The Highland Council

Sutherland County Committee – 22 February 2017

Agenda Item	**9.**
Report No	**SCC/ 04/17**

Road maintenance on the A839 Mound to Rogart

Report by Director of Community Services

Summary

This report details the investigations and conclusions carried out on the surface dressing operations over the A839 Mound to Rogart Road

1. Background

1.1 As part of the 2015/16 Structural Maintenance Programme, the A839 from The Mound to Rogart village was surface dressed over a period from 04/08/2015 to 06/08/2015

1.2 In November 2015 an apparent failure either side of the centreline was observed and further sweeping was carried out.

1.3 At the same time an investigation was instigated into the possible causes of the failure.

2. Surface Dressing Process

2.1 The surface dressing process is based on Road Note 39, A Design Guide for Road Surface Dressing and the Code of Practice for Surface Dressing (Road Surface Dressing Association 2007).

2.2 All personnel including designers, supervisory staff and operatives have been trained in the relevant parts of the operation and these qualifications are updated at the recommended intervals.

2.3 The plant used for the works is serviced at the beginning of each season and outputs monitored at regular intervals throughout the process.

2.4 The Surface Dressing Operation from design through completion and aftercare is monitored under the Councils Quality Assurance system Operational Procedure 705.

2.5 The following tests are carried out before the season starts:

- Bitumen sprayer calibrated and gauges calibrated
- Chipper is serviced and output calibrated.

2.6 The following tests are carried out at regular intervals (usually 3 -4 times per full day of production):

- Carpet tiles check on bitumen output from the sprayer
- Gauge box check on output from chipper.
- Bitumen temperature checks.

3. Project Timeline

3.1

- Surface dressing start date – 04/08/2015
- Surface Dressing end date – 06/08/2015
- Aftercare brushing dates:
  - 05/08/2015
  - 06/08/2015
  - 07/08/2015
  - 09/08/2015
  - 10/08/2015
  - 24/08/2015
  - 25/08/2015
  - 26/08/2015

3.2 On completion of the regular aftercare a visual inspection of the site showed no further rejection of surface dressing stone.

4.0 **History of failure**

4.1 The first indications of surface chip rejection began to appear in early November 2015 after the first frosts. The rejection appeared to be concentrated over a narrow strip over the centreline of the road.

4.2 Additional regular sweeping was carried out on a regular basis to ensure a minimum of loose chip on the road

4.3 While remedial measures were considered at this stage due to the low winter temperatures a suitable process could not be found.

4.4 After considering all the practical options the Archway Roadmaster was considered to be the best solution to the problem but it would not be cost effective to use until the site had completely stabilised

4.5 The site was considered stable in the middle of September 2016 when the regular sweeping exercises yielded a minimal amount of sweepings for this type of road

4.6 Due to the availability of the Archway Roadmaster a 50m experimental section of remedial works was carried out on 17/09/2016.

4.7 The trial section appeared to be successful and further works were carried out on 03/10/2016 until 05/10/2016 when road surface temperatures made it impossible. It should be noted that this second round of repairs was carried out when temperatures were borderline for the process but due to public pressure it was agreed to try the process. This also provided evidence for

future working in relation to road surface temperatures.

4.8 Failure of this most recent repair began to become apparent within 3 weeks of the application.

4.9 The original 50m length of repair is still intact and proves that given normal temperatures this repair will be effective going forward.

5.0 Remedial Measures

5.1 The following remedial measures will be carried out in April/May as soon as the road surface temperatures reach the acceptable minimum of 5 degrees Centigrade:

- Plane of centreline irregularities
- Use Archway Roadmaster to repair failed surface matrix
- Once repair has cured adequately (4 -6 weeks depending on temperature and traffic levels) White Lining to be completed.

6.0 Investigation

6.1 The normal probable causes for chip rejection in surface dressing are as follows:

- Insufficient bitumen applied
- Temperatures too low
- Humidity too high
- High shade areas
- Insufficient rolling
- Insufficient traffic

6.2 Given that the rest of the surface dressing on this stretch of road has performed as expected the only area which could contribute to this failure is:

- Insufficient bitumen applied

6.3 The calibration and monitoring of the bitumen spraying is carried out using 2 standard tests:

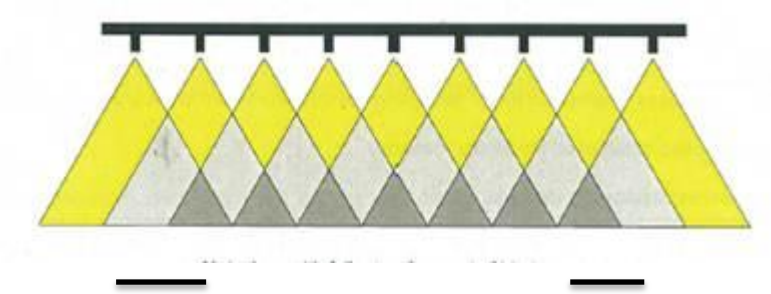
- Pyramid test at the beginning of each day
- Carpet tile tests at intervals throughout the day.

6.4 The pyramid tests for the days in question are within acceptable tolerances

6.5 The carpet tile tests carried out throughout the operations were all within tolerance but did show less bitumen being applied to the offside wheeltrack

6.6 The carpet tile tests are carried out by laying carpet tiles across the lane and driving the sprayer over them. They are then weighed and bitumen spray rate is calculated. However the tiles cannot be laid in the wheel tracks so the jets above the wheel tracks cannot be checked using this test. We have to rely on the pyramid test carried out first thing in the morning for their calibration.

6.7 The diagram below shows the overlap of the jet sprays across the bar with the wheel tracks shown below



6.8 Failure of one of the jets above or either side of the wheel track would not be detected by the carpet tile test.

6.9 It has been concluded that failure of one of the jets above the offside wheel track is the mechanism of failure in this case.

7.0 Improvement Plan

7.1 In order to ensure consistent operation of the sprayer unit full service and calibration will be carried out prior to the season starting by a sprayer calibration company

7.2 The set up of a sprayer calibration site is being investigated within the Highland Council Area managed by the Council's accredited testing Laboratory to allow accurate spraybar output checks to be carried out throughout the Surface Dressing season.

8.0 Conclusion

8.1 The success of surface dressing operations is dependant of a number of factors such as air and surface temperatures, humidity, bitumen temperature and spread rates, chip cleanliness and spread rates, amount of shade, volume of traffic to name the main ones

8.2 Given the variety of factors that can affect the surface dressing it is essential that we exercise strict control over those that we can influence.

8.3 The Improvement Plan in section 7 above will ensure a consistent and accurate volume of bitumen being applied to the surface and therefore greater likelihood of a successful operation.

9. Implications

9.1 Cost of full calibration will be more than offset by the reduction in dressing failures.

9.2 The reduction in repeated dressing of failures will reduce our carbon footprint.

Recommendation

The Committee is invited to note the content of this report.

Designation: Director of Community services

Date: 06/02/2017

Author: G. Mackenzie, Roads Operations Manager Caithness and Sutherland

Background Papers: