

Sun Mining Services

Light Density WALA



Case study - July 2014

Introduction

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

Detail description

The general blasting practice at the mine was to use ANFO in dry holes and Emulsion blends (70/30 pumped) in wet holes. Blast holes were 229mm in diameter and ranging from 15-18 meters deep with average depth of 16.5m. The rock strata of the blast area were mainly hard shale. The average powder factor in benches loaded with ANFO was 0.22 while in the wet area the powder factor was as high as 0.27.

365 kg of ANFO was being loaded into 16.0m deep holes with 5.5 m stemming and an average in-hole density of 0.84 g/cc. The pumped emulsion had an average in-hole density of 1.26 g/cc.

On average 280 kg of WALA was loaded per hole with an in-hole density of 0.6 g/cc to substitute ANFO. The stem height achieved was 5.0 with a loaded powder factor was 0.15. About 200 holes were loaded with WALA and slept for 4 days before being fired. The area loaded with WALA expressed and lifted higher than the areas loaded with ANFO and pumped emulsion. The average VOD for WALA was 3448 m/s and no fuming was observed. There was no measurable difference in digging rate between the WALA loaded section and the area loaded with ANFO and pumped emulsion blends.

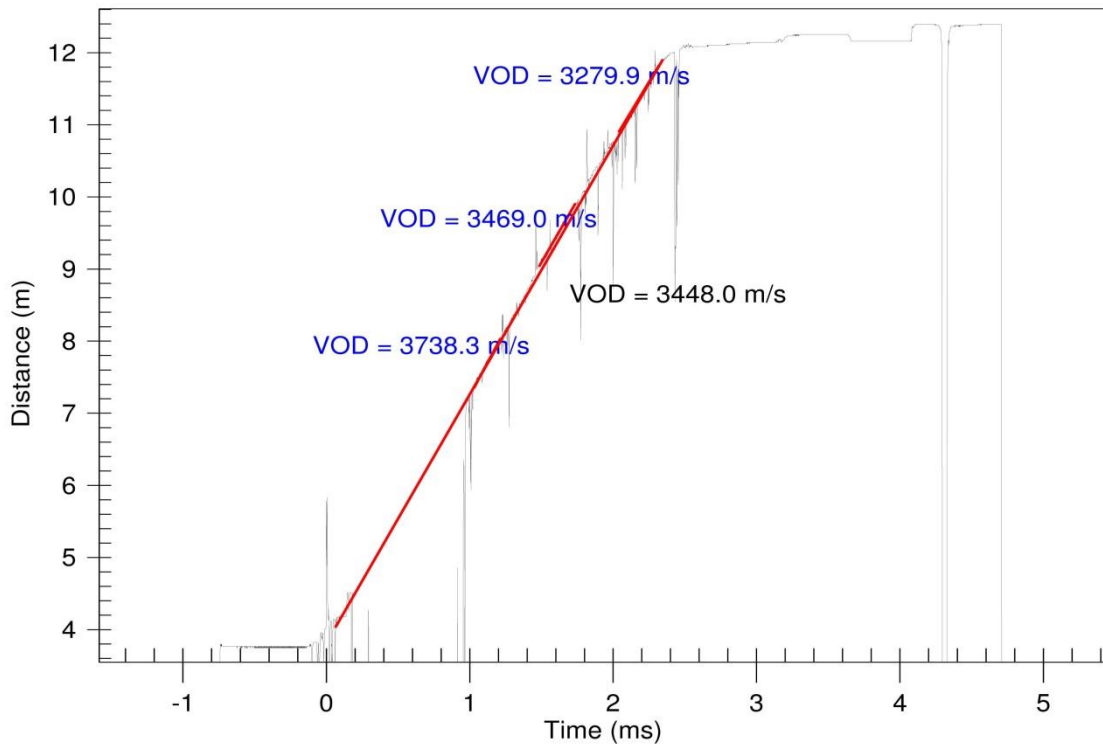
In a separate blast on the same mine site, an area was dedicated to be loaded with pumped WALA (70/30 blend) to compare the performance against Emulsion blends.

Emulsion blends (70/30) were being pumped at average in-hole density of 1.26 g/cc in wet holes having up to 8.0 m of water. 630 kg of Emulsion blends were pumped in each hole to achieve 6.0 stemming height. The average blast hole depth was 18.0 meters. In comparison only 440 kg of WALA (70/30) was pump in similar holes to achieve the same stemming height. The initial cup density of WALA was 1.15 g/cc. The final cup density after 60 minutes was 0.75 g/cc and the average in-hole density for WALA was 0.89 g/cc. WALA did not float when the density went below 1.0 g/cc due to exclusive NanoBlok characteristics and maintained its integrity during the 3 days sleeping time. The shot was fired after 3 days and the area loaded with WALA lifted 1.0 m higher than the rest of the shot. No post blast fuming was observed in the area loaded with WALA.

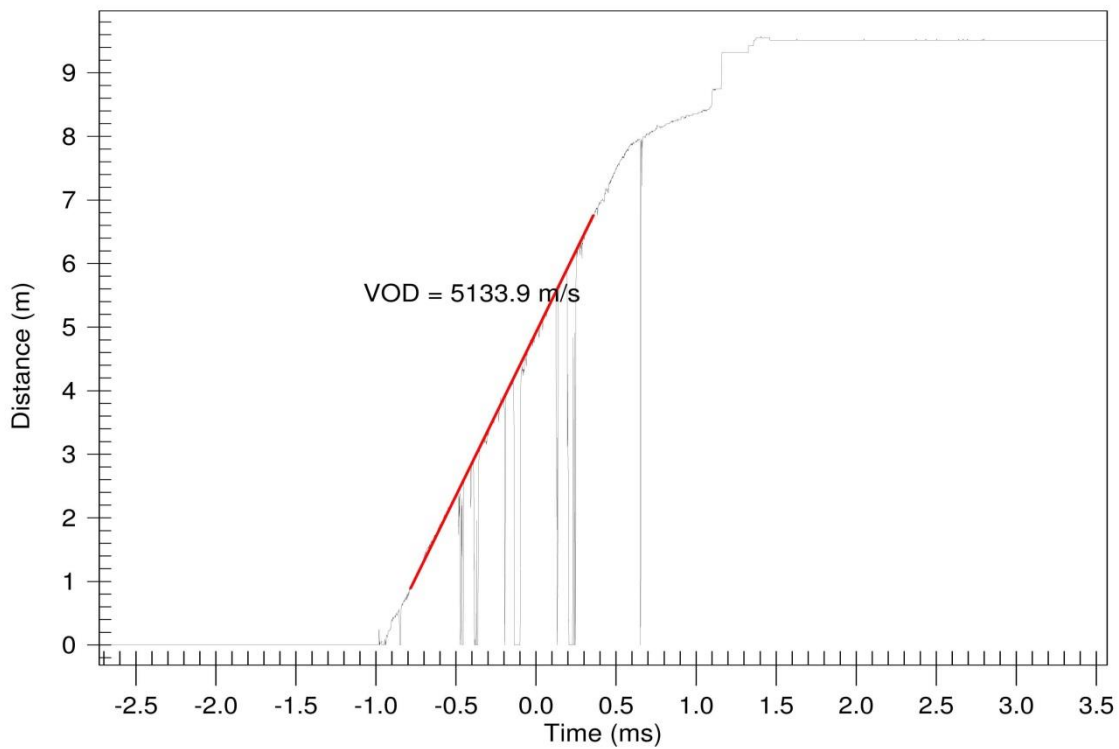
Conclusion

- . In dry holes the powder factor was reduced by 23% compared to ANFO with no measurable performance difference.
- . In wet holes the powder factor was reduced by 31% compared to Emulsion blends with improved blast results.
- . 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.

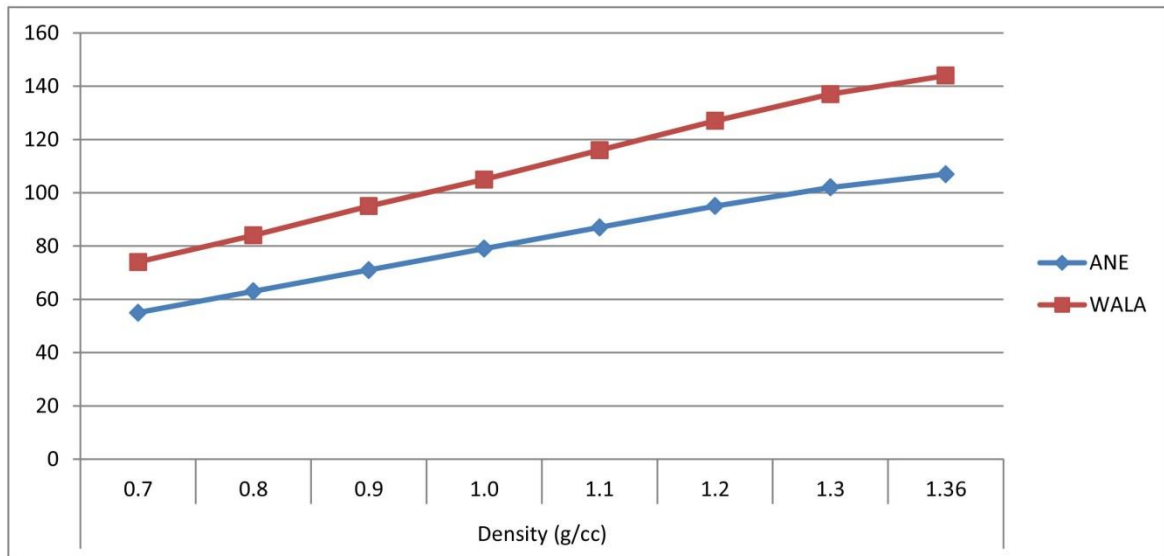
LEIGH CREEK COAL MINE - WALA blend TRIAL, cup density 0.5 g/cc, 26 July 2014
 VOD Data



Emulsion 70/30 blend - pumped - average density 1.26 g/cc

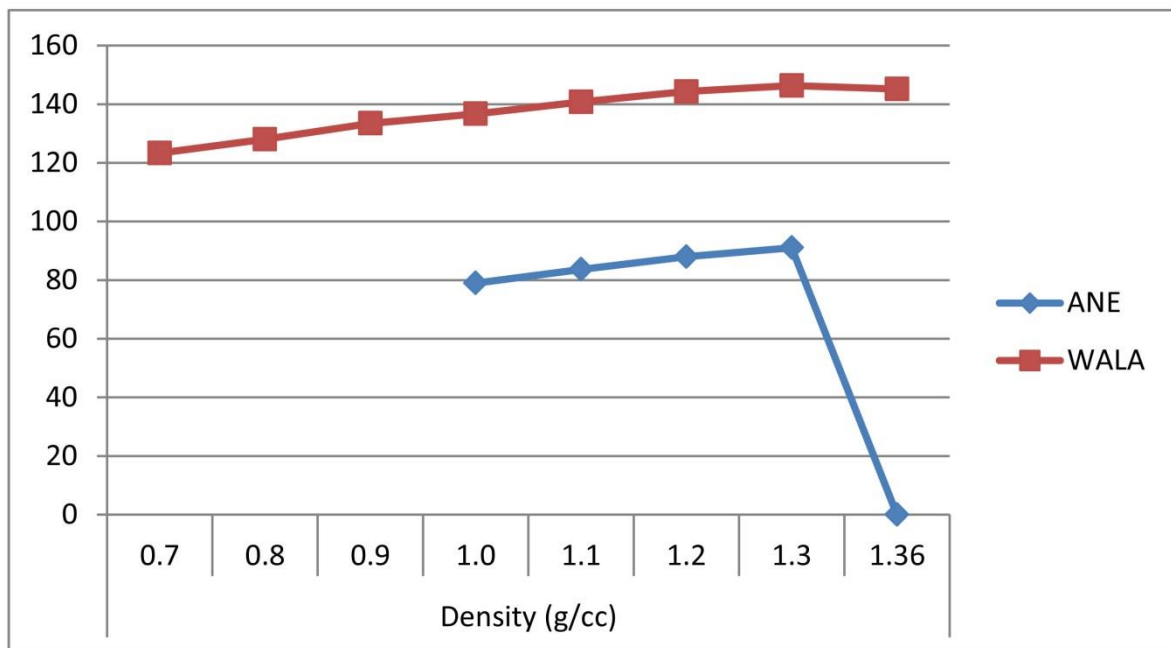


Bulk Strength comparison chart



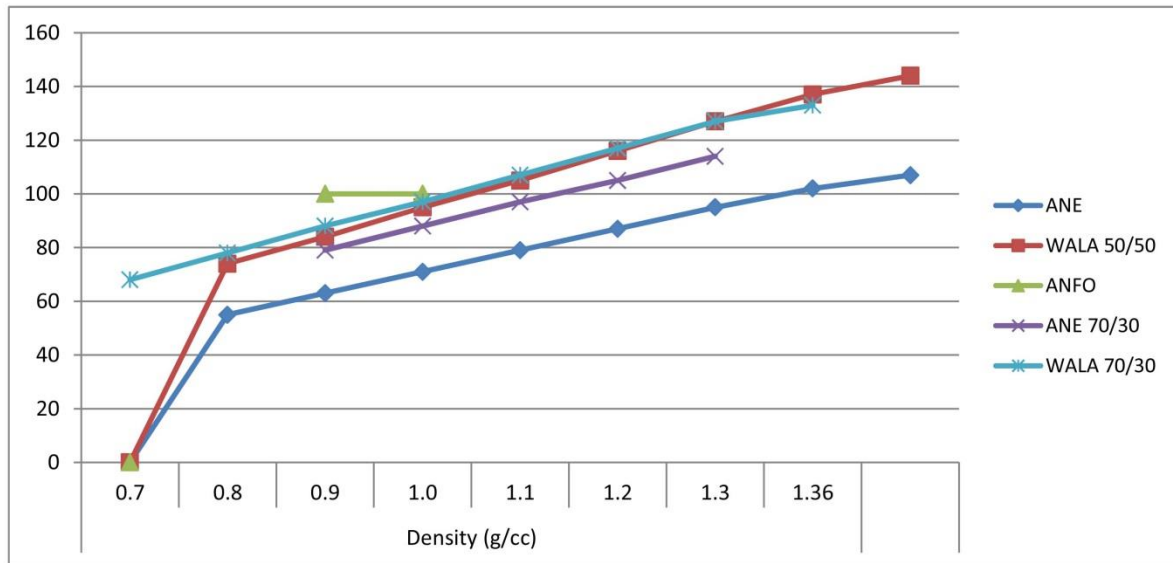
- Standard single salt ANE formulation has been used for energy calculation. the water content has been assumed to be 17.58%.
 - IPCM WALA formulation has been used for the calculation of energy

Effective bulk Strength comparison chart



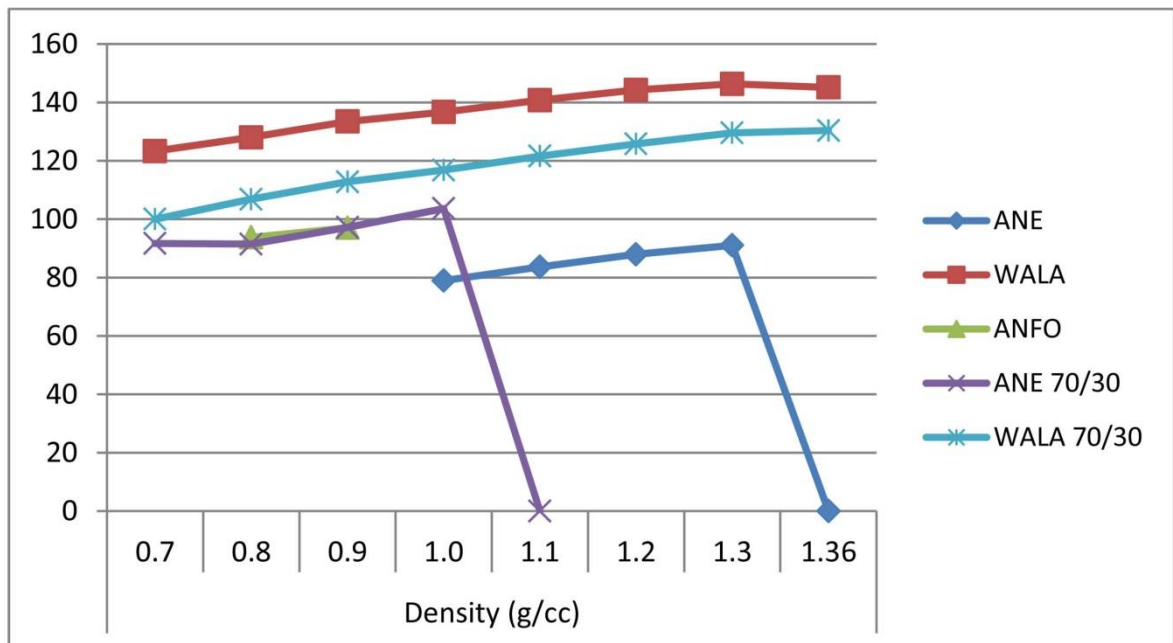
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Bulk Strength comparison chart



- 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%)
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