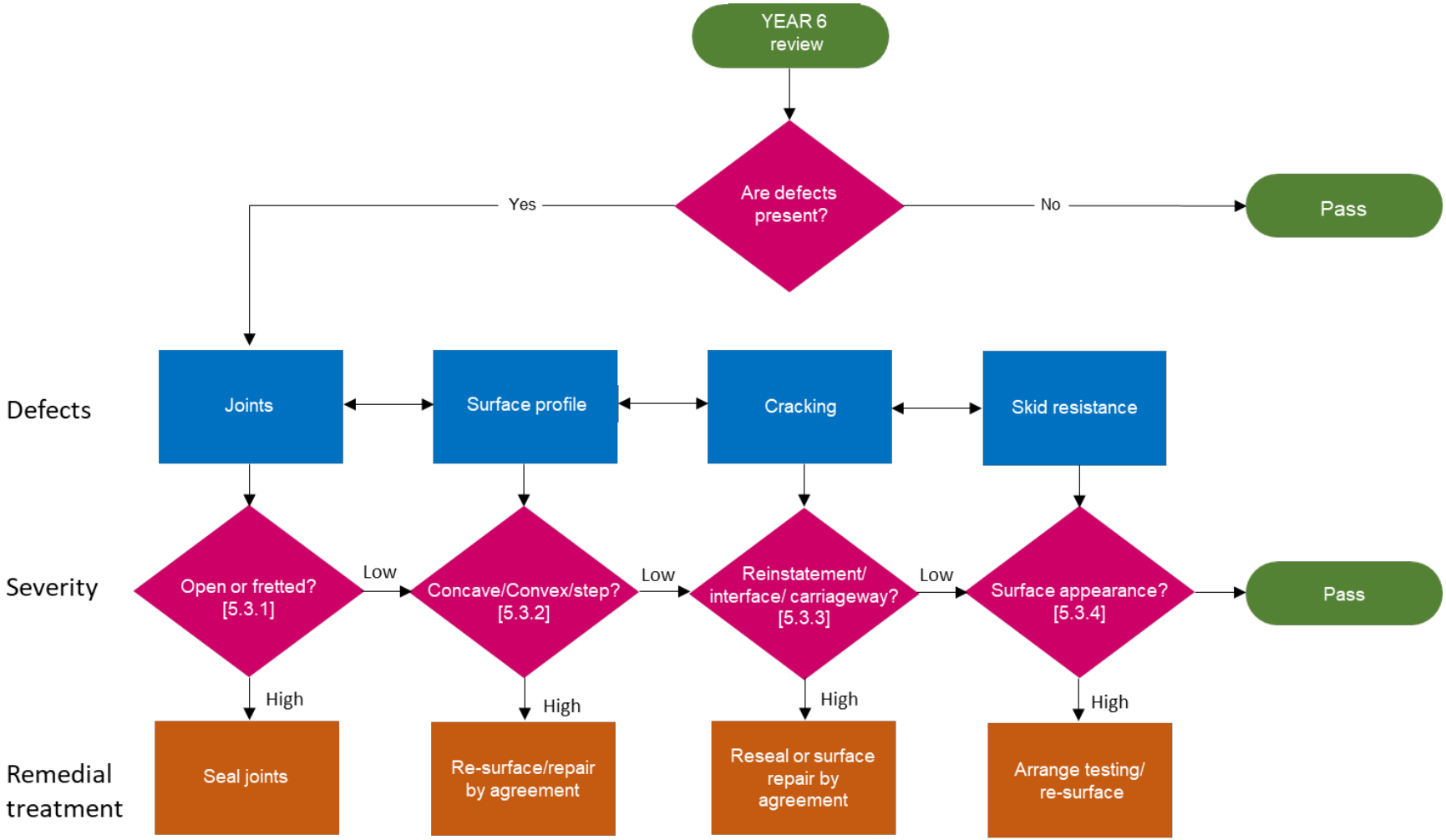

Figure 5-1 - Assessing reinstatement condition at six years

Unacceptable joint – NB associated with aggregate loss, step depression and cracking

Acceptable joint – slightly open on reinstatement 7.1 years old

Figure 5-2 - Joint examples

5.3.2 SURFACE PROFILE

The profile of a reinstatement should be as flat and flush as possible with the surrounding adjacent carriageway. There should not be any significant depressions or crowning of the surface. Figure 5-3 provides examples of an acceptable and unacceptable profile. A visual assessment should be sufficient to determine whether the profile is acceptable, but if the assessment is disputed then the SROR performance requirements for surface profile could be applied, e.g. limits for edge depression, surface depression/crowning, etc.

Unacceptable profile – reinstatement 3 years old

Acceptable profile – reinstatement 6 years old

Figure 5-3 - Profile examples

5.3.3 CRACKING

It is preferable that a reinstatement is crack free but the presence of some fine cracks could be considered as acceptable and attributed to fair wear and tear following six years in service. It is likely that some cracks will have occurred shortly after installation, e.g. at edges or corners. Where they are observed to be stable and show no signs of ongoing deterioration then they should be assessed as acceptable. Figure 5-4 shows an example of cracking that should be considered as acceptable after six years in service.

Fine crack present in upper left hand corner – reinstatement 6.5 years old

Figure 5-4 - Acceptable cracking

Extensive cracking as shown in Figure 5-5, or wide cracks are not acceptable and should be considered as requiring remedial action and be treated as per the guidance provided in the SROR.

Careful attention is required when assessing cracking that is beyond the boundary of the reinstatement. It is important to assess whether such cracks exist as a direct result of the reinstatement installation. In general, cracking within the reinstatement that causes damage to the adjacent carriageway is seen to radiate beyond the reinstatement limits. Figure 5-6 shows an examples of carriageway cracking that was a direct result of the reinstatement installation. However, it should be noted that a substandard carriageway will exhibit defects that are not associated with the installation of the reinstatement and the two should not be confused. Figure 5-7 shows an example of a road that exhibits defects, such as wheel track rutting and cracking, that are not related to the installation of the reinstatement.

Extensive cracking within reinstatement limits

Figure 5-5 - Unacceptable cracking

Carriageway cracking caused as a direct result of reinstatement

Figure 5-6 – Cracking related to reinstatement

Carriageway cracking that was not caused by reinstatement installation

Figure 5-7 - Carriageway cracking not related to reinstatement

5.3.4 SKID RESISTANCE

An assessment of the reinstatement should be made to ascertain whether it represents a skid risk to road users. If the surface appears to be smooth with little or no texture then consideration should be given to assessing the skid resistance of the reinstatement surface. The size, location and inclination will all influence the degree of skidding risk and further guidance is provided in the SROR.

5.4 CONSULTATION EXERCISE

A small one-day workshop was organised on 2 September 2022. The workshop was attended by representatives of two utility companies, two local authorities, the SRWC and WSP. A summary of the WSP study findings was presented, including the survey methodology; survey results; observations made; and the proposed method for assessing reinstatements at the end of the six year guarantee period.

5.4.1 PRELIMINARY FEEDBACK

Comments on the proposal to assess reinstatements at six years old were invited from the group. A wide-reaching discussion took place on the subject, which covered several topics which could be grouped into four themes: attitudinal, training, communication and technical. In general, the attendees appeared sceptical that the draft proposal would work in practice. The reasons provided were far-reaching and they have been broken down into the four themes:

Attitudinal

- Some local authorities have different working cultures and practices.
- Examples of adversarial relationships where referenced where there was no real desire to work collectively – “some local authorities may fail as it’s their last chance to claim”
- Variable or regional reactions to pass/fail criteria on localised defects.
- Implementation may be challenging.
- A lot of reinstatements are failed for only an open joint.

Training

- Not much training is provided for inspectors and the passing on of knowledge is often lost when inspectors leave their role.
- Do inspectors have the experience to make the judgment call.
- Further training is required for everyone.
- Inspectors should be included if there are any other further workshops.

Communication

- General improvement in communication is required between all parties at all levels.
- Some local authorities could be more challenging than others and need to be included in any process going forward.

Technical

- Should the depth or extent of reinstatement be considered when assessing?
- Objectivity Vs subjectivity

5.4.2 NEED FOR A CONSISTENT APPROACH

For any assessment approach to be successful it needs to be consistently applied in order to produce similar results. For this to occur, inspectors need to understand the process and share similar attitudes towards the process. The workshop suggested that the latter may be challenging owing to a lack of training and other external factors. However, one successful example of a local authority and a utility company working together was cited by one of the attendees. It was explained that in the year proceeding the end of a guarantee period, joint surveys between the local authority

and utility company were carried out to determine whether any remedial works were required. As a result, the decision-making process was shared between the parties as to whether remedial works were required. Once agreed and completed, the reinstatements were recorded as having passed their respective guarantee periods.

5.4.3 TRAINING & EDUCATION

The need for adequate training and education appeared to be a popular topic. It was stressed by some of the attendees that this was not solely concerned with inspectors, but should be extended to supervisors and managers.

Attendees appeared encouraged that the study findings showed that the performance of reinstatements had improved over the last 20 years and that it was important that this information was widely disseminated.

The ‘fair wear and tear’ aspect of assessing reinstatements triggered some debate amongst the attendees. It was argued that some local authority inspectors would fail a reinstatement at six years based on the condition of the joint alone. This example demonstrated that an open discussion needs to take place around the issue of fair wear and tear. During the WSP survey around three quarters of the reinstatements were assessed to have an open joint. However, the survey team considered that where the reinstatement’s surface profile and condition was good, i.e. the open joint was the only defect present, then the reinstatement was safe and would be serviceable for several years.

Figure 5-8 Shows a reinstatement that was located on a Type 2 road and had been in service for 10.4 years. The reinstatement was not defect free and exhibited an open joint. However it was assessed as being safe and still serviceable. This example provides clear evidence that an open joint on its own, with no other defects present, will remain safe and serviceable beyond six years.

Figure 5-8 – Site RIP 4.27 marked G/M, age 10.4 yrs, Type 2

6

CONCLUSIONS AND RECOMMENDATIONS

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 SURVEY RESULTS

Based on a comparison of a similar survey carried out in 2012, the latest survey produced the following conclusions:

- The general condition of reinstatements has improved since 2012, with an expected increase in service life.
- Only six percent of the 2022 reinstatements were assessed as unsatisfactory, which compares with 21% of the reinstatements surveyed in 2012.
- Thirty six percent of the reinstatements were assessed as Good by the inspection panel. This compares to 19% in 2012.
- Data collected on all road category types in 2022 suggested that the majority of reinstatements that comply with the SROR specification, will not require maintenance until they have been in service for 10-12 years. This compares to the estimate of approximately 6-7 years, previously made for heavily trafficked sites in 2012.

6.2 OBSERVATIONS

- The best performing reinstatements were typically surfaced with hot rolled asphalt (HRA).
- The majority of reinstatements (77%) were judged to exhibit an open joint.
- Density of reinstatements: particularly in city environments, around 20% of the 2022 reinstatement tracks were observed to cut across other reinstatements, were located within other reinstatements or close to other reinstatements.
- It was estimated that around 15% of the 2022 reinstatements were located in carriageways that were considered to be in poor or substandard condition.

6.3 SIMPLIFIED 6 YEAR ASSESSMENT METHOD

- A broad definition for the service life of a reinstatement could be viewed as:

  > "A reinstatement is regarded to be at the end of its service life, requiring remedial treatment, if it possesses a serious fault or faults that are regarded to compromise road safety."

- With the aid of a flowchart and step-by-step guidance, a process has been proposed to assess whether a reinstatement should pass or fail a six year guarantee period.

6.4 WORKSHOP

- Workshop attendees were sceptical that the draft proposal would work in practice.
- Barriers to the success of the proposal were believed to relate to several areas, including conflicting attitudes towards the assessment of fair wear and tear, inadequate training and poor communication.

6.5 RECOMMENDATIONS

In order to develop a future assessment process that is consistent and produces similar results, consideration should be given to establishing a requirement for inspectors and managers to hold a qualification as part of a national certification scheme.

Appendix A

SURVEY METHOD

MARKING

A.1 The ‘zone of influence’, i.e. ± 1 m either side of the utility reinstatement being assessed, shall be assessed on the basis of its current serviceability irrespective of the elapsed time since it was installed. In considering the serviceability of the reinstatement/carriageway, the aspects in Figure A-1 shall be considered, together with any project related aspects given in the initial briefing. If any of the aspects are evident to a significant degree on the section, the relevant suffix from Figure A-1 shall be applied to the basic marking.

A.2 Once any appropriate fault suffixes have been assigned, the basic mark shall be allocated from the 7-point scale in Figure A-2. Intermediate markings between scales shall not be given. When considering the markings, any sections that warrant a suffix cannot have a basic mark of G or better. One exception is G Jo/Jf where the reinstatement itself is considered to be in a good condition but the joint is considered to be open or starting to fret.

A.3 When each member has reported his individual result, the Convenor shall convert them using the transformation:

E = 6; G = 5; M = 4; A = 3; S = 2; P = 1; and B = 0.

Suffix	Description	Notes
J_o /J_{jf}	Joint issue	j_o = *open or not sealed* j_f = fretting at joint
$–_c$ / $–_r$	loss of chippings	$–_c$ = aggregate/chip loss on carriageway
	loss of aggregate	$–_r$ = aggregate/chip loss on reinstatement
Con_c / Con_v	∪	relative to carriageway, reinstatement is
	∩	low (concave) or high (convex)
C_c / C_r	cracking	C_c = cracking in carriageway C_r = cracking in reinstatement
S_c / S_r	stripping	Sc = stripping in carriageway Sr = stripping in reinstatement
Dc / Dr	Depressed or dropped	Where there is stepping between the reinstatement and the carriageway.

Figure A-1 – Defect suffixes

Mark		Description	
E	(excellent)	no discernible fault	Termed satisfactory
G	(good)	no significant fault	
M	(moderate)	some faults but insufficient for serious problem	
A	(acceptable)	several faults but would usually be just acceptable	
S	(suspect)	seriously faulted but still serviceable in the short term	Termed unsatisfactory
P	(poor)	requires remedial treatment	
B	(bad)	requires immediate remedial treatment	

Figure A-2 - Basic mark

A.4 The mean of the individual arithmetic values is calculated to one decimal place and is converted back to a Panel Mark using the transformation given in Table A-1.

Table A-1 – Calculation of panel marks

Arithmetic mean	Panel mark	Arithmetic mean	Panel mark
5.8 to 6.0	E	2.3 to 2.7	A/S
5.3 to 5.7	E/G	1.8 to 2.2	S
4.8 to 5.2	G	1.3 to 1.7	S/P
4.3 to 4.7	G/M	0.8 to 1.2	P
3.8 to 4.2	M	0.3 to 0.7	P/B
3.3 to 3.7	M/A	0.0 to 0.2	B
2.8 to 3.2	A		

A.5 Suffixes shall be applied to the Panel marking when at least a third of the Panel members, rounded up, give it on their individual markings provided the basic Panel marking is not G or better, as then no suffixes can be applied (with the exception of jo/Jf).

A.6 The number of panel members shall be noted when reporting the results.

Appendix B

SURVEY RESULTS

Table B-1 – Summary of visual assessment surveys (RIP1.01-2.24)

Site	Age (Yrs.)	Marking			Site	Age (Yrs.)	Marking		
		Score	Panel Mark	*Defects*			Score	Panel Mark	Defects
RIP 1.01	4.0	4	M	*Jo Conv Cr*	RIP 1.31	3.8	5	G	*Jo*
RIP 1.02	8.1	4	M	*Jo Conv Cr*	RIP 1.32	4.2	4	M	*Jo*
RIP 1.03	8.1	5	G		RIP 1.33	3.4	5	G	*Jo*
RIP 1.04	6.9	5	G	*Jo*	RIP 1.34	3.7	5	G	*Jo*
RIP 1.05	9.9	1.3	S/P	*Jo Conc Dr*	RIP 1.35	4.1	4.7	G/M	*Jo*
RIP 1.06	9.7	*Under parked car*			RIP 1.36	6.6	5	G	
RIP 1.07	9.8	5	G		RIP 2.01	7.4	*Resurfaced*		
RIP 1.08	9.8	5	G	*Jo*	RIP 2.02	7.2	4	M	Jo Jf Conv Conc
RIP 1.09	7.0	3.3	M/A	*Jo Jf Conv Cr Dr*	RIP 2.03	3.8	5	G	
RIP 1.10	7.3	4	M	*Jo -r Dr*	RIP 2.04	6.7	5	G	*Jo*
RIP 1.11	6.6	2	S	*Jo Jf -r conv Cr Dr*	RIP 2.05	3.5	4.7	G/M	*Jo Cr*
RIP 1.12	6.8	5	G		RIP 2.06	4.0	4.7	G/M	*Jo Conv*
RIP 1.13	2.6	5	G		RIP 2.07	3.6	5.7	E/G	
RIP 1.14	7.1	*Resurfaced*			RIP 2.08	3.5	4.7	G/M	*Jo Jf -r*
RIP 1.15	3.8	*Resurfaced*			RIP 2.09	3.4	5.3	E/G	
RIP 1.16	3.7	4.7	G/M	*Sr*	RIP 2.10	6.5	5	G	*Jo*
RIP 1.17	3.7	2.7	A/S	*Jo -r Cr Dr*	RIP 2.11	4.1	5.3	E/G	
RIP 1.18	7.0	5	G		RIP 2.12	7.1	*Resurfaced*		
RIP 1.19	6.6	*Resurfaced*			RIP 2.13	8.7	4.3	G/M	*Jo -r Dr*
RIP 1.20	4.2	4	M	*Dr*	RIP 2.14	7.4	3.7	M/A	*Jo Jf Conv Dr*
RIP 1.21	4.0	5	G		RIP 2.15	4.4	5.3	E/G	
RIP 1.22	3.7	5	G		RIP 2.16	6.5	3	A	*Jo Cr*
RIP 1.23	4.3	5	G		RIP 2.17	3.9	5	G	*Jo*
RIP 1.24	3.8	4	M	*Jo Cr Dr*	RIP 2.18	3.9	4	M	*Jo -r Dr*
RIP 1.25	7.7	4.3	G/M	*Jo Conv*	RIP 2.19	3.2	*Resurfaced*		
RIP 1.26	4.2	4	M	*Jo*	RIP 2.20	3.7	4.7	G/M	*Jo Dr*
RIP 1.27	4.0	4.3	G/M	*Jo Conv*	RIP 2.21	6.7	5.7	E/G	
RIP 1.28	3.6	3.7	M/A	*Jo Conv Cr*	RIP 2.22	6.7	5	G	
RIP 1.29	7.1	4.3	G/M	*Jo*	RIP 2.23	3.8	4	M	*Jo Dc*
RIP 1.30	3.5	4.7	G/M	*Jo Dr*	RIP 2.24	4.2	4	M	*Jo*

Table B-2 – Summary of visual assessment surveys (RIP1.01-2.24)

Site	Age (Yrs.)	Marking			Site	Age (Yrs.)	Marking		
		Score	Panel Mark	*Defects*			Score	Panel Mark	Defects
RIP 2.25	7.1	2.3	A/S	*Jo Cr Dr*	RIP 3.26	10.4	5	G	
RIP 2.26	3.6	3.7	M/A	*Jo -r Dr*	RIP 3.27	9.9	4.3	G/M	*Jo Conv Cr*
RIP 2.34	3.6	3.7	M/A	*Jo Cr Conv*	RIP 4.01	7.4	3.7	M/A	*Jo -r Sr*
RIP 2.35	2.9	4	M	*Jo -r Conv*	RIP 4.02	7.5	3.7	M/A	*Jo -r Conv Sr*
RIP 2.36	6.9	4.7	G/M	*Jo*	RIP 4.03	9.5	5	G	
RIP 2.37	4.6	4	M	*Jo Conv Cr*	RIP 4.04	9.8	3.7	M/A	*Jo -r Con v Cr*
RIP 2.38	3.2	*Not surveyed*			RIP 4.05	9.1	*Resurfaced*		
RIP 3.01	6.9	5	G	*Jo*	RIP 4.06	10.1	3	A	*Jo Conv Cr*
RIP 3.02	7.3	5	G	*Jo*	RIP 4.07	7.4	*Resurfaced*		
RIP 3.03	3.5	4	M	*Jo Cr Dc*	RIP 4.08	9.7	3.7	M/A	*Jo -r*
RIP 3.04	3.7	4.3	G/M	*Cr Conv Dc*	RIP 4.09	6.6	4	M	*Jo Conv Cr*
RIP 3.05	6.9	4.7	G/M	*Jo*	RIP 4.10	4.5	4	M	*Jo*
RIP 3.06	7.4	5	G	*Jo*	RIP 4.11	10.1	4.7	G/M	*Jo Dr*
RIP 3.07	6.4	3.7	M/A	*Jo -r Sr Dr*	RIP 4.12	7.2	4	M	*Jo Dr*
RIP 3.08	3.6	4.7	G/M	*Sr*	RIP 4.13	3.3	5	G	
RIP 3.09	7.7	4.7	G/M	*Jo -r*	RIP 4.14	4.0	5	G	*Jo*
RIP 3.10	3.5	3.7	M/A	*Conv Cr Dr*	RIP 4.15	7.1	5	G	*Jo*
RIP 3.11	7.9	4.3	G/M	*Jo Conc Dr*	RIP 4.16	3.8	*Resurfaced*		
RIP 3.12	3.8	4.3	G/M	*Jo Conv*	RIP 4.17	9.7	*Resurfaced*		
RIP 3.13	6.6	4.7	G/M	*Jo*	RIP 4.18	3.6	5	G	*Jo*
RIP 3.14	3.9	4.3	G/M	*Jo Conv*	RIP 4.19	10.1	*Resurfaced*		
RIP 3.15	7.1	4	M	*Jo Conv*	RIP 4.20	7.2	*Resurfaced*		
RIP 3.16	6.7	5	G		RIP 4.21	6.7	*Resurfaced*		
RIP 3.17	4.0	4.7	G/M	*Jo*	RIP 4.22	10.0	4	M	*Jo*
RIP 3.18	6.8	*Resurfaced*			RIP 4.23	4.3	4	M	*Jo -r Dr*
RIP 3.19	6.8	5	G	*Jo*	RIP 4.24	7.4	5	G	*Jo*
RIP 3.20	7.5	4.3	G/M	*Jo Conv Dc*	RIP 4.25	3.8	5	G	*Jo*
RIP 3.21	6.7	4.3	G/M	*Jo -r Conv Cr*	RIP 4.26	7.1	5	G	*Jo*
RIP 3.22	4.1	4.7	G/M	*Jo -r*	RIP 4.27	10.4	4.3	G/M	*Jo -r*
RIP 3.23	11.1	4.7	G/M	*Jo -r*	RIP 4.28	7.2	*Resurfaced*		
RIP 3.24	10.3	4.0	M	*Jo Conv Cr*	RIP 4.29	7.2	*Resurfaced*		
RIP 3.25	9.7	4.7	G/M	*Jo -r conv*	RIP 4.30	4.1	4.3	G/M	*Jo -r Conc*

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