Stonecutters Bridge

LOCATION
Hong Kong - China

CLIENT
Highways Department of Hong Kong

CONTRACTOR
Maeda Hitachi Yokogawa
Hsin Chong JV

DESIGN
Ove Arup & Partners
Hong Kong LTD

INSTALLATION
2009-2011

• Type of structure
Cable-stayed bridge

• Overall length
1600 m (main span 1018 m)

• Anti-seismic devices
  - type and quantity
    N. 8 shock transmission units (2 spare units more)
  - characteristics
    Maximum force 8000 kN
    Displacement ± 400 mm

• Special bearings
  - type and quantity
    N. 4 free sliding spherical bearings also acting as shock transmission units (1 spare unit more)
  - characteristics
    Maximum force 50600 kN at SLS
    Maximum force 65000 kN at ULS
The Stonecutters bridge is a single span cable-stayed bridge 1600 m long with a 1018 m main span that sets it amongst the longest bridges of this type. It is designed to withstand extreme wind storms and earthquakes. Thus, a non-conventional restraint system has been used to connect the deck to the pylons in both the longitudinal and transverse directions. At each pylon, a group of four 8000 kN capacity (800 mm total stroke) Shock Transmission Units (STUs) are installed along the longitudinal direction. At the onset of any dynamic action, they temporarily link the deck to the pylons providing a very stiff, stable connection. The units installed at the same pylon have a common hydraulic circuit that makes them react simultaneously during the dynamic event in order to avoid torque effects in the bridge structures. Furthermore, said hydraulic circuit is designed to reduce to a minimum the reaction associated with slow movements induced by deck thermal expansions and to prevent unexpected overloads. To control and mitigate the transversal movements of the main bridge girder, two special lateral spherical bearings connect the girder to each pylon. They are hydraulically preloaded and react as STUs only at the occurrence of a dynamically imposed load. They transmit compression forces only, therefore only one bearing at each tower will be fully loaded at any given time.