ISTITUTO CASE POPOLARI
BRINDISI

CALCOLI BALCONI E ARCHITRAVI

IMPRESA: ING. S. DE LUCA A.
[illegible]

BALCONI:

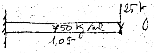
1) Tipo luce m. 1,05

Analisi carichi
pp. 0,12 × 2500 = 300 k/mq
pavim. = 60 "
malta e int. = 40

$p = 400$ k/mq
sovracc. acc. 350

$q = 750$ k/mq

peso ringhiera P 25 k/ml



$\sigma_c = 40$ k/cmq $\sigma_f = 1400$ k/cmq

$M_1 = \frac{1}{2} 750 \cdot 1,05^2 = 415$ Kgm
$M_2 = 25 \times 1,05 \simeq 27$
$M_t = 442$ kgm

$d = 0,493 \sqrt{\frac{44200}{100}} = 10,5$ cm ~ 11 cm ; $d = 12$; $h = 14$; $t = 0,9 \times 12 = 11$ cm

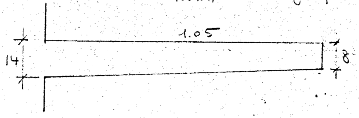
$A_f = \frac{44200}{1400 \times 11} = 2,85$ cmq/ml di soletta

1φ10 e 1φ8 alternati/ogni 20 cm

h = 14 cm

TAGLIO: $T = 750 \times 1,05 + 25 = 105$ k

$\tau_{max} = \frac{105}{100 \times 11} = \sim 1$ k/cmq



2) tipo luce m. 0,85

Analisi carichi (v. balcone tipo 1)

$p = 750$ k/mq

$P = 25$ k/ml

$M_1 = \frac{1}{2} 750 \cdot \overline{0,85}^2 = 270$ kgm

$M_2 = 25 \cdot 0,85 = \sim 22$

$M_t = 292 \sim 300$ kgm

$d = 0,493 \sqrt{\frac{30000}{100}} = \sim 9$ cm; Assumo $d = 12$; $h = 14$; $t = 11$ cm

$A_f = \frac{30000}{1400 \times 11} = 1,95$ cmq/ml   1Φ8 ogni 20 cm

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ARCHITRAVI SU MURI INTERNI

ARCH (a)   luce reale m. 1,30 – luce teorica m. 1,50

PIANO GENERICO   Analisi carichi

pp. $0,50 \times 0,30 \times 2500 =$ 375 k/ml

solaio: $\frac{5,00 + 4,10}{2} \times 605 =$ 2750 "

pavim. e int. in trave $0,50 \times 70$ 35 "

sovraccarico sulla trave $0,50 \times 250$ 125 "

3285 k/ml

$\sigma_c = 45$ k/cq $\sigma_f = 1420$ k/cq

$M = \frac{1}{12} p l^2 = \frac{1}{12} 3285 \cdot \overline{1,50}^2 = 615$ kgm

$$d = \begin{cases} = 0,446 \sqrt{\frac{61500}{43}} = 17 \\ = 0,446 \sqrt{\frac{61500}{50}} = \sim 16 \\ = 0,446 \sqrt{\frac{61500}{60}} = \sim 15 \end{cases}$$
Disponibile h = 20; d = 18; t = 0,9·18 = 16,5 cm

$A_f = \frac{61500}{1400 \times 16,5} = 2,67$ cmq (3Φ10 diritti e 1Φ8 sagomato)

PIANO ULTIMO   Analisi carichi: pp   375

pav. + int.   35

sovracc. trave   125

solaio $\frac{5,00 + 4,10}{2} \times 700$ 3180

3715 k/ml

q,

$M = \frac{1}{12} 3715 \cdot \overline{1,50}^2 = \sim 700$ kgm

$d = 0,446 \sqrt{\frac{70000}{43}} = 12$ Disponibile h = 35 cm; d = 33 cm; t = 0,9·33 = ~30 cm

$A_f = \frac{70000}{1400 \times 30} = 1,70$ cmq (2Φ10 diritti e 1Φ6 sagomato)

TAGLIO: $T = 3285 \times \frac{1,30}{2} = \sim 2150$ kg; $\tau_{max} = \frac{2150}{43 \times 25} = 2,15$ k/cq

Staffe Φ6 / ogni 30 cm.

ARCH (b)   luce reale 2,30 m; luce teorica m. 2,50

PIANO GENERICO: Analisi carichi (come arch. (a) 3285 k/ml)

$M = \frac{1}{12} 3285 \cdot \overline{2,50}^2 = 1710$ kgm

$$d = \begin{cases} = 0,446 \sqrt{\frac{171000}{43}} = \sim 29 \text{ cm} \\ = 0,446 \sqrt{\frac{171000}{50}} = \sim 26 \text{ cm} \\ \ \ 0,446 \sqrt{\frac{171000}{60}} = \sim 24 \text{ cm} \end{cases}$$
h = 30 cm; d = 28 cm; t = 0,9·28 = 25,6

$A_f = \frac{171000}{1400 \times 25,6} = 4,76$ cmq (3Φ10 + 1Φ12 diritti, 1Φ12 sagomato)

PIANO ULTIMO   Analisi carichi (come arch. (a)) = 3715 k/ml

$M = \frac{1}{12} 3715 \cdot \overline{2,50}^2 = 1950$ kgm – Assumo h = 35 cm; d = 33; t = 0,9·33 = 30

$A_f = \frac{195000}{1400 \times 30} = 4,65$ cmq (3Φ10 + 1Φ12 diritti, 1Φ12 sagomato)

TAGLIO: $T = 3285 \times \frac{2,30}{2} = 3800$ kg $\tau_{max} = \frac{3800}{43 \times 25,6} = 3,50$ k/cq

ARCH ⓒ luce reale m. 1.60 . luce teorica m. 1.70

- **PIANO GENERICO**

Analisi carichi (come arch ⓐ) 3285 Kg/ml

$M = \frac{1}{12}\,3285 \cdot \overline{1{,}70}^2 = 793$ Kgm

$$d = \begin{cases} 0{,}446\sqrt{\dfrac{79300}{43}} = 20 \text{ cm} \\ 0{,}446\sqrt{\dfrac{79300}{50}} = 18 \text{ cm} \\ 0{,}446\sqrt{\dfrac{79300}{60}} \quad 16.5 \text{ cm} \end{cases}$$

Assumo h = 20 cm
d = 18 cm
$t = 0{,}919 \times 18 = 16{,}5$ cm

$A_f = \frac{79300}{1400 \times 16.5} = 3{,}44$ cmq (3φ10 diritti e 1φ12 sagomato)

- **TAGLIO**: $T = 3285 \times \frac{1.70}{2} = 2800$ Kg; $\tau_{max} = \frac{2800}{43 \times 23} = 2.85$ Kg/cmq

- **PIANO ULTIMO**:

Analisi carichi (come arch ⓐ) $p = 3715$ Kg/ml

$M = \frac{1}{12}\,3715 \times \overline{1{,}70}^2 = \sim 900$ Kgm

Assumo h = 35 cm; d = 32; t = 30 cm

$A_f = \frac{90000}{1400 \times 30} = 2{,}14$ cmq (2φ10 diritti e 1φ10 sagomati)

ARCH. ⓓ luce reale m. 1.25 luce teorica m. 1.30

- **PIANO GENERICO**: Analisi carichi (come arch. ⓐ) $p = 3285$ Kg/ml

$M = \frac{1}{12}\,3285 \cdot \overline{1{,}30}^2 = 465$ Kgm

Assumo h = 20 cm t = 16.5

$A_f = \frac{46500}{1400 \times 16.5} = 2{,}00$ cmq (2φ10 diritti e 1φ8 sagomato)

- **PIANO ULTIMO** Analisi carichi (come arch. ⓐ) $p = 3715$ Kg/ml

$M = \frac{1}{12}\,3715 \cdot \overline{1{,}30}^2 = \sim 530$ Kgm, Assumo h = 35 cm t = 30 cm

$A_f = \frac{53000}{1400 \times 30} = \sim 1{,}26$ cmq (2φ10 diritti)

ARCH ⓔ luce reale m. 2.20; luce teorica 2,30 m.

PIANO GENERICO: Analisi carichi:

pp	375	Kg/ml
pavim. + int. su trave	75	"
sovracc. su trave: 0,50 × 250	125	"
	575	
solaio $\frac{4.20}{2} \times 605$	~ 1275	
p	1850	Kg/ml

$M = \frac{1}{12}\,1850 \cdot \overline{2{,}30}^2 = 820$ Kgm

Assumo h = 30 cm; d = 28; t = 25,6 cm

$A_f = \frac{82000}{1400 \times 25.6} = 2{,}28$ cmq (2φ10 diritti 2φ8 sagomati)

PIANO ULTIMO: Analisi carichi

	575	Kg/ml
solaio $\frac{4.20}{2} \times 700 =$	~ 1475	"
$p =$	2050	Kg/ml

$M = \frac{1}{12}\,2050 \cdot \overline{2{,}30}^2 = \sim 910$ Kg/ml

Assumo h = 35 cm d = 32 t = 30 cm

$A_f = \frac{91000}{1400 \times 30} = 2{,}16$ cmq (2φ10 diritti 1φ10 sagomato)

TAGLIO: $T = 2050 \times \frac{2.30}{2} = 2360$ Kg; $\tau_{max} = \frac{2360}{43 \times 30} = \sim 1{,}9$ Kg/cmq

ARCH ⓕ luce reale m. 1,80; luce teorica m. 1,90

- **PIANO GENERICO** Analisi carichi (come arch. ⓔ) $p = 1850$ Kg/ml

$M = \frac{1}{12}\,1850 \cdot \overline{1{,}90}^2 = 555$ Kgm Assumo h = 30 d = 28 t = 25.6 cm

$A_f = \frac{55500}{1400 \times 25{,}6} = 1.55$ cmq (2φ10 diritti)

PIANO ULTIMO : Analisi carichi (come arch. ⓔ) $p = 2050$ Kg/ml

$M = \frac{1}{12}\,2050 \cdot \overline{1{,}90}^2 = 615$ Kgm Assumo h = 35 d = 32 t = 30 cm

$A_f = \frac{61500}{1400 \times 30} = \sim 1{,}50$ cmq (2φ10 diritti)

ARCH (g) luce reale m. 2,10 luce teorica m. 2,20

PIANO GENERICO Analisi dei carichi (come arch. (d)) p = 3285 kg/ml

$M = \frac{1}{12} 3285 \cdot \overline{2,20}^2 = 1330$ kgm

$$d = \begin{cases} 0,446 \sqrt{\frac{133000}{43}} = \sim 25\ \text{cm} \\ 0,446 \sqrt{\frac{133000}{50}} = 23\ \text{cm} \\ 0,446 \sqrt{\frac{133000}{60}} = 21\ \text{cm} \end{cases}$$

Assumo h = 30 cm
d = 28 cm
t = 26,5 cm

$A_f = \frac{133000}{1400 \times 26,5} = 3,70$ cmq (4Φ10 diritti 2Φ10 sagomati)

PIANO ULTIMO: Analisi carichi (come arch. (d)) p = 3715 kg/ml

$M = \frac{1}{12} 3715 \cdot \overline{2,20}^2 = 1500$ kgm Assumo h = 35; d = 32; t = 30

$A_f = \frac{150000}{1400 \times 30} = 3,57$ cmq (4Φ10 diritti 1Φ10 sagomati)

TAGLIO: $T_{max} = 3715 \times \frac{2,20}{2} = 4100$ kg; $\tau_{max} = \frac{4100}{43 \times 30} = \sim 3,20$ kg/cmq
Staffe Φ6/ogni 20 cm

ARCH (h): luce reale m. 1,50; luce teorica m. 1,60

PIANO GENERICO Analisi dei carichi: (v. arch. (e))

	575	kg/ml
solaio: $\frac{5,00+4,30}{2} \times 605 = \sim$	2815	"
p =	3390	kg/ml

$M = \frac{1}{12} 3390 \cdot \overline{1,60}^2 = 720$ kgm Assumo h = 20; d = 18; t = 16,5 cm

$A_f = \frac{72000}{1400 \times 16,5} = 3,12$ cmq (3Φ10 diritti + 1Φ10 sagomato)

PIANO ULTIMO Analisi carichi (v. arch. (e'))

	575	kg/ml
solaio $\frac{5,00+4,30}{2} \times 700 =$	3255	"
p =	3830	kg/ml

$M = \frac{1}{12} 3830 \cdot \overline{1,60}^2 = 815$ kgm
Assumo h = 35 cm t = 30 cm

$A_f = \frac{81500}{1400 \times 30} = 1,95$ cm (2Φ10 diritti + 1Φ8 sagomato)

Staffe Φ6 /ogni 30 cm.

ARCH (i) luce reale m. 1,10. luce teorica m. 1,20

PIANO GENERICO: Analisi carichi

pp	375	kg/ml
pavim. e int.	35	"
sovracc. trave	125	"
solaio $\frac{5,40}{2} \times 605$	1650	"
p =	2185	kg/ml

$M = \frac{1}{12} 2185 \cdot \overline{1,20}^2 = 262$ kgm

$$d = \begin{cases} 0,446 \sqrt{\frac{26200}{43}} = \sim 11,0 \\ 0,446 \sqrt{\frac{26200}{50}} = \sim 10,5 \\ 0,446 \sqrt{\frac{26200}{60}} = \sim 9,0 \end{cases}$$

Assumo h = 20 d = 18 t = 16,5 cm

$A_f = \frac{26200}{1400 \times 16,5} = 1,17$ cmq (2Φ10 diritti)

PIANO ULTIMO: h = altezza cordolo
A_f = 2Φ10 diritti
Staffe Φ6 /ogni 30 cm.

ARCH (l) luce reale m. 1,10 luce teorica m. 1,20

Analisi carichi:

pp	375	kg/ml
pavim. e int.	35	"
sovracc. trave	125	"
muratura 0,60 × 100 × 1600 ~	1000	"
	1535	kg/ml
pianerottolo Φ10 × $\frac{2,50}{2}$ ~	900	
p	2435	kg/ml

$M = \frac{1}{12} 2435 \cdot \overline{1,20}^2 = 294$ kgm
Assumo h = 20 t = 16,5 cm

$A_f = \frac{29400}{1400 \times 16,5} = 1,32$ cmq (2Φ10 diritti)

TAGLIO: $T = 2435 \frac{1,10}{2} = 1340$ kg $\tau_{max} = \frac{1340}{43 \times 16,5} = 1,9$ kg/cmq
Staffe Φ6 /ogni 30 cm.

ARCHITRAVI SU MURI ESTERNI

ARCH. (m) FINESTRE ESTERNE luce reale 1,30 (tra spalle) l. teorica m 1,40

PIANO GENERICO: Analisi carichi

pp. $0,50 \times 0,35 \times 2500 = \sim 450$ kg/ml

muratura $0,25 \times 1,00 \times 1.600 = 400$ ″

solaio $\frac{500}{2} \times 605$ 1500 ″

$p = 2300$ kg/ml

$M = \frac{1}{12} 2300 \cdot \overline{1,40}^2 = 376$ kgm

$d = 0,446 \sqrt{\frac{37600}{43}} = \sim 14$ Assumo $h = 20$ $d = 18$ $t = 16,5$

$A_f = \frac{37600}{1400 \times 16,5} = 145$ cmq (2φ10 diritti)

PIANO ULTIMO: $h = 35$ cm $A_f = 2φ10$

ARCH. (n) FINESTRE SCALE luce m. 1,70 l. teorica m. 1,85

Analisi carichi pp 450 kg/ml

muratura $0,60 \times 2,20 \times 1600 = 2120$

$p = 2570$

gradini: $\frac{245 \times 110}{30} \times 100 = 900$

$p = 3470$ kg/ml

SCALA "A"

$M = \frac{1}{12} 2570 \cdot \overline{1,85}^2 = 740$ kgm

$d = 0,446 \sqrt{\frac{74000}{43}} = \sim 19$ cm Assumo $h = 25$ $t = 0,92 \times 23 = 21$ cm

$A_f = \frac{74000}{1400 \times 21} = 2,50$ cmq (2φ10 diritti + 2φ8 sagomati)

TAGLIO $T = 2570 \cdot \frac{1,70}{2} = 2200$ kg $\tau_{M} = \frac{2200}{43 \times 21} = 2,50$ kg/cmq

SCALA "B"

$M = \frac{1}{12} 3470 \times \overline{1,85}^2 = \sim 1000$ kgm

$d = 0,446 \sqrt{\frac{100000}{43}} = 22$ cm Assumo $h = 25$ $t = 21$ cm

$A_f = \frac{100000}{1400 \times 21} = 3,40$ cmq (2φ10 + 1φ12 diritti + 2φ8 sagomati)

TAGLIO: $T = 3470 \frac{1,70}{2} = \sim 3000$ kg $\tau_{M} = \frac{3000}{43 \times 21} = 3,35$ kg/cmq

Staffe φ6 ogni 20 cm

– ARCH. PORTONCINI DI INGRESSO:

come quelle delle finestre sovrastanti