

Obra: TRF-4 VARAS VERTICAL PARTE 2 (TRF-2 VARAS VERTICAL PARTE 2)

Sistema de unidades: M.K.S (m.tf.s)

Materiais:

Concreto: C25, em geral

Aço: CA-50-A e CA-60-B

Aço Perfis:

Laminado e soldado: A-36 , 2548.42 kgf/cm²

Dobrado: A-36, 2548.42 kgf/cm²

Armadura de vigas
Obra: TRF-4 VARAS VERTICAL PARTE 2
Grupo no 1 Piso 1 --- Piso igual 1

V 1 --- Grupo: 1

Tramo nº 1 (*P10-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.023 cm.
(C/21466)

Arm.sup: ----- 1.2 1.3 0.0(0.17)
1.2(4.94)

Arm.inf: ----- 1.2 1.2 1.2 1.2 ----- 1.2(0.70) 1.2(2.20)

Moment.: -0.1 0.2 0.5 0.5 0.2 -0.3 -2.6 -0.1(0.11) 0.2(0.83) 0.5(2.20)
-2.6(5.00)

Cortant.: ----- 0.5 0.2 -0.2 -0.5 -0.8 ----- 0.6(x= 0.40)
-1.0(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
4.60) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+4.17=4.25) ----- 2Ø10(1.55>>), 1Ø10(1.00>>)

Arm.Inferior: 2Ø10(0.12D+5.37>>)

Estribos: 35x1Ø5c/0.14(4.80)

Tramo nº 2 (*P20-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.120 cm.
(C/4163)

Arm.sup: 1.3 1.2 ----- 0.2 2.4(0.34)
0.2(4.83)

Arm.inf: ----- 1.2 1.6 1.7 1.2 ----- 1.7(2.80)
1.2(4.30)

Moment.: -2.6 -1.5 1.0 2.3 2.3 1.1 -0.3 -3.6(0.29) 2.4(2.80)
1.1(4.17) -0.4(4.89)

Cortant.: ----- 3.8 2.3 0.8 -0.7 -2.2 ----- 4.6(x= 0.40)

-3.0(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.55+1.60=3.15), 1Ø10(<<1.00+1.35=2.35) -----
2Ø6.3(3.97+0.08D=4.05)

Arm.Inferior: 2Ø10(<<5.49+5.37+0.12D=10.98), 1Ø10(5.30)

Estribos: 35x1Ø5c/0.14(4.80)

V 2 --- Grupo: 1

Tramo nº 1 (*P10-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.132 cm.
(C/3802)

Arm.sup: ----- 0.1(0.17)
0.1(4.83)

Arm.inf: ----- 1.2 1.2 1.3 1.4 1.2 ----- 1.2(0.80) 1.5(3.22)
1.2(4.01)

Moment.: -0.1 0.5 1.3 1.9 2.0 0.7 -0.2 -0.2(0.11) 0.5(0.83) 2.1(3.22)
1.0(4.01) -0.2(4.89)

Cortant.: ----- 1.1 0.8 0.5 -1.3 -1.6 ----- 1.3(x= 0.40)
-1.8(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+5.74+0.08D=5.90) -----

Arm.Inferior: 2Ø12.5(0.15D+5.74+0.15D=6.04)

Estribos: 35x1Ø5c/0.14(4.80)

V 3 --- Grupo: 1

Tramo nº 1 (*V 1- *) (C= 1.88) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.126 cm.
(C/1491)

Arm.sup: 1.2 1.2 1.2 1.2 1.6 2.4 3.2 1.2(0.61)
2.8(1.76)

Arm.inf: ----- 0.0(0.06)

Moment.: 0.0 -0.2 -0.7 -1.4 -2.3 -3.3 -4.5 -0.0(0.10) 0.0(0.06) -0.3(0.48)
-4.5(1.88)

Cortant.: 0.0 -1.3 -1.9 -2.4 -3.0 -3.6 -4.0 0.0(x= 0.00)
-4.0(x= 1.88)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.10)
0.00(x= 1.88) Lim.: 0.54

Arm.Superior: 2Ø12.5(0.15D+1.85>>) ----- 1Ø10(1.50>>)

Arm.Inferior: 2Ø8(0.10D+2.15=2.25)

Estribos: 13x1Ø5c/0.14(1.75)

Tramo nº 2 (* -V 1*) (C= 4.70) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.200 cm.
(C/2352)

Arm.sup: 3.2 1.2 ----- 2.7(0.00)

Arm.inf: ----- 1.2 1.3 2.2 2.2 1.5 1.2 2.3(2.69)
1.4(4.03)

Moment.: -4.5 -0.5 1.8 3.1 3.1 2.1 0.0 -4.5(0.00) 3.2(2.69)
2.1(3.92) -0.0(4.70)

Cortant.: -4.0 3.6 2.2 0.8 -0.6 -2.0 -3.4 4.9(x= 0.00)
-4.0(x= 0.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 4.70) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<2.00+1.30=3.30), 1Ø10(<<1.50+0.95=2.45) -----
2Ø6.3(3.77+0.08D=3.85)

Arm.Inferior: 2Ø10(5.08+0.12D=5.20), 1Ø10(3.70)

Estribos: 33x1Ø5c/0.14(4.50)

V 4 --- Grupo: 1

Tramo nº 1 (*P11-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.224 cm.
(C/2237)

Arm.sup: 0.1 ----- 3.5 3.5 0.2(0.17)
7.1(4.60)

Arm.inf: ----- 1.2 1.8 2.7 3.6 ----- 1.2(0.92) 4.4(3.22)

Moment.: -0.2 0.9 2.5 3.8 5.0 -4.9 -6.8 -0.3(0.11) 1.1(0.92) 6.2(3.22)
-10.0(4.71)

Cortant.: ----- 2.1 1.7 1.4 -10.3 -10.6 ----- 2.2(x= 0.40)
-10.8(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
4.60) Lim.: 0.54

Arm.Superior: 2Ø8(0.10D+3.85=3.95) ----- 4Ø16(1.90>>)

Arm.Inferior: 2Ø12.5(0.15D+5.55=5.70), 1Ø16(3.35)

Estribos: 24x1Ø8c/0.15(3.46), 9x1Ø8c/0.14(1.26)

Tramo nº 2 (*P20-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.057 cm.
(C/8711)

Arm.sup: 3.5 1.2 ----- 0.1 3.2(0.06)
0.1(4.83)

Arm.inf: ----- 1.2 1.2 1.3 1.2 ----- 1.4(3.60)
1.2(4.03)

Moment.: -6.8 -0.9 0.2 1.1 1.8 0.9 -0.2 -6.8(0.00) 1.9(3.60)
1.1(4.03) -0.2(4.89)

Cortant.: ----- 1.6 1.2 0.9 0.6 -1.9 ----- 1.7(x= 0.40)
-2.1(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 4Ø16(<<1.90+1.95=3.85) ----- 2Ø6.3(3.67+0.08D=3.75)

Arm.Inferior: 2Ø10(5.58+0.12D=5.70)

Estribos: 34x1Ø5c/0.14(4.65)

V 5 --- Grupo: 1

Tramo nº 1 (*V 1- *) (C= 0.47) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.005 cm.
(C/9434)

Arm.sup: 1.2 1.2 1.2 1.2 1.2 1.5 1.9 1.2(0.15)
1.8(0.44)

Arm.inf: ----- 0.1(0.06)

Moment.: 0.0 0.1 -0.4 -1.0 -1.6 -2.1 -2.7 0.0(0.00) 0.1(0.06) 0.0(0.10)
-2.7(0.47)

Cortant.: 0.0 -5.7 -7.4 -7.4 -7.4 -7.4 -7.5 0.0(x= 0.00)
-7.5(x= 0.47)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.10)
0.00(x= 0.47) Lim.: 0.54

Arm.Superior: 2Ø16(0.19D+0.44>>) -----

Arm.Inferior: 2Ø10(0.15D+0.44>>)

Estribos: 3x1Ø6.3c/0.14(0.34)

Tramo nº 2 (* - *) (C= 1.78) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.073 cm.
(C/-2436)

Arm.sup: 1.9 2.2 2.6 3.1 3.8 4.5 5.4 2.5(0.51)
5.0(1.66)

Arm.inf: -----

Moment.: -2.7 -3.1 -3.7 -4.4 -5.3 -6.3 -7.5 -2.7(x= 0.00) -2.0(x= 0.38)
-7.5(x= 1.78)

Cortant.: -7.5 -1.6 -2.2 -2.7 -3.2 -3.7 -4.1 -0.7(x= 0.00)
-7.5(x= 0.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 1.78) Lim.: 0.54

Arm.Superior: 2Ø16(<<1.78>>) ----- 2Ø10(0.95>>)

Arm.Inferior: 2Ø10(<<0.59+2.11=2.70)

Estribos: 12x1Ø5c/0.14(1.58)

Tramo nº 3 (* -V 1*) (C= 4.70) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.493 cm.
(C/953)

Arm.sup: 5.4 1.2 ----- 4.6(0.00)

Arm.inf: ----- 1.2 2.5 4.0 4.0 2.4 ----- 4.2(2.83)
2.7(3.84)

Moment.: -7.5 -0.5 3.5 5.6 5.6 3.4 -0.0 -7.5(0.00) 5.8(2.83)
3.8(3.84) -0.0(4.70)

Cortant.: -4.1 6.3 3.8 1.3 -1.2 -4.2 -4.5 8.6(x= 0.00)
-4.5(x= 4.70)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 4.70) Lim.: 0.54

Arm.Superior: 2Ø16(<<2.41+1.44=3.85), 2Ø10(<<0.95+0.95=1.90) -----
2Ø6.3(3.52+0.08D=3.60)

Arm.Inferior: 2Ø16(5.11+0.19D=5.30), 1Ø10(2.85)

Estribos: 6x1Ø6.3c/0.14(0.84), 22x1Ø6.3c/0.17(3.66)

V 6 --- Grupo: 1

Tramo nº 1 (*V 1-V 1*) (C= 2.15) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.014 cm.
(C/15289)

Arm.sup: -----

Arm.inf: ----- 1.2 1.2 1.2 1.2 1.2 ----- 1.2(0.31) 1.2(1.08)
1.2(1.84)

Moment.: 0.0 0.6 0.9 1.0 0.9 0.6 0.0 0.0(0.00) 0.6(0.36) 1.0(1.08)
0.6(1.79) 0.0(2.15)

Cortant.: 1.9 1.3 0.6 0.0 -0.6 -1.3 -1.9 1.9(x= 0.00)
-1.9(x= 2.15)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 2.15) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+2.29+0.08D=2.45) -----

Arm.Inferior: 2Ø10(0.12D+2.29+0.12D=2.53)

Estribos: 14x1Ø5c/0.14(1.95)

V 7 --- Grupo: 1

Tramo nº 1 (*P12-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.125 cm.
(C/3994)

Arm.sup: ----- 2.1 3.4 0.1(0.17)
4.1(4.66)

Arm.inf: ----- 1.2 1.4 2.1 1.2 ----- 1.2(0.92) 2.3(2.85)

Moment.: -0.2 0.7 2.0 2.9 1.3 -3.0 -6.6 -0.2(0.11) 0.9(0.92) 3.2(2.85)
-6.7(4.89)

Cortant.: ----- 1.6 1.3 1.0 -4.4 -5.9 ----- 1.8(x= 0.40)
-6.7(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+3.77=3.85) ----- 2Ø16(1.95>>), 1Ø10(1.00>>)

Arm.Inferior: 2Ø10(0.12D+5.53=5.65), 1Ø10(3.00)

Estribos: 28x1Ø5c/0.14(3.95), 7x1Ø5c/0.13(0.80)

Tramo nº 2 (*P20-P31*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.280 cm.
(C/1783)

Arm.sup: 3.4 1.8 ----- 0.3 3.6(0.23)
0.4(4.83)

Arm.inf: ----- 1.2 2.5 3.4 1.7 ----- 3.5(3.60)
2.1(4.03)

Moment.: -6.6 -2.6 1.1 3.5 4.7 2.3 -0.6 -6.6(0.00) 4.8(3.60)
3.0(4.03) -0.7(4.89)

Cortant.: ----- 5.2 3.7 2.2 0.7 -5.0 ----- 5.9(x= 0.40)
-5.7(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 2Ø16(<<1.95+2.00=3.95), 1Ø10(<<1.00+1.00=2.00) -----
 2Ø6.3(3.62+0.08D=3.70)

Arm.Inferior: 2Ø12.5(5.55+0.15D=5.70), 1Ø12.5(3.80)

Estribos: 28x1Ø5c/0.14(3.87), 7x1Ø5c/0.13(0.80)

V 8 --- Grupo: 1

Tramo nº 1 (*V 1- *) (C= 4.71) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.190 cm.
 (C/2489)

Arm.sup: ----- 1.2 2.9
 1.7(4.38)

Arm.inf: ----- 1.5 2.2 2.1 1.2 1.2 ----- 1.3(0.67) 2.2(2.02)

Moment.: -0.0 2.1 3.1 3.0 1.7 -0.6 -4.0 -0.0(0.00) 2.1(0.79) 3.1(2.02)
 -4.0(4.71)

Cortant.: 3.2 2.0 0.6 -0.9 -2.3 -3.7 -4.9 3.2(x= 0.00)
 -4.9(x= 4.71)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
 0.00(x= 4.71) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+3.82=3.90) ----- 2Ø12.5(1.30>>), 1Ø10(0.95>>)

Arm.Inferior: 2Ø10(0.12D+4.78>>), 1Ø10(3.70)

Estribos: 33x1Ø5c/0.14(4.52)

Tramo nº 2 (* -V 1*) (C= 4.70) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.185 cm.
 (C/2537)

Arm.sup: 2.9 1.2 ----- 2.9(0.00)

Arm.inf: ----- 1.2 1.2 2.1 2.2 1.5 ----- 2.2(2.69)
 1.3(4.03)

Moment.: -4.0 -0.7 1.7 2.9 3.0 2.1 -0.0 -4.0(0.00) 3.1(2.69)
 2.1(3.92) -0.0(4.70)

Cortant.: -4.9 3.7 2.3 0.9 -0.5 -1.9 -3.4 4.9(x= 0.00)
 -4.9(x= 0.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
 0.00(x= 4.70) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<1.30+1.30=2.60), 1Ø10(<<0.95+0.95=1.90) -----
 2Ø6.3(3.67+0.08D=3.75)

Arm.Inferior: 2Ø10(<<4.90+4.77+0.12D=9.79), 1Ø10(3.70)

Estribos: 33x1Ø5c/0.14(4.50)

V 9 --- Grupo: 1

Tramo nº 1 (*P12-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.025 cm.
(C/19733)

Arm.sup: ----- 1.2 1.2 1.2 1.2 ----- 1.2 1.2 0.0(0.17)
1.2(4.94)

Arm.inf: ----- 1.2 1.2 1.2 1.2 ----- 1.2(0.70) 1.2(2.20)

Moment.: -0.1 0.2 0.5 0.5 0.2 -0.3 -0.9 -0.1(0.11) 0.2(0.83) 0.5(2.20)
-0.9(5.00)

Cortant.: ----- 0.5 0.2 -0.2 -0.5 -0.8 ----- 0.7(x= 0.40)
-1.0(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
4.60) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+4.12=4.20) ----- 2Ø12.5(1.55>>)

Arm.Inferior: 2Ø10(0.12D+5.63=5.75)

Estribos: 34x1Ø5c/0.14(4.72)

Tramo nº 2 (*P20-P32*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.025 cm.
(C/20041)

Arm.sup: 1.2 1.2 ----- 1.2(0.06)
0.0(4.83)

Arm.inf: ----- 1.2 1.2 1.2 1.2 ----- 1.2(2.80)
1.2(4.30)

Moment.: -0.9 -0.3 0.2 0.5 0.5 0.2 -0.1 -0.9(0.00) 0.5(2.80)
0.2(4.17) -0.1(4.89)

Cortant.: ----- 0.8 0.5 0.2 -0.2 -0.5 ----- 1.0(x= 0.40)
-0.6(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
4.60) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<1.55+1.55=3.10) ----- 2Ø6.3(4.07+0.08D=4.15)

Arm.Inferior: 2Ø10(5.53+0.12D=5.65)

Estribos: 34x1Ø5c/0.14(4.65)

V 10 --- Grupo: 1

Tramo nº 1 (*V 1- *) (C= 4.70) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.330 cm.

(C/1424)

Arm.sup: ----- 1.4
1.2(4.36)

Arm.inf: ----- 1.7 2.7 2.8 2.2 1.2 ----- 1.5(0.67) 2.9(2.01)
1.2(4.03)

Moment.: -0.0 2.4 3.7 4.0 3.1 1.1 -1.9 -0.0(0.00) 2.4(0.78) 4.0(2.01)
1.1(3.92) -1.9(4.70)

Cortant.: 3.7 2.4 1.0 -0.4 -1.8 -3.2 -4.5 3.7(x= 0.00)
-4.5(x= 4.70)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 4.70) Lim.: 0.54

Arm.Superior: $2\emptyset 6.3(0.08D+3.97=4.05)$ ----- $2\emptyset 12.5(1.05>>)$

Arm.Inferior: $2\emptyset 12.5(0.15D+5.00=5.15)$, $1\emptyset 10(2.85)$

Estribos: $33 \times 1\emptyset 5c/0.14(4.50)$

Tramo nº 2 (* -V 1*) (C= 4.70) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.020 cm.
(C/-23982)

Arm.sup: 1.4 1.2 1.2 1.2 ----- 1.6(0.00)

Arm.inf: ----- 1.2 1.2 1.2 1.2 1.2 1.2(3.69)
1.2(4.03)

Moment.: -1.9 -1.3 -0.6 0.5 0.8 0.8 0.6 -2.2(0.00) 0.8(3.69)
0.8(3.92) -0.0(4.70)

Cortant.: -4.5 1.1 0.8 0.5 0.2 -0.1 -0.4 1.4(x= 0.00)
-4.5(x= 0.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 4.70) Lim.: 0.54

Arm.Superior: $2\emptyset 12.5(<<1.05+3.20=4.25)$ ----- $2\emptyset 6.3(1.82+0.08D=1.90)$

Arm.Inferior: $2\emptyset 10(4.93+0.12D=5.05)$

Estribos: $33 \times 1\emptyset 5c/0.14(4.50)$

V 11 --- Grupo: 1

Tramo nº 1 (*P13-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.025 cm.
(C/19833)

Arm.sup: ----- 1.2 1.2 0.0(0.17)
1.2(4.94)

Arm.inf: ----- 1.2 1.2 1.2 1.2 ----- 1.2(0.70) 1.2(2.20)

Moment.: -0.1 0.2 0.5 0.5 0.2 -0.3 -0.9 -0.1(0.11) 0.2(0.83) 0.5(2.20)
-0.9(5.00)

Cortant.: ----- 0.5 0.2 -0.2 -0.5 -0.8 ----- 0.7(x= 0.40)
-1.0(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+4.12=4.20) ----- 2Ø10(1.55>>)

Arm.Inferior: 2Ø10(0.12D+5.63=5.75)

Estribos: 34x1Ø5c/0.14(4.72)

Tramo nº 2 (*P20-P32*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.025 cm.
(C/20085)

Arm.sup: 1.2 1.2 ----- 1.2(0.06)
0.0(4.83)

Arm.inf: ----- 1.2 1.2 1.2 1.2 ----- 1.2(2.80)
1.2(4.30)

Moment.: -0.9 -0.3 0.2 0.5 0.5 0.2 -0.1 -0.9(0.00) 0.5(2.80)
0.2(4.17) -0.1(4.89)

Cortant.: ----- 0.8 0.5 0.2 -0.2 -0.5 ----- 1.0(x= 0.40)
-0.6(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.55+1.55=3.10) ----- 2Ø6.3(4.07+0.08D=4.15)

Arm.Inferior: 2Ø10(5.53+0.12D=5.65)

Estribos: 34x1Ø5c/0.14(4.72)

V 12 --- Grupo: 1

Tramo nº 1 (*P20-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.358 cm.
(C/1398)

Arm.sup: 0.2 ----- 0.2 0.3(0.17)
0.3(4.83)

Arm.inf: ----- 1.2 2.4 2.8 2.4 1.2 ----- 1.2(0.70) 2.8(2.50)
1.2(4.30)

Moment.: -0.4 1.4 3.3 4.0 3.3 1.4 -0.4 -0.4(0.11) 1.4(0.83) 4.0(2.50)
1.4(4.17) -0.4(4.89)

Cortant.: ----- 3.0 1.5 0.0 -1.5 -3.0 ----- 3.8(x= 0.40)
-3.8(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+5.74+0.08D=5.90) -----

Arm.Inferior: 2Ø10(0.12D+5.74+0.12D=5.98), 1Ø12.5(3.45)

Estribos: 34x1Ø5c/0.14(4.72)

V 13 --- Grupo: 1

Tramo nº 1 (*P20-P13*) (C= 3.93) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.022 cm. (C/17685)

Arm.sup: 1.2 1.2 ----- 1.2 1.2 1.2(0.29)
1.2(3.64)

Arm.inf: ----- 1.2 1.2 1.2 1.2 1.2 ----- 1.2(1.96)

Moment.: -0.9 -0.6 0.9 1.3 0.9 -0.6 -0.9 -1.4(x= 0.29) 1.3(x=
1.96) -1.4(x= 3.64)

Cortant.: ----- 2.3 1.2 -0.0 -1.2 -2.3 ----- 2.8(x= 0.40)
-2.8(x= 3.52)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 3.52) Lim.: 0.54

Arm.Superior: 2Ø10(0.12D+4.66+0.12D=4.90) -----

Arm.Inferior: 2Ø10(0.12D+4.66+0.12D=4.90)

Estribos: 27x1Ø5c/0.14(3.73)

V 14 --- Grupo: 1

Tramo nº 1 (*P13-P12*) (C= 6.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.143 cm. (C/4185)

Arm.sup: 1.2 1.2 ----- 1.2 1.2 2.2(0.40)
1.6(5.60)

Arm.inf: ----- 1.8 2.1 1.2 ----- 2.6(2.40)

Moment.: -1.9 -1.1 2.6 3.0 1.5 -1.0 -2.2 -3.3(x= 0.34) 3.7(x=
2.40) -2.4(x= 5.77)

Cortant.: ----- 3.2 2.8 -1.3 -1.6 -2.0 ----- 3.5(x= 0.40)
-2.3(x= 5.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 5.60) Lim.: 0.54

Arm.Superior: 2Ø10(0.12D+6.37>>), 1Ø12.5(0.15D+1.75=1.90) ----- 2Ø10(1.88>>)

Arm.Inferior: 2Ø10(0.12D+6.53=6.65), 1Ø12.5(3.60)

Estribos: 42x1Ø5c/0.14(5.80)

Tramo nº 2 (*P12-P12*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.027 cm.
(C/14588)

Arm.sup: 1.2 1.2 ----- 1.2 1.2 1.2(0.06)
1.2(3.70)

Arm.inf: ----- 1.2 1.2 1.2 ----- 1.3(2.06)

Moment.: -2.2 -0.8 0.6 1.7 0.7 -0.8 -0.9 -2.2(x= 0.00) 1.8(x=
2.06) -1.5(x= 3.70)

Cortant.: ----- 2.0 1.8 1.5 -1.9 -2.2 ----- 2.1(x= 0.40)
-2.3(x= 3.58)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
3.58) Lim.: 0.54

Arm.Superior: 2Ø10(<<6.49+1.46=7.95), 2Ø10(<<1.88+4.35+0.12D=6.35) -----

Arm.Inferior: 2Ø10(4.58+0.12D=4.70)

Estribos: 27x1Ø5c/0.14(3.78)

V 15 --- Grupo: 1

Tramo nº 1 (*V 7-V 5*) (C= 4.17) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.352 cm.
(C/1184)

Arm.sup: ----- 1.2
1.2(4.02)

Arm.inf: ----- 1.9 3.1 3.7 2.8 1.3 ----- 2.0(0.75) 3.7(2.11)
1.4(3.43)

Moment.: 0.0 2.6 4.3 5.2 3.9 1.8 -1.3 0.0(0.00) 2.8(0.75) 5.2(2.11)
1.9(3.43) -1.3(4.17)

Cortant.: 4.4 3.1 1.9 0.6 -2.5 -3.8 -5.0 4.4(x= 0.00)
-5.0(x= 4.17)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x=-0.00)
0.00(x= 4.17) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+4.24>>) ----- 1Ø12.5(0.95>>)

Arm.Inferior: 2Ø12.5(0.15D+4.24>>), 1Ø12.5(3.10)

Estribos: 29x1Ø5c/0.14(3.97)

Tramo nº 2 (*V 5-V 4*) (C= 0.93) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.008 cm.
(C/11337)

Arm.sup: 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2(0.00)
1.2(0.65)

Arm.inf: ----- 0.0(0.87)

Moment.: -1.3 -1.0 -0.7 -0.4 -0.2 -0.0 -0.0 -1.3(0.00) -0.1(0.71)
0.0(0.87) -0.0(0.93)

Cortant.: -5.0 2.0 1.8 1.5 1.2 0.9 0.0 2.3(x= 0.00)
-5.0(x= 0.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 0.83) Lim.: 0.54

Arm.Superior: 2Ø6.3(<<4.32+0.90+0.08D=5.30), 1Ø12.5(<<0.95+0.90+0.15D=2.00) -----

Arm.Inferior: 2Ø12.5(<<4.39+0.90+0.16D=5.45)

Estribos: 6x1Ø5c/0.14(0.80)

V 16 --- Grupo: 1

Tramo nº 1 (*V 5- *) (C= 0.93) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.055 cm.
(C/1692)

Arm.sup: 1.2 1.2 1.2 1.7 2.4 3.1 3.9 1.2(0.28)
3.6(0.87)

Arm.inf: ----- 0.1(0.06)

Moment.: 0.0 -0.4 -1.4 -2.4 -3.4 -4.4 -5.4 0.0(0.00) 0.1(0.06) -0.5(0.22)
-5.4(0.93)

Cortant.: 0.0 -6.4 -6.5 -6.5 -6.6 -6.7 -6.7 0.0(x= 0.00)
-6.7(x= 0.93)

Torsores: 0.00 0.01 0.01 0.01 0.01 0.01 0.01 Extr. apoio: 0.01(x= 0.10)
0.01(x= 0.93) Lim.: 0.54

Arm.Superior: 2Ø12.5(0.15D+0.90>>), 2Ø10(0.90>>) -----

Arm.Inferior: 2Ø12.5(0.15D+0.90>>)

Estribos: 8x1Ø5c/0.11(0.80)

Tramo nº 2 (* -V 2*) (C= 5.72) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.202 cm.
(C/2843)

Arm.sup: 3.9 1.2 ----- 3.9(0.00)

Arm.inf: ----- 1.2 2.0 1.6 1.2 ----- 2.0(3.14)
1.2(4.61)

Moment.: -5.4 -1.1 1.6 2.8 2.2 1.2 -0.0 -5.4(0.00) 2.8(3.14)
 1.4(4.61) -0.0(5.72)

Cortant.: -6.7 3.7 2.0 0.3 -1.4 -1.1 -1.5 5.3(x= 0.00)
 -6.7(x= 0.00)

Torsores: 0.01 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.01(x= 0.00)
 0.00(x= 5.72) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<1.05+1.75=2.80), 2Ø10(<<0.90+1.15=2.05) -----
 2Ø6.3(4.37+0.08D=4.45)

Arm.Inferior: 2Ø12.5(<<1.05+5.80+0.15D=6.99)

Estribos: 40x1Ø5c/0.14(5.53)

V 17 --- Grupo: 1

Tramo nº 1 (*P20-P20*) (C= 3.93) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.002 cm.
 (C/203914)

Arm.sup: ----- 1.2 2.5 0.0(0.17)
 2.1(3.87)

Arm.inf: ----- 1.2 1.2 1.2 1.2 ----- 1.2(0.62) 1.2(1.52)

Moment.: -0.0 0.1 0.3 0.3 0.1 -0.3 -4.8 -0.1(0.11) 0.1(0.65) 0.3(1.52)
 -4.8(3.92)

Cortant.: ----- 0.4 0.1 -0.1 -0.4 -0.7 ----- 0.5(x= 0.40)
 -0.8(x= 3.52)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 3.52) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+2.92=3.00) ----- 3Ø16(1.70>>)

Arm.Inferior: 2Ø10(0.12D+4.48=4.60)

Estribos: 26x1Ø5c/0.14(3.57)

Tramo nº 2 (*P20-P20*) (C= 6.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.509 cm.
 (C/1180)

Arm.sup: 2.5 1.7 ----- 1.6 3.1 5.3(0.40)
 4.2(5.66)

Arm.inf: ----- 1.2 4.2 5.1 3.0 ----- 1.2(1.11) 5.9(2.40)

Moment.: -4.8 -2.4 5.9 7.2 4.2 -2.2 -6.0 -7.7(0.29) 0.1(1.11) 8.1(2.40)
 -6.5(5.77)

Cortant.: ----- 7.6 5.8 -2.1 -3.9 -5.7 ----- 8.7(x= 0.40)
 -6.7(x= 5.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=

5.60) Lim.: 0.54

Arm.Superior: 3Ø16(<<1.70+1.85=3.55) ----- 2Ø16(2.00>>), 1Ø10(1.20>>)

Arm.Montagem: 2Ø6.3(2.60)

Arm.Inferior: 2Ø16(6.30), 1Ø16(3.60)

Estribos: 11x1Ø6.3c/0.14(1.54), 25x1Ø6.3c/0.17(4.10)

Tramo nº 3 (*P20-P20*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.107 cm.
(C/3706)

Arm.sup: 3.1 1.6 ----- 1.7 2.8 3.1(0.06)
2.9(3.75)

Arm.inf: ----- 1.2 3.5 1.3 ----- 3.7(2.06)

Moment.: -6.0 -2.3 1.5 4.9 1.8 -2.3 -5.3 -6.0(x= 0.00) 5.2(x=
2.06) -5.3(x= 3.98)

Cortant.: ----- 5.5 5.2 4.8 -5.8 -6.0 ----- 5.6(x= 0.40)
-6.1(x= 3.58)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
3.58) Lim.: 0.54

Arm.Superior: 2Ø16(<<2.00+1.65=3.65), 1Ø10(<<1.20+0.80=2.00) ----- 2Ø12.5(1.55>>),
1Ø10(1.00>>)

Arm.Montagem: 2Ø5(1.30)

Arm.Inferior: 2Ø12.5(4.30), 1Ø12.5(2.40)

Estribos: 17x1Ø5c/0.14(2.28), 11x1Ø5c/0.13(1.43)

Tramo nº 4 (*P20-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.056 cm.
(C/8976)

Arm.sup: 2.8 1.6 ----- 1.2 4.7 3.2(0.34)
6.1(4.71)

Arm.inf: ----- 1.2 1.6 1.2 ----- 1.6(2.40)

Moment.: -5.3 -2.2 1.0 2.3 1.4 -0.6 -9.0 -5.3(x= 0.06) 2.3(x=
2.40) -9.7(x= 4.83)

Cortant.: ----- 4.7 3.2 -0.3 -1.8 -3.7 ----- 5.4(x= 0.40)
-17.4(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.01(x=
4.60) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<1.55+1.85=3.40), 1Ø10(<<1.00+1.25=2.25) ----- 3Ø16(1.65>>),
1Ø10(1.15>>)

Arm.Montagem: 2Ø10(1.95)

Arm.Inferior: 3Ø12.5(5.30)

Estribos: 23x1Ø10c/0.17(3.81), 7x1Ø10c/0.13(0.91)

Tramo nº 5 (*P20-P20*) (C= 5.73) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.442 cm.
(C/1296)

Arm.sup: 4.7 1.5 ----- 1.6 3.0 4.6(0.06)
6.3(5.32)

Arm.inf: ----- 1.2 3.0 4.9 5.6 1.2 ----- 5.6(3.99)
1.2(4.66)

Moment.: -9.0 -2.1 4.3 6.8 7.7 -2.3 -5.8 -9.0(0.00) 0.1(0.95) 7.7(3.99)
1.0(4.66) -9.1(5.44)

Cortant.: ----- 5.2 3.5 1.8 0.1 -10.9 ----- 6.2(x= 0.40)
-11.9(x= 5.32)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
5.32) Lim.: 0.54

Arm.Superior: 3Ø16(<<1.65+1.80=3.45), 1Ø10(<<1.15+1.30=2.45) ----- 2Ø16(1.90>>),
2Ø12.5(1.45>>)

Arm.Montagem: 2Ø8(2.50)

Arm.Inferior: 2Ø16(6.05), 2Ø10(3.75)

Estribos: 28x1Ø8c/0.15(4.09), 9x1Ø8c/0.14(1.26)

Tramo nº 6 (*P20-P20*) (C= 1.78) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.007 cm.
(C/-25333)

Arm.sup: 3.0 1.2 1.2 ----- 2.5(0.06)
0.0(1.60)

Arm.inf: ----- 1.2 1.2 1.2 ----- 1.2(1.03)
0.0(1.43)

Moment.: -5.8 -0.9 -0.1 0.2 0.2 0.1 -0.1 -5.8(0.00) 0.2(1.03)
0.1(1.43) -0.1(1.66)

Cortant.: ----- 0.8 0.3 -0.2 ----- 1.2(x= 0.40)
-0.6(x= 1.38)

Torsores: ----- 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
1.38) Lim.: 0.54

Arm.Superior: 2Ø16(<<1.90+0.75=2.65), 2Ø12.5(<<1.45+2.14+0.16D=3.75) -----

Arm.Inferior: 2Ø10(2.33+0.12D=2.45)

Estribos: 11x1Ø5c/0.14(1.48)

V 18 --- Grupo: 1

Tramo nº 1 (*V 7-V 4*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.534 cm. (C/936)

Arm.sup: -----

Arm.inf: ----- 2.0 3.1 3.4 2.7 1.2 ----- 2.1(0.89) 3.4(2.38)
1.2(4.17)

Moment.: -0.0 2.8 4.4 4.7 3.8 1.7 0.0 -0.0(0.00) 3.0(0.89) 4.8(2.38)
1.7(4.17) 0.0(5.00)

Cortant.: 4.0 2.6 1.2 -0.3 -1.8 -3.2 -2.2 4.0(x= 0.00)
-3.2(x= 4.17)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 5.00) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+5.14+0.08D=5.30) -----

Arm.Inferior: 2Ø12.5(0.15D+5.14+0.15D=5.44), 1Ø12.5(3.65)

Estribos: 35x1Ø5c/0.14(4.80)

V 19 --- Grupo: 1

Tramo nº 1 (*P32-P32*) (C= 6.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.026 cm. (C/23340)

Arm.sup: 1.2 1.2 ----- 1.2 1.2 1.2(0.34)
1.2(5.94)

Arm.inf: ----- 1.2 1.2 1.2 ----- 1.2(2.63)

Moment.: -0.7 -0.5 0.4 0.6 0.3 -0.5 -1.7 -1.3(x= 0.34) 0.6(x=
2.63) -1.7(x= 6.00)

Cortant.: ----- 1.1 0.7 -0.1 -0.5 -0.9 ----- 1.3(x= 0.40)
-1.2(x= 5.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
5.60) Lim.: 0.54

Arm.Superior: 2Ø10(0.12D+2.33=2.45) ----- 2Ø10(2.05>>)

Arm.Montagem: 2Ø5(2.45)

Arm.Inferior: 2Ø10(0.12D+6.53=6.65)

Estribos: 41x1Ø5c/0.14(5.72)

Tramo nº 2 (*P32-P31*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.014 cm.

(C/27498)

Arm.sup: 1.2 1.2 ----- 1.2 1.2 1.2(0.17)
1.2(3.75)

Arm.inf: ----- 1.2 1.2 1.2 ----- 1.2(2.06)

Moment.: -1.7 -1.0 0.2 1.3 0.3 -1.0 -1.5 -1.8(x= 0.17) 1.4(x=
2.06) -1.8(x= 3.75)

Cortant.: ----- 2.0 1.8 1.5 -2.0 -2.2 ----- 2.1(x= 0.40)
-2.3(x= 3.58)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
3.58) Lim.: 0.54

Arm.Superior: 2Ø10(<<2.05+1.65=3.70) ----- 2Ø10(1.60>>)

Arm.Montagem: 2Ø5(1.30)

Arm.Inferior: 2Ø10(4.45)

Estribos: 26x1Ø5c/0.14(3.63)

Tramo nº 3 (*P31-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.029 cm.
(C/17196)

Arm.sup: 1.2 1.2 ----- 1.2 1.2(0.06)
1.4(4.71)

Arm.inf: ----- 1.2 1.2 1.2 1.2 1.2 ----- 1.2(0.94) 1.2(3.09)
1.2(4.17)

Moment.: -1.5 -0.3 0.8 1.1 1.1 0.9 -1.9 -1.5(0.00) 0.3(0.94) 1.1(3.09)
0.9(4.17) -2.2(4.83)

Cortant.: ----- 0.8 0.5 0.2 -0.1 -0.5 ----- 1.0(x= 0.40)
-4.9(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x=
4.60) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.60+1.45=3.05) ----- 2Ø10(1.30>>)

Arm.Montagem: 2Ø5(2.70)

Arm.Inferior: 2Ø10(5.40)

Estribos: 34x1Ø5c/0.14(4.65)

Tramo nº 4 (*P30-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.012 cm.
(C/40375)

Arm.sup: 1.2 1.2 1.2 ----- 1.2 1.2 1.2(0.06)
1.5(4.66)

Arm.inf: ----- 1.2 1.2 1.2 ----- 1.2(2.97)

1.2(4.04)

Moment.: -1.9 -0.5 0.1 0.4 0.5 -0.3 -1.4 -1.9(0.00) 0.5(2.97)
0.2(4.04) -2.2(4.71)

Cortant.: ----- 0.9 0.5 0.2 -0.1 -3.8 ----- 1.0(x= 0.40)
-3.9(x= 4.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.40) 0.00(x= 4.60) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.30+1.95=3.25) ----- 2Ø10(1.83+0.12D=1.95)

Arm.Montagem: 2Ø5(2.05)

Arm.Inferior: 2Ø10(5.58+0.12D=5.70)

Estribos: 34x1Ø5c/0.14(4.72)

Armadura de vigas
Obra: TRF-2 VARAS VERTICAL PARTE 2
Grupo no 2 Piso 2 --- Pisoigual 1

V 1 --- Grupo: 2

Tramo nº 1 (*P10-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.215 cm.
(C/2327)

Arm.sup: ----- 1.5 4.1 0.1(0.03)
4.1(4.97)

Arm.inf: ----- 2.0 3.3 3.2 1.7 ----- 2.4(1.00) 3.4(2.05)

Moment.: -0.1 3.6 5.8 5.7 3.0 -1.9 -7.9 -0.2(0.03) 4.3(1.00) 6.1(2.05)
-7.9(5.00)

Cortant.: ----- 3.4 1.0 -1.6 -4.1 -6.2 ----- 5.8(x= 0.10)
-7.5(x= 4.90)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.90) Lim.: 0.72

Arm.Superior: 2Ø6.3(0.08D+3.47=3.55) ----- 2Ø12.5(1.85>>), 1Ø16(1.30>>)

Arm.Inferior: 2Ø12.5(0.15D+5.07>>), 1Ø12.5(4.10)

Estribos: 35x1Ø5c/0.14(4.80)

Tramo nº 2 (*P20-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.208 cm.
(C/2403)

Arm.sup: 4.1 1.5 ----- 4.3(0.09)
0.1(4.97)

Arm.inf: ----- 1.5 3.1 3.3 2.1 ----- 3.4(3.05)

2.4(4.02)

Moment.: -7.9 -2.2 2.8 5.6 5.9 3.8 -0.1 -8.0(0.04) 6.1(3.05)
 4.3(4.02) -0.2(4.97)

Cortant.: ----- 6.4 4.3 1.8 -0.9 -3.5 ----- 7.7(x= 0.10)
 -5.6(x= 4.90)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.90) Lim.: 0.72

Arm.Superior: 2Ø12.5(<<1.85+1.90=3.75), 1Ø16(<<1.30+1.40=2.70) -----
 2Ø6.3(3.47+0.08D=3.55)

Arm.Inferior: 2Ø12.5(<<5.22+5.07+0.15D=10.44), 1Ø12.5(4.15)

Estribos: 35x1Ø5c/0.14(4.80)

V 2 --- Grupo: 2

Tramo nº 1 (*V 1- *) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.314 cm.
 (C/1591)

Arm.sup: ----- 1.5 3.9
 3.9(4.99)

Arm.inf: ----- 2.7 4.2 4.1 2.4 ----- 3.1(1.00) 4.4(2.05)
 1.5(4.02)

Moment.: -0.0 4.8 7.6 7.4 4.4 -1.1 -7.0 -0.0(0.00) 5.6(1.00) 7.9(2.05)
 0.1(4.02) -7.0(5.00)

Cortant.: 6.1 4.6 1.5 -1.9 -5.0 -7.0 -6.2 6.1(x= 0.00)
 -7.1(x= 4.30)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
 0.00(x= 5.00) Lim.: 0.72

Arm.Superior: 2Ø6.3(0.08D+3.72=3.80) ----- 2Ø16(1.65>>), 1Ø10(1.05>>)

Arm.Inferior: 1Ø16(5.07>>), 2Ø12.5(0.15D+5.07>>)

Estribos: 35x1Ø5c/0.14(4.80)

Tramo nº 2 (* -V 2*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.322 cm.
 (C/1555)

Arm.sup: 3.9 1.5 ----- 3.9(0.00)

Arm.inf: ----- 2.5 4.2 4.3 2.7 ----- 1.5(1.00) 4.5(3.02)
 3.1(4.02)

Moment.: -7.0 -1.0 4.5 7.6 7.7 4.8 0.0 -7.0(0.00) 0.2(1.00) 8.0(3.02)
 5.5(4.02) 0.0(5.00)

Cortant.: -6.2 7.1 5.1 1.8 -1.6 -4.6 -6.0 7.2(x= 0.55)

-6.2(x= 0.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 5.00) Lim.: 0.72

Arm.Superior: 2Ø16(<<1.65+1.65=3.30), 1Ø10(<<1.05+1.05=2.10) -----
2Ø6.3(3.72+0.08D=3.80)

Arm.Inferior: 1Ø16(<<5.07+5.07=10.14), 2Ø12.5(<<5.22+5.07+0.15D=10.44)

Estribos: 35x1Ø5c/0.14(4.80)

V 3 --- Grupo: 2

Tramo nº 1 (*P11-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.484 cm.
(C/1033)

Arm.sup: 0.1 ----- 1.9 7.8 0.1(0.03)
8.1(4.87)

Arm.inf: ----- 3.2 5.7 6.5 4.0 ----- 3.8(1.00) 6.5(2.30)

Moment.: -0.2 5.7 10.2 11.6 7.1 -3.4 -15.8 -0.2(0.03) 6.8(1.00) 11.6(2.30)
-15.8(5.00)

Cortant.: ----- 6.9 3.4 -2.7 -9.2 -14.0 ----- 7.7(x= 0.10)
-16.9(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x=
4.82) Lim.: 0.72

Arm.Superior: 2Ø10(0.12D+3.58=3.70) ----- 3Ø16(1.85>>), 2Ø12.5(1.25>>)

Arm.Inferior: 2Ø16(0.19D+5.51=5.70), 2Ø12.5(4.10)

Estribos: 18x1Ø10c/0.22(3.92), 4x1Ø10c/0.2(0.80)

Tramo nº 2 (*P20-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.398 cm.
(C/1257)

Arm.sup: 7.8 3.0 ----- 0.4 8.4(0.15)
0.5(4.93)

Arm.inf: ----- 2.0 5.2 6.6 4.0 ----- 6.7(3.30)
4.8(4.02)

Moment.: -15.8 -5.3 3.5 9.3 11.9 7.2 -0.8 -15.8(0.03) 12.0(3.30)
8.7(4.02) -0.9(4.96)

Cortant.: ----- 12.0 8.4 4.9 -1.8 -9.3 ----- 15.5(x= 0.18)
-16.6(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x=
4.82) Lim.: 0.72

Arm.Superior: 3Ø16(<<1.85+2.10=3.95), 2Ø12.5(<<1.25+1.35=2.60) -----
 2Ø10(3.33+0.12D=3.45)

Arm.Inferior: 4Ø16(5.46+0.19D=5.65)

Estribos: 6x1Ø8c/0.14(0.80), 20x1Ø8c/0.15(3.05), 8x1Ø8c/0.11(0.80)

V 4 --- Grupo: 2

Tramo nº 1 (*V 1- *) (C= 2.23) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.494 cm.
 (C/452)

Arm.sup: 1.2 1.2 1.4 2.4 3.6 5.1 6.9 1.2(0.70)
 6.3(2.10)

Arm.inf: ----- 0.0(0.06)

Moment.: 0.0 -0.7 -1.9 -3.4 -5.1 -7.1 -9.3 -0.0(0.10) 0.0(0.06) -0.6(0.57)
 -9.3(2.22)

Cortant.: 0.0 -2.8 -3.6 -4.3 -5.0 -5.7 -6.3 0.0(x= 0.00)
 -6.3(x= 2.22)

Torsores: 0.00 0.00 0.01 0.01 0.01 0.01 0.01 Extr. apoio: 0.00(x= 0.10)
 0.01(x= 2.22) Lim.: 0.54

Arm.Superior: 2Ø16(0.19D+2.20>>) ----- 2Ø12.5(1.20>>)

Arm.Inferior: 2Ø16(0.19D+2.20>>)

Estribos: 15x1Ø5c/0.14(2.10)

Tramo nº 2 (* -V 1*) (C= 3.62) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.019 cm.
 (C/19496)

Arm.sup: 6.9 2.8 1.2 ----- 6.0(0.00)

Arm.inf: ----- 1.2 2.3 2.8 2.5 1.4 2.8(2.59)
 2.4(3.11)

Moment.: -9.3 -3.9 1.4 3.2 3.9 3.5 1.9 -9.3(0.00) 3.9(2.59)
 3.5(3.02) -0.0(3.63)

Cortant.: -6.3 6.2 4.3 2.3 0.4 -2.1 -3.7 7.9(x= 0.00)
 -6.3(x= 0.00)

Torsores: 0.01 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.01(x= 0.00)
 0.00(x= 3.63) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<1.20+0.85=2.05), 2Ø16(<<2.39+3.70+0.19D=6.27) -----

Arm.Inferior: 2Ø16(<<2.39+3.70+0.19D=6.27)

Estribos: 8x1Ø5c/0.1(0.80), 19x1Ø5c/0.14(2.63)

V 5 --- Grupo: 2

Tramo nº 1 (*V 1-V 1*) (C= 2.13) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.014 cm.
(C/15468)

Arm.sup: -----

Arm.inf: ----- 1.2 1.2 1.2 1.2 1.2 ----- 1.2(0.30) 1.2(1.06)
1.2(1.82)

Moment.: 0.0 0.6 0.9 1.1 0.9 0.6 -0.0 0.0(0.00) 0.6(0.35) 1.1(1.06)
0.6(1.77) -0.0(2.12)

Cortant.: 1.9 1.3 0.7 ----- -0.7 -1.3 -1.9 1.9(x= 0.00)
-1.9(x= 2.12)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 2.12) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+2.26+0.08D=2.42) -----

Arm.Inferior: 2Ø10(0.12D+2.26+0.12D=2.50)

Estribos: 14x1Ø5c/0.14(1.93)

V 6 --- Grupo: 2

Tramo nº 1 (*P12-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.556 cm.
(C/899)

Arm.sup: 0.2 ----- 2.4 8.1 0.2(0.03)
8.6(4.87)

Arm.inf: ----- 4.1 6.9 7.8 3.8 ----- 4.8(1.00) 7.8(2.43)

Moment.: -0.3 7.4 12.3 13.7 6.7 -4.3 -15.9 -0.4(0.03) 8.7(1.00) 13.7(2.43)
-15.9(4.98)

Cortant.: ----- 7.7 3.5 -3.0 -11.9 -14.1 ----- 13.4(x= 0.10)
-15.7(x= 4.85)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.01(x=
4.85) Lim.: 0.72

Arm.Superior: 2Ø12.5(0.15D+3.55=3.70) ----- 4Ø16(1.85>>), 2Ø10(1.40>>)

Arm.Inferior: 4Ø16(0.19D+5.46=5.65)

Estribos: 6x1Ø8c/0.14(0.80), 18x1Ø8c/0.15(2.70), 10x1Ø8c/0.13(1.30)

Tramo nº 2 (*P20-P31*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.426 cm.
(C/1174)

Arm.sup: 8.1 2.8 ----- ----- ----- 0.5 8.5(0.13)

0.6(4.93)

Arm.inf: ----- 2.4 5.5 6.7 4.4 ----- 6.7(3.63)
5.3(4.02)

Moment.: -15.9 -5.1 4.3 9.8 12.0 7.9 -1.0 -15.9(0.00) 12.1(3.63)
9.5(4.02) -1.1(4.96)

Cortant.: ----- 12.1 8.5 4.7 1.4 -9.9 ----- 14.8(x= 0.15)
-19.8(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.15) 0.00(x= 4.82) Lim.: 0.72

Arm.Superior: 4Ø16(<<1.85+2.00=3.85), 2Ø10(<<1.40+1.40=2.80) -----
2Ø12.5(3.50+0.15D=3.65)

Arm.Inferior: 3Ø16(5.46+0.19D=5.65), 1Ø16(5.46+0.19D=5.65)

Estribos: 22x1Ø12.5c/0.22(4.72)

V 7 --- Grupo: 2

Tramo nº 1 (*P12-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.221 cm.
(C/2262)

Arm.sup: ----- 1.5 4.3 0.1(0.03)
4.3(4.92)

Arm.inf: ----- 2.1 3.4 3.2 1.6 ----- 2.5(1.00) 3.5(2.05)

Moment.: -0.1 3.8 6.1 5.8 3.0 -2.2 -8.7 -0.2(0.03) 4.5(1.00) 6.3(2.05)
-8.7(5.00)

Cortant.: ----- 3.6 0.9 -1.8 -4.6 -7.0 ----- 5.5(x= 0.10)
-8.1(x= 4.80)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.03(x= 4.82) Lim.: 0.72

Arm.Superior: 2Ø6.3(0.08D+3.57=3.65) ----- 2Ø16(1.80>>), 1Ø10(1.35>>)

Arm.Inferior: 2Ø12.5(0.15D+5.06>>), 1Ø12.5(4.20)

Estribos: 28x1Ø5c/0.14(3.92), 7x1Ø5c/0.13(0.80)

Tramo nº 2 (*P20-P32*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.196 cm.
(C/2549)

Arm.sup: 4.3 1.5 ----- 0.1 4.6(0.15)
0.2(4.93)

Arm.inf: ----- 1.5 3.1 3.2 2.0 ----- 3.4(3.05)
2.3(4.02)

Moment.: -8.7 -2.7 2.6 5.5 5.8 3.5 -0.3 -8.8(0.05) 6.0(3.05)

4.1(4.02) -0.3(4.96)

Cortant.: ----- 7.2 4.7 1.9 -0.9 -3.6 ----- 8.4(x= 0.18)
-6.0(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.18) 0.00(x= 4.82) Lim.: 0.72

Arm.Superior: 2Ø16(<<1.80+1.90=3.70), 1Ø10(<<1.35+1.40=2.75) -----
2Ø6.3(3.62+0.08D=3.70)

Arm.Inferior: 2Ø12.5(<<5.21+5.17+0.15D=10.53), 1Ø12.5(4.05)

Estribos: 7x1Ø5c/0.13(0.80), 28x1Ø5c/0.14(3.85)

V 8 --- Grupo: 2

Tramo nº 1 (*V 1-V 2*) (C=10.00) I-Am.305x60.6

Flecha= 0.113 cm. (C/8857) Coef. de aproveitamento: 8.92%

Moment.: -0.0 0.6 0.6 -0.0 0.6 0.6 -0.0 -0.0(0.03) 0.6(1.85) 0.7(2.55)
0.6(8.15) -0.0(5.00)

Cortant.: 0.3 0.2 -0.2 -0.5 0.2 -0.2 -0.3 0.5(x= 0.10)
-0.5(x= 9.90)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x=10.00) Lim.: 0.00

V 9 --- Grupo: 2

Tramo nº 1 (*V 1- *) (C= 4.98) I-Am.305x60.6

Flecha= 0.034 cm. (C/14587) Coef. de aproveitamento: 4.78%

Moment.: -0.0 0.4 0.6 0.7 0.6 0.4 0.0 -0.0(0.00) 0.4(0.83) 0.7(2.49)
0.4(4.15) 0.0(4.98)

Cortant.: 0.6 0.4 0.2 ----- -0.2 -0.4 -0.6 0.6(x= 0.00)
-0.6(x= 4.98)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x=-0.00)
0.00(x= 4.98) Lim.: 0.00

Tramo nº 2 (* -V 1*) (C= 5.00) I-Am.305x60.6

Flecha= 0.035 cm. (C/14396) Coef. de aproveitamento: 4.83%

Moment.: 0.0 0.4 0.6 0.7 0.6 0.4 -0.0 -0.0(0.00) 0.4(0.83) 0.7(2.50)
0.4(4.17) -0.0(5.00)

Cortant.: -0.6 0.4 0.2 ----- -0.2 -0.4 -0.6 0.6(x= 0.00)
-0.6(x= 5.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)

0.00(x= 5.00) Lim.: 0.00

V 10 --- Grupo: 2

Tramo nº 1 (*P20-P20*) (C= 5.00) I-Am.305x60.6

Flecha= -0.052 cm. (C/-9534) Coef. de aproveitamento: 19.28%

Moment.: 0.1 -0.0 -0.3 -0.7 -1.3 -2.1 -4.0 0.0(0.00) 0.1(0.10) -0.0(1.11)
-4.0(5.00)

Cortant.: ----- -0.2 -0.4 -0.6 -0.8 -1.0 ----- -0.0(x= 0.10)
-1.1(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.82) Lim.: 0.00

Tramo nº 2 (*P20-V 1*) (C= 5.07) I-Am.305x60.6

Flecha= 0.734 cm. (C/691) Coef. de aproveitamento: 66.54%

Moment.: -4.0 -4.0 -2.9 -1.9 -1.1 -0.5 -0.0 -5.0(0.15) -0.2(3.97)
0.0(5.02) -0.0(5.07)

Cortant.: ----- 1.4 1.2 1.1 0.9 0.7 0.0 1.6(x= 0.18)
-0.0(x= 5.07)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.18) 0.00(x= 5.07) Lim.: 0.00

V 11 --- Grupo: 2

Tramo nº 1 (*V 1-V 1*) (C=10.11) I-Am.305x60.6

Flecha= -0.552 cm. (C/-1832) Coef. de aproveitamento: 54.09%

Moment.: 0.0 -0.7 -2.1 -4.1 -2.1 -0.7 0.0 0.0(0.00) 0.0(0.04) -0.3(7.90)
0.0(10.1) 0.0(10.1)

Cortant.: 0.0 -0.6 -1.0 1.4 1.0 0.6 0.0 1.4(x= 5.05)
-1.4(x= 5.05)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x=10.11) Lim.: 0.00

V 12 --- Grupo: 2

Tramo nº 1 (*P13-P12*) (C= 6.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.048 cm.
(C/12449)

Arm.sup: 1.5 1.5 ----- ----- ----- 1.5 1.5 1.5(0.09)
1.5(5.99)

Arm.inf: ----- 1.5 1.5 1.5 1.5 1.5 ----- 1.5(1.08) 1.5(2.38)
1.5(4.89)

Moment.: -0.7 0.5 1.5 1.7 1.1 -0.4 -2.1 -1.3(0.09) 0.6(1.08) 1.8(2.38)
 0.2(4.89) -2.1(6.00)

Cortant.: ----- 1.3 0.8 -0.3 -0.9 -1.4 ----- 1.8(x= 0.10)
 -1.9(x= 5.90)

Torsores: ----- 0.03 0.03 0.02 0.02 0.02 ----- Extr. apoio: 0.03(x= 0.10) 0.02(x= 5.90)
 Lim.: 0.72

Arm.Superior: 2Ø10(0.12D+1.63=1.75) ----- 2Ø10(2.00>>)

Arm.Montagem: 2Ø5(2.85)

Arm.Inferior: 2Ø10(0.12D+6.07>>)

Estribos: 42x1Ø5c/0.14(5.80)

Tramo nº 2 (*P12-P12*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.027 cm.
 (C/14736)

Arm.sup: 1.5 1.5 ----- 1.5 1.5 1.5(0.03)
 1.5(3.97)

Arm.inf: ----- 1.5 1.5 1.5 1.5 1.5 ----- 1.5(0.79) 1.5(1.81)
 1.5(3.19)

Moment.: -2.1 0.4 1.9 2.2 1.6 -0.4 -2.3 -2.1(0.03) 0.8(0.79) 2.3(1.81)
 0.3(3.19) -2.3(3.98)

Cortant.: ----- 2.4 1.1 -0.2 -1.5 -2.5 ----- 3.0(x= 0.10)
 -2.6(x= 3.56)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.10) 0.03(x= 3.88)
 Lim.: 0.72

Arm.Superior: 2Ø10(<<2.00+1.45=3.45) ----- 2Ø10(1.50>>)

Arm.Montagem: 2Ø5(1.60)

Arm.Inferior: 2Ø10(<<6.19+4.06=10.25)

Estribos: 27x1Ø5c/0.14(3.78)

Tramo nº 3 (*P12-P11*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.049 cm.
 (C/10138)

Arm.sup: 1.5 1.5 ----- 1.5 2.6 1.5(0.06)
 2.5(4.97)

Arm.inf: ----- 1.5 1.5 1.8 1.5 ----- 1.5(0.99) 1.8(2.33)
 1.5(4.01)

Moment.: -2.3 0.8 2.8 3.2 2.1 -1.5 -5.3 -2.4(0.06) 1.3(0.99) 3.3(2.33)
 0.1(4.01) -5.3(5.00)

Cortant.: ----- 2.6 1.2 -0.4 -2.0 -3.2 ----- 2.8(x= 0.58)

-3.3(x= 4.33)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.10) 0.01(x= 4.80) Lim.: 0.72

Arm.Superior: 2Ø10(<<1.50+1.50=3.00) ----- 2Ø12.5(2.00>>), 1Ø10(1.00>>)

Arm.Montagem: 2Ø5(2.00)

Arm.Inferior: 2Ø12.5(5.25)

Estribos: 34x1Ø5c/0.14(4.75)

Tramo nº 4 (*P11-P10*) (C= 5.73) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.223 cm. (C/2573)

Arm.sup: 2.6 1.5 ----- 2.6 3.3(0.20)
2.7(5.68)

Arm.inf: ----- 2.0 3.3 3.8 1.5 ----- 1.5(1.13) 3.9(3.77)
1.6(4.60)

Moment.: -5.3 -1.5 3.5 6.0 6.9 1.8 -5.1 -6.0(0.14) 0.2(1.13) 7.1(3.77)
2.8(4.60) -5.1(5.72)

Cortant.: ----- 5.1 3.5 1.9 -5.0 -6.1 ----- 5.7(x= 0.33)
-6.7(x= 5.33)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.02(x= 0.20) 0.00(x= 5.63) Lim.: 0.72

Arm.Superior: 2Ø12.5(<<2.00+2.05=4.05), 1Ø10(<<1.00+1.25=2.25) ----- 2Ø10(1.43>>),
1Ø12.5(1.15>>)

Arm.Montagem: 2Ø5(2.75)

Arm.Inferior: 3Ø12.5(6.05), 1Ø10(5.25)

Estribos: 40x1Ø5c/0.14(5.48)

Tramo nº 5 (*P10-P10*) (C= 1.78) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= -0.011 cm. (C/-15978)

Arm.sup: 2.6 2.4 1.7 1.5 1.5 1.5 ----- 2.8(0.10)
1.5(1.19)

Arm.inf: ----- 0.1(1.75)

Moment.: -5.1 -4.3 -3.1 -2.1 -1.2 -0.4 0.1 -5.1(0.03) -0.2(1.41)
0.1(1.75) 0.0(1.78)

Cortant.: ----- 3.7 3.9 3.7 3.3 3.1 ----- 3.9(x= 0.60)
0.9(x= 1.35)

Torsores: ----- 0.01 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.10) 0.00(x= 1.68) Lim.: 0.72

Arm.Superior: 2Ø10(<<1.43+1.85+0.12D=3.40), 1Ø12.5(<<1.15+1.40=2.55) -----

Arm.Inferior: 2Ø8(2.05+0.10D=2.15)

Estribos: 12x1Ø5c/0.14(1.58)

V 13 --- Grupo: 2

Tramo nº 1 (*V 1-P20*) (C= 0.97) I-Am.305x60.6

Flecha= 0.000 cm. (C/457459) Coef. de aproveitamento: 0.72%

Moment.: -0.0 0.0 0.1 0.1 0.1 0.1 0.1 -0.0(0.00) 0.0(0.19) 0.1(0.74)
0.1(0.88) 0.0(0.97)

Cortant.: 0.3 0.2 0.2 0.2 0.1 0.1 ----- 0.3(x= 0.00)
0.0(x= 0.87)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x=-0.00) 0.00(x=
0.87) Lim.: 0.00

Tramo nº 2 (*P20-P13*) (C= 3.93) I-Am.305x60.6

Flecha= 0.008 cm. (C/51931) Coef. de aproveitamento: 5.30%

Moment.: 0.1 0.3 0.3 0.3 0.2 -0.3 -0.5 0.0(0.07) 0.3(0.67) 0.3(1.44)
-0.9(3.84)

Cortant.: ----- 0.2 0.0 -0.1 -0.3 -1.0 ----- 0.3(x= 0.10)
-1.1(x= 3.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x=
3.82) Lim.: 0.00

V 14 --- Grupo: 2

Tramo nº 1 (*V 6-V 3*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.715 cm.
(C/699)

Arm.sup: -----
1.2(4.58)

Arm.inf: ----- 2.7 4.8 5.2 3.6 1.2 1.2 3.1(0.99) 5.5(2.13)
1.5(4.01)

Moment.: 0.0 3.7 6.7 7.2 5.1 1.4 0.9 0.0(0.00) 4.4(0.99) 7.6(2.13)
2.0(4.01) -0.9(4.58)

Cortant.: 5.1 4.5 2.6 -1.6 -3.9 -6.4 3.9 5.2(x= 0.09)
-6.5(x= 4.20)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 5.00) Lim.: 0.54

Arm.Superior: 2Ø10(0.12D+5.14+0.12D=5.38) -----

Arm.Inferior: 2Ø16(0.19D+5.14+0.19D=5.52), 2Ø10(3.35)

Estribos: 27x1Ø5c/0.14(3.70), 10x1Ø5c/0.11(1.10)

V 15 --- Grupo: 2

Tramo nº 1 (*V 4-V 3*) (C= 1.00) Viga alta Tipo R Seção B*H = 15 X 30 Flecha= -0.001 cm.
(C/-173233)

Arm.sup: 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7(0.32)
0.7(0.73)

Arm.inf: ----- 0.7 ----- 0.7(0.20) 0.7(0.22)
0.7(0.81)

Moment.: 0.0 0.1 0.1 -0.1 -0.1 0.1 -0.0 -0.1(0.48) 0.1(0.20) 0.1(0.22)
0.1(0.81) -0.1(0.73)

Cortant.: 0.0 0.1 -0.2 -0.5 -0.4 -0.1 0.0 0.1(x= 0.20)
-0.6(x= 0.41)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.20)
0.00(x= 0.81) Lim.: 0.10

Arm.Montagem: 2Ø8(0.10D+0.94+0.10D=1.14)

Arm.Inferior: 2Ø8(0.10D+0.94+0.10D=1.14)

Estribos: 8x1Ø5c/0.12(0.95)

V 16 --- Grupo: 2

Tramo nº 1 (*V 1-P20*) (C= 1.03) I-Am.305x60.6

Flecha= 0.020 cm. (C/5147) Coef. de aproveitamento: 11.69%

Moment.: 0.0 -0.3 -0.8 -1.3 -1.8 -2.3 -2.0 -0.0(0.07) 0.0(0.04) -0.1(0.24)
-2.3(0.91)

Cortant.: 0.0 -2.8 -2.8 -2.9 -2.9 ----- 0.0(x= 0.00)
-2.9(x= 0.86)

Torsores: 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.00) 0.00(x=
0.86) Lim.: 0.00

Tramo nº 2 (*P20-P20*) (C= 3.92) I-Am.305x60.6

Flecha= -0.027 cm. (C/-14390) Coef. de aproveitamento: 10.71%

Moment.: -2.0 -1.1 -0.9 -0.7 -0.6 -1.1 -2.5 -2.0(x= 0.00) -0.2(x= 2.78)
-2.5(x= 3.92)

Cortant.: ----- 0.5 0.4 0.2 0.1 -1.2 ----- 0.6(x= 0.18)
-1.3(x= 3.75)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x= 3.75) Lim.: 0.00

Tramo nº 3 (*P20-V 8*) (C= 2.45) I-Am.305x60.6

Flecha= 0.111 cm. (C/2198) Coef. de aproveitamento: 19.95%

Moment.: -2.5 -2.6 -2.0 -1.4 -0.9 -0.4 0.0 -3.0(0.15) -0.2(1.91)
0.0(2.41) 0.0(2.45)

Cortant.: ----- 1.5 1.4 1.4 1.3 1.2 0.0 1.6(x= 0.18)
-0.0(x= 2.45)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.18) 0.00(x= 2.45) Lim.: 0.00

V 17 --- Grupo: 2

Tramo nº 1 (*P20-P20*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.171 cm. (C/2330)

Arm.sup: 0.2 ----- 1.5 3.5 0.3(0.07)
3.5(3.97)

Arm.inf: ----- 2.0 3.6 3.9 2.8 1.5 ----- 2.4(0.79) 4.0(1.81)
1.5(3.19)

Moment.: -0.5 3.5 6.5 7.0 5.0 -0.8 -6.8 -0.5(0.04) 4.3(0.79) 7.1(1.81)
1.6(3.19) -6.8(3.98)

Cortant.: ----- 5.7 2.6 -1.1 -4.8 -8.7 ----- 9.1(x= 0.18)
-12.2(x= 3.88)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x= 3.88) Lim.: 0.72

Arm.Superior: 2Ø6.3(0.08D+2.92=3.00) ----- 2Ø12.5(1.55>>), 1Ø12.5(1.05>>)

Arm.Inferior: 3Ø16(0.19D+4.51=4.70)

Estribos: 5x1Ø6.3c/0.16(0.80), 8x1Ø6.3c/0.22(1.81), 10x1Ø6.3c/0.11(1.10)

Tramo nº 2 (*P20-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.094 cm. (C/5340)

Arm.sup: 3.5 1.5 ----- 6.8 3.7(0.09)
6.7(4.97)

Arm.inf: ----- 1.5 2.9 3.9 3.6 2.6 ----- 1.5(0.97) 3.9(2.58)
2.8(4.05)

Moment.: -6.8 -2.1 5.2 7.0 6.5 4.6 -13.8 -6.8(0.04) 2.1(0.97) 7.0(2.58)
5.0(4.05) -13.8(5.00)

Cortant.: ----- 5.4 3.8 0.3 -1.4 -3.4 ----- 6.9(x= 0.10)

-19.4(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.82) Lim.: 0.72

Arm.Superior: 2Ø12.5(<<1.55+2.15=3.70), 1Ø12.5(<<1.05+1.25=2.30) ----- 3Ø16(1.75>>), 1Ø16(1.15>>)

Arm.Montagem: 2Ø10(1.60)

Arm.Inferior: 3Ø16(5.50)

Estribos: 18x1Ø10c/0.22(3.82), 6x1Ø10c/0.15(0.90)

Tramo nº 3 (*P20-P20*) (C= 5.73) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.559 cm. (C/1025)

Arm.sup: 6.8 1.5 ----- 7.3 7.8(0.15)
8.1(5.58)

Arm.inf: ----- 1.5 5.4 8.7 9.9 2.0 ----- 1.5(1.13) 10.2(3.77)
3.5(4.60)

Moment.: -13.8 -2.8 9.7 15.0 16.7 3.5 -15.1 -14.3(0.10) 2.4(1.13) 17.2(3.77)
6.2(4.60)-15.3(5.67)

Cortant.: ----- 11.8 7.5 3.8 -12.3 -15.9 ----- 15.3(x= 0.18)
-22.2(x= 5.52)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x= 5.52) Lim.: 0.72

Arm.Superior: 3Ø16(<<1.75+2.25=4.00), 1Ø16(<<1.15+1.50=2.65) ----- 3Ø16(1.94>>), 2Ø16(1.40>>)

Arm.Montagem: 2Ø10(2.10)

Arm.Inferior: 3Ø16(6.40), 3Ø16(4.05)

Estribos: 19x1Ø10c/0.22(4.14), 9x1Ø10c/0.14(1.26)

Tramo nº 4 (*P20-P20*) (C= 1.78) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= -0.032 cm. (C/-5570)

Arm.sup: 7.3 6.3 4.3 2.7 1.5 1.5 ----- 7.4(0.06)
1.5(1.19)

Arm.inf: ----- 0.1(1.75)

Moment.: -15.1 -11.3 -7.7 -4.9 -2.7 -1.0 0.1 -15.1(0.00) -0.4(1.41)
0.2(1.75) 0.0(1.78)

Cortant.: ----- 13.4 10.7 8.5 6.8 5.7 ----- 14.2(x= 0.20)
1.6(x= 1.60)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.20) 0.00(x= 1.68) Lim.: 0.72

Arm.Superior: 3Ø16(<<1.94+1.85+0.26D=4.05), 2Ø16(<<1.40+1.05=2.45) -----

Arm.Inferior: 2Ø16(2.16+0.19D=2.35)

Estribos: 11x1Ø8c/0.15(1.53)

V 18 --- Grupo: 2

Tramo nº 1 (*V 6-V 3*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.529 cm. (C/945)

Arm.sup: -----
1.2(4.83)

Arm.inf: ----- 1.6 3.1 3.7 3.3 2.3 ----- 2.0(0.99) 3.7(2.56)
2.5(4.01)

Moment.: 0.0 2.3 4.4 5.1 4.6 3.2 0.0 0.0(0.00) 2.7(0.99) 5.1(2.56)
3.5(4.01) -0.5(4.83)

Cortant.: 2.8 3.4 1.9 0.3 -1.7 -3.6 2.2 3.5(x= 0.58)
-8.7(x= 4.51)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 5.00) Lim.: 0.54

Arm.Superior: 2Ø10(0.12D+5.14+0.12D=5.38) -----

Arm.Inferior: 2Ø12.5(0.15D+5.14+0.15D=5.44), 1Ø12.5(4.00)

Estribos: 23x1Ø6.3c/0.17(3.84), 8x1Ø6.3c/0.12(0.96)

V 19 --- Grupo: 2

Tramo nº 1 (*V 1-P32*) (C= 4.89) I-Am.305x60.6

Flecha= 0.035 cm. (C/14111) Coef. de aproveitamento: 5.49%

Moment.: -0.0 0.1 0.5 0.7 0.8 0.6 -0.0 -0.0(0.00) 0.1(0.97) 0.8(3.35)
0.6(3.97) -0.0(4.86)

Cortant.: 0.3 0.1 0.4 0.2 0.0 -0.7 ----- 0.5(x= 0.97)
-0.9(x= 4.79)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x=-0.00) 0.00(x= 4.79) Lim.: 0.00

V 20 --- Grupo: 2

Tramo nº 1 (*P32-P32*) (C= 6.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.057 cm. (C/10496)

Arm.sup: ----- 1.5 1.5 0.0(0.03)
 1.5(5.97)

Arm.inf: ----- 1.5 1.5 1.5 1.5 ----- 1.5(1.08) 1.5(2.38)

Moment.: -0.0 1.2 1.8 1.7 0.7 -0.9 -2.6 -0.0(0.03) 1.2(1.08) 2.0(2.38)
 -2.6(5.97)

Cortant.: ----- 1.0 0.4 -0.7 -1.2 -1.8 ----- 1.4(x= 0.10)
 -2.2(x= 5.82)

Torsores: ----- 0.00 0.00 0.05 0.05 0.05 ----- Extr. apoio: 0.00(x= 0.10) 0.05(x= 5.82) Lim.: 0.72

Arm.Superior: $2\phi 6.3(0.08D+4.37=4.45)$ ----- $2\phi 10(2.05>>)$

Arm.Inferior: $2\phi 10(0.12D+6.28=6.40)$

Estribos: $41x1\phi 5c/0.14(5.72)$

Tramo nº 2 (*P32-P31*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.027 cm.
 (C/14679)

Arm.sup: 1.5 1.5 ----- 1.5 1.5 1.5(0.03)
 1.5(3.96)

Arm.inf: ----- 1.5 1.5 1.5 1.5 ----- 1.5(0.79) 1.5(2.01)
 1.5(3.19)

Moment.: -2.6 -0.5 1.6 2.2 1.5 -0.3 -2.0 -2.6(0.00) 0.4(0.79) 2.2(2.01)
 0.4(3.19) -2.0(3.98)

Cortant.: ----- 2.8 1.4 0.1 -1.4 -2.1 ----- 3.1(x= 0.31)
 -2.1(x= 3.31)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.18) 0.01(x= 3.81) Lim.: 0.72

Arm.Superior: $2\phi 10(<<2.05+1.60=3.65)$ ----- $2\phi 10(1.45>>)$

Arm.Montagem: $2\phi 5(1.45)$

Arm.Inferior: $2\phi 10(4.40)$

Estribos: $26x1\phi 5c/0.14(3.63)$

Tramo nº 3 (*P31-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.040 cm.
 (C/12629)

Arm.sup: 1.5 1.5 ----- 1.5 1.7 1.5(0.18)
 1.7(4.97)

Arm.inf: ----- 1.5 1.5 1.5 1.5 1.5 ----- 1.5(0.99) 1.5(2.58)
 1.5(4.01)

Moment.: -2.0 -0.7 2.0 2.7 2.0 -0.8 -3.5 -2.5(0.18) 0.5(0.99) 2.7(2.58)
 0.5(4.01) -3.5(5.00)

Cortant.: ----- 2.2 1.3 0.2 -1.3 -2.3 ----- 2.2(x= 0.58)
 -2.4(x= 4.33)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.18) 0.01(x= 4.82) Lim.: 0.72

Arm.Superior: 2Ø10(<<1.45+1.80=3.25) ----- 2Ø12.5(1.80>>)

Arm.Montagem: 2Ø5(1.85)

Arm.Inferior: 2Ø10(5.40)

Estribos: 34x1Ø5c/0.14(4.65)

Tramo nº 4 (*P30-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 0.094 cm.
 (C/5320)

Arm.sup: 1.7 1.5 ----- ----- 2.0 2.2(0.18)
 2.0(4.96)

Arm.inf: ----- ----- 1.5 2.3 2.6 1.5 ----- 1.5(0.99) 2.6(3.33)
 1.7(4.01)

Moment.: -3.5 -1.2 2.5 4.2 4.6 2.0 -3.9 -4.0(0.15) 0.1(0.99) 4.6(3.33)
 3.0(4.01) -3.9(5.00)

Cortant.: ----- 3.9 2.7 1.3 0.1 -6.5 ----- 4.1(x= 0.58)
 -6.8(x= 4.58)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.18) 0.02(x= 4.90) Lim.: 0.72

Arm.Superior: 2Ø12.5(<<1.80+1.95=3.75) ----- 2Ø12.5(1.28>>)

Arm.Montagem: 2Ø5(2.25)

Arm.Inferior: 3Ø12.5(5.45)

Estribos: 34x1Ø5c/0.14(4.72)

Tramo nº 5 (*P30-P30*) (C= 2.50) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= -0.008 cm.
 (C/-31753)

Arm.sup: 2.0 1.6 1.5 1.5 1.5 ----- ----- 2.1(0.10)
 1.5(1.67)

Arm.inf: ----- ----- ----- 1.5 1.5 ----- 1.5(1.99)
 1.5(2.08)

Moment.: -3.9 -2.8 -1.5 -0.5 0.0 0.2 0.0 -3.9(0.03) 0.1(1.99)
 0.2(2.08) -0.1(1.58)

Cortant.: ----- 3.0 2.8 2.0 1.2 0.5 ----- 3.1(x= 0.58)
 0.0(x= 2.33)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.10) 0.00(x=

2.40) Lim.: 0.72

Arm.Superior: $2\emptyset 12.5 (<< 1.28 + 2.57 + 0.25D = 4.10)$ -----

Arm.Inferior: $2\emptyset 10 (2.68 + 0.12D = 2.80)$

Estribos: $17 \times 1\emptyset 5c / 0.14 (2.30)$

Armadura de vigas
 Obra: TRF-2 VARAS VERTICAL PARTE 2
 Grupo no 3 Piso 3 --- Pisoigual 1

V 1 --- Grupo: 3

Tramo nº 1 (*P10-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.140 cm.
 (C/3582)

Arm.sup: ----- 1.2 2.2 0.0(0.04)
 2.2(4.93)

Arm.inf: ----- 1.2 1.8 1.7 1.2 ----- 1.3(1.00) 1.8(2.05)

Moment.: -0.1 1.6 2.5 2.4 1.2 -0.8 -3.4 -0.1(0.03) 1.8(1.00) 2.6(2.05)
 -3.4(5.00)

Cortant.: ----- 1.4 0.4 -0.7 -1.7 -2.6 ----- 2.5(x= 0.10)
 -3.2(x= 4.90)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.90) Lim.: 0.54

Arm.Superior: $2\emptyset 6.3 (0.08D + 3.62 = 3.70)$ ----- $2\emptyset 10 (1.70 >>), 1\emptyset 10 (1.00 >>)$

Arm.Inferior: $2\emptyset 12.5 (0.15D + 5.07 >>)$

Estribos: $35 \times 1\emptyset 5c / 0.14 (4.80)$

Tramo nº 2 (*P20-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.138 cm.
 (C/3632)

Arm.sup: 2.2 1.2 ----- 2.3(0.10)
 0.0(4.96)

Arm.inf: ----- 1.2 1.7 1.8 1.2 ----- 1.9(3.05)
 1.3(4.02)

Moment.: -3.4 -0.9 1.2 2.4 2.5 1.6 -0.1 -3.4(0.03) 2.6(3.05)
 1.9(4.02) -0.1(4.97)

Cortant.: ----- 2.7 1.8 0.8 -0.4 -1.5 ----- 3.3(x= 0.10)
 -2.4(x= 4.90)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.90) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.70+1.75=3.45), 1Ø10(<<1.00+1.00=2.00) -----

2Ø6.3(3.52+0.08D=3.60)

Arm.Inferior: 2Ø12.5(<<5.22+5.07+0.15D=10.44)

Estribos: 35x1Ø5c/0.14(4.80)

V 2 --- Grupo: 3

Tramo nº 1 (*V 9- *) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.178 cm.
(C/2806)

Arm.sup: ----- 1.2 1.8
1.8(4.99)

Arm.inf: ----- 1.3 2.0 2.0 1.2 ----- 1.5(1.00) 2.1(2.05)

Moment.: 0.0 1.8 2.8 2.8 1.6 -0.4 -2.5 0.0(0.00) 2.1(1.00) 3.0(2.05)
-2.5(5.00)

Cortant.: 2.3 1.7 0.6 -0.7 -1.9 -2.5 -2.0 2.3(x= 0.00)
-2.5(x= 4.30)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 5.00) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+3.92=4.00) ----- 2Ø12.5(1.50>>)

Arm.Inferior: 2Ø12.5(0.15D+5.07>>)

Estribos: 35x1Ø5c/0.14(4.80)

Tramo nº 2 (* -V 1*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.159 cm.
(C/3141)

Arm.sup: 1.8 1.2 ----- 1.8(0.00)

Arm.inf: ----- 1.2 1.9 1.9 1.3 ----- 2.0(3.05)
1.4(4.02)

Moment.: -2.5 -0.5 1.4 2.6 2.7 1.8 0.0 -2.5(0.00) 2.8(3.05)
2.0(4.02) 0.0(5.00)

Cortant.: -2.0 2.4 1.8 0.7 -0.5 -1.6 -2.2 2.4(x= 0.80)
-2.2(x= 5.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 5.00) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<1.50+1.60=3.10) ----- 2Ø6.3(3.67+0.08D=3.75)

Arm.Inferior: 2Ø12.5(<<5.22+5.07+0.15D=10.44)

Estribos: 35x1Ø5c/0.14(4.80)

V 3 --- Grupo: 3

Tramo nº 1 (*P11-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.619 cm. (C/807)

Arm.sup: 0.1 ----- 1.2 5.9 0.1(0.04)
6.2(4.85)

Arm.inf: ----- 2.8 4.5 4.8 2.8 ----- 3.2(1.00) 4.9(2.30)

Moment.: -0.2 3.9 6.3 6.7 3.9 -1.7 -9.6 -0.2(0.03) 4.5(1.00) 6.9(2.30)
-9.6(5.00)

Cortant.: ----- 3.9 1.7 -1.6 -5.2 -8.1 ----- 7.2(x= 0.10)
-10.9(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.82) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+3.72=3.80) ----- 2Ø16(1.70>>), 2Ø12.5(1.20>>)

Arm.Inferior: 2Ø12.5(0.15D+5.40=5.55), 2Ø12.5(4.55)

Estribos: 6x1Ø6.3c/0.14(0.80), 16x1Ø6.3c/0.17(2.72), 12x1Ø6.3c/0.1(1.20)

Tramo nº 2 (*P20-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.402 cm. (C/1242)

Arm.sup: 5.9 1.9 ----- 0.3 6.5(0.18)
0.3(4.93)

Arm.inf: ----- 1.9 3.8 3.9 2.4 ----- 4.0(3.05)
2.8(4.02)

Moment.: -9.6 -2.7 2.7 5.3 5.4 3.3 -0.4 -9.6(0.03) 5.7(3.05)
3.9(4.02) -0.5(4.96)

Cortant.: ----- 7.5 4.4 1.6 -1.1 -3.6 ----- 10.0(x= 0.18)
-8.7(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x= 4.82) Lim.: 0.54

Arm.Superior: 2Ø16(<<1.70+1.90=3.60), 2Ø12.5(<<1.20+1.25=2.45) -----
2Ø6.3(3.62+0.08D=3.70)

Arm.Inferior: 2Ø16(5.36+0.19D=5.55), 1Ø10(3.00)

Estribos: 10x1Ø6.3c/0.11(1.10), 16x1Ø6.3c/0.17(2.75), 7x1Ø6.3c/0.12(0.80)

V 4 --- Grupo: 3

Tramo nº 1 (*V 1-V 1*) (C= 2.17) Viga alta Tipo R Seção B*H = 15 X 40 Flecha= 0.001 cm.

(C/277967)

Arm.sup: ----- 0.9 0.9 0.9 ----- 0.9 0.9 0.9 -----
0.9(1.73)

Arm.inf: ----- 0.9 0.9 0.9 ----- 0.9 0.9(0.42) 0.9(0.48)
0.9(2.16)

Moment.: 0.1 0.7 0.6 0.2 -0.5 -0.8 0.1 0.0(0.00) 0.8(0.42) 0.8(0.48)
0.1(2.17) -0.8(1.73)

Cortant.: 2.4 0.6 -0.8 -1.3 -1.2 0.4 3.2 3.2(x= 2.17)
-1.4(x= 1.23)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 2.17) Lim.: 0.15

Arm.Superior: 2Ø8(0.10D+2.31+0.10D=2.51) -----

Arm.Inferior: 2Ø8(0.10D+2.31+0.10D=2.51)

Estribos: 12x1Ø5c/0.17(1.98)

V 5 --- Grupo: 3

Tramo nº 1 (*V 1-V 1*) (C= 2.17) Viga alta Tipo R Seção B*H = 15 X 40 Flecha= 0.009 cm.
(C/25472)

Arm.sup: ----- 0.9 0.9 ----- 0.9 0.9 -----
0.9(1.98)

Arm.inf: ----- 0.9 0.9 0.9 0.9 ----- 0.9 0.9(0.42) 0.9(0.64)
0.9(2.16)

Moment.: 0.0 0.8 1.0 0.6 -0.1 -0.7 0.0 -0.0(0.00) 0.9(0.42) 1.0(0.64)
0.0(2.17) -0.7(1.98)

Cortant.: 2.8 1.1 -0.3 -1.2 -1.6 -0.2 3.6 3.6(x= 2.17)
-1.7(x= 1.48)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 2.17) Lim.: 0.15

Arm.Superior: 2Ø8(0.10D+2.31+0.10D=2.51) -----

Arm.Inferior: 2Ø8(0.11D+2.31+0.11D=2.53)

Estribos: 12x1Ø5c/0.17(1.98)

V 6 --- Grupo: 3

Tramo nº 1 (*P12-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.590 cm.
(C/847)

Arm.sup: ----- 1.2 5.1 0.1(0.04)
5.3(4.93)

Arm.inf: ----- 2.5 4.0 4.4 2.8 ----- 2.9(1.00) 4.4(2.30)
 1.2(4.02)
 Moment.: -0.2 3.5 5.7 6.2 4.0 -0.9 -7.8 -0.2(0.03) 4.0(1.00) 6.2(2.30)
 0.2(4.02) -7.8(5.00)
 Cortant.: ----- 3.6 1.6 -0.3 -4.6 -7.1 ----- 6.0(x= 0.10)
 -9.8(x= 4.90)
 Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x=
 4.90) Lim.: 0.54

Arm.Superior: $2\emptyset 6.3(0.08D+3.67=3.75)$ ----- $2\emptyset 16(1.60>>)$, $2\emptyset 10(1.00>>)$

Arm.Inferior: $2\emptyset 12.5(0.15D+5.07>>)$, $1\emptyset 16(4.40)$

Estribos: $22 \times 1\emptyset 6.3c/0.17(3.70)$, $10 \times 1\emptyset 6.3c/0.11(1.10)$

Tramo nº 2 (*P20-P31*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.361 cm.
(C/1386)

Arm.sup: 5.1 1.4 ----- 0.3 5.3(0.10)
 0.3(4.93)
 Arm.inf: ----- 1.8 3.3 3.4 2.0 ----- 3.5(3.05)
 2.4(4.02)
 Moment.: -7.8 -1.9 2.5 4.6 4.8 2.9 -0.4 -7.8(0.00) 5.0(3.05)
 3.3(4.02) -0.5(4.96)
 Cortant.: ----- 6.1 3.7 1.3 -1.1 -3.3 ----- 8.4(x= 0.10)
 -8.6(x= 4.82)
 Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x=
 4.82) Lim.: 0.54

Arm.Superior: $2\emptyset 16(<<1.60+1.80=3.40)$, $2\emptyset 10(<<1.00+1.05=2.05)$ -----
 $2\emptyset 6.3(3.67+0.08D=3.75)$

Arm.Inferior: $2\emptyset 12.5(<<5.22+5.17+0.15D=10.54)$, $1\emptyset 12.5(3.95)$

Estribos: $6 \times 1\emptyset 6.3c/0.14(0.80)$, $18 \times 1\emptyset 6.3c/0.17(3.12)$, $7 \times 1\emptyset 6.3c/0.12(0.80)$

V 7 --- Grupo: 3

Tramo nº 1 (*P12-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.374 cm.
(C/1338)

Arm.sup: ----- 1.2 4.9 0.1(0.04)
 5.2(4.82)
 Arm.inf: ----- 2.0 3.2 3.2 2.0 ----- 2.3(1.00) 3.4(2.05)
 Moment.: -0.1 2.8 4.4 4.5 2.8 -1.1 -8.0 -0.1(0.03) 3.2(1.00) 4.7(2.05)
 -8.0(5.00)

Cortant.: ----- 2.8 1.0 -1.0 -3.2 -6.6 ----- 4.2(x= 0.10)
 -9.6(x= 4.55)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.82) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+3.72=3.80) ----- 2Ø16(1.60>>), 2Ø10(1.05>>)

Arm.Inferior: 2Ø12.5(0.15D+5.06>>), 1Ø12.5(3.80)

Estribos: 23x1Ø6.3c/0.17(3.84), 8x1Ø6.3c/0.11(0.88)

Tramo nº 2 (*P20-P32*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.298 cm.
 (C/1681)

Arm.sup: 4.9 1.2 ----- ----- ----- 0.2 5.3(0.15)
 0.2(4.93)

Arm.inf: ----- ----- 1.9 3.1 3.1 1.9 ----- 3.2(2.80)
 2.2(4.02)

Moment.: -8.0 -1.5 2.7 4.3 4.3 2.6 -0.3 -8.0(0.03) 4.5(2.80)
 3.0(4.02) -0.3(4.96)

Cortant.: ----- 6.6 3.2 1.0 -1.0 -2.7 ----- 9.3(x= 0.30)
 -6.1(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.18) 0.00(x= 4.82) Lim.: 0.54

Arm.Superior: 2Ø16(<<1.60+1.70=3.30), 2Ø10(<<1.05+1.10=2.15) -----
 2Ø6.3(3.77+0.08D=3.85)

Arm.Inferior: 2Ø12.5(<<5.21+5.17+0.15D=10.53), 1Ø10(3.60)

Estribos: 7x1Ø6.3c/0.12(0.84), 23x1Ø6.3c/0.17(3.81)

V 8 --- Grupo: 3

Tramo nº 1 (*V 9-V 1*) (C=10.00) Viga alta Tipo R Seção B*H = 20 X 50 Flecha= 3.325 cm.
 (C/301)

Arm.sup: -----

Arm.inf: ----- 5.1 7.6 8.2 7.6 5.0 ----- 5.8(2.00) 8.2(5.00)
 5.7(8.02)

Moment.: -0.0 9.1 13.4 14.2 13.4 9.0 -0.0 -0.0(0.00) 10.4(2.00) 14.2(5.00)
 10.2(8.02) -0.0(10.0)

Cortant.: 6.0 3.9 1.2 1.5 -1.2 -3.9 -5.9 6.0(x= 0.00)
 -5.9(x=10.00)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
 0.00(x=10.00) Lim.: 0.72

Arm.Superior: 2Ø6.3(0.08D+10.14+0.08D=10.30) -----

Arm.Inferior: 4Ø16(0.26D+10.14+0.26D=10.66), 1Ø16(6.75)

Estribos: 70x1Ø5c/0.14(9.80)

V 9 --- Grupo: 3

Tramo nº 1 (* -P13*) (C= 1.68) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.037 cm.
(C/4570)

Arm.sup: 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2(0.56)
1.2(1.66)

Arm.inf: 1.2 1.2 1.2 ----- 1.2(0.04) 1.2(0.34)

Moment.: 0.6 0.4 -0.3 -0.6 -0.9 -1.2 -1.5 -0.0(0.13) 0.6(0.00) 0.4(0.34)
-1.5(1.68)

Cortant.: 0.0 -0.3 -0.5 -0.6 -0.5 0.1 ----- 0.5(x= 1.58)
-0.6(x= 0.88)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.01 ----- Extr. apoio: 0.00(x= 0.00) 0.01(x=
1.58) Lim.: 0.54

Arm.Superior: 2Ø10(0.12D+1.65>>) -----

Arm.Inferior: 2Ø10(0.12D+1.78=1.90)

Estribos: 12x1Ø5c/0.14(1.55)

Tramo nº 2 (*P13-P12*) (C= 6.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.974 cm.
(C/616)

Arm.sup: 1.2 ----- 1.2 3.3 1.2(0.06)
3.3(5.99)

Arm.inf: ----- 2.4 5.5 5.1 2.7 ----- 3.0(1.19) 6.6(2.35)
1.2(4.81)

Moment.: -1.5 3.3 7.6 7.1 3.8 -0.3 -5.1 -1.6(0.06) 4.2(1.19) 8.9(2.35)
0.6(4.81) -5.1(6.00)

Cortant.: ----- 5.7 4.8 -2.2 -3.0 -3.9 ----- 5.9(x= 0.70)
-4.5(x= 5.90)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.02(x= 0.10) 0.00(x=
5.90) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.77+1.38=3.15) ----- 2Ø12.5(1.62>>), 2Ø10(1.20>>)

Arm.Montagem: 2Ø5(3.50)

Arm.Inferior: 3Ø16(6.15), 1Ø10(5.20)

Estribos: 7x1Ø5c/0.13(0.91), 35x1Ø5c/0.14(4.89)

Tramo nº 3 (*P12-P12*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.127 cm.
(C/-3135)

Arm.sup: 3.3 2.9 1.9 1.3 1.2 1.2 1.2 3.8(0.10)
1.2(2.67)

Arm.inf: ----- 1.2 1.2 1.2 ----- 1.2(3.19)
1.2(3.24)

Moment.: -5.1 -4.0 -2.7 -1.8 -1.2 1.3 -1.2 -5.3(0.09) 1.3(3.19)
1.3(3.24) -1.2(3.97)

Cortant.: ----- 2.2 1.6 1.0 0.4 -0.2 ----- 2.5(x= 0.10)
-0.3(x= 3.88)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x=
3.88) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<3.98>>), 2Ø10(<<1.20+1.55=2.75) -----

Arm.Inferior: 2Ø10(4.25)

Estribos: 27x1Ø5c/0.14(3.78)

Tramo nº 4 (*P12-P11*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.207 cm.
(C/2413)

Arm.sup: 1.2 ----- 1.2 2.4 1.2(0.10)
2.4(4.91)

Arm.inf: ----- 1.2 2.0 2.2 1.5 ----- 1.2(0.99) 2.3(2.22)
1.2(4.01)

Moment.: -1.2 1.3 2.9 3.1 2.0 -0.4 -3.8 -1.2(0.00) 1.7(0.99) 3.2(2.22)
0.3(4.01) -3.8(5.00)

Cortant.: ----- 2.2 0.9 -0.5 -1.9 -3.3 ----- 2.9(x= 0.10)
-3.8(x= 4.72)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.10) 0.01(x=
4.85) Lim.: 0.54

Arm.Superior: 2Ø12.5(<<5.60+1.10=6.70) ----- 2Ø10(1.55>>), 1Ø12.5(1.00>>)

Arm.Montagem: 2Ø5(2.80)

Arm.Inferior: 2Ø10(5.25), 1Ø10(3.50)

Estribos: 34x1Ø5c/0.14(4.75)

Tramo nº 5 (*P11-P10*) (C= 5.73) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.137 cm.

(C/4197)

Arm.sup: 2.4 1.2 ----- 1.3 2.7(0.15)
1.3(5.71)

Arm.inf: ----- 1.2 2.0 2.4 1.2 ----- 2.4(3.77)
1.3(4.60)

Moment.: -3.8 -1.3 1.5 2.8 3.3 1.4 -2.0 -3.8(0.06) 3.4(3.77)
1.8(4.60) -2.0(5.72)

Cortant.: ----- 2.8 1.9 1.0 -1.8 -2.4 ----- 3.1(x= 0.47)
-2.9(x= 5.63)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.15) 0.00(x=
5.63) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.55+2.15=3.70), 1Ø12.5(<<1.00+1.25=2.25) ----- 2Ø10(1.33>>)

Arm.Montagem: 2Ø5(2.75)

Arm.Inferior: 2Ø12.5(5.95)

Estribos: 40x1Ø5c/0.14(5.48)

Tramo nº 6 (*P10-P10*) (C= 1.78) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.008 cm.
(C/-21698)

Arm.sup: 1.3 1.2 1.2 1.2 1.2 1.2 ----- 1.5(0.10)
1.2(1.19)

Arm.inf: ----- 0.0(1.73)

Moment.: -2.0 -1.7 -1.1 -0.7 -0.4 -0.2 0.0 -2.1(0.07) -0.1(1.41)
0.0(1.75) 0.0(1.78)

Cortant.: ----- 1.9 1.7 1.5 1.2 1.1 ----- 1.9(x= 0.10)
0.5(x= 1.50)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x=
1.68) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.33+1.85+0.12D=3.30) -----

Arm.Inferior: 2Ø10(1.98+0.12D=2.10)

Estribos: 12x1Ø5c/0.14(1.58)

V 10 --- Grupo: 3

Tramo nº 1 (*V 6-V 3*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.522 cm.
(C/958)

Arm.sup: -----

Arm.inf: ----- 2.0 3.3 3.6 2.8 1.5 ----- 2.3(0.99) 3.7(2.11)

1.6(4.01)

Moment.: 0.0 2.8 4.6 5.0 4.0 2.1 -0.0 0.0(0.00) 3.3(0.99) 5.2(2.11)
2.3(4.01) -0.0(5.00)

Cortant.: 3.0 2.9 1.4 -0.6 -1.9 -1.1 -0.9 3.4(x= 0.47)
-4.1(x= 4.24)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Extr. apoio: 0.00(x= 0.00)
0.00(x= 5.00) Lim.: 0.54

Arm.Superior: 2Ø6.3(0.08D+5.14+0.08D=5.30) -----

Arm.Inferior: 2Ø12.5(0.15D+5.14+0.15D=5.44), 1Ø12.5(3.85)

Estribos: 35x1Ø5c/0.14(4.80)

V 11 --- Grupo: 3

Tramo nº 1 (*V 8-P20*) (C= 3.65) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.177 cm.
(C/-2067)

Arm.sup: ----- 1.2 1.8 3.7 6.1 3.3 1.2(1.21)
7.5(3.47)

Arm.inf: 2.4 2.7 2.0 1.2 ----- 2.8(0.35) 2.6(0.75)

Moment.: 3.4 3.8 2.8 -2.5 -5.2 -8.3 -5.5 0.0(0.00) 3.9(0.35) 3.6(0.75)
-9.9(3.47)

Cortant.: 1.7 -1.0 -2.4 -3.7 -4.7 -4.6 ----- 1.7(x= 0.00)
-5.0(x= 2.85)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.00) 0.00(x=
3.47) Lim.: 0.54

Arm.Superior: ----- 2Ø16(1.82>>)

Arm.Montagem: 2Ø16(0.19D+4.46=4.65)

Arm.Inferior: 2Ø16(0.25D+4.05=4.30)

Estribos: 25x1Ø5c/0.14(3.37)

Tramo nº 2 (*P20-P20*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.136 cm.
(C/-2928)

Arm.sup: 3.3 2.0 1.8 1.4 1.5 2.2 3.0 2.8(0.03)
3.3(3.88)

Arm.inf: ----- 1.2 1.2 ----- 1.5(0.18) 1.2(2.20)

Moment.: -5.5 -2.8 -2.6 -2.0 -2.1 -3.1 -4.5 -5.5(0.00) 2.1(0.18) 0.2(2.20)
-4.7(3.91)

Cortant.: ----- -1.3 0.9 0.4 -0.8 -2.1 ----- 10.2(x= 0.18)

-3.0(x= 0.45)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x= 3.88) Lim.: 0.54

Arm.Superior: 2Ø16(<<3.98>>) -----

Arm.Inferior: 2Ø16(4.40)

Estribos: 25x1Ø8c/0.15(3.71)

Tramo nº 3 (*P20-P20*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.729 cm. (C/686)

Arm.sup: 3.0 ----- 1.2 5.8 2.9(0.01)
6.2(4.87)

Arm.inf: ----- 2.0 5.0 5.7 3.9 ----- 2.8(0.99) 5.8(2.22)
1.2(4.01)

Moment.: -4.5 2.8 7.0 7.9 5.4 -1.2 -9.4 -4.5(0.00) 3.9(0.99) 8.0(2.22)
0.8(4.01) -9.4(5.00)

Cortant.: ----- 6.7 2.9 -0.9 -4.8 -11.9 ----- 9.7(x= 0.10)
-12.7(x= 4.82)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x= 4.82) Lim.: 0.54

Arm.Superior: 2Ø16(<<5.80+1.20=7.00) ----- 2Ø16(1.65>>), 2Ø12.5(1.15>>)

Arm.Montagem: 2Ø8(2.60)

Arm.Inferior: 2Ø16(5.60), 1Ø16(3.45)

Estribos: 25x1Ø8c/0.15(3.64), 9x1Ø8c/0.12(1.08)

Tramo nº 4 (*P20-P20*) (C= 5.72) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.388 cm. (C/1473)

Arm.sup: 5.8 2.1 ----- 3.3 6.4(0.18)
3.3(5.70)

Arm.inf: ----- 2.7 4.6 5.4 2.5 ----- 1.2(1.13) 5.5(3.77)
3.1(4.60)

Moment.: -9.4 -3.0 3.8 6.4 7.5 3.5 -5.2 -9.4(0.00) 0.2(1.13) 7.7(3.77)
4.4(4.60) -5.2(5.72)

Cortant.: ----- 5.9 3.7 2.0 -3.4 -5.3 ----- 7.8(x= 0.18)
-9.3(x= 5.57)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x= 5.57) Lim.: 0.54

Arm.Superior: 2Ø16(<<1.65+2.30=3.95), 2Ø12.5(<<1.15+1.25=2.40) ----- 2Ø16(1.36>>)

Arm.Montagem: 2Ø6.3(2.60)

Arm.Inferior: 2Ø16(6.20), 2Ø10(3.90)

Estribos: 27x1Ø6.3c/0.17(4.60), 8x1Ø6.3c/0.11(0.80)

Tramo nº 5 (*P20-P20*) (C= 1.78) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.021 cm.
(C/-8491)

Arm.sup: 3.3 2.9 1.9 1.2 1.2 1.2 ----- 3.6(0.13)
1.2(1.19)

Arm.inf: ----- 0.0(1.73)

Moment.: -5.2 -4.1 -2.6 -1.6 -0.8 -0.3 0.0 -5.3(0.04) -0.2(1.41)
0.0(1.75) 0.0(1.78)

Cortant.: ----- 5.8 4.2 3.1 2.2 1.8 ----- 6.9(x= 0.15)
0.8(x= 1.50)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.15) 0.00(x=
1.68) Lim.: 0.54

Arm.Superior: 2Ø16(<<1.36+1.85+0.19D=3.40) -----

Arm.Inferior: 2Ø10(2.08+0.12D=2.20)

Estribos: 13x1Ø5c/0.12(1.53)

V 12 --- Grupo: 3

Tramo nº 1 (* -P32*) (C= 1.68) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.035 cm.
(C/4858)

Arm.sup: 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2(0.56)
1.2(1.66)

Arm.inf: 1.2 1.2 1.2 ----- 1.2(0.04) 1.2(0.34)

Moment.: 0.5 0.4 -0.3 -0.6 -0.9 -1.2 -1.4 -0.0(0.00) 0.5(0.00) 0.4(0.34)
-1.4(1.68)

Cortant.: 0.0 -0.3 -0.5 -0.6 -0.5 0.3 ----- 0.9(x= 1.58)
-0.6(x= 0.88)

Torsores: 0.00 0.00 0.00 0.00 0.00 0.01 ----- Extr. apoio: 0.00(x= 0.00) 0.01(x=
1.58) Lim.: 0.54

Arm.Superior: 2Ø10(0.12D+1.65>>) -----

Arm.Inferior: 2Ø10(0.12D+1.78=1.90)

Estribos: 12x1Ø5c/0.14(1.55)

Tramo nº 2 (*P32-P32*) (C= 6.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.817 cm.
(C/735)

Arm.sup: 1.2 ----- 1.2 3.4 1.2(0.07)
4.2(5.82)

Arm.inf: ----- 2.2 5.0 4.5 1.9 ----- 2.8(1.19) 6.0(2.35)

Moment.: -1.4 3.0 7.0 6.3 2.7 -1.7 -5.6 -1.7(0.07) 3.9(1.19) 8.2(2.35)
-6.0(5.87)

Cortant.: ----- 5.3 4.4 -2.4 -3.2 -4.1 ----- 5.5(x= 0.70)
-4.5(x= 5.45)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.10) 0.01(x= 5.82) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.77+1.38=3.15) ----- 2Ø16(2.02>>), 1Ø10(1.20>>)

Arm.Montagem: 2Ø5(3.10)

Arm.Inferior: 2Ø16(6.25), 1Ø16(3.90)

Estribos: 41x1Ø5c/0.14(5.72)

Tramo nº 3 (*P32-P31*) (C= 3.98) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= -0.108 cm.
(C/-3674)

Arm.sup: 3.4 2.7 1.8 1.2 1.2 1.2 1.2 3.5(0.18)
1.2(2.67)

Arm.inf: -----

Moment.: -5.6 -3.8 -2.5 -1.6 -1.0 -0.7 -1.1 -5.6(x= 0.00) -0.4(x= 3.19)
-1.1(x= 3.98)

Cortant.: ----- 2.1 1.6 1.1 0.6 0.3 ----- 2.2(x= 0.45)
0.1(x= 3.20)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x= 3.81) Lim.: 0.54

Arm.Superior: 2Ø16(<<3.98>>), 1Ø10(<<1.20+0.80=2.00) -----

Arm.Inferior: 2Ø10(4.30)

Estribos: 26x1Ø5c/0.14(3.63)

Tramo nº 4 (*P31-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.184 cm.
(C/2719)

Arm.sup: 1.2 ----- 1.2 1.9 1.2(0.18)
1.9(4.85)

Arm.inf: ----- 1.2 1.8 2.1 1.5 1.2 ----- 1.2(0.99) 2.1(2.47)

1.2(4.01)

Moment.: -1.1 0.6 2.5 3.0 2.1 -0.1 -3.0 -1.7(0.15) 1.1(0.99) 3.0(2.47)
0.5(4.01) -3.0(5.00)

Cortant.: ----- 2.4 1.2 -0.2 -1.6 -2.9 ----- 2.8(x= 0.47)
-3.2(x= 4.47)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.01(x= 0.18) 0.01(x= 4.82) Lim.: 0.54

Arm.Superior: 2Ø16(<<6.00+1.35=7.35) ----- 2Ø10(1.45>>), 1Ø10(1.00>>)

Arm.Montagem: 2Ø5(2.70)

Arm.Inferior: 2Ø12.5(5.30)

Estribos: 34x1Ø5c/0.14(4.65)

Tramo nº 5 (*P30-P30*) (C= 5.00) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.054 cm.
(C/9266)

Arm.sup: 1.9 1.2 1.2 ----- 1.2 2.2(0.18)
1.2(4.99)

Arm.inf: ----- 1.2 1.4 1.7 1.2 ----- 1.7(3.67)
1.4(4.01)

Moment.: -3.0 -1.5 1.0 2.0 2.4 1.6 -1.2 -3.1(0.10) 2.4(3.67)
1.9(4.01) -1.2(5.00)

Cortant.: ----- 2.2 1.6 0.8 0.2 -2.4 ----- 2.4(x= 0.47)
-2.7(x= 4.90)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.18) 0.00(x= 4.90) Lim.: 0.54

Arm.Superior: 2Ø10(<<1.45+2.25=3.70), 1Ø10(<<1.00+1.05=2.05) ----- 1Ø6.3(1.00>>),
2Ø10(1.12>>)

Arm.Montagem: 2Ø5(2.10)

Arm.Inferior: 2Ø12.5(5.40)

Estribos: 34x1Ø5c/0.14(4.72)

Tramo nº 6 (*P30-P30*) (C= 2.50) Viga alta Tipo R Seção B*H = 20 X 40 Flecha= 0.000 cm.
(C/533574)

Arm.sup: 1.2 1.2 1.2 ----- 1.2(0.03)
0.0(2.46)

Arm.inf: ----- 1.2 1.2 1.2 1.2 ----- 1.2(1.72)
1.2(2.01)

Moment.: -1.2 -0.7 0.2 0.5 0.6 0.5 0.2 -1.3(0.03) 0.6(1.72)
0.5(2.01) -0.0(2.47)

Cortant.: ----- 1.5 1.1 0.6 0.2 -0.2 ----- 1.6(x= 0.10)
-0.4(x= 2.40)

Torsores: ----- 0.00 0.00 0.00 0.00 0.00 ----- Extr. apoio: 0.00(x= 0.10) 0.00(x=
2.40) Lim.: 0.54

Arm.Superior: 1Ø6.3(<<1.00+1.00=2.00), 2Ø10(<<1.12+2.57+0.16D=3.85) -----

Arm.Inferior: 2Ø10(2.73+0.12D=2.85)

Estribos: 17x1Ø5c/0.14(2.30)