A PROGRAM PACKAGE FOR CALCULATION OF HEAT TRANSFER DYNAMICS IN ROCK AND BACKFILLING MASSIFS DURING KIMBERLITE MINING

Description

The program package is designed for assessment of strength and determination of temperature field in backfilling and rock massif around workings during kimberlite mining. The problem formulation includes a two-dimensional heat conduction equation considering a heat released from backfilling material during hydration and a heat spent for ice-water phase transformations occurring in the surrounding rock massif. This two-dimensional model allows for simulating a mining sequence by several layers. The calculation program is developed using Visual C++ language.

Technical appraisal and economic benefits

Determination of dynamics of thawing areas around workings and of backfilling material strength as a function of cement consumption, dimensions and mining sequence of blocs when mining by horizontal layers. This allows for optimization of mining costs.

Application areas

– in research institutes for assessing mining systems of deposits in the cryolitic zone involving backfilling of mined-out space,
– in mines located in the cryolitic zone for choosing mining parameters, such as dimensions of workings, consumption of binding materials in the backfilling massif, sizes of protection pillars, sequence of cut mining, etc.

Development stage

Simulation of heat transfer processes in backfilling and rock massifs during mining northern ore deposits by horizontal layers under the state budgeted programs carried out by the Chersky Mining Institute of the North SB RAS.

For educational purposes in the Institute of Mathematics and Information Science of the Yakutsk State University.
Patent situation
Patent pending.

Commercial offers
Joint commercialization.

Estimated cost
As agreed price.

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