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# SUMMARY

An instrument has been developed at the Central Research Laboratories (CRL) of the Broken Hill Proprietary Company Limited, for the determination of the FeO content of iron ore sinters. It involves a simple method of measuring the magnetic permeability of pressed briquettes. Laboratory tests have shown that the instrument is more sensitive to changes in sinter FeO than the wet analytical procedure commonly used. Plant operational experience and laboratory tests have shown its suitability as a control instrument.

# THEORY

The FeO content of an iron ore sinter is directly related to its magnetite content. Because magnetite is highly ferro magnetic, the sinters magnetic properties can be readily utilised to determine the quantity of magnetite, or FeO, present. In the CRL Magnetic Permeability Meter (MPM) the magnetic permeability of a specially prepared briquette is measured.

# RESULTS AND DISCUSSION

The MPM was found to provide an accurate measure of sinter FeO. Analysis of production plant sinters were made using MPM and conventional wet FeO techniques at two separate laboratories. The interlaboratory correlation for the MPM was better (corr. coef. 0.98) than the wet FeO results (corr. coef. 0.86). These results illustrate the suitability of the instrument as a control tool.

Preparation of the briquette requires care during the grinding and pressing stages. The MPM requires calibration for individual plant operations and only needs recalibration when significant changes are made to the fluxing practice.

The first 150 days operation with the MPM at one sinter strand is shown in figure 1. Daily results for both wet FeO and MPM readings are plotted and illustrate the high degree of correlation over the whole period. Because of the ease and speed of using the MPM, plant sinters were examined on a two hourly basis. This revealed short term variations in FeO not previously evident.

A wide range of sinter plant operating conditions were examined using experimental pot mixes and results given in figure 2. As before, a high degree of correlation exists between magnetic permeability and FeO. The correlation with magnetite volume (by microscopy) is also good. The correlation of MPM readings with reducibility (JIS M8712) and RDI shows the suitability of the meter to indicate these variables.

# CONCLUSION

This new meter provides an inexpensive and rapid method for the measurement of sinter FeO and indicates properties such as reducibility and low temperature reduction degradation index.

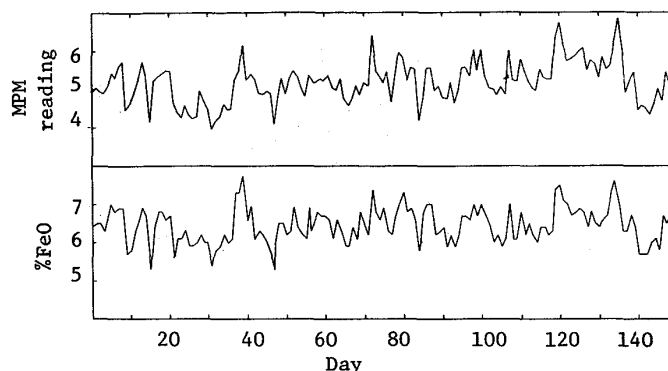


Fig. 1. Relationship between MPM readings and wet FeO analysis

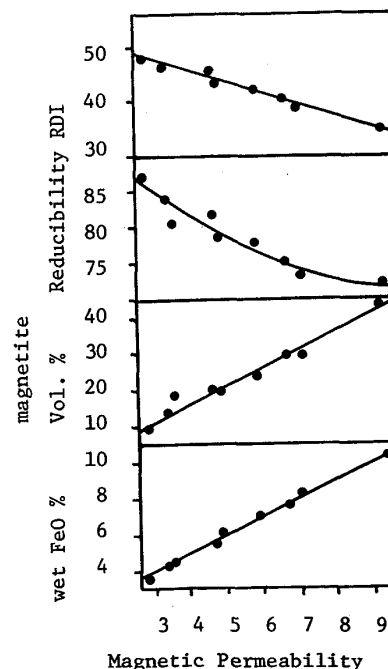


Fig. 2. Relationship between MPM reading and sinter properties.