

# INCREASED PRODUCTIVITY THROUGH IMPROVED BLAST DESIGN

## PROJECT SUMMARY

### DYNOCONSULT TAKES A HOLISTIC APPROACH TO MILLING PROCESSES

Instead of looking at each sub process as a separate cost centre, DynoConsult, the consulting arm of Dyno Nobel, looks at the whole operation and provides solutions to improve overall productivity.

Improved blasting practices and milling solutions have shown potential to boost grinding circuit efficiency at the Porgera Joint Venture (PJV) gold mine in the Papuan Highlands.

Approximately 15% increase in Sag mill throughput was recognized during the field trials of Mine-to-Mill optimization project lead by DynoConsult.



## BACKGROUND

### THE PORGERA GOLD MINE REQUESTS HELP

This project evolved in 2000 - at a time of depressed gold prices, rising costs and significant power constraints to the mine.

DynoConsult was contracted to advise engineers at the Porgera Joint Venture (PJV) gold mine in the Highlands of Papua New Guinea.

#### Porgera Gold Mine

- Open-cut mining started in 1988
- 18-year mine life
- PJV mines over 210,000 tonnes per day
- Produces over of 700,000 ounces of gold per year

## PROJECT GOALS

### IMPROVED BLASTING PRACTICES AND MILLING SOLUTIONS LEAD TO A GREATER OPPORTUNITY FOR PROFIT

PJV recognized that the optimization of drill and blast results could contribute significantly to the mine's profitability. DynoConsult specialists were located on-site from project planning to completion of test work. The project team consisted of members from DynoConsult, PJV and alliance partners the JKMRRC.

Close to a 15% increase in Sag mill throughput was recognized during the field trials of the Mine-to-Mill optimization project led by the DynoConsult team. This resulted in a greater opportunity for profit through improved blasting practices and milling solutions that revealed the potential to boost grinding circuit efficiency

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## TECHNOLOGY APPLIED

### **DYNO NOBEL'S ONGOING RELATIONSHIP WITH PJV HELPS TO ENSURE THE GAINS ACHIEVED DURING THE PROJECT ARE IMPLEMENTED SUCCESSFULLY**

The initial benchmark blast trials in mid 2000, and simulation studies explored the impact of blasting alternatives, changing blast patterns and explosive types. Subsequent trial blasts resulted in ROM fragmentation being clearly finer at the primary crusher. Compared to the benchmark trial, this resulted in approximately 15% more throughput for the test case; with all other conditions, including rock strength, being similar.

The project team have developed and implemented a system to maintain the quality of the new designs and track the benefits of mine-to-mill blast optimization. DynoConsult also provides on-going blast optimization training for the blast crew and PJV engineers. More recently, PJV and Dyno Consultants are also concentrating efforts on minimizing the potential for ore dilution and wall damage resulting from the use of higher powder factors as part of the mine-to-mill project work.

## VALUE ADDED

### **THE PJV PROJECT HAS SIGNIFICANT IMPLICATIONS FOR THE ENTIRE MINING INDUSTRY**

According to Mark Fisher - Mine Superintendent PJV: "What I am excited about is the fact that not only is there potential to improve mill throughput, but we are starting to see a better focus on how we do out drilling in the pit and how we design our blasting."

Improvements in throughput equal improvement in profit. Mine-to-mill optimization projects are viable in many open-pit operations and the PJV project has significant implications for the entire mining industry.