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All Hands on Deck

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User Manual

PARTNERS

CETEM CEIPES Institut für Lern-Innovation FAU UNIVERSIDAD DE MURCIA INNOVAWOOD

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1. Introduction

1.1. What is AHOD360?

All Hands on Deck 360° (AHOD360) is a European educational project dedicated to preserving and passing on traditional shipbuilding craftsmanship – one of the oldest professions in Europe. Building on the predecessor project All Hands on Deck (AHOD), AHOD360 aims to document, digitise, and prepare the often orally transmitted knowledge of ship carpenters (boat builders) for vocational education and training.

Using modern technologies such as 360° tours, immersive learning, and a multilingual digital terminology database, the cultural heritage of maritime wooden shipbuilding is made accessible to future generations – vividly, practically, and interactively.

1.2. Project Goals and Benefits

AHOD360 is particularly aimed at young people, trainees, and professionals in the field of wood processing and boat building. The project pursues several specific goals:

- **Increase attractiveness**: Immersive learning offerings are designed to inspire more young people to pursue traditional maritime professions.
- **Preserve knowledge**: The expertise of experienced European shipbuilders is systematically recorded and digitally processed.
- **Strengthen vocational education**: The content serves to modernise and internationalise vocational education and training (VET) in craft professions.
- **Promote networking**: A collaborative online portal enables Europe-wide exchange between learners and professionals.

1.3. Why Virtual Shipyards?

The virtual presentation of real shipyards provides a unique access to the world of maritime craftsmanship: learners can discover traditional tools, materials, techniques, and workplaces through 360° tours – whether on a screen or with a VR headset.

While this form of digital immersion does not replace hands-on practice, it offers a low-threshold, exciting introduction and conveys basic knowledge. The virtual shipyard is a

"learning space" where historical practices, cultural differences, and craft principles can be experienced – visually, audibly, and interactively.

2. Didactic Concept of Virtual Shipyards

The virtual shipyards within the framework of **AHOD360** – **All Hands on Deck 360°** are more than digital replicas of real spaces: they have been designed as **media-supported learning environments** where Europe's maritime craftsmanship culture can be experienced – vividly, independently, and immersively. Their didactic approach combines **visual-spatial learning, interactive media usage,** and **vocational orientation** in a low-threshold digital format.

2.1 Learning Objectives and Competence Areas

The virtual shipyards enable broad access to learning, which promotes both specialised and interdisciplinary skills. The aim is to give learners the opportunity to get to know, compare and reflect on **traditional shipbuilding from different maritime regions in Europe.**

The central learning objectives are:

- **Gain insights** into authentic working environments of traditional boatyards.
- **Identify and understand** materials (e.g., oak wood, esparto grass), tools (e.g., adze, hand saw), and processing techniques (e.g., wood bending, frame construction).
- **Understand regional differences** in construction methods and cultural influences (e.g., between the North Sea, Mediterranean, and Atlantic Arc).
- **Enhance spatial thinking and technical understanding** by navigating 360° panoramas.
- **Boost learning motivation** through self-directed and visually supported exploration.

These goals can be categorised into various fields of expertise, such as: *technical understanding, knowledge of materials, cultural awareness, media* literacy and *vocational orientation*.

2.2 Forms of Mediation: Observing, Experiencing, Interacting

AHOD360 employs a multi-channel, activating learning approach. Users are encouraged not just to consume content, but to explore it independently:

- **Observing**: By deliberately exploring the panoramas, users can consciously perceive and contextualize details (e.g., wood storage, structure of a boat frame).
- **Experiencing**: The immersive 360° presentation creates a sense of closeness and authenticity – even without being physically on site.
- **Interacting**: Embedded hotspots provide videos, photos, audio commentary, explanatory texts, and documents – all directly within the context of the workshop environment. Interactive map views also enable targeted navigation.
- **Comparing & Reflecting**: The platform's structure allows for direct comparison between five regions – from the Cintura shipyard in Sicily to the Dutch shipyard Klaas Hennepoel – each with its own artisanal profile.

2.3 Target Groups: Trainees and Adults

AHOD360 has been specifically developed for learners engaged in vocational education, craft training, or museum-based learning. Thanks to its modular structure, the project is suitable for both beginners and more advanced users:

- **Vocational students and apprentices** in fields such as wood technology, ship or boat building, restoration, heritage conservation, and carpentry
- **Teachers and trainers** looking for practical, digital content to support workshop-based or subject-specific teaching
- **Professionally interested adults or visitors** in cultural and historical contexts (e.g. museums, maritime centres)

- **Young people exploring career options**, who wish to engage with traditional trades in an accessible and approachable way

2.4 Quiz Questions and Learning Assessment

Beneath each virtual shipyard on the AHOD360 learning platform, users will find an interactive quiz featuring five tasks that relate directly to the content of the respective site. The questions address typical topics – such as materials used, regional features, or specific work processes – and encourage learners to actively reflect on what they have seen.

These H5P-based quizzes:

- offer a playful form of self-assessment.
- can be completed without logging in or receiving a grade.
- motivate learners to repeat and reinforce their knowledge.
- can also be integrated into lessons by teachers and trainers.

The tasks are deliberately varied in format – image matching, multiple-choice questions, true/false statements, or short drag-and-drop exercises. In this way, users can review, deepen their understanding, or simply continue exploring with curiosity.

3. Technical Notes on Navigation

3.1 Device Compatibility (PC, Tablet, VR)

The virtual tours in AHOD360 are based on the Pano2VR player, a well-established solution for browser-based 360° experiences. The application runs entirely in a web browser and does not require any additional software.

Supported devices:

- PCs and laptops (Windows, macOS, Linux)
- Tablets and smartphones (iOS, Android)
- VR headsets with WebXR support, such as:
    - Meta Quest 2 / 3 / Pro
    - HTC Vive Focus
    - Pico 4

For VR headsets, a WebXR-compatible browser is required, such as Mozilla Firefox Reality, Oculus Browser, or Microsoft Edge (Chromium-based).

Technical requirements:

- A modern web browser with WebGL support (Chrome, Firefox, Safari, Edge)
- An active internet connection to load the tours
- JavaScript must be enabled in the browser

3.2 Basics of the User Interface and Controls

The user interface of the virtual shipyards is simple, user-friendly, and adapted to various devices. Exploration does not involve free movement as in computer games, but rather targeted jumps from one location to another – known as panorama nodes. Each of these

points is a 360° image that can be explored interactively using a mouse, touch gestures, or motion sensors.

On PC or laptop

- **Panoramic view:** Click and hold the left mouse button to freely control the viewing angle.
- **Navigation:** Use the location overview or click on navigation hotspots to move to other panoramas.
- **Interaction:** Click on icons to play videos or display additional information.
- **Menu operation:** Language, sound, symbol display, or fullscreen mode can be adjusted via the edge-of-screen menu.

On tablet or smartphone

- **Panoramic view:** Swipe with your finger to look around the panorama.
- **Navigation:** Hotspots can be selected by touch; the location overview is accessible via a side menu.
- **Special feature:** Thanks to gyroscopic sensors, the device can also be controlled by physical movement – the view adjusts to the orientation of the device.
- **Touch-optimised:** Menus and icons are adapted for smaller screens and are easy to use with fingers.

With VR headset (e.g. Meta Quest, Cardboard)

- **Immersive experience:** The 360° panoramas come to life in virtual reality. The viewing direction is controlled directly by head movement.
- **Interaction:** Navigation is done via gaze control (focusing on a hotspot) or using a controller, depending on the system.
- **Menu access:** Limited – some VR headsets display menus as floating elements in space.

- **Note:** The virtual tour is generally compatible with common WebVR browsers (e.g. Firefox Reality, Oculus Browser), but performance may vary depending on the device.

Accessibility notes: The intuitive controls allow for low-barrier use; however, certain input methods (e.g. screen readers or keyboard-only navigation) are currently only partially supported. The tours rely on visual orientation and targeted interaction with hotspots.

3.3 How to Navigate the Shipyard

Navigation in the virtual shipyards is based on an icon-driven interface. Users can move between different panorama locations by clicking with the mouse, using touch gestures, or with a VR controller. Free movement through the space is not possible – instead, users "jump" from point to point. Each location offers a 360° view and interactive content through so-called **hotspots**.

3.3.1. Home Page of a Virtual Shipyard

When opening a virtual shipyard, an introductory page appears first, preparing users for the interactive environment. Here, users have the opportunity to make an initial setting:

Figure 1: Introductory Page of a Virtual Shipyard, Example of Böbs Shipyard, Baltic Sea

Speaker Icon:

This icon allows users to turn the sound on or off from the start. It affects background noises, narration, or audio guides within the shipyard.

This introductory page is designed to let users decide whether they want to experience the tour with or without sound – which is particularly beneficial for public settings, mobile use, or accessibility applications.

After making a selection, users are taken directly to the first panorama of the shipyard.

3.3.2. General Overview of the User Interface

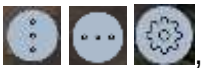
The menu navigation is structured similarly across all devices. By clicking or tapping the respective icons  , the menus can be opened or hidden:

Figure 2: Menu Navigation Explained Using the Example of the Cintura Shipyard, Island Area

1. **Back Button & Share Function**: Allows switching to the previous view or sharing the tour via external channels.
2. **Location Overview**: Opens a list of all available panoramas (further explanations in the following section under "Location Overview").
3. **Options Menu**: Offers various settings for display and controls (further explanations under "Options Menu").

3.3.3. Switching Between Locations

Once the initial entry has been made, users have various functions available to orient themselves within the virtual shipyards and access content in a targeted way. A central element of navigation is **switching between the individual panorama locations**. Two main options are available for this:

Hotspots in the Panorama:

	At certain points in the image, there are clickable icons that mark the transition to another space.
	Previously visited locations are marked with a checkmark.
	When using on a desktop, a small preview of the destination appears when hovering the mouse over the hotspot.

Location Overview:

By clicking the menu icon on the left  , a complete list of all locations can be opened. From here, users can jump directly to any panorama. Previously visited locations are indicated by the colour change of the room labels (here in light blue).

In selected shipyards, an interactive map is also available, allowing users to directly select rooms.

3.3.4. Map Function

In two of the virtual shipyards – **Astilleros Nereo** (Mediterranean) and **Böbs Shipyard** (Baltic Sea) – an **interactive map function** is available in addition to the regular location overview. This feature is especially useful for targeted, non-linear exploration or for thematic focus, such as when learners wish to directly compare specific work areas.

The map can be opened via a **map icon in the left menu area**: 

Figure 3: Map Function Using the Example of the Astilleros Nereo Shipyard (Mediterranean)

When clicked, a **pop-up window** opens with a schematic representation of the entire shipyard.

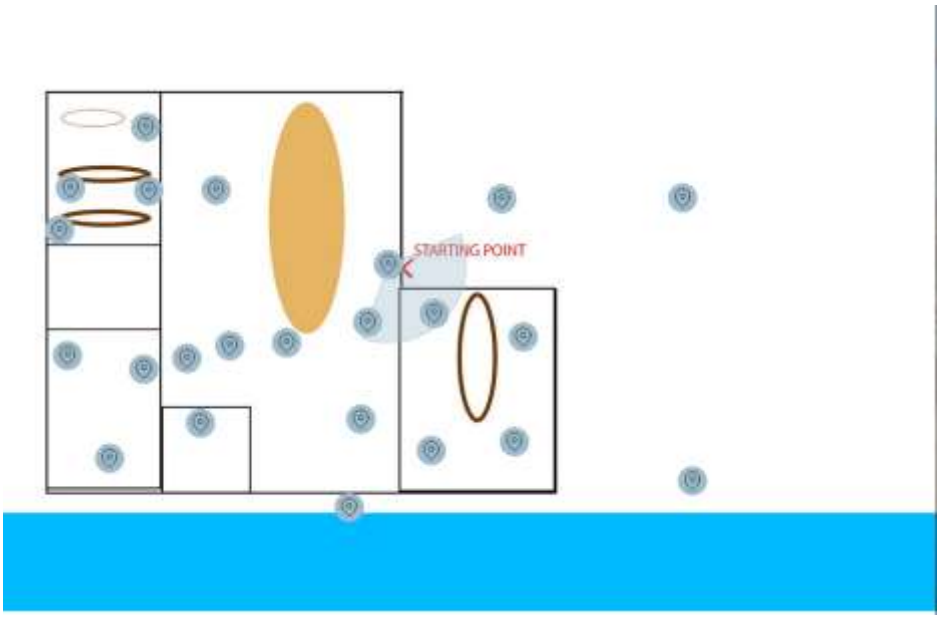


Figure 4: Schematic Representation of the Entire Shipyard Area, Example of Astilleros Nereo (Mediterranean)

What does the map show?

- The **rooms and stations** of the shipyard are shown from a bird's-eye view.
- The current location is highlighted with a **marker** ("STARTING POINT").
- The viewing direction is represented by a circular segment or field of view – a fan-shaped area that shows which direction and **at what angle the user is currently looking within the panorama**.

Interactive Hotspots on the Map:

- All relevant positions are marked as **clickable hotspots** on the map.
- Clicking on a hotspot will take the user directly to the desired room or location.
- The map allows for **quick and non-linear navigation** through the virtual shipyard.

3.3.5. Options Menu

The options menu  is located in the right sidebar and allows for individual settings to customize the user experience:

	Change language – Choose between English, German, Spanish, French, and Italian.
	Enable automatic rotation – The panorama slowly rotates automatically.
	Hide all icons – For an undisturbed view.

	Turn sound on/off – e.g. for background noise or audio tracks.
	Enable/disable fullscreen mode – For an immersive experience on PC or laptop.

Additional feature on mobile devices: Gyroscope mode

On **smartphones and tablets,** the options menu also features a gyroscope icon:

Function: Activates the device's motion control. The viewing direction in the panorama automatically follows the tilt and orientation of the device.

Advantage: Particularly immersive and intuitive, especially when standing or using Cardboard VR.

Tip: Can be deactivated if the user prefers to manually swipe or click.

Figure 5: View on a smartphone with the gyroscope icon in the options menu.

3.3.6. Overview of Symbols – Interactive Learning Content

The virtual shipyards are equipped with interactive elements, called hotspots, which are visible in the panorama and provide access to additional content. These contents are central components of the learning experience – offering explanations, visual materials, and context-specific knowledge directly from the shipyard.

	Single image (photo) with explanatory context
	Short video clip offering authentic insights into work techniques, narrated or demonstrated by experienced boatbuilders. Many videos come with manually created subtitles to make the content multilingual and understandable.
	Commentary, often as a description of the object or work situation
	PDF document with supplementary content or work materials
	External link, e.g., to additional resources

These hotspots are typically positioned directly within the panorama – often at realistic locations (e.g., workbench, boat hull, wood storage) – and encourage deeper engagement with the topic.

Note: The interactive features described here apply to all virtual shipyards. The media-supported content – such as photos, videos, audio, or information texts – is accessible via hotspots and varies in scope and design depending on the shipyard.

4. Overview: The Five Virtual Shipyards

4.1 Diversity of Maritime Craftsmanship

The five virtual shipyards in the AHOD360 project represent an exceptional range of traditional boatbuilding skills in Europe. They were carefully selected to showcase the **regional, cultural, and craft diversity** of the shipwright profession, making it visible and tangible.

Each shipyard is exemplary of a maritime area and provides an authentic insight into the local work methods, materials, and constructions rooted there. The panoramic tours allow users to virtually enter these locations, explore, and directly engage with objects, tools, and people. It becomes clear that traditional shipbuilding is not only technical knowledge but also cultural heritage. It thrives on local resources, passed-down skills, and the close connection between workshop, landscape, and way of life.

Through digital presentation, new opportunities for engaging with these crafts arise – accessible, interactive, and sustainable. Learners can compare, discover, and set their own focal points across national borders.

4.2 Comparison of Regions & Building Traditions

The five shipyards exemplify how differently boatbuilding has historically developed in Europe – shaped by **climatic conditions, regional raw materials, usage types, and socio-economic backgrounds**.

Region	Shipyard	Characteristics
North Sea	Klaas Hennepoel, NL	Flat-bottomed boats, historical wooden connections, Frisian building style
Mediterranean	Astilleros Nereo, ES	Construction and restoration of Mediterranean Jábega boats, traditional techniques with olive wood and esparto grass
Baltic Sea	Böbs Shipyard, DE	Yacht building with tradition, transition between craftsmanship and modern services
Atlantic Arc	Albaola Itsas Kultur Faktoria, ES	Reconstruction of historical whaling galleons, UNESCO-awarded training project
Islands / Southern Europe	Cintura Shipyard, IT	Multigenerational workshop in Trapani, focus on traditional fishing boats and craft knowledge

Despite all regional differences, the five shipyards have one thing in common: **the preservation of traditional knowledge in boatbuilding**. In all the companies presented, craftsmanship is not only practised, but also actively **passed on** – **whether through family inheritance, public training formats or intergenerational learning processes.**

The shipyards work with locally available materials and use **specific processing techniques** that often only occur in their region – whether it be frame bending with an open flame, the use of esparto grass or the millimetre-accurate marking of planks on the floor of a ship hall.

What they also have in common is that they see themselves as **bridges between the past and the future**: they document, restore, reconstruct – but they also educate, experiment, and open up to new target groups. At a time when many traditional trades are threatened with extinction, they are thus making a contribution to **cultural sustainability** – both in analogue form and through their digital representation in AHOD360.

5. The Shipyards in Profile

5.1 North Sea – Scheepswerf Klaas Hennepoel (NL)

5.1.1 Overview & Cultural Context

Scheepswerf Klaas Hennepoel is located in Warmond, near Leiden in the Netherlands, and was founded in the early 2000s by ship's carpenter **Alexander de Vos**. The aim was to create a place where **traditional Dutch boatbuilding is not only preserved, but also lived, taught and further developed**.

The shipyard was deliberately built in the 19th-century style, with historical wooden joints (*pen-en-gat*), reused bricks and traditional architecture. This makes it not only a workshop, but also an example of **built memory culture**.

The focus is on **restoring, maintaining and passing on** knowledge about classic Dutch boat types such as the **Boeier** or the **Tjotter**. These flat-bottomed boats used to be in service on inland waterways and in the Wadden Sea. They are restored in Klaas Hennepoel using materials (often oak) and techniques that are true to the originals – including **bending planks over fire and water** or **marking out and roughing** the frames by hand.

The shipyard is also a **place of learning**: students and apprentices regularly work here to learn traditional techniques directly on the object. Whether drawing rib models, operating historical tools or talking to the master, learning takes place **directly in the work process**.

Despite its clear focus on historical craftsmanship, the shipyard also integrates **sustainable and modern approaches**, for example by using regional raw materials, storing wood in a way that conserves resources, and using machines in a considered way.

Visitors can view the shipyard by appointment, take part in workshops or experience guided tours. One thing is clear: the work here is not museum-like – it is living craftsmanship and part of a collective memory that is also preserved digitally by AHOD360.

5.1.2 Thematic Focus of the Hotspots

In the virtual shipyard Klaas Hennepoel, the following thematic areas are the focus:

- **Materials Science**: Various stages of processed wood, storage, cutting markings
- **Traditional Techniques**: Wood bending, frame manufacturing, measuring transfer, and hull construction
- **Tools & Machines**: Hand tools such as the adze, saws, woodworking machines
- **Construction Elements**: Rudders, bilge boards, masts, frames, and boat stands
- **Historical Ship Parts**: e.g. a bilge board (for flat-bottomed boats), a detachable mast, or an ice ship gangway
- **Learning and Training Situations**: Students sketch, measure, and reconstruct with expert guidance

5.1.3 Hotspots in the Tour

The virtual tour through the Klaas Hennepoel shipyard covers a total of eleven locations, representing different areas of the shipyard grounds. The hotspots are placed directly within the images – each at the relevant object or workstation. Here is an overview:

Outdoor Area / Central Square

- Two videos showcase central work techniques: wood bending over fire and water, as well as hewing with the adze – each providing insights into real learning situations.
- Photos document wood at various stages of processing: from rough shapes to pre-shaped planks to cut material with markings.
- The access to the wood storage area with its traditional construction is also visible.

Ramp and Access to Water

- The ramp to the water, with its large wooden gates, is documented in several photos – showing how finished boats are launched from the workshop area.

Boat Hall I

- Close-up shots show historical boat elements such as carved wood decoration, a typical Dutch bilge board, and a detachable mast.
- The hall gives an impression of the construction of traditional flat-bottomed boats.

Boat Hall II

- This room serves as a passage area and does not feature any hotspots.

Wood Storage (Part 1 & 2)

- Several hotspots show wood at different stages of processing: rounded, marked, pre-shaped.
- The storage structure with intermediate wood, ventilation, and material variety is clearly depicted.

Workshop Area I (Main Workshop)

- Traditional tools are displayed here (adze, saws, molds).
- Models of the main frames illustrate the planning and sequencing of the hull structure.

Workshop Area II

- Hotspots show measuring transfers directly on parts (e.g. rudders).
- Machines for wood cutting and shaping can be seen in use.

Workshop Area III

- Tools and materials are carefully organized in shelves.
- A woodworking machine is shown in detail.

Workshop / Staircase Area

- Photos document the construction of a boat hull – both externally and internally.
- Marked planks and a special wooden frame for stabilizing the boat during the building phase are also shown.

Drawing Table on the Upper Floor

- A video documents a learning situation where students draw and discuss historical boat bodies – a clear example of hands-on learning on site.

The virtual Klaas Hennepoel shipyard makes the processes of traditional shipbuilding comprehensible step by step – from the stored tree trunk to the drawn frame shape – offering an authentic and accessible insight into Dutch boatbuilding tradition.

5.2 Intermediterranean – Astilleros Nereo (ES)

5.2.1 Overview & Cultural Context

The **Astilleros Nereo** shipyard in the Pedregalejo district of Málaga is considered one of the oldest still-active traditional wooden shipyards in Spain. The **Sánchez-Guitard** family took over the business in its current form in 1966, but the roots of the site go back to 1919 – and probably much further. Located in a neighbourhood that was once dominated by fishermen, Nereo is not just a shipyard, but a **cultural memory of Mediterranean seafaring tradition**.

The shipyard specialises in the construction, reconstruction and **restoration of wooden boats**. Its work follows the techniques of traditional shipwrights – for example, in **caulking**, **rope-making**, the use of natural resins such as **pine pitch** or the **use of locally sourced woods** such as Andalusian oak or Aleppo pine.

The shipyard manager and boat builder **Alfonso Sánchez-Guitard**, who learned his trade in the traditional way – from father to son – enjoys special attention. Under his leadership, internationally acclaimed projects have been realised, such as a faithful replica of the 'Galveztown', an 18th-century brigantine, and a 2,700-year-old **Phoenician barque**, rebuilt based on archaeological finds.

Nereo is not only a shipyard, but also a **place of learning and education**. An **ecological museum (Ecomuseo)** with an ethnographic focus, guided tours and workshops make the shipyard a place of education for visitors from all over Europe. The workshops are open to international students who want to familiarise themselves with the principles of historical boatbuilding techniques.

In addition, the shipyard has been included in the Spanish 'National Industrial Heritage Plan' as a **cultural asset of special interest (BIC)**. It is exemplary for combining **maritime everyday culture, sustainable craftsmanship and intercultural learning** – traditionally anchored and at the same time digitally communicated by AHOD360.

5.2.2 Thematic Focus of the Hotspots

In the virtual Astilleros Nereo shipyard, the following thematic areas are emphasized:

- **Mediterranean Shipbuilding Tradition**: Phoenician ships, Jabega boats, historical hulls, and model plans.
- **Construction and Restoration Techniques**: Caulking, rope making, preparations for wood processing, transport & drying.
- **Tools & Equipment**: Adzes, curved planers, pins, tongs, drills, saws – in use and on display.
- **Materials & Sustainability**: Regional woods, tar, resin, handpicked materials.
- **Cultural Significance & Family History**: Maritime heritage, religious symbols, ethnographic museum.

5.2.3 Hotspots in the Tour

The virtual tour of **Astilleros Nereo** consists of **23 panoramic locations**, each representing different areas of the shipyard, workshops, storage zones, and museum sections. There are **60 interactive hotspots** embedded in the tour, focusing on maritime craftsmanship, tools, historical ship types, and regional identity. The following content is **organised by panorama**:

Outdoor Area I – View of the Mediterranean

- Photo of the Mediterranean Sea as a cultural and historical reference point for shipbuilding.
- Introduction to the importance of the sea for the development of Europe.

Outdoor Area II – Launch and Surroundings

- Video of a boat launch on-site.
- Photo explaining the technique of "beaching" (drying boats on the shore).
- Shipyard logo as a distinctive symbol.

Outdoor Area III – Maritime Environment

- Photo of the Virgen del Carmen, patron saint of sailors.
- Symbolic reference to religious and local identity.

Outdoor Area IV – Main Entrance & Management

- Video featuring the shipyard manager introducing the main building (with subtitles).
- Context on the history and management of the business.

Workshop Area I – Phoenician Boat

- Video on the reconstruction of a Phoenician wooden boat.
- Photo of a boat lifter (mechanical lifting aid).

Workshop Area II – Boat Bow

- Photo of the bow form of a Phoenician ship – typically wedge-shaped.

Workshop Area III – Caulking Area

- Video on caulking (seam sealing with cotton).
- Video on traditional rope-making.
- Video introducing the Ecomuseum.
- Video about caulking tools.

Workshop Area IV – Tree Trunks & Work Platforms

- Video on bringing tree trunks onto the shipyard grounds.
- Photo of a gangway for working at height.

Workshop Area V – Material Transport

- Video on wood transport with machinery.
- Photo of a forklift in operation.

Workshop Area VI – Sawing Workshop

- Two videos on the use and setup of the main saw.

Workshop Area VII – Tar Coating

- Video on the traditional use of tar for wood preservation.

Storage Hall I – Surface Treatment

- Video featuring two apprentices sanding a boat hull.

Workshop Interior I – Tools & Boat Parts

- Video on the use of the adze.
- Instructional video on the components of a Mediterranean boat.
- Boat-building process of a Jabega boat in several scenes.

Workshop Interior II – Tool Variety

- Video on curved planes, hand drills, and measuring instruments.
- Numerous photos of traditional tools: pliers, saws, drills, chisels, measuring devices.

Workshop Interior III – Sharpening & Connection Techniques

- Video on sharpening tools.
- Video on fastening techniques using traditional methods.

Workshop Interior IV – Boat Structure

- Photo of the hull of a Jabega boat.

Wood Storage I – Maintenance & Cleaning

- Video on maintaining a boat (cleaning, preparation).

Wood Storage II – Types of Wood & Storage

- Videos on wood types used in Mediterranean shipbuilding.
- Storage, cutting, and use of Aleppo pine, oak, etc.
- Photo of a planer machine for material thickness.

Wood Storage III – Frame Construction

- Video on making frames.

Museum I – Models & Family History

- Videos on boat parts from traditional boat plans.
- Photos of ship models: Galveztown, Jabeque, Pilgrimage Ship.
- Family history of the Guitard family as shipyard operators.

Museum II – Cultural History

- Photos showing the significance of maritime heritage in Málaga.
- Explanations of the ethnographic value and history.

Museum III – Boat Models

- Photos of ship models like "Arrogante" or the tuna fishing boat "Marina II."

Museum IV – Historical Boats

- Models of the "Sainte Marie" and a whaling boat, with accompanying text.

The virtual tour of **Astilleros Nereo** vividly demonstrates the working processes of a traditional Mediterranean shipyard – from wood storage to boat reconstruction.

5.3 Baltic Sea – Böbs Shipyard (DE)

5.3.1 Overview & Cultural Context

The **Böbs shipyard** is located in the traditional **Lübeck-Travemünde** on the Baltic Sea and looks back on over a hundred years of history. Since its foundation in **1912** by the shipbuilder **Hans Böbs**, the shipyard has continuously developed – from classic boatbuilding to a modern company specialising in **yacht care, maintenance and restoration**.

The shipyard is particularly characterised by its **craftsmanship excellence** combined with technical innovation: Böbs specialises in the maintenance and repair of classic wooden boats, but also builds new boats to individual specifications. In addition to a **floating dock**, spacious workshops and modern equipment, the shipyard is still an active **training company** that passes on traditional skills to the next generation.

Although the shipyard does not have a publicly accessible exhibition area, the adjacent **marina**, individual tours and workshop discussions provide very authentic insights into the world of yacht technology and wooden boat building. One highlight is the restoration of the historic regatta yacht **Germania VI**, which exemplifies the high standards of quality and faithfulness to the original.

5.3.2 Thematic Focus of the Hotspots

The hotspots of the virtual **Böbs Shipyard** are distributed across 18 panoramic areas and provide insights into the following topics:

- **Materials & Storage**: Types of wood, veneers, board storage, mast storage
- **Tools & Machines**: Planing benches, saws, drills, clamps
- **Traditional Work Techniques**: Sanding, planing, gluing, dowels, and tenons
- **Hull & Deck Construction**: Construction and repair of strip decks, planks, deck coverings

- **Restoration Practices**: Interviews, models, historical references (e.g., White Heather)
- **Surface Treatment**: Varnishing, priming, paint mixing
- **Vocational Education & Craft Heritage**: Training programmes, historical boat models

5.3.3 Hotspots in the Tour

The virtual tour of **Böbs Shipyard** takes you through 18 panoramas, showcasing various halls, work areas, storage zones, and specialized rooms. The hotspots are thematically placed on machines, workbenches, or on components:

Harbour

- Photos and videos on boat cranes, wood delivery, floating docks, and underwater ship cleaning

Old Hall 2, Workbench Area

- Video on hand planing
- Photos of hand plane models

Old Hall 2, Gluing Station

- Detailed photos of workbench, clamps, and gluing blocks

Wood Workshop 1 – Woodworking

- Videos on sanding machines, sharpening stones, material storage
- Photos of sandpaper, strip storage

Wood Workshop 2 – Woodworking

- Videos on band saws, planer machines, drilling machines
- Photos of veneers, circular saws, storage areas

Wood Workshop 3 – Woodworking

- Video on table saw
- Storage of wood panels

Painting Hall

- Description of the hall's function – painting decks, hulls, and superstructures

Colour Mixing Room

- Description of the mixing processes – temperature, precision, paints

Mast Storage

- Description of boat mast storage, e.g., for winter storage

Entrance Gate

- Link to training offers
- Photo of the last wooden boat built (HB40, model)
- Video on the shipyard's history

Metal Workshop

- Videos on threading, restoration, metalworking
- Photos of historical machines, workbenches, and tools

Hall B

- Description of boat storage for winter or during maintenance

Historical Wooden Boat (Interior)

- Description and interior view of a 100-year-old wooden boat

Historical Wooden Boat (Deck Area)

- Video: sanding the deck

Hall A, Elskrit

- Video on underwater coating
- Photo of a classic strip deck

Hall A, Strip Deck

- Videos on placing, cutting, and fixing deck strips (strip deck construction)

Hall A, Sanded Deck

- Videos on priming and the entire wood deck construction process

The virtual shipyard offers a hands-on insight into the operations and facilities of a modern yacht company with traditional roots – from woodworking to metalworking – and impressively demonstrates the connection between craftsmanship and technical innovation on the Baltic Sea.

5.4 Atlantic Arc – Albaola Itsas Kultur Faktoria (ES)

5.4.1 Overview & Cultural Context

Albaola Itsas Kultur Faktoria, located in **Pasajes**, Basque Country, Spain, is an important centre for traditional **shipbuilding**. The shipyard was founded with the aim of preserving the **maritime heritage of the Basque Country** and reconstructing old craftsmanship techniques. The shipyard is particularly well known for the reconstruction of the **San Juan**, a historic **whaling ship from the 16th century** that is considered to be one of the oldest shipwrecks in the **North Atlantic**.

The Albaola shipyard combines historical **craftsmanship** with modern **research approaches**. Not only are historical ships built here, but techniques such as the use of **treenails** and traditional **construction methods** are also maintained. Albaola is a vibrant centre for **maritime culture**, attracting professionals and enthusiasts from all over the world.

The shipyard is also an active **educational centre**, where **workshops** and **events** are held to communicate the history of **whaling** and Basque **shipbuilding**. **Guided tours** provide insights into current projects and offer visitors an authentic experience. A particular highlight is the reconstruction of the **San Juan**, which is seen as a symbolic project for the preservation of Basque maritime heritage.

5.4.2 Thematic Focus of the Hotspots

The hotspots of the virtual **Albaola Shipyard** are distributed across various panoramic areas, offering insights into the following thematic fields:

- **Heritage & Archaeology**: Historical discoveries, archaeological excavations, and the reconstruction of the shipwreck.
- **Shipbuilding Techniques**: Traditional craftsmanship techniques in shipbuilding, such as inserting treenails and model-making.

- **Materials & Tools**: The use of wood types, tools, and machinery in the shipbuilding process.
- **Construction of Ship Structures**: The construction and repair of ship parts such as the hull, deck, and keel.
- **Reconstruction & Restoration**: The process of ship reconstruction and the historical reference to original parts.
- **Model Making & Detail Work**: Ship models and close-up shots of the building processes.
- **Vocational Education & Craft Heritage**: Training programmes and the preservation of craftsmanship knowledge and traditions in shipbuilding.

5.4.3 Hotspots in the Tour

The virtual tour of the **Albaola Shipyard** is extensive and consists of 16 panoramic areas with a total of 141 hotspots, providing detailed insights into various thematic areas. To ensure a clearer presentation, the information about the individual rooms in this guide has been thematically summarised, while maintaining all essential details.

Museum Room 1: This room highlights the historical significance of the Albaola ship project. Key features include photos and documents showing the ship's history and its reconstruction. Noteworthy are depictions of historical maps, such as one from 1594, and a document about the ship's sinking, which was rediscovered through archaeology. Additional hotspots offer insights into the connection between the shipwreck and the Gipuzkoa region, as well as the discovery of the wreck by a Canadian underwater archaeology team.

Museum Room 2: This room is dedicated to the history of Red Bay in Canada, the site where the shipwreck was found. It showcases the origins and importance of the archaeological excavations, as well as various discoveries related to the wreck and the whalers living there. Particularly interesting are photos of divers and the excavation of the shipwreck, which highlight the methodology and challenges of the project. Key topics include international collaboration and the inclusion of the site on the UNESCO World Heritage List.

Museum Room 3: This room presents the model-making of the historical ship. Various models are shown, representing the original design of the Nao, as well as the ongoing

reconstruction. Additional hotspots explain the selection of the right wood for construction and the special craftsmanship techniques used in the ship's reconstruction. Details of the various ship sections and building processes, such as making dovetail joints and measuring the individual parts, are also included.

Museum Room 4: This room displays nautical instruments, maps, and ship drawings from the 16th to the 19th century. Particular attention is given to historical maps of Newfoundland and Red Bay, as well as a graffito from Redon depicting a ship. The room offers valuable insight into the development of navigation instruments and the cultural influences between Basque whalers and the Inuit.

Museum Room 5: This room showcases various equipment from the ships, such as the famous Basque whaling ship. Details of the tools and devices used on the ships are shown, including a stone chain and the equipment of the Nao, which is compared to the historical originals. Photos and information on the use of these artefacts deepen the understanding of whaling traditions.

Timber Storage: This area explains the storage and processing of the wood for shipbuilding. Hotspots show how the wood is cut, stored, and prepared. Particularly interesting are the different wood types selected for shipbuilding and how they are systematically stacked in the storage area.

Slipway: This area is dedicated to the construction process of the Nao. Several phases of shipbuilding along the slipway are documented, from arranging the hull structure to installing the planks. Through detailed images, the entire building process from the foundation to completion is visible, including the use of special techniques to stabilize and reinforce the ship.

Slipway Corridor 1: In the first corridor of the slipway, detailed information on the construction of the ship is provided. Hotspots include depictions of fabrication techniques, such as installing planks, using rivets, and special wood joints required for shipbuilding. The way in which the individual components of the ship are assembled to stabilise the structure is also explained.

Slipway Corridor 2: This corridor continues the journey of the ship, focusing on specific building processes such as inserting treenails (wooden nails) and caulking the planks. Videos

show craftsmen at work and document step-by-step the handling and installation of these important connection elements.

Slipway Corridor Rear Area: Here, the importance of teamwork in the ship's reconstruction is highlighted. Specific hotspots are dedicated to the historical and modern participants of the project, such as Robert Grenier and the collaboration with Parks Canada. Details about UNESCO's involvement and the recognition of the project as a World Heritage site offer a view of the international significance of the endeavour.

Slipway Corridor 3: The continuation of the construction work is documented here. This corridor includes detailed descriptions of further progress, such as the installation of the bow and stern areas of the Nao. Special attention is given to the construction of the ship's stability components.

Slipway Corridor 4: In this section, the use of historical machines for the production of ropes and other nautical tools is shown. Detailed photos and videos provide insight into the manufacture and use of ropes, which were essential for shipbuilding and whaling. This craftsmanship is discussed, as well as the production of iron chains in the forge.

Ropery: In this area, the focus is on the production of chains and other connecting elements used in shipbuilding and navigation. The steps of chain production and their importance for the ship's structure are explained in detail.

Forge: In the forge, the entire process of chain production and ironworking is vividly demonstrated. Videos show the blacksmith at work, producing and processing iron pieces, while photos document various tools and machines used in this process.

Classroom: This room is dedicated to the training of shipbuilders. Videos and photos show the wood planning process and the techniques that help craftsmen during ship construction. Special attention is given to the precise handling of tools and the detailed crafting of ship parts.

Workshop: The workshop offers a practical insight into the daily work of shipbuilders. Here, the craft of wood and metalworking is explained, and tools such as axes and saws are presented. Another hotspot shows how ship parts like rudders and masts are prepared and assembled.

Use the virtual tour to explore the various aspects of the Albaola Shipyard project and gain a comprehensive insight into the construction and reconstruction of the historic Nao.

5.5 Islands – Cintura Shipyard (IT)

5.5.1 Overview & Cultural Context

The **Cintura shipyard** is located in the **historic area of Trapani** in **Sicily** and can look back on **more than 150 years of history**. **Founded in 1867 by the Martines** family, the shipyard has earned an outstanding reputation for its **masterful craftsmanship in shipbuilding**. It specialises in the **construction and restoration of traditional wooden boats**, combining **traditional craftsmanship techniques** with **modern construction methods**. Over six generations, the knowledge and art of shipbuilding has been passed down by experienced **master shipwrights**, making the shipyard a **cultural landmark** in the Trapani region.

The shipyard plays an outstanding role in the region, not only **economically** but also **socially**. As an **employer** and **training centre for aspiring artisans**, it plays a significant role in **preserving traditional craftsmanship** that might otherwise be lost. It also represents an **indispensable cultural treasure**, with a strong tradition and expertise in shipbuilding. Today, the shipyard is managed by **Giacomo Cintura**, who preserves tradition through **innovation** while meeting the **diverse demands of the modern public**.

5.5.2 Thematic Focus of the Hotspots

The hotspots of the virtual tour through **Cintura Shipbuilding** cover various thematic areas, offering a deep insight into both traditional and modern shipbuilding techniques, as well as the associated craftsmanship. The main topics include:

1. **Tools and Machines**: The hotspots showcase a variety of traditional and modern tools and machines used in the shipbuilding operation. These include handheld tools such

as small axes and saws, as well as stationary machines like milling machines and planers.

2. **Construction and Restoration Techniques**: Another key focus is on the techniques required for the construction and restoration of wooden boats, including the use of specialized machines like bending machines and the application of gluing and joinery techniques.
3. **Woodworking**: Cintura Shipbuilding has earned a reputation for its exceptional woodworking. Several hotspots highlight the different types of wood used in shipbuilding, as well as the precise woodworking processes necessary for building ship structures.
4. **Cultural Significance**: In addition to the craftsmanship aspects, the shipyard also provides valuable insights into the cultural significance of shipbuilding for the Trapani region, including the historical importance of boats and ships for the local society and economy.
5. **Functional Aspects and Logistics**: Some hotspots show how the shipbuilding company organizes the logistics and transportation of materials and boats. This includes the use of cranes, forklifts, and special transport carts employed within the shipyard.

5.5.3 Hotspots in the Tour

Divided into various panoramas, the 50 hotspots of the virtual tour of the **Cintura Shipyard** provide a detailed overview of the shipyard, guiding visitors step by step through the different areas to discover the key aspects of shipbuilding and restoration. Some panoramas do not contain additional hotspots but are designed to provide an overall view of a specific area of the shipyard or a general impression of the surroundings. The tour is structured as follows:

Entrance:

- **Launch Ceremony**: A video showcasing the traditional ceremony of launching a ship into the water.
- **Shipyard History**: A documentary on the history and significance of the shipyard.

Outdoor 1:

- **Overview Panorama**: No additional hotspots.

Outdoor 2:

- **Overview Panorama**: No additional hotspots.

Outdoor 3:

- **Abrasion**: A photo with a description showing the wear and tear of surfaces from friction or contact with rough materials.

Outdoor 4:

- **Bridge Crane**: A video demonstrating the operation of a bridge crane used for lifting heavy materials.
- **Dock**: A photo showing a structure where ships are built, repaired, or loaded/unloaded.

Outdoor 5:

- **Handling Cart**: A video showing a cart used for transporting heavy materials and equipment within the shipyard.
- **Vertical Work Platform**: A link to a video demonstrating the use of a vertical work platform.

- **Construction Ladder**: A description of a construction ladder used for climbing or accessing pits.
- **Coating**: A photo with a description showing the application of a protective coating to prevent corrosion and wear.
- **Woodworking**: A video demonstrating woodworking techniques at the shipyard.

Outdoor 6:

- **Overview Panorama**: No additional hotspots.

Outdoor 7:

- **Boat Storage**: A link to a video showcasing boat storage.
- **Self-Propelled Crane**: A video demonstrating the operation of a self-propelled crane used for moving heavy loads within the shipyard.

Outdoor 8:

- **Overview Panorama**: No additional hotspots.

Outdoor 9:

- **Forklift**: A photo with audio describing the operation of a forklift used for lifting and moving materials over short distances.

Outdoor 10:

- **Joinery**: A video showing joinery work within the shipyard.

Carpentry 1:

- Thickness Planer: A video demonstrating the use of a thickness planer.
- Surface Grinding Machine: A video showing the use of a surface grinding machine.
- Models: An audio file describing various shipbuilding models.
- Pliers: A video showing the use of pliers in the construction process.
- Sharpening Machine: A video demonstrating the function of a sharpening machine.
- Miter Cutter: A video demonstrating the use of a miter cutter.
- Machines: A photo with a description of important machines in shipbuilding, such as compressors and air extractors.
- Knife Sharpening: A video showing how knives are sharpened.
- Small Carpentry Work: A video showing detailed carpentry work.

Carpentry 2:

- Profiling Machine: A video demonstrating the use of a profiling machine.
- Bending Techniques: A video showing bending techniques in shipbuilding.
- Dust Extractor: A video demonstrating the use of a dust extractor.

Carpentry 3:

- Wood Types: A video describing various types of wood used in shipbuilding.
- Hole Cutter: A video showing the use of a hole cutter.
- Bandsaw: A video with audio explaining the operation of a bandsaw.
- Carpenter's Workbench: A video showing a workbench used for carpentry.

Outdoor 11:

- Overview Panorama: No additional hotspots.

Outdoor 12:

- **Overview Panorama**: No additional hotspots.

Museum:

- **Small Axe**: A video showing the use of a small axe.
- **Large Axe**: A video demonstrating the use of a large axe.
- **Block**: A video showing the use of a block in shipbuilding.
- **Galvanized Nails**: A video with a photo showing the galvanizing of nails.
- **False Angles**: A video demonstrating the use of false angles in carpentry.
- **Caulking Mallet**: A video with a photo showing the use of a caulking mallet.
- **Small and Large Dowels**: A video demonstrating the use of small and large dowels.
- **Hammer**: A video with a photo showing the use of a hammer.
- **Edge Grinder**: A video demonstrating the use of an edge grinder.
- **Rasp**: A video with a photo showing the use of a rasp.
- **Saw**: A video with a photo demonstrating the use of a saw.
- **Small Saw**: A video with a photo showing the use of a small saw.
- **Large Saw**: A video with a photo showing the use of a large saw.
- **Drill**: A video with a photo demonstrating the use of a drill.
- **Port of Trapani (Image 1)**: A photo of the historic Port of Trapani.
- **Ship Construction (Image 2)**: A photo showing ship construction.
- **Museum**: A photo of an old ship's wheel and a historical diving helmet.
- **Sicilian Historical Heritage**: A link to a video about Sicily's historical heritage.
- **Trapani Shipbuilders**: A link to an article about the shipbuilders of Trapani.
- **D'Amico Shipbuilders**: A link to an article about Mastro Michele D'Amico, a famous shipbuilder.

In conclusion, the **Cintura Shipyard** is a significant site for traditional shipbuilding and craftsmanship. The virtual tour offers a comprehensive insight into various aspects of shipbuilding and ship restoration, showcasing both modern techniques and centuries-old traditions.

6. Interactive Quiz Questions for Each Shipyard

Interactive quiz questions are available on the website for each of the five virtual shipyards, in the languages of German, English, Italian, French, and Spanish. These quizzes were created using H5P, an open-source technology designed for developing interactive learning content. The quiz questions are carefully designed to offer a variety of question types, including multiple-choice questions, drag-and-drop tasks, fill-in-the-blank exercises, and memory games.

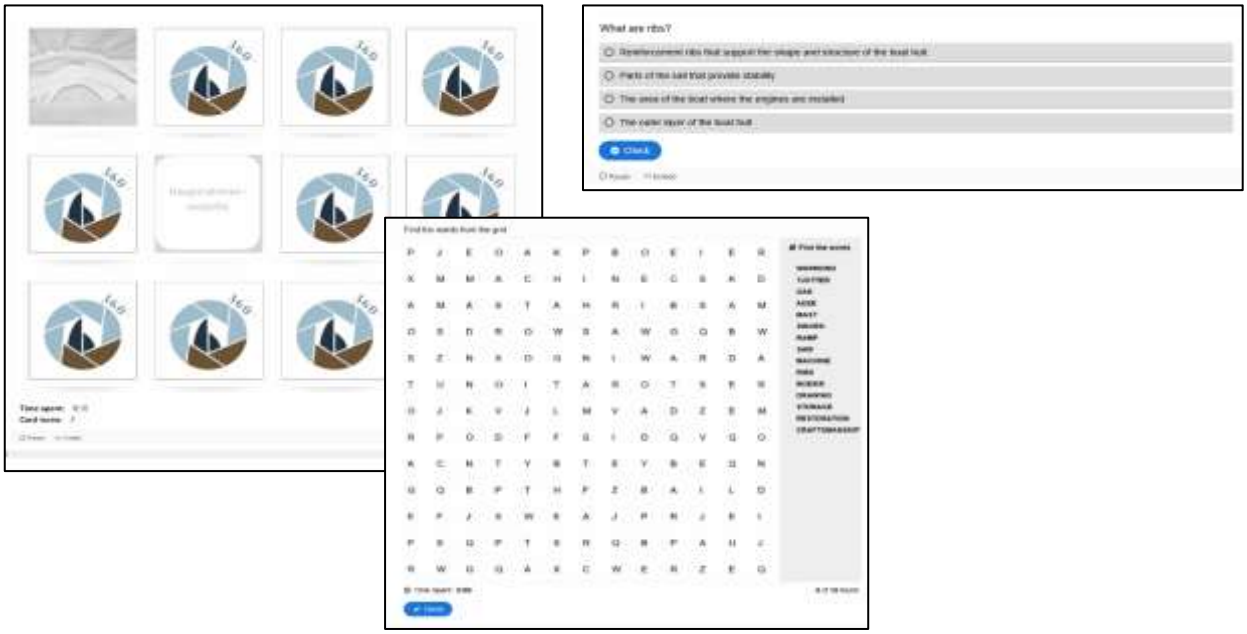


Figure 6: Examples of interactive quiz questions

The quizzes provide learners with an entertaining way to independently test their knowledge. Since the results are not saved, learners can repeat the quizzes multiple times without their performance being tracked. Additionally, these examples can serve as inspiration for teachers to create their own interactive quizzes using H5P.

This approach encourages active learning and provides a fun, engaging way for users to reinforce their understanding of the shipbuilding processes and techniques explored in the virtual tours.



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