

Documenting a 20th century wooden vessel at risk: the AGIOS SPYRIDON project

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Abstract: *Agios Spyridon*, a 24 m long wooden vessel, was built in 1950, and operated in Cyprus as a trawler until 2004. Between the years 2005 and 2019 it remained on dry land, exposed to the elements. It suffered severe damages and the local authorities decided that it should be destroyed. To mitigate the consequences of its unavoidable loss, a project of controlled destruction took place in 2019, led by the University of Cyprus. Applying a rescue excavation approach, the vessel was fully recorded, using both conventional and digital methods. The project also included activities for raising public awareness for the protection of maritime heritage, as well as plans for future display of rescued components of the ship's hull and gear.

Keywords: Cyprus, wooden fishing trawler, controlled destruction, ship recording

1. Introduction. A brief biography of the trawler AGIOS SPYRIDON

The trawler *Agios Spyridon* (Άγιος Σπυρίδων) was built in 1950 in Crete. It was registered in Cyprus in 1954 and withdrawn in 2004, under the European program for fisheries protection, by the Cypriot Department of Fisheries and Marine Research¹ (NC 1). It was a 24 m long vessel of a type known as *karavoskaro* (Καραβόσκαρο) in the Aegean, used as both a merchant and fishing vessel (Damianidis 1998: 73–76, 103; Segditsas 1940: 237–238). *Agios Spyridon* was propelled by a diesel, eight-cylinder, Kelvin engine and rigged with two masts used only for fishing purposes. While in Cyprus, it changed owner at least three times and was involved in fishing activities in Cypriot, Lebanese and Egyptian waters (NC 1, NC 2, NC 4).

In 2005, after its retirement, the Cypriot Department of Fisheries allowed the Municipality of Polis Chrysochous to preserve and protect *Agios Spyridon* as a monument of vernacular maritime heritage. It was dry docked outside the marina at Latsi, Polis Chrysochous, on the northwest coast of Cyprus. The boat remained fully rigged, sitting on concrete blocks and supported on its sides with beams, without protection from the elements. As a result, the deterioration of the entire structure was a matter of time (Fig. 1). In 2018 the local municipality council concluded that the vessel had turned into a hazard and should be destroyed. The Maritime Archaeological Research Laboratory (MARELab) of the University of Cyprus took action at this point and put significant effort to raise funding for the vessel's protection. The efforts bore no fruit and a controlled destruction program was deemed the next best option. Thus, the *Agios Spyridon* project commenced in November 2019, and was funded by the Honor Frost Foundation, the Municipality of Polis Chrysochous and the Cypriot Department of Fisheries and Marine Research. It was conducted in collaboration with the Cyprus Institute, the company Blue Lines Shipbuilders, one of the oldest traditional shipwrights' families of Cyprus (NC 3), and a team of Greek specialists in wooden boat recording, led by Dr Kostas Damianidis. This paper discusses the approach that was adopted for the comprehensive documentation and the controlled destruction of the vessel.

¹ Cyprus Fleet Register on the Net (<http://ec.europa.eu/fisheries/fleet/index.cfm?method=Download.menu>, accessed on June 15, 2018).



Fig. 1 The Agios Spyridon on dry land: (a) in 2006 (photo: K. Damianidis) and (b) prior to the project's commencement in 2019 (photo: © University of Cyprus, MARELab)

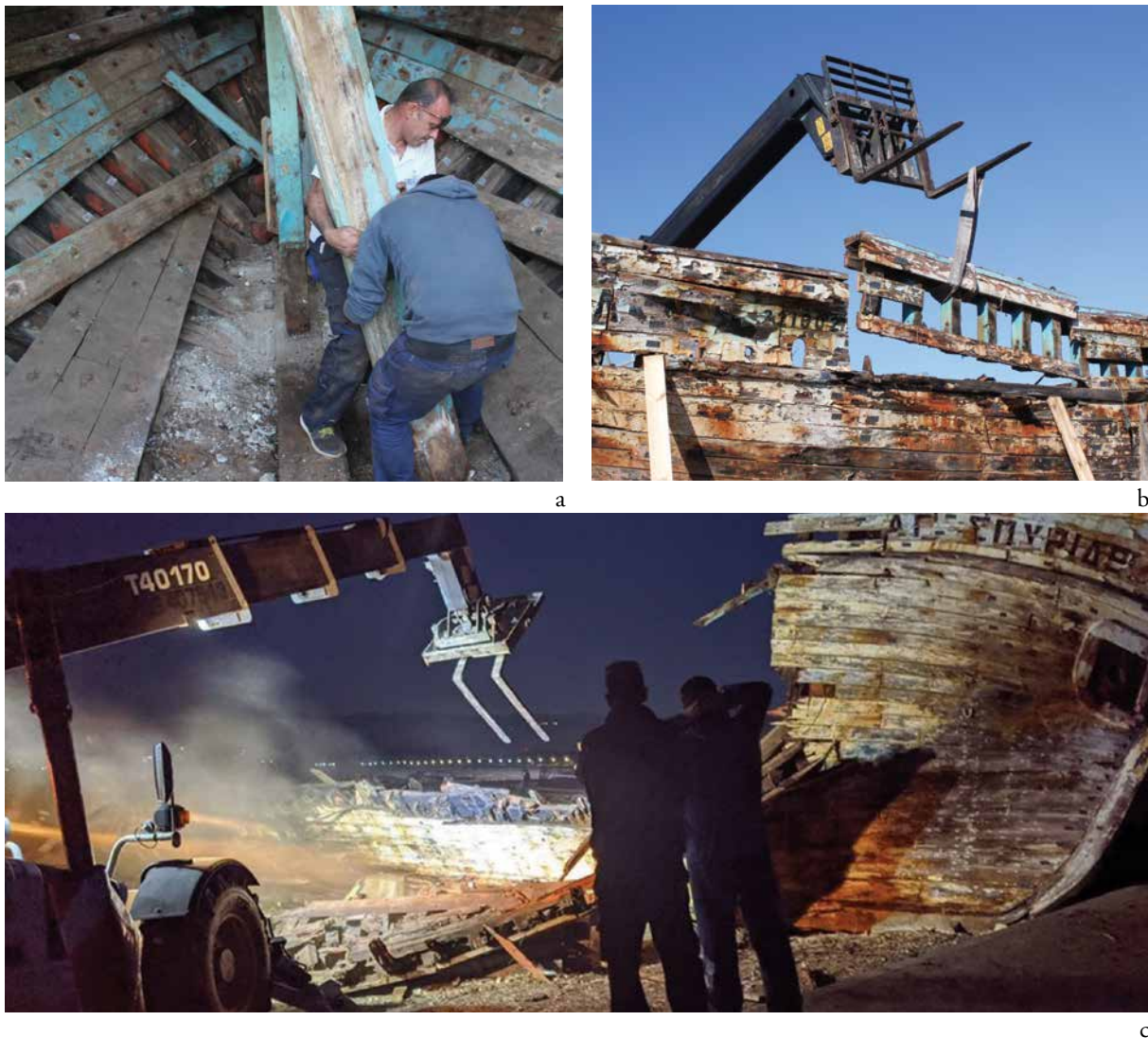


Fig. 2 Main phases of Agios Spyridon's controlled destruction a) Structural timbers being carefully disassembled. Cutting (b) and breaking (c) parts of the vessel using mechanical means and a telescopic handler (photo: © University of Cyprus, MARELab)



Fig. 3 The different methods of recording Agios Spyridon: a) Conventional measurements, b) Laser Scanning, and c) Photogrammetry

2. The Agios Spyridon project

The main objectives of the *Agios Spyridon* project were: (i) to preserve the structural, morphological and technological characteristics of the wooden vessel, through digital documentation, (ii) to select and preserve physically some of the key parts of the hull that could be useful for the study of the vessel, and (iii) to raise awareness about the preservation of nautical heritage.

Prior to any destruction, the vessel was recorded with laser scanning and a 3D model was created.² Fieldwork for the controlled dismantling lasted 15 days between November 28 and December 12, 2019, and was organized into three main phases:

- Removal of all superstructures, mechanical parts, fishing equipment and part of the deck, in order to expose the interior for recording;
- Full recording of the ship's interior;
- Removal of the characteristic parts of the vessel to be salvaged, and final destruction.

² http://ephemera.cyi.ac.cy/?q=Agios_Spyridon (accessed on April 14, 2022).

One of the main concerns was the selection of the technical methods and tools that should be used for the dismantling, considering the limited time available and the destructing character of the project. Three methods were used (Fig. 2): (i) careful dismantling of mechanical and fishing equipment, as well as parts of the vessel, with the use of hand tools, or electric cutting wheels for rusted bolts and joints; (ii) cutting and removing wooden parts of the vessel with the use of chain saws, and (iii) breaking large parts of the vessel with the use of a telescopic handler, by either pushing or pulling. This method was mainly used during the last phase of destruction, when the remaining parts of the vessel were considered already as disposal material.

Throughout the destruction process, the hull together with the mechanical and fishing equipment were photogrammetrically recorded, as they were gradually exposed. Alongside the photogrammetric documentation of the interior sections and details, many measurements were taken with conventional methods. Before the final destruction, the hull was also recorded with laser scanning (Fig. 3).

2.1. Morphometric digital documentation

Terrestrial Laser Scanning (TLS), using a phase-shift device, was selected as the most effective method for recording the boat's external and internal compartments. All morphological features were recorded in two phases, one during the pre-disturbance survey and one before the final destruction, almost at the end of the project. The main objective of the latter was to improve the first model with all the structural details that were exposed during the controlled dismantling, which were not initially visible.

A 4D database was created, consisted of two 3D models of 106 (March 2018) and 77 (December 2019) range maps, respectively. The difference in the overall number of stations was due to the dismantling progress and decreased complexity. The average resolution for the final point clouds is estimated to be 7 mm (X-Y).

An unavoidable difference was created applying a common pipeline after a TLS survey (Grussenmeyer *et al.* 2016). The latter was supported by aerial (2018) and terrestrial (2019) image-based campaigns, used to record and map high definition RGB values. The aerial survey was performed by the CyI USRLab using a DJi Inspire 2 drone. The computed photogrammetric camera network was hence spatially aligned with the TLS data to allow a detailed re-projection of colours on the vessel geometry.

The final 3D models of both seasons today available on the EpHEMERA database (Abate *et al.* 2017), were aligned in the same local reference system (Fig. 4) in order to: (i) perform a multitemporal comparison of the different epochs; (ii) analyse morphometric features of the lost structure, and (iii) extract architectural 2D drawings of the vessel.

2.2. Close-range (multi-image) photogrammetry

Close-range (multi-image) photogrammetric documentation was used to record parts of the boat during the pre-disturbance phase and as they were exposed, during its dismantling. The documentation proceeded as in an archaeological excavation, while the exact 'stratigraphic' sequence (matrix) of the boat was reconstructed in the post-processing phase, by merging the various recorded models. During this process, the laser scanning data was of essential importance, as the TLS point-cloud provided data for geo-referencing the photogrammetric point-cloud (Fig. 4). Additionally, this procedure allowed the combination, when and where necessary, of the two point-clouds (TLS and photogrammetric), thus creating a fully integrated system of 3D recorded data. The image data capture was done with both SLR (Canon EOS 550D with an 18–55 lens) and compact (Olympus TG-5) cameras; data were processed in Agisoft® Metashape (formerly PhotoScan).

2.3. Measurements with conventional methods

The 3D model of the vessel was blind in specific structural details due to the limited access in certain interior spaces. For these areas, mainly at the stern and the bow, the use of some conventional measurements and recording methods was necessary.

The team of architects used printed 2D sections of the TLS 3D model and filled by hand the structural details that were missing. Most of the conventional measurements were taken at the counter stern (inside and outside of the boat), at the interior space of the bow, and at several sections of the middle part of the structure. Key structural details were recorded on these sections, such as: the assembling of the frames, the resting of the beams on the clamps, and the joining arrangements of the hanging knees. The conventional measurements together with all the data from the 3D digital models were used to produce architectural 2D drawings of the vessel.

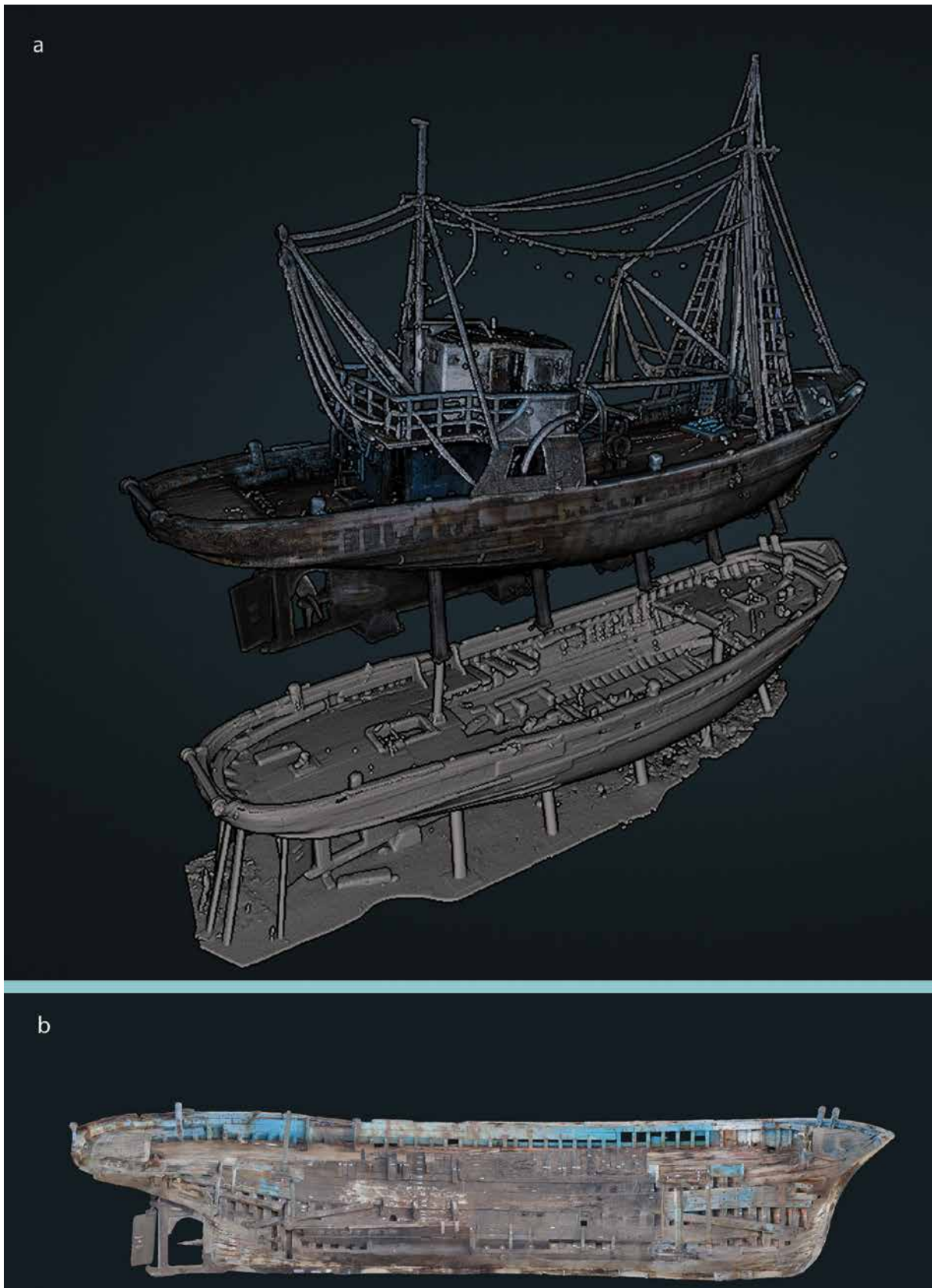


Fig. 4 The digital documentation of Agios Spyridon a) The TLS 3D models (© Cyprus Institute); b) A longitudinal section of the 3D model created from a combination of the TLS and photogrammetry point clouds (TLS © Cyprus Institute; Photogrammetry © University of Cyprus, MARELab)

3. Shipbuilding information

Agios Spyridon was one of the largest surviving wooden trawlers in Cyprus, and possibly in the eastern Mediterranean, and had preserved all fishing gear *in situ*, both on deck and in the interior. Its basic dimensions were recorded with accuracy during the project: overall length = 23.88 m; keel length = 18.8 m, maximum beam = 6.16 m; midship height = 3.26 m (Fig. 5).

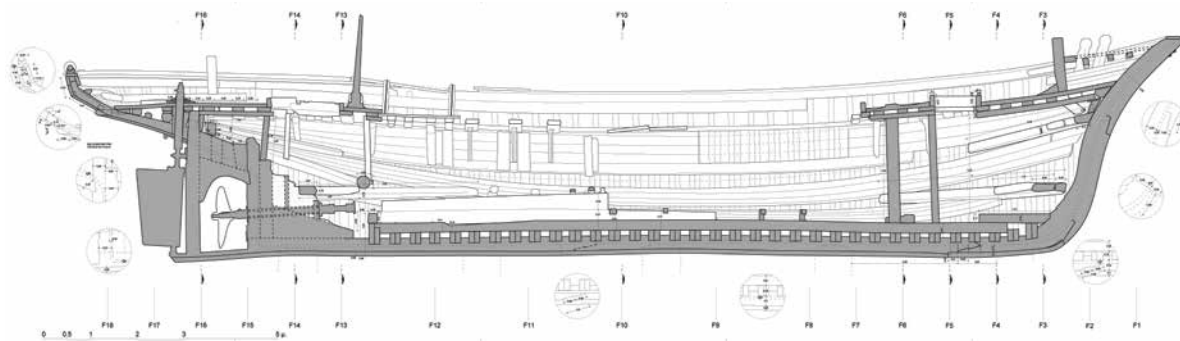


Fig. 5 Longitudinal construction section of the trawler *Agios Spyridon* (drawing: K. Damianidis, G. Tzavaras)

The vessel had, 49 full frames from the stem to the stern post. They consisted mainly of nine pieces each, including the floor timbers, the futtocks and the top timbers. The cross section of the double frames was approximately 12 × 24 cm and the single 12 × 12 cm. The last full frame on the stern was above the vertical stern post. This is a strong structural element that supports almost all the cant frames that were placed radially behind it.

On most of the transversal sections the keel had a cross section about 17–18 cm wide × 23 cm high and the false keel 17–18 × 9 cm. The rabbet had a width of 5.5 cm. Clamps had a thickness of 11 cm and the keelson had cross sections of 28 × 21 cm amidships. The cross section of the deck beams was about 9 × 15–28 cm and the deck planking had a thickness of 4.5 cm.

There were 12 hanging knees on each side of the vessel beneath the deck reinforcing the joints between some of the deck beams with the shelf clamp and the respective futtocks. The two main breast hooks were located on the bottom parts of the bow and the stern, together with their legs (i.e. separate timbers that were extended more than 4 m on top of the lower parts of the frames). They were made of natural curved logs with adequate angles and lengths. These, together with their legs were the main reinforcing components at the extremities of the vessel. The double frames were visible in some areas (cross sections of both pieces: 21–26 cm sided, 12–14 cm moulded). The average space between two successive frames was 19 cm, ranging from 16 to 21 cm.

The planking of the hull consisted of planks (5–5.5 cm thick), the wale below the waterway timber (9 cm thick), the bulwark planks (about 4 cm thick) and the plank sheer on the top of the planking (6 cm thick). Under the frames, the keelson, the sister keelsons, the limber strakes, the lower and the upper clamps, the legs of the breast hooks, and the shelves, had various thicknesses.

The elliptical stern of the vessel rested on the heavy axial structure of the lower part of the stern. The stern post consisted of two vertical pieces that stood upon the rear end of the keel. Aft of this stern post the axial structure extended with five vertical pieces; only the rear one was resting on an extension of the keel (9 × 18 cm) and the false keel (9 × 18 cm). Between the stern post and this vertical rear piece there was the opening for the placement of the propeller. Above the propeller opening, a wooden knee was fixed, and on top of it rested the other vertical pieces. Aft of this lower axial structure, there was the rudder hole and the metal rudder, were supported by two metal stays (bearings) and fastened on the axial structure. The aftermost complete frame of the skeleton together with 12 cant frames and the upper extension of the stern post comprised the skeleton of the elliptical stern. All of them were resting on the lower axial structure of the stern that is described above. The cant frames were placed radially around a centre that was located at the top of the rear pieces of the axial structure of the lower stern. They were placed at almost equal intervals, which at their top averaged 65 cm (46–69 cm). The cant frames were connected together with several curved pieces horizontally placed in a way that provided support to the structure of the aft deck and gunwale (Fig. 6).

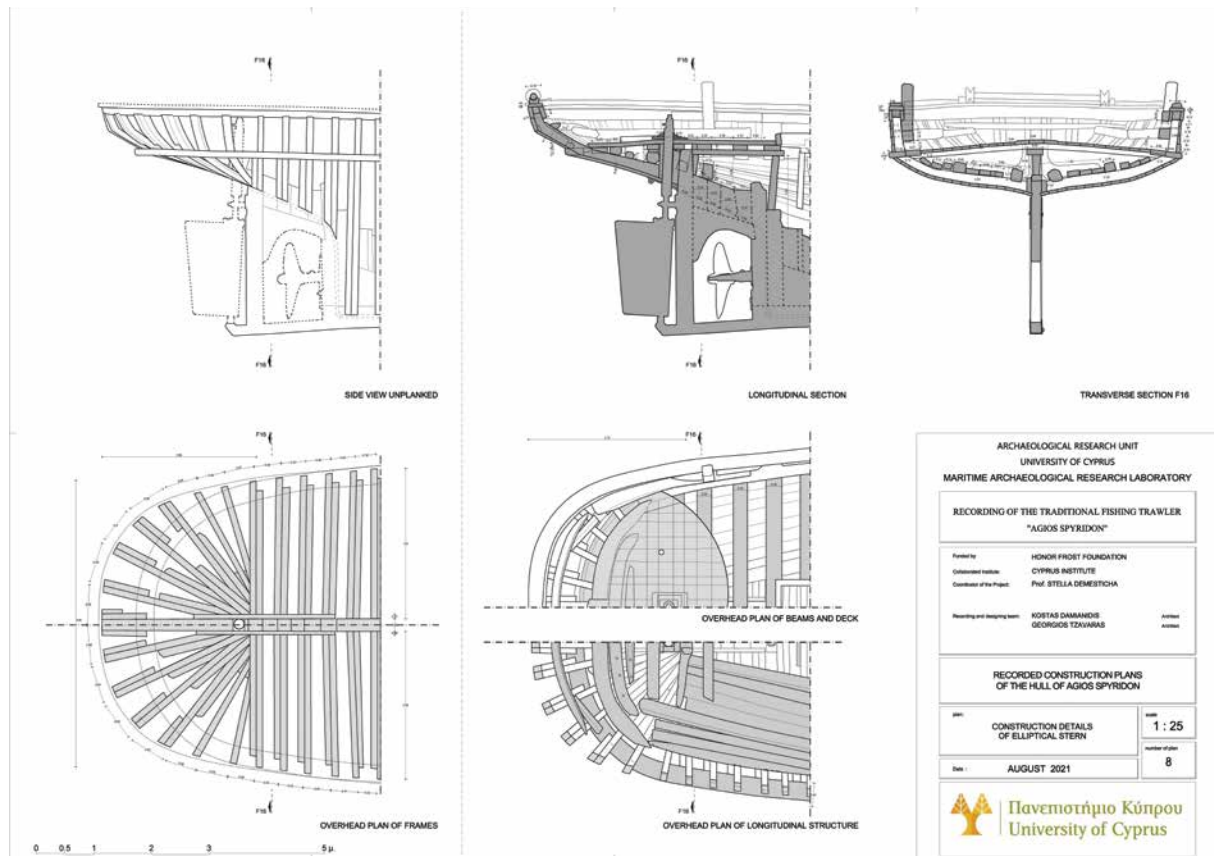


Fig. 6 Construction details of elliptical stern of the trawler Agios Spyridon (drawing: K. Damianidis, G. Tzavaras)

4. Large wooden vessels in danger: is controlled destruction a solution?

The project *Agios Spyridon* was the first experimental controlled destruction of a traditional vernacular wooden vessel in the Eastern Mediterranean. In this respect, it addresses some key issues regarding monuments of nautical cultural heritage (UNESCO 20013; Firth 2015). One of these issues concerns the role of legislation and how it combines with the support of local authorities for the protection of historic and traditional wooden vessels. In the case of *Agios Spyridon*, the attitude of the local council is revealing. The boat was initially perceived as a promising cultural heritage conservation project, and legislation was used positively for its protection. But over time, local authorities lost interest when they realized the amount of effort and resources that were necessary for its conservation. So, when the vessel failed to become an ‘attractive’ monument because of neglect, its destruction and removal from the town’s waterfront was deemed the optimum solution and to the community’s best interest, in terms of aesthetics and safety. A similar case in Greece concerned the *Eleni. P.*, a 24 m long Greek vessel of a type known as *perama* (πέραμα) (Damianidis 1998: 52–60). She was protected by law, but this was not enough to save her (Damianidis 2016: 22–24, 33). She was left dry docked, without any care, since the late 1990s, in a boatyard on the island of Salamis, Greece. The initial conservation plan was never materialised, because of bad management by the authorities, and in 2018, already in bad condition, the boat eventually collapsed.

The dilemma between the conservation of a vessel in danger and its controlled destruction is not a simple one, especially because the 21st century is the last phase of the long history of vernacular wooden vessels in the eastern Mediterranean (Damianidis 1996). Their gradual decommission and the lack of new wooden shipbuilding projects deprives these boats of their ethnological, technological and traditional context (Adams 2013: 22–26). No matter how extensively vessels are documented and studied, their withdrawal automatically removes an important part of the local cultural her-

³ UNESCO: Convention on the Protection of the Underwater Cultural Heritage, <https://unesdoc.unesco.org/ark:/48223/pf0000126065>, accessed on March 10, 2022.

itage stock. In balance, their protection and preservation allow for their recording and study and adds important chapters to the nautical history of the region. Preservation of large vessels on dry land, however, requires constant care and resources, otherwise it fails. The cases of *Agios Spyridon* and *Eleni P.*, discussed above, exemplify the fact that, apart from legislative measures, the role of local communities, hence public awareness, is imperative. For instance, it is possible that the sad fate of *Agios Spyridon* is related to a general lack of maritime literacy on the island of Cyprus (Nicolaou 2021).

Controlled destruction with full documentation can be the only mitigating solution, if/when preservation fails. The *Agios Spyridon* project tried to collect as much information as possible, but the physical remains of the boat are forever lost. The project followed a rescue excavation approach and tried to document pieces of the boat's technology, function and biography, all recorded with multimodal digital recording. Usually, archaeologists are trying to reconstruct a vessel from random preserved fragments. In this case, a methodology was developed to effectively do the opposite: record an entire structure in two weeks, while selectively salvaging sections and timbers, representative of a vessel to be destroyed. At the end of fieldwork, more than 100 construction parts of the *Agios Spyridon* were selected to be salvaged: pieces of the hull, mechanical and fishing equipment, rigging components, and personal belongings.

Along with the digital preservation of *Agios Spyridon*, the project focused on raising public awareness, to prevent the destruction of such vessels in the future. In order to get the local population actively involved and wishing to preserve as much of the material remains of *Agios Spyridon* as possible, artists and craftspeople were invited to select pieces from the ones not salvaged for further study, to give them a second life through creative reuse. An exhibition based on their work will be organized in the future.

The logistical difficulties and the challenges arising from the rescue character of the *Agios Spyridon* project notwithstanding, the added value of the recording approach discussed above was increased via a multidimensional use of the collected data, in a way that prolongs the vessel's life and contributes to the enrichment of the nautical cultural heritage of the region.

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