

With only vehicular and passenger ferries available for access to the North Shore, the need for a bridge was pressing. After three Royal Commissions the Auckland Harbour Bridge Authority was formed and using loan money the first bridge was built as a toll structure. It was agreed that the connecting motorways would be provided by the National Roads Board.

The main bridge was designed by Freeman Fox & Partners (UK) and built by the Cleveland Bridge Company and Dorman Long between 1955 and 1959. With a total length of 1097m it is longer than the Sydney Harbour Bridge, with a main steel arch span of 243m set 42m above high water. There are seven spans set on six concrete piers.

It was originally designed with five lanes and two footpaths but was reduced to four lanes to keep costs down. Fortunately the design of the piers was conservative and when the traffic grew at an extremely fast rate it was found that there was sufficient reserve to use the original piers for four extra lanes.

These extensions (clip-ons) in two extra bridges used the existing piers and we now have three bridges giving a total of eight lanes. These extensions prefabricated in Japan were orthotropic welded steel box structures and when designed in the mid 1960s were at the forefront of technology. Because there was insufficient knowledge at that time of fatigue life in the fillet welds of splice joints in the stiffening troughs of the steel deck some minor cracking occurred after about 15 years and several thousand joints had to be replaced with stronger 100% butt welds. This was of great interest worldwide as there are several similar structures built at about the same time.

The clip-ons were added between 1968 and 1969 and greatly improved the capacity, with a large increase in toll revenue.

The toll charge was reduced and collection made only one-way until by 1984 the bridge loans were paid off and the cost of toll collection was about to exceed its revenue. Rather than increase the tolls the Harbour Bridge Authority offered the Bridge to the National Roads Board on condition that it be toll-free. Fortunately the National Roads Board was able to finance the million-dollar-plus annual maintenance cost of the bridge and it has become an integral part of the Auckland motorway system.

One interesting facet of the bridge is the fact that a design study done on the clip-ons by Ministry of Works & Development on behalf of the Auckland Regional Authority showed that there is capacity on

each of the clip-on bridges to carry a light rail line as well as two lanes of light traffic. Heavy lorry and bus traffic would then use the main centre bridge.

The other interesting feature of the bridge is the moveable concrete traffic barrier, which was put in about 1989. This, apart from being a major safety device, allows tidal traffic flow on the bridge, greatly increasing its peak load capacity.