# A Curved Self Anchored Suspension Bridge

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## Summary

San Diego has recently built a new baseball stadium in the heart of the downtown area of the city. As part of an attempt to revitalize the area, the city has commissioned a landmark pedestrian bridge from the new ballpark – over the local trolley tracks, over several sets of freight train tracks, and over a busy downtown thoroughfare – to the recently expanded convention center and the San Diego Bay. The bridge design is a self-anchored suspension bridge with a single inclined pylon. The main span of the bridge is 108m and the pylon is 40m tall. The pylon is inclined at a 60 degree angle from the horizontal and leans over the deck to support the single pair of suspension cables. 34 individual suspenders attached to the main cable support the deck from the top of the railing at one edge of the deck only. The unbalanced support conditions generate a large overturning moment due to dead and live loads on the deck. To balance this overturning moment, the bridge is horizontally curved in plan and a longitudinal tendon is placed at the top of the railing. The radial force generated by the tendon above the deck elevation generates a restoring moment which balances the forces in the bridge deck. The bridge will complete the link between the downtown and the San Diego Bay as well as serving as an icon to the city of San Diego.

**Keywords**: footbridge; self-anchored suspension; aesthetic; structural concepts; stainless steel

## 1. Introduction and Discussion

The downtown area of the City of San Diego is situated on the San Diego Bay. For many years it has been the goal of the city to complete a pedestrian and bicycle link between the historic Balboa Park area of the city through downtown all the way to the Bay and Harbor area. The last step in the link from Park to Bay is blocked by the local trolley tracks, several sets of freight train tracks, and a busy downtown thoroughfare. In 2004, the city commissioned the Centre City Development Corporation (CCDC) to design and build a bridge to complete the approximately 2 mile route linking the Park to the Bay. The site chosen for the final bridge link is adjacent to the recently constructed Petco Park, Home of Major League Baseball's San Diego Padres and the nearly 50,000 sq. m. San Diego Convention Center on the San Diego Bay.

CCDC recognized that the high profile project location needed a landmark structure to act as the gateway to the city and as an icon of the revitalized downtown area of San Diego. They hired a design team lead by bridge designers, T.Y. Lin International, to develop plans, Figure 1, for the bridge and surrounding plazas. This paper describes the design process for the bridge from the type selection phase through final design and highlights some of the more interesting features of the bridge.

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