International Milestone RCC Project

Miyagase Dam

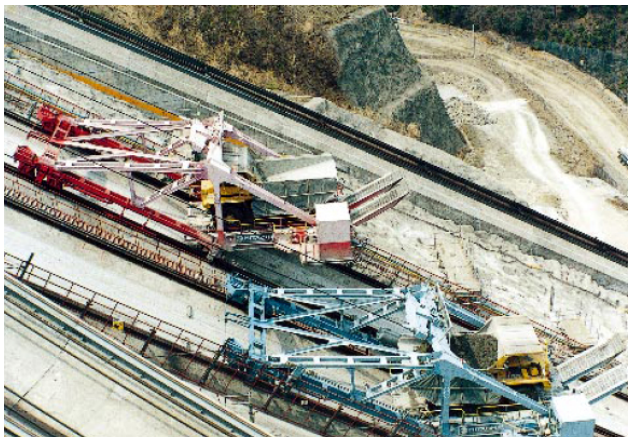
in Japan

Dam type	Gravity dam constructed by RCD method
Location	Kanagawa Prefecture, Japan
Dam height	156m
Dam volume	2.06 million m^3
Reservoir capacity	193 million m^3
Dam purpose	Flood control, Maintenance of normal flow, Water supply, Power generation
Construction period	1987- 1998

The Miyagase Dam was completed in 1998 by the Ministry of Construction (at present, Ministry of Land, Infrastructure and Transport), the Japanese Government. The dam was located on the Sagami River in the Kanto Region. This dam is the highest and the largest RCD (Roller Compacted Dam-concrete) dam in Japan with a height of 156 m and with a volume of 2.06×10^6 m^3.

At the Miyagase Dam, the major challenge to be overcome in the design stage was the problem of thermal stress generated in the mass concrete of the large RCD dam body. To resolve this problem, thermal stress analysis based on the restraint matrix method was performed and a comprehensive study of the starting time of concrete placement and the placement schedule was established. The results of this study could completely prevent thermal cracking in the dam body. Furthermore, thermal condition in the dam body was strictly monitored using optical fiber thermometers during the construction.

On the other hand, concerning the execution, at this dam, the concrete was transported by inclines where dump trucks were directly loaded. Concrete mixed at the batching and mixing plant was dumped into dump trucks of a weight of 20 ton, then dump trucks with 9 m^3 of concrete were transported to the construction surface through two rows of inclines.



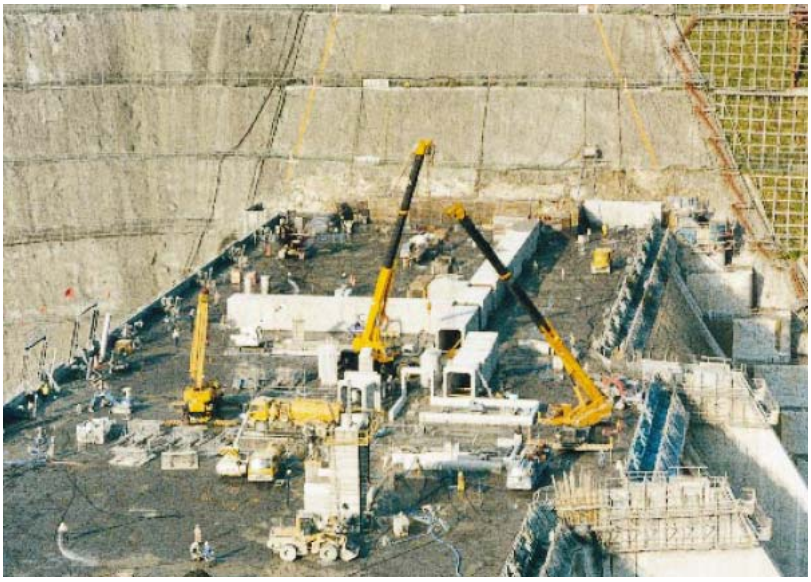
Dump trucks mounted on inclines

Inclines for dump truck mounted

In addition, layered concrete placing methods for dam construction, such as RCD method, require a continuous cycle without making a vertical gap or a cold joint in a field to secure quality and safety of the construction, as well as to make the transversal movement of heavy equipment easier. However, this continuous cycle shall be suspended due to the construction of embedded structures, such as galleries, conduits, shafts and gate operation rooms. At the dam, pre-cast members were adopted for the inspection galleries, the elevator shaft, the gate operation rooms, etc. and pre-fabricated conduits were also adopted. These measures contributed time saving in the dam construction. The experiences in the Miyagase Dam project could contribute the earlier completion and greater safety of any RCD dam project.

Based on the detailed investigation and the advanced technical development, the maximum monthly concrete placing volume exceeded 117,000m^3.

The construction of the Miyagase Dam was an epoch making event in the RCD and RCC methods not only in Japan but also in the world.



Pre-cast products

Pre-cast products

Concrete placement by RCD method

Companies Involved in the Project

Owned by: Ministry of Construction (at present, Ministry of Land, Infrastructure and Transport)

Design consulting by: IDOWR Engineering Co., Ltd. and Japan Dam Engineering Center

Constructed by: Joint venture of Kajima, Obayashi and Toda (Dam body) and Joint venture of Hazama, Fujita and Sumitomo (Quarry)