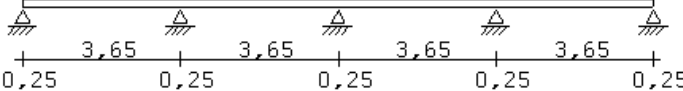


## Travi T5 - T6 - T7 - T8

|                                         |                                                             |                           |
|-----------------------------------------|-------------------------------------------------------------|---------------------------|
| acc. : $f_{yk} = 4500 \text{ daN/cm}^2$ | $f_{yd} = f_{yk} / 1,15 = 3913 \text{ daN/cm}^2$            | copriferro sup : 3,00 cm  |
| cls. : $R_{ck} = 250 \text{ daN/cm}^2$  | $f_{cd} = 0,85 \times f_{ck} / 1,50 = 118 \text{ daN/cm}^2$ | copriferro inf : 3,00 cm  |
| Coeff.Car.Perm. Strutturali= 1,30       | $E_c = 314470 \text{ daN/cm}^2$                             | Coeff.Car.Variabili= 1,50 |
| Coeff.Car.Perm. Non Strutt.= 1,50       |                                                             | Coeff.Car.Sismici = 0,30  |

### CARICHI (daN/m)

|               |                                                                                    |        |        |        |
|---------------|------------------------------------------------------------------------------------|--------|--------|--------|
| Q             | 364                                                                                | 365    | 365    | 364    |
| G2            | 740                                                                                | 740    | 740    | 740    |
| G1            | 305                                                                                | 307    | 307    | 305    |
| p.p.          | 150                                                                                | 150    | 150    | 150    |
|               |  |        |        |        |
| f. (l/2) (cm) | -0,313                                                                             | -0,140 | -0,140 | -0,313 |
| f.max. (cm)   | -0,317                                                                             | -0,140 | -0,140 | -0,317 |
| pos. (m)      | 1,65                                                                               | 1,95   | 1,70   | 2,00   |
| f/l           | 1/1152                                                                             | 1/2600 | 1/2600 | 1/1152 |

### DATI GEOMETRICI SEZIONE

| asta | luce(m) | B.sup | H.sez. | B.inf | s.anima | s.ala sup. | s.ala inf. | J(cm4)       |
|------|---------|-------|--------|-------|---------|------------|------------|--------------|
| 1 T5 | 3,65    | 30    | 20     |       |         |            |            | 20000 (Rett) |
| 2 T6 | 3,65    | 30    | 20     |       |         |            |            | 20000 (Rett) |
| 3 T7 | 3,65    | 30    | 20     |       |         |            |            | 20000 (Rett) |
| 4 T8 | 3,65    | 30    | 20     |       |         |            |            | 20000 (Rett) |

### REAZIONI VERTICALI APPOGGI

| nodo  | N.max. [daN] | N.perm. [daN] |
|-------|--------------|---------------|
| 1 P6  | 3573         | 652           |
| 2 P7  | 9909         | 1902          |
| 3 P8  | 9036         | 1550          |
| 4 P9  | 9909         | 1902          |
| 5 P10 | 3573         | 652           |

## Travi T5 - T6 - T7 - T8

### MOMENTI MAX. (+) IN CAMPATA

| asta | pos. [m] | MEd[daNm] |   | MRd[daNm] | X[cm] | X/d  | arm.inf. [cm <sup>2</sup> ] | arm.sup. [cm <sup>2</sup> ] |
|------|----------|-----------|---|-----------|-------|------|-----------------------------|-----------------------------|
| 1    | 1,60     | 2840      | < | 3454      | 4,50  | 0,26 | 3 Ø 16 (6,03)               | 4 Ø 12 (4,52)               |
| 2    | 1,90     | 2146      | < | 2640      | 3,81  | 0,22 | 4 Ø 12 (4,52)               | 4 Ø 12 (4,52)               |
| 3    | 1,75     | 2146      | < | 2640      | 3,81  | 0,22 | 4 Ø 12 (4,52)               | 4 Ø 12 (4,52)               |
| 4    | 2,05     | 2840      | < | 3454      | 4,50  | 0,26 | 3 Ø 16 (6,03)               | 4 Ø 12 (4,52)               |

### MOMENTI MAX. (-) SU APPOGGI

| asta | nodo       | MEd[daNm]      |        | MRd[daNm]      | X[cm]        | X/d          | arm.sup. [cm <sup>2</sup> ]    | arm.inf. [cm <sup>2</sup> ] |
|------|------------|----------------|--------|----------------|--------------|--------------|--------------------------------|-----------------------------|
| 1    | sx.<br>dx. | -3530          | <      | -5099          | 4,31         | 0,25         | 4 Ø 12 (2,21)<br>8 Ø 12 (9,04) | (10,55)                     |
| 2    | sx.<br>dx. | -3530<br>-2997 | <<br>< | -5099<br>-5105 | 4,31<br>4,58 | 0,25<br>0,27 | 8 Ø 12 (9,04)<br>8 Ø 12 (9,04) | (10,55)<br>8 Ø 12 (9,04)    |
| 3    | sx.<br>dx. | -2997<br>-3530 | <<br>< | -5105<br>-5099 | 4,58<br>4,31 | 0,27<br>0,25 | 8 Ø 12 (9,04)<br>8 Ø 12 (9,04) | 8 Ø 12 (9,04)<br>(10,55)    |
| 4    | sx.<br>dx. | -3530          | <      | -5099          | 4,31         | 0,25         | 8 Ø 12 (9,04)<br>4 Ø 12 (2,21) | (10,55)                     |

### TAGLIO SLU cdc non Sismica

| asta | nodo       | VEd[daN]     |        | VRd[daN]     | VRd'         | VRcd           | VRsd         | staffe                 |
|------|------------|--------------|--------|--------------|--------------|----------------|--------------|------------------------|
| 1    | sx.<br>dx. | 3573<br>5069 | <<br>< | 8598<br>8598 | 2919<br>4238 | 13493<br>13493 | 8598<br>8598 | Ø 8/ 7 cm<br>Ø 8/ 7 cm |
| 2    | sx.<br>dx. | 4840<br>4518 | <<br>< | 8598<br>8598 | 4238<br>4071 | 13493<br>13493 | 8598<br>8598 | Ø 8/ 7 cm<br>Ø 8/ 7 cm |
| 3    | sx.<br>dx. | 4518<br>4840 | <<br>< | 8598<br>8598 | 4071<br>4238 | 13493<br>13493 | 8598<br>8598 | Ø 8/ 7 cm<br>Ø 8/ 7 cm |
| 4    | sx.<br>dx. | 5069<br>3573 | <<br>< | 8598<br>8598 | 4238<br>2946 | 13493<br>13493 | 8598<br>8598 | Ø 8/ 7 cm<br>Ø 8/ 7 cm |

VEd  
VRd = min (VRcd, VRsd)

Taglio di Calcolo  
Taglio Resistente

VRd' =  $(0.18 k (100 \text{ ro } f_{ck})^{(1/3)}) / 1,50 \text{ bw d}$   
VRmin =  $(0.035 k^{(3/2)} f_{ck}^{(1/2)} \text{ bw d})$

Taglio Res.senza staffe k =  $1 + (20/d)^{(1/2)} \leq 2$   
Taglio Res.Min. VRd'  $\geq$  VRmin

VRcd =  $0.9 d \text{ bw } f'_{cd} \text{ ctg} \theta / (1 + \text{ctg}^2 \theta)$   
VRsd =  $0.9 d A_{sw} f_{yd} \text{ ctg} \theta$

Taglio Res.cls compresso f'cd =  $0.5 x f_{cd} = 59 \text{ daN/cm}^2$   
Taglio Res.con staffe

ctg  $\theta = 1,00$

inclinazione biella cls

## Travi T5 - T6 - T7 - T8

### STATO LIMITE DI TENSIONI DI ESERCIZIO

Grado di aggressività ambientale : ordinarie (a)

| Asta | Q.acc.            | M[daNm] | $\sigma.f.$ [daN/cm <sup>2</sup> ] | $\sigma.c.t$ [daN/cm <sup>2</sup> ] | $\sigma.c.c$ [daN/cm <sup>2</sup> ] |
|------|-------------------|---------|------------------------------------|-------------------------------------|-------------------------------------|
| 1    | RARA              | 1695    | 1931                               |                                     | 84,19 < 124,50 = 0.60 fck           |
|      | FREQUENTE (0,5)   | 1453    | 1656                               |                                     | 72,17 < 93,38 = 0,45 fck            |
|      | QUASI PERM. (0,3) | 1357    | 1546                               |                                     | 67,40 < 93,38 = 0,45 fck            |
| 2    | RARA              | 970     | 1457                               |                                     | 53,10 < 124,50 = 0.60 fck           |
|      | FREQUENTE (0,5)   | 774     | 1163                               |                                     | 42,37 < 93,38 = 0,45 fck            |
|      | QUASI PERM. (0,3) | 696     | 1046                               |                                     | 38,10 < 93,38 = 0,45 fck            |
| 3    | RARA              | 970     | 1457                               |                                     | 53,10 < 124,50 = 0.60 fck           |
|      | FREQUENTE (0,5)   | 774     | 1163                               |                                     | 42,37 < 93,38 = 0,45 fck            |
|      | QUASI PERM. (0,3) | 696     | 1046                               |                                     | 38,10 < 93,38 = 0,45 fck            |
| 4    | RARA              | 1695    | 1931                               |                                     | 84,19 < 124,50 = 0.60 fck           |
|      | FREQUENTE (0,5)   | 1453    | 1656                               |                                     | 72,17 < 93,38 = 0,45 fck            |
|      | QUASI PERM. (0,3) | 1357    | 1546                               |                                     | 67,40 < 93,38 = 0,45 fck            |

Tensione di Trazione CLS : 1.2 fctm 18,88 (sez.non fessurata)

Tensione di Trazione ACC : 0.8 fyk 3600 (sez. fessurata)

| Nodo | Q.acc.            | M[daNm] | $\sigma.f.$ [daN/cm <sup>2</sup> ] | $\sigma.c.t$ [daN/cm <sup>2</sup> ] | $\sigma.c.c$ [daN/cm <sup>2</sup> ] |
|------|-------------------|---------|------------------------------------|-------------------------------------|-------------------------------------|
| 1    | RARA              | 0       |                                    |                                     |                                     |
|      | FREQUENTE (0,5)   | 0       |                                    |                                     |                                     |
|      | QUASI PERM. (0,3) | 0       |                                    |                                     |                                     |
| 2    | RARA              | -2292   | 1765                               |                                     | 81,91 < 124,50 = 0.60 fck           |
|      | FREQUENTE (0,5)   | -1999   | 1540                               |                                     | 71,44 < 93,38 = 0,45 fck            |
|      | QUASI PERM. (0,3) | -1882   | 1450                               |                                     | 67,25 < 93,38 = 0,45 fck            |
| 3    | RARA              | -1661   | 1280                               |                                     | 62,14 < 124,50 = 0.60 fck           |
|      | FREQUENTE (0,5)   | -1401   | 1080                               |                                     | 52,41 < 93,38 = 0,45 fck            |
|      | QUASI PERM. (0,3) | -1296   | 999                                |                                     | 48,48 < 93,38 = 0,45 fck            |
| 4    | RARA              | -2292   | 1765                               |                                     | 81,91 < 124,50 = 0.60 fck           |
|      | FREQUENTE (0,5)   | -1999   | 1540                               |                                     | 71,44 < 93,38 = 0,45 fck            |
|      | QUASI PERM. (0,3) | -1882   | 1450                               |                                     | 67,25 < 93,38 = 0,45 fck            |
| 5    | RARA              | 0       |                                    |                                     |                                     |
|      | FREQUENTE (0,5)   | 0       |                                    |                                     |                                     |
|      | QUASI PERM. (0,3) | 0       |                                    |                                     |                                     |

Tensione di Trazione CLS : 1.2 fctm 18,88 (sez.non fessurata)

Tensione di Trazione ACC : 0.8 fyk 3600 (sez. fessurata)

## Travi T5 - T6 - T7 - T8

### STATO LIMITE DI FESSURAZIONE

Grado di aggressività ambientale : Cond.amb. ordinarie

Comb.Carichi : FREQUENTE

Comb.Carichi : QUASI PERMANENTE

| Asta | $E_{xsm} \times S_{rm}$ | = | $W_m \times 1,70$ | = | $W_k$ | (mm)   | $E_{xsm} \times S_{rm}$ | = | $W_m \times 1,70$ | = | $W_k$ | (mm)   |
|------|-------------------------|---|-------------------|---|-------|--------|-------------------------|---|-------------------|---|-------|--------|
| 1    | $0,00079 \times 124,52$ | = | 0,10              |   | 0,17  | < 0,40 | $0,00074 \times 124,52$ | = | 0,0917            |   | 0,156 | < 0,30 |
| 2    | $0,00055 \times 109,40$ | = | 0,06              |   | 0,10  | < 0,40 | $0,00050 \times 109,40$ | = | 0,0545            |   | 0,093 | < 0,30 |
| 3    | $0,00055 \times 109,40$ | = | 0,06              |   | 0,10  | < 0,40 | $0,00050 \times 109,40$ | = | 0,0545            |   | 0,093 | < 0,30 |
| 4    | $0,00079 \times 124,52$ | = | 0,10              |   | 0,17  | < 0,40 | $0,00074 \times 124,52$ | = | 0,0917            |   | 0,156 | < 0,30 |

Comb.Carichi : FREQUENTE

Comb.Carichi : QUASI PERMANENTE

| Nodo | $E_{xsm} \times S_{rm}$ | = | $W_m \times 1,70$ | = | $W_k$ | (mm)   | $E_{xsm} \times S_{rm}$ | = | $W_m \times 1,70$ | = | $W_k$ | (mm)   |
|------|-------------------------|---|-------------------|---|-------|--------|-------------------------|---|-------------------|---|-------|--------|
| 1    |                         |   |                   |   |       |        |                         |   |                   |   |       |        |
| 2    | $0,00073 \times 77,56$  | = | 0,06              |   | 0,10  | < 0,40 | $0,00069 \times 77,56$  | = | 0,0535            |   | 0,091 | < 0,30 |
| 3    | $0,00051 \times 77,56$  | = | 0,04              |   | 0,07  | < 0,40 | $0,00048 \times 77,56$  | = | 0,0369            |   | 0,063 | < 0,30 |
| 4    | $0,00073 \times 77,56$  | = | 0,06              |   | 0,10  | < 0,40 | $0,00069 \times 77,56$  | = | 0,0535            |   | 0,091 | < 0,30 |
| 5    |                         |   |                   |   |       |        |                         |   |                   |   |       |        |

$E_{sm}$  = deformazione media  
 $S_{rm}$  = distanza media tra le fessure (mm)  
 $W_m = E_{sm} \times S_{rm}$  : valore medio dell'apertura  
 $W_k = 1,7 \times W_m$  : valore caratteristico apertura