MECHANICAL EQUIPMENT AT THE KRASNOYARSK HYDROELECTRIC PLANT

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On the basis of drawings prepared by the Lengidrostal' Special Design Office, mechanical equipment (Fig. 1) totalling 20,323 tons during the construction period and 40,631 tons during permanent operation, was fabricated and installed.

Equipment Installed during the Construction Period (operated from 1963 to 1971). The mechanical equipment installed on the crest of the dam included sliding gates, each 25.5 m long, which operated under a head of 12 m. The eighteen first-stage low-level openings (6 x 13.5 m) were equipped with deep sliding gates designed for a head of 26 m. A universal crane 2 x 200 tons in capacity, with a swinging jib, fabricated at the construction site, was used for installing the crane and highway bridges on the crest and for handling the gates installed from the upstream side and the gates for the first-stage low-level outlets. The crest gates, installed from the downstream side without any water pressure against them, were handled by a 2 x 200-ton gantry crane. To close the eight second-stage low-level outlets (6 x 5 m), which were subjected to heads of up to 98 m, use was made of segmented gates handled by 200-ton hydraulic hoists. Seven of them were intended for operation at full opening, and one was intended for passage of water under heads of up to 70 m. To close the openings in cases of emergency under heads of up to 98 m, the constructors installed special equipment consisting of an emergency sliding gate with a bypass, a stem, a dismountable cantilever frame, a portal, and an 800-ton hydraulic hoist [1].

Equipment Installed during the Period of Operation. Owing to the fact that each unit is fed by two penstock lines within the limits of the powerhouse dam, 24 intake openings were contemplated. Since by the time of the putting into operation of units 1-4, construction of the upstream front had not yet been completed, the intake equipment in the powerhouse dam (operating since 1967) was installed according to a provisional scheme (Fig. 2): two

Fig. 1. View from the upstream side. 1) Left non-overflow dam; II) spillway; III) non-overflow dam on river channel; IV) dam and powerhouse; V) intake of high-head hydraulic laboratory. 1) Trashracks 12.4-24.0-2.0; 2) main sliding gate 8.0-10.5-40.0; 3) 250-ton hoist for main gate; 4) 2 x 125/16-ton gantry cranes; 5) main gate with electric heater 25.0-12.5-10.04; 6) main gate 25.0-12.5-10.04; 7) crane bridges and runways; 8) second-stage low-level openings; 9) guiding emergency gates for the second-stage low-level openings; 10) trashrack; 11) emergency wheeled gate; 12) 10-ton gantry crane; 13) emergency gate in the reservoir; 14) 10-ton gantry crane; 15) trashrack.

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trashrack sections were installed on the sill; the hydraulic hoists for the main gates were installed at the design elevations, on provisional trestles. The vent pipes for the penstocks were used as supports for the trestle. In this manner, about 80 tons of steel were saved.

**Equipment of the Powerhouse Dam.** An emergency barrier for the intake openings (Fig. 3) is provided by the main sliding gates under heads of up to 40 m during 2-2.5 min. Each gate is operated by a 250-ton hydraulic hoist. The hydraulic hoist is divided into six independent groups (four in each group). Each group has its own oil-pumping installation, which includes an NPD-200 A pump with a 30-kW AOP-2-81-6 electric motor. The gates are lifted from the sills when the water levels are equalized. To equalize the levels and to remove the loads, the gates are