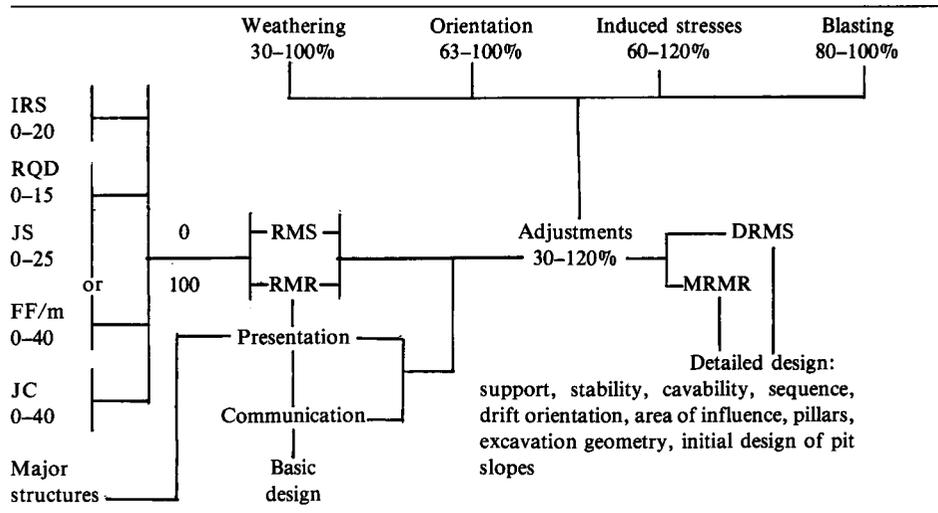


TABLE XV
OVERVIEW OF THE MRMR SYSTEM



Technology development Innovation in South African equipment*

The synergy of South African research and manufacturing has resulted in several highly innovative metallurgical devices in recent years.

Carbon-concentration Meter

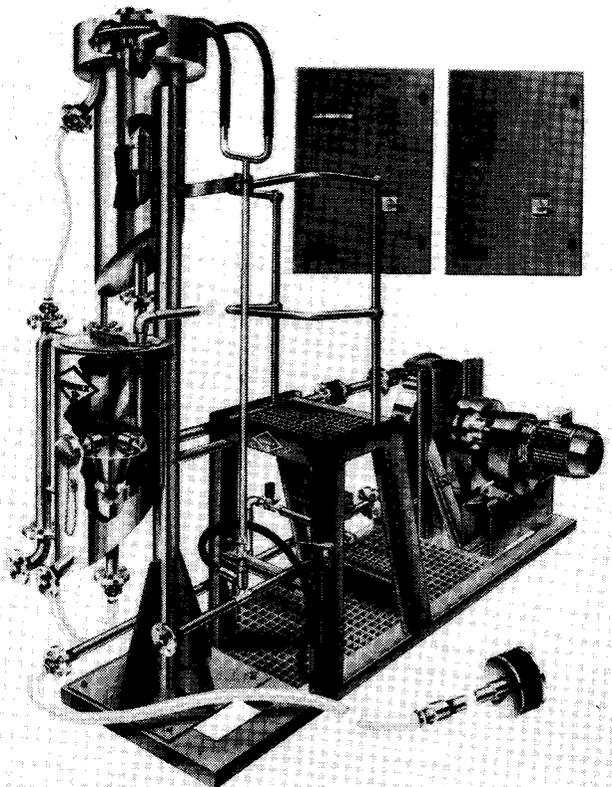
The latest of these, the ultrasound-based carbon-concentration meter, was developed by Mintek with original sponsorship by the Chamber of Mines Research Organization, and is now being manufactured and marketed worldwide by Debex Electronics in Johannesburg.

Designed to achieve precise on-line measurement of critical carbon-concentration levels during the gold-recovery process, the novel instrument makes possible significant improvements and cost savings in metallurgical gold-recovery plants, and has excited international interest as a new and valuable metallurgical tool.

During the carbon-in-pulp gold-recovery process, carbon granules are added to the gold slurry, which follows the initial cyanide-leaching stage. The gold-cyanide complex within the slurry is deposited onto the carbon granules, and the carbon-concentration level is therefore critically important for optimum gold recovery.

Before the development of the new instrument, there was no way of continuously and accurately assessing this level through the six to eight absorption stages involved, since carbon-in-pulp is pumped from one tank to another in counter flow to the flow of pulp or slurry.

Günter Sommer, the Director of the Measurement and Control Division at Mintek, says that the carbon-concentration meter is an international first and was developed



The Debmeter system. On the left, cutaway views of the de-aerator tank and ultrasonic transducer array system. The slurry presentation system is on the right of the drawing.

* Released by Group Public Affairs, De Beers Industrial Diamonds, P.O. Box 916, Johannesburg 2000.

in South Africa after four years of in-depth research.

'The carbon-concentration meter has a measurement accuracy of approximately 2 ml per litre in a process in which the acceptable concentration has been regarded up to now as 60 ml per litre. Clearly, the accuracy that is now possible must have a significant impact on efficiency and plant economics', he comments.

The meters are now in production at Debex, where managing director Dennis Haywood expects to have instruments on the market at around R30 000 a unit by the end of the year.

Portable Gold Analyser

Another very advanced instrument designed for the gold-mining industry, the portable gold analyser, has also been researched and developed in this country, in a difficult project now nearing completion by the Chamber of Mines research arm.

The object is to provide an easily operated, hand-held, hi-tech yet robust instrument that can carry out gold assays at the reef face underground, thus doing away with the delays associated with geological sampling and subsequent analysis on surface.

Debex has been selected to bring this sophisticated instrument to production and then to market the device. The company has already built several pre-production prototypes, and word in the market place has it that the long-awaited instrument will be available in the near future.

Particle-size Monitor

Mintek was again at the forefront of international metallurgy with research and development into the on-stream particle-size monitor (PSM), with Debex the chosen manufacturer for this instrument, which is yet another South African 'first'.

Branded the 'Debmeter' by Debex, the on-line PSM is now in production environments around the country and performing well.

The Debmeter's function is to monitor particle-size distributions in milling circuits, where mined ore is reduced to slurry for subsequent treatment.

Optimum plant profitability is often dependent on continuous and reliable control within narrow limits of the size of the product from milling operations, and the Debmeter performs the precision measurement perfectly, using advanced ultrasound technology.

Debex manager John Williams says that Mintek devoted extensive research, not only into the ultrasound measuring technique but also into the materials-handling and control aspects.

'This is now a very efficient system that automatically and continuously extracts large representative volumes of slurry sample from mill circuits and, prior to measuring particle size, removes any entrained air, which might reduce the accuracy. The entire system is reliable, sturdy, and requires very little maintenance', he reports.

Hydrostatic Probe

The final instrument in this impressive line-up of recent South African innovation is another Mintek development.

The hydrostatic probe is a process-monitoring sampling probe that requires no external power or other service connections, is robust and easy to install, and requires little maintenance other than simple filter cleaning or replacement.

Debex was again selected to produce and sell the probe, and good sales have been achieved, including repeat orders, which illustrate the popularity of both the concept and the instrument.

The probe works on the principle of the higher specific gravity outside the filterhead acting on the filtered liquid (of lower specific gravity) within it. The hydrostatic pressure pushes the filtered sample liquid through a connecting pipe and up above the surface of the pulp mixture to the sensor cells.

Precise positioning of the probe is simple, and it is ideal for extracting continuous clear samples of filtrate from pulps for pH, conductivity, or other analytical measurement, the sampling of leaching tanks being a typical application.

Fitted with long-life micrometre filters and made from corrosion-resistant components, the probe can be operational within an hour of delivery.

Synergy of Research and Manufacturing

These are just four current examples of South African innovative thinking and technical competence, in which the R & D expertise of major research bodies has been used to develop new instruments, and then commercial operations such as Debex have been brought in to make and market them. The synergy works well, and several other exciting new products are reputed to be under development.

Testing of detonators*

The Chief Mining Engineer has asked the South African Bureau of Standards to monitor locally manufactured, as well as imported, detonators. This could ensure greater safety in fiery mines.

The Detonator Testing Facility at Kloppersbos, to the north of Pretoria, was opened formally on 12th June, 1990, but permitted explosives have been tested for some time at Kloppersbos. A specification has already been

drawn up for permitted explosives, and one manufacturer has obtained permission to apply the SABS Mark to his product.

The testing of permitted detonators was also thought to be advisable so that criteria can be formulated for a national standard for detonators.

Among the aspects that are being investigated at Kloppersbos are safety and performance. It is particularly important in the case of fiery coal mines that detonators and explosives should not result in the ignition of methane gas.

* Released by the South African Bureau of Standards, Private Bag X191, Pretoria, 0001.