anchoring the Kyrenia Ship:
An experimental project to reconstruct the ship’s anchor

Dedicated to Honor Frost and her passion for the study of ancient anchors: “Ancore, the potsherds of marine archaeology” (Frost 1973: chapter title).

Introduction

Since its excavation in the late 1990s, the Kyrenia ship has become a seminal component of the corpus of archaeological evidence related to late-Classical and early-Hellenistic Period seafaring in the Eastern Mediterranean. The excavation recovered pieces of a single, one-armed wood-on-hook anchor fitted with a short, lead-filled wooden stock (van Duivenvoorde 2002: Fig. 1). The excavations included four hexagonal wooden stock cores of the anchor, which provided the necessary weight to sink the anchor; the concretes formed around the anchor arm’s iron tip; and some small wood fragments (Figs 2–4). The original anchor had a central wooden shank, carved from a crooked-grown oak timber, that terminated in a hook, or arm. The stock of the anchor was set perpendicular to the arm, which ensured that, when deployed, the anchor would always fall with its arm down and dig itself into the seabed. This poster discusses the anchor’s hypothetical reconstruction and the archaeological experimentation with scale models and a full-scale replica of the anchor. In order to study physical aspects of its manufacture and gain a better understanding of anchor making in the ancient Mediterranean, the Kyrenia Ship Project built a full-scale reconstruction on Cyprus using authentic materials, tools, and methods. Following in-water testing with the scale models, the full-scale anchor was deployed from Kyrenia Liberty to experiment with its handling and stowage aboard the ship and to test its setting performance on the seabed. The study of the Kyrenia ship anchor is undertaken by the author under the auspices of the Kyrenia Ship Project with the on-going support of Susan Kataré and Laina Swiny. The full-size anchor reconstruction was made by Kleanthis Monastakis and Rosella Van Duivenvoorde on Kyrenia Liberty.

With the experience of the small-scale model, the construction of a full-scale anchor commenced in Cyprus in mid-2012: working on its parts. Kleanthis completed the anchor almost a year later. He used only traditional hand tools to fashion and shape the oak tree branch into the anchor, and to make the copper nails, the iron tooth, and lead inserts.

The work commenced with the selection and sawing off a bifurcated branch from a local oak tree, with permission of the Cyprus Forestry Department. Once in Kleanthis’ yard, he removed the bark with an ax (it is important to do this when the wood is green as the bark comes off easier) and cut the timber roughly to the dimension of the anchor (Figs 6–7).

The Kyrenia ship anchor reconstruction and its study are still preliminary, as further tests are needed to undertake at sea, the anchor was most easily affixed to the ship’s mast derrick, which is lighter than oak, which makes it easier to handle aboard the ship and would provide better buoyancy for lifting from the sea.

On Kyrenia Liberty

The anchor was tested aboard Kyrenia Liberty in Limassol harbor for two days. The use of the ship’s mast derrick proved to be less beneficial, as the anchor was most easily affixed to the ship’s mast derrick, which is lighter than oak, making it easier to handle aboard the ship and would provide better buoyancy for lifting from the sea.

The Kyrenia anchor is unique among all known wooden hook anchors in that it has a relatively high stock core consisting of two core fillings on either side of the shank. Anchor-stock fillings Pb 19 and Pb 21 formed one side of the stock core, while Pb 20 and Pb 22 formed the other side. The two halves of the stock core were joined through the wooden shank by a 9-cm-long lead connection (Figs 1–3). The four anchor-stock core-fillings have a maximum overall length of 782 mm, maximum height of 182 mm, and maximum width of 22 mm. The complete core weighs 66.6 kg, but the weight is distributed unevenly, 28.3 kg on one side of the shank and 38.3 kg on the other. The cores are trapezoidal in section and the heavier side is marked by four copper core nails (Fig. 1).

Chisel marks impressed on the core surfaces, the asymmetrical and irregular shapes of the cores, and the copper nails driven into core-filling Pb 22 all evidence that the Kyrenia anchor was a unique piece.

The four nails used to mark the heavy side of the stock and the single nail that fastened the iron anchor tooth were shaped with a hammer from copper bars (Fig. 11). The square sections of the nail shafts are a direct result of the hammering. If hammered excessively, copper becomes brittle, but this can be adjusted easily by heating the nail for a short time at about 500–700°C. Kleanthis used his wood oven to anneal the fasteners. The main issue proved to be acquiring pure copper, as today, it is hard to come by; the barreled bars (measuring 1 m in length and 1 cm in section) had to be imported from Greece.

Kleanthis used chisel from his own to mark the design and shape of the anchor on the wood, such as the opening in the stock. For the making of the anchor wood core, he used a hammer and chisel and an ax. He chiseled out an oblong cavity from a single timber, forming the mold for filling the core of the wooden stock with molten lead. He then cut out a central section from the side of the stock, just enough to create a tight fit onto the shank. Before connecting the two anchor parts, he chiseled out a small opening through the thickness of the shank, where the shank would be fitted into the stock (Fig. 1).

Kleanthis used chisel from his own timber to mark the design and shape of the anchor on the wood, such as the opening in the stock. For the making of the anchor wood core, he used a hammer and chisel and an ax. He chiseled out an oblong cavity from a single timber, forming the mold for filling the core of the wooden stock with molten lead. He then cut out a central section from the side of the stock, just enough to create a tight fit onto the shank. Before connecting the two anchor parts, he chiseled out a small opening through the thickness of the shank, where the shank would be fitted into the stock (Fig. 1).

Kleanthis found that the anchor stock and shank/arm timbers had to be kept wet in order to prevent the wood from splitting, and to make their carving easier. Almost daily, he took the anchor parts into the sea for a soak. Additionally, he filled the holes carved into the anchor stock with water and covered the timbers with a wet cloth every night after work.

The four nails used to mark the heavy side of the stock and the single nail that fastened the iron anchor tooth were shaped with a hammer from copper bars (Fig. 11). The square sections of the nail shafts are a direct result of the hammering. If hammered excessively, copper becomes brittle, but this can be adjusted easily by heating the nail for a short time at about 500–700°C. Kleanthis used his wood oven to anneal the fasteners. The main issue proved to be acquiring pure copper, as today, it is hard to come by; the barreled bars (measuring 1 m in length and 1 cm in section) had to be imported from Greece.

The anchor’s iron tooth was made by a local blacksmith and fashioned around the tip of the anchor arm before being nailed in place (Figs 9–10). Kleanthis pre-drilled all nail holes before driving the nails into the timber (Fig. 9).

Next Kleanthis and his assistant Phytos dug the anchor stock into the ground (placing the anchor upside down) and lifted the inside of the stock with ashes and built a clay rim around the stock opening to prevent the wooden stock from burning (Fig. 13). The clay also served to guide the pin into the stock.

Discussion

The Kyrenia ship anchor reconstruction and its study are still preliminary, as further tests are needed to undertake at sea, the anchor was most easily affixed to the ship’s mast derrick, which is lighter than oak, making it easier to handle aboard the ship and would provide better buoyancy for lifting from the sea.

References


Dr Wendy van Duivenvoorde, Wendy.vanDuivenvoorde@flinders.edu.au

Flinders University, Adelaide, Australia

Kleanthis Monastakis and Rosella Van Duivenvoorde on Kyrenia Liberty.