

# Safety & Quality through Binder Selection

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# Health & Safety at Work Act

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Working smarter

Working together

*Proactively identify health &  
safety hazards & risks*

*& take steps to prevent these  
from happening*

Zero Harm



# Types of Binders Used in Chip Sealing

## Bitumen

Refinery produced material (softer grade)  
Air blown to increase viscosity (harder grade)

## Hot Cutback Bitumen

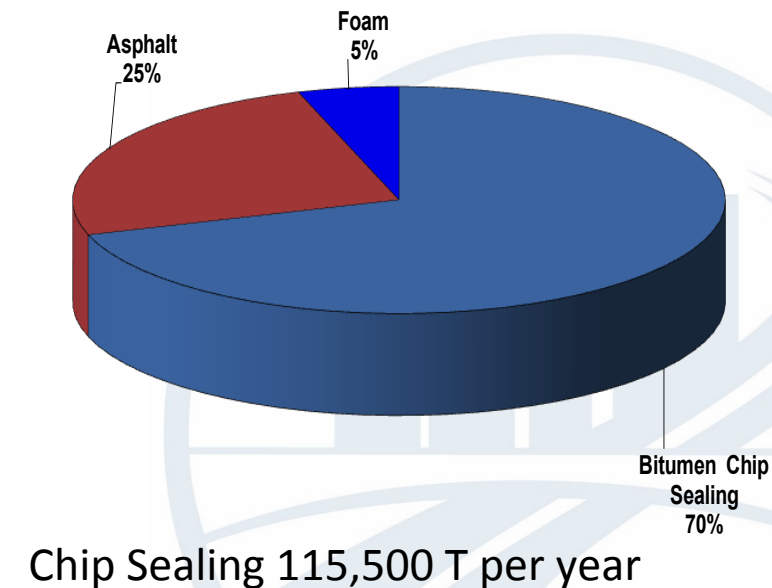
Bitumen 'cutback' with petroleum solvents

## Emulsions

Mixture of bitumen, water & emulsifying agent

## Polymer-Modified Binders

PMB & Polymer-modified emulsions (PME)



# Hot Cut Back bitumen

## Significant Risks include;

- Fire
- Explosion
- Burns



**ROADBLOCK:** Firefighters clean up after this morning's tar-truck fire. PICTURE: Kelly Schlicker

## Tanker fire backs up rush-hour traffic

By Andrew McAlley

A fire aboard a bitumen tanker brought Hamilton rush-hour traffic to a standstill on a major thoroughfare this morning.

Vehicles backed up for more than a kilometre either side of the fire added to delays for emergency services getting to the crash.

A witness travelling north along Avalon Dr about 8.05am said he noticed smoke coming from an oncoming tanker.

"A bus went past this tanker then all of a sudden smoke was coming out of it and stuff was being blown into the air."

Insulation material and other debris littered both sides of SH1 for about 200m.

"The truck stopped and I raced over with a fire extinguisher from my van. Another bloke stopped and together with the driver we unhitched the trailer and fought the fire," he said.

His partner rang 111 and tried to warn traffic.

"It seemed like ages to get an answer and it was really hard trying to get traffic to stop," she said.

A spokesman for Hamilton-based Black Top Pavements, Rhett Bishop, said he wasn't aware it was one of his company's vehicles.

"I was stuck in the line of traffic and did a u-turn so never realised it was one of our boys," he said.

The driver of the tanker was too shaken to speak at the scene of the accident but firefighters said he was a very lucky man.

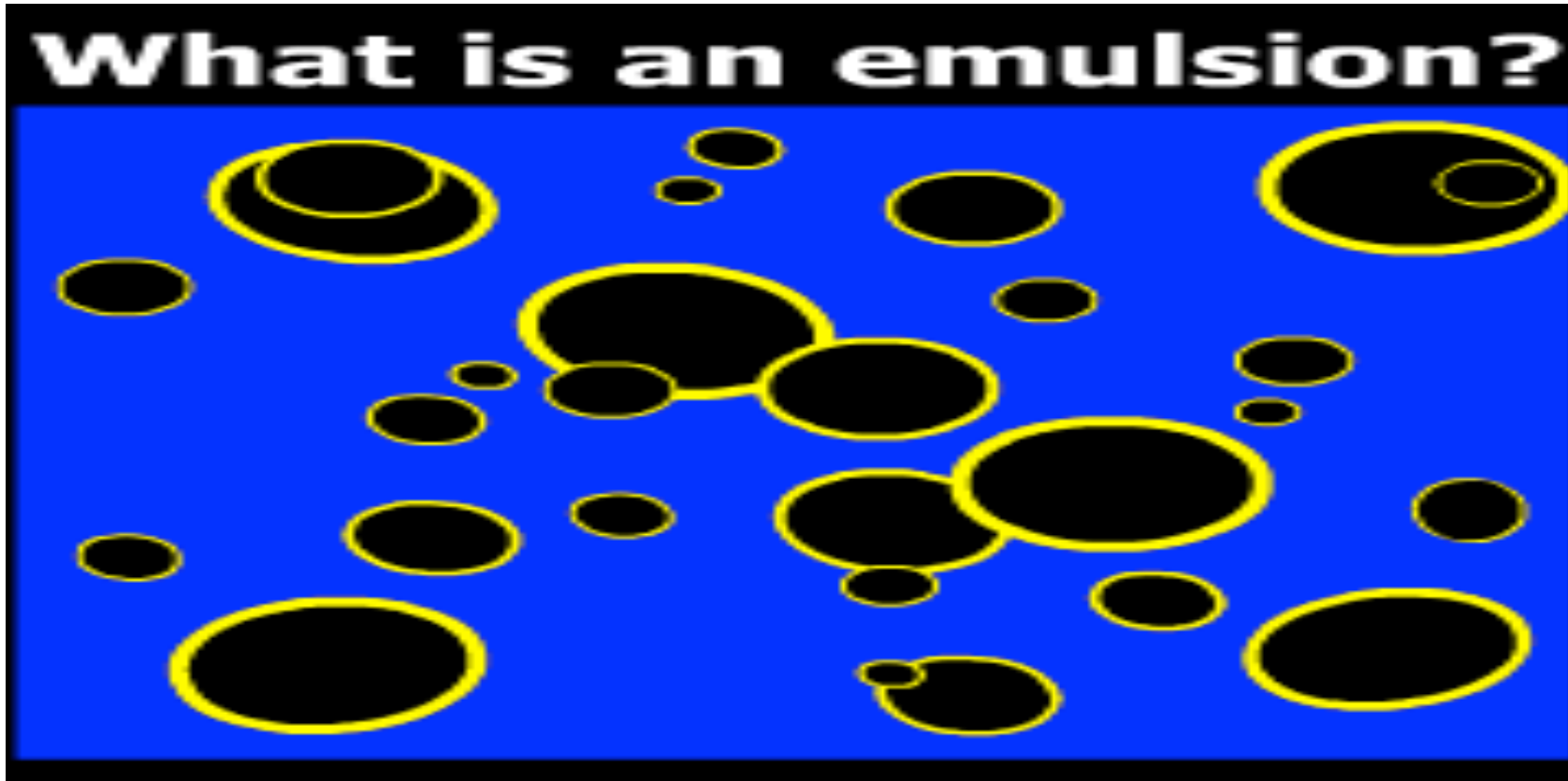




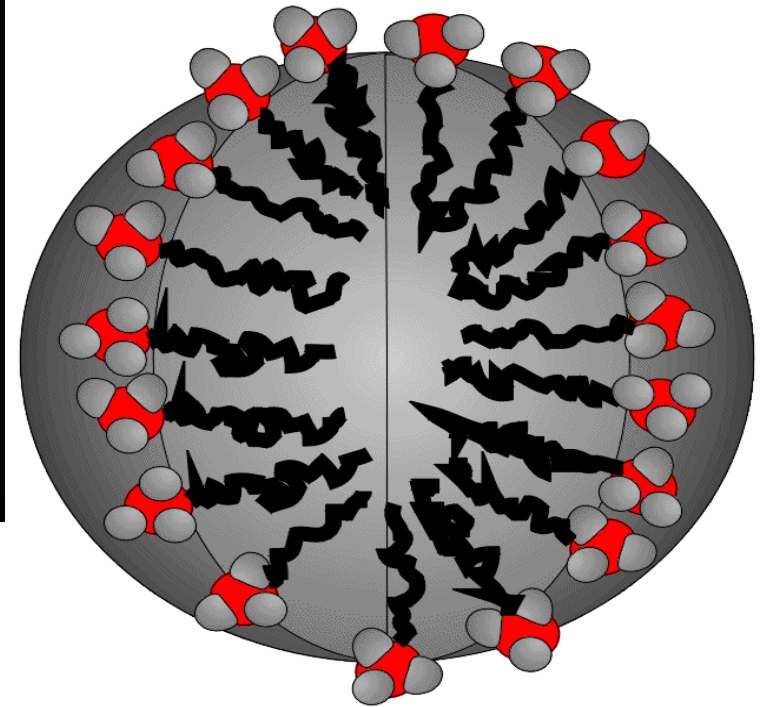
Warning – disturbing image



# EMULSION



**Bitumen & water are immiscible**  
**Need emulsification**

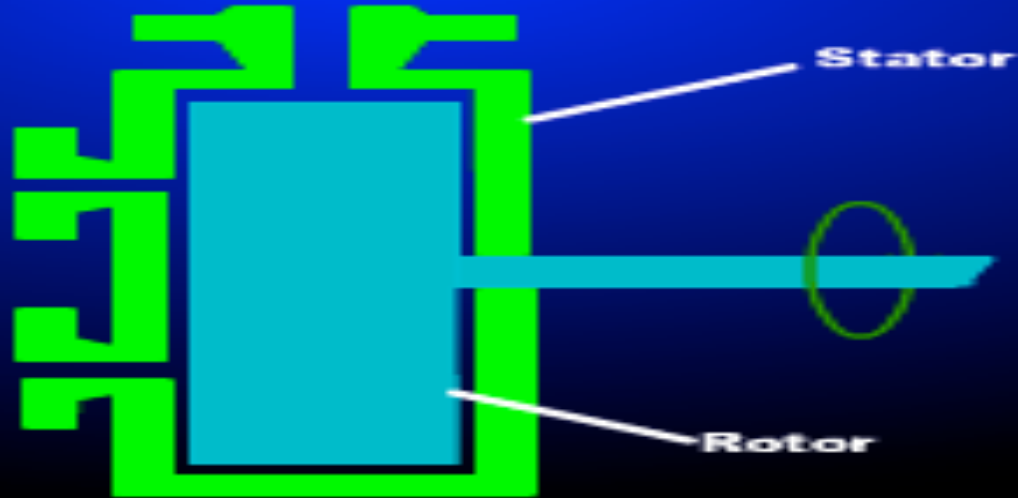


# EMULSION



**How do you make an emulsion?**

**Rotor/Stator  
Gap**





# Benefits of Emulsions

## Health and Safety

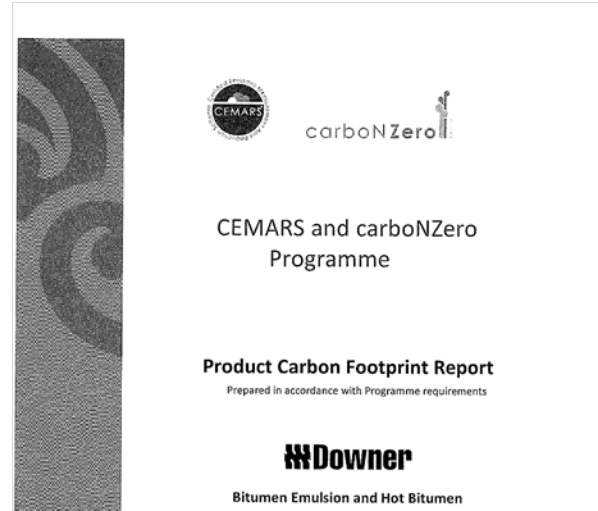
- Safety for Workers & Public
  - Lower spray temperature (<90°C vs 160°C)
  - Not flammable
  - Non toxic

## Sustainability

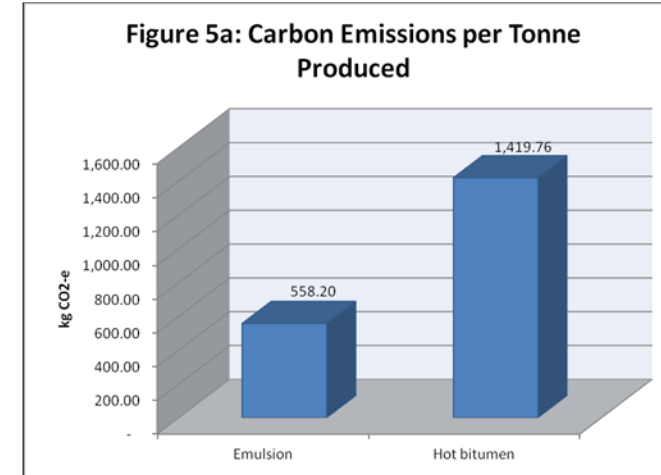
- Energy Conservation- Manufacture
  - Emulsion <10% of cutback
- Energy Conservation- Spraying
  - Emulsion 25% of cutback
- Greenhouse gases
  - Cutbacks emit Volatile Organic Compounds VOCs
- ~ 30% energy saving incl. transport



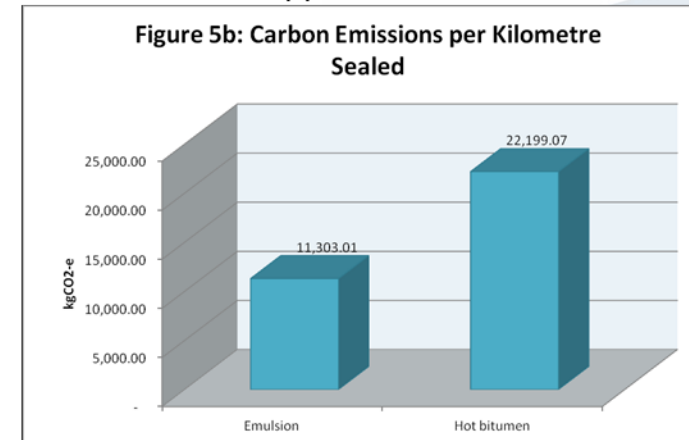
# Emissions



861 less Carbon Emissions per Tonne  
Or approx **61% less**



10,896 less Carbon Emissions per Kilometre  
Or approx **49% less**



# Traditional Limitations of Emulsion



**Spills**



**Storage stability**



**Slow Set up  
time**



Running of Emulsion  
Taken 10 minutes after spraying



**Run Off**



**Streaking**



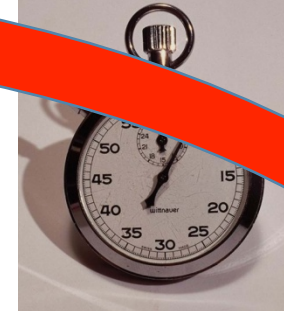
# Viabile Alternative to Cutback



Spills



Storage stability



Slow Set up  
time



Running of Emulsion  
Taken 10 minutes after Spill



Run-off



Cost saving



# Safety & Quality through Binder Selection

HEALTHY PEOPLE IN SAFE AND PRODUCTIVE WORKPLACES



A principal's guide to contracting to meet the  
Health and Safety in Employment Act 1992

■ A GUIDE FOR WORKPLACES

## Health & Safety

Any **judgement of whether** a safeguard is **“reasonably practicable”** should take into **account the current state of knowledge** within the industry.

The **“current state of knowledge”** should not **be confused with industry common practice.**

When asking what a reasonable principal would do, the **courts look at best, not actual, practice.**

# Summary

## **Health & Safety at Work Act**

**Identified risks – have to take steps to prevent these from happening**

**Range of safe emulsion solutions available to select now & continuing to develop more in collaboration with clients**

**Emulsion is now a viable replacement for Hot Cut Back Bitumen in Chip Seals**