The Ship Lift at Three Gorges Dam, China – World's Largest Elevator

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Abstract

The ship lift at the Three-Gorges-Dam in China will be the largest of its kind worldwide. The entire structure is nearing completion. Within four reinforced concrete towers a steely ship chamber supported by ropes with counterweights will be lifted up to 113 m. This results in nearly 33.000 tons of moved masses. The article presents the structural aspects of the project from the design to the execution.

Keywords: ship lift, moveable structure, reinforced concrete tower, seismic design, post tensioning, ropes, mechanical parts

1 Introduction

The Three Gorges reservoir dam was designed as a reinforced concrete gravity wall with a length of approx. 2.3 km and a height of 185 m (fig. 2). The dam itself was finished in May 2006. The Yangtze River is one of the most heavily navigated waterways in the world. At present, shipping traffic can only pass the dam by means of a two-lane, five-chamber lock chain. The final component of the dam complex is the ship lift (fig. 1), of which its major structure has been under construction since 2008 and will mostly be used for passenger ships. It will shorten the time taken for ships to pass the dam from over 3 hours at present to approx. 40 min. The maximum difference between the up- and downstream water levels is 113 m. With this maximum lifting height, a maximum boat water displacement of 3.000 tons and internal dimensions of 120 m x 18 m x 3,5 m (useable space), the vertical ship lift will be the largest of its kind worldwide [1] (Tab. 1).

Figure 1. Ship lift (view from downstream)

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