2007 NZRF/RIAA Roadmarking Conference

Transit New Zealand's TNZ P/30 Specification for High Performance Roadmarkings

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Abstract

High Performance road markings are specialised makings to be applied to roads with a traffic volume of > 5,000 v/day and where a traffic safety strategy has identified the need for improved delineation.

TNZ P/30 Specification for High Performance Road markings sets out the requirements for high performance road markings. The improved delineation is to be achieved through standard road markings with specific retroreflective properties, with or without the addition of audio tactile profiled road markings.

This specification will only be used in conjunction with a traffic safety strategy and as such will not be available on the Transit New Zealand website, but may be obtained from joanna.towler@transit.govt.nz

Introduction

TNZ P/30 Specification for High Performance Roadmarkings sets out the requirements for high performance road markings, where these are required for road safety. The specification is intended for use in areas where improved delineation, compared with standard road marking specifications, is required for achievement of specific road safety initiatives.

Background

The request for a specification that would provide improved delineation over and above Transit New Zealand (Transit)'s standard specifications was made in late 2006. One of the motivations was to achieve a relatively long life from high performance markings, ideally of 5 or 6 years. Transit's Auckland office had a number of capital works, in conjunction with road safety improvements, scheduled for tender in the upcoming months.

A handful of meetings were held between Transit staff Joanna Towler (National Office), Brian Rainford (Auckland), MWH consultants Jim Bernhard (Auckland) and Peter Roach (Wellington) and Vince Dravitzki of Opus Central Laboratories. After establishing the delineation needs of Transit Auckland, Vince Dravitzki was commissioned to prepare a set of delineation performance requirements for use in the

upcoming tender documents. Although the clauses described in the following sections focus on improvements in material properties, such as retroreflectivity, it was also important to the client to achieve a longer life from the markings. We are optimistic that this will be achieved through this new specification.

Specification Development Process

MWH took the delineation performance requirement clauses prepared by Vince Dravitzki and used them in their road marking tender documents. After tenders had closed, the clauses and any notices to tenderers were forwarded to Joanna Towler at Transit. Joanna then took the working clauses and developed them into TNZ P/30 Specification for High Performance Roadmarkings.

In late June 2007, at a gathering of industry road marking representatives, the group worked through TNZ P/30 and further refined it. A few action points are outstanding, and once these are resolved, a P/30 sub-group of interested road marking representatives will meet again, probably in October 2007, to go over P/30 again with a view to "signing it off" for use.

As the P/30 specification will only be used in conjunction with a traffic safety strategy, and under the supervision of a traffic engineer, it will not be available on the Transit New Zealand website, but may be obtained directly from Joanna Towler.

Contents of the Specification

The specification covers the application of road marking systems that may be applied in any of the following combinations:

- Standard ("flat") road markings delivering high performance in wet and dry night time conditions.
- Profiled road markings used as centrelines or edge lines.
- For narrow lane width, with the permission of transit's Traffic and Safety Manager, a system of a standard high performance road marking in combination with a profiled "lumps only" marking on the road shoulder.

The markings applied shall be one of the following:

- A Transit type approved product, approved under either:
    - TNZ M/20:2003 Specification for Long-Life Roadmarking Materials.
    - TNZ M/7:2006 Specification for Roadmarking Paint.
- A proprietary product that does not yet have Transit Type approval. The product must either be currently under trial and working towards a Transit Type Approval, or, the supplier must use the contact as an insitu trial. In either case an application for a provisional Transit Type approval must immediately be made to transit's Engineering Policy Manager (engineeringpolicymanager@transit.govt.nz).

The contract documents may specify M/7 type markings in some areas and M/20 type markings in other areas.

Performance Requirements–Standard Markings

Standard high performance road markings at any time during the expected life of the markings shall comply with minimum performance criteria. Some of these requirements are duplicated from TNZ P/20 Pilot Performance Based Specification for Pavement Markings.

5.2.1 Night Time Visibility

Reflectivity (dry): A minimum of 150 mcd/m²/lux when measured with a 30m-geometry retroflectometer.
Reflectivity (wet): A minimum of 80 mcd/m²/lux when measured with a 30m-geometry retroflectometer.

These values (150 dry and 80 wet) match the final (end of life) performance required of Classifications RD1 and RW1 type markings as specified in AS 4049.4 Tables 3 and 4 respectively.

The test for retroreflectivity in wet conditions was to be that as set out in ENI436, clause B6, where the road marking is wetted, then measured after a required recovery time of 1 minute. However, after discussion at the industry meeting it was decided to use the Australian method of wet night retroreflectivity testing (AS 4049.4, Appendix K).

The reflective properties apply to both white and yellow standard high performance road markings.

5.2.2 Day time visibility

Daytime visibility of either, 150m of forward view, or, Q_d > 100 mcd/m^2/lux. This is the performance required of Classification Q2 minimum luminance coefficient in diffuse illumination in EN 1436.

5.2.3 Colour

White as per TNZ P/20:2006 or yellow as per TNZ P/20:2006, which are:

White roadmarkings: The colour of white roadmarkings must fall within the colour boundary described by discolouration of not more than 4/5 (using *ISO 105-A03*) from colour Y35 of *AS 2700S*.

Yellow roadmarkings: The colour of yellow roadmarkings must fall within the colour boundary described by a discolouration of not more than 4/5 (using *ISO 105-A03*) from colour Y13 - Y14 of *AS 2700S*.

5.2.4 Skid resistance

Skid resistance as per TNZ P/20:2006, which is either:

a) 45 BPN or greater for roadmarkings with a dry film thickness of less than 0.9 mm; or

b) 50 BPN or greater for roadmarkings with a dry film thickness of 0.9 mm or greater; or

c) the value (in BPN) specified within the Contract.

Performance Requirements - Audio Tactile Profiled Markings

Where the contract documents call for audio tactile profiled markings, the markings applied shall be one of the following:

- A transit type approved product, approved under TNZ M/24:2006 Specification for Audio Tactile Profiled Roadmarkings.
- A proprietary product that does not yet have Transit Type Approval. The product must be either currently under trial and working towards a Transit Type Approval, or, the supplier must use the contract as an insitu trial. In either case, an application for a provisional transit Type Approval must immediately be made to transit's engineering Policy Manager (engineeringpolicymanager@transit.govt.nz).

Audio tactile profiled markings shall comply with TNZ M/24:2006 and the following, as required by the contract specification:

- The design is to be that shown in MOTSAM (MOTSAM needs to be updated) and the material is to be from the list of approved materials in TNZ M/24 Notes, or,
- The design and material combination is from the list of Approved Specialised designs and material combinations listed in TNZ M/24 Notes: 2007.

The feeling of Transit's National Safety Engineer is that MOTSAM should not include an audio tactile design, and proposes that the MOTSAM design be deleted.

On chip sealed surfaces the height of the stand alone audio tactile profile may be raised from 9 to 11 mm.

Standard High Performance Roadmarking In Combination With"Lumps Only' Profiled Markings.

Where Transit's Traffic and Safety Manager has given permission, a system of standard high performance road marking edge line in combination with "lumps only" profiled markings on the shoulder may be used. It is desirable that no gap should be

visible between the profile and the line, and that the maximum overlap between the profile and the line not exceed 15 mm or 10% of the profile width.

Alternatively, with permission, a “lumps only” design with no solid line could be used.

The Standard High Performance Roadmarkings and the profiled markings shall comply with the clauses above.

Width of Markings

In order to enhance the high performance markings visibility and effectiveness, all markings applied in accordance with P/30 shall be a minimum of 150mm wide, in accordance with research (Dravitzki 2003).

Monitoring of Markings

The monitoring of standard high performance road markings shall be as set out in TNZ P/20:2006. Surveillance of the audio tactile profiled road markings shall be set out in TNZ M/24:2006.

Compatibility

Tenderers are required to provide information in their tenders confirming which road marking products their marking materials are compatible with (for use in the case of a remark over existing road marking). Tenderers shall note any special preparation that may be required of existing markings prior to remarking with the high performance road marking system proposed.

Plant and Equipment

Roadmarking applications applying paint, long-life or audio tactile profiled markings shall comply with the following requirements:

- Paint shall be applied with applications holding a current T/8 Certificate issued in accordance with TNZ T/8 Specification for Roadmarking Paint Applicator Testing.
- Long-life and audio tactile profiled markings shall be applied with applicators holding a current T/12 Certificate issued in accordance with TNZ T/12 Specification for Long-Life Roadmarking Applicator Testing.

Other Clauses

The P/30 specification also contains clauses on setting out, traffic control, dimensional tolerances, surface preparation, preparation of the surface to be marked, non-conforming markings, defects liability period, quality assurance requirements such as visual inspection after application, and reporting of application of compliant markings. These clauses are all as per Transit's standard clauses, found in TNZ P/22 Specification for Reflectorised Pavement Marking.

Conclusion

The P/30 specification was developed in response to an industry need, to provide delineation at a higher level than Transit's standard specifications, with a longer life, for use in road safety applications.

References

Dravitzki, V.K., Wood, C.W.B., Laing, J.N., Potter, S., *Guidelines for Performance of New Zealand Markings*, Central Laboratories Report 03-527605, December 2003

Standards Australia, AS 4049.4 – 2006, Australian Standard, *Paints and related materials – Pavement marking materials, Part 4: High performance pavement marking systems*, Standards Australia, 2006.

I.S. EN 1436 Road Marking Materials – Road Marking for Road Users, 1998

TNZ M/20:2003: Specification for Long-Life Roadmarking Materials
TNZ M/20 Notes: 2003 Notes: The Specification for Long-Life Roadmarking Materials
TNZ M/24:2006: Specification for Audio Tactile Profiled Roadmarkings
TNZ M/24 Notes: 2007: Notes to the Specification or Audio Tactile Profiled Roadmarkings
TNZ P/22:2006: Specification for Reflectorised Pavement Marking
TNZ M/7:2006: Specification for Roadmarking Paint
TNZ M/7: Notes 2007: Notes to the Specification for Roadmarking Paint
TNZ P/20P: 2006: Pilot Performance Based Specification for Pavement Marking
TNZ P/30 Draft Specification for High Performance Roadmarkings
TNZ/NZRF T/8: 2006: Specification for Roadmarking Paint Application Testing
TNZ T/12: 2003: Specification for Long-Life Roadmarking Materials Application Testing
Manual of Traffic Signs and Markings
Traffic Control Devices Rule
Code of Practice for Temporary Traffic Management