



VALUE OF EMULSION

The benefits of using bitumen emulsion over hotcut cutback bitumen are social, technical and environmental.

Recent advances in bitumen emulsion technology mean emulsion is now a viable alternative to hot cutback for all chip seal pavement solutions. Emulsions are now capable of achieving applications which were previously considered difficult or not possible.

As the use of emulsion eliminates the most significant safety risks associated with hot cut back bitumen and is now considered best practice for chip sealing in New Zealand.



HAS LESS CARBON
than hot or cut back bitumen



CONSUMES
Less energy



Contributes to
HIGHER
Productivity and
GREATER
Safety



Social

There are significant health and safety risks associated with hot cut back bitumen which the use of emulsion eliminates.

Along with burns to operators due the products elevated temperatures (170°C), there have been tanker explosions due to the highly flammable nature of the product.

Significant events have included;

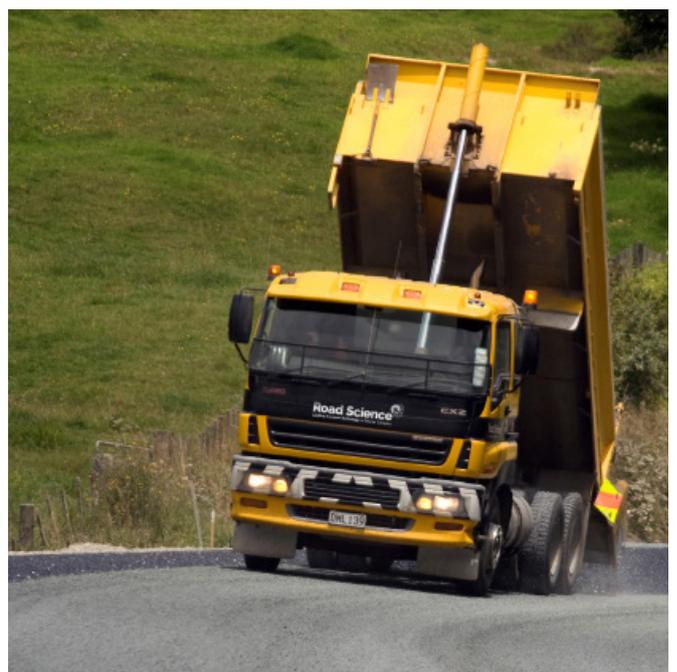
- A 21 year old male was killed in Greymouth when a hot cutback tank exploded in September 2009
- A hot cutback tanker exploded among traffic in Hamilton distributing debris and causing traffic delays in 2009
- A hot cutback sprayer had an explosion in Hawkes Bay in May 2013
- A hot cutback sprayer had an explosion alongside traffic on a state highway in Marlborough in February 2015
- A hot cutback sprayer exploded on a local road in Tararua District in April 2016
- There was a significant fire which destroyed two tankers in a yard in Hamilton in April 2017

The use of emulsion complies with new Health and Safety Legislation, as it all but eliminates serious hazards and safety risks associated with hot cutback bitumen.

Every year the use of hot cutback bitumen will seriously harm nine people and on average every ten years one person will be killed.

Bitumen emulsion reduces the spray temperature from 170°C to 80°C this eliminates serious burns and explosions associated with the use of hot cutback bitumen.

Emulsion eliminates the risk of explosion as the need for cutback' agents such as kerosene are no longer needed. Roothing teams are more comfortable using emulsions as they know they can return home without having to deal with fumes that hot cutback bitumen creates.





Technical

Emulsion cures onto the chip under a wide range of environmental conditions which reduces the risk of early life stripping and this leads to an extension of the sealing season.

Emulsion binders provide better adhesion to chip than cutback binders do. This leads to some designers using less binder for emulsion than for the equivalent cutback seal.

New generation emulsions have a superior viscosity to hot cutback bitumen. This leads to less run off and the ability to seal on steep slopes with greater confidence.

Emulsions can be stored for in excess of three weeks which means weather and operational delays are more easily managed.

Adhesion to chip is achieved through a chemical reaction with the emulsion leading to a lower risk of bleeding seals during the hot summer months.

Environment

Every sealing season the current usage of hot cutback bitumen emits over **3.5 million litres** of kerosene to atmosphere. Emulsion does not require the addition of kerosene and therefore eliminates the damage caused to both people and the environment.

An independent study by CarboNZero has revealed new generation emulsions halves the CO₂ emissions associated with chip sealing, this is equivalent to planting 650,000 trees.

It is true that emulsions should not be sprayed when it is raining because, as a water based system, this can result in wash off and staining of kerb and channel or road side shoulders. With planning and mitigation methods this risk can all but be eliminated. Cure times of modern emulsions are much faster which in turn reduces the risk.

The future

Downer has decided to work away from hot cut back towards emulsion as quickly as our customers are comfortable with the move.

We encourage all of our customers to consider the implications of the new health and safety legislation when considering the **choice** between hot cut back bitumen or emulsions for chip seals.