

**American Research Center in Egypt - Egyptian Antiquities
Project**

**"Conservation and Display of Roman Mosaics
Korn el-Dikka, Alexandria"**

**Progress Report
for Preparatory Work**

submitted by Dr Wojciech Kołataj, the Project Director

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This report was prepared for
The Egyptian Antiquities Project of the American Research Center in Egypt, rnc.
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I. Administrative activities

1. The following ARCE/EAP administrative requirements have been fulfilled
 - 1.1. Indemnification/Accident coverage was obtained to cover permanent employees (staff members) at the Misr Insurance Company
 - 1.2. Medical evacuation insurance coverage for three expatriate staff members will be provided by MEDEX. This concerns W.Kołataj, G.Majcherek and E.Parandowska. Mr. Edwin Brock already has the required medical evacuation insurance coverage.
 - 1.3. Liability coverage (toward third parties) is in the process of being taken out
2. Preparation work started as from April 1, 1998. A two month delay in beginning of the Project (in the Proposal, February 1, 1998 was set as the initiation date) necessitated the moving up the initiation date and updating the time schedule.
3. The Project Director opened an interest-bearing Egyptian Pound account in Commercial International Bank (CIB), Garden City Branch in Cairo. Initial mobilization payment was transferred by the ARCE/EAP to this account
4. At an official meeting with Prof. Gaballah Ali Gaballah, Secretary General of the Supreme Council of Antiquities, the Project Director informed him of the objectives and schedule of activities of the Kom el-Dikka EAP Project and discussed the necessity to prolong the current SCA license for restoration work at the site for the coming year (the present license is valid until Dec. 31, 1998, including security clearance for the Project staff). A photocopy of the present license has already been submitted to the ARCE/EAP. Both issues were fully accepted by the Secretary General of the SCA.
Prof. Gaballah Ali Gaballah also suggested publishing a note in the press presenting the objectives of the planned Project. The Project Director informed him of the requirement to obtain ARCE's prior written approval.
5. Air ticket for Mrs E. Parandowska, Project conservator, was purchased and transferred to Warsaw.
6. All the staff members were advised on their professional duties and responsibilities as well as other procedures (e.g. medical evacuation procedures, US-Embassy Warden message, policy of Confidentiality, Code of ethics and Conflict of Interest, etc.).
7. A group of local unskilled workers was hired to clean the area prior to starting the conservation work proper.

II. Technical preparation and fieldwork

1. Following the ARCE/EAP Grant Director's and Technical Director's recommendations, the shelter technical design was adjusted in the areas of:
 - 1.1. Span of girders supporting roof.
 - 1.2. Type of covering (corrugated steel sheets).
 - 1.3. Construction and materials used for glass panels (security glass)
 - 1.4. Methods of drainage and insulation of mosaics.
2. A series of black & white photographs and slides documenting state of preservation of the area prior to preservation activities were taken by Mr. E. Brock, Project photographer.
3. Mr Mradny (civil engineer) completed all the preliminary structural analysis calculations as well as the shelter's construction drawings in order to prepare detailed construction material specifications. Decisions were made concerning the methods of construction and assembly. On this basis it was possible to prepare a detailed cost estimate. A construction work time schedule was also established. Cf. Attachment no. 1. Draft drawings and structural analysis calculations.
4. A survey of the Byzantine building was made, updating the data on its condition. The walls of this building will constitute a "natural" perimeter for the planned mosaic display. Inventory drawings (scales 1:10 and 1:50) are being made. The wall structure was rendered photogrammetrically. Drawings will be included in the Final Report.
Cf. Attachment no 2. A sample of rectifying photo.
5. The task of clearing the mosaics was also undertaken. Some 14 cubic metres of modern fill overlying the mosaics were removed, and fragments of two mosaics were re-excavated:
 - a) Reg. No. α -2. Black and white *opus tessellatum* mosaic decorated with rosette.
 - b) Reg. No. α -3. Black and white *opus tessellatum* mosaic with geometrical design.

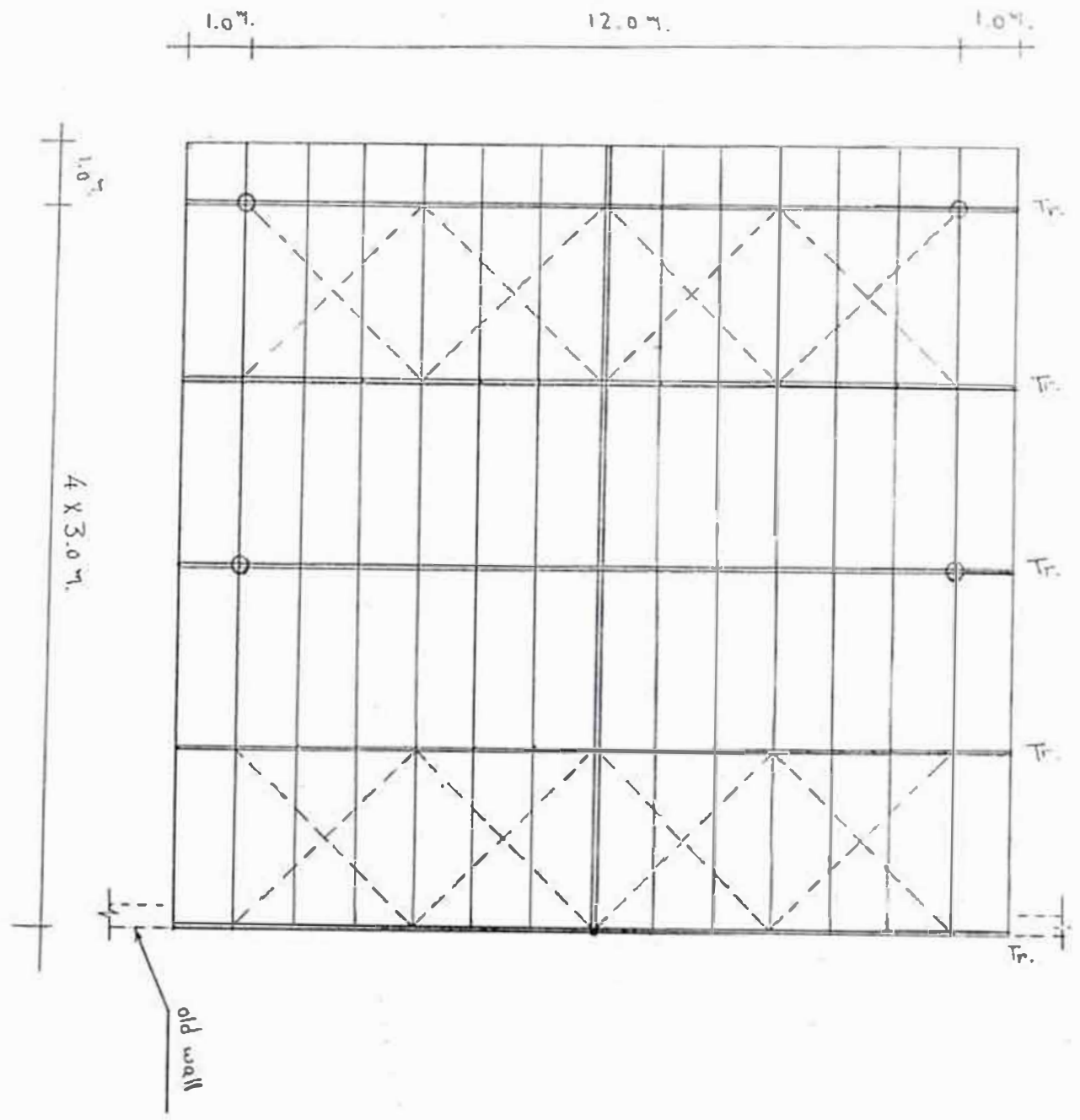
The mosaics were found to be covered with a thin protective layers of sand and lime. Few adjacent sections of the walls of the Byzantine building were also cleared to in order to evaluate the existing conditions of their foundations. This work was supervised by Dr. G. Majcherek.
6. Mrs. E. Parandowska, Project conservator, evaluated the state of preservation of these two mosaic fragments. The condition of the bedding and mosaic surface was found to correspond to the state of preservation recorded in 1972, when the mosaics had been discovered. Detailed conservation recommendations and specification of necessary materials will be completed by June 1998.

7. According to our present evaluation, it is viable to transfer another mosaic from a nearby location and include it in the planned display. This mosaic is situated under the surrounding escarpment bordering the site from Saphia Zaghoul Street. This option will be presented separately to the ARCE/EAP Grant Director.
8. As part of accompanying work, some 36 m of stairs and 26 m of sidewalk (with casing wall) leading from the Theatre area to the mosaic shelter was made. This work was entirely financed by the Polish Mission. The remaining 20 m of sidewalk is to be completed by the end of May.
Cf. Attachment No 3. Photograph of stairs.
9. Work was initiated with the objective of opening the ancient sewage system. Some 7 m of R4 street channel were cleared. It will be used to drain off rainwater from the area of the mosaic shelter.
10. The general appearance of the area has been greatly improved by the current refurbishment project undertaken by the Governorate in this part of the city, including a new openwork fence off Safia Zaghoul Street and general development of the area. The new surroundings will certainly provide better display opportunities for the mosaic pavillion. The scope and character of this work was consulted with the Polish Mission.



ATTACHMENT No. 1

DRAFT STRUCTURAL CALCULATIONS AND DRAWINGS



Loading :-

$$\text{Cover} = 10 \times 3 = 30 \text{ Kg./m'}$$

$$\text{Purlins} = 5 \times 3 = 15 \text{ Kg./m'}$$

$$\text{Bracing} = 5 \times 3 = 15 \text{ Kg./m'}$$

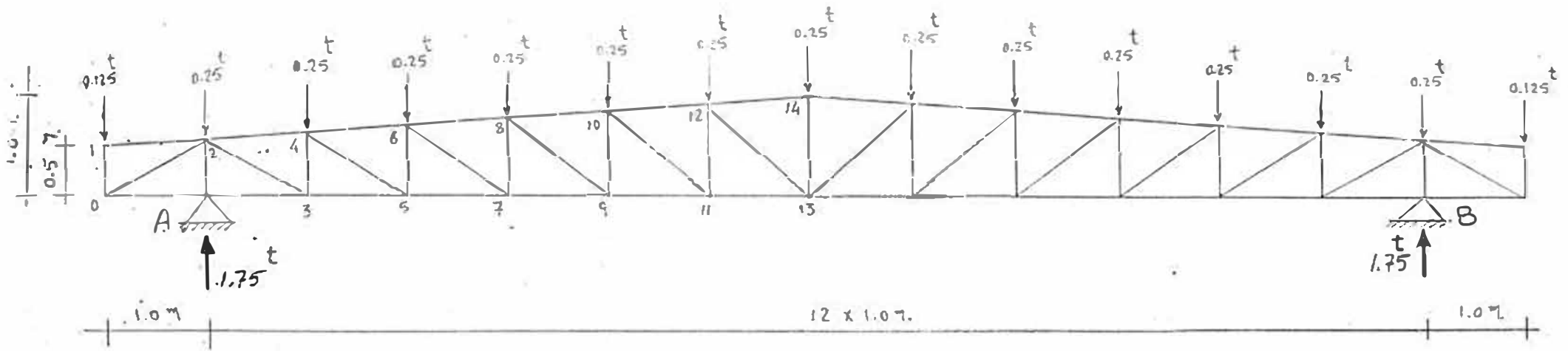
$$\text{O.W.} = 75 \text{ Kg./m'}$$

$$\text{Plaster \& steel net} = 50 \text{ Kg./m'}$$

$$\text{L.L.} = 50 \text{ Kg./m'}$$

$$w = 30 + 15 + 15 + 75 + 50 + 50 = 235$$

$$\text{For wind} \approx 0.25 \text{ t/m'}$$





Lengths

Verticals

0-1 = 0.5 m

7-8 = 0.77 m

1-2 = 0.57 m

2-10 = 0.84 m

2-4 = 0.64 m

4-12 = 0.93 m

5-6 = 0.71 m

13-14 = 1.0 m

Lower members = 1.0 m

Upper members = 1.0 m

$\alpha_1 = 4.05^\circ$

(Upper members)

$\alpha_5 = 38.3^\circ$

$\alpha_2 = 22.68^\circ$

$\alpha_6 = 40.69^\circ$

$\alpha_3 = 32.62^\circ$

$\alpha_7 = 42.92^\circ$

$\alpha_4 = 35.37^\circ$

$\beta_1 = 25.6^\circ$

$\beta_2 = 33.76^\circ$

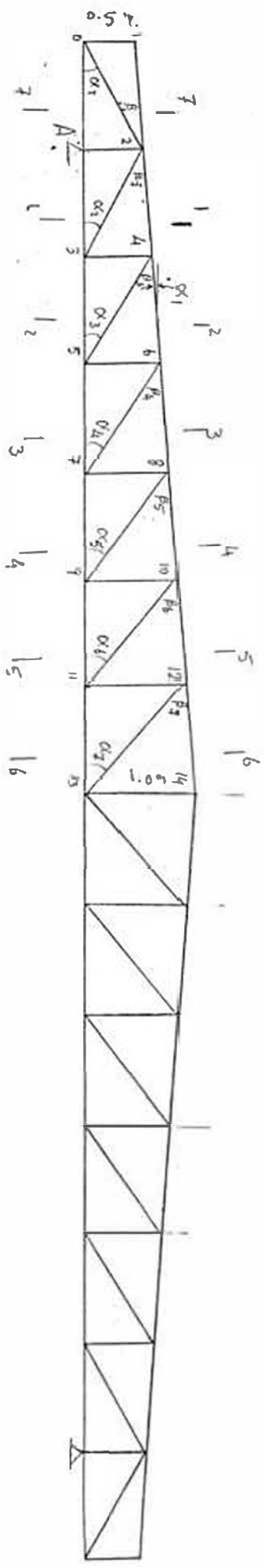
$\beta_3 = 26.7^\circ$

$\beta_4 = 39.45^\circ$

$\beta_5 = 42.38^\circ$

$\beta_6 = 44.77^\circ$

$\beta_7 = 47.0^\circ$



Sec. 1-1

$$M \sum_2 = 0$$

$$1.75(12) - 0.125(13) - 0.25(12) - 0.25(11) - 0.25(10) - 0.25(9) - 0.25(8) \\ - 0.25(7) - 0.25(6) - 0.25(5) - 0.25(4) - 0.25(3) - 0.25(2) - 0.25(1) \\ + 0.57(F_{B-3}) = 0$$

$$F_{B-3} = \frac{0.125}{0.57} = 0.22 \text{ t (tension)}$$

Sec. 7-7

$$M \sum_2 = 0$$

$$0.125(1.0) - 0.57(F_{0-8}) = 0$$

$$F_{0-8} = 0.22 \text{ t (tension)}$$

Sec. 2-2

$$M \sum_4 = 0$$

$$1.75(11) - 0.125(12) - 0.25(11) - 0.25(10) - 0.25(9) - 0.25(8) - 0.25(7) \\ - 0.25(6) - 0.25(5) - 0.25(4) - 0.25(3) - 0.25(2) - 0.25(1) + 0.64 F_{3-5} \\ = 0$$

$$F_{3-5} = 1.95 \text{ t (tension)}$$

Sec. 3-3

$$M \sum_6 = 0$$

$$1.75(10) - 0.125(11) - 0.25(10) - 0.25(9) - 0.25(8) - 0.25(7) - 0.25(6) \\ - 0.25(5) - 0.25(4) - 0.25(3) - 0.25(2) - 0.25(1) - 0.71 F_{5-7} = 0$$

$$F_{5-7} = \frac{2.625}{0.71} = 3.7 \text{ t (tension)}$$

Sec. 4-4

$$M \sum_8 = 0$$

$$1.75(9) - 0.125(10) - 0.25(9) - 0.25(8) - 0.25(7) - 0.25(6) - 0.25(5) \\ - 0.25(4) - 0.25(3) - 0.25(2) - 0.25(1) - 0.79 F_{7-9} = 0$$

$$F_{7-9} = 4.11 \text{ t (tension)}$$

$$\sum \mathcal{M}_{10} = 0$$

$$1.75(8) - 0.125(9) - 0.25(8) - 0.25(7) - 0.25(6) - 0.25(5) \\ - 0.25(4) - 0.25(3) - 0.25(2) - 0.25(1) - 0.86 F_{9-11} = 0$$

$$F_{9-11} = \frac{3.875}{0.86} = 4.51 \quad (\text{tension})$$

sec. 6-6

$$\sum \mathcal{M}_{12} = 0$$

$$1.75(7) - 0.125(8) - 0.25(7) - 0.25(6) - 0.25(5) - 0.25(4) \\ - 0.25(3) - 0.25(2) - 0.25(1) - 0.93(F_{11-13}) = 0$$

$$F_{11-13} = \frac{4.25}{0.93} = 4.57 \quad (\text{tension})$$

For uppers

7

$$M_{a_3} = 0$$

$$1.75(1.0) - 0.25(1.0) - 0.125(2) - r_1 \cdot F_{2-4} = 0$$

$$r_1 = 0.638 \text{ m.} \quad 1.25 = 0.638 F_{3-4}$$

$$F_{3-4} = 1.96 \text{ t (Comp.)}$$

sec. 2-2

$$M_{a_5} = 0$$

$$1.75(2.0) - 0.125(3) - 0.25(2) - 0.25(1.0) - r_2 \cdot F_{4-6} = 0$$

$$r_2 = 0.708 \text{ m.} \quad 2.375 = 0.708 F_{4-6}$$

$$F_{4-6} = 3.35 \text{ t (Comp.)}$$

sec. 3-3

$$M_{a_7} = 0$$

$$1.75(3.0) - 0.125(4) - 0.25(3) - 0.25(2) - 0.25(1.0) - r_3 \cdot F_{6-8} = 0$$

$$r_3 = 0.788 \text{ m.} \quad 3.25 = 0.788 F_{6-8}$$

$$F_{6-8} = 4.12 \text{ t (Comp.)}$$

sec. 4-4

$$= 0$$

$$1.75(4.0) - 0.125(5.0) - 0.25(4.0) - 0.25(3.0) - 0.25(2.0) - 0.25(1.0) - r_4 \cdot F_{8-10} = 0$$

$$r_4 = 0.858 \text{ m.} \quad 3.875 = 0.858 F_{8-10}$$

$$F_{8-10} = 4.52 \text{ t (Comp.)}$$

sec. 5-5

$$M_{a_{11}} = 0$$

$$1.75(5.0) - 0.125(6.0) - 0.25(5.0) - 0.25(4.0) - 0.25(3.0) - 0.25(2.0) - 0.25(1.0) - r_5 \cdot F_{10-12} = 0$$

$$r_5 = 0.927 \text{ m.} \quad 4.25 = 0.927 F_{10-12}$$

$$F_{10-12} = 4.58 \text{ t (Comp.)}$$

Sec. 6-6

$$M_{2,13} = 0$$

$$1.75(6) - 0.125(7.0) - 0.25(6.0) - 0.25(5.0) - 0.25(4.0) - 0.25(3.0) \\ - 0.25(2.0) - 0.25(1.0) - r_6 \cdot F_{12-14} = 0$$

$$r_7 = 0.997 \quad \eta$$

$$4.375 = 0.997 F_{12-14}$$

$$F_{12-14} = 4.387 \quad t$$

(Comp.)

Sec. 7-7

$$M_{2,0_i} = 0$$

$$1.75(1.0) + 1.75(13.0) - 0.25(1.0) - 0.25(2.0) - 0.25(3.0) - 0.25(4.0) \\ - 0.25(5.0) - 0.25(6.0) - 0.25(7) - 0.25(8.0) - 0.25(9.0) - 0.25(10) \\ - 0.25(11.0) - 0.25(12.0) - 0.125(13.0) + r_8 \cdot F_{1-2} = 0$$

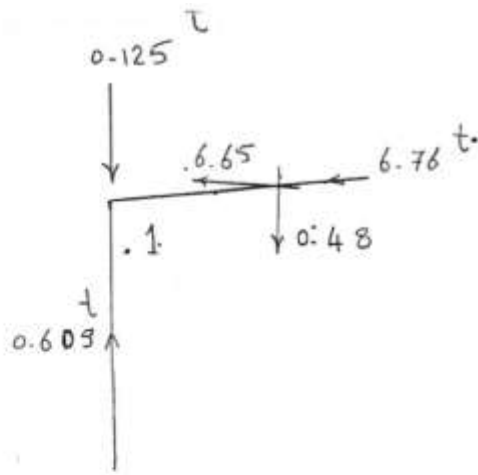
$$r_8 = 0.499 \quad \eta$$

$$3.375 = -0.499 F_{1-2}$$

$$F_{1-2} = 6.76 \quad t$$

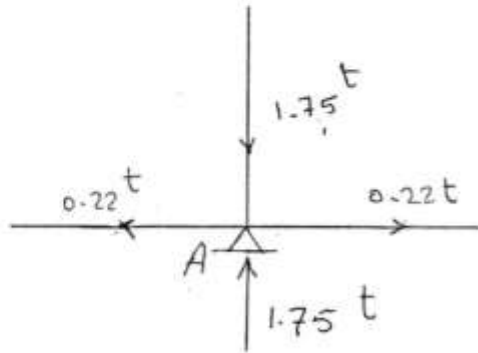
(Comp.)

Joint 1 :-



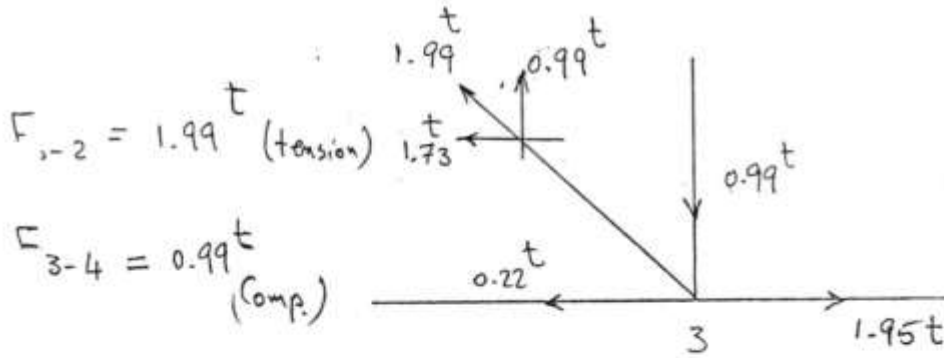
$F_{0-1} = 0.605t$
(Comp.)

Joint A :-



$A-2 = 1.75t$
(Comp.)

Joint 3 :-

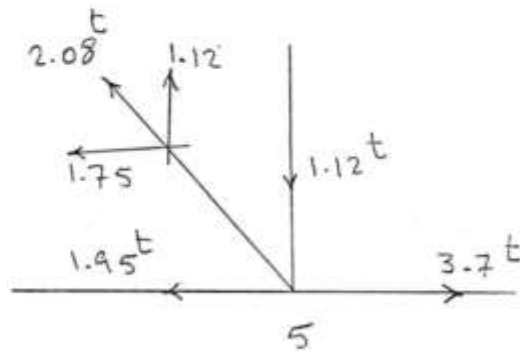


$\alpha_2 = 29.68^\circ$

$F_{3-2} = 1.99t$ (tension)

$F_{3-4} = 0.99t$
(Comp.)

Joint 5 :-



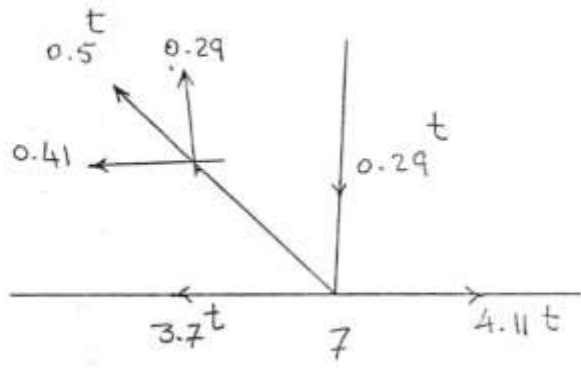
$\alpha_3 = 32.62^\circ$

$F_{5-4} = 2.08t$ (tension)

$F_{5-6} = 1.12t$ (Comp.)

Joint 7 :-

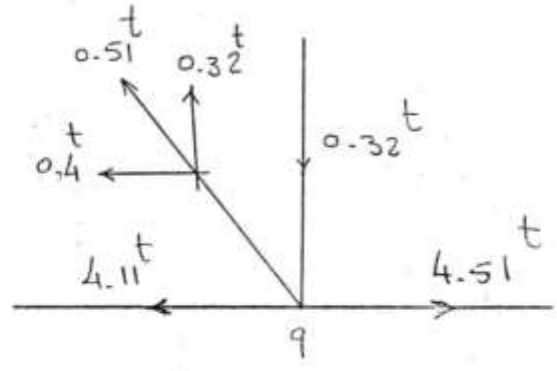
$F_{7-6} = 0.5t$ (tension)
 $F_{7-8} = 0.29t$ (Comp.)



$\alpha_4 = 35.37^\circ$

Joint 9 :-

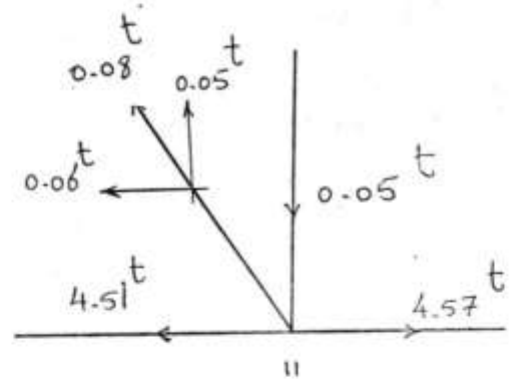
$F_{9-8} = 0.51t$ (tension)
 $F_{9-10} = 0.32t$ (Comp.)



$\alpha_5 = 38.3^\circ$

Joint 11 :-

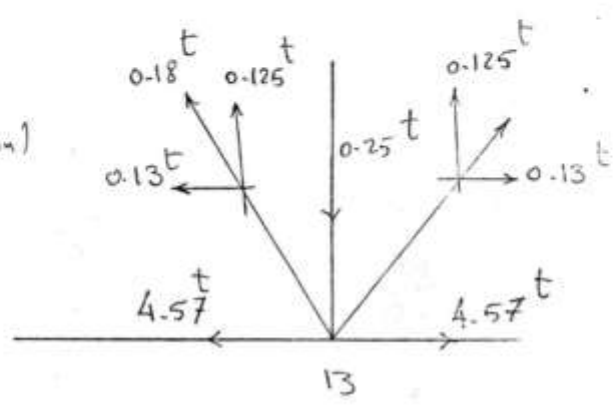
$F_{11-10} = 0.08t$ (tension)
 $F_{11-12} = 0.05t$ (Comp.)



$\alpha_6 = 40.69^\circ$

Joint 13

$F_{13-12} = 0.18t$ (tension)
 $F_{13-14} = 0.25t$ (Comp.)



$\alpha_7 = 42.92^\circ$

$$C = 6.76 t$$

$$l_{bx} = 0.8 (1.0) = 0.8$$

$$l_{by} = 1.071 = 0.8$$

$$\text{Let } \frac{l}{i} = 100 \quad F_{pb} = 0.7 t / C_1^2$$

$$A_{req.} = \frac{6.76}{0.7} = 9.65 C_1^2 \quad (4.825 C_1^2 \text{ for one angle})$$

(70x7)

$$A = 4.9 C_1^2 \quad a_1 = 7 C_1$$

$$\frac{l_{bx}}{i_{x1}} = 100 = \frac{80}{0.3 a_2} \quad a_2 = 2.67 C_1$$

$$\frac{l_{by}}{i_{y1}} = 100 = \frac{100}{0.45 a_3} = 2.22 C_1$$

$$a = \frac{7 + 2.67 + 2.22}{3} = 3.56 C_1$$

Choose 50 x 5 C₁

$$\lambda_x = \frac{80}{1.5} = 53.3$$

$$\lambda_y = \frac{100}{2.25} = 44.44$$

$$F_{pb} = 7 \left(\frac{1000}{53.3} \right)^2 = 2664 \text{ kg/C}_1^2$$

$$i_x = 0.3 \times 5 = 1.5$$

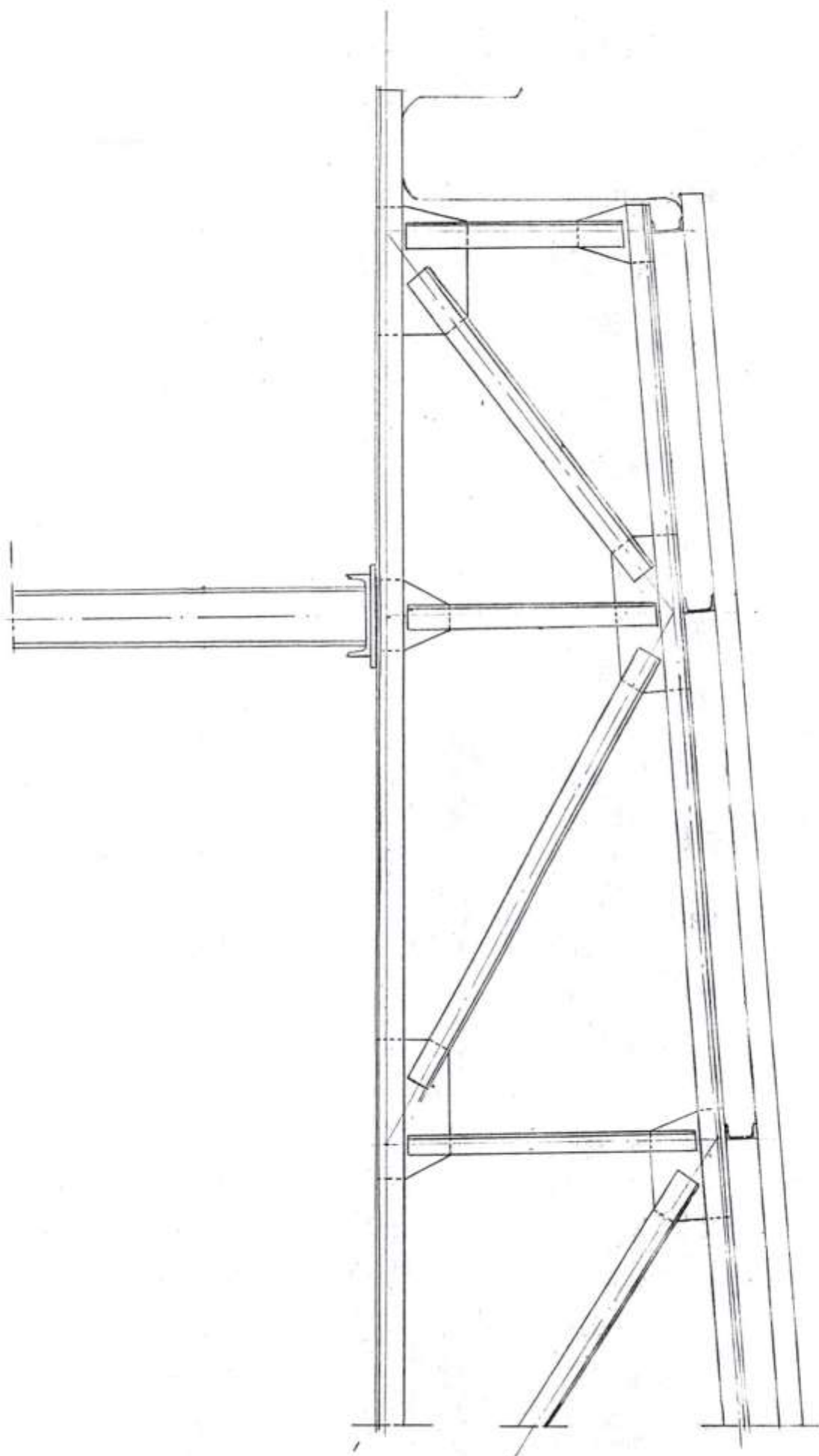
$$i_y = 0.45 \times 5 = 2.25$$

$$\text{Fact.} = \frac{6760}{2 \times 4.8} = 704 < F_{pb} \text{ (O.K.)}$$

$$T = 4.57 \quad t \quad (\text{tension})$$

$$A = \frac{4570}{1400} = 3.26 \text{ g}^2 \quad \text{for one angle} = 1.63 \text{ g}^2$$

choose 50 15



$$A_c = 24 \text{ cm}^2$$

$$A_{\text{plate}} = 20 \text{ cm}^2$$

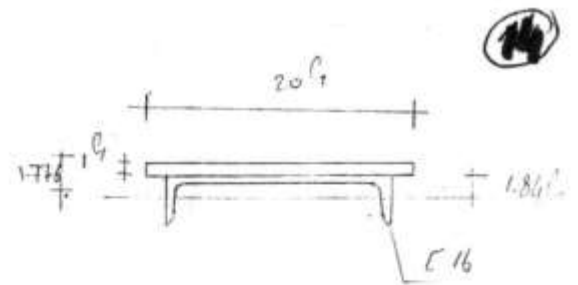
$$I_{yc} = 85.3 \text{ cm}^4$$

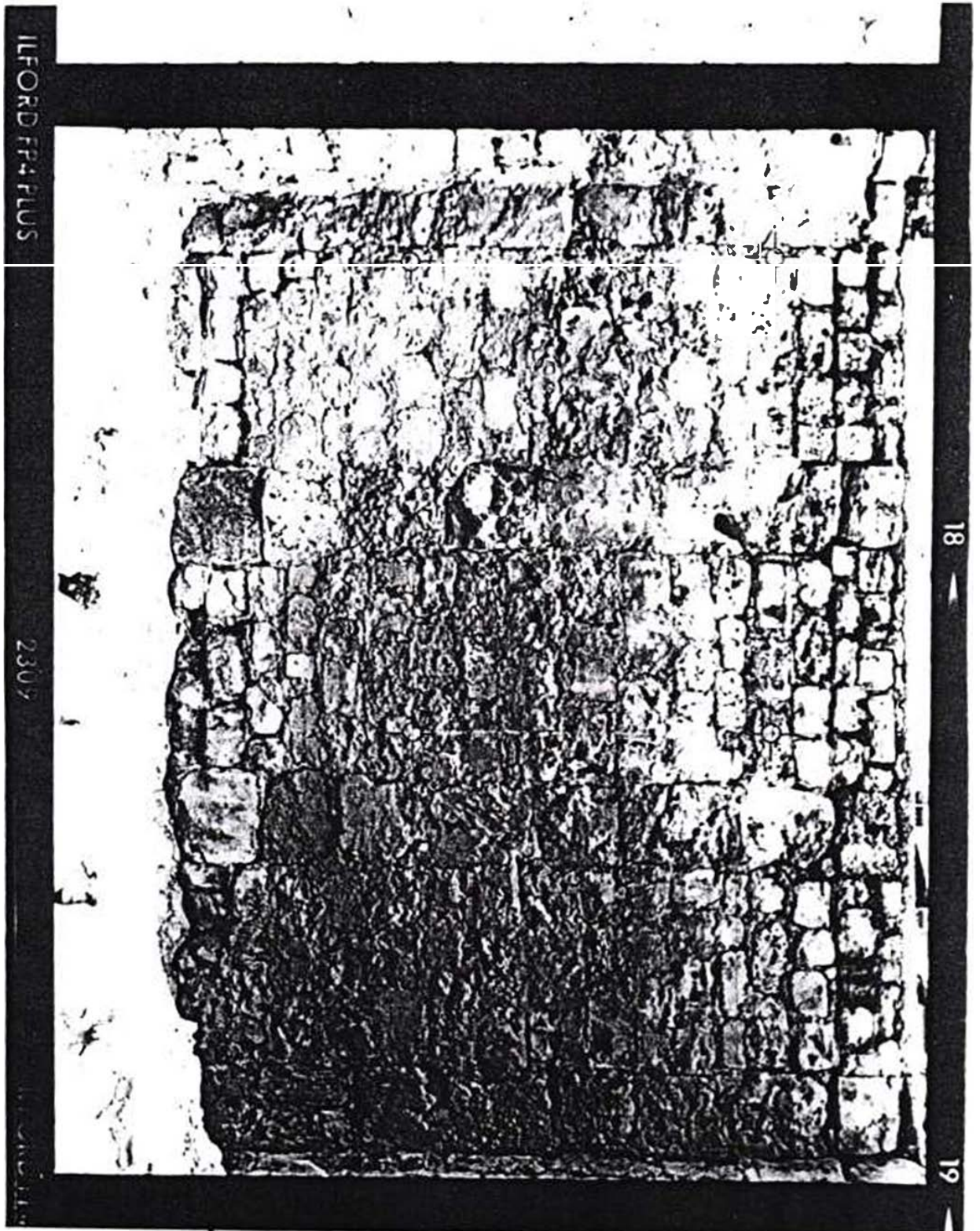
$$I_{yp} = \frac{20(1)^3}{12} = 1.67 \text{ cm}^4$$

$$y = \frac{24(2.84) + 20 \cdot 0(0.5)}{44} = 1.276 \text{ cm}$$

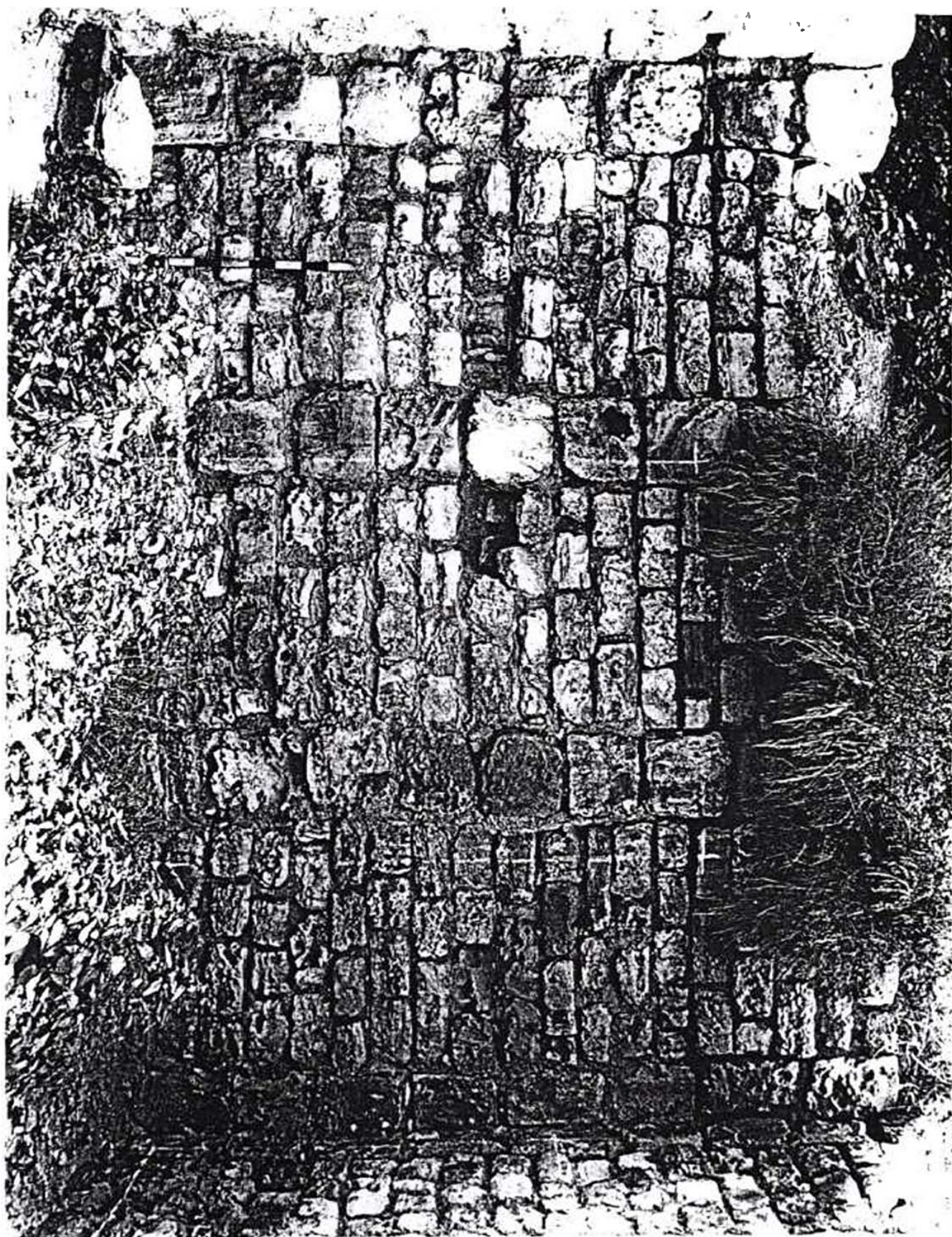
$$I = 85.3 + 24(1.066)^2 + 20(1.276)^2 + 1.67 = 146.7 \text{ cm}^4$$

$$f = \frac{137}{146.7} (1.276) = 1.19 \text{ cm} \quad \pm 1 \text{ cm?} \quad (\text{O.K.})$$

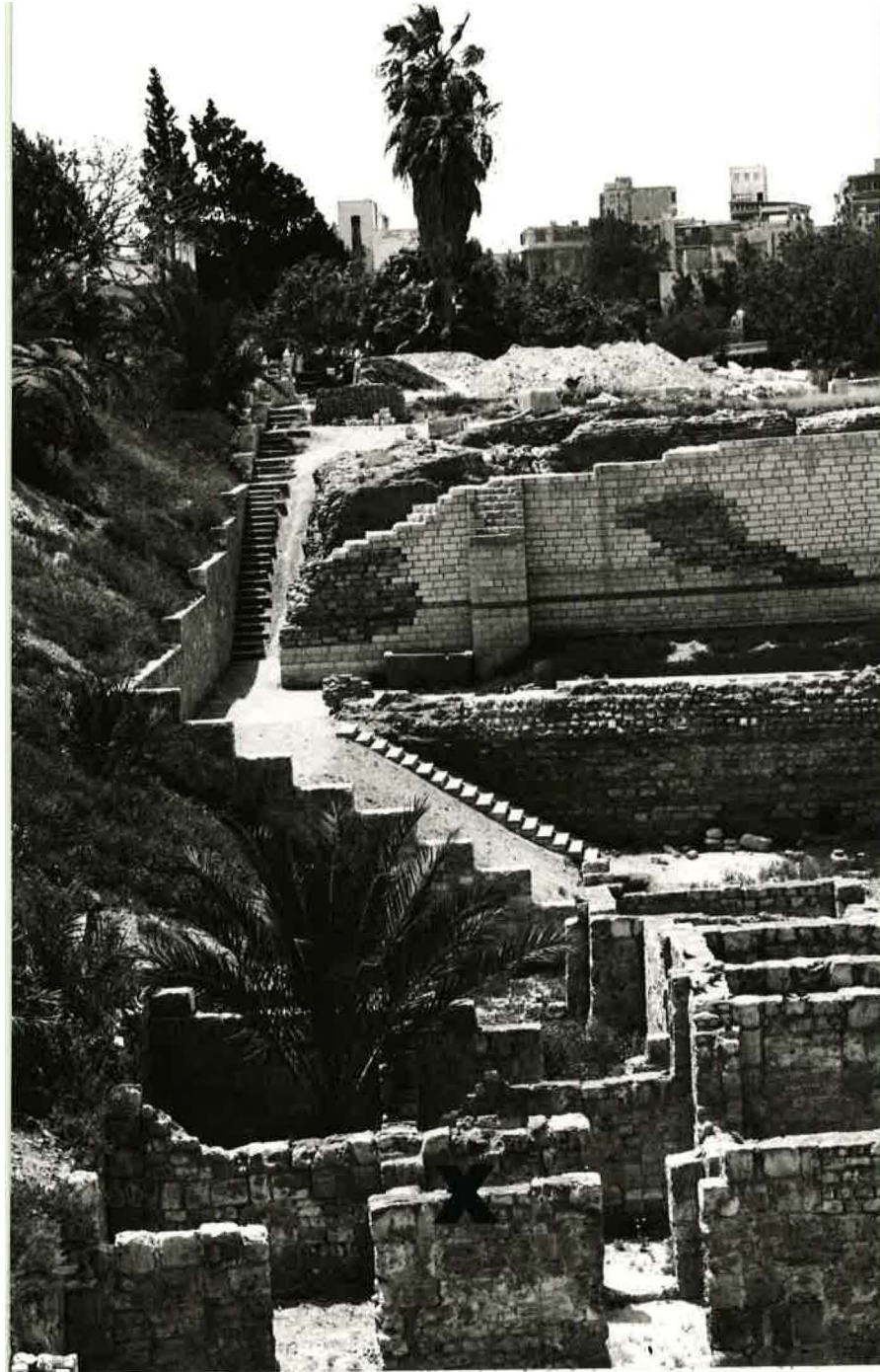




Photogrammetrical sample of the rectified photo
/southern wall/



photogrammetrical sample of the rectified photo
/northern wall/



Place of the shelter and the entrance way