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DETERMINATION OF QUARTZ AND PYRITES IN COAL
SAMPLES FOR COMPARISON WITH THEIR ABRASIVE
PROPERTIES.

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DETERMINATION OF QUARTZ AND PYRITES IN COAL
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PROPERTIES.

Three coal samples, 66/1130A, 66/1130B and 66/1048, with abrasiveness indices of 533, 779 and 142 mg of iron eroded^x, respectively, were heated ^{at} 350°C in a current of air to remove carbonaceous material. This low temperature was applied to prevent an alteration of the inorganic minerals.

The quartz content was determined in the heated as well as the unheated coal, by means of X-ray diffraction method, using an internal standard, viz. calcium fluorite.

The pyrites content was determined on the coal as such, using the addition method.

In order to obtain the purest possible sample of pyrites for addition, some crystals of pyrites originating from Phoenix Colliery were ground to pass a 325 mesh B.S.S. sieve. After treatment with dilute HCl and washing, the powder was dried and then separated in bromoform (S.G. = 2.8) in a centrifuge.

The abrasiveness indices were plotted in Figure 1, against quartz and pyrites contents, respectively. It will be observed that the abrasiveness increases generally with increasing quartz as well as pyrites content. The increase in the abrasiveness indices seems to be approximately linear with the increase in the sum of the concentrations of both minerals, as far as conclusions from these few measurements are warranted.

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^xH.F.Yancey, M.R.Geer and J.D.Price: Mining Engineering, 1951, Volume 3, page 262-268.

Since quartz and pyrites nearly have the same hardness (according to Mohr's scale) such a conclusion is, however, entirely possible.

The hardness of quartz is 7 and that of pyrites 6 - 6.5. According to information received it would appear that, in practice, quartz has an even more damaging effect than pyrites, which would agree with these hardness indices.

TABLE OF RESULTS

Sample No.	66/1130A	66/1130B	66/1048
Abrasiveness, mg Iron abraded	533	779	142
Residue after heat treatment, %	25.2	32.5	26.9
Quartz in unheated sample, %	5.9	8.3	4.3
Quartz in heated sample, calculated to that of unheated sample, %	5.8	7.6	3.9
Quartz content, % (Average of the two methods)	5.9	8.0	4.1
Pyrites content, % in unheated sample	3.8	3.1	2.8
Clay minerals and other minerals, %, by difference	15.5	21.4	20.0

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PRETORIA:

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FIG. 1.

QUARTZ AND PYRITES CONTENT VERSES ABRASIVENESS

HARDNESS INDEX.

ACCORDING TO MOHR'S SCALE.

QUARTZ 7

PYRITES 6—6.5

