The Situation

The Darlot Mine is located approximately 680 km north east of Perth, Western Australia. Like the other two Barrick mines in the Yilgarn District, it is a fly-in, fly-out operation. Underground mine operations began in 1996 following completion of surface mining.

Mining Issues

Orica Mining Services were asked to provide the timing design and i-kon™ blasting service at Darlot Gold Mine for Blast BR 997. Barrick provided the blast hole design and co-ordinates data which was exported into Orica's SHOTPlus-i™ underground software. Here various blast design timing options were analysed with respect to continuous improvement. This blast was fired faster than the previous blasts. Recently blasts at other mines have been fired using faster timings producing smaller fragmentation size and increased production rates. Fast timing was used in blast BR 997.

Technical Solutions

The blast was broken up into two sections the first the slot followed by the main blast. The offset was 160 ms between the last slot hole firing and the first main ring hole firing. The slot fired into a rise at the eastern end, which was virtually full width. The main shot was then fired south back into the slot. The main shot had a large void below except the last three rings that ramped up along an ore/waste contact. The Slot was fired with 10 ms between holes and 30 ms running back in the standard configuration with the centre hole firing first. This provided a burden relief of 22.6 and 20.4 ms/ m. After the blast looking at the rise from the top drive the dirt was to be piled up at the rise end of the stope and well fragmented. The slot was modeled in independently using SHOTPlus-i™ open cut to provide the schematics provided below.

Results

After the blast the mill holes and top of stope were inspected. The back or north end of the stope clearly demonstrated half barrels. A clean wall was very important in this stope as it meant the reduction of low-grade material being mixed with the ore thus reducing dilution. The fragmentation of the dirt inspected in the mill holes was extremely fine and consistent.
The photo below shows fragmentation at the draw points.

Gary Goh (Technical Services Supt. - Darlot Gold Mine)

Operations Overview

Darlot uses i-kon™ in conjunction with emulsion for mass blast applications as well as multi directional blasts. In this example we were carrying out a mass blast in one of our bulk stope where we had to fire out a slot in conjunction with multiple main rings. In total the blast yielded approximately 40Kt of ore. Conventional detonators were not used in this blast because of its scatter and the requirement for better fragmentation and controlled directional firing. As from the picture above the blast was a success and it achieved a very good result in blast fragmentation.

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