

HISTORIC SHIPS AND DOCKS: A MARRIAGE OF CONVENIENCE OR THE PERFECT UNION?

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SUMMARY

Docks are essential for the construction and maintenance of ships, hosting vessels regularly throughout their operational lives. Major historic ships across the UK are increasingly located permanently within dry docks, due to the financial benefits and opportunities for preservation, accessibility and interpretation. Through the docks, ships can create stronger bonds to their local communities, complement their curatorial interpretation, and enhance their impacts on society. This association also benefits docks that are otherwise at risk of neglect and abandonment. However, placing historic vessels within docks can require large capital expenditure, increase ongoing costs, and constrain future decision-making. Accordingly, full consideration must be given to the consequences of placing vessels within docks, before the preferred conservation path is selected. Through reference to various case studies, the benefits and drawbacks of installing historic ships within dry docks are explored, highlighting how this proposition ultimately provides more certainty and controls to a historic vessel owner.

1. INTRODUCTION

Ships and docks share a mutually beneficial relationship. Docks play a vital and often underappreciated role throughout a vessel's operational lifespan. They are essential for construction, maintenance, and decommissioning or deconstruction. Regular docking is fundamental to ensure that ships remain seaworthy, and to allow their function and facilities to evolve as needed. On the other hand, docks are created and supported by demand for ship construction and maintenance. Docks that are not occupied by an active shipping industry often lose their purpose and fall into disuse and disrepair.

When, specifically, ships transition from working to historic vessels, a number of important changes take place, presenting both challenges and opportunities. Historic vessels generally no longer provide a commercial service, reducing their income and limiting funding for maintenance. However, as their structures age the amount of intervention required rises. When carrying out maintenance and restoration, the preservation of historic fabric becomes more important – elements that once would have been stripped out and replaced must now be retained for curatorial and interpretational purposes. Accessibility requirements increase, as ships are typically presented as museums or exhibits. These vessels often also become stationary assets, losing the need to maintain complex propulsion and navigation systems that enabled the vessel to navigate safely. This removes the need for the vessel to remain classed, eliminating minimum standards of compliance. At the same time, ships that do not need to travel can remain in single locations, establishing emotional and logistical connections with their surroundings.

This evolution impacts the relationship between ships and docks. When an historic vessel is not permanently located within, or close to, a dry dock, accessing dry docks for maintenance is logistically complex, expensive and laden with potential risks. On the other hand, when available,

dry docks can provide a long-term home for historic ships, facilitating ongoing maintenance and reducing the costs of conservation. New opportunities for accessibility and interpretation can be created, and the vessels can more easily interface with museums and communities. The docks themselves can be unique and valuable historical artefacts, with over 40 dry docks Grade II listed by Historic England (Historic England, n.d.). As such, the relationship between historic ships and their docks is very different to their working counterparts.

At the time of writing, many of the United Kingdom's pre-eminent historic vessels are permanently located in dry docks. This includes Napoleonic timber warships, pioneering Victorian steamships, and 1960's fishing trawlers. Within maritime heritage, permanent installation in dry docks is commonly viewed as the preferential solution for large ships, both timber and metal-hulled. However, placing historic ships within dry docks comes with a distinct set of challenges, specific to each location and vessel. These require full consideration before irreversible decisions, which have major consequences for ongoing and future conservation, are made.

Through reference to various case studies, this paper investigates the interdependencies between historic ships and docks. The conservation impacts are evaluated, before discussion of the wider social effects. This enables conclusions to be drawn on its effectiveness and applicability to other vessels.

2. CONSERVATION BENEFITS

Conservation is the key concern for most historic ships. Preserving historic fabric, allowing interpretation and sharing knowledge are typically among historic ship owners' central goals and priorities. This section examines how installing historic ships in dry docks can help to deliver effective conservation.

HMS *Victory* presents one of the earliest examples of a ship conserved beyond its working lifespan for its historical significance. After the end of its naval career, *Victory* gradually fell into a condition of disrepair and in 1922 was transferred into Portsmouth Harbour's No. 2 dock (Aberg, 2005). This move was initially motivated by an urgent requirement for restoration. Upon its arrival, *Victory* was found to be in such poor condition that refloating was deemed impossible - it was estimated that between a third and half of its fabric required replacement (Aberg, 2005). As such the ship has remained within the dock to allow the continuous restoration and maintenance that it requires. This is one of the core benefits of placing historic vessels within docks. Having constant and comprehensive access to the hull facilitates monitoring and intervention. In turn, this reduces loss of historic fabric and risk of deterioration, lowers the costs of carrying out works and permits the vessel to remain at least partially open to the public during the works.

At the time of writing, HMS *Unicorn* in Dundee is in a comparable position to HMS *Victory* in 1922. A 200-year-old timber frigate, *Unicorn* has not been dry docked since 1971. It is now in poor condition with pronounced hogging. Due to geographical constraints, the adjacent East Graving Dock is the only location available for restoration works (UPS, n.d.). Once these are completed, it is intended that the dock shall serve as a permanent home to the vessel, with the dock itself repurposed to house a new museum space and public realm. In this way, docks can provide certainty for historic vessels and a stable environment in which long-term plans can be made. They provide the facilities necessary for ongoing conservation, reducing reliance upon external parties, and helping to avoid the situation in which *Unicorn* now finds itself.

One of the greatest challenges facing HMS *Unicorn* is that the East Graving Dock has been abandoned since the 1990s. In contrast, when SS *Great Britain* was returned to the Great Western Dockyard in Bristol in 1970, the dock was still part of an operational shipyard. After restoration within its dock, the ship was opened to the public as a museum. However, in 1998 it was discovered that severe corrosion of SS *Great Britain* was ongoing within the dock, threatening the remaining historic fabric and structural integrity of the ship. To address this and further support the structure of the ship, a glass structure was constructed around the ship's waterline. This creates a de-humidified environment within the dock which can be effectively monitored and controlled. It has reduced the ongoing loss of historic fabric from the hull and created a unique space within the dock for visitors to examine the ship's underside (Watkinson & Tanner, 2008). In addition, it has enabled installation of lifts for improved public access, increasing the site's functionality as a museum.

Innovative interpretational choices have also been adopted on the *Cutty Sark*, in London. This former tea clipper was installed in a custom-built dry-dock in Greenwich in 1954. After a costly and complex restoration process beginning

in 2006, the ship has been raised 3m above its dock on a steel frame and is partially enclosed by a glass canopy to the waterline. To the external viewer it is intended to seem afloat, while from beneath the elegant and sleek lines of the hull are emphasised. The underlying chamber is used as museum space and for events, providing an extra source of income (Royal Museums Greenwich, 2013). Through changing the manner in which visitors interact with historic vessels, docks offer new opportunities for public accessibility and interpretation.

The preceding case studies are ships that are, or will be, sited within drained docks. An alternative approach is to leave vessels afloat within their dock. The dock can then be emptied when the vessel requires maintenance. For example, the timber polar exploration vessel RRS *Discovery* is located in Dundee, within a dock built for the return of the ship in 1992. At the time of writing, the dock is drained to allow major remedial works to be carried out to the ship. Upon completion thereof, it is planned that *Discovery* will be refloated within this facility. In this situation, floating is preferred as immersion in salt water can help to preserve the timbers. This can reduce the frequency of required works, improving financial and environmental sustainability.

Similarly, HMS *Trincomalee* is afloat within a dry dock in the National Museum of the Royal Navy in Hartlepool. This provides interpretational benefits – the ship is displayed afloat within the surrounding museum, which is designed in the style of a Georgian quayside. In addition, keeping the ship afloat retains flexibility in long-term decision making. If deemed preferable in the future, the ship can be permanently dry-docked. However, due to the loss of strength and deformation as timbers dry out, this would ultimately be an irreversible process. By keeping the ship afloat, a broader range of long-term options are retained.

Moving beyond the UK, the iron-hulled ship SS *Pommern* sits afloat within a bespoke dock in the Åland Islands, adjacent to Mariehamn's maritime museum (Hagmark & Eriksson, 2019). The dock was completed in 2019, and its primary purpose is to enable the ship to be dry-docked in-situ. This will allow inspection and maintenance works to be carried out without towing the ship elsewhere, as has been carried out historically. This provides the museum with greater oversight of *Pommern's* condition, allowing maintenance to be streamlined and interventions to be carried out locally (Hagmark & Eriksson, 2019). This reduces operating costs and increases sustainability, fosters a local pool of traditional skills to future-proof the maintenance of the ship, and creates community engagement and interest.

On the other hand, the conservation of the docks also benefits from the presence of historic vessels. Portsmouth's No. 2 dock is now the oldest operational dock in the world. The Hull Maritime Project involves renovation of the former North End Shipyard to serve as

the permanent home of the trawler *Arctic Corsair* (Hull Maritime, n.d.). Prior to the involvement of HMS *Unicorn*, there were no plans for the restoration of the East Graving Dock. While SS *Great Britain*'s dock was operational at the time of its return, the ship's presence has undeniably guaranteed its continued upkeep. In contrast, the adjacent Albion Dockyard was derelict between 2016 and 2019 and is now proposed for development by SS *Great Britain*'s managing trust to house a replica of the SS *Great Western* (NHS-UK, n.d.).

In summary, docks provide long-term homes for historic ships, simplifying restoration campaigns and ongoing maintenance, and helping in the preservation of historic fabric. Through improved accessibility, they can provide visitors with novel perspectives and create opportunities for enhanced interpretation. Through effective design, docks can create new links between the ship and the surrounding community. Finally, the presence of the vessels can ensure the survival and ongoing upkeep of historic docks, which would otherwise be neglected.

3. CHALLENGES

Section 2 has used a number of case studies to identify how placing an historic vessel within a dry dock can provide benefits for the conservation of both the ship and dock. In this section, these case studies are explored further to examine the challenges posed by this relationship.

Firstly, the dock can require significant investment to make it suitable to hold the historic ship. Dundee's East Graving Dock has been unused for over 25 years. The dock gate, dating from the early 20th century, has seized and warped, rendering the gate inoperable. The timber jetty used to guide ships around the dock arm has lost members and experienced severe rot. The pump infrastructure has been removed and the condition of the culverts is unknown. As such, the restoration of the dock will itself be a significant project. Uncertainty remains regarding the stability of the dock arm and the full scope of works necessary to prepare it. These works will require large amounts of funding and a significant programme of works, while HMS *Unicorn* awaits the dock's preparation.

Similarly, the *Arctic Corsair* will be instated in a historic dock at North End Shipyard upon completion of restoration of the vessel. The dock has remained unused for an extended period, during which time its infrastructure has degraded. As in Dundee, the dock gate requires replacement, and large amounts of silt has had to be removed. In addition, the base slab has been found to leak, which requires intervention. Addressing these issues will require over £1.5 million. However, these costs are dwarfed by those of constructing a new dock, as with *Pommern*.

Issues with the dock can also lead to higher operational expenditure. Returning SS *Great Britain* in the dock in

which it was constructed has manifest interpretational benefits, but the use of the listed historic dock also has some challenges. Active leaking through the dock walls was found to create the ideal atmosphere for corrosion and has increased the cost of the ongoing environmental management. Similarly, HMS *Victory*'s dock has required significant cleaning and graving repairs to overcome water leakage, structural cracks, corrosion and the effects of climate change (Vinci Response, n.d.).

In addition, removing ships from the water for extended periods can lead to damage to their structures. When first docked, HMS *Victory* was supported by 22 steel cradles, running at regular intervals across its width. Over time it was found that these were insufficient to adequately spread the vessel's weight, causing large deformations to form. These required large amounts of timber replacement, and development of an alternative cradle system. The new system involves 134 props which serve to spread the weight more evenly across the hull and can be adjusted to maintain balanced loading at all times. This system is complex and innovative and its cost of approximately £35 million would be beyond the capacity of most museums and vessel owners (BBC, 2020). Similar deformations at prop locations were observed on the *Cutty Sark* prior to its restoration (Tresidder & Davies, 2018). This reflects that, although removing vessels from water can facilitate maintenance, it can have unforeseen consequences and increase the amount of maintenance required.

Vessels that are kept afloat within their docks are less likely to experience deformation and damage. However, the dry-docking procedure is expensive and contains significant risks. The vessel can be damaged as the load paths within the structure change. Failure to adequately support the ship can cause it to capsize, putting historic fabric, surrounding infrastructure and operatives and visitors at risk. When the dock is refilled, there is a high likelihood of water ingress into the vessel. This is particularly relevant for timber ships, which require time for the timbers to absorb water and swell up, squeezing the caulking tight to form a watertight seal.

While placing historic ships in dry docks can help to aid their management and operation, it can also constrain them in the long term. For example, when RRS *Discovery* was transported to Dundee in 1992 it was placed in a fully functional dry dock with a working caisson gate. However, construction of the V&A Dundee adjacent to the vessel involved removal of the dock gate, and replacement with a permanent concrete wall. The design of the V&A is such that, even if a gate was present, all of *Discovery*'s masts would need to be removed to enable this. This geographical constraint has created a significant challenge in the procurement of restoration works. As the ship can no longer be transported to a shipyard, all contractors must relocate to the site to carry out restoration works, resulting in higher mobilisation costs.

In summary, placing historic ships within docks can require large amounts of investment in the dock itself. Unexpected ongoing costs can also arise, due to maintenance to the dock structure and to the vessel. Permanent dry-docking and keeping ships afloat both pose challenges and must be managed correctly. While placing ships within docks helps provide certainty for the future, it can also constrain the ship's future conservation options which may increase costs.

4. SOCIAL IMPACT

The preceding sections have discussed the reasons for placing historic vessels within dry docks, and the numerous challenges that this can present. This discussion has focused on the practicalities of delivering the ongoing conservation of historic vessels. While conservation is generally the central aim for historic ships, a secondary goal is that ships play an important and meaningful role in their communities. This section examines how docks can enable historic ships to have wider social impacts.

Docks can supplement and complement the historic nature of the ships, allowing them to communicate more about the societies and industries that created them. Locating SS *Great Britain* within the Great Western Dockyard enables the story of the ship's construction to be told and facilitates connection to the wider engineering innovation of the Victorian era. The historic dock office is used as a museum exhibit on the life of Isambard Kingdom Brunel, who also designed the Clifton Suspension Bridge and the Great Western Railway, key pieces of infrastructure for Bristol. The *Arctic Corsair's* placement within the North End Shipyard reinforces the ship's links not only to Hull's fishing industry but also to its shipbuilding history, emphasised by the adjacent historic Scotch Derrick crane. These are further supplemented by the wider Hull Maritime Project, including a refurbished light vessel and maritime museum. The seaport surrounding HMS *Trincomalee* helps to transport its visitors to a different century, providing important historical context to the ship.

Placing ships within docks enables connections to other historical assets, and the creation of maritime heritage centres. This helps attract visitors to enable the ships to remain financially sustainable and culturally important. HMS *Victory* is at the heart of Portsmouth's Historic Dockyard. This places it alongside other major vessels such as HMS *M.33*, the *Mary Rose* and HMS *Warrior*, and within a wider museum complex. The size of this collection, and the significance of its contents, make this a site of national importance. Similarly, locating HMS *Gannet*, *Cavalier* and *Ocelot* together in the Historic Dockyard Chatham creates a substantial and meaningful monument to Chatham's long naval history. This could not be achieved by the ships or dockyards in isolation. The *Cutty Sark* in London is in close proximity to the Old

Royal Naval College and the National Maritime Museum, enabling visitors to better understand its place within Britain's wider maritime heritage. By providing interfaces between the historic ships and their surroundings, docks are key in the creation of cultural hubs.

Finally, docks provide opportunities to create new areas of public realm. In the Åland Islands, the public can walk on the dock arm around *Pommern*. A large area of promenade has been created on the quayside, serving as space for public interactions and events, and bringing more life to the community. By delivering wider public benefits as part of a conservation project, the ship has helped to cement its local popularity and significance. Similarly, proposals for the East Graving Dock in Dundee involve emptying and restoring the dock to working order, alongside returning a substantial portion of the dock arm to the public domain. The restoration of an existing swing bridge on the dock arm will allow formation of a continuous path from RRS *Discovery* to HMS *Unicorn* and onwards through the city. By providing wider social benefits, this project can create deeper connections with the community and help to ensure its future survival.

In summary, combining docks and ships offers the opportunity to create destinations of enhanced cultural and social value. They can forge stronger links to the communities in which they are located, help to ensure a steady flow of visitors, and share common stories and culture. This can serve as a means of regeneration and regrowth. For example, the Hull Maritime Project aims to create a world-class visitor attraction of the future, bringing an additional 300,000 visitors to the city per year, and reconnecting the centre of Hull to its historic waterfront. Similarly, the National Museum of the Royal Navy Hartlepool was constructed as part of the economic regeneration of old industrial dockland. It receives 50,000 visitors a year, with ambitious expansion plans launched in 2022 to double this. Through these means, historic ships can act to support the communities that created them.

5. HERITAGE SKILLS AND WIDER CONTEXT

A growing concern for historic ships is the steady decrease in the availability of traditional skills. These are vital to maintain and preserve historic ships in a way that is sympathetic with the original fabric, and in keeping with the methods and techniques used to build these vessels. The disappearance of these skills is a major underlying factor in the growing costs and complexities in preserving historic ships. This decline can be traced to the closure and abandonment of dry docks in the UK and globally. Dry docks played host to the construction and maintenance of ships and were where the trades and skills needed to preserve these ships were retained. As the businesses that sustained drydocks started to falter and close, the skills they fostered started to disappear. It is important thus that drydocks are not only viewed as a tool for the simple

operation of drydocking a ship, but as a focus for the trades and craftsmanship needed to preserve the vessels.

By connecting ships to docks, this narrative can be better presented and interpreted, with the stories and technologies developed in these locations brought to the forefront. This can provide a different perspective of a historic ships story, and enhance it, with the two complementing each other.

SS Great Britain is unique in that the ship is located in the drydock in which it was built. The combination of this element with the famous story of the design by Isambard Kingdom Brunel creates a narrative that is unique, and an offering that outstrips the potential sum of each element.

Through discussion and presentation of the connection between these artefacts, a spotlight is placed on industries, skills and careers that historically built the docks and ships, but are still available today. Highlighting these skills and crafts promotes these industries, and allows people, to engage with them. It may help such careers to be viewed as modern and available, and not as historical and outdated. For example, a key element of Hull Maritime's project was to reconnect the population to their waterfront and heritage, with a view of promoting it as a future as well.

By contextualising the ships within docks, people can connect not only to the ship, but the industry that built them, and in so lay the foundations for new generations to be interested in skills and techniques that will ensure the future preservation of our maritime heritage.

6. COMPARISON TO OTHER CONSERVATION METHODS

Although conserving historic ships within dry docks is often seen as the preferred solution for large vessels, many ships are not permanently located within docks. Through comparison to these other forms of conservation, the advantages of docks can be better understood and appreciated.

Many historic ships are conserved afloat at moorings. Such vessels rarely have guaranteed regular access to dry docks, or the funding to pay for it. This can result in long-term degradation and loss of historic fabric. PS *Wingfield Castle* is a museum ship moored within Hartlepool Marina. Due to modifications to the marina gates, the ship can no longer leave the marina. As such, *Wingfield Castle* can only be docked within HMS *Trincomalee's* dock, which is also within the marina. However, this dock also requires substantial modification to ensure *Wingfield Castle* can enter. Due to this situation, *Wingfield Castle* has degraded significantly over time, and is now closed to the public. HMS *Unicorn* is similarly trapped within a dock system. Its inability to access a working dry dock has led to the current extent of degradation, which is the critical threat to the ship's ongoing survival.

The result of this is that ships outside docks are more susceptible to sinking. For example, while moored in Portsmouth harbour, HMS *Victory* sank in 1854 and narrowly avoided the same fate in 1887 and 1903. The latter of these events was caused by accidental ramming by another ship (Aberg, 2005). The *Medway Queen*, an historic paddle steamer, sank at its mooring in the River Medina in 1978, and was only refloated 7 years later. The *Esther*, a fishing smack from the late 19th century, is currently sunk at its mooring adjacent to the *Ross Tiger* in Grimsby, and HMS *Bronington* has been sunk in Birkenhead since 2016.

However, docks do not completely make historic ships immune from unforeseen events. The *Cutty Sark* caught fire in 2007 while in dock, during restoration works. This caused extensive damage and increased the cost of the works by £5-10 million (Royal Museums Greenwich, 2013). HMS *Victory* has been subject to multiple deathwatch beetle infestations since it was installed in No.2 Dock. These are estimated to have caused the greatest loss of historic timber from the ship in this time period (McKie, 2024). If ships are not adequately supported, damage can occur such as to HMS *Victory* and the *Cutty Sark*.

In addition, remaining afloat at a mooring avoids ongoing liability for upkeep of the dock. As discussed above, this can be substantial. It also allows flexibility in terms of operations, and does not preclude options for maintenance and restoration. This is particularly relevant where a nearby shipyards and facilities allow for access to a competitive market, which can provide better value for restoration project. Tall Ship *Glenlee* in Glasgow until recently had access to numerous shipyards on the Clyde for the ship's maintenance, allowing for competitive tendering, with this still being true now, although on a much-reduced scale. Similarly in Hull, works to the *Arctic Corsair* and the *Spurn Light Vessel* had access to enough shipyards to allow for competition and negotiations that provided increased value to the local council.

7. CONCLUSIONS

This paper has investigated the relationship between historic ships and their docks, through reference to a number of case studies from around the United Kingdom and beyond. It has shown how docks can play an invaluable role in the conservation of historic ships, by facilitating maintenance and preservation of historic fabric, allowing interpretation and access, and connecting them to their communities.

While historic ships are highly valuable and significant artefacts, docks can magnify their importance. This can be through placing them within their wider historical context, and connecting them to other pieces of maritime heritage, such as HMS *Victory* within Portsmouth's Historic

Dockyard. Docks can change their relationship to the public domain and physically transform them into part of the community, as with *Pommern*. Finally, they can act as a catalyst for regeneration and regrowth, as with HMS *Trincomalee* and the surrounding 18th Century seaport in Hartlepool. Through these means, historic ships and docks can serve as a focal point for placemaking. By creating locations that engage both locals and tourists, they can share knowledge, culture and common stories.

These benefits cannot be delivered without overcoming challenges. Docks have very high construction costs, and reinstating non-operational facilities such as the North End Shipyard in Hull and the East Graving Dock in Dundee can involve significant investment. The need to maintain the dock will cause operating costs to increase, as in the Great Western Dockyard and on HMS *Victory*. Both permanent dry-docking and keeping vessels afloat within docks contains risks, and docks can limit the conservation options available to vessels.

Accordingly, when selecting the preferred long-term conservation path for an historic ship, many factors must be taken into consideration. These include: the condition of the vessel and its structures, and how these will evolve over time; the local availability of dry docks, their status and situation; the vessel's funding model and how that compares to ongoing costs; how immediate and future works can be delivered successfully and sustainably; the ship's historic significance and how that can best be interpreted, and the requirements and opportunities for the surrounding community.

Historic ships have now been permanently kept in dry docks for over a century. This long experience, and the large number of highly significant vessels that are conserved in this manner, has allowed a comprehensive evaluation of its benefits and shortcomings, opportunities and challenges to be carried out. This context can be used to benefit historic ships that will be conserved in this manner in the future.

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