# BENEFITS OF FLEXIBLE PAVEMENTS.

Paving surfaces made with bituminous products, known as flexible pavements, have changed Australia and the world.

They provide save, smooth, cost effective and readily maintained surfaces. They have provided quality roads within cities to enable travel for cars, heavy trucks, bicycles and pedestrians. They have also linked rural areas allowing freight and tourism across the vast continent of Australia.

These roads not only allow for people to travel freely, they also carry most of the goods and services. From farms to shops, from ports to people's homes

Not only do flexible pavements effectively link our society, they are also have a very low environmental impact.

## Greenhouse emissions.

Flexible pavements are made by combining stone and bitumen. In some cases other products are also used to alter the properties of the material.

Stone is mined locally and transported relatively short distances to either an asphalt plant or directly to a road surfacing site. Bitumen is a product of hydrocarbons. However, unlike other uses of hydrocarbons (eg petrol, diesel, oil etc) bitumen is not consumed. Instead it is mixed with the stone and remains as a safe and stable road surface.

Bitumen in asphalt is not consumed and produces no greenhouse emissions

Bitumen is therefore does not produce greenhouse gas other that the small amount associated with refining the bitumen and heating it to allow it to be effectively laid.

## Reuse/recycling

Flexible pavements may be reused and recycled. In the US the asphalt industry reuses and recycles nearly 100 million tonnes of its own product each year.

This reduces the amount of new bitumen and stone needed to construct new roadways.

A profiling machine removes the wearing (top) course from a flexible pavement, ready for a new surface to be applied and the removed material to be returned to an asphalt plant for re use.

In Australia, as in the US, the wearing (top) course of a pavement may become damaged or worn over time. When this occurs that layer can be removed using a milling machine. A new wearing surface can then be applied. The material removed can then be returned to an asphalt plant and combined with new material to be used elsewhere.

Flexible pavements are therefore fully recyclable.

**Road Safety**

Smooth, textured flexible pavements give vehicle tyres a superior road surface, providing both quality or ride and high friction under cornering and breaking.

The surface friction characteristics can also be readily maintained through resurfacing without the need to replace or re-construct roads.

## Noise Reduction

The interaction between tyres and the road surface generates noise. This noise can be very intrusive, particularly for large volume, fast flowing traffic.

This noise can be heard by vehicles in a vehicle as well as by those living or working near a road.

Asphalt surfaces are low noise surfaces compared to other surfaces. Also asphalt surfaces can be designed to reduce noise levels by 50%. To a person living nearby this is the equivalent to halving the traffic volume or reducing the traffic speed by 25%.

These surfaces can be applied during road construction or added as an overlay to an existing road surface, including non-asphalt surfaces. Importantly the noise absorbing properties of specially designed asphalt remain effectively undiminished over time.

## Water Spray

Rain during daylight hours is reported to increase collision risk by 50 to 100%. This is due to the reduction in visibility caused by water spray and the lowering of friction on a wet surface.

Flexible pavements can reduce spray and maintain effective skid resistance. For example open graded asphalt provides pathways for water to run-off, minimising the amount of surface water between the tyre and road surface.

Low textured, wet pavements also reflect light, increasing glare. The high textured flexible pavements significantly reduce glare.

The above photos were taken within a short time of each other. The top photo shows a smooth surface with significant water spray. The open graded surface on the lower photo shows no spray

## Energy Savings

Vehicles travelling on smooth, well maintained surfaces reduce fuel consumption. In the US studies have shown that vehicles travelling on these roads consume up to 4.5% less fuel compared to travelling on rough pavements. Asphalt pavements are laid smooth and stay smooth throughout their life. When maintenance is required, the top wearing course can be readily and cheaply replaced with little disruption to traffic.

Lower fuel consumption reduces costs for motorists. It also reduces greenhouse emissions.

Resurfacing of old, rough pavements provides significant environmental benefits as well as increasing road safety.

## Congestion

Road congestion adds time to journeys, increases greenhouse emissions, and increase the risk of accidents. It is therefore important that road construction and especially road maintenance is done quickly with as little disruption to traffic.

Flexible pavements can be quickly and effectively maintained, including fully resurfaced. Flexible pavements can also be maintained a lane at a time or with a short whole road closure.

Flexible pavements reduce congestion during maintenance and construction.


## Reflection

Whilst glare is not often reported as the primary cause of accidents, it does play a major role, particularly at night, in rain, and in early morning and late afternoon.

Flexible pavements are black and relatively non-reflective. Open graded asphalts particularly offer significant reductions in road surface glare. Line markings are also able to be readily seen in contract to the pavement colour.

Of course, different coloured pavements can also be applied, such as the green or red pavements used to define bus routes or cycle paths etc. Even these pavements, with can be coloured and textured to reduce sun glare.

## Warm Mix Asphalt

The flexible pavement industry recognises that flexible pavements are have a low environmental footprint. They are low greenhouse emitters, retaining the carbon with the pavement structure. They are also fully reusable / recyclable again reducing greenhouse emissions.

However, the flexible pavement industry recognises the importance of always seeking new ways to reduce the environmental impact of road surfacing. Asphalt plants are therefore designed to meet the strictest environment protection and community standards.

A new technology known as warm mix asphalt is also being applied in Australia. This technology produces asphalt at lower temperatures than the usual hot mix asphalt. This reduces the amount of energy used to produce the asphalt while still allowing it to be successfully laid.

Warm Mix asphalt will even further reduce the low greenhouse footprint of asphalt compared to other pavement surfaces.