

COLLOQUIUM ON SHAFT SINKING

The 'Star' published a report on the colloquium on 15th November, 1972. As this will be of interest to members, it is re-printed by kind permission of the 'Star'.

Mac Thain

The super-Mines of the future envisaged by Mr Jeff Goode, president of the Chamber of Mines, in his Gold Symposium address in London, will be entirely different from those producing today — not merely amalgamations of properties into bigger units.

Existing geological knowledge points to them being extremely deep, exploiting reefs with a gold content well below the pay limits of the present time.

This will call for the handling and treatment of tonnages of 500 000 tons a month or more and lease areas large enough to support operations at this rate for half a century.

Some of the thinking towards the achievement of super mining emerged today at a colloquium of shaft-sinking organised by the South African Institute of Mining and Metallurgy.

SINGLE SHAFT

General opinion is that such a giant could best be served by a single shaft system going down to well below the present estimated depth limit of 3 650 m from surface up which rock could be hoisted in one lift.

This would be possible by the use of Blair hoists, invented and developed in this country.

Should there be no radical change in present techniques, the diameter

of the main component would have to be around 14 m in diameter and the upcast ventilation one over 8 m based on calculations by G. W. Holl and H. G. Fairon of Mining and Engineering and Technical Services.

Although initial costs would be high, this would prove far more economic in the long run than one or two smaller ones.

HAULAGES

Such an ultra-deep shaft system will call for radical changes in underground layouts, Mr H. M. Wells of the Department of Mining Engineering at the University of the Witwatersrand told the colloquium.

The whole system would have to be treated as an integrated whole from stope to mill and designed primarily as a means of moving traffic efficiently from a dispersed source to concentrated destinations (rock) and from concentrated sources to dispersed destinations (men and materials).

Mr Wells visualises a number of footwall haulages extending from the shaft to serve self-contained production manager's sections. Main haulages would be perfectly graded towards the shaft and of a size to accommodate large equipment travelling at high speed.

Properly planned, a single haulage could handle over 100 000 tons of rock a month over a distance of 5 km.

Much progress has been made with knowledge of rock mechanics as a result of research undertaken by the mining industry in recent years. By the time that Super-Mines get under way, rockbursts could well

be very much a thing of the past.

Further advances can be expected in working conditions underground. Holding out considerable promise is each worker carrying his own microclimate around with him by means of refrigerated clothing.

Within the next decade no explosives would be exploded underground. Tunnels would be driven by boring machines, which are already being used for raises, haulages and shafts up to 5 m in diameter and being developed for even bigger ones.

CONTINUOUS

In the stopes, rockcutters, now not far off the production stage, can be expected to slice the ore out.

Apart from all the other advantages flowing from non-explosive rock-breaking, it would be possible to mine continuously around the cleok.

Holding out great promise is a centrifugal mill now under test at the Chamber of Mines research laboratories.

Compact in size with a fast throughput, it offers the possibility of reducing ore to the fineness called for by reduction plants at each production section.

Mechanisation of all operations will be the order of the day wherever possible, with the resultant shift from a labour-intensive to a capital-intensive structure.

In consequence the underground labour force will consist virtually entirely of technicians and operatives employed on a permanent basis.

Initial capital costs will be high, but with outputs of the magnitude that mining engineers envisage, returns will be proportionately great.