The National Museum of Art, Osaka - Osaka, Japan

By Zhenyu Yu

Standing at over 2,600 meters tall, the National Museum of Art in Osaka, Japan towers over its urban neighbors. The museum now resides between the Dojima River and Tosabori river and was originally purposed for the Expo'70. The building was later renovated into its current iteration and opened in 2004.

The above ground structure features many curved steel and glass notes. The twisting and winding of the steel pieces are meant to emulate the flowing nature of bamboo along riverbanks. The entire piece encapsulates the lobby area, allowing adequate natural lighting into the main atrium during the daytime. As Cesar Pelli, the architect, puts it "[the building's] forms are an expression of bamboos growing from the ground, reaching for the clouds and swaying in the wind". Cesar intended for this design to be a "dynamic and exciting view of contemporary art".

The actual museum itself resides completely underground. The entire museum goes as far as twenty meters below grade. Three subterranean levels make up the exhibit showroom floors. In a plan view, one can see the lobby built along the impressive steel sculpture. The lobby leads straight into the top floor of the museum which serves as a public space. Opposite of the lobby is the loading docks. The top floor also is where the auditorium is stationed. The top floor Is also where the office spaces as well as conference rooms reside. The middle floor is dedicated solely to temporary art pieces. Conversely, the bottommost floor consists of the permanent exhibit gallery as well as the mechanical systems and storage.

The museum partially sits under the flood level. The surrounding terrain contains no bedrock, but rather a soil that's very dense in water content. The designers created the building with these design challenges in mind. With over 145,000 square feet of gallery space – plenty of which is precious art and artifacts, a robust outer shell was the most important task for structural engineers. The outer walls use a three-layer design that reaches a maximum thickness of over ten feet. Concrete is used to give the outer walls structure, as well as a waterproofing membrane to resist the waterlogged soil. To overcome the buoyancy of the water infused soil, the subterranean portion is designed with a submarine like shape. The designers also considered the impact of earthquakes, sustainability and security with the outer hull.

Sources:

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