The current issue and full text archive of this journal is available on Emerald Insight at:
www.emeraldinsight.com/2044-1266.htm

Received 17 April 2019
Revised 25 July 2019
Accepted 9 September 2019

Designing with maritime heritage: adaptive re-use of small-scale shipyards in northwest Europe

Jelle Hettema and Linde Egberts
Faculty of Humanities, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

Abstract

Purpose – The purpose of this paper is to describe the different design approaches architects take towards the adaptive reuse of small-scale shipyards. Thereby giving a proposition for future projects by giving insight in how others preceded and showcasing different possibilities.
Design/methodology/approach – The research is based on a literary review in combination with a case study, following one main question: What architectural approaches do architects employ in redesigning nineteenth- and twentieth century dockyards in Northern Europe and how do these approaches consider the history of building and context? First, this paper researches the history of adaptive reuse. Additionally, the historical and cultural context of shipyards is researched. Finally, a case study is done linking theory with practice. Selected cases are: Kromhout shipyard in Amsterdam, Verftet Ny-Hellesund in Ny-Hellesund and the Maritime Museum in Helsingør.
Findings – Four approaches to adaptive re-use were distinguished in the cases: differentiation, continuation, cultivation and optimisation. Each has its own implications for the design and the chosen approach is ultimately related to the important heritage values of each individual shipyard. Heritage professionals proved to have a great say, in the early stages of the adaptation process, in which the adaptive reuse approach was chosen.
Research limitations/implications – This comparative research enables an in-depth analysis and comparison and thorough qualitative understanding. It however limits the insight in the representativeness of these cases.
Originality/value – This paper compares the adaptive reuse of small-scale shipyards in an international perspective. It offers insight into the patterns, principles and context of the architectural reuse of this underexposed industrial heritage.

Keywords Architecture, Northwest Europe, Shipyard, Adaptive reuse, Industrial heritage

Paper type Research paper

Introduction

The re-use of industrial heritage is hot: every self-respecting town polishes up its historic breweries, textile mills or fish factories and gives them a new function, often recreational, cultural or creative. The same happens with historic shipyards, that signify the longstanding relationship of towns with livelihoods depending on the water. By adapting and reusing these wharfs, the histories of these sites can become part of future identity narratives.

The readability of the layered pasts of port cities is an important argument to re-use historic wharfs instead of the alternative: demolition. But taken more broadly, cultural heritage plays an important role in sustainability (Auclair and Fairclough, 2015;

© Jelle Hettema and Linde Egberts. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial & non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at http://creativecommons.org/licences/by/4.0/legalcode

The Interreg Europe project HERICOAST (2016–2020) has provided us with the research time to develop this paper. The authors are grateful to Hans Renes for his constructive comments during our research and Iris Burgers for fruitful discussions.

Journal of Cultural Heritage Management and Sustainable Development
Vol. 10 No. 2, 2020
pp. 130-143
Emerald Publishing Limited
2044-1266
DOI 10.1108/JCHMSD-04-2019-0032

Tweed and Sutherland, 2007), in all three dimensions that are generally associated with the concept of sustainability: environment, economy and society (Tweed and Sutherland, 2007). Particularly the idea that dynamic and adaptive re-use of heritage contributes to social and cultural aspects of sustainability has gained momentum over the past decade in heritage studies and heritage institutions. It is for example the basic idea of the Historic Urban Landscape approach, developed by UNESCO in 2011 (Bandarin and Van Oers, 2015).

Historic shipyards also embody opportunities for sustainable development of historic landscapes and their communities. As we can see in every major port city in Europe, harbour areas, including historic wharfs, are being transformed drastically. The reuse of historic elements in these areas offers the potential of recognisability of former meanings and functions of the area. It can therewith offer inhabitants (minorities or former employees, for example) and visitors "anchors for identification". Moreover, the presence of built heritage can boost local economies by attracting investments and tourists. And lastly, the preservation of built structures can be less environmentally damaging than demolition and construction of new buildings.

For these, and many other reasons, historic shipyards are being re-used in many historic port cities, towns and villages. Crucial for the present and future meanings of these wharfs are the choices that are made during the adaptive reuse process: which parts of the wharf's history is retold, which features are assigned heritage value, what is the future function and very importantly: how do architects bring together all these elements in their design?

In this paper we focus on small-scale wharfs as a specific form of coastal industrial heritage from an architectural point of view (Clark, 1997). Small-scale wharfs suffered greatly of competition amongst each other, while trying to keep up with modernisation processes. We aim to gain overview of the variation in design approaches to adaptive re-use of these shipyards, thereby giving a proposition for future projects. Not by giving single instructions on how to design, but rather by giving insight in how others preceded and where the challenges lay, which can help both architects and heritage professionals, governments and investors, and all others concerned with a similar transformation.

Research aim and question

Although industrial heritage is today well-studied and the interest for reusing industrial buildings has boomed, shipyards are underexposed in research on industrial heritage. The majority of sources regarding industrial heritage and especially water-related industrial heritage originate from the 1980s, when more historic ports came under threat by growing capacity of maritime transport and the ever-sprawling cities (Haspel, 1992).

Furthermore, there is an obvious (yet significant) change in society. In Northern Europe, access to rivers and the seas historically provided a convenient way of transportation and therefore: prosperity. In most countries that were strongly connected to the sea, communities could exist that for their sustenance relied solely on the water (Davids, 2015). This also brought along distinctive ways of living and therefore specific ways of building. However, in most towns the connection that the public had with water has since the beginning of the nineteenth century, more or less, faded away. The invention of more practical and faster transportation services over land like the train and automobile, diminished the importance of water for cities and their people. Since that time, the usage of surface water has two purposes: recreation and freight shipping, the latter of which has more or less disappeared from the hearts of cities and moved out to large-scale harbour complexes. The re-use of industrial shipyards forms an opportunity to restore the historic relationship of towns with the water, but it is unclear how this relationship is

integrated in the new form and functions of these historic locations. This raises the main question we aim to answer:

RQ1. What approaches do architects employ in redesigning small-scale nineteenth- and twentieth century dockyards in Northwest Europe and how do these approaches consider the history of building and context?

The aim of this paper is to explicate the different design approaches architects can take towards the transformation of shipyards and to evaluate how these incorporate the heritage values of these shipyards. The outcome for this paper is a number of possibilities and gives recommendations for the transformation of shipyards.

We choose to focus on shipyards because of their specific qualities, namely, their multidimensional relationship to the water to be able to assess which approaches do most justice to these qualities. By doing so, we hope to contribute to adaptive reuse of industrial heritage not as a generic matter, but as interventions that reflect the complexity of cultural, historical, spatial and typological characteristics of individual sites. Only this way, industrial heritage can contribute to sustainability of societies in the long term.

Adaptive re-use of industrial heritage has received much attention from researchers in the fields of architecture, spatial planning, heritage, economics and tourism (Wicke, 2018; Xie, 2015; Oeverman and Mieg, 2015). These studies are most often limited to case studies of iconic transformations, such as Zeche Zollverein in Essen, Germany. Comparative and integrative studies of adaptive re-use of industrial heritage are few and far between, which leads to a situation in which we know very little about the patterns and commonalities among these cases. The added value of this paper lies in its comparative perspective, that enables us to develop vision and recommendations for the choices and interventions that result in "good" transformation projects, meaning those projects in which some of the characteristic heritage values of an area have been respected and enhanced in its re-use process.

Research methods

The research of this paper consists of three elements. First, shipyards as a heritage category are introduced through a general historical sketch and some remarks about reuse of this building type. This is based on a literary review, including sources discussing the impact of water and sea on society. Second, we discuss how approaches to adaptive re-use of built heritage in general can be analysed and categorised. Third, we perform an analyses on three cases, that are more or less comparable in size: the Kromhout shipyard in Amsterdam, the Netherlands, Verftet Ny-Hellesund in Ny-Hellesund, Norway and the Maritime Museum in Helsingør, Denmark.

The choice for these small yards has to do with the challenges of re-using them. Small-scale shipyards have quite different re-use challenges than their larger counterparts, that are often adapted by building new structures inside the historic shell (as is the case at Rotterdam Drydock Company that now functions as a school for vocational technical training). The choices for the studied cases are based on three aspects:

(1) comparable small size of the historic wharf;

(2) comparable locations: seafaring connections and parallel histories provide the cases with related historic backgrounds; and

(3) different transformation approaches, showing a spectrum of possibilities.

For each case the study of historical literary is combined with interviews with experts and with site visits. A total of eight different aspects are included in each case analysis: history and context, site, architecture, heritage values, aim and design brief, transformation design, approaches and an evaluation of the outcomes.

Shipyards in their historical context

Maritime life has been an integral part of society, especially within port cities. The transnational influences from the seafarers landing in a port city provided a fusion of maritime and land based culture (Beaven *et al.*, 2016). This was encouraged by the nature of early maritime transport. Ships were made of timber and equipped with sails and masts. Their size, speed and capacity matched those of the harbour they docked, which in its turn resulted in a steady stream of seafarers and leading to a maritime culture within the city. Maritime and city life were deeply interconnected and mutually interdependent: harbour workers and sailors lived in the city permanently or temporarily and complex economies developed around the storage and trade of goods that came and went by ship.

The upscaling of maritime transportation has distanced and alienated maritime life from cities. This is made possible first by two inventions: steam engines and iron-hulled construction techniques. These enabled the increasing size of ships and faster transportation between harbours. Port layout changed and could expand outside the city borders, since steam engines enabled ports to be connected to cities by train (Quartermaine, 1999; Hein, 2016). Sprawling wet docks and harbours can be seen in port cities like London, Rotterdam or Copenhagen (Haspel, 1992). Furthermore, the biggest innovation in seafaring is containerisation. While standardised in the 1960s, containerisation put its mark on maritime transportation in the last 30 years, with large bulk carriers and tankers. The size of these ships has grown from 30,000 to over 300,000 tonnes (Bruce and Eyres, 2012) and has accelerated docking times and eliminated the need for storage buildings, since containers are essentially portable warehouses (Quartermaine, 1999).

On the other hand, a small, yet influential, market remained next to the large-scale maritime transportation. Small-scale shipyards could serve local communities and often specialised in building and repairing of (recreational) ships. These shipyards can be seen in urban areas, like shipyard Koningspoort in Rotterdam, as well as rural areas, like shipyard De Hoop in Workum (Stenvert *et al.*, 2000). In these cases, there is still some remnant of the relationship between maritime and city life.

Within maritime architecture, shipyards are often rudimentary and utilitarian buildings. Early shipyards could be limited to a timber workshop and slipway with an optional ropeyard defining the size of such shipyards (Lintsen, 1993). Slipways and dry-docks are the typical elements of a shipyard, they could – but were not necessarily – be combined within a single shipyard. Shipyards show similarities on a global scale, because the standardisation of shipping contributed to a standard layout of dockyards (Bruce and Eyres, 2012). Simultaneously, various types of wharfs existed to accommodate the different types of ships (Hein, 2011). Shipyards evidently grew in scale along with the increasing size of ships and the need for storage of prefabricated elements (Clark, 2005). This is linked to the way ships can be constructed today using block production (Davids and Schippers, 2008). Many shipyards replaced multiple slipways or dry-docks with one larger dry-dock. The utilitarian buildings are often fairly simple, with little to no decoration. However, larger shipyards can have striking constructions with large steel trusses or concrete domes, of which the historic dockyard of Chatham is an example.

What distinguishes shipyards from other industrial buildings is their position on the edge of the land and water, both physically and culturally. Where early wharfs were situated on the water's edge, industrial ones used sloped slipway and dry-docks, through which the border between architecture, land and water is blurred. More culturally, wharfs produced the vessels that gave humans access to the sea and parts of the world beyond the waters.

Adaptive re-use approaches

The above-mentioned particular characteristics that are at the core of the heritage value of historic wharfs as a specific type of industrial heritage. Therefore, we are intrigued by the

question whether these characteristics are appropriated or emphasises when wharfs are being adapted for re-use. A wide range of shipyards has been transformed throughout the world over the previous decades. Large-scale examples include NSDM in Amsterdam, RDM in Rotterdam, shipyard 1862 in Shanghai and multiple examples in the USA, like Hunters Point shipyard in San Francisco, Philadelphia Naval shipyard and Kearney Point New Jersey. Many of them are part of large inner-city restructuring processes, in which abandoned harbour areas are re-integrated in the city's structure by the development of housing and commercial districts with high building density, which make use of the attractive atmosphere of industrial heritage on the waterfront (Hein, 2016). Yet, this seems rather different for shipyards of a smaller size. Due to their scale and location, they offer much less opportunities for fuelling urban restructuring and densification. Large-scale shipyards moved out of historic cities, often up- or downstream or on the opposite site of the river (Renes, in preparation). These locations are now ideal for urban densification, relatively close to the historic city centres and with attractive waterfront. Small-scale shipyards have often remained in their historic locations in cities, towns and villages, making the relationship with the surrounding spatial dynamics quite different. Particularly in areas that struggle with declining populations or low spatial dynamics, their fate is uncertain.

The ways in which these wharfs have been adapted and re-used often fit into long traditions of preservation and re-use of built heritage, that is dominated by several distinguishable trends or approaches. In the nineteenth century, two approaches were most common: the restoration movement, bringing heritage back to an ideal state, embodied by the iconic French state architect Viollet-le-Duc, and the conservation movement which focussed on originality of material, signified through the figure of the British cultural critic John Ruskin. A more nuanced view on conservation and restoration was proposed by the Austrian art historian Alois Riegl, which also introduced the use value of buildings (Wong, 2016). The adaptive reuse of heritage means the restoration or renovation of buildings, in order to give them a new function (Wong, 2016, Austin *et al.*, 1988). Originally conceived by architects, the concept become more theorized during the 1970s, starting off with case studies of particular building types (Cantacuzino, 1975) and later developing into more substantial considerations of the relationship between restoration ethics and the way in which architecture relates to existing environments and buildings (Machado, 1976).

Since the 1970s, scholars have applied various schools of thought to adaptive re-use, ranging from typological and technical, to programmatic and strategic (Plevoets and Van Cleempoel, 2019). The Danish landscape architect Ellen Braae fits into the strategic school, by focussing on the attitude architects take towards the history of buildings and the aim they have for the new architecture. To her, adaptive reuse means to view architecture as a medium that can be altered and is always in transition (Braae, 2018, Braae and Diedrich, 2012). Braae's approach to adaptive re-use forms a good starting point for comparing adaptive re-use of historic shipyards, as she focusses on the strategies of the architects in their response to the history of existing built structures. She distinguishes four different approaches:

(1) Differential: in this approach, new architecture is prevailed over historic architecture. Therefore, new interventions should be distinguishable from the existing building, resulting in contrasting architecture. This approach is exemplified by *museo di castelvecchio* by Carlo Scarpa and more extreme in the Military History Museum by studio Libeskind.

(2) Continuity: this approach is based on historic architecture being superior over the present. Adaptive re-use of this kind is intended as submissive to the existing building, and is kept as minimal as possible to make sure that the building can still function. An example of this attitude towards historic architecture is the theory of John Ruskin, or more recently the renovation of the Burgerweeshuis by Wessel de Jonge.

(3) Cultivation: in this approach, the history of the building is seen as an open-ended past. There is not one past, but a layered past, from different perspectives. Out of this stratified history the architect can choose which version to show in the design. The new architecture thereby goes into dialogue with the past, while creating something new. An example of this approach is the work by David Chipperfield, like the Neues Museum in Berlin.

(4) Optimisation: this final approach sees historic architecture as the relics of a universal knowledge. History and the past are something that can be moulded to an optimised version within a building. Therefore, the material of the building is inferior to this story. The transformation of the building should underline this story or even exaggerate it in order to propagate this to the coming generations. This approach is represented by the work of Viollet-le-Duc and can be seen in MVRDV's glass farm in Schijndel (the Netherlands) where the historic farm was demolished and replaced by an enlarged imprinted glass replica.

Case study

The three case studies we focussed on are examples of shipyards that have lost their function and were recently adapted for re-use. By transforming the shipyards, the sites have become publicly accessible, enabling the experience of these otherwise closed-off areas to everyone who did not work there (apart from occasions like baptism of ships). The studied transformations vary from a restoration to an altogether rebuilding of the site, because all projects have a different context, different reasons for preservation and different performing architects.

The three examples showcase the intensity of the changes on seafaring inflicted by the industrial revolution. Once thriving communities like Ny-Hellesund lost their source of income and impoverished. On the other hand, Kromhout shipyard managed to keep up with the upcoming technology for a while, as is the case for Helsingør somewhat later in time. Due to the shift of manufacturing to other countries, shipbuilding activity diminished in Northern Europe in the second half of the twentieth century. This can clearly be seen throughout the history of these cases. All shipyards could thrive throughout the beginning of the twentieth century, growing larger until the 1960s. Finally, maritime communities in Northern Europe were connected through an extensive network. The communities of these three cases were no exception, being connected to other Northern European maritime countries.

Kromhout shipyard, Amsterdam (the Netherlands)

Like many other shipyards, Kromhout was established in the Eastern part of Amsterdam in 1757. The yard consisted of multiple buildings, with the iconic East and West hall from (from 1887 to 1899), office buildings and piers for mooring boats. After the Kromhout factory left the building to upscale its production elsewhere, Stadsherstel acquired the complex in 1975 for *f*700.000 to save if from demolition. Three years later, Kromhout was listed as a municipal and national monument, for its rarity a remaining small-scale shipyard in this part of Amsterdam, the rarity of the machinery and the steel trussed sheds. In 2002, Stadsherstel Amsterdam, commissioned the adaptive re-use process, in which the two sheds have been restored, while the remaining of the yard was stripped, remediated and replaced with new buildings. The additional buildings were replaced by a new office building, designed by Duinker van der Torre architects (Duinker van der Torre, 2017). In contrast to the pre-existing storage sheds, the office is different in scale and material, but in structure and morphology it is similar to the two old sheds.

The transformation of Kromhout fits best with the Braae's category of optimisation. The entirety of the shipyard was stripped, except for the two iconic sheds, which are restored

and thereby placed on a proverbial pedestal. To a lesser extent, the continuity category is also applicable. The newly added office buildings take some of the idiom and general structure of the shipyard, implemented in a contemporary design, without attempting to replicate or historicise (Plate 1).

Verftet Ny-Hellesund, Ny-Hellesund (Norway)

The former Bentsen and Sønner Slipp shipyard is situated in an historic outport on the south coast of Norway and was in use between 1909 and 2008. The family-owned company built and maintained ships mostly for local use, but also some larger cargo vessels and passenger. The shipyard in Ny-Hellesund originally consisted of one main building, with adjacent small sheds, the slipway and crane, and on the other side a concrete diesel container. This original building was demolished in to make room for a restaurant and apartments in 2010, after a design of Strek Arkitekter. The volume of the original shed has been reconstructed in faded colours and its interior refers to the family history of the shipyard. From the original structures only one concrete fuel tank remains and is converted into an apartment and the slipway is now used as bathing place. At that time, the site was not listed as a monument, but these development plans gave rise to the protection of the villagescape in 2016 (Riksantikvaren, 2018).

This adaptive re-use project falls into Braae's cultivation category, as the architects focus on the stories of the family-owned site, illustrated by the enlarged photographs of the former shipyard in the rental apartments. This is also materialised through the focus on the exterior image of the buildings; with the colour and material of the façade the main focus point. The approach could also be seen as optimisation, as the image of the building is clearly preferred over the material authenticity of the heritage (Plate 2).

Maritime museum in Helsingør (Denmark)

The historic Helsingør Værft was in use between 1882 and 1983, and employed approximately 3,600 workers in its heyday. The yard was expanded several times in the direction of the nearby Kronborg Castle. After its designation as a World Heritage Site in 2000, the site's moat defence system was extensively reconstructed and restored. The former shipyards dry-dock now lies within this castle compound and was transformed in 2015, when the maritime museum was moved out of the historic castle. The World Heritage guidelines dictated that the new museum could not obstruct views on the castle. The design brief also stated that the shape and size of the dock, the void within the dock and the materiality and its industrial character of the dock were to remain visible in the new museum. The winning design, by Bjarke Ingels Group, turned this complicated brief into their advantage, but excavating the surrounding soil and placing the museum around the dry-dock. Two walkways cross the void of the dry-dock, one does this perpendicular on the orientation and provides access to the castle as well as the auditorium space. The other walkway zigzags through the void and provides access to the museum and more exhibition space.

This intervention fits best in Braae's differential category as the architects make a stark contrast between the modern museum and the rough material and the void of the dry-dock. However, while the new design for the maritime museum is contrasting to its host structure, the dry-dock is used as a canvas for the new architecture, that in its turn is not overpowering (Plate 3).

Comparing adaptive re-use of small-scale shipyards

Similarities

Even though the cases show different approaches, they show some striking similarities. First of all, the shipyards are all placed perpendicular to the water, with an entrance on land and



Plate 1.
Kromhout shipyard in 1980 (photo credits: Stadsarchief) and in 2018 (photo by Jelle Hettema)

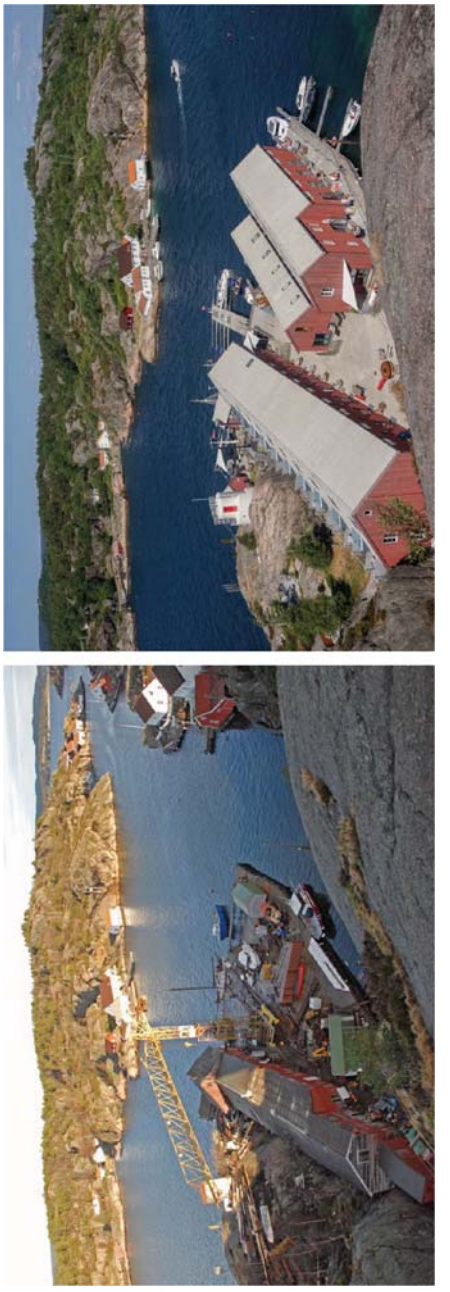


Plate 2.
Helsingør shipyard around 1900 (photographer unknown) and the Maritime museum in 2018 (photo by Linde Egberts)



Plate 3.
Ny-Hellesund shipyard in 2008 (photo by Arnfinn Håverstad) and Verftet in 2018 (photo by Jelle Hettema)

the opening of the building towards the water. Both Helsingør and Kromhout are connected to the road network of the city, the yard is formed between the road and the water.

Second, many features of a typical shipyard like the multiple workshops, storage, crane and the dry-dock or slipway were present in each case. Even the case of Ny-Hellesund, which is limited to one building, had several sheds and a large metal crane. Furthermore, the dockyards showcase a range of the materials that are common in industrial buildings since the industrial revolution, namely, raw concrete and cast iron. The case in Ny-Hellesund displays a more traditional materialisation with wood being the most common material.

Third, each site had to be sanitized drastically in order to facilitate new uses. Both the area and the water have become polluted over time with oil, chemicals and scrap metal. This has to be removed in order to make the space functional for a new purpose. Often, structural adjustments are also necessary, as is the case in Helsingør but also Kromhout. This structural improvement and the remediation of the site is linked to most of the cost. In all these cases, much of the building was stripped, in order to remediate the site. Most of all the additional buildings, sheds, cranes, etc. were demolished. Because of the remediating of the site, many of the former chaos (name it patina or quirkiness) in the yard was therefore cleaned up, leaving a sterile version of the shipyard. Most notably, in each of the cases the removal of the cranes has changed the sight of the shipyards significantly. This leads to a certain serenity that was not present before the transformation.

Fourth, in all three case studies heritage values of the area were integrated into the design brief. This implied that respective heritage values of these shipyards are now visible throughout the redesign. What is deemed valuable in the dockyard and what is aimed for the design, in a way, instructs the approach that the architects take.

Fifth, the heritage values that were included in the brief, and also were represented in the new designs focus is mostly on the material and the morphology of the building, reacting to the spatial development of the site and the preservation of the material. Particularly morphology, or the spatial development of the site, is a guideline for the transformation design. Only in the case of Verftet Ny-Hellesund the focus of the design brief was not only on the building itself, but moreover on the connection to the Bentsen family and the history of the shipyard. This is the exception, because the design also focussed on the area of the village and the impact this new development has on the archipelago. But in outline, the way the design reacts on the existing material and the morphology is different, inducing the different approaches.

Finally, the respective aims for the transformation show similarities among the cases. For instance, the new buildings were all designed to be open to the public, with functions like a museum or a restaurant or event space.

Differences

Some striking differences between the cases can also be found, such as their scale in relationship to their surroundings. The dockyards in Helsingør and Ny-Hellesund stand out, as the plot size of the dockyard are much larger than the surrounding buildings, regardless the density of the area. On the other hand, Kromhout shipyard is more similar to the plot size of surrounding buildings.

Moreover, out of the studied cases, only Kromhout shipyard is listed as a national monument. The shipyard in Helsingør is only partially protected, the dry-dock is not protected. In contrast, the yard in Ny-Hellesund stimulated the protection of the area, while not being listed in itself. In each case, different aspects were seen as valuable for the heritage of the site. In the case of Kromhout material and function were valuable, while in Ny-Hellesund the ties to the Bentsen family and the image of the yard were

important. In Helsingør the experience of the dry-dock and its surroundings was regarded as most valuable.

Furthermore, the choice for an architect done through a commission or a competition both has advantages and disadvantages. The process of a competition can be slower, but it can also give a new perspective on the situation, like in Helsingør, where the rule-breaking design was most fitting. In the case of Kromhout, working with one architectural firm made them able to work in a straightforward manner.

Throughout the case study, a variety of approaches for the transformation of shipyards was shown, ranging from optimisation in Kromhout to cultivation in Ny-Hellesund and differentiation in the Maritime Museum of Helsingør. Also, the architecture of the transformation of shipyards varies widely among the cases, differing in scale and deviation from the original building. The transformation of Kromhout stays close to the original image and function of the yard, while the Maritime Museum is more radical in its approach and architectural expression. Some parts of the original buildings are left intact, to a lesser extent in Ny-Hellesund.

Conclusions and discussion

As appears from the comparison between the shipyards of Kromhout, Ny-Hellesund and Helsingør, adaptive re-use of shipyards follows a several approaches to bring together the old and the new. The comparison of these cases led to several conclusions, related on the one hand to heritage interpretations and on the adaptation process on the other.

As has become clear, the historic and spatial character of shipyards lies in their specific connection between land and water. While these shipyards were historically closed off, their new functions make them publicly accessible. In the case of Ny-Hellesund and Kromhout, the way in which the building is made accessible contributes to the connection of the building to the water. In the case of Helsingør, the Maritime Museum and its exhibition underscore the multidimensional relationship of society to the water. The quintessential shipyard elements, such as the slipway or dry-dock, were considered the project in all three cases. This allows the area not only to be typologically recognisable, and it also ties these localities into their international historic context. In other words: the three cases illustrate that adaptive re-use can highlight both historic as well as contemporary connection between people and the water, even though this relationship has shifted from utilitarian to a recreational and cultural one.

These interpretations of the characteristic relationship of land and water seems unrelated to the categorisation of the adaptations based by Braae. All four categories were represented in the cases, sometimes in combination and without one dominating the others. This rather shows that adaptive re-use of shipyards can lead to highly diverse outcomes, that can each do justice to the core characteristics of historic shipyards.

When looking at the adaptation process, it is striking that the architects seemed not to be the central decision makers in choosing an adaptation strategy. Rather, heritage professionals influence the choice of adaptation strategy by the ways they select and frame the heritage values of the shipyards. The values they indicated narrowed the possible approach of the architects and, therefore, the outcome of the design. The analysis of the case studies also showed that there is no need for a world-famous star architect or a significant budget to transform shipyards to make successful adaptations.

The main benefit of this research paper is that it contextualises a width of possible strategies to adaptive re-use of shipyards. This can help architects, heritage specialists, owners and governments become aware of the choices they make and the potential outcomes to which they lead for this particular building type. Based on the outcomes, recommendations can be made to professionals involved in adaptive re-use of this particular building type. The following five heritage aspects are important to consider by heritage

specialists and architects in the design for the reuse of shipyards, in order to retain the character of the site:

(1) the morphology of the site, with the dry-dock or slipway perpendicular on the water;

(2) the relation between building and water, additionally, between humans and water;

(3) the rough industrial materiality, as well as the additional buildings and cranes on the site;

(4) the remnants of the industrial activity and chaos once present in the yard, the "smell" and "grease" of the yard; and

(5) the narrative of the yard, its place in the history of its surroundings, company or local community, as well as the international maritime network.

Furthermore, these aspects should be established early on in the adaptation process, because the framing of heritage determines to a large part the design approach. In order to come to successful cooperation and outcomes, mutual between architects and heritage professionals is crucial for successful adaptive re-use designs. The paper is very timely, as is illustrated by the adaptation of the Leeuwarden Declaration on the adaptive reuse of built heritage in 2018.

This paper is also relevant to scholarly discussions of adaptive reuse, as it contributes to international, integrative perspectives that are often lacking. Moreover, it sheds light on re-use strategies of a building type that has not received so much attention as some of its industrial contemporaries, like coal mines or breweries. Therewith it draws attention to the differences between industrial heritage sites and pleads for adaptation strategies that do justice to their own historic and spatial specificities. It could therewith also be of relevance for scholars working on the adaptive re-use of large-scale shipyards or different types of heritage.

Due to its small number of cases and limited geographic scope, this paper does not offer any quantitative insight in the adaptive re-use of industrial buildings. This limits the applicability of its outcomes to other contexts. Future research could shed more light on how adaptation strategies are distributed across various categories, like those proposed by Braae. It could also shed light of the relationship between adaptive re-use and World Heritage discussions, which was the case in all three case studies, but falls outside the scope of this paper. Nevertheless, it illustrates that architects are strongly embedded in heritage contexts when adapting the use of historic shipyards and that the heritage values of this building type can be successfully redesigned in a broad range of ways.

References

Auclair, E. and Fairclough, G.J. (2015), *Theory and Practice in Heritage and Sustainability: Between Past and Future*, Routledge, Taylor & Francis Group, London.

Austin, R., Woodcock, D., Steward, W. and Forrester, R. (1988), *Adaptive Reuse, Issues and Case Studies in Building Preservation*, Taylor & Francis Group, Abingdon.

Bandarin, F. and Van Oers, R. (2015), *Reconnecting the City: The Historic Urban Landscape Approach and The Future of Urban Heritage*, John Wiley & Sons, Chichester.

Beaven, B., Bell, K. and James, R. (2016), *Port Towns and Urban Cultures, International Histories of the Waterfront, c. 1700-2000*, Palgrave Macmillan, London.

Braae, E. (2018), *Recycling Post-Industrial Landscapes*, Lecture, Delft.

Braae, E. and Diedrich, L. (2012), "Site specificity in contemporary large-scale harbour transformation projects", *Journal of Landscape Architecture*, Vol. 7 No. 1, pp. 20-33.

Bruce, G. and Eyres, D. (2012), *Ship Construction*, Elsevier, Amsterdam.

Cantacuzino, S. (1975), *New Uses for Old Buildings*, Architectural Press, London.

Clark, C. (1997), "Vintage ports: the transition of historic Dockyard buildings to civilian uses", *Transactions of the Built Environment*, Vol. 26 No. 1, pp. 662-673.

Clark, C. (2005), "Coming into the light: the rediscovery and reuse of Naval Heritage buildings", *Transactions of the Built Environment*, Vol. 79 No. 1, pp. 33-44.

Davids, K. (2015), "Local and global: seafaring communities in the North Sea Area, c. 1600-2000", *International Journal of Maritime History*, Vol. 27 No. 4, pp. 629-646.

Davids, M. and Schippers, H. (2008), "Innovations in Dutch shipbuilding in the first half of the twentieth century", *Business History*, Vol. 50 No. 2, pp. 205-225.

Duinker van der Torre (2017), "t' Kromhout", available at: www.dvdt.com/project.php?n=3,3,72,125&t=0 (accessed 3 March 2018).

Haspel, J. (1992), *Industriekultur und arbeitswelt an der Wasserkante: Zum Umgang mit Zeugnissen der Hafen- und Schiffahrtsgeschichte*, Hans Christian Verlag, Hamburg.

Hein, C. (2011), *Port Cities; Dynamic Landscapes and Global Networks*, Routledge, Abingdon.

Hein, C. (2016), "Port cities and urban waterfronts: how localized planning ignores water as a connector", *Wiley Periodicals, Inc.*, Vol. 3 No. 3, pp. 419-438.

Lintsen, H.W. (1993), *Geschiedenis van de techniek in Nederland. De wording van een moderne samenleving 1800-1890*, *Deel IV*, Walburg Pers, Zutphen.

Machado, R. (1976), "Old buildings as palimpsest. towards a theory of remodeling", *Progressive Architecture*, Vol. 11, pp. 46-49.

Oeverman, H. and Mieg, H.A. (2015), *Industrial Heritage Sites in Transformation: Clash of Discourses* (Routledge Studies in Heritage, 6) Routledge, New York, NY (Routledge Studies in Heritage, 6).

Plevoets, B. and Van Cleempoel, K. (2019), *Adaptive Reuse of The Built Heritage: Concepts and Cases of an Emerging Discipline*, Routledge, New York, NY.

Quartermaine, P. (1999), *Port Architecture: Constructing The Littoral*, Wiley, Hoboken, NJ.

Riksantikvaren (2018), "Cultural environments", available at: www.riksantikvaren.no/en/Topics/Cultural-environments (accessed 1 August 2018).

Stenvert, R., Kolman, C., Broekhoven, S., Van Ginkel-Meester, S. and Kuiper, Y. (2000), *Monumenten in Nederland: Fryslân*, Waanders Uitgeverij, Zwolle.

Tweed, C. and Sutherland, M. (2007), "Built cultural heritage and sustainable urban development", *Landscape and Urban Planning*, Vol. 83 No. 1, pp. 62-69.

Wicke, C. (2018), *Industrial Heritage and Regional Identities* (Routledge cultural heritage and tourism series), Routledge, London, (Routledge cultural heritage and tourism series).

Wong, L. (2016), *Adaptive Reuse: Extending The Lives of Buildings*, Birkhäuser, Basel.

Xie, P.F. (2015), *Industrial Heritage Tourism*, Channel View Publication.

Interviews

Bentsen, H. (2018), 20 July.

Morel, P. (2018), 11 September.

Corresponding author
Linde Egberts can be contacted at: l.r.egberts@vu.nl

For instructions on how to order reprints of this article, please visit our website:
www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: **permissions@emeraldinsight.com**