

## Precast mast delivers thanks to manufacturer's attention to detail

**Project:** Mount Street Footbridge

**Precaster:** Reinforced Earth

**Location:** Perth, WA

**Client:** Main Roads Western Australia

**Engineer:** GHD Group

**Builder:** FORTEC Australia

Mount Street Footbridge is located in the heart of Perth's CBD. Connecting St Georges Terrace with Kings Park, the 73.5-meter long footbridge runs over the Mitchell Freeway below. It has seen a recent upgrade this year, delivering improved safety and accessibility for pedestrians and cyclists.

The new and improved structure comprises the installation of a precast concrete mast weighing 31.7 tonnes and measuring 14.3 metres. As well, the Footbridge has been fitted with new LED lighting and upgraded balustrades. The LED lighting installed on the bridge coincides with the lighting at Optus Stadium and the Matagarup Bridge nearby.

Installed in 1972, the original mast held an integral part in the structural capability of the footbridge. After nearly 50 of the previous mast holding up the footbridge, it had developed cracks, leading to the necessary replacement.

### **Class 2 curved precast elements specified with intricate steel fixings and thermal probes**

National Precast Master Precaster Member Reinforced Earth was awarded the contract to



manufacture a replacement precast concrete mast for the Footbridge in early 2019. The scope included manufacture of three concrete elements with intricate steel fixings and thermal control probes.

When manufacturing the precast mast for the footbridge, a Class 2 finish was required finish for the curved radiused sections of the mast and capping sections. Steel moulds were custom manufactured and used to cast the elements and achieved the desired result.

### **Maximum curing temperature specified**

Also set out in the specification was a requirement around curing temperatures, calling for a maximum concrete temperature differential of 20°C. Reinforced

Earth worked closely with their concrete suppliers and a durability consultant to conduct a thermal control analysis on the elements, based on the selection of moulds, the concrete mix design and the specification requirements.

A low heat concrete mix was used to eliminate the risk of exceeding the maximum temperature. Additionally, 20kgs of ice per m<sup>3</sup> of concrete was added and poured early in the day to ensure the concrete delivery temperature was as low as possible. Due to the poor insulation properties of the steel moulding, a timber plywood housing had to be built around the mould to keep it insulated throughout the curing phase.

Four temperature probes were installed in each mast section to record the maximum temperature and the temperature differential whilst curing. The four probes recorded the ambient temperature, the concrete temperature 50mm from the edge of the mould face, the concrete temperature at the centre of the products and the concrete temperature 50mm from the edge of the product at the trowel face. These probes were monitored regularly so that the timber plywood housing could be removed for periods of time to control the concrete temperatures.

### **Precast delivers in one third of in-situ time... plus other benefits**

Precast concrete was chosen for this project as it took only a third of the amount of time of in-situ concrete, had it been used. With the total construction period being from 6th May to late September 2019, the Mount Street Footbridge is officially open to the public.

Ease of control and installation on-site were two additional benefits from choosing precast.

The Reinforced Earth team prides itself on its

problem-solving skills and determination to work through challenges efficiently and professionally, to supply high-quality precast to their clients.

The company is happy with the result. The steel mould performed at a high level, resulting in compliance with the client's expectations and specifications. Due to the manufacturer's measures and precautions, the temperature of the concrete did not exceed either the maximum nor the differential figures. The maximum concrete temperature recorded was 54°C and the maximum temperature differential recorded was 7°C.

