

# Zea Harbour Project: *preliminary report 2009-2010\**

BJØRN LOVÉN & MAD S MØLLER NIELSEN

During the 2009 and 2010 seasons, the Zea Harbour Project (ZHP), under the Danish Institute at Athens and supervised by the Ephorate of Underwater Antiquities, conducted surface cleaning, excavation, survey dives, and digital survey in the two ancient naval harbours of the Piraeus: Mounichia (modern Mikrolimano; Figs. 1-2) and Zea (today also called Pashalimani; Figs. 1, 3). The Carlsberg Foundation has generously provided the funding for our fieldwork and research. The following report summarises the most significant results of the 2009 and 2010 campaigns.<sup>1</sup>

## 1. Mounichia, 2009-2010

During 2009 and 2010, the investigations focused on shipsheds in the northern and north/northwestern part of the harbour, the northern ancient fortified mole (M-FM<sub>1</sub>), and the remains of a large square tower (M-T<sub>3</sub>) in the southern fortified mole (M-FM<sub>2</sub>) (Fig. 2). The

investigations had two main objectives with regards to clarifying the architecture and topography of the ancient naval harbour. The first was to obtain dateable material related to these structures; the second was to document in detail the architecture of the shipsheds and the two fortified moles.

### *Mounichia, Group 1 Shipsheds (M-G<sub>1</sub>)*

Visual inspection dives on the northern side of Mounichia located the remains of a side wall and four colonnades (Fig. 2). These structures are tentatively identified as the remains of at least six shipsheds belonging to M-G<sub>1</sub>. Large areas of worked bedrock, several architectural elements, and an unidentified built structure (M-G<sub>1</sub>/U:1) were also found. Surface cleaning exposed the structures for digital surveying. Three test trenches revealed that the colonnades stand on a foundation fill, which contained a small quantity of diagnostic ceramics (Fig. 4). The su-

---

\* We wish to thank Dr. A. Simosi, the Ephor of the Ephorate of Underwater Antiquities, former Ephor Dr. St. Samartzidou, and our supervisor, Dr. D. Kourkoumelis. We would also like to thank Dr. A. Mantis, Ephor of the 26<sup>th</sup> Ephorate, former Ephor E. Ligouri, and our supervisor Dr. K. Axioti. Thanks are also due to: The Hellenic Coast Guard, Hellenic Sailing Club (NOE), Nautical Athletic League (NAΣ), the National Sailing Center of Piraeus (EKΠ), Viking (Trelleborg), and the staff of the Danish Institute at Athens. The ZHP worked in the field with the following teams: *The 2009 Land Team*: Dr. K. Axioti (supervisor from the 26<sup>th</sup> Ephorate of Prehistoric and Classical Antiquities), Dr. B. Lovén (archaeologist, director), N. Bargfeldt (archaeologist, field director), R. Anderson (architect), P. Athanasopoulos (archaeologist), M.M. Nielsen (archaeologist), S. Hoffmann (student), M. Kelly (student), A. Latortue (student), and E. Mortensen (student). *The 2009-2010 Underwater Teams*: Dr. D. Kourkoumelis (supervisor from the Ephorate of Underwater Antiquities, 2009-2010), Dr. B. Lovén (archaeologist, director, 2009-2010), Ch. Papadopoulou (archaeologist, field director), I. Sapountzis (archaeologist, 2009-2010; field director), R. Anderson (architect, 2009-2010), C.W.D. Pochin (technician, 2009-2010), P. Athanasopoulos (archaeologist, 2009-2010), N. Bargfeldt (2009, archaeologist), Y. Nakas (archaeologist, 2010), M.M. Nielsen (archaeologist, 2009-2010), V. Tsiairis (archaeologist, 2009-2010), K. Vafiadou (archaeologist, 2010), A. Świąch (student, 2009; archaeologist, 2010), M. Arenfeldt (student, 2009), S. Hoffmann (student, 2010), E. Mortensen (student, 2009), and C.T. Nielsen (student, 2009-2010). Mette Schaldemose (archaeologist, assistant director) supported all teams in the field. Dr. A. Trakadas and Dr. D. Davis have edited this article.

<sup>1</sup> The preliminary results from the 2010 investigations have also been published in 'Archaeology in Greece Online': <http://chronique.efa.gr/index.php/fiches/voir/1878/> [Accessed 30 August 2011].



**Fig. 1.** Satellite photograph of the coastal area between Zea and Mounichia Harbours (© Google Earth Pro 2009).

perstructure foundations of these shipsheds extend for a distance of at least 33.6 m from the modern shoreline and to a depth of more than 2 m. This area will be crucial for understanding sea level change since Antiquity, and hence the harbour front topography of the ancient Piraeus. Large areas of the modern harbour in this area were also surveyed digitally in detail, providing data useful for understanding how its development has affected the ancient harbour.

#### *Mounichia, Group 2 Shipsheds (M-G2)*

An unidentified structure (M-G2/U:1) was located in the area of M-G2 (Fig. 2). M-G2/U:1 consists of four re-used column drums laid side by side. A similar construction has been observed in the ramps of the Phase 3 shipsheds in Area 1 at Zea Harbour, suggesting that M-G2/U:1 may belong to the M-G2 shipsheds. The structure awaits more detailed documentation in 2011.

#### *Mounichia, Fortified Mole 1 (M-FM1)*

Excavation along the inner (western) side of the northern fortified mole (M-FM1) was carried out in order to define and date its construction (Fig. 2). The ancient mole had been identified during previous survey and excavations by the ZHP in 2008.<sup>2</sup>

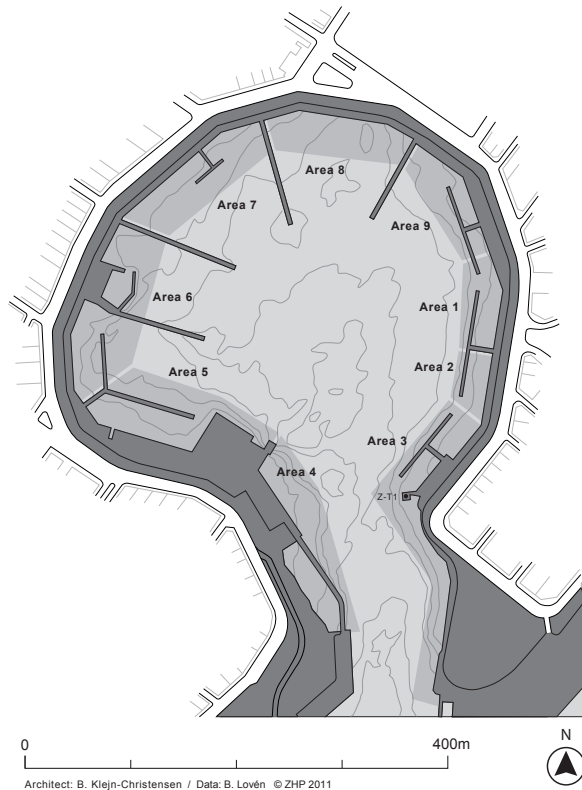
A substantial section of the west, inward side of the fortified mole is preserved under and alongside the modern quay (Fig. 5). Its extant remains consist of two courses of limestone ashlar blocks, at least three blocks deep, preserved for a total length of 12.7 m. To the north it disappears under the modern quay. This section of the fortified mole can be traced (but not reached) deep under the modern quay towards Tower M-T1 (south).

Four trenches were opened in 2009. Excavation revealed that the rubble foundations of the fortified mole and original bedrock harbour floor have been largely destroyed by dredging. Only one of the trenches produced stratified material (M-FM1/T4-2009). In 2010 this trench was extended towards the west (M-FM1/T1-2010).

The rubble foundations were found to be destroyed about 2 m to the west of the inward side of the fortified



**Fig. 2.** Mikrolimano Harbour (ancient Mounichia): areas under investigation in 2009 and 2010 (© ZHP 2011).



**Fig. 3.** Zea Harbour: designations of Areas 1-9 (© ZHP 2011).

mole. The foundation consists of irregularly shaped stones of various sizes (c. 0.10-0.20 m) set in compact, medium- to fine-grained sediments. The sediments vary slightly in colour (white to grey) and frequently contain a more clay-like texture mixed with pebbles. Several large, fragmented limestone blocks (c. 1.00 x 0.30 m) were found distributed throughout a large part of the trench. Some of the blocks have at least two worked surfaces, but it is unclear whether they are re-used blocks intentionally employed in the rubble foundation or part of a collapse from the fortified mole. Excavation in the rubble foundation yielded diagnostic pottery that may provide a date for this structure. In 2011 the project plans to remove the block fragments and continue excavation.

### *Mounichia Towers 1-3 (M-T1, M-T2 and M-T3)*

In order to identify key architectural features as well as to locate potential areas for future excavations, a visual inspection was conducted on the submerged parts of the three identified towers of the ancient Mounichia Harbour.

*Mounichia Tower 1* (M-T1; Figs. 2, 6) was inspected in order to define the structural plan in more detail. Three to four courses were recognisable at the southern and southeastern sides, although clear identification was made difficult due to encrustations, beach-rock, marine life and erosion of the limestone bedrock. It was possible to define a division between a lower rubble foundation and a more level upper foundation of blocks.

East of Tower M-T1, built foundations are preserved to a height of at least two courses. Several blocks of the upper course are missing, exposing the course below. The blocks in the lower course are large, irregularly shaped limestone blocks of varying size. A third course may exist below, but this cannot be determined without surface cleaning.

The modern rubble breakwater just to the west of the tower covers at least three courses of the fortified mole. It is uncertain how the fortified mole is preserved under the modern breakwater, which must be removed to allow for further investigation.

In sum, two to three foundation courses are preserved at different locations in and around Tower M-T1. To the west, the courses represent the fortified mole (M-FM1), while to the east, the structure is not fully understood; it may be a platform or an earlier tower building phase.

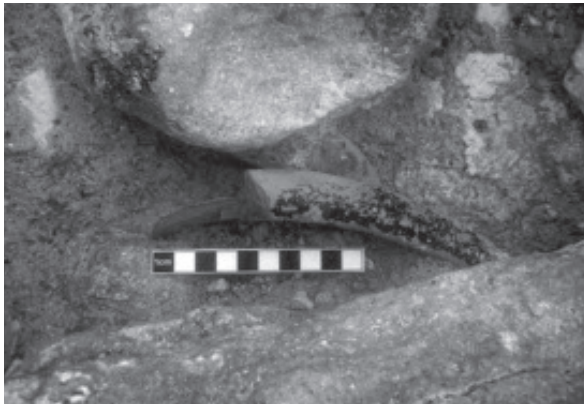


Fig. 4. *M-G1/Trench 1/2010: detail of closed context excavated in the M-G1 shipsheds (M.M. Nielsen © ZHP 2010).*



Fig. 5. *Excavations on west side of the fortified mole M-FM1 (Mentogiannis © ZHP 2009).*

*Mounichia Tower 2* (M-T<sub>2</sub>; Fig. 2) is tentatively defined as the entrance tower of the southern fortified mole (M-FM<sub>2</sub>). Visual inspection identified several large blocks and segments of worked bedrock northeast of the southeasternmost jetty in the harbour. Features were difficult to assess due to encrustations and beach-rock. Individual blocks exhibit pry-marks, while one had a rock-cutting for a T-clamp. A similar T-clamp cutting has been identified in the foundations of M-T<sub>1</sub>. All features are severely eroded.

Seven blocks covered by beach-rock were identified in situ. They are partly covered by a breakwater that reinforces a jetty and projects southwards. The blocks may belong to the fortified mole connecting M-T<sub>2</sub> and M-T<sub>3</sub>.

It is not possible at present to define the precise extent of the southern part of the fortified harbour entrance. In 2011 the ZHP will explore this area further.

*Mounichia Tower 3* (M-T<sub>3</sub>; Figs. 2, 7), outside the modern harbour, is the largest and best preserved towers of M-FM<sub>2</sub>. A large section of the upper part of the eastern M-T<sub>3</sub> foundations consists of very large, irregularly shaped limestone blocks of varying size (roughly 2.5 x 1.0 x 2.0 m). These blocks are set on either bedrock or on what appears to be a built/rubble foundation resting on bedrock. The rubble foundation was constructed with semi-rectangular blocks of varying size (0.2-0.5 x 0.2-0.5 m).

The tower foundations and the fortified mole extending northeast between M-T<sub>3</sub> and M-T<sub>2</sub> are preserved to a height of three or perhaps four courses, and rest on worked bedrock. The fortified mole east of M-T<sub>3</sub> is preserved to a maximum height of about 2.25 m above its rock-cut foundations. Identification of individual blocks and courses was complicated by encrustations, beach-rock, and marine growth.

A trench was excavated perpendicular to the curtain wall west of M-T<sub>3</sub>. The trench was opened in order to identify the location and possible link between the southern fortified mole (M-FM<sub>2</sub>) and Koumoundourou Hill. Only one layer was excavated. Its uniform matrix consists of large, rounded stones (c. 0.10-0.30 m) mixed with pebbles/gravel of varying size (c. 0.05-0.02 m) and colour (mainly light brown to dark grey), mixed with loose, fine sand. The sediments contained very little organic material. The trench was excavated down to bedrock with no finds. It is possible that the bedrock could have been used for structural elements, but no structural features were recognised.

Overall, the investigations in 2009 and 2010 resulted in a more detailed understanding of the harbour fortifications of *Mounichia* and particularly the two ancient moles with integrated towers protecting the harbour entrance.



Fig. 6. Mounichia Harbour: Tower M-T1 from the north (M.M. Nielsen © ZHP 2005).



Fig. 7. Mounichia Harbour: area of Tower M-T3 from the south (M.M. Nielsen © ZHP 2010).

## 2. Zea Harbour, 2009-2010

Investigations in Zea Harbour focused on the shipsheds. Targeted excavations, extensive surface cleaning, and digital survey were carried out in Area 2 and Area 3. In Area 3 digital survey work was also carried out on Tower Z-T1 (Fig. 3).

### Area 2

In 2010 surface cleaning and excavations of Structure 1, located between side-walls W29(?)/30(?) and W31(?)/32(?), were completed. The structure was constructed on an incline; it is most likely part of the wedge-shaped space between Group 1 and Group 2 (Fig. 8). In 2009 and 2010 five trenches were opened around Structure 1 and several closed contexts were found. These have assisted in the understanding of the chronology and construction sequences of the aforementioned structures.

In the southernmost part of Area 2, more than 90 m<sup>2</sup> were surface cleaned in 2010 in order to answer a very important question: how far to the south do the Group 1 shipsheds extend? Two well-preserved, rock-cut colonnade foundations define the southern side of Shipshed 34, and the Group 1 shipsheds have been followed for a total length of 143 m along the modern shoreline (Fig. 8). The investigations also exposed large areas of ancient quarrying that has destroyed parts of Shipshed 34.



Fig. 8. Zea Harbour: topographical reconstruction of Groups 1-5.



**Fig. 9.** From left to right:., southwestern open-passage and rock-cut ramp foundations of Slipway 36 (B. Lovén © ZHP 2009).

### Area 3

In the northern part of Area 3, about 200 m<sup>2</sup> were surface cleaned in 2009 (Fig. 3). The work focused on the areas around four large raised rock-cut platforms. The ZHP exposed slipway structures, quarrying associated with the construction of the slipways, later quarrying conducted when the slipways had gone out of use, and several unidentified features. At present it is only possible to identify the open-passage between Slipways 36 and 37, and the southern side of Slipway 36's ramp foundations (Fig. 9). Two possible ramp structures were also exposed; if they are related to the same building phase as the ramp of Slipway 36, we are dealing with a slipway type wider than the 6.5 m wide shipsheds found in Group 1 at Zea.

In 2009 digital survey work was conducted on the northern side of Tower Z-T<sub>1</sub> (Fig. 3). The tower stands at a height of four courses of limestone ashlar, which have been re-used as the foundation of a modern jetty.

### 3. Geophysical survey, 2009

Selected areas in and around the Zea and Mounichia Harbours were surveyed using a 'Chirp II' sub-bottom profiler (Fig. 10). The objectives of this geophysical survey were to locate any ancient harbour structures and to document the bathymetry below the sediments. At both Zea and Mounichia, previously unknown remains of the fortified moles flanking the harbour mouths were



**Fig. 10.** Geophysical survey of the harbour fortifications in Zea Harbour (I. Sapountzis © ZHP 2009).

discovered, and these data will help to reconstruct the entrance of the harbours.

BJØRN LOVÉN  
 Priorvej 2, st. tv.  
 2000 Frederiksberg  
 Denmark  
 bjoern.loven@gmail.com

MADS MØLLER NIELSEN  
 c/o Østerbrogade 59  
 5600 Fåborg  
 Denmark  
 moellernr1@yahoo.dk

### Works cited

Lovén, B. & M.M. Nielsen 2010  
 'The Zea Harbour Project: preliminary report 2007-2008', *PoDIA* 6, 167-74.