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U.N.R.R.A. - C.A.S.A.S.

LEGGE 173 - QUARTIERE COORDINATO DI BRINDISI

"RIONE PARADISO"

FONDAZIONI TIPO IN LINEA LUNGO

RELAZIONE INTEGRATIVA ALLA RELAZIONE GENERALE DI CALCOLO

Brindisi, li'

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VISTO: si approva

L'INGEGNERE CAPO
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"RIONE PARADISO"

RELAZIONE INTEGRATIVA ALLA RELAZIONE GENERALE DI CALCOLO

Su richiesta della Direzione Lavori e' stato proceduto al ridimensionamento delle strutture in fondazione mediante una riduzione delle sezioni di calcestruzzo delle travi stesse.

La presente relazione riproduce i calcoli relativi al nuovo dimensionamento delle strutture in fondazione gia' assunto e riportato negli esecutivi allegati ed e' sostitutiva, nella relazione generale, della parte di calcolo che si riferisce alle fondazioni.

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Pilastrata 48-61/1-14

l = 1,00 mt. EJ = cost

$$P = 371.200$$

Peso fondazioni al ml.

magro	0,05x1,00x1,00x2,000	=	100 Kg/ml.
ala	0,20x1,00x1,00x2,500	=	500 "
costola	0,55x0,60x1,00x2,500	=	825 "
			1.425 Kg/ml.

Terra sovrastante	0,45x1,00x1.800	=	810 "
			2.235 Kg/ml.

$$\sigma_f = \frac{371.200 + 2.235 \cdot 38,00}{100 \times 3.800} = 1,2 \text{ Kg/cm}^2$$

$$P = \frac{371.200}{38,00} = 9.770 \text{ Kg/ml.}$$

$$M_{48} = M_{49} = M_{53} = M_{54} = M_{55} = M_{56} = M_{60} = M_{61} = \frac{1}{12} \cdot 9770 \cdot 3,40^2 = 9412 \text{ Kg.m.}$$

$$M_{48-49} = M_{49-50} = M_{52-53} = M_{53-54} = M_{54-55} = M_{55-56} = M_{56-57} = M_{59-60} = M_{60-61} =$$

$$\frac{1}{14,5} \cdot 9770 \cdot 3,40^2 = 7.790 \text{ Kg.m.}$$

$$M_{50} = M_{57} = \frac{1}{12} \cdot \frac{(3,40 + 2,00)^2}{2} \times 9770 = 5.935 \text{ Kg.m.}$$

$$M_{50-51} = M_{57-58} = \frac{1}{14,5} \cdot 2,00^2 \cdot 9.770 = 2695 \text{ Kg.m.}$$

$$M_{51} = M_{58} = \frac{1}{12} \cdot \frac{(1,70+2,00)^2}{2} \cdot 9770 = 2787 \text{ Kg.m.}$$

$$M_{51-52} = M_{58-59} = \frac{1}{14,5} \times 1,70^2 \times 9770 = 1948 \text{ Kg.m.}$$

$$M_{52} = M_{59} = \frac{1}{12} \cdot \frac{(1,70+2,40)^2}{2} \times 9770 = 5295 \text{ Kg.m.}$$

Si calcolano le armature per:

$$H = 80 \text{ cm.} \quad h = 75 \text{ cm.} \quad b = 55 \text{ cm.} \quad n = 10$$

$$\sigma_f = 1400 \text{ Kg/cm}^2.$$

$$M = 9412 \text{ Kg.m.} \quad \sigma_c = 34 \text{ Kg/cm}^2. \quad A_f = 9,64 \text{ cm}^2.$$

$$M = 5935 \text{ Kg.m.} \quad \sigma_c = 26 \quad " \quad A_f = 6,1 \quad "$$

$$M = 7790 \text{ Kg.m.} \quad \sigma_c = 23 \quad " \quad A_f = 8,0 \quad "$$

- Taglio -

$$T = 9770 \cdot \frac{3,40}{2} = \text{Kg. } 16609$$

$$\tau_{max} = \frac{16609}{0,9 \cdot 55 \cdot 75} = 4,47 \text{ Kg/cm}^2. \quad \text{staffe } \emptyset 8/20"$$

$$\tau_{os} = \frac{1,01 \times 1400}{55 \times 20} = 1,28 \text{ Kg/cm}^2$$

$$\tau_v = 4,47 - 1,28 = 3,19 \text{ Kg/cm}^2 \quad 4 \text{ Kg./cm}^2.$$

A l a

$$M = \frac{1}{2} \cdot 9770 \times 0,225^2 = 247 \text{ Kg.m.} \quad \emptyset 8/20 \text{ cm.}$$

P i l a s t r a t a 36-23

$$l = 1,40$$

$$P = 261.057 \text{ Kg.}$$

Peso fondazione al ml.

magro	0,05x1,40x1,00x2000	=	140 Kg/ml.
costola	0,40x0,50x1,00x2500	=	500 "
alà	1,40x0,30x1,00x2500	=	1.050 "
			1.700 Kg/ml.
terra sovrastante	1,00x0,50x1,00x1800	=	900 "
			2.600 Kg/ml.

$$\sigma_t = \frac{261.057 + 2.600 \times 18,40}{1.840 \times 140} = 1,2 \text{ Kg/cm}^2.$$

$$P_c = \frac{261.057}{18,4} = 14.200 \text{ Kg./ml.}$$

$$M_1 = \frac{1}{12} \times 1,7^2 \times 14.200 = 3.400 \text{ Kg.m.}$$

$$M_m = \frac{1}{14,5} \times 1,7^2 \times 14.200 = 2.800 "$$

$$H = 80 \text{ cm.}$$

$$h = 75 \text{ cm.}$$

$$b = 40 \text{ cm.} \quad n = 10$$

$$\sigma_f = 1.400 \text{ Kg./cm}^2.$$

$$M = 3400 \text{ Kg.m.} \quad \sigma_c < 25 \text{ kg./cmq.} \quad A_f = 3,73$$

$$M = 2800 \quad " \quad \sigma_c 9,70 \quad " \quad A_f = 3,50$$

$$T = \frac{1}{2} \times 1,7 \times 14.200 = 12.100 \text{ Kg.}$$

$$\tau_{max} = \frac{12.100}{0,9 \times 75 \times 40} = 4,48 \text{ Kg/cmq.}$$

$$\tau_s = \frac{1,01 \times 1.400}{40 \times 20} = 1,78 \quad "$$

$$\tau_r = 2,70 \text{ Kg/cmq.} < 4 \text{ kg./cmq}$$

A l a

$$M = \frac{1}{2} 14.200 \times 0,50^2 = 1.775 \text{ Kg.m.}$$

$$H = 30 \text{ cm.} \quad h = 25 \text{ cm.} \quad b = 100 \text{ cm.} \quad n = 10$$

$$\sigma_f = 1.400 \text{ Kg/cmq.} \quad \sigma_c = 33 \text{ Kg/cmq.} \quad A_f = 5,53 \text{ cmq.}$$

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P i l a s t r a t a 47-40/19-15

$$l = 1,45$$

$$P = 100.734 \text{ Kg.}$$

magro	0,05x1,45x1,00x2000	=	145 Kg/ml.
costola			500 "
ala	1,45x0,30x1,00x2500	=	1088 "
			1733 Kg/ml.
terra sovrastante	0,50x1,05x1,00x1800		945 "
			2678 Kg/ml.

$$\sigma_t = \frac{100.734 + 2678 \times 6,80}{680 \times 145} = 1,2 \text{ Kg/cm}^2.$$

$$P_c = \frac{100.734}{6,80} = 14.814 \text{ Kg/ml.}$$

$$M_f = \frac{1}{12} \times 1,7^2 \times 14.814 = 3570 \text{ Kg.m.}$$

$$M_m = \frac{1}{14,5} \times 1,7^2 \times 14.814 = 2955 \text{ Kg.m.}$$

per H=80 cm. h= 75 cm. b=40 cm. n=10

$$\sigma_f = 1.400 \text{ Kg/cm}^2.$$

$$M_F = 3570 \text{ Kg.m.} \quad \sigma_c = 23 \text{ Kg/cm}^2 \quad A_f = 3,67 \text{ cm}^2$$

$$M_m = 2955 \text{ Kg.m.} \quad \sigma_c = 10,40 \text{ Kg/cm}^2 \quad A_f = 3,00 \text{ cm}^2$$

$$T = \frac{1}{2} \times 14.814 \times 1,7 = 12592$$

$$\tau_{max} = \frac{12592}{0,9 \times 40 \times 75} = 4,66 \text{ Kg/cm}^2 \approx 4$$

$$\phi 8/20''$$

$$\tau_s = 1,41 \text{ Kg/cm}^2$$

$$\tau_r = 3,25 \text{ Kg./cm}^2$$

A 1 a

$$M = \frac{1}{2} \times 14.814 \times 0,525^2 = 2042 \text{ Kg.m.}$$

$$H = 30 \text{ cm.} \quad h = 25 \text{ cm.} \quad b = 100 \text{ cm.} \quad n = 10$$

$$\sigma_f = 1.400 \text{ Kg/cm}^2 \quad \sigma_c = 35 \text{ Kg/cm}^2 \quad A_f = 6,24 \text{ cm}^2$$

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P i l a s t r a t a 1-48/14-61

l= 50 cm.

P= 34.000 Kg.

magro	0,050x0,50x1,00x2000	=	50 Kg/ml
ala	0,50 x0,20x1,00x2500	=	250 "
costola	0,60x0,30x1,00x2500	=	450 "
			750 Kg/ml.
Terra sovrastante : 0,20x0,60x1,00x1800=			216 "
			970 Kg/ml.

$$\sigma_t = \frac{34.000 \times 970 \times 10,15}{1015 \times 50} < 1,00 \text{ Kg/cm}^2.$$

$$P_c = \frac{34.000}{10,15} = 3.400 \text{ Kg/ml.}$$

$$M_{i_{max}} = \frac{1}{10} 3400 \times 4,5^2 = 6885 \text{ Kg.m.}$$

$$M_{ii} = \frac{1}{14} 3400 \times 4,5^2 = 4920 "$$

H= 80 cm. h= 75 cm. b= 30 cm. n= 10

$\sigma_f = 1400 \text{ Kg/cm}^2.$

$$M = 6858 \text{ Kg.m.} \quad \sigma_c = 40 \text{ Kg/cm}^2. \quad A_f = 7,1 \text{ cm}^2.$$

$$M = 4920 " \quad \sigma_s = 25 " \quad A_f = 5 "$$

$$T = \frac{1}{2} 3400 \times 450 = 7650$$

$$\tau_{max} = \frac{7650}{0,9 \times 75 \times 30} = 3,78 \text{ Kg/cm}^2.$$

1 ϕ 8/25"

Ala

Azioni flettenti trascurabili 1 ϕ 8/25"

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P I L A S T R A T A 7-54

$$l = 0,70$$

$$P = 52.000 \text{ Kg.}$$

magro 0,05x0,80x1,00x2000	= 80 Kg/ml.
ala 0,80x0,20x1,00x2500	= 400 "
costola 0,35x0,60x 1,00x2500	= 525 "
	= 1005 Kg./ml.
Terra sovrastante 0,45x0,60x1800	486 "
	1490 Kg/ml.

$$\sigma_t = \frac{52.000 + 1490 \times 9,75}{9,75 \times 80} = 0,85 \text{ Kg/cm}^2.$$

$$P_c = \frac{52.000}{9,75} = 5350 \text{ Kg/ml.}$$

$$M_1 = \frac{1}{10} 5350 \times 4,5^2 = 10.855 \text{ Kg.m.}$$

$$M_m = \frac{1}{14} 5350 \times 4,5^2 = 7740 \text{ Kg.m.}$$

$$H = 80 \text{ cm.} \quad h = 75 \text{ cm.} \quad b = 35 \text{ cm.} \quad n = 10$$

$$\sigma_f = 1400 \text{ Kg/cm}^2.$$

$$M_1 = 10835 \text{ Kg.m.} \quad \sigma_c = 48 \text{ Kg/cm}^2. \quad A_f = 11,40 \text{ cm}^2.$$

$$M_m = 7740 \text{ " } \quad \sigma_c = 25 \text{ " } \quad A_f = 8,00 \text{ "}$$

$$T = \frac{1}{2} 5350 \times 4,5 = 12.038 \text{ Kg.}$$

$$\gamma_{max} = \frac{12038}{0,9 \times 75 \times 35} = 5,10 \text{ Kg/cm}^2.$$

staffe ϕ 8/20" a 2 braccia

$$\gamma_s = \frac{1,01 \times 1400}{35 \times 15} = 2,69 \text{ cm}^2.$$

$$\gamma_v = 5,10 - 2,69 = 2,41 \text{ Kg/cm}^2 \quad 4 \text{ Kg/cm}^2.$$

A l a

$$M = \frac{1}{2} 5350 \times 0,225 = 135 \text{ Kg.m.} \quad \phi \text{ 8/20"}$$

P i l a s t r a t a 39-41/20-26

$$l=100$$

$$P = 35.200$$

magro	0,05x1,00x1,00x2000	=	100 Kg/ml.
ala	0,20x1,00x1,00x2500	=	500 "
costola	0,30x0,60x1,00x2500	=	450 "
			1050 Kg/ml.
Terra	0,70x1,00x0,60x1800	=	756 "
			1806 Kg/ml.

$$\sigma_t = \frac{35.200 \times 1810 \times 3,65}{100} = 1,15 \text{ Kg/cm}^2.$$

$$P_c'' = \frac{35.200}{3,65} = 9645 \text{ Kg/ml.}$$

$$M_1 = \frac{1}{12} 9645 \times 2,25^2 = 4.070 \text{ Kg.m.}$$

$$M_m = \frac{1}{14} 9645 \times 2,25^2 = 3.490 \text{ Kg.m.}$$

$$H = 80 \text{ cm.} \quad h = 75 \text{ cm.} \quad b = 30 \text{ cm.} \quad n = 10$$

$$\begin{array}{lll} \sigma_f = 1400 \text{ Kg/cm}^2. & \sigma_c = 30 \text{ Kg./cm}^2 & A_f = 4,22 \text{ cm}^2 \\ \sigma_f = 1400 \text{ "} & \sigma_c = 14 \text{ " "} & A_f = 3,50 \text{ "} \end{array}$$

$$T = \frac{1}{2} \times 2,25 \times 4070 = 4580 \text{ Kg.}$$

$$\gamma_{max} = \frac{4850}{0,9 \times 30 \times 75} = \frac{4850}{2025} = 2,26 \text{ Kg/cm}^2.$$

$$\text{taglio ed ala} \quad \phi \ 8/25 \text{ cm.}$$

P i l a s t r a t a 5-37/24-57

$$l = 0,80$$

$$P = 55.000 \text{ Kg.}$$

magro	0,05x0,80x1,00x2000	= 80 Kg/ml.
ala	0,20x0,80x1,00x2500	= 400 "
costola	0,30x0,60x1,00x2500	= 450 "
		930 Kg/ml.
Terra sovrastante	0,50x0,60x1,00x1800	= 540 "
		1470 Kg/ml.

$$\sigma_t = \frac{55.000 + 1470 \times 8,00}{80 \times 80} \approx 1 \text{ kg./cmq.}$$

$$P_c = \frac{55.000}{8,00} = 6875 \text{ kg/ml.}$$

$$M_1 = M_m = \frac{1}{12} 6875 \times 2,25^2 = 2900 \text{ Kg.m.}$$

$$H = 80 \text{ cm.} \quad h = 75 \text{ cm.} \quad b = 30 \text{ cm.} \quad n = 10$$

$$\sigma_f = 1400 \text{ Kg/cmq} \quad \sigma_c < 25 \text{ Kg/cmq} \quad A_f = 2,98 \text{ cmq.}$$

$$T = \frac{1}{2} 6875 \times 2,25 = 7734 \text{ Kg.}$$

$$\tau = \frac{7734}{0,9 \times 75 \times 30} = \frac{7734}{2025} = 3,81 \text{ Kg/cmq.} < 4 \text{ Kg./cmq.}$$

Staffe ϕ 8/25"

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P i l a s t r a t a 11-25/51-38

$$P = 10.300 \text{ Kg.}$$

Peso d fondazione al ml.

magro	0,05x0,50x1,00x2000	= 50 Kg/ml.
ala	0,20x0,50x1,00x2500	= 250 "
costola	0,60x0,30x1,00x2500	= 450 "
		750 Kg/ml.

$$\begin{array}{rcl} \text{terra sovrastante } 0,20 \times 0,60 \times 1,00 \times 1800 & = & 216 \text{ Kg/ml.} \\ & & \hline & & 966 \text{ Kg/ml.} \end{array}$$

$$\sigma_t = \frac{10300 + 966 \times 3,00}{50 \times 300} = \frac{13198}{15000} < 1 \text{ Kg/cm}^2.$$

$$P_c = \frac{10300}{3} = 3.433 \text{ Kg/ml.}$$

$$M_1 = M_m = \frac{1}{12} 3433 \times 3^2 = 2575 \text{ Kg.m.}$$

$$H = 80 \quad h = 75 \text{ cm.} \quad b = 30 \quad n = 10$$

$$\sigma_f = 1400 \text{ Kg/cm}^2. \quad \sigma_c = 25 \text{ Kg/cm}^2. \quad A_f = 2,82 \text{ cm}^2.$$

$$T = \frac{1}{2} 10300 = 5.150 \text{ Kg.}$$

$$\tau_{max} = \frac{5.150}{0,9 \times 30 \times 75} = \frac{5150}{2025} = 2,54 < 4 \text{ Kg./cm}^2.$$

A l a

$$M = \frac{1}{2} 3433 \times 0,10^2 = 17 \text{ Kg.m.}$$

Ø 8/25"

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P i l a s t r a t a 20-22/26-24/39-37/41-43

$$P = 37500 \text{ Kg.}$$

Peso fondazioni al ml.

magro	0,05x0,90x1,00x2000	=	90 Kg/ml.
ala	0,20x0,90x1,00x2500	=	450 "
costola	0,60x0,30x1,00x2500	=	450 "
			990 Kg/ml.
terra sovrastante	0,60x0,60x1,00x1800		648 "
			1630 Kg/ml.

$$\sigma_t = \frac{37500 + 1630 \times 4}{90 \times 400} = \frac{44.020}{36.000} = 1,22$$

$$P_c = \frac{37500}{4} = 9375$$

$$M_i = M_m = \frac{1}{12} 9400 \times 1,7^2 = 2263 \text{ Kg.m.}$$

$$H = 80 \quad h = 75 \quad b = 30 \quad n = 10$$

$$\sigma_t = 1400 \text{ Kg/cm}^2. \quad \sigma_c = 25 \text{ Kg/cm}^2. \quad A_f = 2,67$$

$$r = \frac{75}{\frac{230000}{30}} = \frac{75}{7666} = \frac{75}{88} = 0,852$$

$$\sigma_c < 25 \text{ Kg/cm}^2. \rightarrow t = 0,00101$$

$$A_f = 0,00101 \times 30 \times 88 = 2,67 \text{ cm}^2.$$

$$T = \frac{1}{2} 9375 \times 1,7 = 8000 \text{ Kg.}$$

$$\tau_{max} = \frac{8000}{0,9 \times 30 \times 75} = 3,95 < 4 \text{ Kg/cm}^2.$$

A l a

$$M = \frac{1}{2} 9375 \times 0,30^2 = 420 \text{ Kg/m}^2.$$

$$r = \frac{16}{\frac{42000}{100}} = \frac{16}{420} = 0,761 \quad \sigma_c < 25 \text{ Kg/cm}^2.$$

$$A_f = 0,00101 \times 100 \times 21 = 2,12 \text{ cm}^2.$$

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