

- (c) Lower escalation costs if the contractor progresses more slowly than his programme.
- (d) Inducement to the contractor to adhere to his programme within the stated limits.

Signing Authorities

Approval authorities are delegated by the management of Iscor. At present, all contracts and orders above the value of 1 million rands must be approved by the Board of Directors. Below that amount, approval authority is delegated down the line.

Approval authorities as delegated by the management may approve contingent modifications to specific orders or contracts up to a *cumulative summation* equal to the level of authority set by the management. Where

the *cumulative summation* of such modifications exceeds the level set for a specific approval authority, the modification in question must be referred to the higher approval authority authorized to approve the applicable *cumulative summation* of modifications. Details of the original order or contract amount and the total value of all the previous modifications to the same order or contract must be submitted to the approval authority concerned whenever new modifications require his approval.

Conclusion

The opportunity afforded the staff in controlling a project like the Grootegeluk Coal Mine is not an everyday occurrence, and they have learnt much from the day-to-day controls and alterations that cannot be gleaned from textbooks or manuals.

Discussion: Reichert cones for Witwatersrand gold ores*

by G. F. BALDERSON †

In response to the written contribution made by G. J. C. Young to the above paper, I would like to make the following points.

Paragraph 1

The build-up of oxidized coatings on cone surfaces has not been a problem in other applications similar to that at President Steyn. The following companies have commented.

Peko Mines (Warrego) — Gold Ore

The cone feed contains 7 to 8 per cent sulphur. The cones are hosed down if a closure of 2 to 3 days is imminent, because, if they are left unclean, the sulphides oxidize and stick to the surface of the cone. This method is very effective. No problems are experienced during normal operation.

Renison Tin — Tin Ore

The cone feed contains 2 to 4 per cent sulphur. No problems are experienced, and no precautions are taken.

Ardlethan Tin — Tin Ore

The cone feed contains 1 to 2 per cent sulphur. No problems are experienced, and no precautions are taken.

Western Mining Corp. (Kambalda) — Gold Ore

The rougher cone feed contains 8 per cent sulphur, and the cleaner cone feed 25 to 30 per cent sulphur. No oxidized coatings are evident, and no precautions are taken. The cones are cleaned on maintenance days to remove the copper wire that finds its way into the cones.

To my knowledge none of the above add lime in the

grinding circuit.

The build-up on the undersides of cone decks is evidence of poor cone operation, with the cones running for long periods at low pulp density. Poor metallurgical performance is evidence of the same condition since pilot-plant operations under controlled conditions produced good results.

The cones were treated with concentrated acid without the manufacturer's knowledge, and some components were damaged.

Paragraphs 2 and 3

Enlarged hatchways were provided to improve the ease of maintenance of slots in double-cone inserts. The splash from the larger covers is due to low pulp density.

Paragraph 4

The design parameters called for the capability to handle fluctuations of 10 per cent in the tonnage treated. In operation, the fluctuations were often of the order of minus 30 to minus 70 per cent and low-density operation resulted as a middlings recycle could not be expected to compensate for such large reductions.

In hindsight, the preferred installation would have been individual circuits on each mill to overcome tonnage fluctuations in the combined circuit.

Automatically operated cone inserts are installed in many operations elsewhere, and have given satisfactory service under differing operating conditions.

The blistering of the cone decks at President Steyn was exacerbated by acid washing. The specifications of materials used in the construction of cone decks have subsequently been revised to overcome blistering.

The test results have indicated that a cone circuit operated within normally accepted operating parameters should produce metallurgical results on Witwatersrand ores greatly superior to those obtained from Johnson drums, and similar to those detailed elsewhere on gold ores.

* Paper by R. Guest, with a contribution by G. J. C. Young, published in *J. S. Afr. Inst. Min. Metall.*, vol. 82, no. 8, Aug. 1982, pp.

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