

research

Look at the Mott MacDonald website at [www.mottmac.com](http://www.mottmac.com) to find out what other bridges they have designed.

The new airport was needed to allow for more and more people and goods to come in and out of Hong Kong. The Lantau Link makes life easier for all sorts of people, and allows business to flourish. The Airport Express Link and Lantau Link are expected to carry around 250,000 passengers a day.

Mott MacDonald has been responsible for the planning, design and construction of the Lantau Link. Their teams of engineers completed this ambitious project on time and within budget of £600 million. It took only eight years from start to finish.

4 a team approach

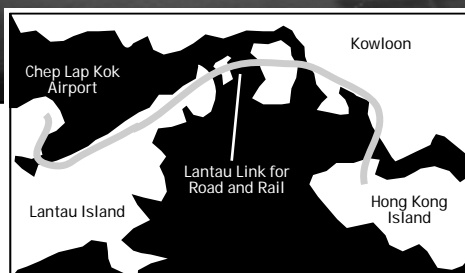
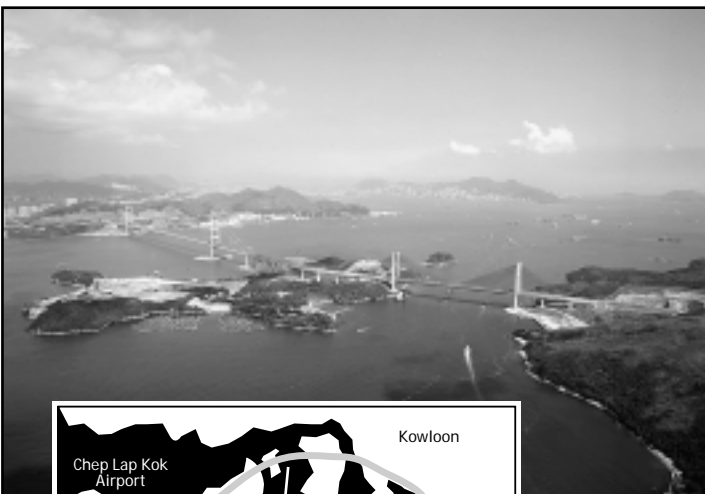
5 costs and benefits

Discuss this with others in your class. Every innovation benefits some people, but usually at a cost to some others. Draw up a list of all those who might be affected by the building and operation of the bridge. Use this list to find out if there any 'losers' from the Lantau Link?

? question



cs 10 lantau link



The Lantau Link joins Hong Kong's commercial heart and the new international airport on Lantau Island by road and rail. It has two bridges and a high-level viaduct.

Both bridges carry:

- A six lane highway on their top decks
- Twin rail tracks and two emergency road lanes on their sheltered lower levels.

The suspension bridge was designed and constructed by the British firm Mott MacDonald.

Business people and tourists need quick, reliable access to the airport.

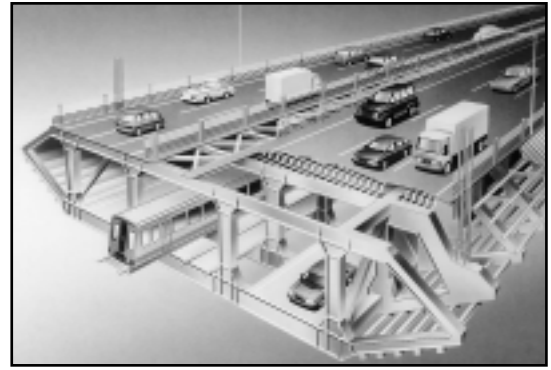


## 1 design criteria

The bridge had to have a six-lane highway, a two-lane covered highway, and two railway lines. The bridge designers had to develop a bridge in the face of many conflicting requirements - strong, stable, able to withstand typhoons, earthquakes, big temperature changes, rain and salty water, collisions with ships. It had to be high enough for large ships to pass underneath, yet low enough not to interfere with flight paths. And it had to look good!

## 2 an innovative design

To produce a strong and stable superstructure to satisfy these tough requirements, Mott MacDonald's bridge engineers developed a streamlined vented steel girder deck. This carries the six-lane express highway on the upper surface. This is separated by a 3.5 m longitudinal vent to allow the wind to pass through. The railway is inside the deck immediately above further longitudinal vents. The two sheltered single lane carriageways are on either side of the rail tracks.



### research

Find out about suspension bridges. Make a simple sketch of a suspension bridge, and name the most important parts. Use notes to explain how each part helps to support the bridge.

Find out about the properties of high tensile steel and how it is different from other forms of steel. Use your findings to explain why the designers chose this material for the cables.



The Lantau Link has three parts, from the left in this picture:

The Kap Shui Mun cable-stayed bridge across the waterway between Ma Wan and Lantau. The main span is 430m.

The two bridges are connected by a high level viaduct across Ma Wan island.

The Tsing Ma suspension bridge crosses the main Ma Wan shipping channel between Tsing Ye and Ma Wan islands. The main span is 1,377 m.

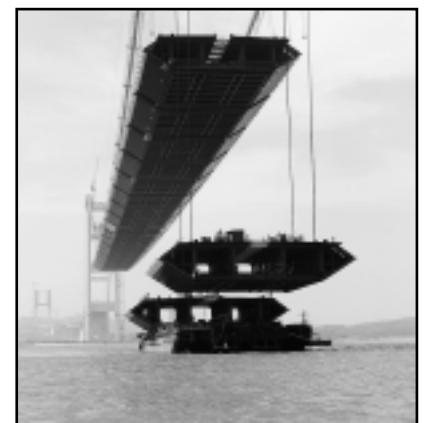
## 3 important detail



The cables are formed by 160,000m of high tensile steel wire - enough to circle the world four times.



The cables are anchored in two massive, concrete structures, one at each end of the bridge. Each contains over 270,000 m<sup>3</sup> of concrete.



The deck was made on the ground and assembled above the water.