

ECOLOGICAL TECHNOLOGY OF CREATING WATERPROOF SCREENS

I.V. Perkun, Ph.D. (Tech.), V.G. Pogrebnyak, Prof., Dr. Sci. (Tech.), I.V. Adamchak, student

*Ivano-Frankivsk National Technical University of Oil and Gas
15 Karpatska Str., Ivano-Frankivsk, Ukraine, 76019
VGPogrebnyak@gmail.com*

The task of creating waterproof screens can be solved by using “aperiodicities” observed in laminar unsettled longitudinal flow of polymer solutions of hydro-dynamic and mechano-chemical behaviour [1].

However polymer solution application for creating waterproof screens in industrial experiments doesn't yield positive results, especially for porous media having laminated heterogeneity and fissures. That's why the technical task of designing technology on creating waterproof screens when feeding polymer solutions into soil-seam (even ignoring the ecological demands) is still to be realized. First of all it is pertinent to the issue of hydrodynamic regimes of feeding polymers into a soil-seam and structural changes in polymer solutions under hydrodynamic field effect.

Within the last years about 80 per cent of foreign experts came to the conception that the only direct (not taking into account immediate studies of a filtration flow) method of “attacking” the problem of nonlinear character in polymer solution filtration lies in the study of unsettled longitudinal flow, i.e. flow with stretching. As it is shown in work [2], filtration flow is nothing else than superposition of flows with shift and stretching, i.e. flows being realized in the input section of a capillary and a slot. That's why short capillaries, slots and hydro-resistors with confuser-diffuser zones can be used as a model of porous medium. Under such flows effects of elastic deformations become so big that disregard of them leads to unpredictable results.

There has been carried out a complex study of polymer solution reaction under hydrodynamic effect. Integrated approach turned out to be a necessary condition for successful solving of the delivered tasks of scientific and technical character (from fundamental studies to concrete technological process). This allowed to formulate a new structural concept with a “common denominator” such as strong deformation effect on the part of a hydrodynamic field on macromolecules that immediately generates the so called rubber-like high elasticity. The technology of creating waterproof screens is based on utilization of rubber-like properties of a polymer solution that arise under definite conditions while going through porous media.

There have been obtained eco-technological criteria and practical recommendations as to practical implementation of technology of creating waterproof screens.

References

1. Pogrebnyak V. G., Perkun I. V., Pogrebnyak A. V. Displacement of Oil from Porous Bed by the Oscillating Flow of Polymer Solution // American J. of Science, Engineering and Technology. 2016.– 1(2). – P. 53–57.
2. Pogrebnyak A.V., Perkun I.V., Pogrebnyak V.G. Degradation of Polymer Solutions in a Hydrodynamic Field with a Longitudinal Velocity Gradient // J. of Eng. Phys. and Thermophys. 2017. – 90(5). – P. 1219–1224.