

Central Laboratories Report No. 07-527906.62

**Assessment of Roadmarking
Material at Moonshine and
Hayward's test sites for
Damar Industries Ltd**

S M Potter

Assessment of Roadmarking Material at Moonshine and Hayward's test sites for Damar Industries Ltd

**S M Potter
June 2007**

Prepared By

Author's Name Shirley Potter
Author's Title Technical Officer

Opus International Consultants Limited
Central Laboratories
138 Hutt Park Road
PO Box 30 845, Lower Hutt
New Zealand

Reviewed By

Reviewer's Name Vince Dravitzki
Reviewer's Title Research Manager

Telephone: +64 4 587 0600
Facsimile: +64 4 587 0604

Date: June 2007
Reference: 527906.62
Status: Doc Status

DISCLAIMER

This report has been prepared solely for the benefit of Damar Industries Ltd. No liability is accepted by this company or any employee or sub consultant of this company with respect to its use by any other person.

This document and its contents is the property of Opus International Consultants Limited.

Any unauthorised employment or reproduction, in full or part is forbidden.

© **Opus International Consultants Limited 2007**

CLIENT: Damar Industries Ltd
P.O Box 7084
Te Ngae
Rotorua

CONTACT: Rob Dunne
Phone (07) 345 6007 x 249
Fax (07) 345 6019

1 Introduction

At the clients request two long life roadmarking materials were assessed, namely Bascoplast Fein yellow and white. The field trial was laid by Kadcam Enterprises Ltd under Central Laboratories supervision at two sites on 28th of April 2003 on State Highway 2. One site on a 10mm Open Graded Porous Asphalt surface south of the State Highway 58, Hayward's hill turn off north of Lower Hutt. The other site is on a grade 3 chip seal north of the Moonshine Bridge, Upper Hutt. The traffic volumes are approximately 12,000 vehicles per day over the test lines.

For each material three test lines were laid across the traffic lane at right angles to the traffic flow. Two of the lines had a primer applied to the road surface by hand with a paint roller. This primer was allowed to dry before application of the road marking material. A third line was laid directly on to the road.

The materials tested are shown in the table below, with their line and batch numbers.

Moonshine site

Line No:	Material	Comp A Batch No	Hardener Batch No	Primer Batch No	Colour
7	Bascoplast Fein & primer	22102681	22104977	23100502	Yellow
8	Bascoplast Fein & primer	22102681	22104977	23100502	Yellow
11	Bascoplast Fein	22102681	22104977		Yellow
9	Bascoplast Fein & primer	22104003	22104977	23100502	White
10	Bascoplast Fein & primer	22104003	22104977	23100502	White
12	Bascoplast Fein	22104003	22104977		White

Hayward's Site

Line No:	Material	Comp A Batch No	Hardener Batch No	Primer Batch No	Colour
7	Bascoplast Fein & primer	22102681	22104977	23100502	Yellow
8	Bascoplast Fein & primer	22102681	22104977	23100502	Yellow
11	Bascoplast Fein	22102681	22104977		Yellow
9	Bascoplast Fein & primer	22104003	22104977	23100502	White
10	Bascoplast Fein & primer	22104003	22104977	23100502	White
12	Bascoplast Fein	22104003	22104977		White

2 Testing Carried Out

Testing was carried out in accordance with the requirement of Transit New Zealand Specification TNZ M/20: 2003 Specification for Long Life Materials, Section 8 "On-Road Performance", with degree of wear, retroreflectivity, skid resistance and colour being the major properties assessed.

The materials were also assessed for compliance with the Draft Australian Standard 4049.2 Thermoplastic Pavement Marking Materials (part 2 being the most applicable part to the materials under test). AS 4049.2 2005 is now issued. The retroreflectivity requirement at 3 million vehicle passes is 100 mcd/lux/m² when measured with a 30m geometry instrument. The values to compare for this requirement are those taken with the Zehntner instrument.

Skid resistance was measured with a British Pendulum tester in accordance with Roadnote 27. The skid measurements were made in the left hand wheel path.

Retroreflectivity measurements were made using Transit N.Z.'s Miroulx 12 and Zehntner retroreflectometer at five points across the left hand wheel path.

The Zehntner has a 30 metre geometry and is able to measure a dry and wet road for retroreflectivity and QD - daylight visibility.

Wear was assessed looking at the performance of both wheel paths. The photos were taken in approximately the same location on the left hand wheel path.

Colour was assessed using the Grey scale for assessing staining ISO 105 A03 1978.

The assessments were carried out at the following intervals:

200,000 vehicle passes	16 May 2003
660,000 vehicle passes	26 June 2003
1.25 million vehicle passes	20 August 2003
3 million vehicle passes	26 January 2004
18 million vehicle passes	14 May 2007



Measuring with the Zehntner instrument immediately after installation.

Measurements were made with this instrument in both the wet and dry condition. For the wet measurements the marking was flooded with water and then measured 60 seconds after the application of water.

3 Requirement and Results

3.1 Note that there is no requirement for 18 million vehicle passes. The tables below show requirements for Transit N.Z M/20 and AS4049.2 for 3 million vehicle passes.

The presence of a primer on the road surface appears to have had little effect on any of the test results and therefore the results reported are an average of all three test lines.

3.2 Adjusted wear for structured markings.

Both the Transit N.Z M/20 and AS 4049.2 involve a wear assessment using photographic scales which view the marking from a vertical position.

The structured markings do not give 100% cover. When viewed from above the marking is 'holey', but when viewed from a driver's perspective it appears as a solid line.

In the result tables we therefore have first assessed the lines according to the photographic scale. We have then made a further assessment of the degree of material loss from the drivers' view and called this 'adjusted wear'.

M/20 requires a deterioration of no less than 8 on the photographic scale on asphalt and chipseal, this being only minor wear. M/20 requirements are usually applied to markings with total initial coverage. We based the structured markings wear assessment on the equivalent criteria of only minor wear, or that there would be no change in rating when viewed vertically. For example if the assessment against the photographic scales was 6 at the start of the trial, it should still be 6 after three million vehicle passes.

Similarly for AS 4049.2, for 'normal' lines the acceptable conditions are 100% intact on asphalt, ie no wear and 95% intact on chipseal (little wear). This has been related to an 'adjusted wear' as a 5% wear.

Equivalent ratings for the structured markings are therefore: on asphalt no change in wear rating, and on chipseal not more than 5% decrease in wear rating.

The result tables for 'adjusted wear' show an initial measurement of wear then at 18 million e.g. 65 → 65 or 4 → 4.

3.3 18 Million Vehicle Passes.

Note that there is no requirement for 18 million vehicle passes.

A summary table at 18 million vehicle passes is shown for each site in tables 13 and 14 at the end of this report.

Reported and tested by:

Reviewed by

S M POTTER
Technical Officer

V K DRAVITZKI
Research Manager
(Materials and Environmental Science)

Table 13. Moonshine site at 18 million vehicle passes

Material	Line No:	Wear	Wear	Wear	RL Dry Ave	RL wet Ave	QD Dry Ave	QD Wet Ave	Mirolux Ave	SKID BPN	Colour
Bascoplast Fein Yellow Structured+ primer	7	4	LCPC	75	104	25	90	118	50	54	4
Bascoplast Fein Yellow Structured+ primer	8	5		80	111	25	91	115	79	55	4
Bascoplast Fein Yellow	11	3		60	107	25	88	102	71	55	4
Bascoplast Fein White Structured + primer	9	4		70	160	42	146	152	131	55	4
Bascoplast Fein White Structured + primer	10	4		70	171	43	147	155	133	45	4
Bascoplast Fein White Structured	12	4		70	169	57	148	159	155	46	4

Table 14. Haywards Site at 18 million vehicle passes

Material	Line No:	Wear	Wear	Wear	RL Dry Ave	RL Wet Ave	QD Dry Ave	QD Wet Ave	Mirolux Ave	SKID BPN	Colour
Bascoplast Fein Yellow Structured + primer	7	4	LCPC	70	64	24	82	104	49	55	4
Bascoplast Fein Yellow Structured + primer	8	4		70	73	25	77	102	56	56	4
Bascoplast Fein Yellow	11	4		65	62	27	75	89	45	56	4
Bascoplast Fein White Structured + primer	9	4		70	124	49	134	139	104	49	4
Bascoplast Fein White Structured + primer	10	4		60	126	44	130	141	112	43	4
Bascoplast Fein White Structured	12	3		60	112	45	124	133	96	46	4

