

Victorian Forts Network RESOURCES

Topic:	Cast Iron and Wrought Iron
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Content:	Fort Purbrook Redan Bridges

1. Wrought Iron at Fort Purbrook

Wrought iron is synonymous with the Industrial Revolution, iron clad ships and many Victorian buildings. It is an iron alloy defined principally by its Carbon content and the method of manufacture used to produce it. It is a form of iron that is no longer produced and as each year passes fewer genuine examples of its use remain - those decorative items or door furniture that are sold now as “wrought iron” are almost invariably mild steel formed in the style of traditional wrought iron work.

The use of wrought iron for structural purposes is relatively widespread at Fort Purbrook and this was at a time when this was a relatively novel application of the material. The pedestrian bridges to the upper floor of the Redan at Fort Purbrook are made from wrought iron and this contrasts with brick bridges performing the same role in Forts Widley and Southwick. Those two forts were built at the same time as Fort Purbrook but by a different contractor.

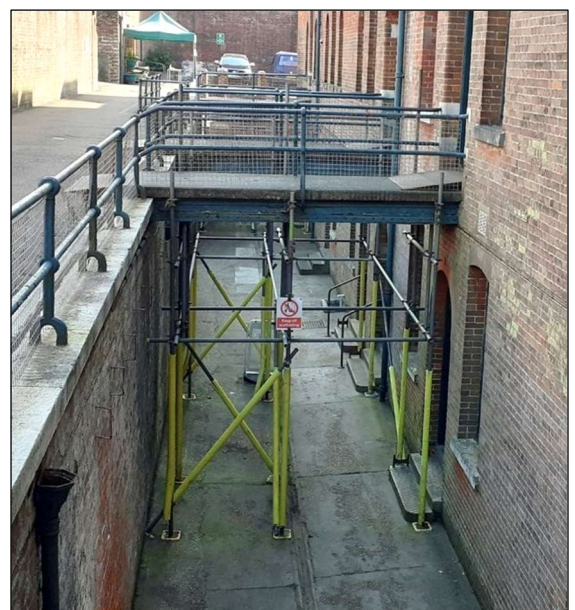
The bridges at Fort Purbrook are therefore particularly important examples in the history of the use of this material.

2. The Need for Renovation

Sadly, the bridges were no longer fit for purpose. Their original form was an iron structure with a wooden walkway but they had been through a number of modifications during over 150 years of service. The final result until very recently was a combination of corroding ironwork, temporary supports, concrete decks of questionable integrity and unattractive access ramps at each end.

The fort is not a museum, it is a heritage site with an important up to date job to do. It is one of the locations of the Peter Ashley Activity Centres, a registered charity providing and enabling a wide range of sports and activities for children and adults. That means that its facilities have to be safe and accessible for all. In particular, the bridges had to be remodelled in a way that would provide step-free access.

Access to the first floor of the Redan was entirely reliant on the bridges being in good order. For over ten years temporary support had been provided



below the bridges to ensure that their use could continue. The condition of the bridges had become a potential threat to the ongoing use of the fort as a residential activity centre.

Restoration was not an option. The structural properties of wrought iron differ from modern steel. It is far less brittle than cast iron but its tensile strength and fatigue resistance are well below that of steel. This created significant challenges for any attempt to repair the bridges. Apart from the cost or recreating a riveted wrought iron construction in the 2020s, it was debatable whether a repaired wrought iron bridge could be declared safe for all possible load conditions. In any case, the original design would not meet the step free access requirement and the handrails would not meet modern regulations.

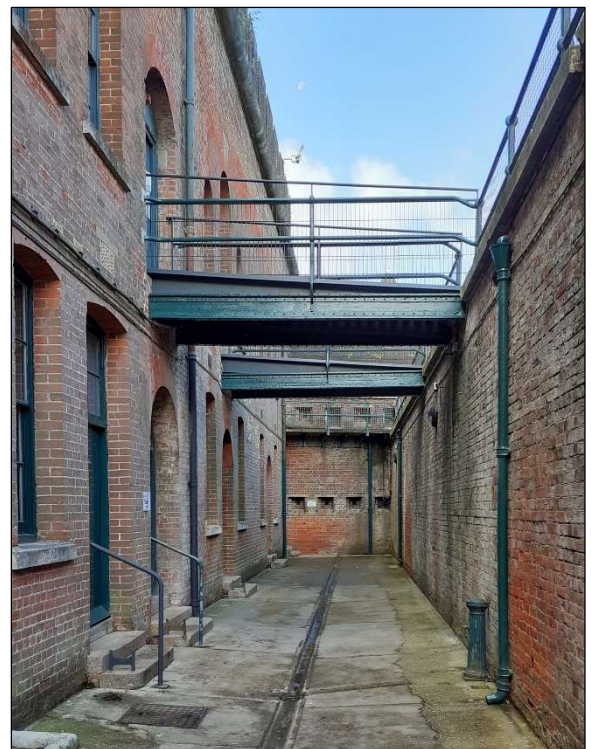
2. The Solution

The result achieved is a very satisfying compromise between functionality and heritage. A modern wood-boarded steel bridge provides a gentle ramp between the two levels. The original wrought iron beams were removed and renovated and then put back in place showing the appearance of the original bridge. The original handrails are also in place and supplemented by new slim profile handrails which meet the modern regulations.

Responsibility for the design, coordination and implementation of the project was led by The Goddard Partnership Limited. Under their guidance and through the development of a Conservation Management Plan, a strategy was been prepared to allow the lengthy task of repairing the bridges to be tackled without interrupting access to the Redan by the tens of thousands of people who visit the fort every year. Working with the contractor, R J Winnicott of Rowlands Castle, a plan was devised to allow walkways to be erected and dismantled in sequence to allow the activities and the vital income they bring to continue during the work.

The recognition of the importance of the use of wrought iron in this context was critical in obtaining financial support for the repairs from the Department of Culture, Media and Sports Heritage Stimulus Fund, managed by Historic England. Their funding, along with the generosity of Portsmouth City Council, as well as contributions from the PAACT's own conservation fund, has allowed this critical project to be completed.

Wrought iron is no longer produced in Britain, with only one supplier near York remaining, who re-purpose existing material for use in conservation projects. It is through their expertise and skill that Fort Purbrook's bridges have been conserved and retained.



The completed bridges are finished with a familiar conservation architect's technique. The new materials are rendered in a modern gunmetal grey finish while the original materials are painted in a traditional dark green.

The work took nearly 4 years to plan, fund and implement and cost £320k but Goddard Partnership are confident that the work will be good for the next 150 years.

