

The Sail Bridge, Swansea, Wales



Flint & Neill Limited designed this 140m long footbridge over the River Tawe which is part of a major re-development in Swansea. The design of this £2.8 million landmark bridge incorporates a curved steel deck supported by stay cables along one side and a 50m high inclined steel mast, and was developed in conjunction with Wilkinson Eyre Architects. The bridge was opened in June 2003 and provides an essential crossing for pedestrians and cyclists from the city centre to the new Port Tawe Innovation Village under development by client Welsh Development Agency.

The deck is supported along one edge by 70mm spiral strand stays in an attractive semi-fan array. A slender steel box girder carries the cycle track and provides the torsional stiffness necessary because of the eccentric cable support, and cantilevered ribs support lightweight aluminium decking for the footway along the outside of the curve. Tuned mass dampers have been designed and installed to control potential dynamic movements under large crowd loading, and aerodynamic fairings are included on the upstream side to prevent large wind-induced vibrations.

The steel mast is the main visible element and is shaped to form a distinctive feature supported on a sculpted central concrete pier. It is inclined backwards to counter-balance the deck, and the plan curvature and mast alignment were selected to minimise transverse loads and bending effects in the mast. The mast cross section varies throughout its height and consists of a curved front face cut from a cylinder with flat plates elsewhere, all designed to facilitate fabrication of this relatively complex shape.

A stainless steel balustrade with wedge wire panels along the inside edge houses the deck lighting, and an open parapet with stressed wires on the outside lends a lightness and delicacy to achieve a high quality and attractive finish.

The Sail Bridge is one of two river crossings constructed by Balfour Beatty with steel fabrication and erection by Rowecord. The other crossing is over the tidal barrage downstream and comprises a large 80m long steel truss over the weir and a double leaf swing bridge over the lock for which M&E specialists Bennett Associates provided design services.

