NZ Conference Report

Performance Results of PMMA durable Road Marking Systems.

STOP, and spend some time to appreciate how Polymethylmethacrylate (PMMA) binder can be used as a pavement marking material, and, married to other products to provide new and innovative highly durable pavement marking systems that are measurable in safety, by performance.

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Confused?

Most people are confused driving on the roads these days because there is so much signage.

At a conference 13 years ago here in New Zealand the international speaker stated that one of the biggest problems we were going to face was signage – he also said the signage we see beside the roads today will be put on the roads in the future with pavement marking materials.

Stop

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1. Standards from Years Past

In Australia, products like solvent based paints were used to mark roads in rural areas and the city areas have traditionally had pavement markings applied with thermoplastic products.

The only thing constant in life is change and this is the same in our industry. Accepting that there is no universal 'one product solves all problems' material, it is increasingly being realised that there are areas where an **even more durable**, more flexible material offering unlimited colour range with superior aggregate holding properties is necessary for today's innovative road marking.

2. Current Standards

In 1994 there were some extensive roadmarking field trials carried out, mainly by the NSW RTA and Transport SA in Australia. The trials proved that waterborne paint could outperform solvent based paint in almost every way. Remarking frequencies could be wound back by at least half. Performance Based Contracts could now be let in rural areas of Australia, now that there were materials available that could 'perform'.

Polymethylmethacrylate (PMMA) or cold applied plastic (C.A.P.) has rapidly shown its versatility and economic superiority over the true effective life of the marking.

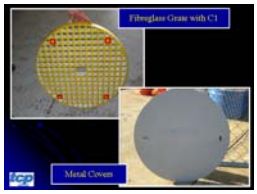
Consider the following:

- C.A.P because it does not need preheating – retains its plasticity, flexibility and colour throughout its effective life.
- It will not "crack up" in winter or "go soft" in summer.
- The colour pigments are not burned off at temperatures over 200ºC.
- It bonds to itself on recoating – no need to remove any remnants of the prior application which usually costs more than the original marking.
- Quick cure times in all temperatures – immediately trafficable minimal road closure time.

3. What Could Be

PMMA has been used selectively around Australia for over 25 years now. It tends to be selected as the durable material of choice for high volume traffic markings, where maintenance is a problem. It is used to inform of toll lanes, coloured bus lanes, school speed zones, and other specialised applications. It is used on difficult substrates, such as concrete, or steel checker plate etc. If there is a high wear area that needs the marking to perform to a high standard, then PMMA is the answer.

Over the past four years, PMMA has been considered as a worthwhile replacement for current materials used for longitudinal linemarking applications. As with anything new, there have been a series of roadmarking field trials initiated, to prove the durability of this new innovative marking material. These trials all take time to generate performance data. But now the time is up. The data has been generated. There are alternative pavement marking systems that can do more than the current 'long life' materials that are in use. Not just thick and white, but skid resistant, night time visible, and wet night visible. I use the plural in describing our 'systems', as along the way, we have discovered and developed other systems that may prove to be even better than the ones that we set out to prove as an alternative to current 'long life'.





4. Effect on Cyclists

In an experiment conducted by Opus Laboratories in New Zealand the other year, it was found that thickness was more of a factor in cyclist instability rather than micro texture of road markings. Dr Darren Walton presented a research paper at the 2003 NZ Roadmarkers Federation Conference that demonstrated the thicker thermoplastics, particularly of greater than 2.5mm, made for cyclist instability when traversed at shallow angles. Various other treatments of paints and glass beads sizes showed little if any noticeable effect.

Thermoplastic is notoriously applied layer over layer, and often exceeds the threshold thickness as mentioned above.

5. Field Trials

TCP, as the agent for Degaroute™ products in Australia & N.Z, has partnered over many years with Potters, the RTA and T.S.A., to initiate roadmarking field trials and generate 'real world' data, using our new innovative range of products. Following is an update on the finding and progress of these current field trials.

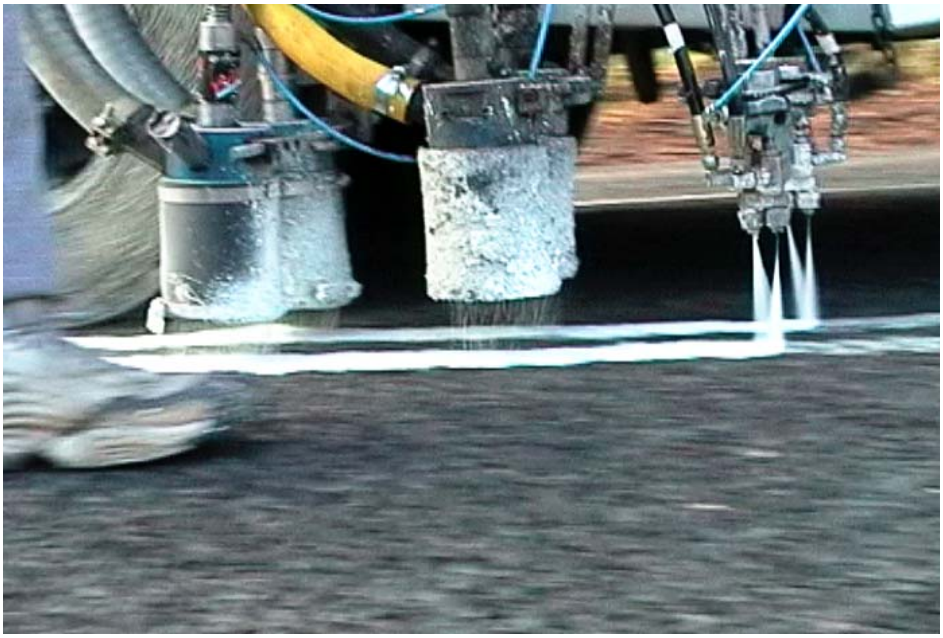
Various field trials have been done over a period of some 5 years – the markings were applied as longitudinal left-side edgelines and on straight and curved road alignments on both asphalts and sprayed seals and also in transverse markings. There was a range of aggregates and beads used in these trials to determine skid resistance and reflectivity performance.

The RTA's Scientific Services provided the monitoring and assessment of the markings for reflectivity and skid resistance.

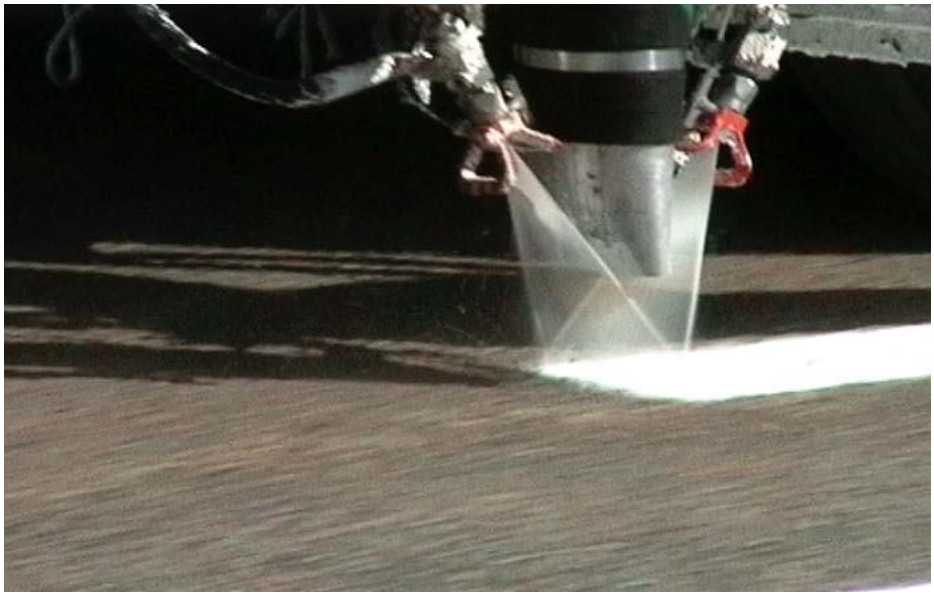
All trial information is forwarded to all authorities throughout Australia as the trilas occur and measurements are taken on a regular basis – this information is also available on request.

The most recent field trial was initiated by the RTA, and partnered by Potters. TCP was asked to participate. The aims of this new round of testing is intended:

a) To improve the retroreflctivity (wet and dry) of roadmarkings.
b) To improve and maintain adequate skid resistance levels.
c) To gauge whether any test markings show improved durability compared to current RTA Spec R141 markings.



PMMA (two component) is applied, followed by angular corundum, then Class D glass beads.



Encapsulation method for applying angular particles into PMMA.

7. Summary

The past four years of field trials have provided TCP with a clearer understanding of pavement marking requirements. We understand more about the importance of proper application techniques and how individual road substrates require individual treatments. We understand that 'long life' markings mean more than they are white and thick. Long life markings must measurably perform. It is clear to TCP that in order for longitudinal linemarking applications to be initially successful and sustainable to high performance levels throughout the life of the marking, the requirements are:

1. The markings should not be so thick (more than 3mm) as to cause a trip hazard, nor a 'tram-lining' for cycles.
2. The markings should always include glass beads to AS / NZS2009-2002 Class D.
3. The glass beads should be made from a high performing pristine glass.
4. The glass beads should have a proprietary adhesive coating applied, at the time of manufacture, prior to packaging.
5. TCP developed dual gun application technique should always be used on sprayed seal road surfaces.
6. Portland cement road surfaces should be coated with a primer and allow to dry prior to application of the PMMA.
7. For improved skid resistance, the addition of surface applied angular particles, in the range of 2 to 1mm should be used at a rate of 200g/m^2.
8. Angular particles should precede spherical particles in application order.
9. Static bead drop application (Speedbeader) to chipseal road surfaces is required, even as very slow application speeds.
10. More work needs to be done on identifying the correct particle size of angular material to use, in the encapsulation method of application, in order for the PMMA and Larger sized beads not to 'drown' the angular particles. It would appear that 2.36mm or larger size particles may be required.

At TCP we know our Marking Systems are true LONG LIFE. Not just white and thick.

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