TITAN CRANE, CLYDEBANK

Title of Project: Titan Crane, Clydebank

Contract Value £3m +

Location Garth Drive, off Cart Street, Queens Quays, Clydebank G81 1NX

Date of Completion: August 2007

Client: Clydebank Re-built Ltd
Engineer: ARUP
Architect: Collective Architecture
Main contractor: MacLean and Speirs Group Limited
Quantity Surveyors: Armours Construction Consultants

Overview

Repair, Restoration and Conversion of a massive former shipyard crane into a visitor attraction centre for public access to upper levels of the crane.

Key factors: main structure 150ft above ground level
Considerable corrosion to both steel, rivets and structure integrity
Riverside location
Exposed tail of the bank location
Bulk of work high of the ground
Weather would be a major
Containment could be problematic
Installation of evacuation staircase
Installation of public use lift

History

Repair and restoration of Sir William Arrol's 1907 Titan Crane, an important legacy of Scotland's engineering heritage and a symbolic landmark for Clydebank and the Clyde, reflected in its status as an 'A' listed building. This innovative project has combined engineering and design excellence to conserve the Titan Crane for future generations, with interpretation of the Crane's history and access to the very top of the crane. Sensitivity to the Crane's original elegant design has been fundamental to the project's success.

The Titan Crane is an outstanding symbol of Scotland's engineering prowess and industrial heritage. This dramatic restoration package has secured the future of the Titan for generations to come, enabling visitors to experience this magnificent feat of engineering and understand its significance to Clydeside.

Engineering heritage

Sir William Arrol, who needs no introduction as one of Scotland's most energetic and ingenious engineers, was the mastermind behind the crane. It was his first Titan on the Clyde. When it was built in 1907 it could lift 150 tons, upgraded to 200 tons in 1937. The Titan assisted in the building of many famous ships including the Lusitania, Queen Mary and QE2.

Rising 150 feet above ground level, the Titan Crane is still the most prominent and recognisable landmark on the Clydebank skyline. It is an 'A' listed building, reflecting its significance to Scotland's industrial heritage and engineering prowess.
The concept of the crane's restoration began in earnest in 2002, when the decision was made to develop a lighting strategy to illuminate the noble structure. It quickly become apparent that the Titan's historical and cultural importance merited full restoration, with huge potential – not only as a unique visitor attraction and truly iconic landmark, but as a showpiece of Scotland's engineering heritage and contemporary design.

Overcoming the challenges of restoration

The task of restoring the crane was monumental. The Titan had fallen into neglect, having been disused since the mid 1980's when UIE built oil rigs in the yard. Flaking paint and rust stains indicated severe problems with corrosion, and vandals had seriously damaged fitments and glazing in the wheelhouse.

Creating visitor access to the wheelhouse without damaging the elegant lines of the original structure, repairing the structure, installing lighting, keeping within a tight budget and meeting stringent regulatory requirements were all major challenges – particularly in such an exposed location where height and weather create significant hazards.
Restoration involved close collaboration between architect, engineer and contractor to ensure that a technically challenging project was procured safely and economically, respecting the crane's heritage and providing an elegant contemporary design solution.

Physically, the project involved a pragmatic approach to repairing the crane – with the objective of it being fit-for-purpose as a visitor attraction, rather than its original design concept of heavy lifting. Old paint and rust were shot-blasted to bring the structure back to bare steel, allowing repairs to be identified and undertaken before applying primer coats and a final top coat. Cladding to existing machinery rooms was repaired with patching or by replacement steel panels and hot riveting. Glazing was reinstated and existing light fittings refurbished. To allow the passage of the spiral escape stair through the jib centre, part of the electrics room roof and floor were removed along with the diagonal bracing that lay in its path.

Integrating engineering and design quality

Engineering and design quality have been married throughout the design and construction process. The new stair and lift shafts are steel frames clad in a robust aluminium cladding – a reference to the industrial heritage of the site whilst also

combining economy, longevity and crisp detailing.
The lift shaft is punctured with tallwindows providing spectacular glimpses of the existing structure during ascent. The emergency stair has been cleverly inserted between the crane's legs as a cylinder to minimise its section – resulting in an elegant design that helps the enduring quality of the original structure come to the fore.

The viewing platform is enclosed with a fine cable net fence and floored with an open mesh grating allowing visitors to walk along the jib, 150 feet above the River Clyde, and soak in the exhilarating views. In the refurbished wheelhouse with its huge lifting equipment, information panels tell the story of the crane and its engineering significance, the shipyard, and the people who lived and worked around the Titan.
At night, innovative computerised digital LED illumination brings the Titan to life, silhouetting the diagonal structure with changing coloured and white light, and casting dramatic shadows on the quayside below.

Emphasising the original structure

Common to every design intervention – be it removal, repair or addition – was the principle of minimal disturbance. Together, the architect and engineer worked hard to minimise visual intrusion and damage to the existing structure.
The ingenuity and enterprise of the project lie in its success in creating visitor access to the very top of the Titan, yet with minimal contact to the crane's historical and structural integrity. The team's inventiveness embraced novel approaches to fire engineering and the pragmatic "fit-for-purpose" approach to repairs to the existing structure.

Delivery and procurement

The result was an efficient and economic project. Successful delivery of such a technically challenging project relied not only on collaborative team working, but also a pragmatic approach to design and procurement and skilled workmanship.
For example, new steel members fulfilled a number of functions; the new stair was prefabricated and inserted in sections to maximise economy; and the skill and accuracy of the steelwork fabricator kept costs down to an absolute minimum.
And, despite the risks associated with working at height and in such an exposed location, the project was delivered without any accidents.

Restoration of the Titan Crane has already resulted in a new lease of life for one of the great engineering masterpieces of Clydeside, enabling a new generation to experience and understand the significance of our industrial history.
Once the waterfront regeneration and community transfer are complete, Sir William Arrol's Titan will regain its original position as the focus of the community – a place for people and activity, the heart of Clydebank's proud engineering heritage.

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Civic role

One hundred years after it was built, the Titan Clydebank opened in August 2007 as a unique attraction where people can enjoy a major piece of industrial heritage as a living experience. It has proved hugely successful: visitors, residents, schools and clubs have all been enthralled by close contact with this magnificent piece of our engineering heritage.

The Titan has also become a catalytic icon for the regeneration of the Clyde waterfront and its future. The crane stands at the heart of Clydebank Re-built's regeneration of the waterfront around the former Clydebank Shipyard.

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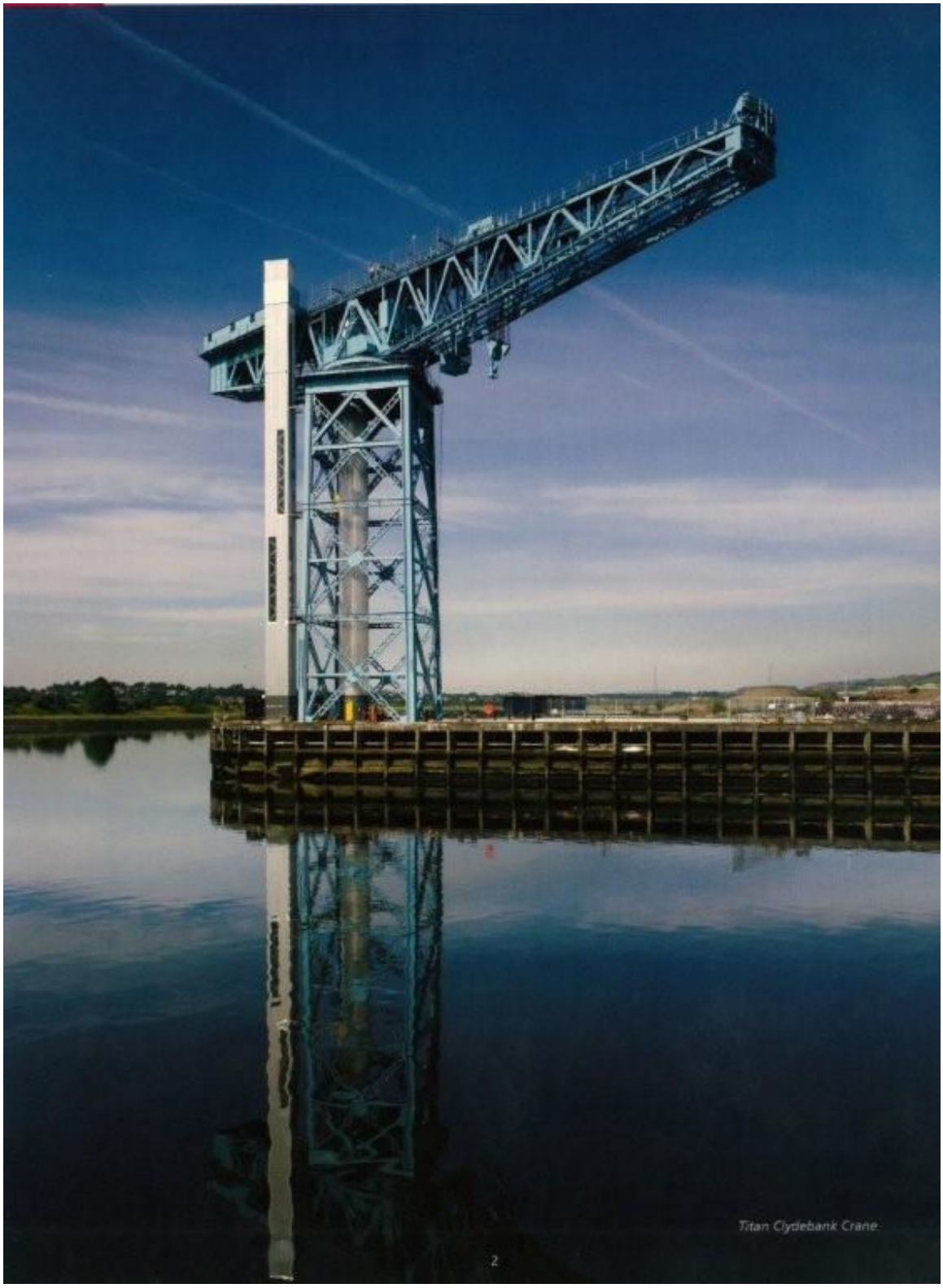
Early stage work building the access platform high above the water

“leg work”

Working platform being lifted into position



The Finished job

Looking good and all lit up on official Opening Night as the New Clydebank Landmark

Update

Titan Crane Wins world acclaim and;

The Chicago Athenaeum 2008 Best New Global Design Award

Short Listed for SALTIRE AWARD