Maximising Durability and Performance of Marking Systems

NZRF Conference

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Factors affecting performance AS4049.4

- Pavement Texture
- Applications Conditions
- Application Equipment
- Application Rate
- Aggregates
- Glass Bead
- Protection from Traffic
- Traffic Type and Volume
- Road Geometry and Dimensions
- Initial and Subsequent Application
- Compatibility
- Effect of Contaminants or pre treatments
- Pavement Luminance

Any System have 3 Critical components

- Effective binder
  - Waterbased,
  - PMMA
  - Thermo
- Quality reflective
  - Media
  - Potters Glass beads
  - 3M Elements
- Application technique

Components affecting systems performance

Critical Components in Systems	Common problems
Binder content - too low / too high	Excessive wear / dirt pickup, extra cost
Binder quality- poor	Yellowing, unpredictable reactions, slow dry, poor adhesion to substrate or reflective media
Reflective media quantity- too low	Low retro's, poor retention, excessive wear
Reflective media quality	Poor retention, Low optical quality, eg rounds or inclusions, crushing, dustiness
Application	Poor bead retention, rapid wear, low retro, excessive downtime, blockages, incorrect film weights, uncontrolled variances, equipment wear, product loss, high consumables, risky behaviour

Application related problems by Binder type

Thermoplastic	Diagnosis
Low initial retro	Poor quality or insufficient glass bead, excessive temperature at application, incorrect coating on bead, road needs trafficking
Rapid loss of retro in service	Thermo too cold at application, incorrect coating on bead

Paint or PMMA	Diagnosis
Low initial retro	Early bead loss, insufficient film thickness, insufficient beads, incorrect bead coating, bead roll, early trafficking
Rapid loss of retro in service	Insufficient paint, insufficient bead

Common Diagnosis’

- Effect of Traffic
- Adhesion Coatings
- Paint film thickness
- Bead embedment
- Bead placement and population

Effect of Traffic
Optimum Retro

- Don’t measure too soon after application.
- Paint dust, Thermo waxes
- Coatings
- Angular particles shadowing
- Requires some trafficking and weathering
- Measure approx one week after
- Some markings continue to rise over 1yr

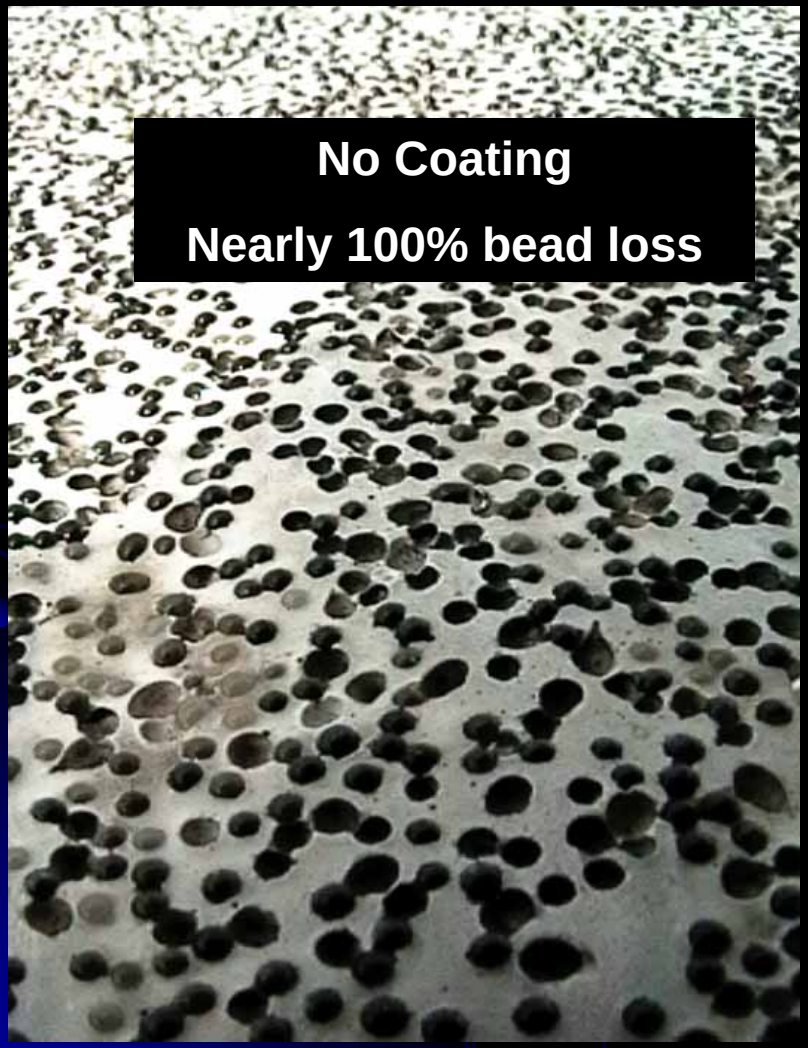
Adhesion Coatings

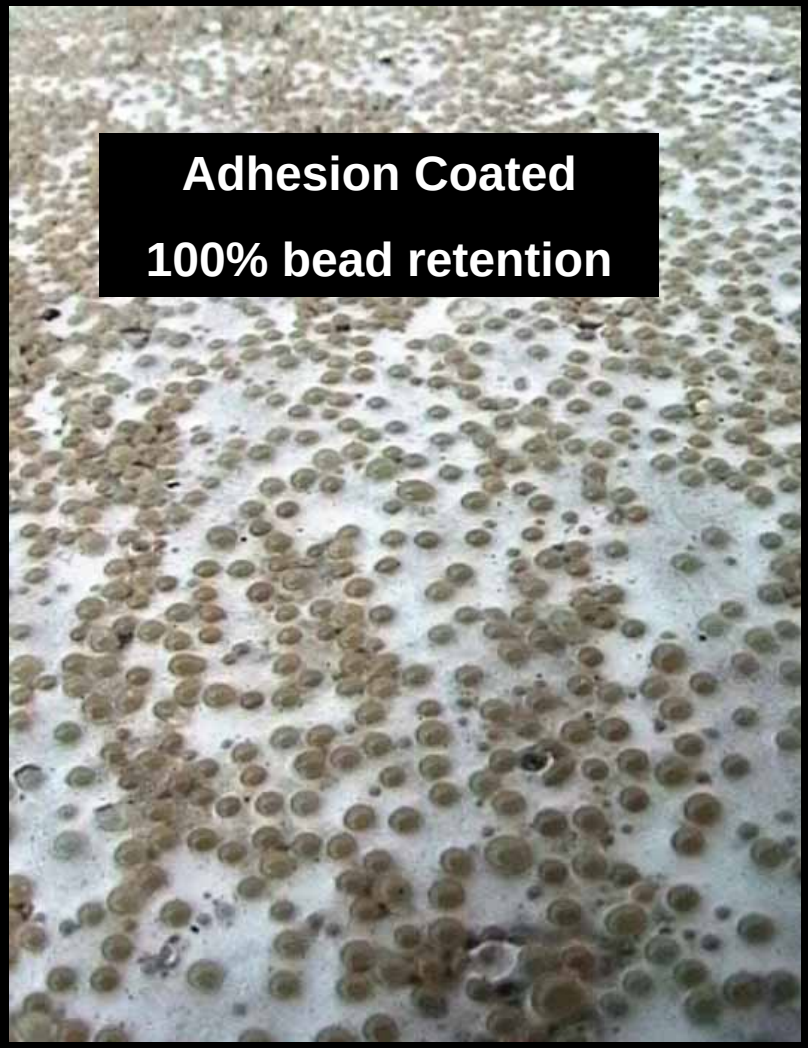
- Proprietary chemical coating
- Promotes adhesion
- Binder specifics
- Other coatings: water proofing or flow enhancers

R- Recommended NR-Not Recommended O- Optional

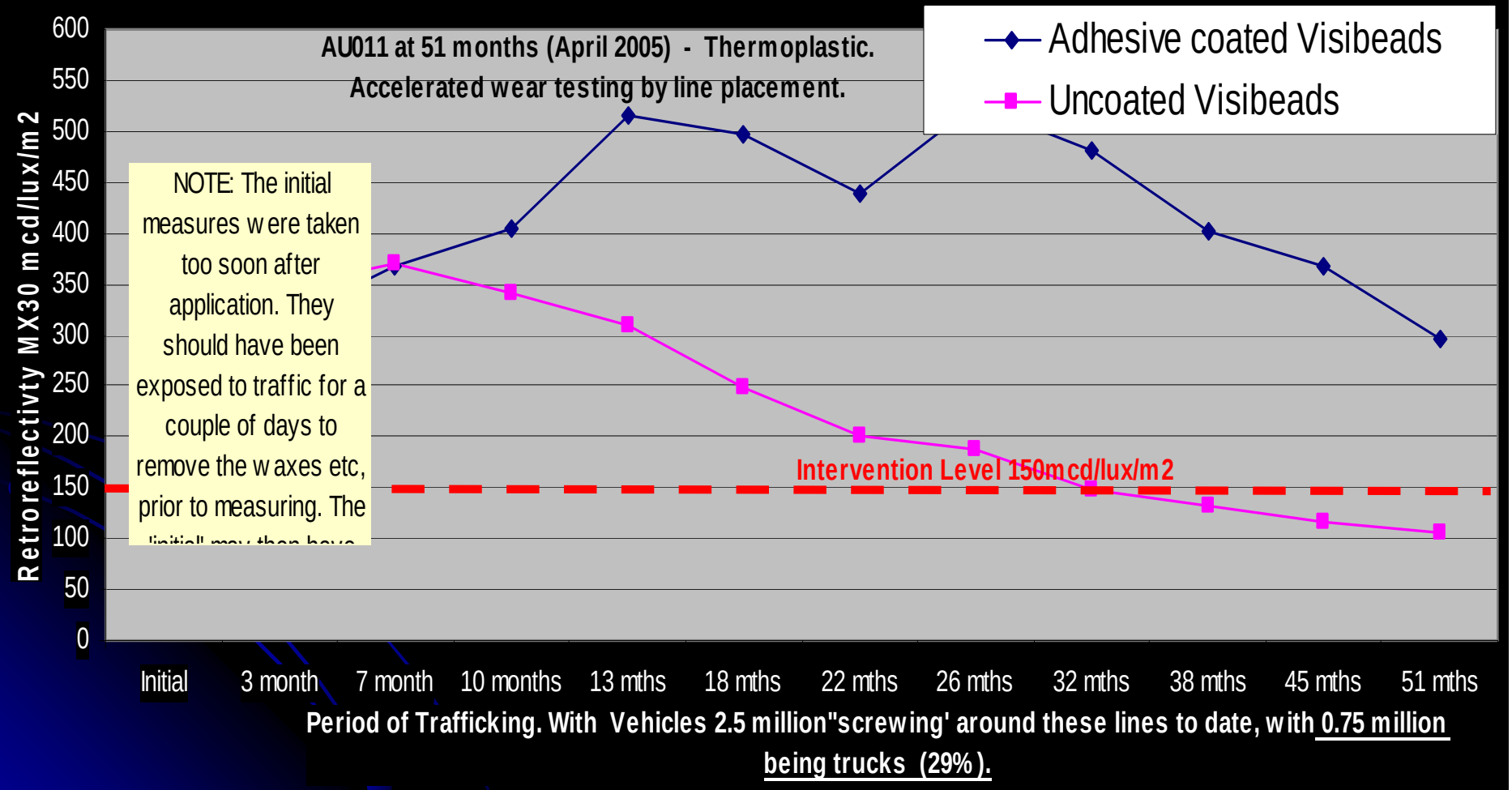
System	Type B	Type C	Type D or DHR
Thermo	NR	NR	R
PMMA	R	R	R
Waterborne Paint	NR	NR	O

Adhesion Coatings for PMMA





Adhesion Coatings for Thermo



Paint Film Thickness

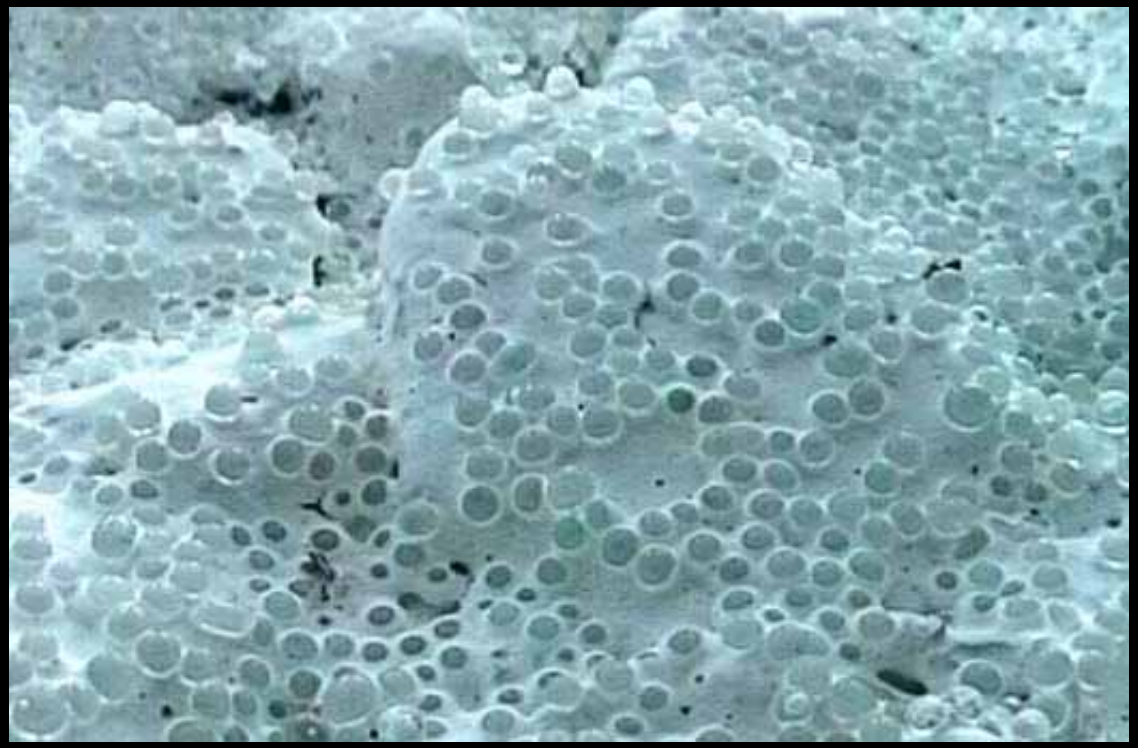
The surface elements provide a barrier between the binder and the vehicle’s tyres to enhance durability

Bead Embedment

Glass beads require 60% embedment for optimum retroreflectivity and to provide a mechanical lock for durability

Bead Placement and Population

- **No bead roll**
- **No bead bounce**
- **Double the retroreflectivity**
- **Retroreflectivity equalised for both viewing directions**



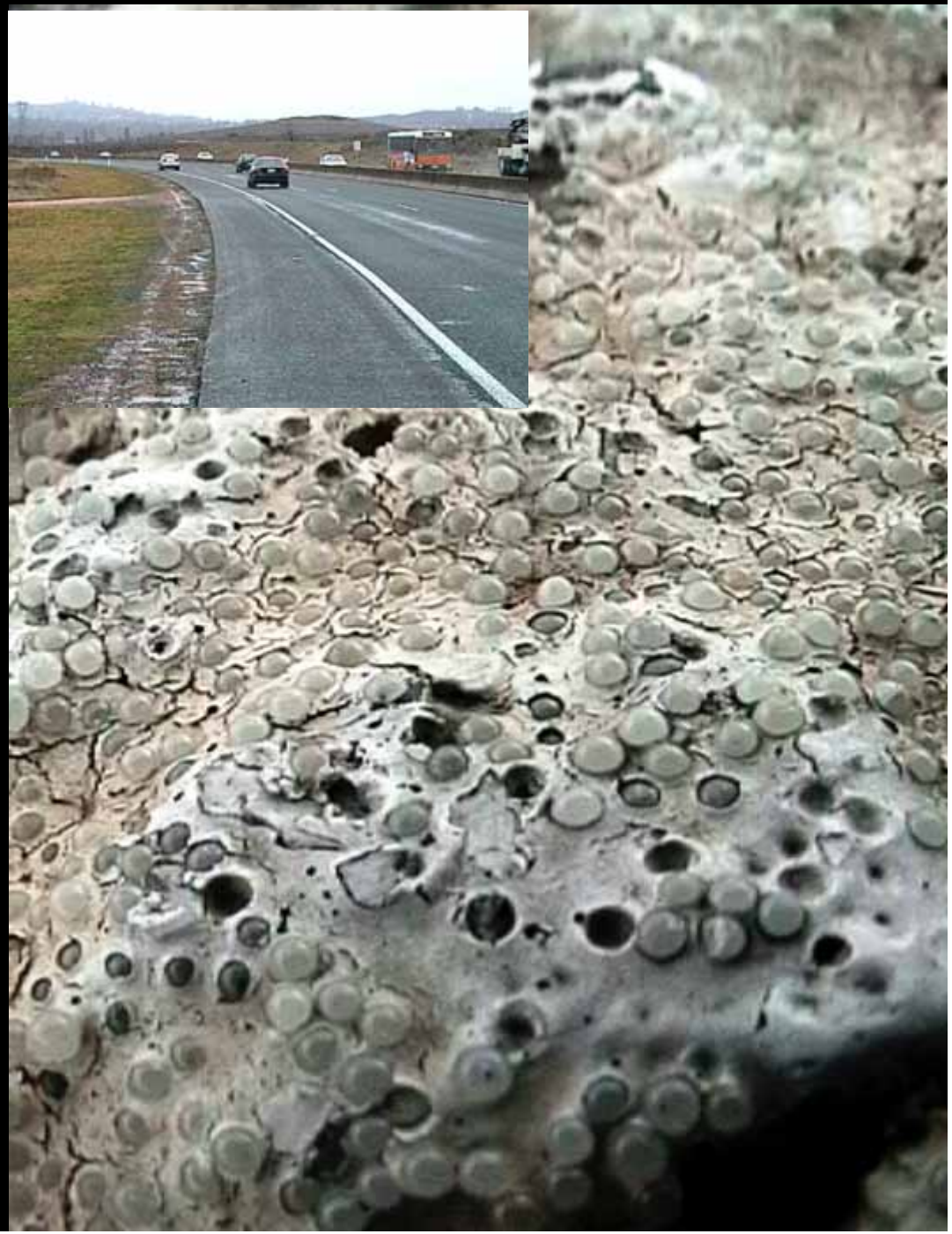
Do it right in waterborne

Section 26 at 53 months
14mm chipseal

Waterborne Paint /
Visimax™ Type D-HR
Performer

Dry retro 232mcd
Wet retro 85mcd
BPN 55

After approx 23 million
LANE vehicles
Ref AU017 Trial



Do it right in PMMA

Section 33 at 53 months

Best PMMA Performer

Dry retro 292mcd -
Wet retro 122mcd -
BPN 51

Do it Right in thermo

2 ½ years Est ADT 50,000.
Dense grade asphalt pavement.
Edgeline observations:
Almost 100% loss of the smaller sized beads.
Dry retro 440mcd, wet retro 107mcd.

Summary

- Choosing good quality products is only half the picture
- The other half is specification and application

SPECIFICATION and APPLICATION

- The grade of good quality glass bead- Pristine Type B vs Type D drop on
- The retained bead rate or bead retention vs bead application rate
- A clear expected retro number 12 months into the life cycle
- Paint film thickness matching the type of substrate and bead type
- Wet and dry specs for thermoplastics
- Coating recommendations for PMMA in Audio Tactile markings

AND then know what to look for