

Enviro news

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Woree to Edmonton successfully completed

The Woree to Edmonton 132kV Structure Painting project was successfully completed in October. Works included the replacement of defective structure fixings and members, surface preparation and the painting of 20 Powerlink Queensland transmission line structures in Far North Queensland. A number of the structures were located in and adjacent to the Trinity Inlet Estuarine Conservation Zone, which forms part of the Great Barrier Reef Marine Park World Heritage Area.

Downer and Powerlink's environmental representatives consulted with regulatory authorities throughout the process of obtaining the Marine Parks permit, to undertake the works within the sensitive marine environment. Site Based Management Plans were developed for each tower location, which identified key risks and the control measures to be implemented to protect sensitive environmental receptors. Procedures included detailed monitoring of wind speed and direction, quantities of materials used and deposition of spent abrasive media.

John Peeters, a Downer Environmental Advisor, said: "The project team faced challenging site conditions including

sandflies and mosquitos, muddy tidal areas and record high temperatures. Innovative ideas were employed to ensure safe access for workers on site, including the installation of geo-grid material over the soft uneven mangrove substrate and stable elevated walkways for when the tide came in. Stingrays, schools of mullet, crayfish and crabs were often spotted passing through the worksite."

To gain a greater understanding of the potential impacts associated with surface preparation and the painting of structures within environmentally sensitive locations, additional investigations were made into the behaviour and composition of abrasive

media. Assessments of associated noise and air quality at the worksites and in surrounding areas were also undertaken. In addition, the condition of fiddler crab populations, sensitive orchids and plants adjacent to the work sites were monitored. Such information is valuable for identifying potential impacts and planning control measures for future projects.

"Thanks to all involved for maintaining a strong focus towards protecting the environment while ensuring project deliverables were achieved," Peeters said. ■



Solar powered automatic farm gates for Ararat Wind Farm

The Ararat Wind Farm project team has installed 15 solar powered automatic farm gates, in what is a true sustainable solution.

This project innovation is not only improving efficiency, safety and our relationship with the local farmers, it is substantially decreasing the associated Greenhouse Gas Emissions (CO₂-e) by 75%.

Ararat Wind Farm is located within commercial sheep growing farms across the district, which means our construction vehicles have to open and close gates regularly. One gate can be opened and closed 50 times a day, taking at least 1.5 minutes each time for light vehicles and two minutes for heavy vehicles. Solar powered gates only take 30 seconds to open and close, which is saving one hour of idle time a day per gate.

Ararat Wind Farm has replaced 15 high traffic gates with solar powered automatic farm gates. Over the remaining six months of the project, Downer will save approximately 10,837kg of carbon equivalent.

In addition, the project team is traversing the large wind farm footprint more efficiently and saving costs on fuel.

“We are also enhancing our relationships with the local farmers by reducing the chances of livestock escaping from paddocks,” said Construction Manager Sam Humffray. ■

Quick facts

- Ute idling uses 1L/hr
- Heavy vehicle idling - 1.8L/hr
- National Greenhouse Accounts Factors: Diesel = 0.0386GJ/L / Diesel = 70.51kgCO₂-e/G
- 68% of vehicles on the construction access tracks are heavy vehicles



First solar gate to be installed on the project. The process has been refined to include a sliding bar on the offside gate to provide greater security. ■



Lights, Camera, Stabilised...

Downer’s Rail division recently completed a lighting retrofit project at our Auburn Maintenance Centre. This has not only reduced the amount of energy used for powering outdoor lighting but stabilised the harmonics of our transformer, resulting in consistent electricity supply.

The Auburn facility is a passenger rolling stock maintenance centre, which maintains the Waratah trains on behalf of Reliance Rail and Sydney Trains. The lighting retrofit project follows on from previous lighting upgrade projects conducted at Auburn in 2013-14 and involved retrofitting:

- 243 x 400W Metal Halide lighting with 250W induction lighting
- 373 x 150W Metal Halide with 85W induction lighting

The new lighting, installed by 31 May 2016, produces the same light levels as the existing lighting system and achieves an annualised GJ savings of 1355GJ, which equates to an annual savings of \$110,000.

In addition, the project will avoid the need for future replacements of a lighting isolation transformer, which costs about \$60,000 and needs to be replaced every five years, due to reduced and stabilised harmonics. Auburn Maintenance Centre presently utilises two lighting isolation transformers. Total harmonic distortion (THD) measured in late 2014 produced an average of 23-29% distortion for A, B and C Phases for Transformer 2. Monitoring conducted in May 2016 shows the lighting retrofit project has reduced the THD to between 0-4% distortion.

Downer actively and continuously seeks opportunities to apply energy efficient solutions for our customers as part of our ongoing commitment to energy savings. ■





Downer's Sustainability performance

Downer's 2016 Sustainability Report has just been released and it includes disclosure of our performance on the non-financial aspects of our operations. We have deliberately not produced hard copies of the report in order to reduce cost and waste. The report is available for download on the Downer intranet and our website.

Our ability to understand and manage the sustainability (environmental, social and corporate governance) aspects of our activities is fundamental to our long-term success as a business. Consequently, our approach to sustainable development is intrinsically linked to our business objectives and seeks to maintain an acceptable balance between the longer term impacts of our operations and the need for short term results.

Our CEO, Grant Fenn, said in the report: *"Our customers are increasingly looking to us to bring forward best practice solutions that will challenge the way they are doing things, which is resulting in some excellent mutually beneficial outcomes. For example, partnering with State and local government customers during the year to pursue common environmental goals enabled us to set new benchmarks for the inclusion of recycled materials in road surfacing products."*

We are always interested in hearing stories about how the business is managing its environment and sustainability performance, so if you have something that you think should be included in the next Sustainability Report, please send your ideas and photographs to sustainability@downergroup.com. ■

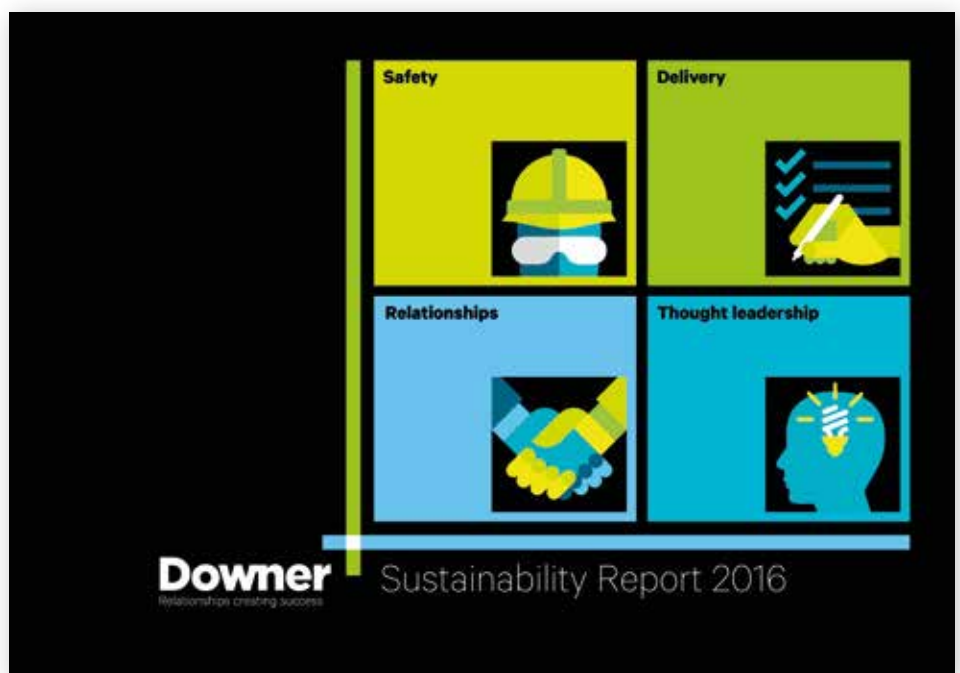


Figure 4: The Downer Pillars





Sustainability in **flexible pavements**

Strategic decisions made with the road industry will continue to ensure a more sustainable future is achieved for current and future generations.

Through relationships with customers, suppliers and the broader industry, Downer is constantly innovating to provide the community with flexible pavement solutions, incorporating greater recycled content, while achieving an overall lower greenhouse gas footprint.

While not a new concept, Warm Mix Asphalt (WMA) is becoming much more commonplace as the industry upgrades to the latest technology. Through the use of water foam systems, asphalt can be produced at a lower production temperature without compromising the pavement's performance. The energy needed can be decreased in excess of 30MJ/t, or 10% of the onsite energy use. In addition, the lower temperature significantly decreases the VOC emissions, therefore decreasing the environmental impacts.

The road authorities are promoting the use of higher reclaimed aggregate. Industry has

met and exceeded the need by installing high recycle content technology asphalt plants, the first in Wingfield, South Australia and Bayswater, Victoria.

The culmination of asphalt production technology and the use of waste products has resulted in the development of asphalt made from 99% recycled materials. This world first was achieved with industry partners to pioneer the reuse of waste items such as toner from used printer cartridges, waste oils, post-consumer tyres and glass, which would ordinarily be stockpiled or sent to landfill.

Applying the learnings from asphalt production on World Environment Day this year, Downer introduced a Low CO₂ Spray Seal containing recycled toner to the market. This new innovative product has the potential to reduce CO₂-e emissions by 45kg per tonne of Spray Seal compared to a standard 45R grade binder.

Downer also manufactures high binder emulsions that eliminate the need for cutback and solvents. The high binder emulsions significantly reduce VOC emissions released; they are transported at a much lower temperature and reduce the amount of transport generated greenhouse gases.

“At Downer, we are finding that by drawing on our deep bank of knowledge and experience in implementing a wide array of sustainable solutions we are increasingly serving as strategic sustainability counsellors to our clients in the road industry, as opposed to simply delivering a specified service or product,” said Ross Brookshaw, Manager Environmental Sustainability. ■



Redcliffs seawall

The new seawall is designed to protect properties on Beachville Road in Redcliffs, New Zealand, from incursion from the estuary of the Heathcote and Avon rivers. The rebuilt section of wall will be about 500m in length and will also run beside part of the new Christchurch Coastal Pathway.

An important part of the new Redcliffs seawall is hidden underwater.

Following the February 22, 2011 earthquake, the ground under the seawall (built about 90 years ago) succumbed to lateral spread, causing about half a kilometre of the seawall to bow outward, no longer providing protection for nearby properties. In three places no wall was left at all.

A big challenge in rebuilding the wall was coping with two metre tidal fluctuations. SCIRT project manager Mark Gleave, a former Royal Engineer with the British Army, was no stranger to working in a marine environment, having worked on civil engineering projects in Britain, including a floating visitor centre at a wildlife reserve and another project on the River Mersey.

Gleave says the first task was clearing the site using a 50 tonne excavator and removing the spoil. He explains that next, the delivery team built a special piling frame and used sheet piles to seal off a rectangular section or bay from the sea. Once one bay was completed, the platform was moved along and the process was repeated.

The bay measured about 24m long by 4m wide. Once in place, the section was de-watered; seawater was pumped out and remains of the old seawall removed.

Separate layers of Geotextile cloth, geogrid, and rock ballast were then lowered into place (Gleave likens the process to the engineering equivalent of making a club sandwich) and a new precast concrete seawall was constructed.

Then came an even trickier part... reno mattresses and boulders placed in a metal grid similar to gabion baskets used to reinforce walls had to be lowered into place underwater, abutting the wall. They had to be laid deeper towards the mouth of the estuary because of a two-in-one slope.

Teams built a half-tonne lifting frame and constructed the mattresses onsite. Divers then used GPS sensors to determine the exact location for the mattresses and marked them with buoys.

A giant 85 tonne crane with a radius of 20m then hoisted the mattresses into place. Divers would make sure they aligned correctly and then unhooked the frame.

It was an exacting and demanding task but one that will provide ongoing protection for Beachville Road properties.

Despite the disruption, Gleave says residents have been very tolerant and joined the delivery team for a coffee each morning. ■



Above top: The rebuilt section of the seawall is 500m in length and runs beside the new Christchurch Coastal Pathway.

Above bottom: Sheet piling, excavation and dewatering was required to prepare the toe of the seawall for the placement of the submerged reno-mattresses.



An unexpected visitor...

During the initial phase of the project the Connells crew working on Beachville Road returned to site from lunch to find an unexpected visitor in the form of a White-flipped penguin, stuck in a 3.5m deep trench.

The penguin must have fallen into the manhole and walked along the 225mm pipe into the trench.

As the penguin was not wearing appropriate PPE the crew had to carefully remove it from site and place it in a ventilated container out of harm's way. The team contacted the Department of Conservation (DOC) to collect the lost penguin. The DOC ranger gave the bird a full bill of health and said it was in perfect condition to be released. Taylors Mistake was chosen as the release spot as White-flipped penguins are renowned surfing enthusiasts and make the area around Godley Head their breeding ground. ■



Did you know?

White-flipped penguins are a sub-species of the Little Blue Penguin and are only found in Canterbury, with about 3,750 breeding pairs left in the wild. The Beachville Team was happy to ensure this bird was returned safely to its environment. The penguin was very feisty and did its best to elude capture, which experts say should bode well for its future.



Above: Two layers of rock are placed along the exterior of the seawall to provide additional protection.





Employee spotlight

David Maucor



What is your role?

I am Environmental Sustainability Manager for Downer in New Zealand. My job is to help our teams understand how our work can impact the environment, our communities and the sustainability of our limited natural resources here in NZ. This involves developing systems and processes that are simple and fit for business.

How long have you been with Downer?

I started with Downer back in April 2012, when I moved to Christchurch to help with the rebuild after the earthquakes.

What are your qualifications and experience?

I studied in France and I am a Landscape and Horticulture Engineer. I followed that with a Masters in Sustainable Development in a Business school.

What do you enjoy most about your job?

I really enjoy educating and raising awareness about the environment and I love the challenge of taking complicated things, and making them simple. I am fortunate to work in a job which strongly aligns with my personal values and passion of environmental protection, education and people. That's what I love about my work!

What challenges do you face in your job?

We are going through a lot of change in the Health Safety and Environmental space. We have restructured our approach to Zero Harm, under the mantra of "operational ownership", which means giving the tools and knowledge to the people who do the work day in day out, and who are best placed to manage this risk, rather than have Zero Harm Advisors manage it for them. We are really excited about this change, but the reality is that changing culture takes time.

What do you enjoy doing when you're not at work?

Well, I have a beautiful one month old daughter, Adèle, who is basically the centre of my world at the moment and I guess that's going to keep me busy for a few years! I also love to visit and explore new places and there are lots of options here in NZ.

What's your favourite sport /hobby to play or watch?

Being French / Kiwi, it goes without saying that I have grown up with the family passion of rugby.

Two things you can't live without?

With the short nights I'm doing at the moment, I'd start with ... coffee! And we've discovered something called "my food bag" – a home delivery of four menus per week.

If I could have a dinner party and invite any four people, dead or alive, the guest list would be...

Neil Armstrong: to hear what it was like to see the earth from the moon. James Cook: to hear the stories of a man who was the first European to meet so many cultures, and describe NZ untouched by European hands. My daughter: so she can hear these stories too. ■

Downer teams up with Eliquo

Downer and Eliquo are proud to announce their collaboration to jointly pursue and deliver key strategic projects in the water industry in Australia and New Zealand.

The partnership is focused on the treatment and recovery of energy and valuable nutrients from wastewater and sewage sludge. Downer is a leader in the water and wastewater industry with extensive experience in designing, building, operating and maintaining water infrastructure for municipal and industrial water customers.

This collaboration will give us access to state of the art technologies that will substantially reduce our cost of service and increase the sustainability profile of our solutions.

The agreement was signed on the UNESCO world-heritage-listed Cockatoo Island in Sydney Harbour, witnessed by His Majesty Willem-Alexander King of The Netherlands and Her Majesty Máxima Queen of The Netherlands. The State visit celebrates the 400 year anniversary of bilateral trade between Australia and The Netherlands. ■



Pictured from left to right: Mike Basterfield (General Manager Water Projects Downer Utilities), Luc Kox (Australia & New Zealand Representative Eliquo Water & Energy/ Director Blue Horizon Solutions), Henk Kamp (Minister for Economic Affairs for The Netherlands), Her Majesty Máxima Queen of The Netherlands, His Majesty Willem-Alexander King of The Netherlands, Trevor Cohen (Executive Director Downer Utilities) and Anthony Johnston (Executive General Manager Strategy and Development Downer Utilities)



Downer and nbn employees lend a hand with members of the Armadale Gosnells Landcare Group, planting 2,000 sedges to restore the Canning River in Kelmscott.

Downer WA nbn **tree planting day with Landcare**

In Field Design Variations (IFDVs) were swapped for gumboots, wet jeans and a billabong when Downer and nbn participated in planting sedges along the Canning River in Kelmscott as part of a wetlands program run by the Armadale Gosnells Landcare Group.

The program, known as the Fancote Park Downstream project, aims to establish riparian vegetation communities and will create and improve habitat and river water quality for native birds, mammals, amphibians, fish, invertebrates, flora and fungi through installation of trees, shrubs, herbs, sedges and rushes and removal of weeds.

The weather gods were smiling down as 20 volunteers from Downer and nbn offered their time and services to restore the river by planting an impressive 2,000 sedges and rushes in a very efficient and speedy manner.

nbn's Deployment Manager, Dain Osborne, said his team found it a really rewarding and enjoyable way to spend the morning.

"We unanimously agree it was far more pleasurable playing in the mud and planting

native trees than playing with IFDVs! It was great to see so many members of the team willingly involved and enjoying themselves."

Downer has been working very closely with the City of Armadale while construction has been taking place in the area. We approached the local Council to offer our services and were introduced to Shane Hunter at the Armadale Gosnells Landcare Group.

Dower Stakeholder Manager Rebecca Lamb said it was gratifying to be able to give back to the community in which we operate.

"We have been constructing the nbn in the City of Armadale since March and it was a very rewarding experience to be able to improve the health of the land and waterways in the area. Planting 2,000 sedges was a fantastic effort!" she said.

"Shane Hunter from the Armadale Gosnells Landcare Group led the day and gave an introduction to the history of the Canning River and how our involvement will make a positive impact on the habitat and river quality.

There has been a huge amount of positive feedback from the team. They were all very happy to get their hands dirty and are looking forward to when they can do something similar again in the future."

The Armadale Gosnells Landcare Group is an independent, not-for-profit organisation that coordinates river restoration, bushland management and community action.

The group has been running since 1998 and consists of two staff members, community groups and many volunteers. ■



Downer, Oxfam and Trail Walkers at Oxfam's Port Villa HO



Vanuatu's Mt Yasur erupting

Downer Water lends a hand in Vanuatu for Oxfam's Water Challenge

On June 30, four representatives from Downer's New Zealand Water business, along with representatives from Oxfam NZ, boarded a flight headed to Port Villa in Vanuatu.

This trip was the culmination of a major fundraising effort by our people within the Downer Water business, as part of the Oxfam Water Challenge, which aims to provide drinking water to communities across Melanesia.

Every year corporate teams representing the water industry in NZ aim to raise money through volunteer work, donations and other fundraising initiatives for the Oxfam Water Challenge. Downer raised the most money with an impressive sum of \$8,000!

Rodger Dawson, South Island Operations Manager, Water, said: "Upon arriving in Port Villa it became very apparent just how devastating 2015's Cyclone Pam has been to the environment and the people of Vanuatu. Visually, we were reminded every day of the destruction it caused, with many public structures and roads still requiring repair."

Despite the hardships suffered, our Downer representatives were greeted warmly by the friendly locals on the islands. "One taxi driver we met even welcomed us into his village to see first-hand where he lived and how they were trying to rebuild their lives," said Dawson.

The Downer team was also lucky enough to have their own personal guide in Downer's

Craig Smart, who lives and works in Vanuatu for our Projects team.

Whilst on Tanna, the team took a tour of the island's active volcano Mt Yasur. "It is quite apparent from the outset when you reach Vanuatu that health and safety regulations have not reached many parts of the local communities and this was especially apparent on Tanna," Rodger said.

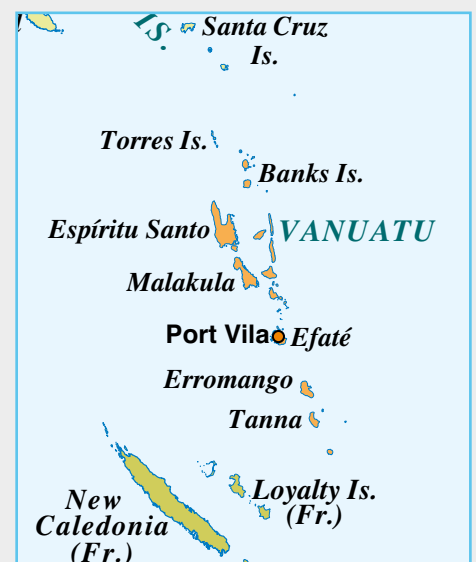
"On our 5th day we were blessed by the village chief before trekking to the top of the volcano. Now this has to be one of the craziest experiences you can ever have... With no steps, handrails or barriers at all, we stood right on the edge of an active volcano."

Perhaps the best part of the experience for the team was the fact that they were able to lend a hand on the spot in assessing damage to a village's water pump. "When some of the people from a local village on Tanna discovered we were water experts they asked us to help fix a broken pump, which supplies water to their whole village.

"We also trekked to a remote water source deep in the jungle, which services several villagers and offered up our expertise to help fix that problem...The dam they had

built showed first-hand how resourceful the people of Vanuatu are. The build involved ten tonnes of concrete carried into the site on foot by the young men of the village. Although, looking at the chief and his machete, I don't think they would have argued too much!"

Everyone who went on the trip came away with a new appreciation for the services we provide and the depth of knowledge we hold in the water business. ■





Downer becomes founding partner of Sustainability Victoria's TAKE2

In June 2016, Premier Daniel Andrews and Minister for Energy, Environment and Climate Change Lily D'Ambrosio announced Victoria's target of net zero greenhouse gas emissions by 2050. As part of this, he launched TAKE2, a system aimed at bringing government, business and the community together to achieve the collective goal.

TAKE2 is a way for all Victorians, including State and local government, businesses, community, educational organisations and individuals, to contribute to reaching Victoria's target of net zero emissions by 2050.

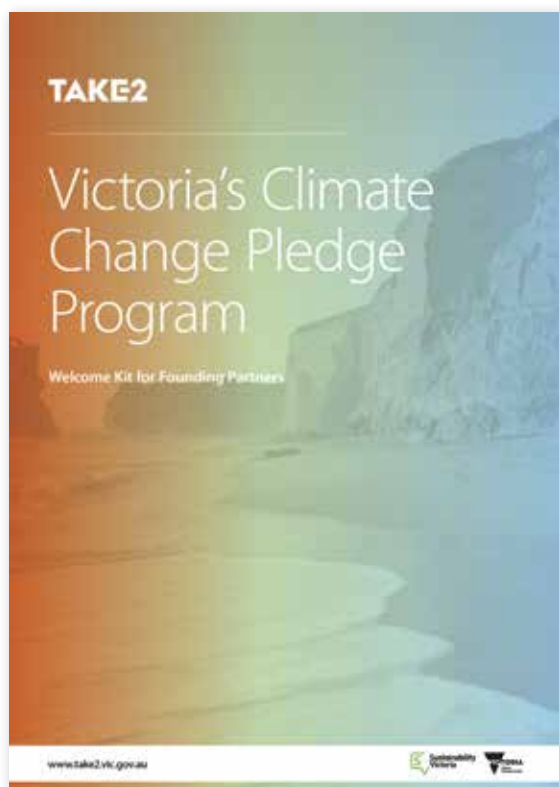
Downer is pleased to announce it has signed on as a Founding Partner to support this initiative. This means we have pledged our commitment to take action and contribute directly to achieving this target.

The CEO of Rail, Michael Miller, attended the Victorian TAKE2 Pledge Action Day in Melbourne on 8 September.

He joined other representatives from business, local government, education and community service sectors to collectively commit to climate change action and help Victoria reach net zero greenhouse gas emissions by 2050.

Scientists agree that greenhouse gases are increasing global temperatures. In Victoria this could mean a future with harsher fire seasons, fewer forests, more hot days, rising sea levels and coastal erosion. Since 1950 Victoria has already seen higher temperatures, less rainfall and a higher sea level.

Through TAKE2, Victorians can make a difference by pledging to do their part to take action on climate change for Victoria, our country and our planet. ■



Michael Miller, CEO Rail



Innovation key to achieving Zero Harm

Downer's Road Services business has decided to cease production of diesel-based cold mix nationally and is looking at the development of new, safer cold mix asphalt alternatives with a lower carbon footprint. Historically, diesel has been used as a fluxing agent in the production of cold mix asphalt.

The dosage of diesel allows for the viscosity of bitumen to be lowered enough to be workable at standard ambient temperatures, giving rise to the name 'cold mix asphalt'.

Diesel has a relatively low flash point (> 61.5°C), the temperature at which it can ignite. Depending on the type of asphalt plant, numerous manufacturing and safety controls are implemented to manage the safety risks with using diesel. Downer's National Research and Development Laboratory is developing alternative fluxing agents with several options being trialled in the business.

"Zero Harm to our people and our community is a priority and we believe that any injury is unacceptable and preventable," said Dante Cremasco, Executive General Manager, Roads Services.

"This requires strong leadership and relentless commitment and can be achieved by continuously focusing on managing risks that have the potential to cause harm, learning from our experiences, and positioning our culture so that not only

leadership teams, but also work teams on the ground, have a commitment and capability to manage Zero Harm.

"Putting that commitment to Zero Harm into practice, we have made a decision to stop production of diesel based cold mix nationally.

"The feedback from my team has been one of enthusiasm and rising to the challenge of developing a new superior, safer and sustainable alternative."

Our National Research and Development Laboratory is leading the development for alternative fluxing agents with several options being trialled in the business.

"We are developing an emulsion based approach that will perform better with a longer shelf life and will completely eliminate all risk of ignition or explosion, making it a true cold mix," said Dante. ■



Dante Cremasco, Executive General Manager, Roads Services



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