

The Use Of New Types Of Waterproofing Pipes

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Abstract – This article describes the new types of pipes under the hoist, which are used in railways. Half of the most common artificial structures on the railway are water-conducting pipes.

Keywords – Pipes, small bridge, reinforced concrete, concrete and metal, round, rectangular, oval.

Railway underpasses make up half of all man-made structures and are the most common road structures.

The pipelines are located at the lowest points of the road and are marked by the lowest ground level in the longitudinal profile. The choice of location for the pipeline depends on the shape of the cross at the intersection.

The circle of pipes is mainly small water currents that work from time to time (when it rains, the snow melts, etc.). The diameter of the pipe hole does not exceed 6 m, but in most cases pipes with a hole diameter of up to 2 m are used.

Pipes are cheaper and easier to operate due to the same water consumption than small bridges. Pipes located at the bottom of the lift do not change the transport conditions of vehicles.

Pipes are available in reinforced concrete, concrete and metal types. Currently, concrete pipes are the most widely used [1].

Depending on the mode of operation, there are pressurized, semi-pressurized and non-pressurized pipes. Pipes are mainly designed and built without pressure to prevent water accumulation during lifting and erosion (Figure 1).

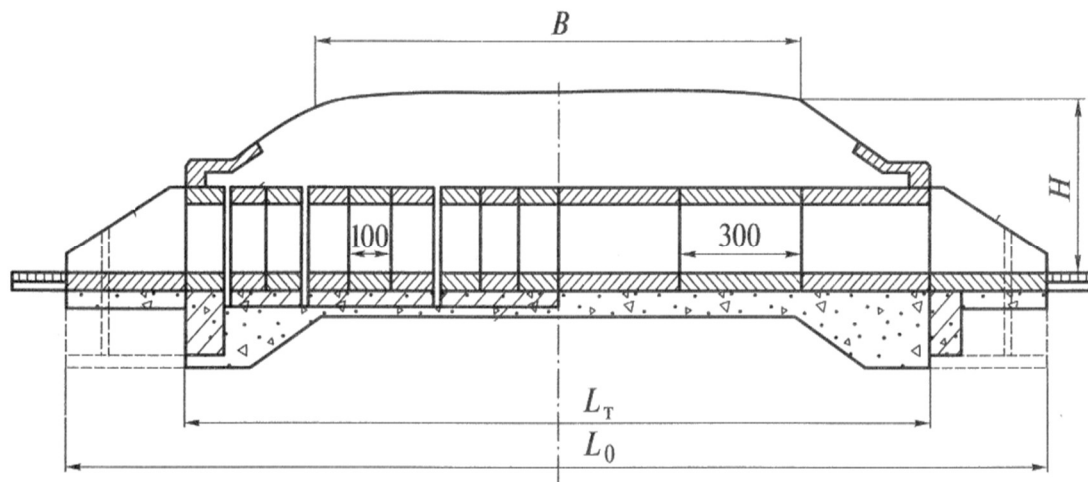


Figure 1. Longitudinal section of the pipeline.

The main components of a pipe are its body, base, inlet and outlet.

The body of the pipe is designed to receive external loads and to make the necessary cracks. The holes at the top of the pipe are called inlets, and the holes at the bottom are called outlets. The foundations of the finish and the head feel the pressure applied to them and provide the necessary reliability of the foundation under the pipe [2].

The drainage capacity of non-pressurized pipes is small: round pipes with a hole up to 2 m can carry up to 12.5 m³ / s, and rectangular pipes with a cross section of 6x3 m can carry water up to 63 m³ / s.

Depending on the shape of the section, the pipes can be round, rectangular or complex sections: oval, convex, round with a flat bottom, and the number of holes in one structure can be one, two or more. The shape of the cross-section of the pipes is taken on the basis of hydraulic calculations when flowing at a speed that does not disappear at the exit and behind the pipe. Various sections of non-pressurized pipes are shown in the figure below (Figure 2).

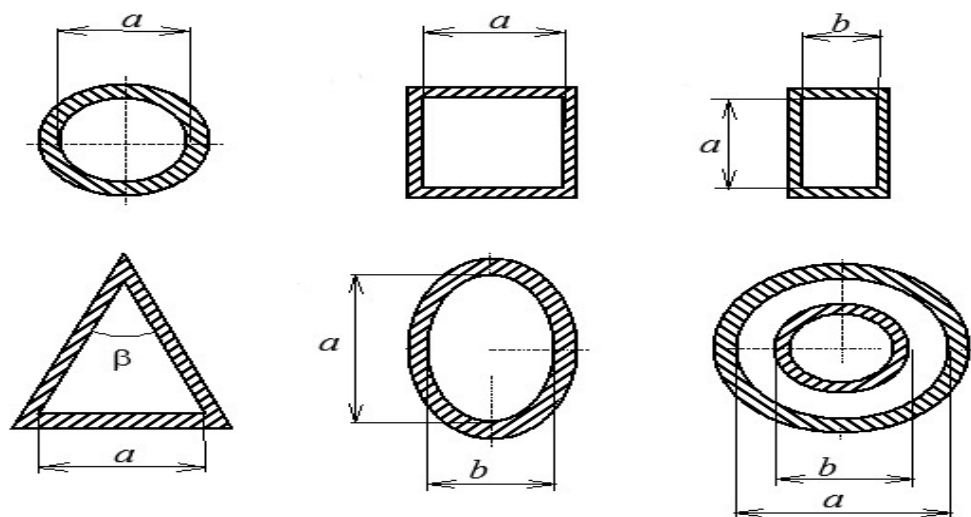


Figure 2. Cross-section of water pipe openings.

The method of strengthening the pipes during laying has a significant effect on the amount of movement from the ground pressure. Depending on the ground conditions, the following methods of laying reinforced concrete pipes are accepted:

- * in a layer of compacted soil;
- * on the ground pillow;
- * for monolithic reinforced concrete foundations;
- * on a pile pillow.

On raised soils, ditches for pipes are made up to the design mark, and in carvings - up to 0.1 below the design mark ... 0.2 m. In weak sandy soils, as well as in moist soils, the bottom of the pit should be compacted by forcing a layer at least 10 cm thick.

If the pipe is located on slopes, its natural surfaces in the pit should be as close as possible to the same markings on both sides of the pit for the width required to pass the installation crane.

If there is a crack in the pavement, it should be provided with a special attachment to support the lift and ensure the complete safety of the vehicles, or to provide a natural foundation for the slopes [3].

It is necessary to take the soil from the pit at such a distance that it is not afraid of the collapse of the walls of the pit at all stages of the work and obstacles to the movement of construction materials. Clean the bottom of the pit before handling the pillowcase.

The corrugated pipe acts as a uniformly distributed elastic structure of the load along the contour, which is affected only by normal stresses and has no bending moments. Due to the restorative effect of the soil cover, the geometric shape of the pipe does not change, and the daily corrugation allows its longitudinal deformation. Possible precipitation from the drainage material should be covered by the proper construction lift of the pipe during laying, as shown in Figure 3.



Figure 3 Corrugated water pipe.

Metal corrugated structures have a number of advantages over other types of pipes:

- * metal, pipes, pipe soil-bearing and high structural strength;
- * the peculiar shape of the pipe and corrugated metal ensures the safe operation of the pipe even in the presence of large longitudinal cracks, which are very dangerous for hard concrete structures;
- * the use of assemblies, pipes, elements reduces the relative costs of traditional materials;
- * Installation of metal, pipes, elements does not require the use of heavy construction equipment. The small number and small size of individual pipes allows the use of even manual assembly, which reduces the construction time of facilities;
 - The cost of maintaining such structures is minimal.

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