

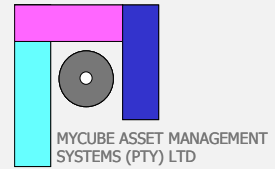
# High Viscosity Emulsion for Seals



**RPF November 2014**

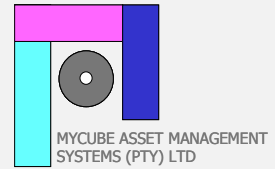
**Gerrie van Zyl**

# Focus of Presentation



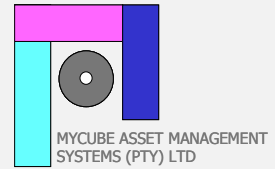
- **Need for high viscosity emulsions**
- **Experience in NZ and Australia**
- **Feedback: Sprayed Seal Alliance Workshop**

# Acknowledgements



- **Fulton Hogan – New Zealand**
- **COLAS - Australia**
- **SABITA**

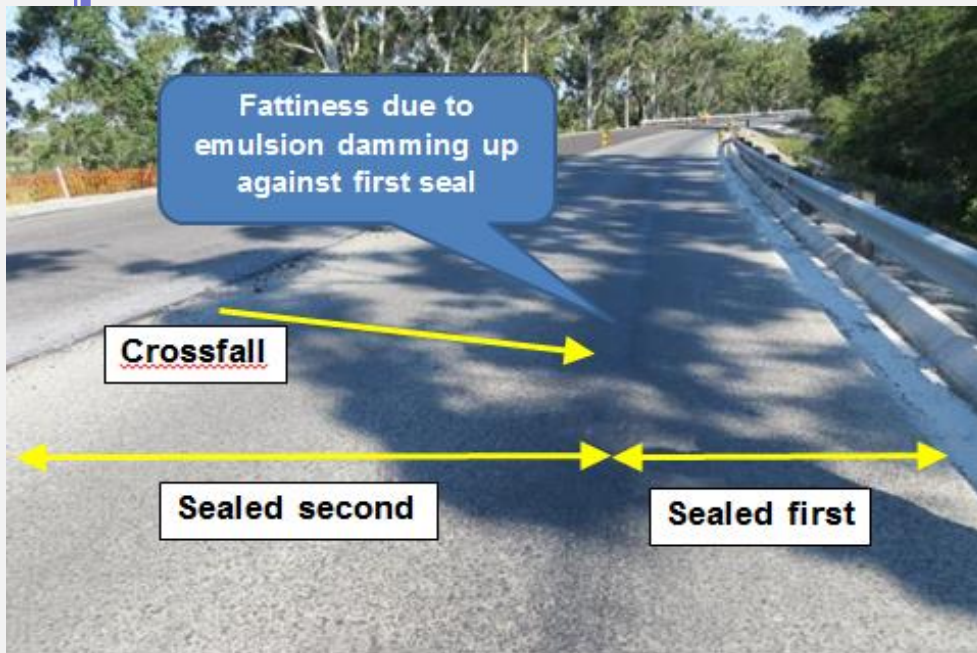
# Emulsion - Benefits



- **Safe compared to hot bitumens**
- **Forgiving Easy flow**
  - Allow low application rates
  - Better adhesion with dusty aggregate
  - Less rolling required
  - Extra time for construction
- **Short-term ageing avoided**

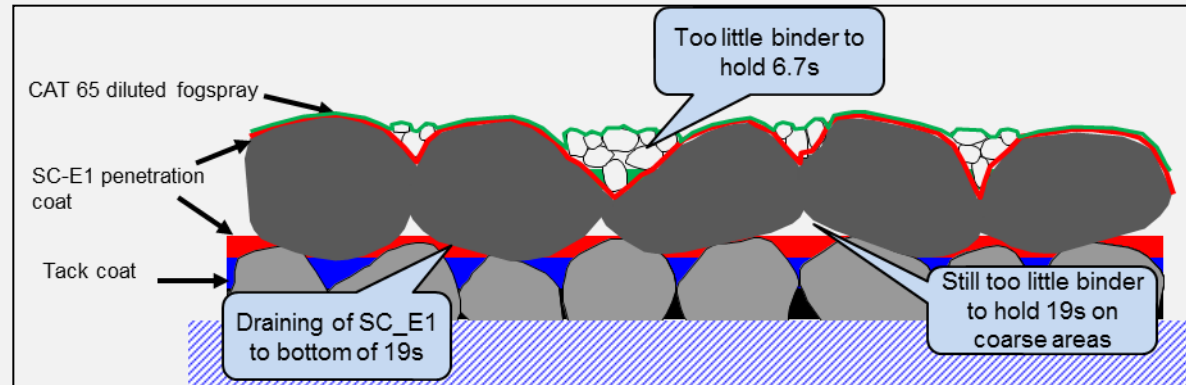
# Our Problem

- Time to opening
- Run-off



# Our Problem

- Run-in



# Existing RSA guidelines

Table 5-2 - Recommended maximum gradients for application of binder types

| Binder type                              | Application viscosity                                     | Maximum gradient |
|--|---|------------------|
| Bitumen grade: 80/100 pen<br>150/200 pen | 40 - 100 cSt<br>40 - 100 cSt                              | 12%<br>10%       |
| Cutback bitumens: MC3000<br>MC 800       | 3000 - 6000 cSt<br>800 - 1600 cSt                         | 8%<br>6%         |
| Emulsions: 60%<br>65%                    | 20 - 50 Saybolt Furol secs<br>51 - 200 Saybolt Furol secs | 6%<br>8%         |

**Note:**

*These values are only approximate and highly dependent on road temperatures, texture and the permeability of the existing surface. The operator's own experience should be added to this table to obtain more reliable values.*

TABLE 2 Maximum emulsion application rates (65% Emulsion)

| Grade   | Macro texture |        |        |
|---------|---------------|--------|--------|
|         | < 0.7 mm      | 1.0 mm | >2.0mm |
| < 4%    | 1.0           | 1.5    | 1.7    |
| 4- 6%   |               | 1.0    | 1.3    |
| 6 - 8 % |               |        | 0.8    |

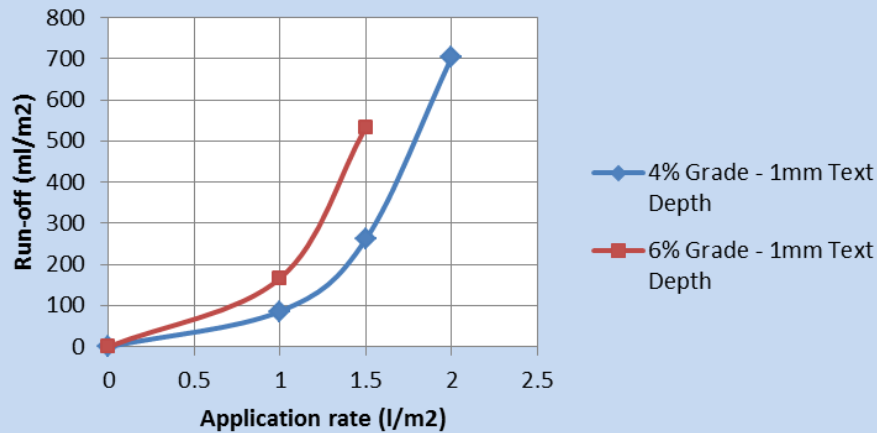
Notes:

- Grade refers to the maximum gradient/cross fall combination
- Viscosity of the binder is dependent on the bitumen content and temperature
- Porous surfacings will allow higher application

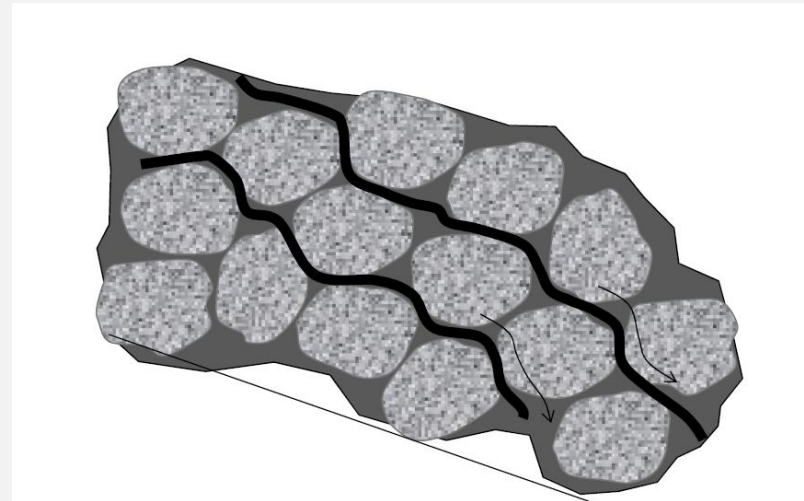
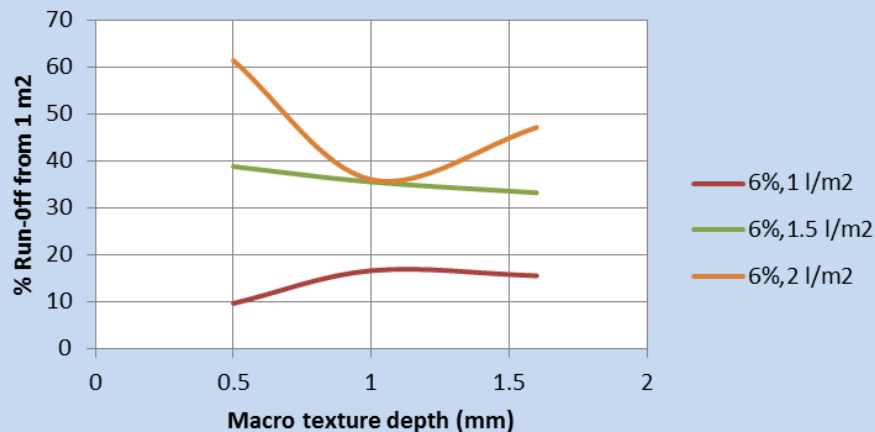
# Recent SA Research

- AA Kashya – M study US

### Cat 65% Emulsion Run-off



### Cat 65% Run-off at 6%

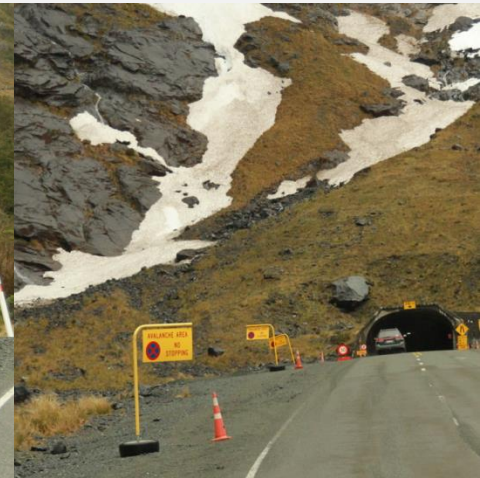
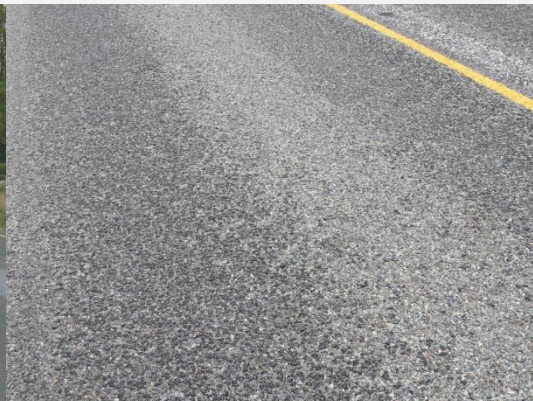




# NZ Experience

- **Realize – different conditions**

- Climate
- Drivers
  - Texture
  - Safety
- Terminology
- Contracts/ responsibility

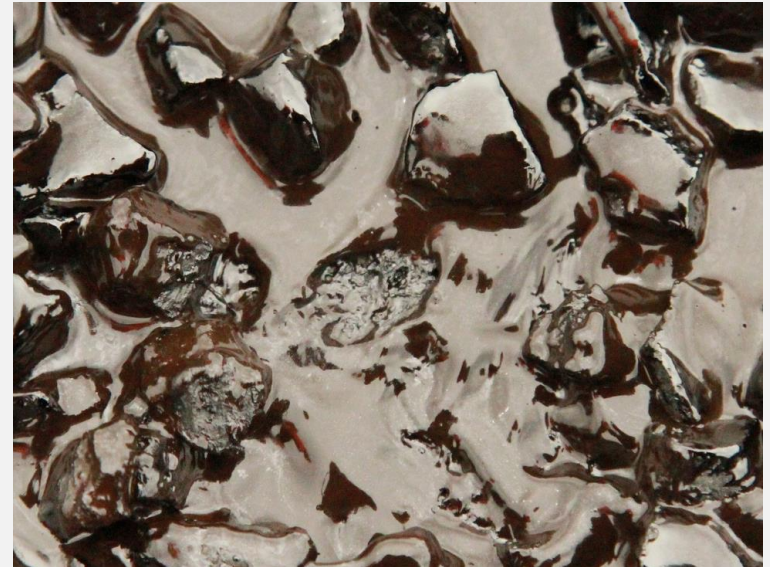


- **Bitumen sources (viscosity, salt content)**
- **Bitumen content (up to 78%)**
- **Temperature (bitumen and emulsion)**
- **Emulsifying and stabilising agents + dosage**
- **Adhesion agents**
- **Mills & settings (Speed, head design, gap)**
- **Polymers e.g. SBSs and 4 SBRs**
- **Co-blending & post blending**
- **Viscosity modifiers**
- **15 stone types**



# End product

- **High viscosity**
- **No run-off at steep grades**
- **Gel/Cheezy, break, cure**



# How steep can you go ?

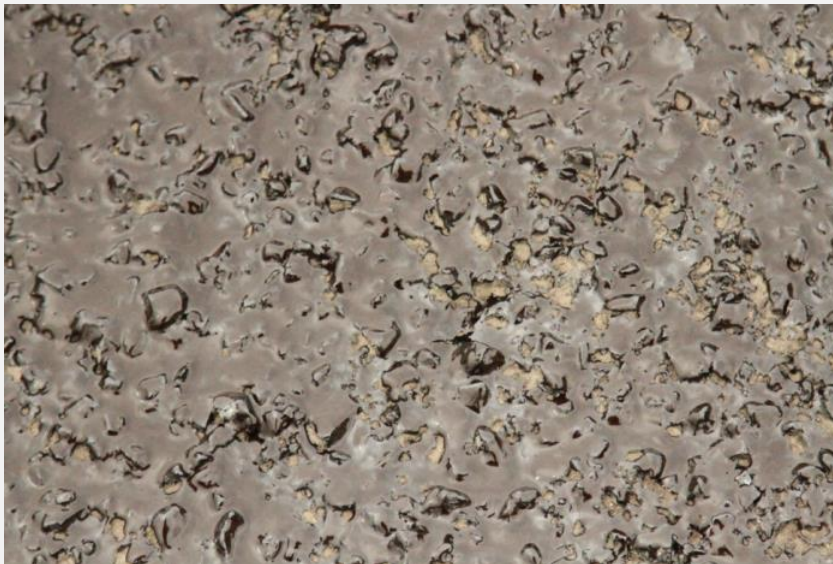
12% +



30% Gradient

# Some concerns

- **Distribution**
- **Permeability**



# Longer term results ?

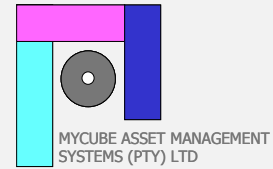


# Rolling practices



# 4<sup>th</sup> Sprayed Seal Workshop

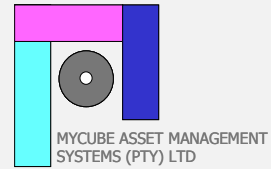
## Sydney 21 October 2014



- **Terminology, understanding and performance**
  - Prime coats
  - Primer seals
  - 1<sup>st</sup> Coat seals/ Initial seals
- **Prime/ Prime Coat**
  - Similar understanding in Aus, NZ and RSA
- **Primer seals**
  - Aus & NZ small aggregate seal for a year
  - Similar to RSA temporary seals



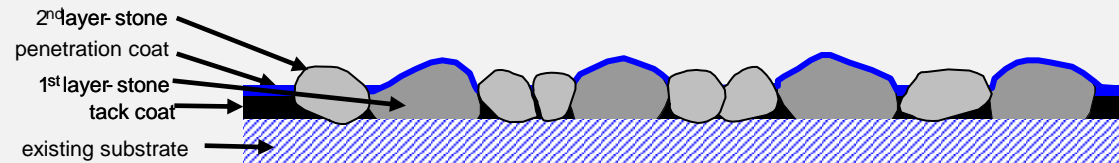
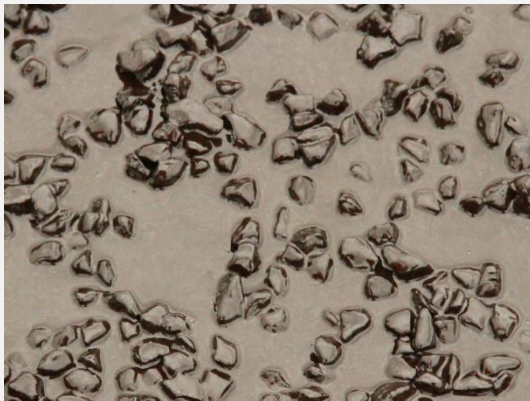
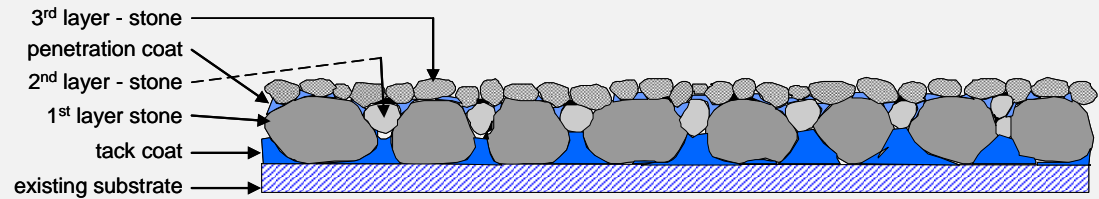
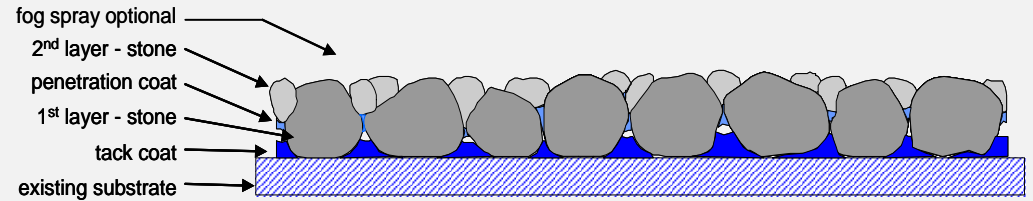
# Sprayed Seal Workshop



- **First Coat Seals/ Initial construction seals**
  - Aus & NZ similar – mostly 2 coats binder & 2 stone appl.
    - Typical performance – Life = 5 years
    - Mode of failure
      - Mainly loss of macro texture to < 1mm
      - Permeability
      - Also ravelling ( not too concerned of upper layer loss)
  - RSA – Mostly Double Seals
    - Typical performance – Life = 8 – 15 years
    - Mode of failure
      - Initial – Mainly ravelling
      - Longer term - mainly cracking

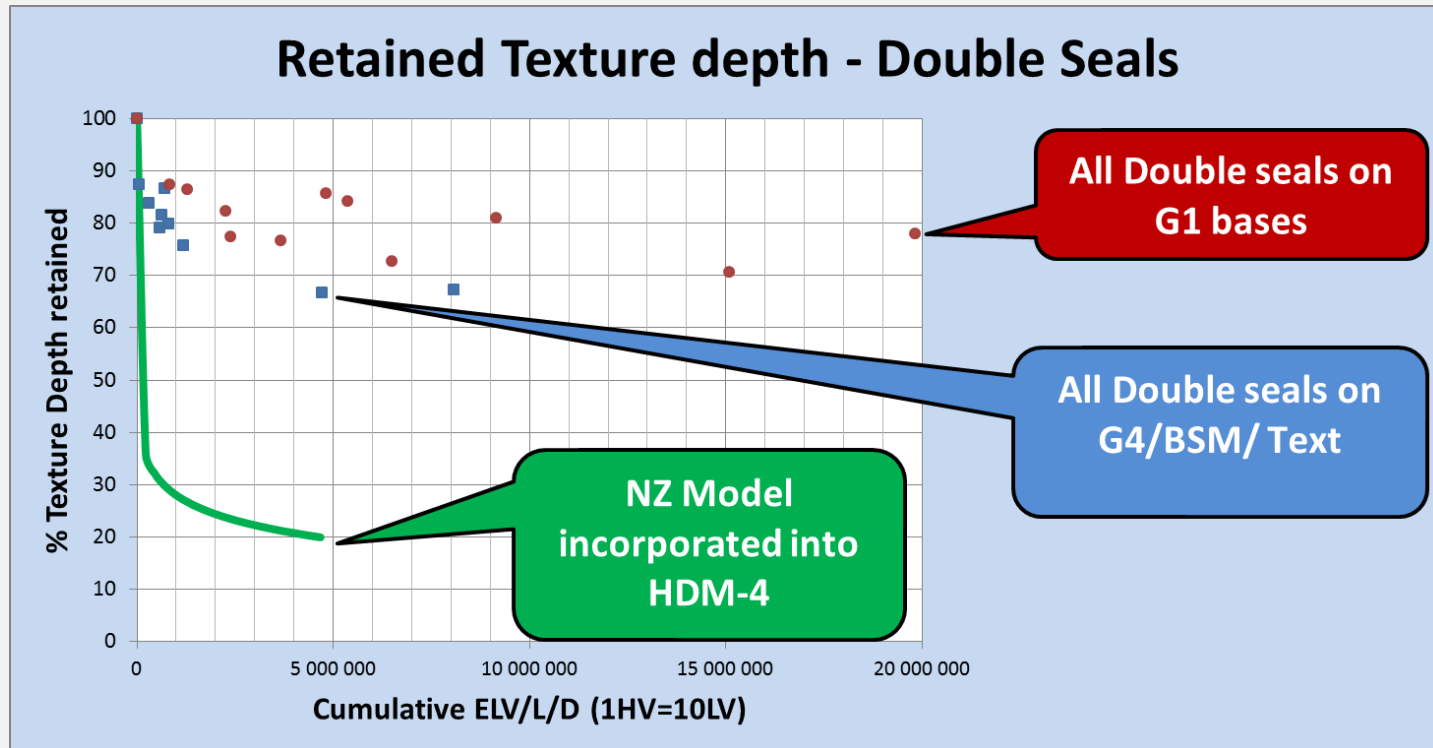
# Why the difference ?

- Opinion on texture loss

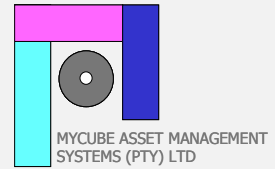


# Why the difference ?

- Opinion on texture loss



# Request to RSA suppliers



- **Knowledge exists in RSA**
- **Willingness to assist – other countries**
- **Some suppliers already busy**
- **We do not have to spray at 16% grades**

# Costs



# End

