

UDC 629.123: 665.61

**THE INFLUENCE OF QUICKLIME ON THE QUALITY
OF EMULSIONS FOR RELEASE COATING****VIKTOR KRASOVSKY, VLADIMIR DRONCHENKO, VLADIMIR IVANOV**
Polotsk State University, Belarus

Experimental studies do not influence the quality of lime-based emulsion of oily waste containing fuel fractions, for use as a release coating forms during the manufacture of concrete products. The recommendations of practical use are given.

Introduction. Oily waste products and solutions of technical detergents are considered to be among the most harmful chemical pollutants [1], which are subject to mandatory collection and disposal, and in some cases – destruction. Unfortunately, collection, recovery and disposal of oily waste products and technical detergent (TMS) is often neglected. As a result, at the present time on the territory of plants and refineries of our republic there are significant amounts of oily waste. This is largely explained by the requirements that must be applied to the waste oil intended for regeneration, purification, and use instead of, or along with other petroleum products. Thus, according to [2] a mixture of spent oil for use as a fuel oil component, should have a mass fraction of solids of not more than 1 percent, the mass fraction of water not more than 2 percent, moreover they should be no contamination. To meet the requirements [2] is necessary to have the company of expensive specialized equipment. This, in turn, combined with relatively small amounts of waste oil and the high cost of transportation to the places for centralized acceptance of the majority of small and medium-sized enterprises makes the collection, recovery and recycling to be not economic.

For such enterprises there is a promising search for ways to use waste oil-containing products directly to the enterprise or enterprises of the region, preferably with a minimum of cleaning and recycling. One possible application is to obtain such emulsions based on oily waste and waste solutions TMS using shock waves encountered when using pneumatic transducer with the subsequent use as a release coating forms during the manufacture of concrete products [3, 4].

Serious adverse events were observed during the initial experiments with oily waste enterprise: fraction diesel fuel and heavy fuel oil, which turned to move away, to defend the top of the emulsion. In further tests the emulsion as a release coating forms in the manufacture of concrete products, these fractions left dark grease stains on concrete, which not only spoil the marketable products, but also complicated the further processing of the outer surfaces. In addition, fuel fractions adversely affect the stability of the emulsion.

The purpose of this study is to obtain an emulsion based on oily waste containing fuel fractions, which when used as a coating does not leave grease stains on the concrete surface during the manufacture of concrete products.

The methodology of the study. One of the substances that contribute to the preservation of a homogeneous composition of the emulsion and prevent separation of the fuel fractions of the emulsion is quicklime [5]. It has been suggested that, when added to the emulsion along with the technical detergent Labomid 101, quicklime can prevent rapid sedimentation of light fractions on a dark surface and the emulsion will provide a release coating, the use of which eliminates the formation of dark spots on the surface of fat, manufactured concrete products.

It should be noted the possible negative impact on the stability of quick lime emulsion. Stability of the prepared emulsion was evaluated by the method described in [6].

We are conducting a pilot study to determine the optimal amount of quicklime in the emulsion, providing a normative quality of concrete structures and do not affect the stability of the emulsion. In all experimental studies, the amount of water in the emulsion was taken to 30%. The water was added in an amount of 101 Labomid 3.0% burnt lime and 0.5% increments from 0% to 4% (by volume of water). The content of the waste: 70-100% – oily waste without oil and diesel fuel, 0-30% – fuel oil and diesel fuel. The emulsion was prepared with the help of shock waves encountered when using pneumatic transducer within 15 minutes.

During the next 30 days visual observation of the presence of differentiation between the factions was carried out and there were taken 4 aspects:

- 1) a clear boundary between the factions;
- 2) fuzzy boundary between the factions;
- 3) «blurred» the transition from one faction to another;
- 4) homogeneous emulsion medium.

Each composition was also measured in the loss of water for 30 days. For the maximum number of fuel taken in the amount of the emulsion, wherein the emulsion separation of water for 30 days did not exceed 2% by

Technology, Machine-building, Geodesy

volume of the emulsion, and the emulsion used directly for the enterprise - less than 2% by volume of the emulsion for one week.

Results and discussion. The experimental studies have been conducted to determine the optimum amount of quicklime in the emulsion, providing quality reinforced concrete structures produced in the forms, which are covered with the prepared emulsion.

The experimental results are presented in Figures 1 and 2 (at the time of observation after 10 and 30 days, with the lime content of from 1 to 3%, in increments of 0.5% and a 6% fuel fractions). Results of the lime content of 3.5% and 4.0% are not shown, since such content it is not a stable emulsion is obtained.

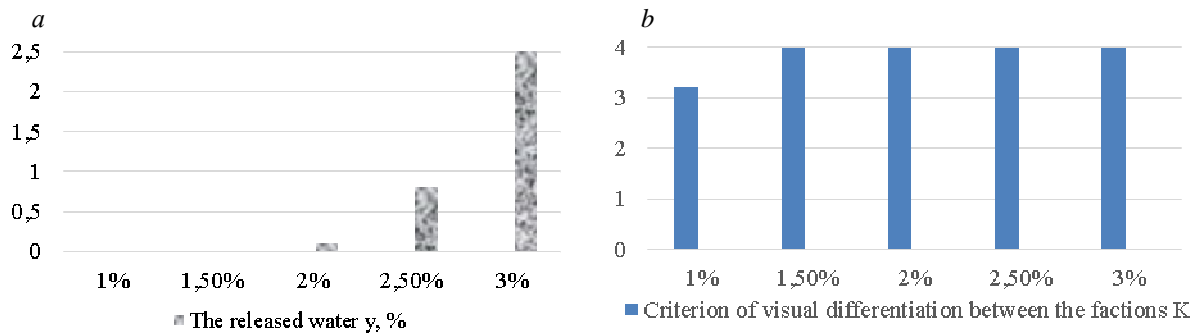


Fig. 1. – Dependence criterion visual distinction between fractions of the K (b) and the released water y (a) (%) of the quicklime content at a time, with the last day of 10 days of the emulsion manufacturing

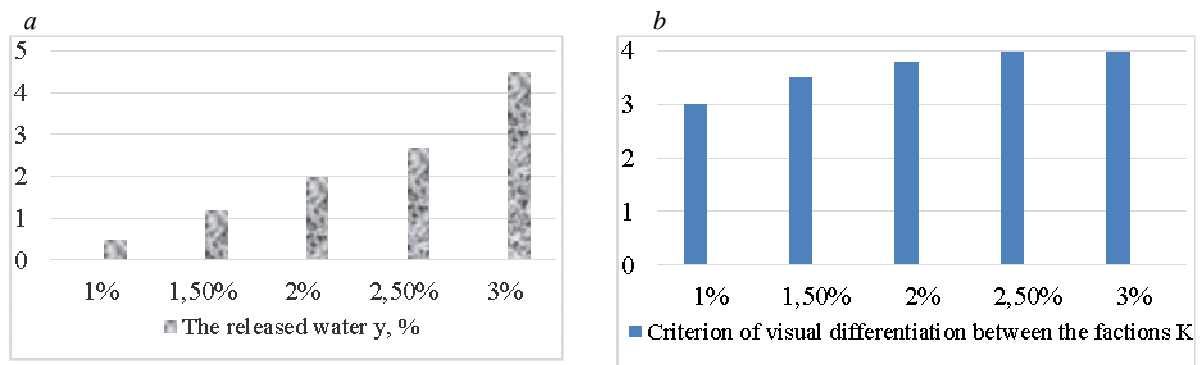


Fig. 2. – Dependence criterion visual distinction between fractions of the K (b) and the released water y (a) (%) on the content of quicklime at a time, from the date of the last 30 days of the emulsion manufacturing

The presence of the emulsion is not slaked lime contributes to the erosion of the boundaries between the fractions. When adding it more uniform emulsion is obtained in which the fuel fraction (if the composition of oily waste, used as the basis for preparation of the emulsion) are distributed evenly in the emulsion. As a result, when using the emulsion as a control is a surface coating on the forms in the manufacture of surface concrete constructions without turns dark oily stains. This in turn will enhance the competitiveness of the emulsion (for use as a release coating).

It was found that increasing the lime content of the emulsion affects the stability of the emulsion. Thus, when the amount of lime 2%, the stability of the emulsion reaches the maximum permissible values, and in some experiments exceeds them.

The analysis of the experimental results (see. Fig. 1 and 2) showed that the presence of fuel oil containing waste fractions used as a basis for the preparation of the emulsion (and then using the latter as a release coating to form in the manufacture of reinforced concrete structures) should be added to the burnt lime in an amount of 1.5%.

In the branch "Novopolotskzhelezobeton" of "Krichev cementnoshifer" produced manufacture staircases LMP 57.11.14-5 using emulsion based on oily wastes. The emulsion is applied to the working surface shapes, its consumption per 1 product amounted to 2,657 kg, which is comparable with the standards of consumption acquired in 2015 per unit of production of lubricants in the manufacture of a flight of stairs LMP 57.11.14-5 that made for industrial emulsol "AT-5 B" 2,646 kg and for emulsol «Betanol-C» - 2,275 kg. Indicators of the quality

of surfaces by using the proposed material, lubrication «AT-5-B» and lubricants «Betanol-C» meet the requirements of enterprise requirements to the quality of the surface of the flight of stairs LMP 57.11.14-5.

The resulting emulsion leaves on the surface of products from oils and grease, blistering and peeling; It does not cause corrosion to steel surfaces of the molds; the average relative value of adhesion reduction of 81.3%; it is able to be held on a vertical surface (an indicator of the ability is retained on the surface coating is based on NSO 76.4%). In the workshops of the branch «Novopolotskzhelezobeton» of «Krichevcementnoshifer» manufactured concrete products at positive temperatures with the categories of purity A3-A7 of the concrete surface. No product made using the control is a coating on the basis of VAT, has not shown the effectiveness of specific natural radionuclides exceeding 370 Bq / kg.

Conclusion. The emulsions of oil-containing waste, used as anti-adhesive coatings on the surface forms in the manufacture of concrete products comply with the requirements of STB 1707 «lubricants for molds and formwork. General technical requirements», set for release coating, and can replace industrial lubricants.

REFERENCES

1. Смазочные материалы и проблемы экологии / А.Ю. Евдокимов [и др.] ; РГУ нефти и газа им. И.М. Губкина– М. : ГУП Изд-во «Нефть и газ», 2000. – 424 с.
2. Нефтепродукты отработанные. Общие технические условия : ГОСТ 21046 –86. – Введ. 01.01.87. – М. : Изд-во стандартов, 2004. – 5 с.
3. Дронченко, В.А. Использование отработавших нефтесодержащих продуктов при производстве железобетонных изделий / В.А. Дронченко // *Материалы, оборудование и ресурсосберегающие технологии : материалы междунар. науч.-техн. конф.* – Могилев, 2015. – С. 231–232.
4. Приготовление эмульсий на основе отработавших пластичных смазок / В.П. Иванов [и др.] // *Проблемы трибології.* – 2016. – Т. 80, № 2. – С. 63–68.
5. Дронченко, В.А. Утилизация отработавших смазочных материалов автотранспортными и агросервисными предприятиями / В.А. Дронченко // *Vol. 45. Inginerieagerară şitransportauto.* – Chişinău: UASM, 2015. – P. 195–198.
6. Дронченко, В.А. Влияние содержания воды на стабильность эмульсии на основе отработавших нефтесодержащих продуктов / В.А. Дронченко // *Вестник Полоцкого государственного университета. Серия В, Промышленность. Прикладные науки.* – 2015. – № 11. – С. 82–86.