

MODERN RAIN SEWERAGE SYSTEMS OF MACHINE-BUILDING ENTERPRISES

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The main polluting components of storm drains (SD) of machine-building enterprise (MBE) are suspended solids, petroleum products and specific pollutants that are not inherent in the SD from residential areas: heavy metal ions, emulsified petroleum products and other specific impurities.

Currently, there are various rainwater drainage systems, which differ in the methods of collection and disposal of rainwater. There is a rainwater drainage system [1], in which SD from contaminated areas enters the surface of the road surface to treatment plants and after treatment enters the collector, which diverts uncontaminated SD runoff. This system has disadvantages: large material losses for the construction of treatment plants and the complexity of the location of storm sewers near each contaminated area.

Also known is a surface runoff treatment system consisting of rainwater catchments located in both contaminated and "conditionally clean" areas; and a rain collector for joint drainage of rainwater from contaminated and uncontaminated areas to treatment plants [2]. However, its disadvantage is the inability to separate and purify the most polluted rainwater. Therefore, the mixture of contaminated and "conditionally clean" SD was confirmed for cleaning. It is impossible to remove clean SD and exclude their cleaning in the proposed system. Both of these phenomena will lead to a significant increase in the cost of rainwater treatment.

Based on the results of the study of environmental hazards and the peculiarities of the formation of the SD from the territory of the MBE, a fundamentally new scheme of their removal has been developed.

Based on the results of the study of environmental hazards and the peculiarities of the formation of the SD of the MBE, a fundamentally new storm sewer scheme has been developed [3], which allows cleaning the most polluted SD (Fig. 1). As a result, the area required for the construction of treatment plants is reduced and the reliability of the treatment system is increased due to the accumulation and treatment of the most polluted SD.

These results are achieved due to the fact that instead of a wastewater collector, which discharges a mixture of "conditionally clean" and the most polluted SD, the

system includes a collector for drainage of "conditionally clean" water into the reservoir and a collector for the most polluted water treatment facilities. The novelty of the scheme is the separate diversion of the SD: heavily contaminated - for local deep treatment facilities, and the SD from "conditionally clean" areas - for cleaning in storage tanks. Depending on the characteristics of the enterprise, other options for the assignment of the SD are possible, which can be developed on the basis of the proposed scheme.

The most met modern requirements are the drainage scheme with an additional settling tank, which is presented in (Fig. 2). According to this scheme, the entire SD is discharged into the reservoir only after treatment.

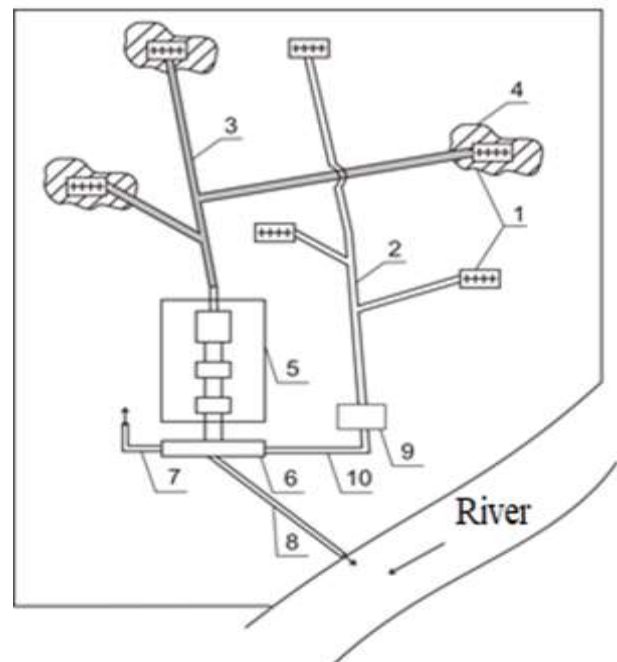
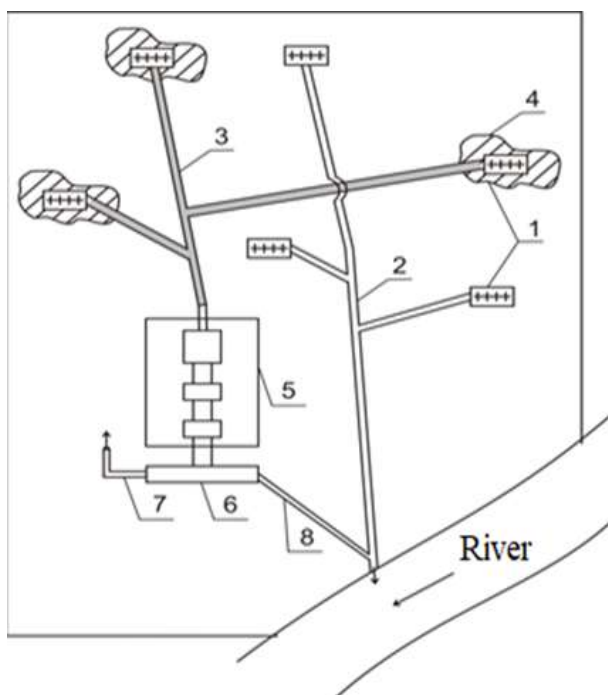


Figure 2 - System of withdrawal of the SD from additional settling tank

Figure 1 - Recommended storm sewer system

- 1 - rainwater collectors; 2 - collector assignment of "conditionally clean" SD;
 3 - collector of the contaminated SD; 4 - the most polluted areas; 5 - local treatment facilities; 6 - storage tank; 7 - pipeline for the removal of the cleaned SD for production; 8 - the pipeline of dump of the cleared SD; 9 - flow settling tank;
 10 - pipeline discharge of the cleaned SD into the storage tank

According to this scheme, the entire SD is discharged into the reservoir only after treatment. The use of the proposed storm sewer system allows ensuring a high effect of treatment of the SD while reducing the area of treatment facilities, reducing treatment costs, increases the reliability of treatment facilities, reduces pollution of the water basin by storm drains from machine-building enterprises.

References:

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