ISTITUTO CASE POPOLARI
BRINDISI

CALCOLI BALCONI E ARCHITRAVI

IMPRESA ING. S. DE LUCA & C.
BARI

BALCONI:

1) Tipo luce m. 1,05

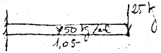
Analisi carichi

sp. $0,12 \times 2500 = 300$ kg/mq
pavim. $= 60$ "
malt. e int. $= 40$

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

$p = 750$ kg/mq

peso ringhiera P 25 kg/ml



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

$$M_1 = \frac{1}{2} 750 \cdot 1{,}05^2 = 415 \text{ Kgm}$$

$$M_2 = 25 \times 1{,}05 = \sim 27 \text{ "}$$

$$M_t = 442 \text{ kgm}$$

?

$$d = 0{,}493 \sqrt{\frac{44200}{100}} = 10{,}5 \text{ cm} \sim 11 \text{ cm} \; ; \; d = 12 ; \; h = 14 ;$$

$t = 0,9 \times 12 = 11$ cm

$$A_f = \frac{44200}{1400 \times 11} = \boxed{2{,}85} \text{ cmq/ml di soletta} \rightarrow ~~3{,}29~~$$

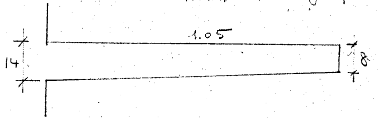
1φ10 e 1φ8 alternati/ogni 20 cm

$h = 14$ cm

?

TAGLIO: $T = 750 \times 1{,}05 + 25 = 105$ kg (1050) ~820

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



2) tipo luce m. 0,85

Analisi carichi (v. balcone tipo 1)

$q = 750$ kg/mq

$P = 25$ kg/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

$d = 0,493 \sqrt{\frac{30000}{140}} = \sim 9$ cm; Assumo $d = 12$; $h = 14$; $t = 11$ cm

$A_f = \frac{30000}{1400 \times 11} = 1,95$ cmq/ml 1φ8 ogni 20 cm

---

ARCHITRAVI SU MURI INTERNI

ARCH ⓐ luce reale m. 1,30 - luce teorica m. 1,50

PIANO GENERICO Analisi carichi

p.p.	$0,50 \times 0,30 \times 2500 =$	375	kg/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	kg/ml

$\sigma_c = 45$ kg/cmq $\sigma_f = 1400$ kg/cmq

$M = \frac{1}{12} p l^2 = \frac{1}{12} 3285 \cdot \overline{1,50}^2 = 615$ 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 $h = 20$; $d = 18$; $t = 0,919 \cdot 18 = 16,5$ cm

$A_f = \frac{61500}{1400 \times 16,5} = 2,67$ cmq (2φ10 diritti e 1φ8 sagomato)

PIANO ULTIMO Analisi carichi:

p.p.		375
pav.+int.		35
sovracc. trave		125
solaio	$\frac{5,00+4,10}{2} \times 700$	3180
		3715 kg/ml

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

$d = 0,446 \sqrt{\frac{70000}{43}} = 12$ Disponibile $h = 35$ cm; $d = 33$ cm; $t = 0,919 \cdot 33 = \sim 30$ 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; $\tau_{max} = \frac{2150}{43 \times 23} = 2,15$ kg/cmq

Staffe φ6 /ogni 30 cm.

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

PIANO GENERICO: Analisi carichi (come arch. ⓐ 3285 kg/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; $t = 0,919 \cdot 28 = 25,6$

$A_f = \frac{171000}{1400 \times 25,6} = 4,76$ cmq (3φ10+1φ12 diritti, 1φ12 sagomato)

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

$M = \frac{1}{12} 3715 \cdot \overline{2,50}^2 = 1950$ kgm - Assumo $h = 35$ cm; $d = 33$; $t = 0,919 \cdot 33 = 30$

$A_f = \frac{195000}{1400 \times 30} = 4,65$ cmq (3φ10 + 1φ12 diritti, 1φ12 sagomato)

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

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)

AREA ⓔ 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
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

$\frac{82000}{1400 \times 25{,}6} = 2{,}28$ cmq (2φ10 diritti 2φ8 sagomati)

PIANO ULTIMO : Analisi carichi 575 kg/ml
solaio $\frac{4.20}{2} \times 700 = \sim 1475$ "
$p = 2050$ 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 sagomati)

TAGLIO: $T = 2050 \times \frac{2.30}{2} = 2360$ kg ; $\tau = \frac{2360}{43 \times 30} = \sim 1{,}9$ 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 ⓖ luce reale m. 2,10 luce teorica m. 2,20

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

$$M = \frac{1}{12} 3285 \cdot \overline{2{,}20}^2 = 1320 \text{ kgm}$$

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

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

$$A_f = \frac{133000}{1400 \times 26{,}5} = 3{,}70 \text{ cmq}$$ (4φ10 diritti 2φ10 sagomati)

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

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

$$A_f = \frac{150000}{1400 \times 30} = 3{,}57 \text{ cmq}$$ (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 30 cm

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

PIANO GENERICO

Analisi dei carichi: (v. arch. ⓔ)	575	kg/ml
solaio: $\frac{5{,}00+4{,}30}{2} \times 605 = \sim$	2815	"
p =	3390	kg/ml

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

$$A_f = \frac{72000}{1400 \times 16{,}5} = 3{,}12 \text{ cmq}$$ (2φ10 diritti + 1φ10 sagomato)

PIANO ULTIMO

Analisi carichi (v. arch. ⓔ)	575	kg/ml
solaio $\frac{5{,}00+4{,}30}{2} \times 700 =$	3255	"
p =	3830	kg/ml

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

$$A_f = \frac{81500}{1400 \times 30} = 1{,}95 \text{ cm}$$ (2φ10 diritti + 1φ8 sagomato)

Staffe φ6/ogni 30 cm.

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

PIANO GENERICO: Analisi carichi

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

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

$$d = \begin{cases} 0{,}446 \sqrt{\dfrac{26200}{43}} = \sim 11{,}0 \\ 0{,}446 \sqrt{\dfrac{26200}{50}} = \sim 10{,}5 \\ 0{,}446 \sqrt{\dfrac{26200}{60}} = \sim 9{,}0 \end{cases}$$ Assumo h=20 d=18 t=16,5 cm

$$A_f = \frac{26200}{1400 \times 16{,}5} = 1{,}17 \text{ cmq}$$ (2φ10 diritti)

PIANO ULTIMO: h = altezza cordolo
A_f = 2φ10 diritti
Staffe φ6/ogni 30 cm.

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

Analisi carichi:

pp	375	kg/ml
pavim. e int.	35	"
sovracc. tot.	125	"
muratura 0,60 × 1,00 × 1600 ~	1000	"
	1535	kg/ml
pianerottolo 710 × $\frac{2{,}50}{2}$ ~	900	
p	2435	kg/ml

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

$$A_f = \frac{29400}{1400 \times 16{,}5} = 1{,}32 \text{ cmq}$$ (2φ10 diritti)

TAGLIO: $T = 2435 \cdot \frac{1{,}10}{2} = 1340$ kg $\tau_{max} = \frac{1340}{43 \times 16{,}5} = 1{,}9$ kg/cmq
Staffe φ6/ogni 30 cm.

ARCHITRAVI SU MURI ESTERNI

ARCH. ⓜ FINESTRE ESTERNE luce reale 1.30 (tra spalle) l. teorica m. 1,40

PIANO GENERICO: Analisi carichi

p.p. $0{,}50 \times 0{,}35 \times 2500 = \sim 450$ kg/ml

muratura $0{,}25 \times 1{,}00 \times 1.600 = 400$ "

solaio $\frac{5{,}00}{2} \times 605$ 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 $h = 20$ $d = 18$ $t = 16{,}5$

$A_f = \frac{37600}{1400 \times 16{,}5} = 1{,}45$ cmq ($2\phi10$ diritti)

PIANO ULTIMO: $h = 35$ cm $A_f = 2\phi10$

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

Analisi carichi p.p. 450 kg/ml

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

$p = 2570$

gradini: $\frac{2{,}45 \times 110}{30} \times 100 = 900$

$p = 3470$ 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 $h = 25$ $t = 0{,}91 \times 23 = 21$ cm

$A_f = \frac{74000}{1400 \times 21} = 2{,}50$ cmq ($2\phi10$ diritti $+ 2\phi8$ sagomati)

TAGLIO $T = 2570 \cdot \frac{1{,}70}{2} = 2200$ kg $\tau_{bx} = \frac{2200}{43 \times 21} = 2{,}50$ 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 ($2\phi10 + 1\phi12$ diritti $+ 2\phi8$ sagomati)

TAGLIO: $T = 3470 \frac{1{,}70}{2} = \sim 3000$ kg $\tau_{bx} = \frac{3000}{43 \times 21} = 3{,}25$ kg/cmq

Staffe $\phi6$ ogni 30cm

- ARCH. PORTONCINI DI INGRESSO:
  come quelli delle finestre soprastanti