

Relazione di calcolo

J. A. C. P.

intervento n. 1312.

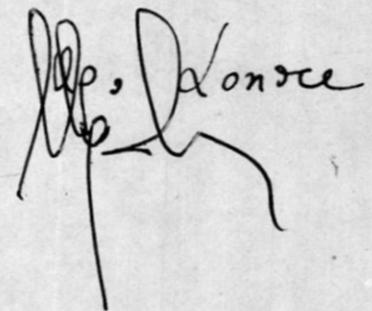
Lotto "B"

palazzine A-B-C-D.

Imprese:

Il calculatore

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imp. 

Relazione di calcolo

Premesse - Criteri generali e di calcolo

Le strutture portanti dei fabbricati, oggetto della presente relazione, sono nello loro generalità, costituite da un sistema di travi elastiche longitudinali, sui quali scaricano direttamente i soletti, aventi struttura trasversale; soletti del tipo a soletta mista con spessore totale

$H = 24 \text{ cm.}$ e con travetti ad interasse di $\text{cm. } 50 \div 55$.

Le fondazioni, data la natura del terreno, costituito al piano di posa di argilla sabbiosa premista a calcare, sono realizzate a mezzo

di travi rovesce continue, la cui larghezza è stata determinata in modo tale che la

pressione unitaria nel terreno stesso sia $1,50 \text{ kg/cm}^2$.

Data la notevole rigidità del sistema di fondazione adottato, tale carico si è ritenuto uniformemente ripartito su tutta la superficie di appoggio delle travi rovesce -

Le analisi dei carichi sui pilastri sono basabili
delle relazioni di seguito riportate -

Per le travi di fondazione sono stati ottenuti
dei momenti: prendendo una condizione di vincolo
per il semi-incastro -

Per le strutture in elevazione è stato adottato
il metodo di H. Cross -

Per tutte le strutture è stato previsto
l'impiego di calcestruzzo con cemento tipo 425 -

Per le armature metalliche è stato previsto l'impiego
di ferro liscio tondo con $\sigma_f = 1400 \text{ kg/cm}^2$ per
le strutture di fondazione, mentre per le
strutture in elevazione ferro ad aderenza moltiplicata

con $\sigma_f = 2000 \text{ kg/cm}^2$ -

Di seguito si riportano i carichi unitari relativi
agli elementi costituenti le strutture ed i materiali
impiegati nella realizzazione dei fabbricati in
oppetto -

JAC P.

intervento n. 1312

lotto "B"

pezzi "C" e "D"

Analisi delle strutture e sovraccarichi

p. trave medio	450 Kp/ml
p. p. filastro medio	1200 Kp.
p. proprio sovr. $H = L_0 + 4$	300 Kp/mq.
sovraccarico permanente con incidenze tramozzi	150 Kp/mq.
sovraccarico accidentale	250 Kp/mq.
sovraccarico su balconi e scale	400 Kp/mq.
p. muro in tufo da cm. $L_0 : 0,20 \times 1 \times 1500$	300 Kp/ml
p. tramozzi da cm. 10	150 Kp/ml.
p. temperatura esterna da cm. 30 per $H = 3,00$ mt.	850 Kp/ml.

Palazzina "D".

Analisi dei cerchi sui pilastri.

Pilastri mm. 1-4-30-33-12-25

pieno copertura box:

$\frac{1}{2}$ del pieno tipo

4600 Kp.

4600 Kp.

cap. 25x25

Ap = 4 ϕ 12

pieno quarto:

p. trave 3.50 x 4.50

= 1575 Kp.

p. solco 1.95 x 1.55 x 700

= 2115 "

p. balcone 1.60 x 1.20 x 800

= 1536 "

p. murat. 3.50 x 850

= 2975 "

p. proprio pilastro

= 1000 "

Totale

9200 Kp.

13800 Kp.

cap. 30x25

Ap = 4 ϕ 12

pieno terzo

9200 Kp.

23000 Kp.

cap. 30x25

Ap = 4 ϕ 12

pieno secondo

9200 Kp.

32200 Kp.

cap. 30x25

Ap = 6 ϕ 12

pieno primo

9200 Kp.

41400 Kp.

cap. 30x30

Ap = 6 ϕ 12

pieno terra

9200 Kp.

50600 Kp.

cap. 40x40

Ap = 4 ϕ 12 + 2 ϕ 14

Pileati mm. 2-3-31-32.

Analisi dei carichi:

piano coperture

Kp. 5135

Kp. 5135

$A_c = 25 \times 25$

$A_p = 4 \phi 12$

piano quarto

p. trave $5,10 \times 450$

= 2295 Kp

p. solco $2 \times 3,10 \times 700$

= 4340

p. muratura $3,10 \times 850$

= 2635 "

p. pupa

= 1000

Totale

10270 Kp.

Kp. 15405

$A_c = 30 \times 25$

$A_p = 4 \phi 12$

piano terzo

10270 Kp.

25675 Kp.

$A_c = 30 \times 25$

$A_p = 4 \phi 12$

piano secondo

10270 Kp

35945 Kp.

$A_c = 30 \times 30$

$A_p = 6 \phi 12$

piano primo

10270 Kp.

46215 Kp.

$A_c = 30 \times 30$

$A_p = 4 \phi 12 + 2 \phi 14$

piano terra

10270 Kp

56485 Kp.

$A_c = 40 \times 40$

$A_p = 4 \phi 12 + 2 \phi 14$

Pilastri mm. 6-10-7-11-23-24-27-28

pieno caperture:

p. trave $3.90 \times 450 = 1755 \text{ vp.}$

p. solco $3.90 \times 3.10 \times 700 = 8463 \text{ vp.}$

p. muratura $3.50 \times 450 = 1575 \text{ .}$

p. proprio pilastro $= 1000 \text{ .}$

Totale 12973 vp. $\text{vp. } 12973$

$A_c = 25 \times 25$ $A_p = 4 \phi 12$

pieno puerco

12973 vp. $\text{vp. } 25946$

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

pieno terzo

12973 vp. $\text{vp. } 38919$

$A_c = 30 \times 25$ $A_p = 6 \phi 12$

pieno secondo

12973 vp. $\text{vp. } 51892$

$A_c = 35 \times 25$ $A_p = 4 \phi 12 + 2 \phi 14$

pieno primo

12973 vp. $\text{vp. } 64865$

$A_c = 35 \times 30$ $A_p = 6 \phi 14$

pieno terra

12973 vp. $\text{vp. } 77838$

$A_c = 40 \times 40$ $A_p = 6 \phi 14 + 2 \phi 12$

per i pilastri 10-11-23-24 si adottano a pieno

terra una sezione $A_c = 35 \times 45$ $A_p = 6 \phi 14 + 2 \phi 12$

Pilastri mm. 5-9-8-22-26-29

Andini dei corichi:

pieno copertura $V_p = 7050$ $V_p = 7050$
 $A_c = 25 \times 25$ $A_p = 4 \phi 12$

pieno quarti:

p. trave $4,80 \times 450 = 1890 V_p$

p. velleo $4,20 \times 1,55 \times 700 = 4557$

p. balcone $3,20 \times 1,20 \times 800 = 3072$

p. murat. $4,20 \times 850 = 3570$

p. inf. pilastro $= 1000$

totale $14089 V_p$ $V_p = 21139$
 $A_c = 30 \times 25$ $A_p = 4 \phi 12$

pieno terzo $14089 V_p$ $V_p = 35228$
 $A_c = 30 \times 30$ $A_p = 6 \phi 12$

pieno secondo $14089 V_p$ $V_p = 49317$
 $A_c = 30 \times 30$ $A_p = 4 \phi 12 + 2 \phi 14$

pieno primo $14089 V_p$ $V_p = 63046$
 $A_c = 30 \times 35$ $A_p = 6 \phi 14$

pieno terra $14089 V_p$ $V_p = 77495$
 $A_c = 40 \times 40$ $A_p = 6 \phi 14 + 2 \phi 12$

A lastro m. 13

p. capetura

8755 vp

vp. 8755

$A_c = 25 \times 25$

$A_p = 4 \phi 12$

piano puente

p. trave $5,70 \times 450$

= 2565 vp.

p. solcio $4,45 \times 1,55 \times 700$

= 4828 u

p. balcun $4,45 \times 1,20 \times 800$

= 4272 u

p. muret. $5,70 \times 850$

= 4845 u

p. pila's pilastros

= 1000.

total

17510 vp

vp. 26265

$A_c = 30 \times 25$

$A_p = 4 \phi 12$

piano terzo

17510 vp

vp. 43775

$A_c = 30 \times 30$

$A_p = 6 \phi 12$

piano secondo

17510 vp

vp. 61285

$A_c = 30 \times 35$

$A_p = 4 \phi 14 + 2 \phi 12$

piano primo

17510 vp

vp. 78790

$A_c = 35 \times 40$

$A_p = 6 \phi 14 + 2 \phi 12$

piano terra

17510 vp.

vp. 96305

$A_c = 40 \times 40$

$A_p = 8 \phi 14$

Pilastri nn. 19-20

pieve caperture:

p. faldria = 4000 vp.

p. trave 5.20 x 450 = 2250 "

p. solcio 1.50 x 1.55 x 800 = 1627 "

p. balcone 1.50 x 1.20 x 800 = ~~1440~~ "

p. zoccolo 3.00 x 1.30 x 800 = 3120 "

p. murat. 5 x 850 = 4250 "

per pilastr. pilastri = 1000 "

Totale 17687 vp. vp. 17687

$A_c = 30 \times 25$ $A_f = 4 \phi 12$

pieve quarto 13687 vp. vp. 31374

$A_c = 30 \times 25$ $A_f = 6 \phi 12$

pieve terzo 13687 vp. vp. 45062

$A_c = 30 \times 30$ $A_f = 6 \phi 12$

pieve secondo 13687 vp. vp. 58748

$A_c = 30 \times 35$ $A_f = 4 \phi 14 + 2 \phi 12$

pieve primo 13687 vp. vp. 72435

$A_c = 30 \times 40$ $A_f = 6 \phi 14 + 2 \phi 12$

pieve terra 13687 vp. vp. 86122

$A_c = 30 \times 50$ $A_f = 8 \phi 14$

Pilastri m. 18-21

piano copertura:

p. fessura = 4000 vp.

p. trave 3.50 x 450 = 1575 "

p. solco 1.50 x 3.10 x 750 = 3255 "

p. murat. 3.10 x 850 = 2635 "

p. proprio pilastro = 1000 "

totale 12465 vp - vp. 12465

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano quarto

8465 vp vp. 20930

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano terzo

8465 vp vp. 29395

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano secondo

8465 vp vp. 37860

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

piano primo

8465 vp vp. 46325

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

piano terra

8465 vp vp. 54790

$A_c = 30 \times 30$ $A_p = 4 \phi 14 + 2 \phi 12$

Pilesti nr 14-16

piano capertura:

p. fabbrica = 4000 vp.

p. trave 2 x 450 - 1000

p. ~~trave~~ 1,40 x 3,25 x 800 = 3640 u

p. murat: 1,50 x 850 = 1275 u

p. pupa = 1500 u

totale 11315 vp vp. 11315

minime oblique Ac = 20 x 70 Ap = 4 φ 12

piano quarto 7315 vp vp. 18630

Ac = 20 x 70 Ap = 4 φ 12

piano terzo 7315 vp vp. 25945

Ac = 20 x 70 Ap = 4 φ 12

piano secondo 7315 vp vp. 33260

Ac = 20 x 70 Ap = 6 φ 12

piano primo 7315 vp vp. 40575

Ac = 20 x 70 Ap = 6 φ 12

piano terra 7315 vp vp. 47890

Ac = 25 x 70 Ap = 6 φ 12

Pilastri mm 15-17

piano capertura:

p. fabbrica = 4000 qp.

p. trave 3.20 x 450 = 1440 "

p. solco 1.90 x 3.10 x 700 = 4123 "

p. solco 1.00 x 1.25 x 700 = 875 "

p. murat. 2.50 x 850 = 2125 "

p. infrio pilastro = 1000 "

totale 13563 qp qp. 13563

misura obliquata $A_c = 20 \times 100$ $A_p = 4 \phi 12$

piano quarto 9563 qp qp 23125

$A_c = 20 \times 100$ $A_p = 4 \phi 12$

piano terzo 9563 qp qp. 32689

$A_c = 20 \times 100$ $A_p = 6 \phi 12$

piano secondo 9563 qp qp. 42252

$A_c = 20 \times 100$ $A_p = 6 \phi 12$

piano primo 9563 qp qp. 51815

$A_c = 20 \times 100$ $A_p = 8 \phi 12$

piano terra 9563 qp qp. 61378

$A_c = 25 \times 100$ $A_p = 8 \phi 12$

Palazzina "C"

Analisi dei carichi:

Pilastri n. 1-3-23-25-27-29-50-52-53-55-56-58

p. coperture $V_p = 5600$ $V_p = 5600$
 $A_c = 25 \times 25$ $A_f = 4 \phi 12$

piano piano

p. trave $4,45 \times 450 = 2002 V_p$

p. solco $1,75 \times 2,70 \times 700 = 3307$

p. murat. $4,45 \times 850 = 3782$

p. balcone $1,25 \times 1,20 \times 800 = 1200$

p. proprio pilastro $= 1000$

totale $11291 V_p$ $V_p = 16892$

$A_c = 30 \times 25$ $A_f = 4 \phi 12$

piano terzo $11291 V_p$ $V_p = 28182$

$A_c = 30 \times 25$ $A_f = 4 \phi 12$

piano secondo $11291 V_p$ $V_p = 39473$

$A_c = 30 \times 30$ $A_f = 6 \phi 12$

piano primo $11291 V_p$ $V_p = 50764$

$A_c = 30 \times 30$ $A_f = 6 \phi 12$

piano terra $11291 V_p$ $V_p = 62055$

$A_c = 40 \times 40$ $A_f = 4 \phi 14 + 2 \phi 12$

Pilastri m. 2-24-28-51-54-57

Andini bi carichi.

p. copertura $K_p. 6700$ $K_p. 6700$
 $A_c = 25 \times 25$ $A_p = 4 \phi 12$

piano quarto.

p. trave $6,35 \times 450 = 2857 K_p.$

p. alceio $1,75 \times 4,60 \times 700 = 5635 "$

p. mont. $4,60 \times 950 = 3910 "$

p. riparo $= 1000 "$

Totale $13402 K_p.$ $K_p. 20100$

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano terzo $13402 K_p.$ $K_p. 33500$

$A_c = 30 \times 25$ $A_p = 6 \phi 12$

piano secondo $13402 K_p.$ $K_p. 46900$

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

piano primo $13402 K_p.$ $K_p. 60300$

$A_c = 30 \times 35$ $A_p = 4 \phi 14 + 2 \phi 12$

piano terra $13402 K_p.$ $K_p. 73700$

$A_c = 40 \times 40$ $A_p = 6 \phi 14 + 2 \phi 12$

Pilastri mm. 5-8-18-21

p. copertura

p. trave 3.45 x 450 = 1550 kg.

p. zolera 3.45 x 4.60 x 700 = 11'10P "

p. murat. 3.45 x 450 = 1550 .

p. pilastro pilastro = 1000 .

totale 15209 kg. kg. 15209

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano quarto 15209 kg. kg. 30418

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano terzo 15209 kg. kg. 45627

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

piano secondo 15209 kg. kg. 60836

$A_c = 30 \times 35$ $A_p = 4 \phi 14 + 2 \phi 12$

piano primo 15209 kg. kg. 76045

$A_c = 35 \times 35$ $A_p = 6 \phi 14 + 2 \phi 12$

piano terra 15209 kg. kg. 91254

$A_c = 40 \times 40$ $A_p = 8 \phi 14$

i pilastri m. 8-18 $A_c = 30 \times 50$

Pilastri mm 4-7-17-20-30-33-44-47

p. caperture

vp. 7000

vp. 7000

$$A_c = 25 \times 25$$

$$A_p = 4 \phi 12$$

piano quarto

p. trave $3,50 \times 4,50$

$$= 1575 \text{ vp.}$$

p. alzo $3,50 \times 2 \times 700$

$$= 4900 \text{ "}$$

p. balcone $3,50 \times 1,20 \times 800$

$$= 3360 \text{ "}$$

p. murat. $3,50 \times 850$

$$= 2975 \text{ "}$$

p. pupio pilastro

$$= 1000 \text{ "}$$

Totale

$$13'810 \text{ vp.} \quad \text{vp. } 20810$$

$$A_c = 30 \times 25$$

$$A_p = 4 \phi 12$$

piano terzo

$$13'810 \text{ vp.}$$

$$\text{vp. } 34620$$

$$A_c = 30 \times 30$$

$$A_p = 6 \phi 12$$

piano secondo

$$13'810 \text{ vp.}$$

$$\text{vp. } 48430$$

$$A_c = 30 \times 30$$

$$A_p = 6 \phi 12$$

piano primo

$$13'810 \text{ vp.}$$

$$\text{vp. } 62240$$

$$A_c = 30 \times 35$$

$$A_p = 4 \phi 14 + 2 \phi 12$$

piano terra

$$13'810$$

$$\text{vp. } 76050$$

$$A_c = 40 \times 40$$

$$A_p = 6 \phi 14 + 2 \phi 12$$

Pilastri num. 6-9-19-22

p. apertura $V_p. 7800$ $V_p. 7800$
 $A_c = 25 \times 25$ $A_p = 4 \phi 12$

p. pianto.

p. trave $3.50 \times 450 = 1575 V_p.$

p. solaio $3.50 \times 2.70 \times 750 = 6615 "$

p. balcone $3.50 \times 1.20 \times 800 = 3360 "$

p. murata $3.50 \times 850 = 2975 "$

p. proprio pilastro $= 1000 "$

Totale $15525 V_p.$ $V_p. 15525$

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano terzo $15525 V_p.$ $V_p. 38850$

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

piano secondo $15525 V_p.$ $V_p. 54375$

$A_c = 30 \times 35$ $A_p = 4 \phi 12 + 2 \phi 14$

piano primo $15525 V_p.$ $V_p. 69900$

$A_c = 30 \times 40$ $A_p = 6 \phi 14$

piano terra $15525 V_p.$ $V_p. 85425$

$A_c = 40 \times 40$ $A_p = 6 \phi 14 + 2 \phi 12$

i pilastri: 32-35-46-49 ognuno $A_c = 30 \times 50$

Pilastri mm. 13-14-40-43

p. capertura.

p. pabbia = 4200 φ .

p. trone 4,50 x 450 = 2025 "

p. soleio 1,00 x 2,70 x 700 = 1890 "

p. pedale 1,50 x 2,75 x 800 = 3300 "

p. balcone 1,00 x 1,30 x 800 = 1040 "

p. muret. 4,50 x 850 = 3825 "

p. f. p. pilastro = 1200.

Totale 17100 φ . φ . 17100

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano quarto φ . 13100 φ . 30200

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano terzo φ . 13100 φ . 43300

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

piano secondo φ . 13100 φ . 56400

$A_c = 30 \times 35$ $A_p = 4 \phi 12 + 2 \phi 14$

piano primo φ . 13100 φ . 69500

$A_c = 30 \times 40$ $A_p = 6 \phi 14$

piano terra φ . 13100 φ . 82000

$A_c = 30 \times 45$ $A_p = 6 \phi 14 + 2 \phi 12$

Pilastri m. 26-37

pieno copertura		
p. pedata	= 4000 lq.	
p. trave 2,60 x 450	= 1170.	
p. solco 1 x 1,25 x 700	= 875.	
p. murat. 2,60 x 850	= 2210.	
p. p. pilastro	= 2800.	
	<hr/>	
totale	11'000 lq.	11'000 lq.

$$A_c = 20 \times 170 \quad A_f = 6 \phi 12$$

pieno quarto lq. 7000 lq. 18000

$$A_c = 20 \times 170 \quad A_f = 6 \phi 12$$

pieno terzo lq. 7000 lq. 25000

$$A_c = 20 \times 170 \quad A_f = 6 \phi 12$$

pieno secondo lq. 7000 lq. 32000

$$A_c = 20 \times 170 \quad A_f = 6 \phi 12$$

pieno primo lq. 7000 lq. 39000

$$A_c = 20 \times 170 \quad A_f = 8 \phi 12$$

pieno terra lq. 7000 lq. 46000

$$A_c = 20 \times 170 \quad A_f = 8 \phi 12$$

Pilastri mm. 12-15-39-42

p. caperture

p. pabbia = 4000 vp

p. trave 3,10 x 450 = 1395 "

p. solco 1,50 x 2,60 x 800 = 3120 "

p. murat. 2,60 x 850 = 2210 "

p. proprio pilastro = 1000 "

totale 11725 vp. vp. 11725

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano quarto 7725 vp. vp. 19450

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano terzo 7725 vp. vp. 27175

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano secondo 7725 vp. vp. 34900

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

piano primo 7725 vp. vp. 42625

$A_c = 30 \times 25$ $A_p = 6 \phi 12$

piano terra 7725 vp. vp. 50350

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

Pilastri mm. 11-16-38-41.

p. coperture

p. pabbia = 4000 kg.

p. trave 3.00 x 450 = 1350 "

p. solco 2.80 x 4.70 x 100 = 1212 "

p. sola 1.00 x 2.60 x 800 = 2080 "

p. murat. 3.00 x 850 = 2550 "

p. proprio pilastro = 1000.

Totale 20192 kg. kg. 20192

$A_c = 25 \times 30$ $A_f = 4 \phi 12$

piano quarto 16192 kg. kg. 36384

$A_c = 25 \times 30$ $A_f = 4 \phi 12$

piano terzo 16192 kg. kg. 52576

$A_c = 25 \times 35$ $A_f = 6 \phi 12$

piano secondo 16192 kg. kg. 68768

$A_c = 25 \times 45$ $A_f = 6 \phi 14$

piano primo 16192 kg. kg. 84960

$A_c = 25 \times 55$ $A_f = 8 \phi 14$

piano terra 16192 kg. kg. 101152

$A_c = 30 \times 55$ $A_f = 8 \phi 14 + 2 \phi 12$

Pilastri: mm 10-36

p. copertura $K_p. 6P_{20}$ $K_p. 6P_{20}$
 $A_c = 25 \times 25$ $A_p = 4 \phi 12$

piano pueno

p. trave $4,75 \times 450 = 2137 K_p.$

p. soletto $3,50 \times 2 \times 700 = 4900 "$

p. balcone $3,50 \times 1,30 \times 800 = 3640 "$

p. muret. $4,75 \times 850 = 4037 "$

p. proprio pilastro $= 1000 "$

totale $15714 K_p.$ $K_p. 22614$

$A_c = 25 \times 30$ $A_p = 4 \phi 12$

piano terzo $15714 K_p$ $K_p. 38328$

$A_c = 25 \times 30$ $A_p = 6 \phi 12$

piano secondo $15714 K_p.$ $K_p. 54042$

$A_c = 25 \times 35$ $A_p = 4 \phi 12 + 2 \phi 14$

piano primo $15714 K_p.$ $K_p. 69756$

$A_c = 30 \times 40$ $A_p = 6 \phi 14$

piano terra $15714 K_p.$ $K_p. 85470$

$A_c = 40 \times 40$ $A_p = 8 \phi 14$

Palazzina "B".

Palazzina "A"
con esteriaco

pilastri num. 1-3 - 1* - 18*

p. Copertura.

p. trave 4,60 x 450 = 2070 kg.

p. solco 2,10 x 2,50 x 700 = 3675 "

p. balcone 2,50 x 1,20 x 800 = 2400 "

p. murat. 4,60 x 850 = 3910 "

p. proprio pilastro = 1000.

totale 13055 kg. kg. 13055

$A_c = 45 \times 25$ $A_p = 4 \phi 12$

p. quinto 13055 kg. kg. 26110

$A_c = 45 \times 25$ $A_p = 4 \phi 12$

p. quarto 13055 kg. kg. 39165

$A_c = 45 \times 25$ $A_p = 6 \phi 12$

p. terzo 13055 kg. kg. 52220

$A_c = 45 \times 25$ $A_p = 3 \phi 12 + 3 \phi 14$

p. secondo 13055 kg. kg. 65275

$A_c = 45 \times 30$ $A_p = 6 \phi 14$

p. primo 13055 kg. kg. 78330

$A_c = 45 \times 30$ $A_p = 6 \phi 14 + 2 \phi 12$

p. terra 13055 kg. kg. 91385

$A_c = 45 \times 45$ $A_p = 8 \phi 14$

Pilastro n. 2 - 9*

p. capentura

p. trave $7,20 \times 450 = 3150 \text{ up.}$

p. alceio $8,10 \times 4,90 \times 700 = 7203 \text{ .}$

p. balcane $2,50 \times 1,20 \times 800 = 2400 \text{ .}$

p. mural. $7,20 \times 850 = 5950 \text{ .}$

p. proprio pilastro $= 1000 \text{ .}$

total 19700 up. $\text{up. } 19700$

$A_c = 30 \times 25$ $A_p = 4 \phi 12$

p. quinto 19700 up. $\text{up. } 39406$

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

p. quarto 19700 up. $\text{up. } 59109$

$A_c = 35 \times 30$ $A_p = 3 \phi 12 + 3 \phi 14$

p. terceiro 19700 up. $\text{up. } 78812$

$A_c = 40 \times 30$ $A_p = 6 \phi 14 + 2 \phi 12$

p. segundo 19700 up. $\text{up. } 98515$

$A_c = 45 \times 35$ $A_p = 8 \phi 14$

p. primo 19700 up. $\text{up. } 118218$

$A_c = 45 \times 40$ $A_p = 10 \phi 14$

p. terra 19700 up. $\text{up. } 137921$

$A_c = 45 \times 45$ $A_p = 5 \phi 16 + 5 \phi 14$

Pilastri mm. 4-7-6-9-18-23-20-21
 mm. 2*3*-6*-4*-19*-20*-23*-24*

p. copertura attico 7643 qp. qp. 7643
 Ac = 25x25 Ap = 4φ12

p. copertura
 p. trave 4,15 x 450 = 1867 qp.
 p. soletto 4,15 x 2,40 x 700 = 6972 qp.
 p. balcone 2,00 x 1,20 x 800 = 1920 qp.
 p. murat. 4,15 x 850 = 3527 qp.
 p. p. pilastro = 1000 qp.

+ totale 15286 qp. qp. 22929
 Ac = 30x25 Ap = 6φ12

p. quinto 15286 qp. qp. 38215
 Ac = 30x30 Ap = 6φ12

p. quarto 15286 qp. qp. 53501
 Ac = 30x35 Ap = 3φ12 + 3φ14

p. terzo 15286 qp. qp. 68787
 Ac = 30x40 Ap = 6φ14

p. secondo 15286 qp. qp. 84073
 Ac = 30x45 Ap = 8φ14

p. primo 15286 qp. qp. 99359
 Ac = 35x45 Ap = 8φ14 + 2φ12

p. terra 15286 qp. qp. 114645
 Ac = 45x45 Ap = 10φ14

Pilastri mm. 5-8-19-22 - 10^{*}-11^{*}-15^{*}-16^{*}

p. copertura etrico 9380 kg. Vg. 9380
 $A_c = 25 \times 25$ $A_f = 4 \phi 12$

p. copertura
 p. trave 4,15 x 450 = 1867 kg.
 p. solco 4,15 x 4,90 x 700 = 14234 kg.
 p. murat. 4,15 x 450 = 1660 kg.
 p. p. pilastri = 1000 kg.
 totale 18761 kg. Vg. 28141
 $A_c = 30 \times 25$ $A_f = 6 \phi 12$

p. quinto 18761 kg. Vg. 46902
 $A_c = 30 \times 30$ $A_f = 6 \phi 12$

p. quarto 18761 kg. Vg. 65663
 $A_c = 30 \times 35$ $A_f = 6 \phi 14$

p. terzo 18761 kg. Vg. 84424
 $A_c = 30 \times 45$ $A_f = 6 \phi 14 + 2 \phi 12$

p. secondo 18761 kg. Vg. 103185
 $A_c = 35 \times 45$ $A_f = 8 \phi 14 + 2 \phi 12$

p. primo 18761 kg. Vg. 121946
 $A_c = 40 \times 45$ $A_f = 10 \phi 14$

p. terra 18761 kg. Vg. 140707
 $A_c = 45 \times 45$ $A_f = 10 \phi 16$

P. Postri mmr 10-15 - 21-22*

p. copertura etico 6P25 up. 6P25 up.
 $A_c = 25 \times 25$ $A_f = 4 \phi 12$

p. copertura

p. trave 3.70 x 450 = 1665 up.

p. solco 3.70 x 2.40 x 700 = 6216 up.

p. balcone 1.90 x 1.20 x 800 = 1824 up.

p. murat. 3.70 x 850 = 3145 "

p. p. prelastro = 1000.

- totale 13850 up. up. 20775

$A_c = 45 \times 25$ $A_f = 4 \phi 12$

p. quinto up. 13850 up. 34625

$A_c = 45 \times 25$ $A_f = 6 \phi 12$

p. quarto up. 13850 up. 48475

$A_c = 45 \times 25$ $A_f = 6 \phi 12$

p. Terzo up. 13850 up. 62325

$A_c = 45 \times 25$ $A_f = 6 \phi 14$

p. secondo up. 13850 up. 76175

$A_c = 45 \times 30$ $A_f = 6 \phi 14 + 2 \phi 12$

p. primo up. 13850 up. 90025

$A_c = 45 \times 35$ $A_f = 8 \phi 14$

p. terra up. 13850 up. 103875

$A_c = 45 \times 45$ $A_f = 8 \phi 14 + 2 \phi 12$

Pilastri m 13-14 - 13^{*} - A^{*}

p. Copertura ottavo vp. 6560 vp. 6560
Ac = 25 x 30 Ap = 4 φ 12

p. Copertura

p. trave 1.90 x 450 = 855 vp.

p. solco 2.90 x 2,35 x 700 = 1480 =

p. murat. 2,10 x 850 = 1785 =

p. p. pilastro = 1000 =

totale 5120 vp. vp. 11680

Ac = 25 x 30 Ap = 4 φ 12

p. quinto 5120 vp. vp. 16800

Ac = 25 x 30 Ap = 4 φ 12

p. quarto 5120 vp. vp. 21920

Ac = 25 x 30 Ap = 4 φ 12

p. terzo 5120 vp. vp. 27040

Ac = 25 x 30 Ap = 4 φ 12

p. secondo 5120 vp. vp. 32160

Ac = 25 x 30 Ap = 4 φ 12

p. primo 5120 vp. vp. 37280

Ac = 25 x 30 Ap = 6 φ 12

p. terra 5120 vp. vp. 42400

Ac = 25 x 30 Ap = 6 φ 12

Pi. lastri: mm. 12-17 - 4*5*

p. coperture alt. w vp. 13123 vp. 13123
 $A_c = 25 \times 25$ $A_p = 4 \phi 12$

p. coperture

p. trave 6.20 x 450 = 2890 vp.

p. ~~trave~~ 2.15 x 3 x 700 = 4575 "

p. scale 1.60 x 2.50 x 800 = 3328 "

p. balcone 1.40 x 1.20 x 800 = 1344 "

p. murat. 6.20 x 850 = 5270 "

p. p. pilestro = 1000 "

+ totale 18247 vp. vp. 31370

$A_c = 45 \times 25$ $A_p = 6 \phi 12$

p. quinto vp. 18247 vp. 49617

$A_c = 45 \times 25$ $A_p = 6 \phi 12$

p. quarto vp. 18247 vp. 67864

$A_c = 45 \times 30$ $A_p = 6 \phi 14$

p. terzo vp. 18247 vp. 86111

$A_c = 45 \times 30$ $A_p = 6 \phi 14 + 2 \phi 12$

p. secondo vp. 18247 vp. 104358

$A_c = 45 \times 35$ $A_p = 8 \phi 14 + 2 \phi 12$

p. primo vp. 18247 vp. 122605

$A_c = 45 \times 40$ $A_p = 6 \phi 16 + 4 \phi 14$

p. terra vp. 18247 vp. 140852

$A_c = 45 \times 45$ $A_p = 10 \phi 16$

Pilastro m. 11. - 12*

p. apertura attico Kp. 12252 Kp. 12252
 $A_c = 25 \times 25$ $A_p = 4 \phi 12$

p. apertura

p. trave 4,10 x 450 = 1845 Kp.

p. solco 2,10 x 5 x 720 = 7350 "

p. solco 0,60 x 2,40 x 720 = 1008 "

p. solco 2,60 x 1,20 x 820 = 2496 "

p. murat. 3,50 x 850 = 2805 "

p. p. pilastro = 1000.

Totale 16504 Kp. Kp. 28756

$A_c = 30 \times 25$ $A_p = 6 \phi 12$

p. quinto 16504 Kp. Kp. 45260

$A_c = 30 \times 30$ $A_p = 6 \phi 12$

p. quarto 16504 Kp. Kp. 61754

$A_c = 30 \times 35$ $A_p = 3 \phi 12 + 3 \phi 14$

p. terza Kp. 16504 Kp. 78268

$A_c = 30 \times 40$ $A_p = 6 \phi 14 + 2 \phi 12$

p. secondo 16504 Kp. Kp. 94772

$A_c = 35 \times 45$ $A_p = 8 \phi 14$

p. primo 16504 Kp. Kp. 111276

$A_c = 40 \times 45$ $A_p = 10 \phi 14$

p. terra 16504 Kp. Kp. 127780

$A_c = 45 \times 45$ $A_p = 6 \phi 16 + 4 \phi 14$

Pilastri m. 16 - 14*

p. Coperture attico $Kp. 13263$ $Kp. 13263$
 $A_c = 20 \times 170$ $Ap = 4 \phi 12$

p. copertura
p. trave $5,60 \times 450 = 2520 Kp.$
p. solaio $2,15 \times 5 \times 700 = 7525 "$
p. solaio $0,85 \times 1,70 \times 700 = 1011 "$
p. soela $2,60 \times 1,20 \times 800 = 2496 "$
p. murat. $3,50 \times 850 = 2975 "$
p. p. pilastro $= 1000 "$

totale $18527 Kp.$ $Kp. 31790$
 $A_c = 20 \times 170$ $Ap = 6 \phi 12$

p. quinto $Kp. 18527$ $Kp. 50317$
 $A_c = 20 \times 170$ $Ap = 8 \phi 12$

p. quarto $Kp. 18527$ $Kp. 68849$
 $A_c = 20 \times 170$ $Ap = 8 \phi 12$

p. terzo $Kp. 18527$ $Kp. 87371$
 $A_c = 20 \times 170$ $Ap = 6 \phi 12 + 4 \phi 14$

p. secondo $Kp. 18527$ $Kp. 105898$
 $A_c = 20 \times 170$ $Ap = 10 \phi 14$

p. primo $Kp. 18527$ $Kp. 124425$
 $A_c = 20 \times 170$ $Ap = 6 \phi 16 + 4 \phi 14$

p. terra $Kp. 18527$ $Kp. 142952$
 $A_c = 20 \times 170$ $Ap = 10 \phi 16$

Pilastri: nr. 24-26 - 8*25*

p. Capertura

p. Trave $5,10 \times 450 = 2295 \text{ kg}$

p. soleo $2,10 \times 3 \times 700 = 4410 \cdot$

p. balcane $1,80 \times 1,20 \times 800 = 1824 \cdot$

p. murat. $2,10 \times 850 = 1785 \cdot$

φ. murat. $3 \times 500 = 1500 \cdot$

p.p. pilastro $= 1000 \cdot$

totale 12814 kg $\text{kg. } 12814$

$A_c = 30 \times 25$ $A_f = 4 \phi 12$

p. quinto $\text{kg. } 12814$ $\text{kg. } 25628$

$A_c = 30 \times 25$ $A_f = 4 \phi 12$

p. quarto $\text{kg. } 12814$ $\text{kg. } 38442$

$A_c = 30 \times 30$ $A_f = 6 \phi 12$

p. terzo $\text{kg. } 12814$ $\text{kg. } 51256$

$A_c = 30 \times 30$ $A_f = 3 \phi 12 + 3 \phi 14$

p. secondo $\text{kg. } 12814$ $\text{kg. } 64070$

$A_c = 30 \times 40$ $A_f = 6 \phi 14$

p. primo $\text{kg. } 12814$ $\text{kg. } 76884$

$A_c = 30 \times 45$ $A_f = 6 \phi 14 + 2 \phi 12$

p. terra $\text{kg. } 12814$ $\text{kg. } 89698$

$A_c = 35 \times 45$ $A_f = 8 \phi 14$

Pilastro m. 25 - 17*

p. cobertura

p. trave $7,10 \times 450 = 3195 \text{ kg.}$

p. solco $2,10 \times 5 \times 700 = 7350 \cdot$

p. murot. $5,20 \times 500 = 2500 \cdot$

p. p. pilastro = 1000.

Totale 14045 kg. $\text{kg. } 14045$

$A_c = 25 \times 25$ $A_f = 4 \phi 12$

p. quinto

$\text{kg. } 14045$

$\text{kg. } 28090$

$A_c = 30 \times 25$ $A_f = 4 \phi 12$

p. quarto

$\text{kg. } 14045$

$\text{kg. } 42135$

$A_c = 30 \times 30$ $A_f = 6 \phi 12$

p. terzo

$\text{kg. } 14045$

$\text{kg. } 56180$

$A_c = 30 \times 35$ $A_f = 3 \phi 12 + 3 \phi 14$

p. secondo

$\text{kg. } 14045$

$\text{kg. } 70225$

$A_c = 30 \times 40$ $A_f = 6 \phi 14$

p. primo

$\text{kg. } 14045$

$\text{kg. } 84270$

$A_c = 30 \times 45$

$A_f = 6 \phi 14 + 2 \phi 12$

p. terra

$\text{kg. } 14045$

$\text{kg. } 98315$

$A_c = 35 \times 45$

$A_f = 8 \phi 14$

Palazzina "D"

Travi di fondazione

Trave 1-5-9-13-22-26-30

$$EP = 25300 + 77495 + 77495 + 16300 + 77495 + 77495 + 25300 = 431580 \text{ kg.}$$

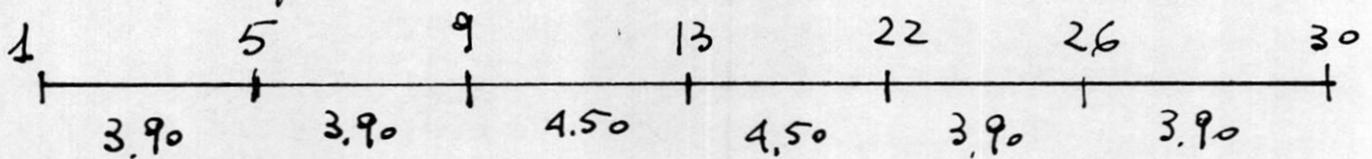
$$l = 24,50 \text{ mt.}$$

$$p = 431580 / 24,50 = 17615 \text{ kg/ml}$$

$$\sigma_f = 17615 / 100 \times 1,20 = 1,48 \text{ kg/cmq.}$$

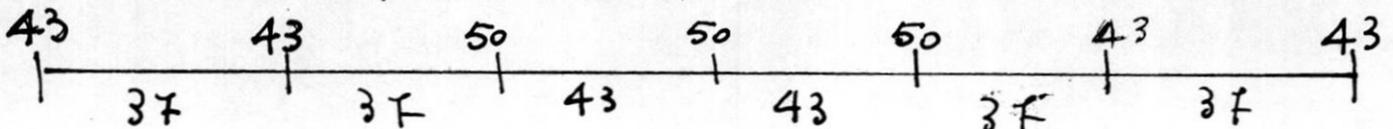
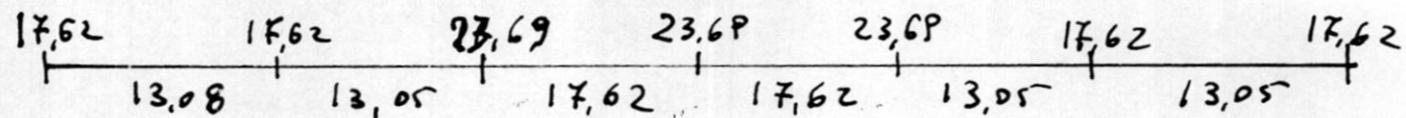
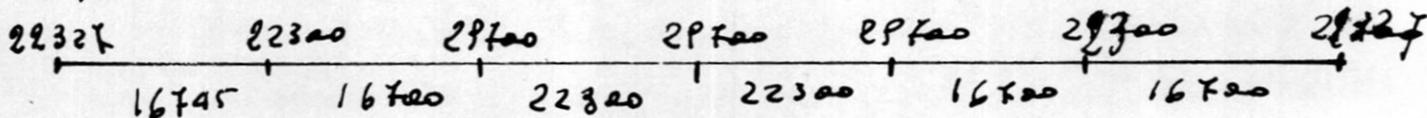
si è esente una larghezza di base $b = 1,20 \text{ mt.}$

schema geometrico e di calcolo



schema simmetrico, per cui rinvendo ed adottando

$H = 120 \text{ cm.}$ $b = 50 \text{ cm}$ si ha:



calculo de :

$$M = 15000 \times 0,45^2 = 1560 \text{ kgm.}$$

ensayo $H = 40 \text{ cm.}$ $b = 100 \text{ cm.}$

$$A_f = 3,10 \text{ cm}^2$$

$$\sigma_c = 20 \text{ kg/cm}^2$$

$$\sigma = 8,98 \text{ kg/cm}^2$$

$$S_p = 12,79 \text{ cm}^2$$

$$S_s = 22 \phi 10$$

Trave 3-7-11-18-21-24-28-32

$$\Sigma P = 28242 + 77838 + 77838 + 27390 + 27390 + 77838 + 77838 + 28242 = 422'627 \text{ Kg.}$$

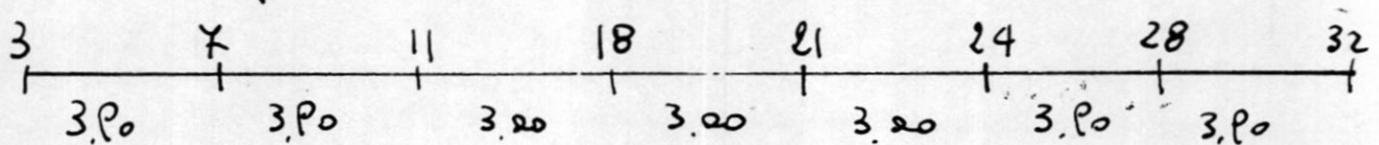
$$l = 24.50 \text{ mt.}$$

$$p = 422'627 / 24.50 = 17'250 \text{ Kg/ml}$$

$$\sigma_f = 17'250 / 100 \times 120 = 1.45 \text{ Kg/cm}^2$$

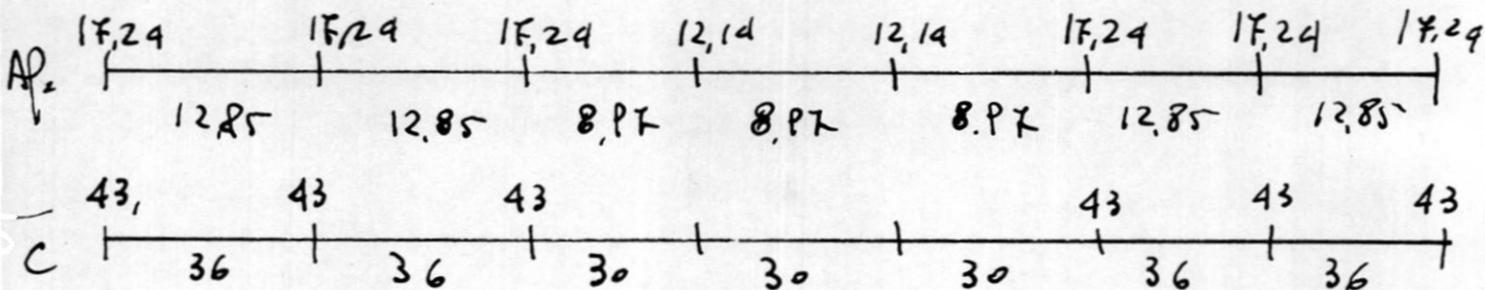
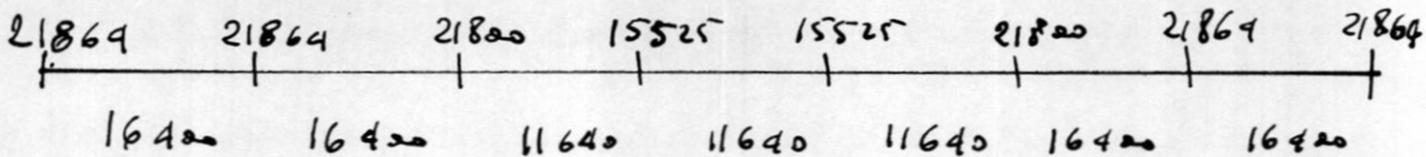
si è adottata una base $B = 1.20 \text{ mt.}$

schema geometrico e di calcolo



schema metrico da cui risulta $h = 100 \text{ cm.}$

$$b = 50 \text{ cm.}$$



$$\sigma = 7.60 \text{ Kg/cm}^2 \quad S_p = 1.40 \text{ cm}^2 \quad S_p = 16 \text{ cm}^2$$

TRAVE 2-G-10-17 / 31-27-23-15

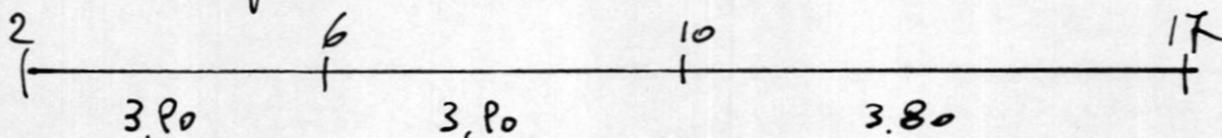
$$\Sigma P = 28240 + 77838 + 77838 + 61372 = 245294 \text{ kg}$$

$$p = 245294 / 12.20 = 20114 \text{ kg/ml}$$

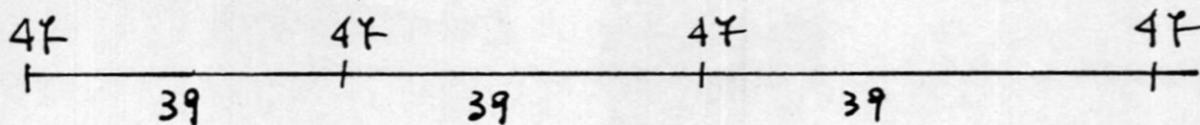
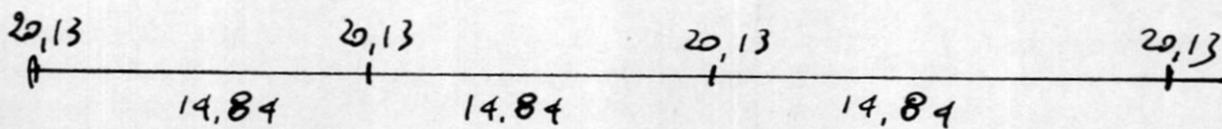
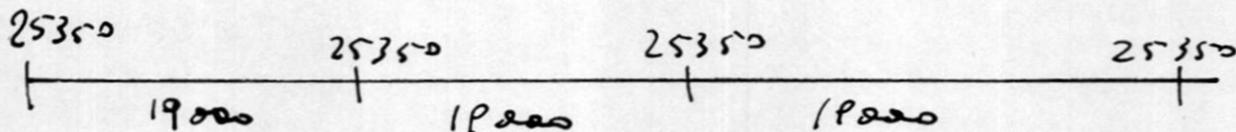
$$q = 20114 / (100 \times 1.30) = 154 \text{ kg/eq}$$

si è adottata una porphyra di base $b = 1.30 \text{ mt}$.

schemi geometrici e i calcoli



elemento $b = 50 \text{ cm}$. $H = 120 \text{ cm}$. $\rho = 2500 \text{ kg/m}^3$



calcolo della base: $p_s = 0.50 \text{ mt}$.

$$M = 15720 \times \frac{0.50^2}{2} = 1962 \text{ kgm}$$

elemento $H = 40 \text{ cm}$. $b = 120 \text{ cm}$.

$$M_f = 3.90 \text{ eq/ml} \quad \sigma_c = 23 \text{ kg/eq}$$

$$\sigma = 8.90 \text{ kg/eq} \quad S_p = 10.90 \text{ eq} \quad S_f = 20 \phi 10$$

Trave 4-8-12-19-26-25-29-33

$$\Sigma P = 25'300 + 77495 + 60659 + 43061 + 43061 + \\ + 60659 + 77495 + 25'300 = 413'030 \text{ kg.}$$

$$l = 24.50 \text{ mt.}$$

$$p = \frac{413'030}{24.50} = 16'858 \text{ kg/mf}$$

$$\sigma_f = \frac{16858}{100 \times 120} = 1.40 \text{ kg/cm}^2.$$

si è adottato una larghezza $b = 120 \text{ mt.}$

le caratteristiche geometriche e i rapporti sono uguali alla Trave 3-7-11-18-21-24-28-32

Trave 1-2-3-4 / 30-31-32-33

$$\Sigma P = 25 \cdot 320 + 28240 + 28240 + 25 \cdot 320 = 108'085 \text{ kg}$$

$$P = P \cdot 60 \text{ mt.}$$

$$p = 108'085 / 9.60 = 11'154 \text{ kg/mt.}$$

$$\sigma_f = 11154 / 100 \times 80 = 1.40 \text{ kg/cm}^2$$

si è adottato una larghezza l. base $b = 0.80 \text{ mt.}$

per tutte le campate $l = 3.10 \text{ mt.}$

armato $H = 120 \text{ cm.}$ $H = 50 \text{ cm.}$ in h_e

$$M_1 = 8932 \text{ kgm.} \quad A_p = 6.85 \text{ cm}^2 \quad \sigma_c = 26 \text{ kg/cm}^2$$

$$M_2 = 6699 \text{ kgm.} \quad A_p = 5.0 \text{ cm}^2 \quad \sigma_c = 22 \text{ kg/cm}^2$$

calcola da:

$$M = 14200 \times \frac{0.25^2}{2} = 440 \text{ kgm.}$$

$$A_p = 0.88 \text{ cm}^2 \quad \sigma_c = 20 \text{ kg/cm}^2$$

$$\sigma = 4.05 \text{ kg/cm}^2$$

Trave 19-18-14 / 20-21-16

$$\Sigma P = 43'200 + 27'400 + 47800 = 118'200 \text{ kg}$$

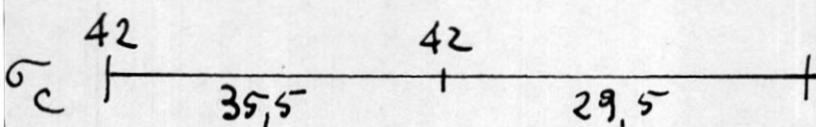
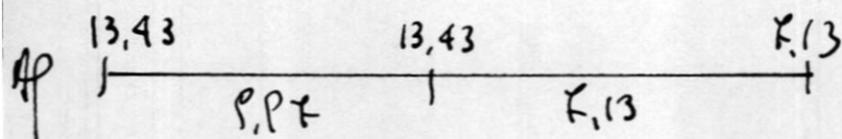
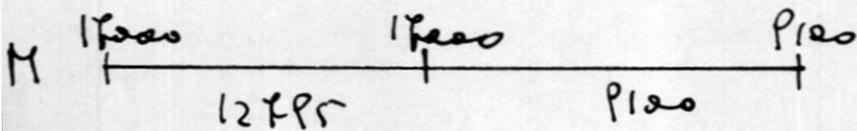
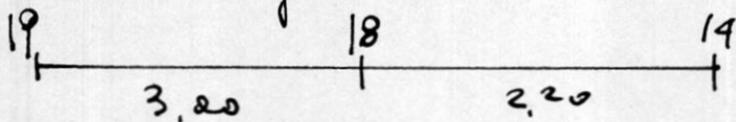
$$l = 5,20 \text{ mt.}$$

$$p = 118'200 / 5,20 = 22748 \text{ kg/mt}$$

$$q = 22748 / 100 \times 150 = 1,52 \text{ kg/cm}$$

si è adottato una larghezza l. base $b = 150 \text{ mt.}$

schema geometrico



si è assunto $H = 120 \text{ cm.}$ $b = 40 \text{ cm.}$

calcolo dei:

$$M = 2750 \text{ kgm.}$$

$$Ap = 5,50 \text{ cm}^2$$

$$\sigma_c = 26 \text{ kg/cm}^2$$

$$\tau = 9,67 \text{ kg/cm}^2$$

$$S_p = 7,30 \text{ cm}^3$$

$$S_s = 13 \text{ cm}^3$$

Piastre ascensore

$\Sigma P = 109.268 \text{ kg}$

eravamo una sezione di base $2.70 \times 2.50 \text{ m}$.
mi ha

$$q = 109.268 / 2.70 \times 2.50 = 1.64 \text{ kg/cm}^2$$

Palazzina "C"

Trevi di fondazione

Trave 1-4-7-10-17-20-23

$$\Sigma P = 31'000 + 76'050 + 76'050 + 69'756 + 76'050 + 76'050 + 31'000 = 404'956 \text{ kg}$$

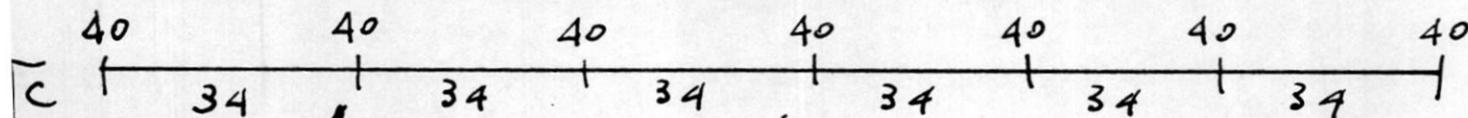
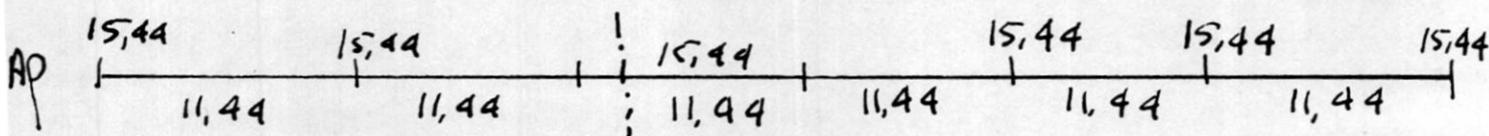
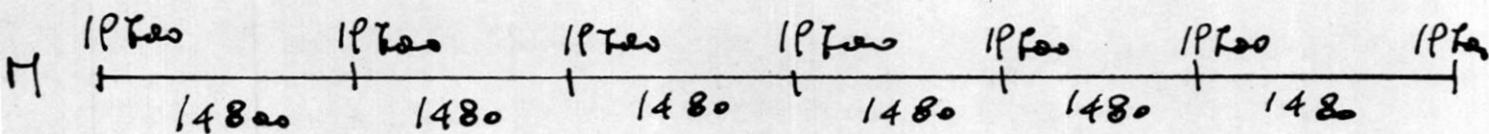
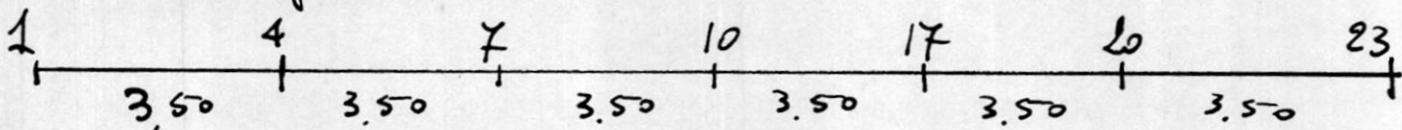
$$l = 21.20 \text{ mt.}$$

$$p = 404'956 / 21.20 = 19'283 \text{ kg/ml}$$

$$q = 19'283 / 100 \times 140 = 1.37 \text{ kg/cq.}$$

si è adottata una larghezza di base $b = 1.40 \text{ mt}$

schema geometrico



Calcolo travi: $\bar{\sigma} = 7,70 \text{ kg/cq}$ $S_p = 8,60 \text{ cm}^3$ $S_g = 16 \text{ cm}^3$
 Calcolo ala: $M = 2280 \text{ kgm}$ $AP = 4,70 \text{ kg/ml}$ $\sigma_c = 24 \text{ kg/cq}$

Trave 2-5-8-11/16-18-21-24

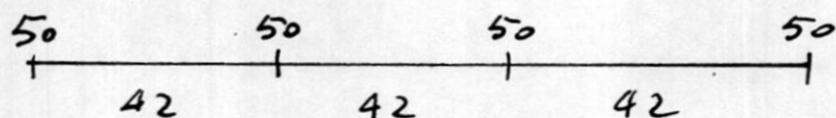
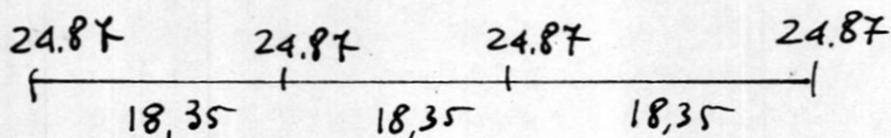
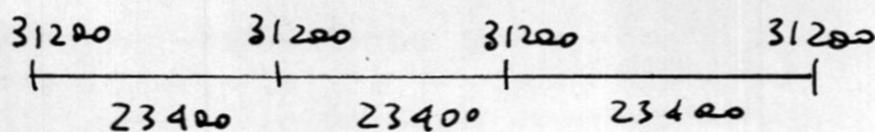
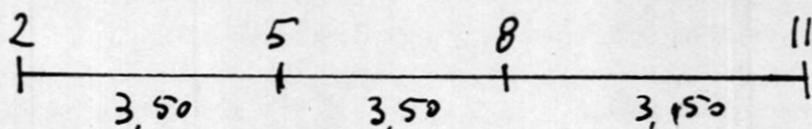
$$\Sigma P_2 = 36'850 + 91'254 + 91'254 + 101'152 + 101'152 + \\ + 91'254 + 91'254 + 36'850 = 641'020 \text{ Kg.}$$

$$l = 21.20 \text{ mt.}$$

$$p = 641'020 / 100 \times 200 = 1.50 \text{ Kg/eq.}$$

si è adottata una periferia di base $b = 2.20 \text{ mt.}$

schema geometrico per metri trave



Calcolo del

$$N = 5400 \text{ rpm}$$

$$AP = 11,10 \text{ cm/imp}$$

$$v_c = 38 \text{ m/eq}$$

Trave 3-6-9-13-14-19-22-25

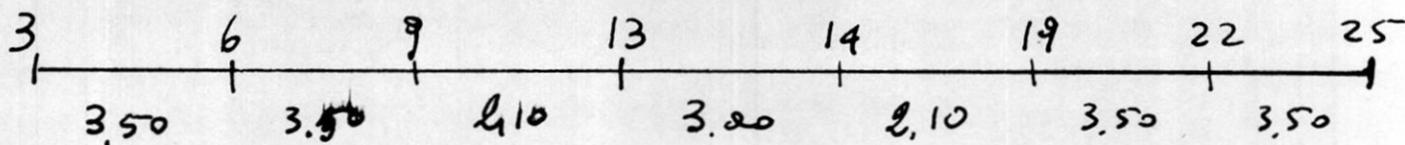
$$\Sigma P = 31000 + 85425 + 85425 + 41300 + 41300 + 85425 + 85425 + 31000 = 486300 \text{ kg.}$$

$l = 24.20 \text{ mt.}$

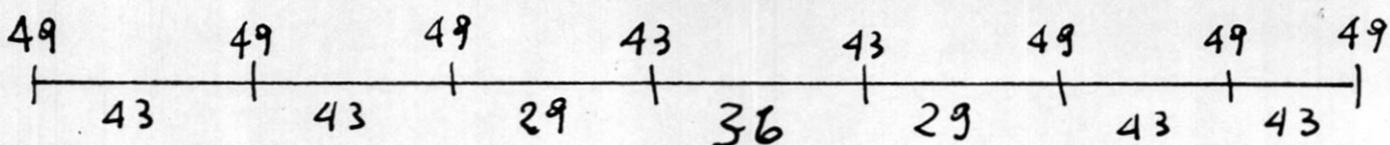
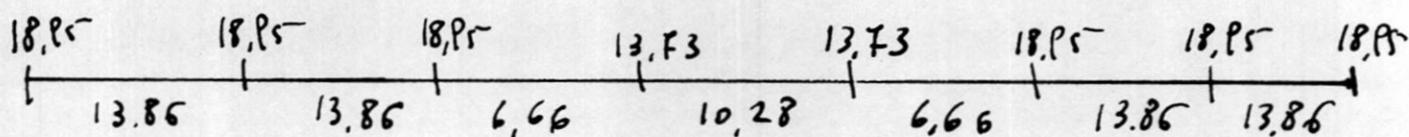
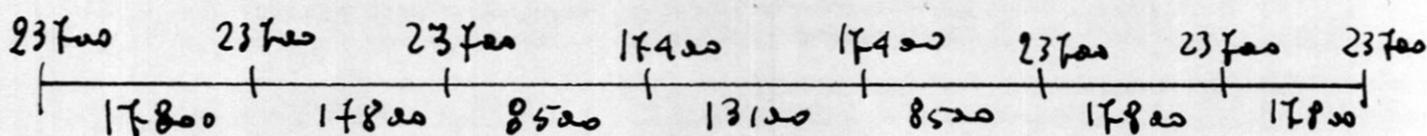
$$p = 486300 / (120 \times 160) = 2.45 \text{ kg/cm.}$$

si è adottata una sezione l. base $b = 160 \text{ mt.}$

schema geometrico e di calcolo.



schema simmetrico annulo $H = 100 \text{ cm.}$ $b = 40 \text{ cm.}$



calcolo da:

$$M = 3700 \text{ kgm} \quad A_p = 7.40 \text{ cm}^2 \quad \sigma_c = 31 \text{ kg/cm}^2$$

$$\sigma = 11.48 \text{ kg/cm}^2 \quad S_p = 10.10 \text{ cm}^3 \quad S_d = 18 \text{ cm}^3$$

Trave 11-12-13 / 14-15-16

$$\Sigma P = 50520 + 50350 + 41300 = 142150 \text{ kg.}$$

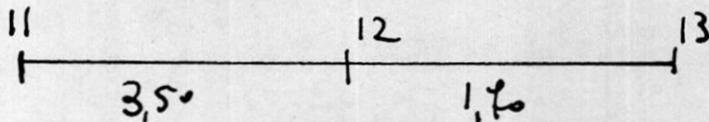
$$l = 5,30 \text{ mt.}$$

$$p = 142150 / 5,30 = 26820 \text{ kg/mt.}$$

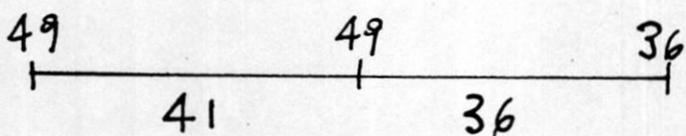
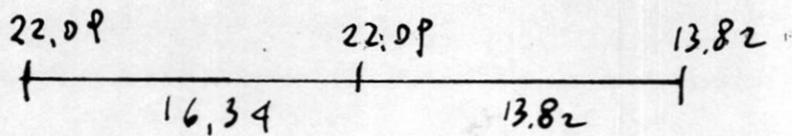
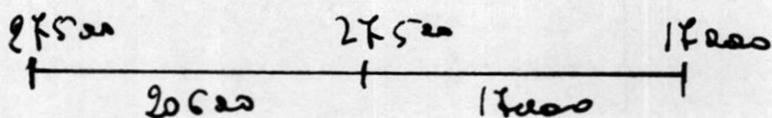
$$q_f = 26820 / 100 \times 160 = 4,62 \text{ kg/eq}$$

si è adottata una sezione a base $b = 160 \text{ cm.}$

schema geometrico



adottando $H = 120 \text{ cm.}$ $b = 50 \text{ cm.}$



$$\sigma = 10,63 \text{ kg/eq}$$

$$s_p = 11,77 \text{ cm}$$

$$s_d = 20 \text{ \# } 10$$

trave 1-2-3 / 23-24-25

$$\Sigma P = 31000 + 36850 + 31000 = 98850 \text{ kg}$$

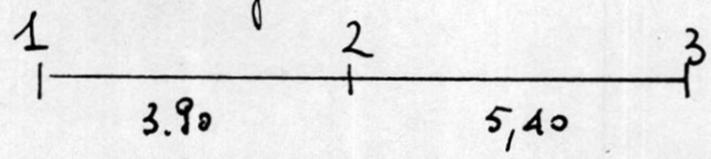
$$l = 9.50 \text{ mt.}$$

$$p = 98850 / 9.50 = 10405 \text{ kg/ml}$$

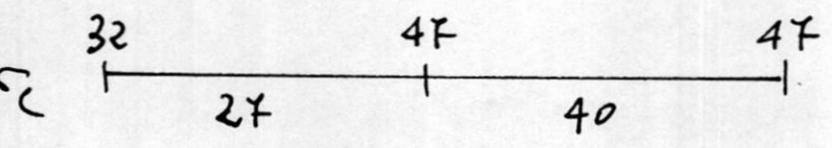
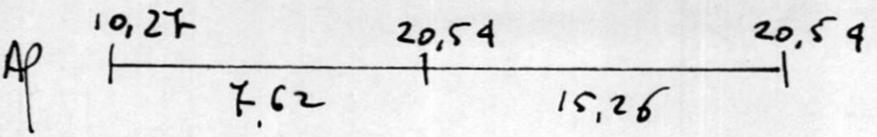
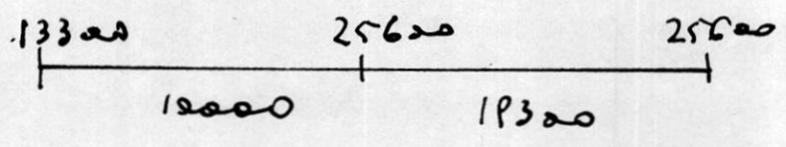
$$q_f = 10405 / 100 \times 70 = 7283.5 \text{ kg/eq.}$$

si e' adottata una lancia l. base $b = 70 \text{ cm}$.

scheme geometriche



adottando $H = 100 \text{ cm}$. $b = 50 \text{ cm}$.



$$G = 606 \text{ kg/eq}$$

trave 2-5-8-11

$$\Sigma P = 68 P_{60} + 140 \gamma_{07} + 140 \gamma_{07} + 63'8 P_0 = 414'264$$

$$l = 13.20 \text{ mt.}$$

$$p = 414'264 / 13.20 = 31'866 \text{ kg/ml}$$

$$q = 31'866 / 100 \times 200 = 1.59 \text{ kg/cm.}$$

n è adottata una altezza l . base $b = 2.00 \text{ mt}$
struttura simmetrica con $l_0 = 4.20 \text{ mt}$.

$$M_1 = 4 \gamma_0 \gamma_0 \text{ kgm} \quad A_p = 38.22 \text{ cm}^2 \quad \sigma_c = 63 \text{ kg/cm}^2$$

$$M_2 = 35'280 \text{ kgm.} \quad A_p = 28.24 \text{ cm}^2 \quad \sigma_c = 53 \text{ kg/cm}^2$$

n è adottata una sezione $H = 100 \text{ cm}$. $b = 55 \text{ cm}$.

$$\sigma = 13.90 \text{ kg/cm}^2 \quad A_p = 14.20 \text{ cm}^2 \quad S_y = 26 \text{ cm}^3$$

calcolo del

$$M = 16200 \times \frac{0.80^2}{2} = 5120 \text{ kgm.}$$

adottando $H = 40 \text{ cm}$. $b = 100 \text{ cm}$.

$$A_p = 7.65 \text{ cm}^2/\text{ml} \quad \sigma_c = 37 \text{ kg/cm}^2$$

Trave 3-6-9-12-17-20-21-26

$$\Sigma P = 456P2 + 114645 + 114645 + 70426 + 70426 + 114645 + 114645 + 4484P = 689973 \text{ kg}$$

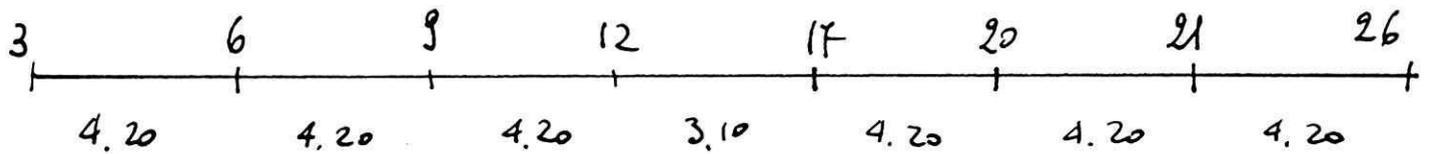
$$P = 28,30 \text{ mt.}$$

$$q = 689973 / 28,30 = 24380 \text{ kg/ml}$$

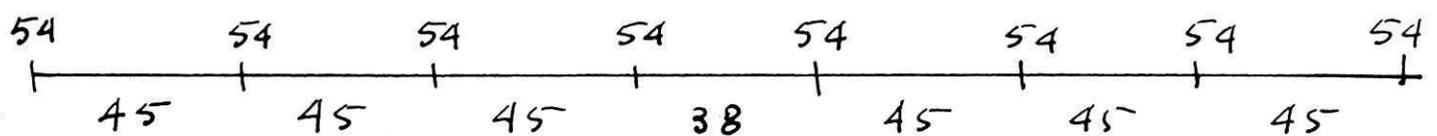
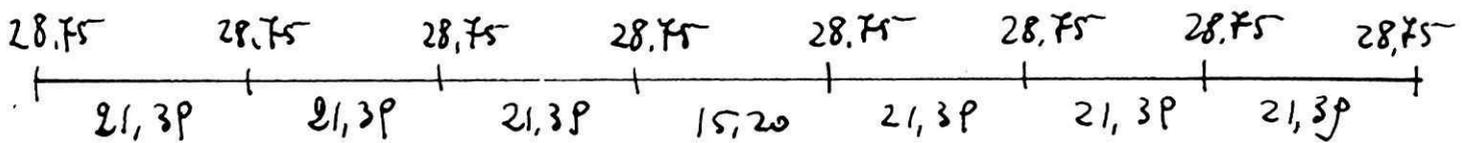
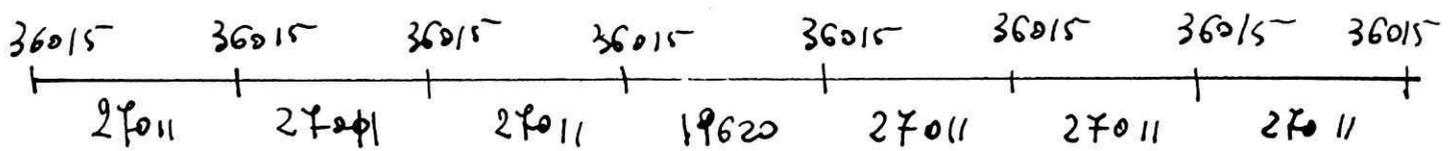
$$q' = 24380 / 100 \times 170 = 1,43 \text{ kg/cq.}$$

si è adottata una sezione di base $b = 170 \text{ mt.}$

schema geometrico.



si adotta $H = 100 \text{ cm.}$ $b = 55 \text{ cm.}$



$$\sigma = 10,60 \text{ kg/cq}$$

$$S_p = 15,91 \text{ cm}^2$$

$$S_1 = 26 \phi 10$$

Trave 16-19-22-25

$$\Sigma P = 71476 + 140708 + 140708 + 49157 = 402047 \text{ kg.}$$

$$l = 12.50 \text{ mt.}$$

$$p = 402047 / 12.50 = 32163 \text{ kg/m}$$

$$q = 32163 / 100 \times 200 = 1.60 \text{ kg/cm}^2$$

struttura simmetrica $l_0 = 4.20$

si adotta $H = 120 \text{ cm.}$ $b = 55 \text{ cm.}$

$$M_1 = 48334 \text{ kgm} \quad N_1 = 38.51 \text{ emp.} \quad \sigma_c = 63 \text{ kg/cm}^2$$

$$M_2 = 35500 \text{ kgm} \quad N_2 = 28.50 \text{ emp.} \quad \sigma_c = 53 \text{ kg/cm}^2$$

$$\tau = 13.93 \text{ kg/cm}^2 \quad S_p = 20.36 \text{ emp.} \quad S_f = 36 \text{ f } 10$$

trave 11-12 / 16-17

$$\Sigma P = 63890 + 70426 = 134316 \text{ kg}$$

$$l = 5,50 \text{ mt.}$$

$$q = 134316 / 5,50 = 24421 \text{ kg/ml}$$

$$of = 24421 / (100 \times 150) = 1,62 \text{ kg/eq.}$$

si è adottato una lunghezza l base $b = 1,50 \text{ mt.}$

$l_0 = 5,20 \text{ mt.}$ si è adottato $H = 100 \text{ cm.}$ $b = 55 \text{ cm.}$

$$M_1 = 55206 \text{ kgm.} \quad AP = 44,84 \text{ cm.} \quad \sigma_c = 68 \text{ kg/eq.}$$

$$M_2 = 41405 \text{ kgm.} \quad AP = 33,95 \text{ cm.} \quad \sigma_c = 58 \text{ kg/eq.}$$

calcolo da:

$$M = 2900 \text{ kgm.} \quad AP = 5,56 \text{ cm/ml} \quad \sigma_c = 27 \text{ kg/eq}$$

si è adottato $H = 40 \text{ cm.}$ $b = 100 \text{ cm.}$

$$\sigma_c = 13,07 \text{ kg/eq} \quad S_p = 23,10 \text{ cm.} \quad S_1 = 42 \text{ fl}$$

trave 1-2-3

$$\Sigma P = 456P2 + 68P60 + 456P2 = 160344 \text{ kg.}$$

$$l = 10,20 \text{ mt.}$$

$$p = 160344 / 10,20 = 15720 \text{ kg/ml}$$

$$q_f = 15720 / (120 \times 120) = 1,31 \text{ kg/cm.}$$

si è adottata una larghezza di base $b = 120 \text{ cm.}$

schemi simmetrici $l_0 = 5,20 \text{ mt.}$

$$M_1 = 32916 \text{ kgm} \quad N_1 = 26,16 \text{ cm} \quad \sigma_c = 51 \text{ kg/cm.}$$

$$M_2 = 24687 \text{ kgm} \quad N_2 = 19,38 \text{ cm} \quad \sigma_c = 43 \text{ kg/cm.}$$

Calcolo da:

$$M = 1550 \text{ kgm} \quad N_1 = 2,10 \text{ cm/ml} \quad \sigma_c = 20 \text{ kg/cm}$$

$$\sigma = 8,09 \text{ kg/cm} \quad S_p = 14,10 \text{ cm} \quad S_s < 14 \text{ cm}$$

Trave 24-25-26

$$\Sigma P = 44849 + 41157 + 44849 = 138855 \text{ kg}$$

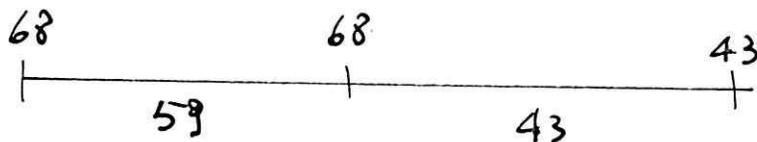
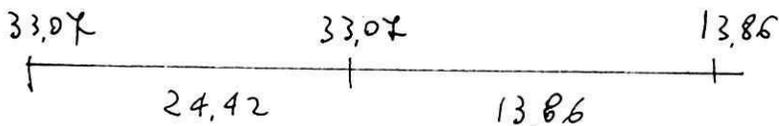
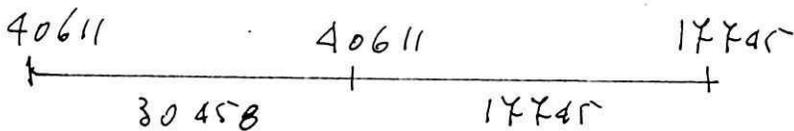
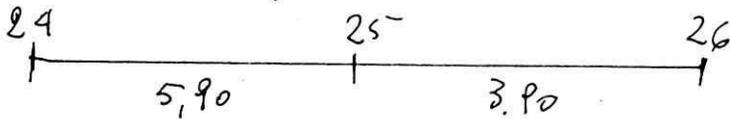
$$l = 10,20 \text{ mt.}$$

$$p = 138855 / 10,20 = 13613 \text{ kg/mt.}$$

$$q = 13613 / 100 \times p_0 = 1,51 \text{ kg/cm}$$

si è adottata una larghezza di base $b = 0,90 \text{ mt.}$

schema geometrico



$$\sigma = 11,17 \text{ kg/cm}$$

$$S_p = 16,21 \text{ cm}$$

$$S_s = 28 \text{ ft}$$