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Modelling Ash Content of Mined Rock of Coal Mines

To reduce general mine ash content modeling of winning quality within a mine according to the following methods is offered:

1. Production units with ash overcontent are determined.
2. Model of ash content averaging includes the function of limitation as for mining coal with high ash content:

$$P = \frac{\sum_{i=1}^n Q_{iA}^d + \sum_{j=1}^m Q_{jA}^d}{\sum_{i+j=2}^{n+m} Q_{i+j}}, \quad (1)$$

Q_{iA}^d is a planned winning from the units within which ash overcontent is recorded; Q_{jA}^d is a planned winning within the units which do not exceed ash content norm; $Q_{i+jA}^d - Q_{jA}^d$ are planned winning within the mine.

Limitation on the planned winning output within the areas with the recorded ash content overcontent sometimes can be represented as follows:

$$0 \leq Q_i \leq Q_{i0}, \quad (2)$$

Q_{i0} is actual winning within the units with the recorded ash content overcontent. The limits of possible plan for the units not exceeding ash content norms:

$$Q_{j0} \leq Q_j \leq Q_j^{\max}, \quad (3)$$

Q_{j0} is actual winning within the units not exceeding ash content norm.

Using the model of ash content averaging it is possible to determine the points of cargo traffic mixing, optimal planned loads on stoping faces allowing limiting the extraction within the units with the exceeded ash content norm.