SELECTION AND USE OF E PLOSIVES FOR BLASTING IN PERMAFROST

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ABSTRACT

Access difficulties and unique climatic and geotechnical conditions of mineral deposits in permafrost in the Russian Northeast require specific approaches in the selection and use of explosives.

Explosives which have low sensitivity to initiation and are stable during handling and under various climatic conditions are necessary due to the subarctic and remote location of the region and long transport routes with many transfer points. Nonexplosive components that do not change in physical state under varying temperatures during transportation are the most appropriate for transporting.

The frozen state of ground, characterized by specific mechanical properties and ice content, requires the selection of explosives with appropriate detonation properties and consideration of the dynamics of impact on the surroundings.

Low air temperatures necessitate special approaches m explosive manufacturing. They make the use of water difficult and require explosives with stable properties at low temperatures and in the presence of ice.

Examples of specific solutions are given based on the experience of VNII-1, other research organizations and the industry. These include the selection of ingredients and technology for making ammonium nitrate based explosives stable in the ice containing ground. The proposed solutions are based on the availability of raw materials and include results of basic research concerning thermodynamics of reaction in the detonation zone occurring along contacts between different phases of the explosive mixtures.