

Waste Oil Fuel Blends Deliver a Fuel Oil Cost Reduction for Bulk Explosive



Project Summary

WASTE OIL FUEL BLENDS DELIVER UP TO A 25% FUEL OIL COST REDUCTION FOR BULK EXPLOSIVES

Dyno Nobel have worked collaboratively with CREATENERGY^e to bring new technology to the processing of site-based waste oil and blending with diesel fuel oil for the onsite manufacture of bulk explosive products. The result has been a reduction in bulk explosive fuel oil cost of up to 25% for customers adopting this new technology.

The containerised solution to enable onsite waste oil processing and blending with diesel fuel oil provides a system that has a small footprint and full automation, enabling a 24/7 operation that can be easily integrated into a mine site waste oil recovery and storage system.

Dyno Nobel has undertaken extensive laboratory testing and blast trials in Eastern Australia to ensure that the use of a waste oil diesel fuel blend delivers, as a minimum, equivalent blasting results in ANFO and ANFO/emulsion blends. The results in emulsion based products are underpinned by the robust formulation of Dyno Nobel's TITAN[®] range of emulsions, allowing the inclusion of processed waste oil into the ANFO fuel blend.

Background

WASTE OIL DIESEL FUEL BLENDS IN ANFO

The use of waste oil diesel fuel blends in ANFO and ANFO/emulsion blends has been employed for many years to achieve:

Reductions in the cost of blasting

The direct replacement of up to 50% of the diesel in ANFO with waste oil delivers an immediate reduction in bulk explosives fuel oil costs to mining operations.

Improved environmental and social management

The consumption of waste oil onsite in explosives is strongly aligned with mine site environmental objectives, and the reduction of road transport for both waste oil removal and diesel delivery to site improves local social outcomes by reducing road

traffic and the potential for environmental damage due to spillage during transport and handling.

While the onsite processing of waste oil is not new technology, the rapid development of satellite communications and rugged processing platforms has enabled the most recent development of remote processing plants.

Robust emulsion technology

The robust formulation of Dyno Nobel's TITAN range of emulsions enables the partial replacement of fuel oil with processed waste oil without affecting performance for emulsion based products.

Advanced processing and blending technology

CREATENERGY has developed purpose-built proprietary equipment and processes to enable the safe, reliable and consistent processing of waste oil to a standard required to replace up to 50% of the diesel in blasting. The equipment is containerised and modular to facilitate ease of transport, installation and customisation to specific site needs.



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Project Goals

ONSITE PROCESSING TO REDUCE EXPLOSIVE COSTS WHILE MAINTAINING BLAST PERFORMANCE

The main aims were to:

1. Conduct waste oil processing onsite to achieve 'cradle to grave' use of waste oil;
2. Provide separate waste oil processing and blending/dispensing facilities;
3. Verify waste oil quality and compatibility with emulsion.
4. Determine blast characteristics of waste oil fuel blend ANFO based explosive products including ANFO, Heavy ANFO and gassed blends.

Technology Applied

RIGOROUS PROCEDURES FOR EQUIPMENT AND PRODUCT TESTING

Dyno Nobel has developed a specification that waste oil must meet in order to be used in the manufacture of ANFO and ANFO/emulsion blends, which includes items such as heavy metals, particulates, water content, glycol content, viscosity, density and flash point. Waste oil blends are tested under laboratory conditions to manufacture ANFO and ANFO/emulsion blends to ensure product stability and sleep times are not adversely affected.

Initial in-field product performance was measured via Velocity of Detonation (VoD) results when benchmarked against VoD for standard diesel fueled products. For 'in-field' product verification of VoD, ShotTrack™ was used. Extended monitoring of product use and MPU maintenance was implemented onsite to ensure there was no operational impact of converting to the waste oil fuel blend product.

Integrated 3G/4G remote HMI monitoring with a very stable and robust processing platform allows for rapid assessment of processed waste oil quality and quantity.

Value Added

CAPTURING COST SAVINGS AND ENHANCING 'RIGHT TO MINE' CREDENTIALS

By removing costs associated with the transport and disposal of waste oil off-site and reducing the diesel fuel oil transported to site, significant cost savings may be achieved. In a project carried out in 2016, a 25% reduction in the fuel cost for bulk explosive was achieved. Bulk explosive product performance was not impacted and no operational adjustments were required outside of the on-site installation of the processing and blending storage containers.

The 'Right to Mine' is strongly linked to consistently achieving environmental and social objectives, particularly for those mine sites in close proximity to landholders and townships. The use of mine-generated waste oil in blasting contributes to achieving these community objectives for mine sites.



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