PROJECT PROFILE

Sydney Opera House

Concrete Roof Shell Inspection, Restoration, and Maintenance | Sydney, Australia

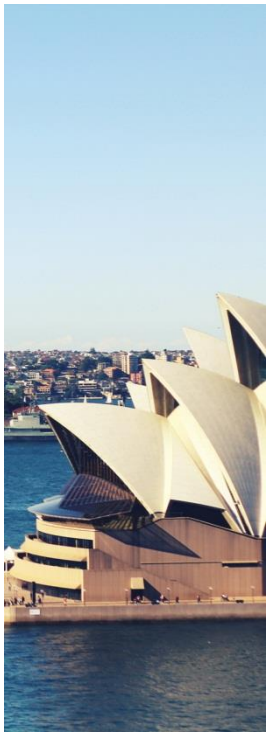
While under consideration for the World Heritage listing, the client enlisted WJE to ensure the structure's maintenance and long-term durability.

CLIENT

Minister for Public Works

BACKGROUND

The Sydney Opera House is a multi-venue performing arts center conceived by Danish architect Jorn Utzon. Built from the winning design of a 1957 competition, the distinctive structure opened in 1973. The Opera House was made a UNESCO World Heritage Site in 2007, solidifying its status as one of the most prestigious buildings in the world.



SOLUTION

WJE has performed a variety of investigations and subsequent repair recommendations for the Sydney Opera House, including sealing the joints between the precast mortar panels of the roof shell and the using moisture monitoring equipment to detect water leaks. Recommendations were also given regarding the use of cathodic protection and repair techniques for the marine skirt panels around the structure. WJE corrosion experts reviewed chloride test data collected from the exposed precast concrete ribs and concluded that protection measures were required to mitigate future chloride ingress. In order to develop an appropriate long-term strategy for the concrete elements of the opera house, small concrete cores were removed from the roof shell structure and tested in the WJE laboratory studies. The cores were treated with a 100 percent solids silane sealer. Several of the treated cores were subjected to accelerate weathering to simulate the effects of ultraviolet radiation and general weathering typical of the Syndey area. The weathered and unweathered cores were then ponded with a salt water mixture, and the rate of chloride ingress was measured over an extended period of time. WJE corrosion experts concluded that the silane sealer had penetrated sufficiently into the concrete to remain effective in both the weathered and unweathered state. Therefore, WJE recommended sealing the exposed concrete ribs.

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