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"Set in stone"? Constructed symbolism viewed through an architectural energetics’ lens at Bronze Age Tiryns, Greece

Ann Brysbaert

Between c. 1400 and 1200 BC, concentrations of Mycenaean centres emerged in the Argive Plain, such as the site of Mycenae and the citadels of Tiryns, Midea and Argos. This region features a breath-taking amount and quality of large-scale architectural and engineering projects: huge ‘Cyclopean’ walls, corbelled vaults, amazingly modern drainage systems, and still working waterworks (Dam at Nea Tirynta). These features could not have been accomplished without a high level of special skills and knowledge – useful for specific social groups. To construct such buildings required large work forces. All these requirements had to be coordinated by a body of palatial staff comprising architects, engineers and supervisors.

Employing architectural energetics, I focus on the physical nature of this built environment, specifically on the ‘Cyclopean’ construction of the Lower Citadel wall at Tiryns, and how it linked in with the surrounding landscape while it was constructed during the final 50 years of the 13th century BC. A series of physical and social construction activities of several groups of people are analysed and quantified in order to improve our understanding of the efforts that went into constructing such massive fortification walls.

I explore the building experiences at Tiryns which incorporate builders’ choices in materials and techniques employed, and investigate how these building activities were embedded in the socio-political context of that period which allowed multiple meanings associated with the Tiryns Lower Citadel fortification wall to be recognized.

1 INTRODUCTION

In the prehistoric East Mediterranean and Greek context, monumental architecture as an expression of power by the ruling class over their subjects has been well argued (Maran 2006a; Tiryns’ post-palatial phases: Maran 2012; for prehistoric Cyprus: Fischer 2009), and many insightful studies have shown several ways and contexts in which the power symbols were transferred from one social class to another, while such transfers were never always without difficulties (Bryranda 1997). Social aspects of power and symbolism have also been studied in relation to continuity contexts in the Argolid, more specifically at Mycenae. Nonetheless, few scholars have looked upon what large-scale structures may have meant for the ordinary people who can see and interact with these as integral parts of their daily activities (Maran 2006b, 76; 2012).

This paper explores the role of the Lower Citadel wall; here it was constructed and by whom, and how it related to definitions, socio-political and symbolic meanings. Both performative and ordinary, observations embedded in ‘Cyclopean’ architecture of this kind have been emphasized and analyzed by Ehrenberg (1997, 1998) among others (DeLaine 1997), who connected the niches and openings to the defensive role of the wall. Iakovidis (1983) saw store rooms in the niches, and Kilian (1988) discussed the cult room in one of them. However, the practical logistics involved in building such large-scale and complex constructions have, so far, been largely overlooked while these aspects stand directly in relation to the structure’s socio-political meanings, in whom it was involved in producing such meanings, and why.

This paper explores these questions in some detail by employing an architectural energetics approach. The method translates construction activities into labour time units, most often expressed in man-days (hereafter: md). Abrams and Bolland (1999) give a full description of the definition and method, and refer to md as person-days but since construction work was/is often done by men, as DeLaine (1997) asserts, I employ the more standard term of man-day: md. Architectural energetics takes into account each step executed in the building process (from quarrying to constructing and decorating) and thus it is compatible with a chaîne opératoire approach, as applied in other socio-technological contexts (Brysbaert 2008; 2011; press), and also, for instance, employed in detail in the important work done by M. Devolder (2013 with further references to her work; 2015). The paper does not, however, address the question of site preparation for construction, such as clearing away standing buildings, nor site preparation, such as...
His recent work in the area of the Lower Citadel has thus presented convincing arguments on the niches and their uses of the North Gate in LH IIIB Final, and Maran (2010) North Gate but recently Maran (2008, 88–9) reassessed the change of tactic, see how many niches had already been holes became visible in Grossmann's last campaigns and some purpose in mind (Grossmann 1980, 480). These shooting holes were the clearest indication that the Lower Citadel wall was intentionally built with a strong defensive constructed to be smaller and narrower on the outside of the wall since there would be no good practical reason to extract any large-scale usage of lithofacies A for the Lower Citadel wall. Given this new evidence, the first phase of the LH IIIB2 building operations at the Lower Citadel wall have been discussed at length by many others. Moreover Maran (2010, 726–9) indicated that this massive programme and, as such, defensive in character, while in a second phase, but before the catastrophic end around 1200 BC, several alterations (e.g. insertion of the larger North Gate) indirectly suggested by Grossmann (1980, 41) goes against Müller's estimate is far too high but does not offer any explanation which is located (Fig. 1). This wall was constructed in the second half of the 13th century BC but several alterations to the original structure took place soon afterwards. A very detailed description on these changes is provided by Maran (2000), Moreover Maran (1990, 73) indicated that this massive wall was part of the first phase of the LH IIIB building operations at Tiryns. He therefore constructed it into two phases, but before the catastrophe and around 1300 BC, several alterations (e.g. extension of the former North Gate) suggested potential political instability, and this reconstructed the defensive purpose of the wall structure at that time. Moreover Maran (2000, 163) suggested that the Lower Citadel wall has been discovered at least by many others. However, Grossmann (1980, 163) considered the changing hues found in the indents and their changing use (even where apparently constructed the smaller and narrower on the outside of the Lower Citadel wall than they were on the inside. These changing hues (more visible in Grossmann’s last campaigns) and some of the indents under the military aspect (and in a change of tactics, as they may exhibit hall already, been linked to LH III E-End) has the Archetypal Tyrannos (Gomme, 1967, 168, 169) (Grossmann 1967, 490) explained the architectural aspect of the construction of Tyrian Upper Citadel’s walls on LH II EBA (see also Leventhal 1960, 25). Within the order removing the checklist, the Lower Citadel wall (the Western citadel area, the East and South Principal streets, and the wider area around the Lower Citadel) which wore all over on LH III EBA, were structured in Cypro-Agean style of architecture. The last that this structure was built probably, a hill later than the Lower Citadel wall as accurately suggested by Grossmann (1960, 21) and against any large scale usage of Hellenic for the Lower Citadel wall, since these would be too good practical reason to construct on LH III EBA. This hill may have been constructed significantly in the large stone mass needed for the Lower Citadel wall (see also Ruggles 1990, 123) on its east to west sides. Moreover, the stones used at the Lower Citadel wall also be corresponded to the colour description of lithofacies A as being dark large blocks, exploited and high larger blocks required for the construction of the Lower Citadel wall, the stones used at the Lower Citadel wall, the stones used at the Lower Citadel wall, the stones used at the Lower Citadel wall. How do we quantify several aspects of the construction? Several types of limestone employed at the citadel of Tiryns 2002 were not specified about which lithofacies were employed a large variety (1980, 202, 204, 205–216), on the one hand, where different stones and in relation to the First, Second and Third Citadel but he actually opposes the three citadels phases (Richter 1978, 215–16), also Kupper (1996). Lithofacies B was built possibly a little later than the Lower Citadel wall as possibly a little later than the Lower Citadel wall as possibly a little later than the Lower Citadel wall as possibly a little later than the Lower Citadel wall as possibly a little later than the Lower Citadel wall as possibly a little later than the Lower Citadel wall as possibly a little later than the Lower Citadel wall as possibly a little later than the Lower Citadel wall.
A. Brysbaert – Constructed Symbolism at Bronze Age Tiryns, Greece

Figure 1 Plan of Tiryns' Lower Citadel wall (Hor. 17a1–3) (with kind permission of Professor J. Maran and kindly provided by M. Kostoula)
needed more effort (De Haan’s 2009, 3, 6 refers to blocks of 2.5 tonnes), it is at this preliminary stage impossible to estimate how many such blocks left the quarries, so the average of 2.5–2.7 tonnes or 1.0 m³ is employed here. Moreover, no real difference in labour costs is to be calculated for quarrying large or medium-size blocks (but see Brysbaert 2013 on the bathroom floor block of 23 tonnes).

The rubble that was used mostly inside the wall but also in between blocks on the outside of the facades, was likely collected from the waste incurred during quarrying itself and during the rough dressing of the blocks, carried out in the quarry or later. Grossmann (1980, 496) mentions that further stone dressing was rarely done for the Lower Citadel wall in comparison with the Upper Citadel materials, and that specific diorite stone pounders may have been employed for such a task. Such work has not been taken into the basic calculations presented here but is being incorporated as part of the larger project aims, together with the efforts involved in filling up the gaps between the larger stones with various materials, and covering the walls with mortar material (Grossmann 1980, 498).

For the total amount of 17,060/21,000 m³ limestone material (or 46,070/57,700 tonnes) at a rate of one md/m³, the same number in man-days would have been required in the quarries. This could translate into 100 men quarrying 171/210 man-days respectively. Since at least three different lithofacies may have been employed in the Lower Citadel wall, possibly three groups of 30 men could have been working in three different quarry areas simultaneously, assuming that the quarry location itself was not limited to this number of people to work alongside one another, and that the work required was essentially repetitive and did not allow for specialization. In contrast to this model, one group of 30 men may have gone from quarry to quarry, providing an ongoing

<table>
<thead>
<tr>
<th>Total length</th>
<th>156 m (T_15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average thickness (W side)</td>
<td>7.5 m (9 measurements) (T_8, T_76)</td>
</tr>
<tr>
<td>Average preserved height (N side)</td>
<td>6.5 m</td>
</tr>
<tr>
<td>Limestone density factor</td>
<td>2,700 kg/m³</td>
</tr>
<tr>
<td>Large block size (2–13 m³)</td>
<td>2–13 tonnes</td>
</tr>
<tr>
<td>Medium block size (0.2–0.8 m³)</td>
<td>500 kg–2 tonnes</td>
</tr>
<tr>
<td>Small block size (0.01–0.2 m³)</td>
<td>30–500 kg</td>
</tr>
<tr>
<td>Large block size average</td>
<td>2.5 tonnes</td>
</tr>
<tr>
<td>Medium block size average</td>
<td>1 tonne</td>
</tr>
<tr>
<td>Small block size average</td>
<td>250 kg</td>
</tr>
<tr>
<td>Large block size % of total wall</td>
<td>65%</td>
</tr>
<tr>
<td>Medium block size % of total wall</td>
<td>25%</td>
</tr>
<tr>
<td>Small block size % of total wall</td>
<td>10%</td>
</tr>
<tr>
<td>Total volume of stone mass</td>
<td>17,060/21,000 m³ (46,070/57,700 tonnes)</td>
</tr>
</tbody>
</table>

the stones employed can be matched with specific extraction locations, the most likely scenario is that stones for the Lower Citadel’s wall may have come from Libykhass and R, but many could have come from S and F. The letter designations here are in block alignment to Philotheus, almost 1 km south-east of Tiryns. In reference to the total volume in cubic metres or mass in tonnes, the volume for the Lower Citadel wall was calculated as follows (Conder 1900, 67, after Rankin, that it is impossible to calculate this). In his critical work done at Petra, Bessac (2007, 136) suggests limestone extraction costs at 1 m³ (unworked block). He suggests that only 0.136 md/m³ was employed (Bessac 2007, 135, n. 495). This figure is similar to De Haan (2009, 3) who suggests 1.1 md/m³ for masonry blocks, based on modern experiments with very experienced workers. Abrams (1994) suggests similar numbers (1 to 1.4 md/m³) for Athenian limestone. Pakkanen (2013) calculated one skilled and one unskilled worker and added 0.2 unit for supervision, based on excavated columns and ethnographical comparanda. Most of their calculations are for a 10-hour workday (Hildreth 1997; Rule, 1927), but a 9-hour workday would be more likely (Hildreth 1997: 52). This seems to be a realistic suggestion since it corresponds to the working hours of later and modern workers (Hildreth 1997: 52). This is why I am applying this figure. In following Bessac and De Haan, although the carefully cut corner blocks are not calculated into account for those preliminary calculations, I employ one man-day per cubic metre (hereafter: md/m³) because mainly roughly worked or unworked blocks were employed throughout. While some of the blocks are larger than 2.5–2.7 tonnes and may thus have needed more effort (De Haan 1999, 3), another 15 blocks of 2.5 tonnes (i.e. at this preliminary stage impossible to estimate how many such blocks left the quarries, so the average of 2.5–2.7 tonnes or 1.0 m³ is employed here). Moreover, no real difference in labour costs is to be calculated for quarrying large or medium-size blocks (but see Brysbaert 2013 on the bathroom floor block of 23 tonnes).

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Before any further discussion of transporting the stone from the quarry to the building site, the means of transporting needs to be considered. Without seeing a definite conclusion, Leach (1958, 54-6) discusses this aspect in some detail and states that it would depend on the size of the load. He concludes that a single pair of oxen or one yoke can only transport part of the load, and that for loads of 2–5 tonnes, one yoke would be insufficient. However, if the load is more than 5–6 tonnes, then two yokes or two pairs of oxen would be required.

It is generally accepted that the oxen were used for both transporting and ploughing purposes. This is supported by the large number of oxcarts depicted in the palace walls. For example, in the palace at Knossos, there are numerous depictions of oxcarts, both in the palace and in the tombs, indicating that the oxen were used for both agricultural and transport purposes. However, there is some disagreement as to whether the oxen were used for both purposes simultaneously or if they were used for one purpose at a time.

One of the most important questions regarding the use of oxen for transport is how many yokes of oxen were required to transport a certain load. There are several factors that need to be considered when answering this question, such as the size and weight of the load, the road conditions, and the terrain. For example, Consiglio (1949, 92) notes that lubricants were used to reduce the friction of the wheels on the road, which would have reduced the amount of force required to pull the load. However, it is not possible to be certain of the number of yokes required for a given load, as this would depend on the specific circumstances.

In general, it is estimated that a single pair of oxen or one yoke can transport up to 2 tonnes of stone, while two yokes or two pairs of oxen can transport up to 4 tonnes. However, this is a general estimate and the actual number of yokes required would depend on the specific circumstances.

In conclusion, the use of oxen for transport during the Late Bronze Age was a common practice, and the size and weight of the load would determine the number of yokes required to transport it. The use of lubricants and the condition of the road would also affect the number of yokes needed. However, it is not possible to be certain of the exact number of yokes required for a given load without more specific information.
A crucial factor that has cost implications is the loading and unloading of the carts (Table 2). Burford (1960, 12, 15, 17) indirectly points out the importance of this activity in Classical times by referring to the experience one needed in loading heavy blocks onto carts, the payments that were accounted for doing so, and the officials that were in charge of organizing such work, especially the unloading of heavy blocks. De Haan (2009, 7) reports that the loading and unloading of 2.5 tonnes blocks can be done in a matter of 20 minutes. While this may well be the case of still massive second-century per meter-size blocks and, as such, it involves labor input at a rather important scale for the Lower Citadel layout, considering its size (Loader 1998, 65–73). Hodges (1989, 133, 139) refers to four men at the levers and two people inserting supports but we should not forget that the blocks here are regular and evenly weighted blocks each of 2.5 tonnes. The larger blocks at Tiryns are far more irregular, both in shape and size and, as such, have engaged fewer people at the levers, thus a total of two people per work team. However, the blocks here are regular and evenly weighted blocks each of 2.5 tonnes. The larger blocks at Tiryns are far more irregular, both in shape and size and, as such, have engaged fewer people at the levers, thus a total of two people per work team. However, the medium to smaller blocks may have been helped by four people per team (Loader 1998, 67). Loading heavy blocks thus entails both levering and hauling efforts to be carried out by teams of well-coordinated people. If each block of 2.5–3.5 tonnes took 20 minutes to load for its quantity, and again to unload on site (Burford 1960, 7), 65% of the Lower Citadel wall block volume falls in that category while 35% medium to small material can be handled in the same time by four people. Hodges (1989, 133) believed this line because the block size of lifting devices with commercial size in the cost of human effort. While there is no evidence for such devices in Tiryns or the Lower Citadel, the lifting blocks are all from the site and in situ before they will be captured in the end stones. Based on this, the lifting tasks, as calculated amount of 6,000-13,000 hand, is in response to Table 2 the important step. In order to avoid raising people lifting the large load, each team should also be divided into two people lifting the load and the same may have applied to the single yoke setting.

Table 3 summarizes the calculations for the block transport from quarry to site (Table 2). The speed of a yoke return journey is c. 2 km/h. According to DeLaine (1997, 108) such loads moved at 1.67 km/hour one way. So each yoke, single or quadruple, could have gone loaded and returned empty to the quarries in 1 hour, so, in an ideal 10 hour working day, 10 trips/day could be achieved. Loader (1998, 69) similarly refers to 1.8–2.5 km/h. The number of return trips that would have to be made sounds very high but this number would be decreased if several yokes, e.g. five groups, were set up to work in rotation to achieve a constant flow of stone provision to the construction site. Such work, however, may have become difficult, if not impossible, if rainfall turned some of the roads muddy and slippery, thus making transport work impossible during parts of the winter and early spring. Taking such environmental factors into account already indicates that constructing such large-scale works may not have continued uninterruptedly for years on end. Agricultural activities may have delayed this further (Brysbaert 2013).
Memorial baths were a popular architectural feature alongside temples and palaces in the Bronze Age. A study of the construction techniques used at the Bronze Age site of Tiryns, Greece, reveals insights into the power and control of the builders. The construction of the lower citadel wall was a significant undertaking, requiring a high level of skill and coordination. The stones used in the construction were large, and the perfect joints and stepped appearance of the wall symbolize the power behind such works. The actual day-to-day process of getting the blocks in place and lifting them into position were complex, involving the use of ramps and oxen yokes. The figure given for the volume of earth moved is 281.25 m³, calculated based on Küpper's calculations. If this ramp needed to be moved 1.5 km, it would require a minimum of 16 yokes. The complexity of the construction processes is evident, with the need for organized collaboration and careful planning. The use of layered construction and stepped joints demonstrates a high level of skill and precision. The construction techniques used at Tiryns have been compared to those used in the construction of the Great Pyramid of Giza, highlighting the advanced engineering knowledge of the Bronze Age.
have been moved. If the wall is taken to have been 10 m high, a volume of 9,000 m³ would have been required and if this needed to be moved four times, thus a volume of 36,000 m³ of earth, the cost would have been 19,600 md (based on Küpper 1996, 50–1). A hundred people would have been shifting earth for 196 days.

**Table 4** Cost calculations of Grossmann’s ramp, based on 281.25 m³, for note a: see endnotes p. 103

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (md/m³)</th>
<th>Cost (md)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digging soil and throwing behind</td>
<td>0.15</td>
<td>1,969</td>
</tr>
<tr>
<td>Loading into baskets</td>
<td>0.06</td>
<td>788</td>
</tr>
<tr>
<td>Carry 100 m: (md/trip + md/m³)</td>
<td>0.0045 x trip_nbr + 0.075 md/m³</td>
<td>2,272</td>
</tr>
<tr>
<td>Ramming of earth</td>
<td>0.0367</td>
<td>482</td>
</tr>
<tr>
<td>Supervision</td>
<td>10% of total</td>
<td></td>
</tr>
<tr>
<td>Total work for 281.25 m³</td>
<td>6,500 md</td>
<td></td>
</tr>
<tr>
<td>Total work (supervised)</td>
<td>7,140 md</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5** Cost calculations of Küpper’s ramp, based on 13,125 m³ for 10 m height

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate (md/m³)</th>
<th>Cost (md)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digging soil and throwing behind</td>
<td>0.15</td>
<td>1,640</td>
</tr>
<tr>
<td>Loading into baskets</td>
<td>0.06</td>
<td>984</td>
</tr>
<tr>
<td>Carry 100 m: (md/trip + md/m³)</td>
<td>0.0045 x trip_nbr + 0.075 md/m³</td>
<td>2,124</td>
</tr>
<tr>
<td>Ramming of earth</td>
<td>0.0367</td>
<td>382</td>
</tr>
<tr>
<td>Supervision</td>
<td>10% of total</td>
<td></td>
</tr>
<tr>
<td>Total work (supervised)</td>
<td>6,780 md</td>
<td></td>
</tr>
</tbody>
</table>

Note: For calculations of Küpper’s ramp, based on 13,125 m³ for 10 m height in Table 5.
As far as the actual time for wall construction itself is concerned, Loader comments: 'Little consideration has been given to the blocks even piled in rows at the quarry. She (Loader 1998, 61-9) gives examples of other cultural settings and wanted an easy calculation for the activities to be done by manpower and for animal traction. The blocks (Loader 1998, 65) enter in ground-breaking with contact on their sides and are cut to the same height, width, and thickness. While construction with irregular massive blocks would have been needed only towards the end of the construction, the full one km distance. Translating this into pulling this weight up the ramp a 2.5 tonnes block from the quarry to the site, covering an average for the massive blocks, 5–6 people would be needed. To further allow for a 3% inclination of the 350 m ramp, 6–7 average. The hauling of one 2.5 tonnes block up the ramp through and one block per hour would be hauled up on a linear way. Abrams and Bolland (1999) developed a very convenient 'spread-sheet' model, adapted here for these preliminary results. DeLaine (1997, 105–6) suggests that a maximum of 220 days for all activities. As already indicated, environmental and other factors, such as seasonal changes, and agricultural needs of working the local fields and also grazing, may have had a direct impact on the number of days that people and animals could have been available to work in construction or even the precise nature, extent, and type of agricultural and other work which may have been temporally taken over.'

Loader's model of using a wooden roller system in construction with necessary arithmetic build-ups is to be seen as a far more intricate task, and exactly because of the irregular block size and shape, extra precautions need to be provided in placing them so tightly as possible, requiring pulling or even lifting and placing each single one. As far as the actual stone wall construction itself is concerned, Loader comments: 'Little consideration has been given to the blocks even piled in rows at the quarry. She (Loader 1998, 61-9) gives examples of other cultural settings and wanted an easy calculation for the activities to be done by manpower and for animal traction. The blocks (Loader 1998, 65) enter in ground-breaking with contact on their sides and are cut to the same height, width, and thickness. While construction with irregular massive blocks would have been needed only towards the end of the construction, the full one km distance. Translating this into pulling this weight up the ramp a 2.5 tonnes block from the quarry to the site, covering an average for the massive blocks, 5–6 people would be needed. To further allow for a 3% inclination of the 350 m ramp, 6–7 average. The hauling of one 2.5 tonnes block up the ramp through and one block per hour would be hauled up on a linear way. Abrams and Bolland (1999) developed a very convenient 'spread-sheet' model, adapted here for these preliminary results. DeLaine (1997, 105–6) suggests that a maximum of 220 days for all activities. As already indicated, environmental and other factors, such as seasonal changes, and agricultural needs of working the local fields and also grazing, may have had a direct impact on the number of days that people and animals could have been available to work in construction or even the precise nature, extent, and type of agricultural and other work which may have been temporally taken over.'
With the data employed, Table 9 demonstrates that the Lower Citadel wall could have been constructed by less than an average of 100 men and five teams of oxen, in about three years. This stands in contrast to Müller (1930, 208) who referred to several decades but that was commented upon by Grossmann (1967, 101).

My calculated statements reflect, first, the ‘ideal sketch’ of the basic wall construction produced here in calculating minimum numbers of people, animals and divisions per task over time. In this paper, no niches or any later alterations (details in Maran 2010; and Schnuchel 1983, 404-410). The numbers may equally work for a more realistic picture whereby several external factors (e.g. seasonality) and internal factors (more or fewer workers and oxen available depending on the season) would be taken into account. These factors would necessarily stretch the numbers calculated, and would especially affect the suggested time lines. However, the number of 100 workers, referred to in relation to several tasks may have been higher or lower in reality, depending on many external factors, but would have to be somehow linked up to the real needs of the task at hand and all other embedded tasks. As such, drastically different numbers, especially when linked together as in Table 9, may not be that realistic either when seen from a purely practical viewpoint and based on the types of data.

Table 9 summarizated Lower Citadel wall operation

<table>
<thead>
<tr>
<th>Action</th>
<th>6.5 m wall</th>
<th>8 m wall</th>
<th>Team work</th>
<th>nbrs for 6.5/8 m wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarrying</td>
<td>17,000 md</td>
<td>21,000 md</td>
<td>30 × 568.75/700 md</td>
<td></td>
</tr>
<tr>
<td>Loading and unloading</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>8,400 md</td>
<td>8,000 md</td>
<td>8 × 987/1,000 md</td>
<td></td>
</tr>
<tr>
<td>Medium &amp; small</td>
<td>1,000 md</td>
<td>3,000 md</td>
<td>4 × 1,075/1,346 md</td>
<td></td>
</tr>
<tr>
<td>Transport with oxcart</td>
<td>2,070 trip days</td>
<td>3,530 trip days</td>
<td>8 × 58/714 md</td>
<td></td>
</tr>
<tr>
<td>Ramp building</td>
<td>1,645 md</td>
<td>5,710 md</td>
<td>30 × 20/335 md</td>
<td></td>
</tr>
<tr>
<td>Hauling blocks up the ramp</td>
<td>15,510 md</td>
<td>18,014 md</td>
<td>8 × 1,422/1,800 md</td>
<td></td>
</tr>
<tr>
<td>Positioning blocks in wall</td>
<td>1,637.6 md</td>
<td>2,051.5 md</td>
<td>8 × 182/2,196 md</td>
<td></td>
</tr>
</tbody>
</table>

Table 7. Positioning the blocks in the wall, see also note k in the endnotes p. 103
...and loading, stacking and building. Table 9 indicates the loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building. Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities (ramp and wall building, quarrying and loading, unloading and building, Table 9 indicates embedded links in the construction activities themselves. These strings, thus, of embedded activities...
half of the 13th century BC. This fact, however, is quite independent of any earlier evidence for the existence of a defensive wall at Mycenae, let alone an important one. The excavations conducted by D. Boardman in the 1970s, and those conducted more recently by M. M. P. Boardman and A. J. Boardman, have yet to pin down the precise location of the wall. However, the existence of a wall at Mycenae is now generally accepted and is widely discussed in the archaeological literature. The wall was most likely constructed during the LH IIIB2 period, which corresponds to the last phase of the Mycenaean palatial period. The construction of the wall was a significant undertaking, requiring the mobilization of substantial resources and the use of a large workforce. The wall was likely constructed for defensive purposes, as evidenced by its strategic location and the use of high-quality materials.

The wall was constructed with large stone blocks, some of which were transported from distant quarries. The stones were carefully selected and fitted together to create a sturdy and unyielding barrier. The wall was likely constructed in several phases, with different sections being added over time. The wall was not simply a defensive structure; it also served as a symbol of power and wealth, reflecting the prestige of the Mycenaean rulers. The construction of the wall was a major event in Mycenaean society, involving the use of skilled labor and the mobilization of resources from across the region. The wall was not just a physical barrier; it was also a social and political statement, highlighting the power and influence of the Mycenaean elite.

The construction of the wall was a significant economic undertaking, requiring the use of a large workforce and the mobilization of resources from across the Mycenaean world. The wall was likely constructed in several phases, with different sections being added over time. The wall was not simply a defensive structure; it also served as a symbol of power and wealth, reflecting the prestige of the Mycenaean rulers. The construction of the wall was a major event in Mycenaean society, involving the use of skilled labor and the mobilization of resources from across the region. The wall was not just a physical barrier; it was also a social and political statement, highlighting the power and influence of the Mycenaean elite.
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