Introduction

General Description

The 3-Gorges project is a vitally important and backbone project in the development and harnessing of the Yangtze River (Changjiang River). The dam site is situated at Sandouping (三斗坪) of Yichang City, Hubei Province, about 40 km upstream form the existing Gezhouba (葛州壩).

3-Gorges project is the largest water conservancy project ever built in China and so in the world. With the normal pool level at 175 m, the total storage capacity of the reservoir is 39.3 billion m³. The project is a multi-purpose development project producing comprehensive benefits in the areas of flood control, power generation, irrigation and navigation improvement, as well as promoting other local economy such as for city redevelopment, fishery or tourism purposes.
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The layout of the project comprises of a spillway in the centre of the river channel, while the intake dam sections and non-overflow dam sections are arranged on its both sides. The powerhouses are placed on the back of the intake dam. There are altogether 12 and 14 turbine generator sets installed in the south and north powerhouses section respectively. While the permanent navigation structures are located on the northern bank, which includes a 1-step shiplift and a 2-way, 5-step shiplock system.

Phased river diversion is adopted for the project construction, which is divided into 3 stages.

In the first stage (1993 - 1997), the river on the south side (separated by the islet of Zhongbaodao) will be closed by the use of an earth-and-rock filled cofferdam. Then the open diversion channel will be excavated and the longitudinal reinforced concrete cofferdam constructed in the construction pit. Meanwhile the construction of the temporary shiplock will be carried out on the north bank of the river. During this period, the river flow and navigation will still go through the main river course.
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In the second stage (1998 - 2003), the construction will be started from the building of the second stage transverse cofferdam both upstream and downstream, so as to form the central construction pit where the spillway, the intake dam and the power plant on the north bank will be constructed. At the same time, the formation and construction of the permanent shiplock and the shiplift will also carry out. During this period, the river flow will be diverted through the open diversion channel, and barges or passenger boats might pass through the site either using the open channel or the temporary shiplock.

In the third stage (2004 - 2009), the open diversion channel will be blocked again by cofferdam and the construction of the powerhouse on south side will be carried out similarly. Meanwhile, the reservoir will be impounded up to 135 m level. From this point onward, the power plant on the north side and the permanent shiplock will be put into operation.

The photos provided in this series were taken by the writer after his visit to the 3-Gorges dam site in July 1998.
A-1 to A-5 - Series of layout drawing (in approx. scale only) showing the major phasing arrangement in the carrying out of the dam construction.
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THREE GORGES DAM PROJECT IN YANGTZE RIVER

A-1 to A-5 - Series of layout drawing (in approx. scale only) showing the major phasing arrangement in the carrying out of the dam construction.
B-1 to B-2 - The layout plan showing the overall 3-Gorges dam complex.
B-1 to B-2 - The layout plan showing the overall 3-Gorges dam complex.
C - A view of the 3-Gorges dam site before the formation work. In the middle ground, the islet in the river is called Zhongbaodao (三斗坪), which was later removed to form into an open diversion channel for the diversion of river flow and navigation during the temporary blocking of the river for construction of the first part of the 185-m high main dam structure.
D - The dam site as seen in May 1997. With the forming of a earth-and-rock filled cofferdam on the upper and lower stream, a very large piece of dry land was formed. The location originally at Zhongbaodao was now almost removed and a longitudinal-run reinforced concrete cofferdam was built in the pit as the guiding wall of the open diversion channel.
D - The dam site as seen in May 1997. With the forming of a earth-and-rock filled cofferdam on the upper and lower stream, a very large piece of dry land was formed. The location originally at Zhongbaodao was now almost removed and a longitudinal-run reinforced concrete cofferdam was built in the pit as the guiding wall of the open diversion channel.
E-1 to E-2 - Cross section showing the Spillway dam and the Powerhouse detail.
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1 - The dam site as viewed from the northern bank of the river in July 1998. The separating distance of 1.1 km between the two preliminary sections of dam as seen here will become the spillway, which will be used to control the flow of river water as a means of flow/flood regulation.
2 - The navigation channel of the temporary ship lock. The ship lock was built in the preliminary stage of work to provide and maintain continual navigation during the temporary closure of the river when the river was being blocked by the forming of the cofferdam.
3 - A closer look of the ship gate of the temporary site lock.
4 - The previous dry pit at the south side of river is now used as the diversion channel allowing river flow and navigation continues while the northern section of dam is being constructed. (refer also to drawing A-3)
5 - The side view of the formation work for the middle portions of the 2-way, 5-step shiplock systems. When completed, 5 chambers, each about 280 m in length, will be provided for the lifting up of ship in 5 stages to a maximum level of 175m upstream.
6 - Another view of the formation of the 5-step shiplock at seen from the downstream towards the 185 m high upstream direction.
7 - The 5-step shiplock is to be formed by cutting into hard granite sub-soil. From the slowly ramping up of the 120-ton dumper truck as seen in the photo, the tremendous size of the shiplock can well be conceived.
Scaffold was erected on some of the cut faces for the installation of rock nails as a means to strengthen strata with loose rock.
9 - The forming of one of the ship gate position in the 5-step shiplock.
10 - The abuting section of dam on the northern side of river. In this 250 m long section, a ship lift will be constructed in the latest stage (at year 2007 or beyond).
11 - A closer look of the abuting section of the dam.
12 - The dam base of the power plant section is under construction. In this section, totally 14 sets of turbine generator will be installed contributing a power generating capacity of 700MW for each turbine set.
13 - Close up to look at part of the shutter form system for the casting of the main dam structure.
14 - Detail showing the reinforcing and junctioning treatment to the dam base.
15 - Close up look of the dam head structure which separate the power plant and the spillway section. This is a 185 m tall structure when complete.
16 - Closer look at the earth-and-rock filled cofferdam (one at the upper and lower stream) formed temporary for the blocking of the river course in order to obtain a dry pit at the centre for the construction of the dam structure system.
17 - Artistic view of the 3-Gorges dam when the project is fully completed in the year 2009.