

Chemical composition of the washing water solution after washing the wheelsets of railway transport

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Abstract

The article discusses the impact of economic and industrial water consumption on the state of the hydrosphere and biosphere of the Earth, and also presents the water consumption in Russia, the share of the country's water resources consumed per year and the forecast of water consumption at the end of 2020. The classification of modern methods of wastewater treatment, including in railway depots, is considered. The water consumption and the proportion of circulating water at railway enterprises are analyzed in detail, as well as the most used methods of purification of the used detergent solution (DS) in the enterprise are presented. The description of the work presents the key characteristics of the DS after washing the wheelsets of railway transport, such as pH, total hardness, density and permanganate oxidizability. The data obtained were compared with the requirements (2.1.4.1074-01) and concluded that the water was unsuitable for further operation due to a significant excess of the norm for permanganate oxidizability. The effect of long-term sedimentation of the studied DS was investigated, after which DS was successfully separated into an aqueous phase, an organic phase, a black amorphous organic precipitate, and a yellow amorphous precipitate. The influence of a direct electric current, conducted through the solution at room temperature on carbon electrodes, was studied for a time of 30 minutes, one and three hours. The influence of changes in the pH of the DS medium with subsequent settling was studied. The results of chemical purification of the water under study with such coagulants as ammonium polymolybdate and bismuth(III) salts, the latter of which made it possible to precipitate phosphate ions from solution, are presented. A qualitative reaction with the use of ammonium thiocyanate proved the content of iron(III) ions in the test solution.

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