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SWITZERLAND NOW HAS THE WORLD'S HIGHEST DAM

The completion of the highest dam in the world, that of the Grande Dixence in Canton Valais, was marked by the holding of a ceremony on 22nd September 1961. A brief description of this large hydro-electric scheme may therefore be of interest.

About the year 1930 a first dam was built in the high Vals-des-Dix, forming a reservoir of 50 million cubic metres. The water impounded drove the turbines of the Chandoline power station near Sion, with a head of 1,750 metres, at that time the highest in the world.

Some ten years later the Federal Water Department decided that this valley would be suitable for collecting the waters of several neighbouring valleys if a new dam were constructed below the existing one. After several years of studies, geological surveys and preparatory work, the casting of the concrete of the new dam began in August 1953. This dam, which is of the gravity type without hollows, will impound 400 million cubic metres of water at the maximum level of 2,634 metres above sea level. Its maximum height above foundations is 285 metres and maximum width at the base 198 metres. The coping has a total length of 748 metres and a width of 15 metres. Nearly 6 million cubic metres of concrete were used. In the underlying rock a grout curtain was injected to a depth of 200 metres. The building of the dam itself has taken eight years and employed an average of 1,500 workmen.

Simultaneously work has been progressing on the penstocks, generating stations and tunnels, which, however, are still not completely finished. The tunnels conveying the water to the generating stations have a total length of 27.6 kilometres, including 2.9 kilometres of penstocks and lined pipes. Besides the Chandoline station already referred to, which continues to be used for part of the water, the principal head comprises two sections. The first head of 874 metres supplies the Fionnay station, which is equipped with six generating sets each of 75,000 h.p. with a total output of 360,000 kVA. The second head, of 1,008 metres, leads to the Nendaz station in the Rhone valley (six sets of 90,000 h.p. each, total 480,000 kVA). It is expected that the scheme will produce an average net energy of 1,400 million kVA in winter and 210 million kVA in summer, or a total of 1,610 million kVA per year.

The tunnels for conveying the water from the adjacent valleys have a total length of about 100 kilometres. As it was not possible to locate all the intakes at an altitude above the reservoir level, four pumping stations had to be built to discharge the water from certain valleys into the main pipe. Altogether these stations comprise 10 motor-driven pumps with a total power of 210,000 h.p.

The space at our disposal does not allow us to describe the plant which was used for the construction work and which is of a magnitude commensurate with the size of the dam. We can, however, say that it represents a value of 125 million Swiss francs, has a total installed power of 21,000 h.p. in electric motors and 7,000 h.p. in internal combustion engines, and includes 40 kilometres of cableways which have carried the million tons of cement required at the rate of 1,500 tons a day. The high altitude of the dam also created special problems.

When Switzerland's water power resources are fully exploited, in about the year 1975, the Grande Dixence scheme with its catchment area of 415 square kilometres, 50 per cent of which is glaciers, will account for 16 per cent of the total accumulating capacity of all Swiss power stations. This figure shows the importance of the project for the economy of the country, where the main centres of power generation are situated in the Alps and the most important consumption centres are in the northern plain.

(*Swiss Technics.*)