Part 2

WATER PROTECTION FROM DISCHARGES

2.3. Treatment of industrial and surface waste water from power companies

2.3.1. Technologies of treating industrial and surface waste waters from power companies

2.3.1.2. Mechanical waste water treatment

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In waste water mechanical treatment units the largest impurities are firstly separated on lattices and sieves, installed in the lead of the treatment unit, then suspended particles with a size, as a rule, of more than 0,15 … 0,2 mm are falling out from waste water in sand separators.

The most part of suspended particles is removed in sedimentation tanks or clarifiers are used for these purposes.

Lattices installed in treatment units with meshes usually of 16 … 20 mm, though it should be noted that recently lattices with smaller meshes- up to 4 mm are getting to use. The area of meshes of a lattice working part should be not less than twice area of the live section of an entrance channel at manual cleaning and not less than 1,2 of live section at mechanical cleaning. Lattices are usually installed at an angle of 60 ° to the horizon.

Widely implemented in Russia are mechanical rotary lattices of MGT type designed by Giprokommunvodokanal and mechanical compact vertical PMB 600/800 designed by Mosvodokanal-NIIproekt.

When waste water contains fibrous impurities tape or drum-type sieves are applied. Tape sieve is a tape weaved usually from a bronze wire with the sizes of meshes 0,5×0,5 mm and more and rotating on two blocks. Cleaning of sieves from the caught impurities is more often made by water or with brushes.

Drum-type sieves have a cylinder form with surface covered by a metal grid with a cylinder axis normally or along the moving flow. With drum rotation liquid level in it rises, promoting drum self-cleaning.

Sand separators are used to remove sand and other suspended substances from water (fig. 2.15). They are subdivided at horizontal, vertical and with rotary motion of liquid. Horizontal sand selectors with rotary motion of liquid (tangential and aerated) are used at flow rates of approximately more than 10 thousand m^3/day, and vertical are used more rare due to less stable mode of their operation.

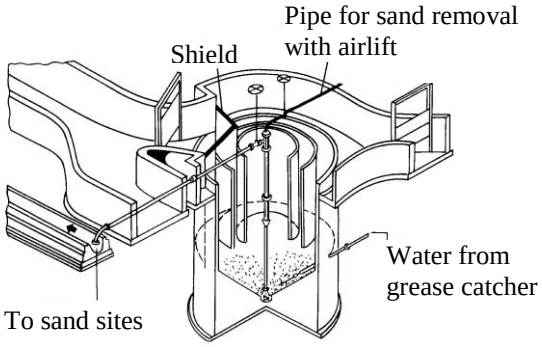

Fig. 2.15. Scheme of water flow in sand selector

Sedimentation tanks are used for separation of sediment or drifting substances with a size less than 0,1 mm from waste water (fig. 2.16). By direction of main water flow they are classified as follows: vertical, horizontal and radial. Sedimentation tanks installed in the lead of biological clearing units are called primary. Vertical sedimentation tanks are used in treatment units with a flow rate of approximately 10 thousand m^3/days. Horizontal sedimentation tanks are installed at treatment facilities with waste water flow rate of 10…15 thousand m^3/days. Radial sedimentation tanks are more often used when waste water flow rate is more than 20 thousand m^3/days.

Sedimentation tanks are the most simple and reliable facilities of treatment units. Calculation and designing approaches are described in a special literature, including SNIP 2.04.03—85. The water drain. External networks and structures (M: the State-system, 1986).

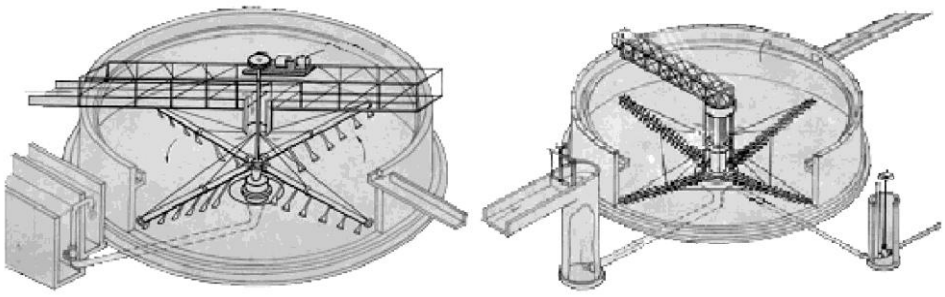

Fig. 2.16. Water flowing scheme in radial sedimentation tanks: *a* — primary; *b* — secondary