Sun Mining Services

Low Density WALA

Post blast fume resistant

Case study - July 2013

Introduction

WALA was proposed to be used at a coal mine in Bowen Basin QLD with the potential to replace Emulsion heavy ANFOs being used for blasting at the time of trial.

Brief Description

Heavy blends of WALA (50/50) were augered in 28m deep blast holes at IPCM. The overburden comprised of soft clay with little to no presence of moisture in the soil. Previous blasts conducted on adjacent bench using augered Emulsion heavy ANFO (40/60) generated level 3 post blast fume event. For the trial purpose, a section of bench was loaded with WALA 50/50 at 0.7 g/cc density and the remaining was loaded with Emulsion Heavy ANFO (40/60). The section loaded with Emulsion Heavy ANFO generated level 3 post blast fume event. The section loaded with WALA did not produce post blast fumes. WALA proved to be an ideal explosive for overburden blasting where post blast fuming is a concern.

Detail description

The general blasting practice at the mine was to use Heavy ANFO blends at the toe section of the holes (up to 10 meters) and top it up with ANFO. If the holes were wet, the general practice was to dewater the hole before any product was loaded. Blast holes were 270mm in diameter and ranging from 28-30 meters in depth with average depth of 28.5m. The rock strata of the blast area were mainly soft clay (top 20 meters) with the transition to sandstone. Average 1600 kg of Emulsion Heavy ANFO was loaded in blast holes. Only 1150 kg of WALA Heavy blend (50/50) was loaded in each hole.

The average cup density for blast holes loaded with WALA was 0.7 g/cc. the stem height for section loaded with WALA was 6 meters while the section loaded with Emulsion Heavy ANFO had 7 meters stem height. The average in-hole density for WALA was 0.91 g/cc.

The initial charge height was 15 m and the product rose by 7.0m in 60 minutes due to chemical gassing reaction. The holes where stemmed after the product achieved the desired stem height and slept for 3 days before the shot was fired.

There was no visible sign of post blast fume in the section loaded with WALA. The section loaded with Emulsion Heavy ANFO produced category 3 fume event.

Immediate observation of the blast result could not identify any difference in the blast performance between the two sections of the shot loaded with different products. Further analysis of the digging tables proved no difference in the dig rate between the areas loaded with WALA compared to areas loaded with Emulsion Heavy ANFO.

Powder factor for the area loaded with WALA was lowered by 29% comparing to the powder factor for the section loaded with Emulsion Heavy ANFO. Despite lower powder factor, there was no observable nor measureable difference in the blast performance between the two sections of the blast. WALA proved to be resilient to post blast fume generation where other conventional Emulsion Heavy Blends are not.

Conclusion

. In dry holes the powder factor was reduced by 29% compared to Emulsion Heavy ANFO with no measurable performance difference.

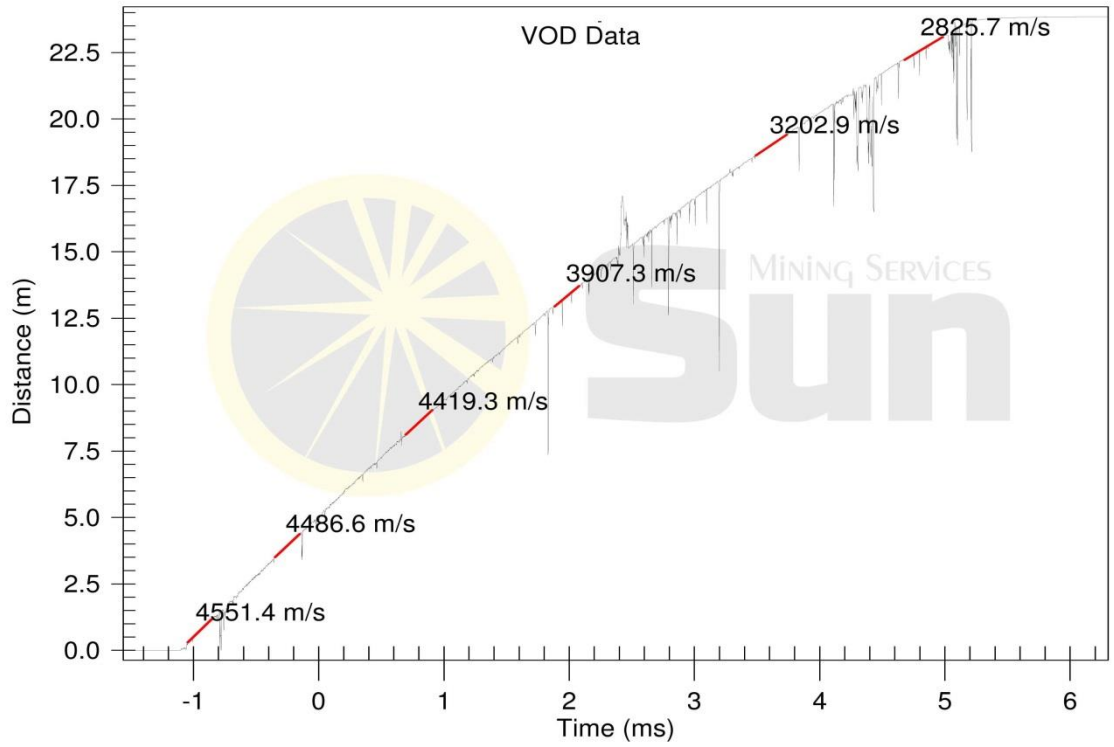
. Soft clay strata in most overburden benches are notorious to post blast fuming events. Lack of confinement and the exchange of Fuel

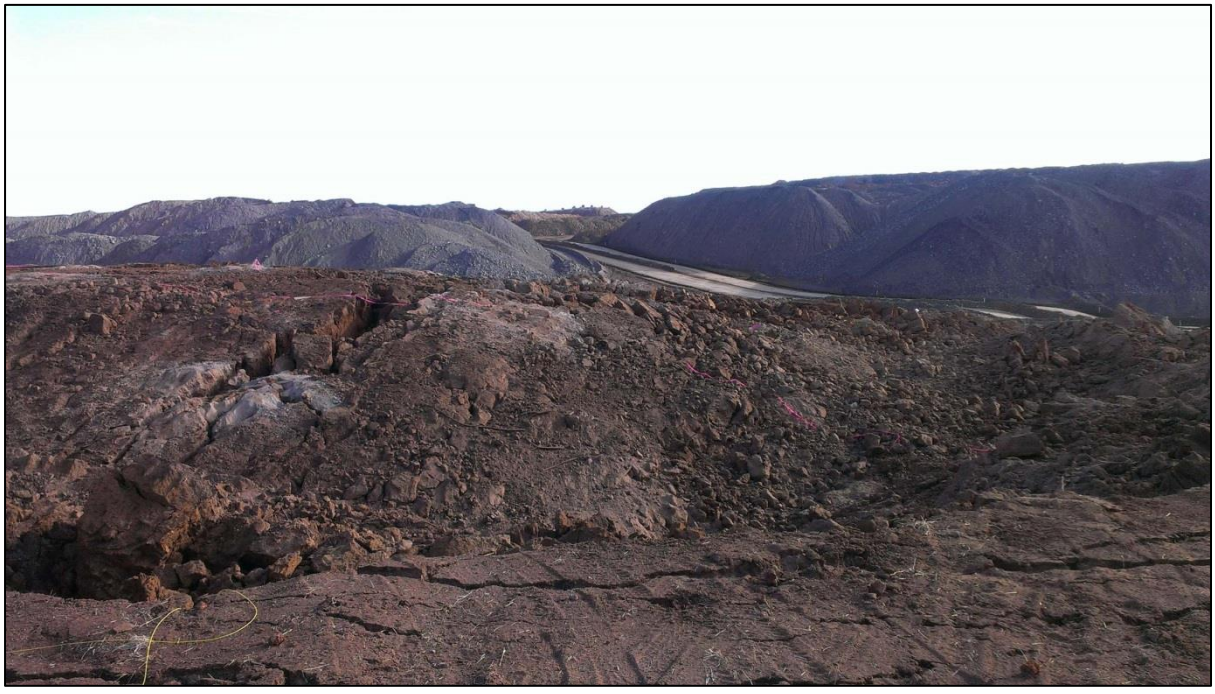
between the ANFO and the surrounding clay contribute to post blast fuming. WALA does not use Diesel in its composition and does not exchange fuel with surrounding clay. Low density WALA does not require confinement for continuous detonation.

. WALA proved to be the ideal explosive choice for the mine.

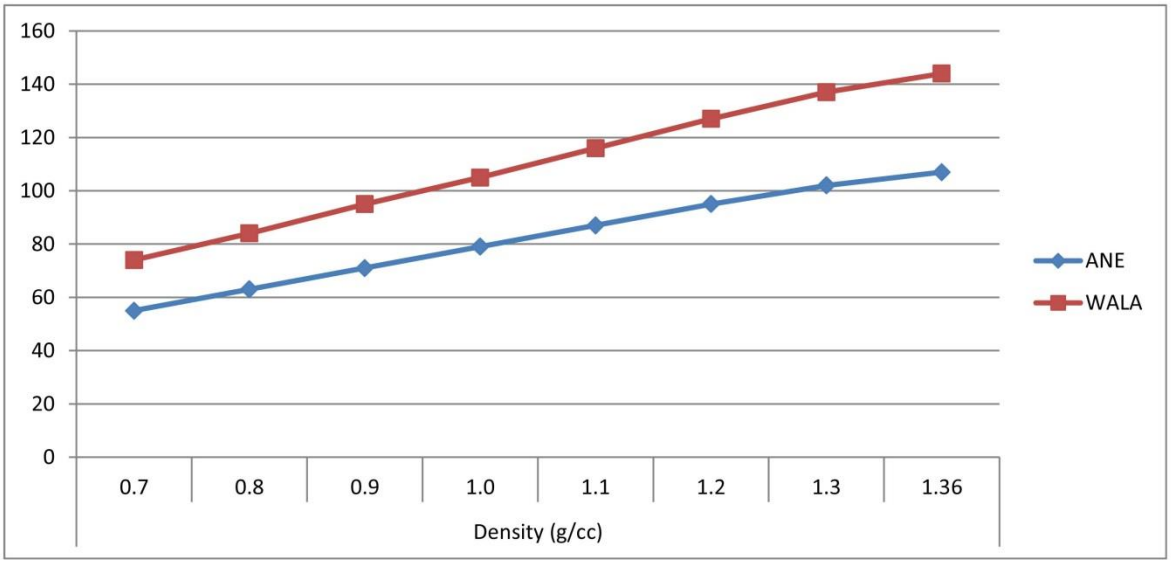
. Lower VOD of WALA delivered better blasting performance in comparison with higher VOD Emulsion blends.

Trial George, Wala Mine, 28m deep, 6m stemming, cup density 0.7 g/cc,
23 July 2013, xxxxxxxxx Coal Mine



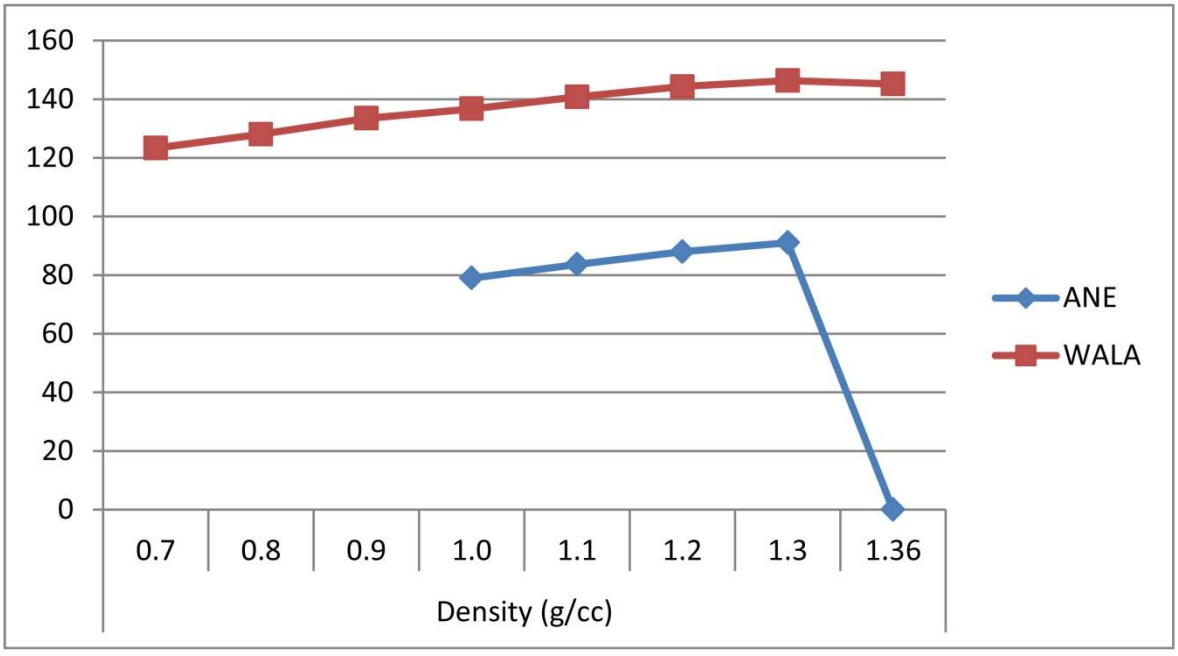


Bulk Strength comparison chart



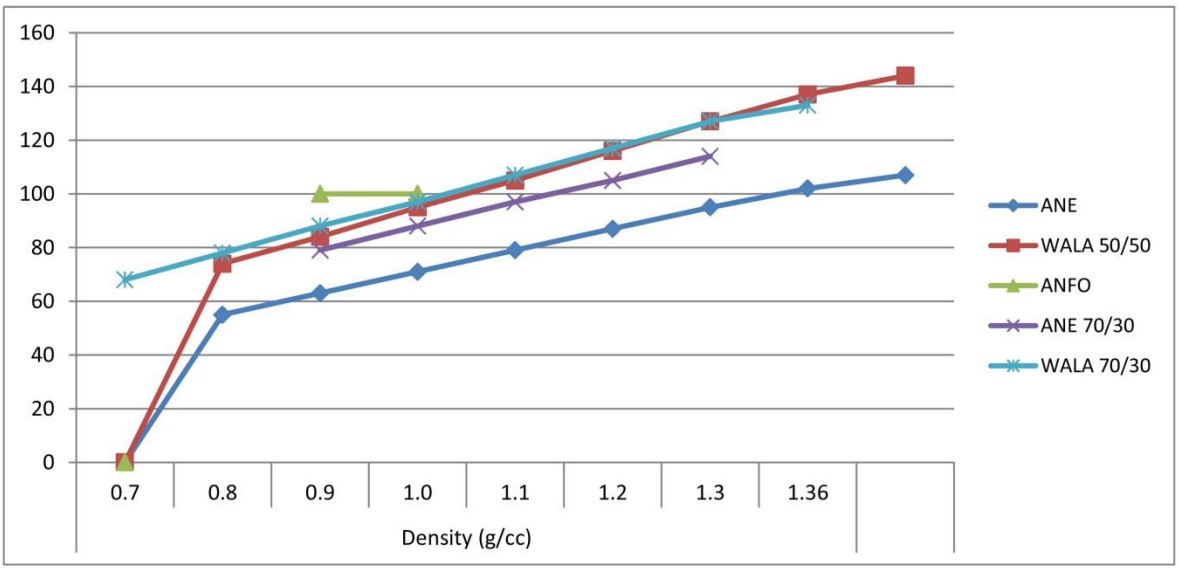
- Standard single salt ANE formulation has been used for energy calculation. the water content has been assumed to be 17.58%.
- IPCM WALA formulation has been used for the calculation of energy

Effective bulk Strength comparison chart



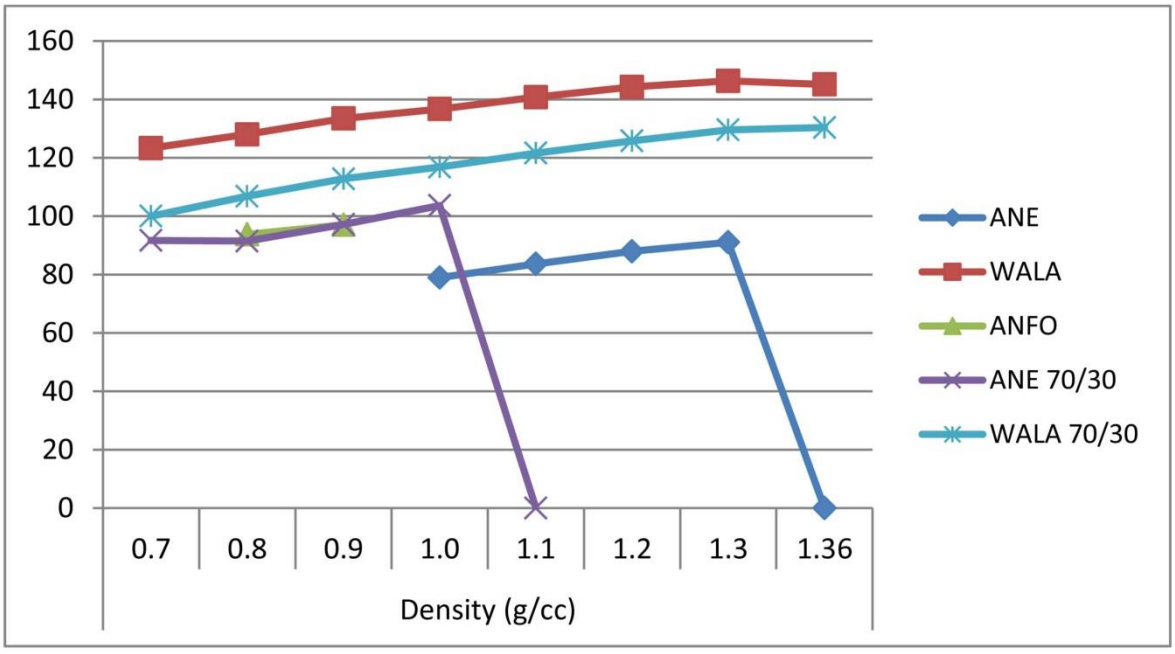
- Standard single salt ANE formulation has been used for energy calculation. the water content has been assumed to be 17.58%.
- IPCM WALA formulation has been used for the calculation of energy

Bulk Strength comparison chart



- Standard single salt ANE formulation has been used for energy calculation. the water content has been assumed to be 17.58%.
- IPCM WALA formulation (water content 10.8%)
- ANFO density has been assumed to be 0.82 g/cc

Effective bulk Strength comparison chart



- Standard single salt ANE formulation has been used for energy calculation. the water content has been assumed to be 17.58%.
- IPCM WALA formulation (water content 10.8%)
- ANFO density has been assumed to be 0.82 g/cc