



Decorated floor tiles from the 19th-century Akko Tower shipwreck (Israel): Analysis of pigments and glaze



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ARTICLE INFO

Article history:

Received 14 May 2017

Received in revised form

30 July 2017

Accepted 6 August 2017

Available online 8 August 2017

Keywords:

Akko Tower Wreck

Ceramic tiles

Clay

Glaze

Pigments

ABSTRACT

The Akko Tower shipwreck lies at the entrance to Akko harbour, Israel. It is apparently the remains of a 25-m-long merchant brig, dated to the first half of the 19th century. In four underwater excavation seasons dozens of fragments of decorated floor tiles were found in the shipwreck and retrieved. The tiles were originally about 20 cm square, covered with a white glaze decorated with blue, yellow, orange, green and brown coloured motifs. The tiles were characterized by visual testing, XRF examination, multi-focus light microscopy, SEM-EDS microscopy, EPMA-WDS chemical analysis and lead isotope analysis, in order to study their composition and determine their manufacturing process and dating. The results reveal that the tiles were made of clay with a lead-based glaze coating with decorations of cobalt blue and antimony yellow pigments. Typological evaluation and the use of commercial cobalt blue and antimony yellow pigments, show that the tiles were most probably manufactured in Sicily after 1802 and possibly before 1850. The dating suggests that the ship operated well into the second half of the century.

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1. Introduction

1.1. The historical setting

The historic walled port city of Akko (Acre, St Jean d'Acre, Akko) is located on a small peninsula that forms the north-eastern extremity of Haifa Bay, in the north of Israel (Fig. 1). In the second half of the 18th century, Akko became the *de facto* capital of the Holy Land, and its principal trading port [[1], p. 134], and was considered the key to the East by the European Powers [[2], pp. 88–89].

In 1799, British control of Akko, its harbour, fortifications and defenders, prevented Napoleon Bonaparte from taking the town, and stopped his advance northwards [[3], p. 28; [4], pp. 372–373]. In December 1831, Akko was heavily bombarded by Muhammad Ali's Egyptian flotilla. The defenders of Akko withstood the attack from the sea, and the Egyptian ships were severely damaged. After a six-month siege, on 27 May 1832, the Egyptians took the town by

land. The period of Egyptian rule over Akko lasted until 3 November 1840, when a British–Austrian–Ottoman fleet bombarded the town. During this attack, the main powder magazine of Akko exploded, causing enormous damage to the town and destroying its fortifications. Akko was taken the next day [[3], pp. 39–48; [4], pp. 561–564].

Although the town was heavily damaged and its fortifications destroyed, ships continued to call at the harbour, which also served as a starting point for survey expeditions to the Holy Land. For example, in August 1847, T. H. Molyneux launched an expedition from the 26-gun sixth-rate frigate HMS *Spartan* to the Dead Sea from Akko [5]. In March–April 1848, the USS *Supply* anchored near Akko, from where W. F. Lynch started his expedition to the Jordan and the Dead Sea [6,7]. In 1860, A. L. Mansell, with HMS *Firefly*, surveyed the bay of Akko and the town [8].

In addition to these naval operations and survey expeditions, Akko harbour served for commercial purposes. Consequently, ships of various types, and from various fleets—European, American, and eastern Mediterranean, used Akko harbour. Analysis of the archaeological data suggests that the Akko Tower Wreck is the remains of one of these ships.

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Fig. 1. Location map of Akko and the Akko Tower Wreck (N. Yoselevich and J. Asuli).

1.2. The Akko Tower shipwreck

In 1966, during an underwater survey of the ancient harbour of Akko, a shipwreck designated as the Akko Tower Wreck was discovered. The shipwreck site is situated about 35 m north of the Tower of Flies, after which it was named (Fig. 1), at a maximum depth of 4.4 m. Four seasons of underwater excavations were conducted in 2012, 2013, 2015 and 2016 by the Leon Recanati Institute for Maritime Studies of the University of Haifa.

The Akko Tower shipwreck, lying north-east to south-west, is 17.8 m long and 6.4 m wide. Among the hull remains were sections of the keel, rising wood, keelson, hull planks, framing timbers, ceiling planks, limber boards, and longitudinal reinforcing components [9]. Preliminary study of the shipwreck indicated that it was the remains of a 25-m-long merchant brig, dated to the first half of the 19th century, and built under the influence of the French shipbuilding tradition in a well-established shipyard [9,10]. A variety of items was found during the excavations, comprising rigging elements, wooden and metal objects, stones, and glazed floor tiles – the subject of this article.

1.3. The glazed floor tiles

Dozens of fragments of decorated floor tiles were discovered in the shipwreck during the excavations (Fig. 2). The tiles were originally about 20 cm square and 16–19 mm thick. All the tiles were white-glazed, and decorated with blue and yellow/orange stencilled motifs, such as arabesques, flowers, tripods, and stars (Fig. 3). A single broken tile (no. 323) had part of a stamp of the letter 'P' on its back (Fig. 3b). This stamp might represent the name of the manufacturer, who has not yet been identified. Simulations of the original shape and tiling patterns are shown in Fig. 4.

This type of tile was manufactured in southern Italy, most probably in Sicily, and generally dated from the end of the 18th to the end of the 19th century [11]. In his report, Raban described glazed floor covering decorated with arabesques, which he claimed were typical of western Mediterranean houses [12], p. 197]. The present research aims to provide further information regarding the manufacturing process, origin and date of the tiles, as part of an ongoing series of studies of the Akko Tower Wreck and its artefacts [e.g. Refs. [9,10]].

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