



Kap Shui Mun Bridge and Ma Wan Viaduct



The Kap Shui Mun Bridge and Ma Wan Viaduct are two important structures in the Lantau Link which provides a direct access to the Hong Kong International Airport at Chek Lap Kok.

The Kap Shui Mun Bridge is 820m long and is the world's longest cable stayed bridge carrying both road and rail traffic. Similar to the Tsing Ma Bridge, it is a double decked bridge carrying a dual three lane expressway at the upper deck with two railway tracks and two single lane sheltered carriageways within the lower deck. The sheltered carriageways cater for maintenance access and traffic diversion during high winds or in emergencies. The shape of the 7.89m deep bridge deck, including the deliberate provision of an air gap at the center in both the upper and lower decks, has been verified by wind tunnel testing for aerodynamic stability.

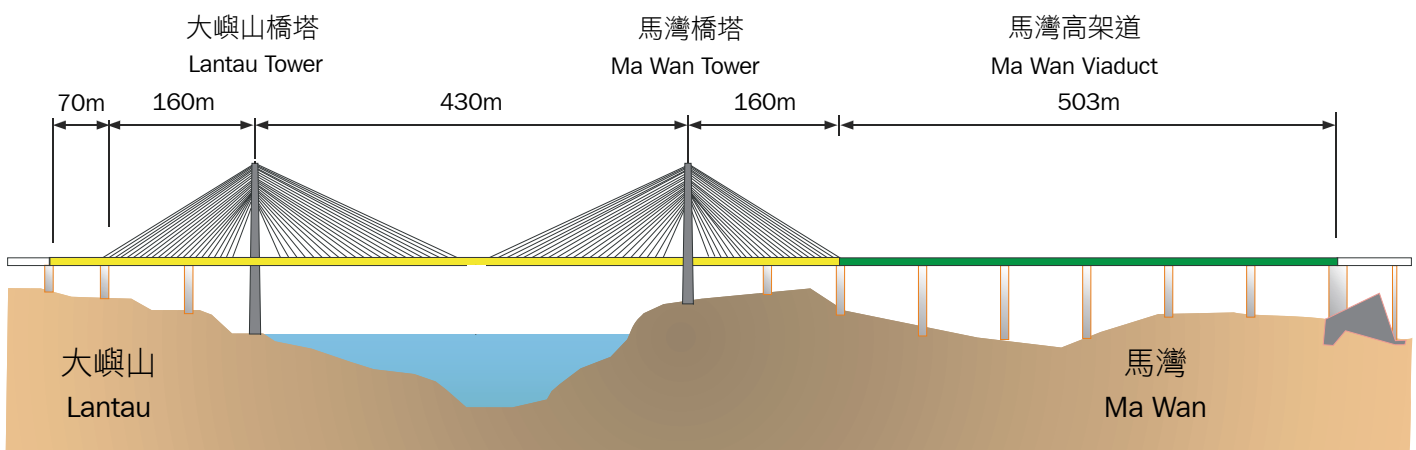
The bridge is supported by two 150m high concrete towers. The legs of each tower were constructed by a jump-form process and were joined together by post-tensioned struts. The tops of the towers were also post-tensioned to resist the bursting forces caused by the stay cable anchorages.

For the main span, partially fabricated steel sections delivered from the Contractor's yard in Shekou were assembled at an assembly yard beside a temporary barge dock built on Lantau. 8.7m long main span units with steel webs and concrete top and bottom slabs were built. The 500-tonne deck units were then transported by barge, lifted into position and joined to their predecessor units on site. The whole bridge is supported by 176 stay cables, each made up of 51 to 102 high tensile steel strands. Each strand is made up of seven galvanized wires of 15.7mm diameter, greased and protected by plastic sheathing. The stay cable is further protected by a heavy duty plastic sheathing.

Trackform for the railway, which carries trains running at speeds up to 135km/hr at the lower deck, is a specially designed sound-deadening and resilient system of post-tensioned concrete slabs, supported on elastomeric bearings.

The 503m long Ma Wan Viaduct consists of six spans over the Ma Wan island. Similar to the 70m long Lantau approach span and Kap Shui Mun Bridge side spans, it is constructed of post-tensioned reinforced concrete boxes with columns founded on hand dug caissons resting on bedrock.

The HK\$ 1.64 billion "Design and Build" Contract, was awarded in late 1992. The Bridge and Viaduct were opened to traffic in May 1997 after 54 months of construction.



Overall Length	820m
Main Span	430m
Height of Towers	150m
Main Span Deck (Steel/Concrete Composite)	
Weight of structural steel	4,770 tonnes
Weight of concrete	18,642 tonnes
Weight of deck/metre	60 tonnes

Sidespan Deck (Concrete)	
Weight of deck/metre	220 tonnes
Design Maximum Movements	
Vertical : at mid-span	470mm
Lateral : at mid-span	155mm
Longitudinal : at Lantau	320mm
Design Traffic Speeds	
Road	100 km/hr
Railway	135 km/hr