

## CASE STUDY

# EXPLOSIVE AND COST REDUCTION USING FORTIS 4D™ ECLIPSE

PT KALTIM PRIMA COAL, INDONESIA

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THE INTRODUCTION OF FORTIS 4D™ ECLIPSE RBS 110 REALIZED:

**6.8%** REDUCTION IN EXPLOSIVE COST PER CUBIC METER (US\$BCM)

INCREASE DIGGER PERFORMANCE BY **11.2%** IN SOFT ROCK

AVERAGE POWDER FACTOR REDUCTION OF **14.6%**

**5%** INCREASE OF VALUE IN USE (VIU) SAVINGS IN 2023 PERIOD. ”

## SITE PROFILE

PT Kaltim Prima Coal (KPC) manages one of the world's largest open-pit coal mines located in Sangatta, East Kalimantan, Indonesia. In 2003, PT. Bumi Resources Tbk acquired KPC shares, increasing coal production capacity to 70 million tons annually. KPC manages a mining concession area covering 61,543 hectares, with support from over 3,909 KPC employees and 26,666 personnel from contractors and related companies. KPC uses through-seam-blasting (TSB) and conventional blasting methods. TSB can reduce the number of blasts by 20-30% and save up to 10% in explosives. KPC is committed to high-quality coal recovery targets, reducing drilling-blasting intensity, and improving productivity through digitalisation.

## THE SITUATION

As part of a continuous improvement and optimization process, the drill and blast department at KPC undertook a project aimed at reducing explosive consumption and costs while simultaneously maintaining the productivity of diggers. KPC is a highly modernized and mature mine that has already made considerable efforts to optimize drilling and blasting through conventional means. KPC's Drill and Blast Department is committed to implementing digital projects to increase the accuracy of explosive product delivery in blast holes. They aim to apply these products in a flexible manner while maintaining the fragmentation results and dig rate of diggers based on the rock characteristics. To pursue further improvements, the Drill and Blast Department at KPC approached Orica to explore new ideas that could drive gains.

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KPC has multiple seam with extreme rock properties difference. Performing 4D Bulk Explosive main optimization project through energy adjustment to the suitable rock properties in project phase 1 with RBS 110, already reduce powder factor that generate cost saving. Digging rate of the broken material also maintained according to KPI project.”

Muhammad Rifai – Sr. D&B Engineer  
KPC



Figure 1 - Location of KPC Mine operations



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## TECHNICAL SOLUTIONS

Orica's 4D™ bulk system offers an expanded range of explosive energy using conventional raw materials. For coal mines, 4D™ provides an economical alternative for ANFO in wet ground that does not require high-energy blasting.

Orica's 4D™ equipped Mobile Manufacturing Units (MMU™) are integrated with the LOADPlus™ control system and BlastIQ™ digital blast record system. These solutions provide comprehensive blast control, improved efficiency, and increased productivity.

Working together, KPC and Orica prepared a project charter to demonstrate 4D™. Key Performance indicators included powder factor, VOD, average in-hole density, drill and blast cost, and digger productivity.

From April to December 2023, Orica closely monitored the delivery of Fortis 4D™ Eclipse products to 454 blasts. The results were verified with KPC. The LOADPlus™ and integrated BlastIQ™ combination proved extremely effective, and the Loading Rules were successfully implemented.

Using 4D™, Orica and KPC implemented a more efficient solution for soft rock using an emulsion blend with a relative bulk strength (RBS) of 110. The Key Performance Indicators (KPIs) were the baseline dig rate, VOD, and no visible fumes. Fortis™ 4D™ Eclipse was applied to normal and TSB locations without impacting performance, while achieving KPC standard fragmentation (P60 target of 300mm and measured by manual photogrammetry) and the standard digging rate. This solution reduced the powder factor by 14.6%, as illustrated by Figure 3.

## THE RESULT

With the introduction of Fortis™ 4D™ Eclipse RBS 110 KPC realized the following ongoing benefits:

- A **6.8% reduction in explosive cost per cubic meter** (US\$/bcm).
- An **increase digger performance by 11.2% in soft rock**, as illustrated by Figure 5.
- An **average powder factor reduction of 14.6%**
- **Increased Value in Use (VIU) savings 5%** in 2023 period.

## ACKNOWLEDGEMENTS

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For more information on how 4D™ can support your operations, please contact your local Orica Representative or visit [orica.com/4D](https://orica.com/4D)



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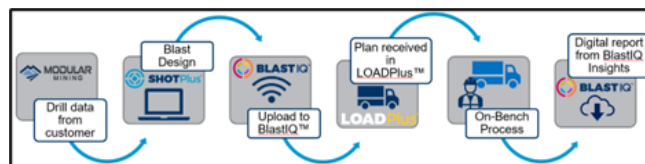


Figure 2 - Application process

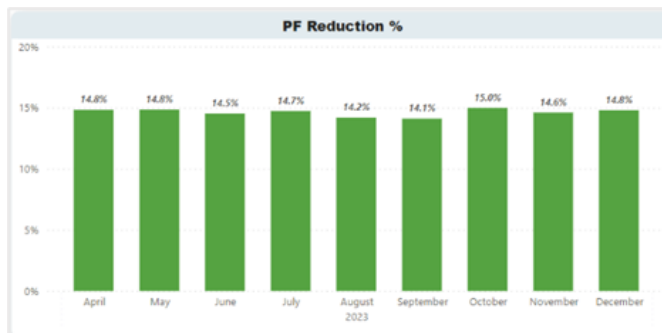


Figure 3 - Powder factor reduction

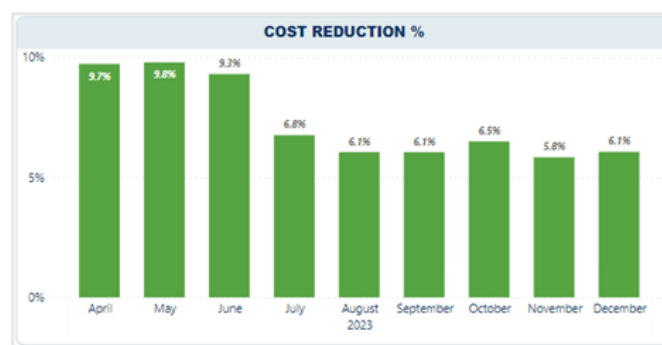


Figure 4 - Cost reduction

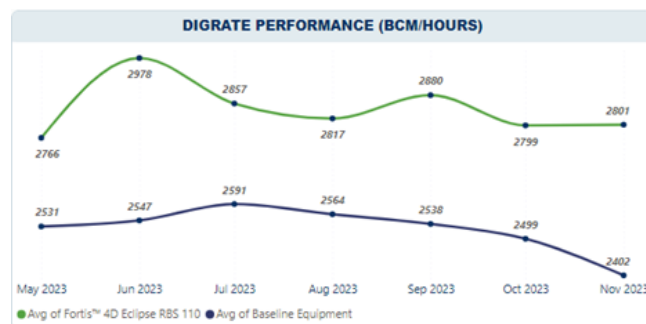


Figure 5 - Digrate reduction

