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SORBENTS FOR EXTRACTION OF SPILLED FUEL-LUBRICATE MATERIALS

Properties of absorbents of biological structure have been researched in the work. Its main advantages in comparison with chemical and polymeric sorbents have been shown. The offered Canadian peat-moss can be used in Ukraine as sorbent for oil products spill liquidation.

Досліджено властивості абсорбентів біологічної будови. Наведено їх основні переваги над хімічними та полімерними. Запропоновано використовувати канадський торф'яний мох на теренах України як сорбент для ліквідації розливів нафтопродуктів.

ecosystem, hydrocarbon compounds, oil, peat, purification, sorbents

Introduction

Oil production, transportation, processing, and use of oil products affect all environmental components (vegetable cover, soil, groundwater and air) due to different leakages.

Problem statement. Measures of such problems vary from small, local ones to ecological catastrophes that threaten ecosystems of great territories. Nowadays pollution of ground and coastal deposits, soils and ground in a hydrocarbonic compounds is eliminated mainly by mechanical way with the subsequent burial of the collected pollution in burial grounds or oil-slime sumps. These burial grounds or oil-slime sumps are concentrators of harmful substances, but most of all they affect ecosystems of territories where they are arranged. Thus, the problem is not solved radically, only the location of burial grounds is varied.

Task solution

The accumulative result of such solution of oil products leakage problems during many years is a huge amount of the grounds affected by hydrocarbonic compounds. The qualitative level of solving oil products leakage problems rises every year under public influence on the one hand, and under action of ecological legislation which is becoming increasingly tougher, on the other hand. More attention is being paid to the subsequent processing of the affected sites after mechanical gathering of oil products. One of components of oil contamination clearing complex is oil sorbents application process for absorption of the spilled oil. At the present time a set of various sorbents, both inorganic (mineral), and organic, is used.

Their absorbing ability differs considerably. Nothing can be better than liquidation of consequences of ecological accidents by the natural help to the nature. All of us know that the spilled oil ruins all life on the ground or in water. The mankind should not admit such failures, realizing that inhabitancy is its basic wealth. However oil spillage happens for different reasons and these oil patches have to be liquidated immediately.

The use of sorbents such as adsorbents and absorbents incorporated into group of sorbents actually is considered to be the best. Oil sorbents are highly effective for water and ground purification from oil products. The sorbent absorbs oil from any landscape fields, whether it is water spaces, soil horizons or bogs due to its hygroscopic microstructure, porosity and the big specific surface area. Clearing by a sorbent brings a big benefit during liquidation of failure, and to buy an oil sorbent or water sorbent is rather simple now. There exist in the world various types of the substances created for different purposes – clearing accident sites, caustic (poison gases) purification. Types of adsorbents as well as absorbents vary: coal sorbents, fibrous sorbents, polymeric sorbents, carbon fiber sorbents, carbon sorbents, bioactive sorbents and chelate sorbents. Thus the price of sorbents can be different. The cost of a sorbent depends on its structure and assignment. The "know-how" of sorbents also plays the role.

Natural adsorbents and absorbents are very popular with industrial companies due to their high efficiency. The price of the sorbent for oil products received from natural materials, for example, of peat, is much lower than the prices of chemical and other sorbents, therefore the price of a sorbent from such materials is affordable for the budget of the

buying organizations. The qualitative modern sorbents usually made on the basis of natural peat, are pressed in briquettes fuel, or, as a result of biodecomposition the period of which makes about 120 days, the used natural absorbent is transformed to agrarian peat.

Absorbent on the basis of Canadian Sphagnum Peat moss is an absolutely ecologically safe decision for liquidation of consequences of oil and oil products spillage. It possesses natural ability to biodecomposition of the absorbed hydrocarbons that allows to leave the used absorbent on the ground.

Among the basic advantages of an absorbent on the basis of peat sphagnum moss are the following:

- ability of biodecomposition (biodegradation) of the absorbed hydrocarbons;
- absence of desorption;
- the opportunity of application on water and ground;
- a high degree of water purification;
- high speed and great volume of absorption;
- universality (more than 85 absorbed substances)
- nonabrasiveness of sorbent;
- isolation of volatile combustible vapours (suppression of vapours is 90 % and more);
- easy and convenient for transportation and application;
- does not demand special preparation and the equipment for application and gathering;
- extensive world experience of use;
- reasonable price.

The biological factor plays the important role among major factors of purification of sea water and ground, such as physical, chemical and biological purification.

To accelerate cleaning of sea water areas and soil it is necessary to apply effective low-cost technologies based on the latest scientific and technical achievements. Application of biological preparations accelerates the process of oil destruction in natural conditions by means of planting on the surface of the polluted grounds of cultures of the microorganisms capable to split hydrocarbons.

So far, more than 540 hectares of ground have been processed and handed over to the authorized commissions. The cleared sites represent various local landscapes - from mesotrophic and upland bogs (including the polluted water surfaces) up to mazut-containing anthropogenic sandy fill.

The preparation consists in association of microorganisms on the basis of mesophilic and psychrophilic strains - decomposers of the oil, working at temperature from +1°C in a wide range of acidity of environment.

All 6 strains, included in the preparation, used some sorts of *Saccharomyces* sp. *Enterobacter* sp., *Bacillus* sp. (2 kinds), *Acinetobacter* sp. (2 kinds); a conclusion about their safety for humans and environment was made.

Conclusion

So, in zones of spilled oil products made on the basis of ecologically pure sorbent Canadian peat-moss can be used for improvement of viability of organisms living in offshore zones, air and ground. Besides, prospects of such sorbents usage for renewal of atmosphere and biosphere of our planet are stipulated by technological effectiveness of their production, desorption absence and low cost in comparison with other sorbents.

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