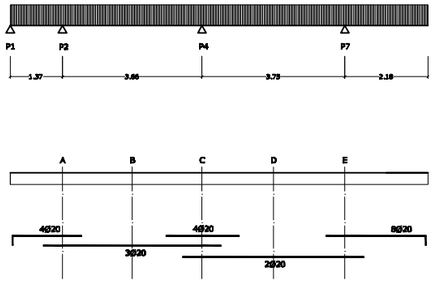
STUDIO DELLA TRAVE



STATO LIMITE ESERCIZIO

Sezione A

Mf = 1034.14 kgm

Af min = 0.5 Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 680.84 mm2
Af = 6.94 cm2 = 3 Ø 16

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 6.87 cm

sf = Mf / (Af x (h - x / 3)) = 104.18 kg/cm2 < 3600
sc = 2Mf / (b x hx (h - x / 3)) = 138.7 kg/cm2 < 140

Sezione B

Mf = 825.2 kgm

Af min = 0.5 Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 553.68 mm2
Af = 8.04 cm2 = 3 Ø 16

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 6.32 cm

sf = Mf / (Af x (h - x / 3)) = 103.88 kg/cm2 < 3600
sc = 2Mf / (b x hx (h - x / 3)) = 138.18 kg/cm2 < 140

Sezione C

Mf = 1013.1 kgm

Af min = 0.5 Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 679.78 mm2
Af = 6.79 cm2 = 3Ø20

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 6.81 cm

sf = Mf / (Af x (h - x / 3)) = 103.48 kg/cm2 < 3600
sc = 2Mf / (b x hx (h - x / 3)) = 142.97 kg/cm2 < 140

Sezione D

Mf = 1013.1 kgm

Af min = 0.5 Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 679.78 mm2
Af = 6.79 cm2 = 3Ø20

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 6.81 cm

sf = Mf / (Af x (h - x / 3)) = 103.48 kg/cm2 < 3600
sc = 2Mf / (b x hx (h - x / 3)) = 142.97 kg/cm2 < 140

Sezione E

Mf = 1013.1 kgm

Af min = 0.5 Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 679.78 mm2
Af = 6.79 cm2 = 3Ø20

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 6.81 cm

sf = Mf / (Af x (h - x / 3)) = 103.48 kg/cm2 < 3600
sc = 2Mf / (b x hx (h - x / 3)) = 142.97 kg/cm2 < 140

STATO LIMITE ULTIMO

Med = 1328 kgm

Afmin = 0.5Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 1023.33 mm2
Af = 10.23 cm2 = 4 Ø 20

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 8.21 cm

fc = 0.8 x fcd x bc= 82788.48 kgcm
fs = fyd x Af = 36984.29 kgcm

Med = fc x z = (0.8 x fcd x bc) x z= 11748.9 kgcm z= 21.57

Med>Med

Med = 1288 kgm

Afmin = 0.5Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 992.66 mm2
Af = 8.42 cm2 = 3 Ø 20

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 7.37 cm

fc = 0.8 x fcd x bc= 81368.88 kgcm
fs = fyd x Af = 32788.07 kgcm

Med = fc x z = (0.8 x fcd x bc) x z= 10828.87 kgcm z= 21.57

Med>Med

Med = 1472 kgm

Afmin = 0.5Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 907.85 mm2
Af = 8.38 cm2 = 4 Ø 20

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 8.1 cm

fc = 0.8 x fcd x bc= 84949.02 kgcm
fs = fyd x Af = 38488.14 kgcm

Med = fc x z = (0.8 x fcd x bc) x z= 11764.9 kgcm z= 21.57

Med>Med

Med = 735.3 kgm

Afmin = 0.5Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 488.84 mm2
Af = 4.98 cm2 = 2 Ø 20

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 5.09 cm

fc = 0.8 x fcd x bc= 40287.44 kgcm
fs = fyd x Af = 18062.59 kgcm

Med = fc x z = (0.8 x fcd x bc) x z= 10888.89 kgcm z= 21.57

Med>Med

Med = 3086 kgm

Afmin = 0.5Mf x 10xd / (0.90 x 230 x (450 x 0.8))= 2418.48 mm2
Af = 24.18 cm2 = 8 Ø 20

x = (m x Af / b) x (-1 + √ (1 + (2 x b x h) / (m x Af))) = 11.89 cm

fc = 0.8 x fcd x bc= 78330.17 kgcm
fs = fyd x Af = 84238.93 kgcm

Med = fc x z = (0.8 x fcd x bc) x z= 16403.38 kgcm z= 21.57

Med>Med

STATO LIMITE ESERCIZIO

Diagramma di taglio

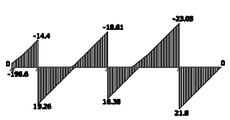
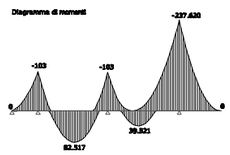


Diagramma di momenti



STATO LIMITE ULTIMO

Diagramma di taglio

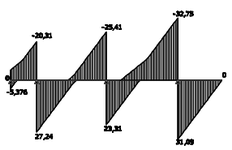
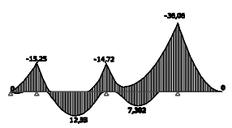
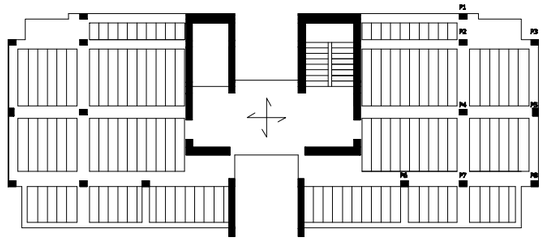
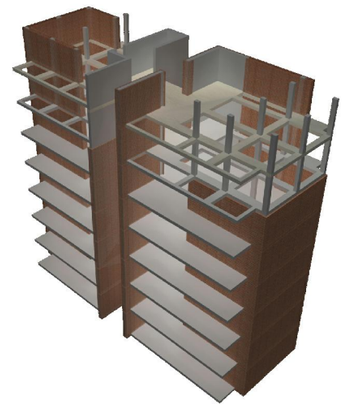


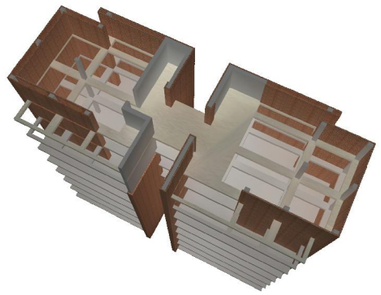
Diagramma di momenti

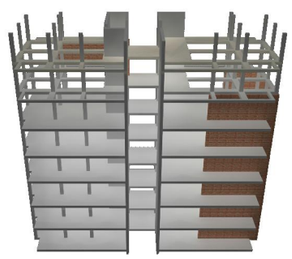


PIANTA STRUTTURALE





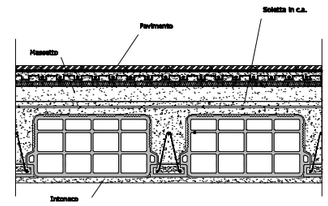




ANALISI DEI CARICHI-SOLAIO TIPO

Carichi accidentali Q	
Residenza	*2.00 kN/m2*
Copertura	*1.50 kN/m2*
Carichi Permanenti G	
Pavimento	0.81 kN/m2
Sottofondo	0.42 kN/m2
Tramezzi	1.50 kN/m2
Intonaco	0.18 kN/m2
Solaio	5.00 kN/m2
TOTALE	***7.91 kN/m2***

DETTAGLIO SOLAIO



STUDIO DEL PILASTRO

A = ((3.66 + 3.75) / 2) x ((5.53 + 3.79) / 2)) = 17.27 m2
P. T: 10 x 17.27 = 172.7 KN
P. C: 9.5 x 17.27 = 164.05 KN
Ned = 172.7 + (2 x 164.05) = 509.45 kN
Ac,nec = Ned / 0.45 fcd = (509.45 a5 / 0.45 x 16.6) = 681.99 cm2
Sezione Pilastro = 40 x 25
As = 0.006 x (40 x 25)= 4.09 cm2 **4Ø12**
Ast = Ø6 c/14cm

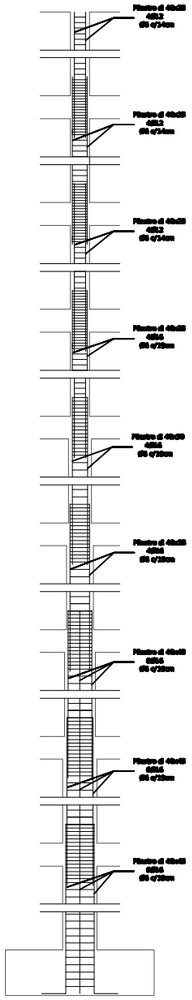
A = ((3.66 + 3.75) / 2) x ((5.53 + 3.79) / 2)) = 17.27 m2
P. T: 10 x 17.27 = 172.7 KN
P. C: 9.5 x 17.27 = 164.05 KN
Ned = 172.7 + (3 x 164.05) = 682.15 kN
Ac,nec = Ned / 0.45 fcd = (682.15 a5 / 0.45 x 16.6) = 913.19 cm2
Sezione Pilastro = 40 x 25
As = 0.006 x (40 x 25)= 5.48 cm2 **4Ø16**
Ast = Ø6 c/19cm

A = ((3.66 + 3.75) / 2) x ((5.53 + 3.79) / 2)) = 17.27 m2
P. T: 10 x 17.27 = 172.7 KN
P. C: 9.5 x 17.27 = 164.05 KN
Ned = 172.7 + (4 x 164.05) = 854.85 kN
Ac,nec = Ned / 0.45 fcd = (854.85 a5 / 0.45 x 16.6) = 1144.38 cm2
Sezione Pilastro = 40 x 30
As = 0.006 x (40 x 30)= 6.87 cm2 **4Ø16**
Ast = Ø6 c/19cm

A = ((3.66 + 3.75) / 2) x ((5.53 + 3.79) / 2)) = 17.27 m2
P. T: 10 x 17.27 = 172.7 KN
P. C: 9.5 x 17.27 = 164.05 KN
Ned = 172.7 + (5 x 164.05) = 1027.55 kN
Ac,nec = Ned / 0.45 fcd = (1027.55 a5 / 0.45 x 16.6) = 1375.57 cm2
Sezione Pilastro = 40 x 35
As = 0.006 x (40 x 35)= 8.25 cm2 **4Ø16**
Ast = Ø6 c/19cm

A = ((3.66 + 3.75) / 2) x ((5.53 + 3.79) / 2)) = 17.27 m2
P. T: 10 x 17.27 = 172.7 KN
P. C: 9.5 x 17.27 = 164.05 KN
Ned = 172.7 + (6 x 164.05) = 1200.25 kN
Ac,nec = Ned / 0.45 fcd = (1200.25 a5 / 0.45 x 16.6) = 1606.76 cm2
Sezione Pilastro = 40 x 40
As = 0.006 x (40 x 40)= 9.64 cm2 **6Ø16**
Ast = Ø6 c/19cm

A = ((3.66 + 3.75) / 2) x ((5.53 + 3.79) / 2)) = 17.27 m2
P. T: 10 x 17.27 = 172.7 KN
P. C: 9.5 x 17.27 = 164.05 KN
Ned = 172.7 + (7 x 164.05) = 1372.97 kN
Ac,nec = Ned / 0.45 fcd = (1096 a5 / 0.45 x 16.6) = 1837.97 cm2
Sezione Pilastro = 40 x 45
As = 0.006 x (40 x 45)= 11.02 cm2 **6Ø16**
Ast = Ø6 c/19cm



POLITECNICO DI MILANO - Facoltà di Architettura Civile - Corso di Laurea Specialistica in Architettura delle Costruzioni
Laboratorio di Progettazione e Costruzione dell'Architettura - Anno Accademico 2009 - 2010
Docenti: R. Nart, S. Biffi, E. Garavaglia, S. Croce, S. La Mura

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LA CITTÀ NEL VERDE: PROGETTO PER BRESCIA
residenza con edificio indifferenziato: piante e schemi strutturali
scala 1:100