

## ***ANEJO N° 6. ESTRUCTURAS***

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***Viaducto de Borges Blanques***

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Subanejo 1.2

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**ESFUERZOS FASE 7  
SECCIÓN NO FISURADA**

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

**CMBAL****Carga Muerta Balasto**

[ 1; 1]CMBAL

Coef. exc:

**SECCIÓN NO FISURADA.**

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | -38.20 | 0.00    |
| 1     | 2    | 1.00  | 0.00  | -33.83 | 36.02   |
| 2     | 2    | 1.00  | 0.00  | -33.83 | 36.02   |
| 2     | 3    | 1.18  | 0.00  | -33.07 | 41.87   |
| 3     | 3    | 1.18  | 0.00  | -33.07 | 41.87   |
| 3     | 4    | 2.35  | 0.00  | -27.93 | 77.71   |
| 4     | 4    | 2.35  | 0.00  | -27.93 | 77.71   |
| 4     | 5    | 3.53  | 0.00  | -22.79 | 107.51  |
| 5     | 5    | 3.53  | 0.00  | -22.79 | 107.51  |
| 5     | 6    | 4.70  | 0.00  | -17.66 | 131.27  |
| 6     | 6    | 4.70  | 0.00  | -17.66 | 131.27  |
| 6     | 7    | 5.88  | 0.00  | -12.52 | 149.00  |
| 7     | 7    | 5.88  | 0.00  | -12.52 | 149.00  |
| 7     | 8    | 7.05  | 0.00  | -7.38  | 160.69  |
| 8     | 8    | 7.05  | 0.00  | -7.38  | 160.69  |
| 8     | 9    | 8.23  | 0.00  | -2.25  | 166.35  |
| 9     | 9    | 8.23  | 0.00  | -2.25  | 166.35  |
| 9     | 10   | 9.40  | 0.00  | 2.89   | 165.97  |
| 10    | 10   | 9.40  | 0.00  | 2.89   | 165.97  |
| 10    | 11   | 10.58 | 0.00  | 8.03   | 159.55  |
| 11    | 11   | 10.58 | 0.00  | 8.03   | 159.55  |
| 11    | 12   | 11.75 | 0.00  | 13.17  | 147.10  |
| 12    | 12   | 11.75 | 0.00  | 13.17  | 147.10  |
| 12    | 13   | 12.93 | 0.00  | 18.30  | 128.61  |
| 13    | 13   | 12.93 | 0.00  | 18.30  | 128.61  |
| 13    | 14   | 14.10 | 0.00  | 23.44  | 104.09  |
| 14    | 14   | 14.10 | 0.00  | 23.44  | 104.09  |
| 14    | 15   | 15.28 | 0.00  | 28.58  | 73.53   |
| 15    | 15   | 15.28 | 0.00  | 28.58  | 73.53   |
| 15    | 16   | 16.45 | 0.00  | 33.71  | 36.93   |
| 16    | 16   | 16.45 | -0.40 | 33.71  | 36.93   |
| 16    | 17   | 17.63 | -0.46 | 38.85  | -5.70   |
| 17    | 17   | 17.63 | -0.46 | 38.85  | -5.70   |
| 17    | 18   | 18.80 | -0.52 | 43.99  | -54.37  |
| 18    | 18   | 18.80 | 0.00  | 43.99  | -54.37  |
| 18    | 19   | 19.98 | 0.00  | 49.13  | -109.08 |
| 19    | 19   | 19.98 | 0.00  | 49.13  | -109.08 |
| 19    | 20   | 21.15 | 0.00  | 54.26  | -169.82 |
| 20    | 20   | 21.15 | 0.00  | 54.26  | -169.82 |
| 20    | 21   | 22.33 | 0.00  | 59.40  | -236.60 |
| 21    | 21   | 22.33 | 0.00  | 59.40  | -236.60 |
| 21    | 22   | 22.50 | 0.00  | 60.17  | -247.06 |
| 22    | 22   | 22.50 | 0.00  | 60.17  | -247.06 |
| 22    | 23   | 23.50 | 0.00  | 64.54  | -309.41 |
| 23    | 1023 | 23.50 | 0.00  | -63.65 | -309.41 |
| 23    | 24   | 24.50 | 0.00  | -59.28 | -247.94 |
| 24    | 24   | 24.50 | 0.00  | -59.28 | -247.94 |
| 24    | 25   | 24.95 | 0.00  | -57.31 | -221.71 |
| 25    | 25   | 24.95 | 0.00  | -57.31 | -221.71 |
| 25    | 26   | 26.40 | 0.00  | -50.97 | -143.20 |
| 26    | 26   | 26.40 | 0.00  | -50.97 | -143.20 |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

CMBAL

Carga Muerta Balasto

[1; 1]CMBAL

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | -44.64 | -73.88  |
| 27    | 27   | 27.85 | 0.00  | -44.64 | -73.88  |
| 27    | 28   | 29.30 | 0.00  | -38.30 | -13.76  |
| 28    | 28   | 29.30 | -0.37 | -38.29 | -13.76  |
| 28    | 29   | 30.75 | -0.31 | -31.95 | 37.17   |
| 29    | 29   | 30.75 | -0.31 | -31.95 | 37.17   |
| 29    | 30   | 32.20 | -0.25 | -25.62 | 78.91   |
| 30    | 30   | 32.20 | 0.00  | -25.62 | 78.91   |
| 30    | 31   | 33.65 | 0.00  | -19.28 | 111.46  |
| 31    | 31   | 33.65 | 0.00  | -19.28 | 111.46  |
| 31    | 32   | 35.10 | 0.00  | -12.94 | 134.82  |
| 32    | 32   | 35.10 | 0.00  | -12.94 | 134.82  |
| 32    | 33   | 36.55 | 0.00  | -6.60  | 148.98  |
| 33    | 33   | 36.55 | 0.00  | -6.60  | 148.98  |
| 33    | 34   | 38.00 | 0.00  | -0.26  | 153.95  |
| 34    | 34   | 38.00 | 0.00  | -0.26  | 153.95  |
| 34    | 35   | 39.45 | 0.00  | 6.08   | 149.73  |
| 35    | 35   | 39.45 | 0.00  | 6.08   | 149.73  |
| 35    | 36   | 40.90 | 0.00  | 12.42  | 136.32  |
| 36    | 36   | 40.90 | 0.00  | 12.42  | 136.32  |
| 36    | 37   | 42.35 | 0.00  | 18.76  | 113.71  |
| 37    | 37   | 42.35 | 0.00  | 18.76  | 113.71  |
| 37    | 38   | 43.80 | 0.00  | 25.10  | 81.91   |
| 38    | 38   | 43.80 | -0.24 | 25.10  | 81.91   |
| 38    | 39   | 45.25 | -0.30 | 31.44  | 40.92   |
| 39    | 39   | 45.25 | -0.30 | 31.44  | 40.92   |
| 39    | 40   | 46.70 | -0.36 | 37.78  | -9.26   |
| 40    | 40   | 46.70 | 0.00  | 37.78  | -9.26   |
| 40    | 41   | 48.15 | 0.00  | 44.12  | -68.63  |
| 41    | 41   | 48.15 | 0.00  | 44.12  | -68.63  |
| 41    | 42   | 49.60 | 0.00  | 50.46  | -137.20 |
| 42    | 42   | 49.60 | 0.00  | 50.46  | -137.20 |
| 42    | 43   | 51.05 | 0.00  | 56.80  | -214.96 |
| 43    | 43   | 51.05 | 0.00  | 56.80  | -214.96 |
| 43    | 44   | 51.50 | 0.00  | 58.76  | -240.96 |
| 44    | 44   | 51.50 | 0.00  | 58.76  | -240.96 |
| 44    | 45   | 52.50 | 0.00  | 63.14  | -301.91 |
| 45    | 1045 | 52.50 | 0.00  | -62.23 | -301.91 |
| 45    | 46   | 53.50 | 0.00  | -57.86 | -241.86 |
| 46    | 46   | 53.50 | 0.00  | -57.86 | -241.86 |
| 46    | 47   | 53.95 | 0.00  | -55.90 | -216.27 |
| 47    | 47   | 53.95 | 0.00  | -55.90 | -216.27 |
| 47    | 48   | 55.40 | 0.00  | -49.56 | -139.81 |
| 48    | 48   | 55.40 | 0.00  | -49.56 | -139.81 |
| 48    | 49   | 56.85 | 0.00  | -43.22 | -72.55  |
| 49    | 49   | 56.85 | 0.00  | -43.22 | -72.55  |
| 49    | 50   | 58.30 | 0.00  | -36.88 | -14.49  |
| 50    | 50   | 58.30 | -0.35 | -36.88 | -14.49  |
| 50    | 51   | 59.75 | -0.29 | -30.54 | 34.39   |
| 51    | 51   | 59.75 | -0.29 | -30.54 | 34.39   |
| 51    | 52   | 61.20 | -0.23 | -24.20 | 74.07   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

CMBAL

Carga Muerta Balasto

[1; 1]CMBAL

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | -24.20 | 74.07   |
| 52    | 53   | 62.65 | 0.00  | -17.86 | 104.57  |
| 53    | 53   | 62.65 | 0.00  | -17.86 | 104.57  |
| 53    | 54   | 64.10 | 0.00  | -11.52 | 125.86  |
| 54    | 54   | 64.10 | 0.00  | -11.52 | 125.86  |
| 54    | 55   | 65.55 | 0.00  | -5.18  | 137.97  |
| 55    | 55   | 65.55 | 0.00  | -5.18  | 137.97  |
| 55    | 56   | 67.00 | 0.00  | 1.16   | 140.88  |
| 56    | 56   | 67.00 | 0.00  | 1.16   | 140.88  |
| 56    | 57   | 68.45 | 0.00  | 7.50   | 134.61  |
| 57    | 57   | 68.45 | 0.00  | 7.50   | 134.61  |
| 57    | 58   | 69.90 | 0.00  | 13.84  | 119.14  |
| 58    | 58   | 69.90 | 0.00  | 13.84  | 119.14  |
| 58    | 59   | 71.35 | 0.00  | 20.18  | 94.48   |
| 59    | 59   | 71.35 | 0.00  | 20.18  | 94.48   |
| 59    | 60   | 72.80 | 0.00  | 26.52  | 60.62   |
| 60    | 60   | 72.80 | -0.25 | 26.52  | 60.62   |
| 60    | 61   | 74.25 | -0.32 | 32.86  | 17.58   |
| 61    | 61   | 74.25 | -0.32 | 32.86  | 17.58   |
| 61    | 62   | 75.70 | -0.38 | 39.19  | -34.66  |
| 62    | 62   | 75.70 | 0.00  | 39.20  | -34.66  |
| 62    | 63   | 77.15 | 0.00  | 45.54  | -96.09  |
| 63    | 63   | 77.15 | 0.00  | 45.54  | -96.09  |
| 63    | 64   | 78.60 | 0.00  | 51.88  | -166.72 |
| 64    | 64   | 78.60 | 0.00  | 51.88  | -166.72 |
| 64    | 65   | 80.05 | 0.00  | 58.21  | -246.53 |
| 65    | 65   | 80.05 | 0.00  | 58.21  | -246.53 |
| 65    | 66   | 80.50 | 0.00  | 60.18  | -273.17 |
| 66    | 66   | 80.50 | 0.00  | 60.18  | -273.17 |
| 66    | 67   | 81.50 | 0.00  | 64.55  | -335.54 |
| 67    | 1067 | 81.50 | 0.00  | -67.48 | -335.54 |
| 67    | 68   | 82.50 | 0.00  | -63.11 | -270.25 |
| 68    | 68   | 82.50 | 0.00  | -63.11 | -270.25 |
| 68    | 69   | 83.08 | 0.00  | -60.59 | -234.68 |
| 69    | 69   | 83.08 | 0.00  | -60.59 | -234.68 |
| 69    | 70   | 84.65 | 0.00  | -53.71 | -144.67 |
| 70    | 70   | 84.65 | 0.00  | -53.71 | -144.67 |
| 70    | 71   | 86.23 | 0.00  | -46.82 | -65.51  |
| 71    | 71   | 86.23 | 0.00  | -46.82 | -65.51  |
| 71    | 72   | 87.80 | 0.00  | -39.93 | 2.81    |
| 72    | 72   | 87.80 | -0.35 | -39.93 | 2.81    |
| 72    | 73   | 89.38 | -0.29 | -33.05 | 60.28   |
| 73    | 73   | 89.38 | -0.29 | -33.05 | 60.28   |
| 73    | 74   | 90.95 | -0.23 | -26.16 | 106.91  |
| 74    | 74   | 90.95 | 0.00  | -26.16 | 106.91  |
| 74    | 75   | 92.53 | 0.00  | -19.28 | 142.69  |
| 75    | 75   | 92.53 | 0.00  | -19.28 | 142.69  |
| 75    | 76   | 94.10 | 0.00  | -12.39 | 167.63  |
| 76    | 76   | 94.10 | 0.00  | -12.39 | 167.63  |
| 76    | 77   | 95.68 | 0.00  | -5.50  | 181.72  |
| 77    | 77   | 95.68 | 0.00  | -5.50  | 181.72  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

CMBAL

Carga Muerta Balasto

[1:1]CMBAL

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 1.38   | 184.97  |
| 78    | 78   | 97.25  | 0.00  | 1.38   | 184.97  |
| 78    | 79   | 98.83  | 0.00  | 8.27   | 177.37  |
| 79    | 79   | 98.83  | 0.00  | 8.27   | 177.37  |
| 79    | 80   | 100.40 | 0.00  | 15.15  | 158.93  |
| 80    | 80   | 100.40 | 0.00  | 15.15  | 158.93  |
| 80    | 81   | 101.98 | 0.00  | 22.04  | 129.64  |
| 81    | 81   | 101.98 | 0.00  | 22.04  | 129.64  |
| 81    | 82   | 103.55 | 0.00  | 28.92  | 89.51   |
| 82    | 82   | 103.55 | -0.26 | 28.92  | 89.51   |
| 82    | 83   | 105.13 | -0.32 | 35.81  | 38.53   |
| 83    | 83   | 105.13 | -0.32 | 35.81  | 38.53   |
| 83    | 84   | 106.70 | -0.38 | 42.70  | -23.30  |
| 84    | 84   | 106.70 | 0.00  | 42.70  | -23.30  |
| 84    | 85   | 108.28 | 0.00  | 49.58  | -95.97  |
| 85    | 85   | 108.28 | 0.00  | 49.58  | -95.97  |
| 85    | 86   | 109.85 | 0.00  | 56.47  | -179.48 |
| 86    | 86   | 109.85 | 0.00  | 56.47  | -179.48 |
| 86    | 87   | 111.43 | 0.00  | 63.35  | -273.85 |
| 87    | 87   | 111.43 | 0.00  | 63.35  | -273.85 |
| 87    | 88   | 112.00 | 0.00  | 65.87  | -311.00 |
| 88    | 88   | 112.00 | 0.00  | 65.87  | -311.00 |
| 88    | 89   | 113.00 | 0.00  | 70.24  | -379.05 |
| 89    | 1089 | 113.00 | 0.00  | -70.26 | -379.05 |
| 89    | 90   | 114.00 | 0.00  | -65.88 | -310.98 |
| 90    | 90   | 114.00 | 0.00  | -65.88 | -310.98 |
| 90    | 91   | 114.58 | 0.00  | -63.37 | -273.82 |
| 91    | 91   | 114.58 | 0.00  | -63.37 | -273.82 |
| 91    | 92   | 116.15 | 0.00  | -56.48 | -179.44 |
| 92    | 92   | 116.15 | 0.00  | -56.48 | -179.44 |
| 92    | 93   | 117.73 | 0.00  | -49.60 | -95.90  |
| 93    | 93   | 117.73 | 0.00  | -49.60 | -95.90  |
| 93    | 94   | 119.30 | 0.00  | -42.71 | -23.21  |
| 94    | 94   | 119.30 | -0.38 | -42.71 | -23.21  |
| 94    | 95   | 120.88 | -0.32 | -35.82 | 38.64   |
| 95    | 95   | 120.88 | -0.32 | -35.82 | 38.64   |
| 95    | 96   | 122.45 | -0.26 | -28.94 | 89.64   |
| 96    | 96   | 122.45 | 0.00  | -28.94 | 89.64   |
| 96    | 97   | 124.03 | 0.00  | -22.05 | 129.80  |
| 97    | 97   | 124.03 | 0.00  | -22.05 | 129.80  |
| 97    | 98   | 125.60 | 0.00  | -15.17 | 159.11  |
| 98    | 98   | 125.60 | 0.00  | -15.17 | 159.11  |
| 98    | 99   | 127.18 | 0.00  | -8.28  | 177.58  |
| 99    | 99   | 127.18 | 0.00  | -8.28  | 177.58  |
| 99    | 100  | 128.75 | 0.00  | -1.40  | 185.20  |
| 100   | 100  | 128.75 | 0.00  | -1.40  | 185.20  |
| 100   | 101  | 130.33 | 0.00  | 5.49   | 181.98  |
| 101   | 101  | 130.33 | 0.00  | 5.49   | 181.98  |
| 101   | 102  | 131.90 | 0.00  | 12.38  | 167.91  |
| 102   | 102  | 131.90 | 0.00  | 12.38  | 167.91  |
| 102   | 103  | 133.48 | 0.00  | 19.26  | 142.99  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

CMBAL

Carga Muerta Balasto

[1:1]CMBAL

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | 19.26  | 142.99  |
| 103   | 104  | 135.05 | 0.00  | 26.15  | 107.23  |
| 104   | 104  | 135.05 | -0.23 | 26.15  | 107.23  |
| 104   | 105  | 136.63 | -0.29 | 33.03  | 60.63   |
| 105   | 105  | 136.63 | -0.29 | 33.03  | 60.63   |
| 105   | 106  | 138.20 | -0.35 | 39.92  | 3.17    |
| 106   | 106  | 138.20 | 0.00  | 39.92  | 3.17    |
| 106   | 107  | 139.78 | 0.00  | 46.81  | -65.12  |
| 107   | 107  | 139.78 | 0.00  | 46.81  | -65.12  |
| 107   | 108  | 141.35 | 0.00  | 53.69  | -144.26 |
| 108   | 108  | 141.35 | 0.00  | 53.69  | -144.26 |
| 108   | 109  | 142.93 | 0.00  | 60.58  | -234.25 |
| 109   | 109  | 142.93 | 0.00  | 60.58  | -234.25 |
| 109   | 110  | 143.50 | 0.00  | 63.09  | -269.81 |
| 110   | 110  | 143.50 | 0.00  | 63.09  | -269.81 |
| 110   | 111  | 144.50 | 0.00  | 67.46  | -335.08 |
| 111   | 111  | 144.50 | 0.00  | -65.63 | -335.08 |
| 111   | 112  | 145.50 | 0.00  | -61.26 | -271.63 |
| 112   | 112  | 145.50 | 0.00  | -61.26 | -271.63 |
| 112   | 113  | 145.68 | 0.00  | -60.49 | -260.99 |
| 113   | 113  | 145.68 | 0.00  | -60.49 | -260.99 |
| 113   | 114  | 146.85 | 0.00  | -55.36 | -192.93 |
| 114   | 114  | 146.85 | 0.00  | -55.36 | -192.93 |
| 114   | 115  | 148.03 | 0.00  | -50.22 | -130.90 |
| 115   | 115  | 148.03 | 0.00  | -50.22 | -130.90 |
| 115   | 116  | 149.20 | 0.00  | -45.08 | -74.91  |
| 116   | 116  | 149.20 | -0.53 | -45.08 | -74.91  |
| 116   | 117  | 150.38 | -0.47 | -39.94 | -24.96  |
| 117   | 117  | 150.38 | -0.47 | -39.94 | -24.96  |
| 117   | 118  | 151.55 | -0.41 | -34.80 | 18.96   |
| 118   | 118  | 151.55 | 0.00  | -34.81 | 18.96   |
| 118   | 119  | 152.73 | 0.00  | -29.67 | 56.84   |
| 119   | 119  | 152.73 | 0.00  | -29.67 | 56.84   |
| 119   | 120  | 153.90 | 0.00  | -24.53 | 88.68   |
| 120   | 120  | 153.90 | 0.00  | -24.53 | 88.68   |
| 120   | 121  | 155.08 | 0.00  | -19.40 | 114.49  |
| 121   | 121  | 155.08 | 0.00  | -19.40 | 114.49  |
| 121   | 122  | 156.25 | 0.00  | -14.26 | 134.26  |
| 122   | 122  | 156.25 | 0.00  | -14.26 | 134.26  |
| 122   | 123  | 157.43 | 0.00  | -9.12  | 148.00  |
| 123   | 123  | 157.43 | 0.00  | -9.12  | 148.00  |
| 123   | 124  | 158.60 | 0.00  | -3.98  | 155.70  |
| 124   | 124  | 158.60 | 0.00  | -3.98  | 155.70  |
| 124   | 125  | 159.78 | 0.00  | 1.15   | 157.36  |
| 125   | 125  | 159.78 | 0.00  | 1.15   | 157.36  |
| 125   | 126  | 160.95 | 0.00  | 6.29   | 152.99  |
| 126   | 126  | 160.95 | 0.00  | 6.29   | 152.99  |
| 126   | 127  | 162.13 | 0.00  | 11.43  | 142.58  |
| 127   | 127  | 162.13 | 0.00  | 11.43  | 142.58  |
| 127   | 128  | 163.30 | 0.00  | 16.56  | 126.14  |
| 128   | 128  | 163.30 | 0.00  | 16.56  | 126.14  |



# CÁLCULO TENSIONAL

Hipótesis de cálculo:

CMBAL

Carga Muerta Balasto

[ 1; 1]CMBAL

Coef. exc:

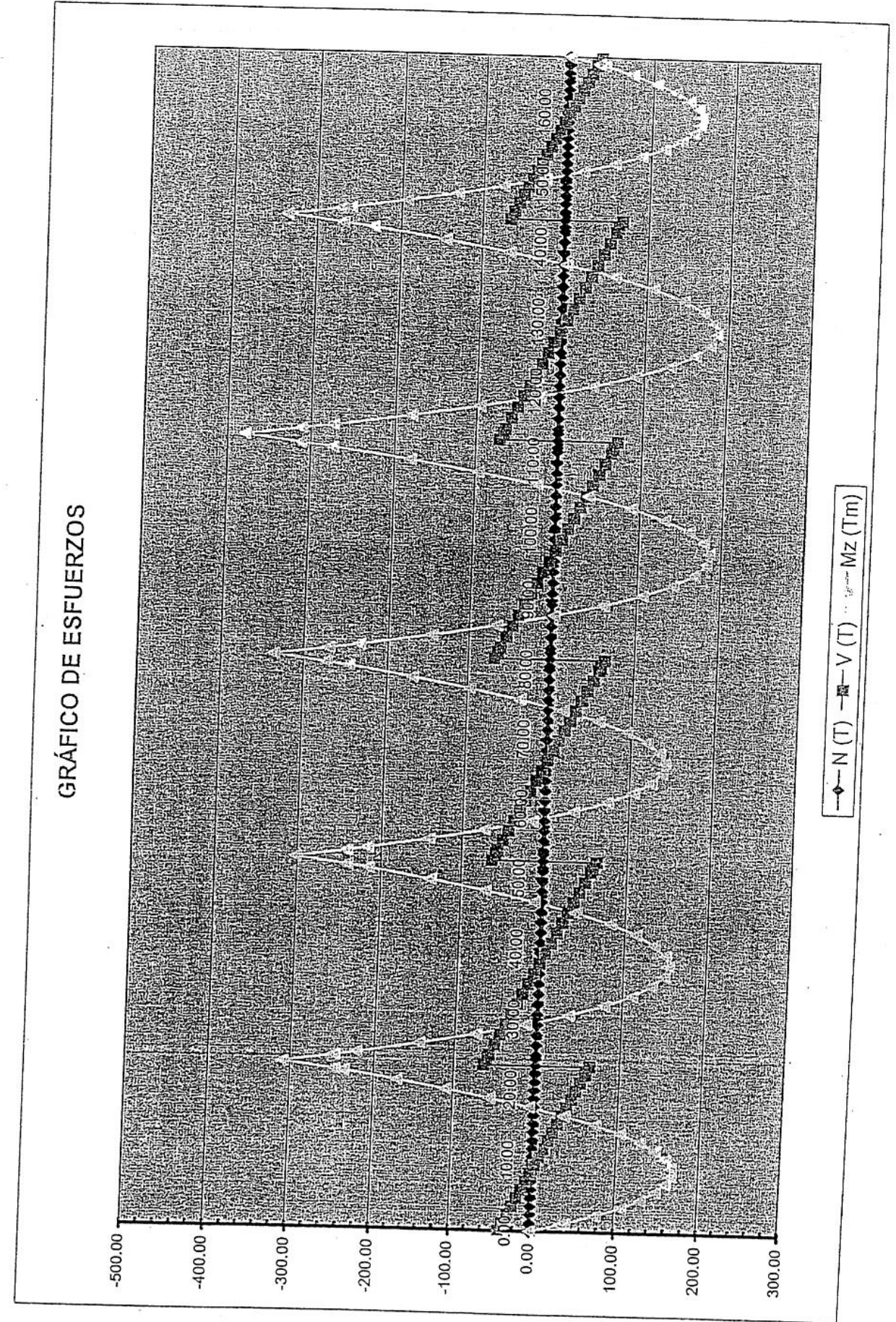
| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 21.70  | 103.66  |
| 129   | 129  | 164.48 | 0.00  | 21.70  | 103.66  |
| 129   | 130  | 165.65 | 0.00  | 26.84  | 75.14   |
| 130   | 130  | 165.65 | 0.00  | 26.84  | 75.14   |
| 130   | 131  | 166.83 | 0.00  | 31.98  | 40.59   |
| 131   | 131  | 166.83 | 0.00  | 31.98  | 40.59   |
| 131   | 132  | 167.00 | 0.00  | 32.74  | 34.92   |
| 132   | 132  | 167.00 | 0.00  | 32.74  | 34.92   |
| 132   | 133  | 168.00 | 0.00  | 37.11  | 0.00    |

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Programa DINTEL IDEAM S.A.  
CMBAL

16/08/01

## GRÁFICO DE ESFUERZOS



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

**CMRESTO****Resto Carga Muerta**

[1; 1]CMRESTO

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | -26.54 | 0.00    |
| 1     | 2    | 1.00  | 0.00  | -23.51 | 25.02   |
| 2     | 2    | 1.00  | 0.00  | -23.51 | 25.02   |
| 2     | 3    | 1.18  | 0.00  | -22.97 | 29.09   |
| 3     | 3    | 1.18  | 0.00  | -22.97 | 29.09   |
| 3     | 4    | 2.35  | 0.00  | -19.41 | 53.99   |
| 4     | 4    | 2.35  | 0.00  | -19.41 | 53.99   |
| 4     | 5    | 3.53  | 0.00  | -15.84 | 74.69   |
| 5     | 5    | 3.53  | 0.00  | -15.84 | 74.69   |
| 5     | 6    | 4.70  | 0.00  | -12.27 | 91.20   |
| 6     | 6    | 4.70  | 0.00  | -12.27 | 91.20   |
| 6     | 7    | 5.88  | 0.00  | -8.70  | 103.52  |
| 7     | 7    | 5.88  | 0.00  | -8.70  | 103.52  |
| 7     | 8    | 7.05  | 0.00  | -5.13  | 111.64  |
| 8     | 8    | 7.05  | 0.00  | -5.13  | 111.64  |
| 8     | 9    | 8.23  | 0.00  | -1.56  | 115.57  |
| 9     | 9    | 8.23  | 0.00  | -1.56  | 115.57  |
| 9     | 10   | 9.40  | 0.00  | 2.01   | 115.31  |
| 10    | 10   | 9.40  | 0.00  | 2.01   | 115.31  |
| 10    | 11   | 10.58 | 0.00  | 5.58   | 110.85  |
| 11    | 11   | 10.58 | 0.00  | 5.58   | 110.85  |
| 11    | 12   | 11.75 | 0.00  | 9.15   | 102.20  |
| 12    | 12   | 11.75 | 0.00  | 9.15   | 102.20  |
| 12    | 13   | 12.93 | 0.00  | 12.72  | 89.36   |
| 13    | 13   | 12.93 | 0.00  | 12.72  | 89.36   |
| 13    | 14   | 14.10 | 0.00  | 16.29  | 72.32   |
| 14    | 14   | 14.10 | 0.00  | 16.29  | 72.32   |
| 14    | 15   | 15.28 | 0.00  | 19.85  | 51.08   |
| 15    | 15   | 15.28 | 0.00  | 19.85  | 51.08   |
| 15    | 16   | 16.45 | 0.00  | 23.42  | 25.66   |
| 16    | 16   | 16.45 | -0.28 | 23.42  | 25.66   |
| 16    | 17   | 17.63 | -0.32 | 26.99  | -3.96   |
| 17    | 17   | 17.63 | -0.32 | 26.99  | -3.96   |
| 17    | 18   | 18.80 | -0.36 | 30.56  | -37.78  |
| 18    | 18   | 18.80 | 0.00  | 30.56  | -37.78  |
| 18    | 19   | 19.98 | 0.00  | 34.13  | -75.78  |
| 19    | 19   | 19.98 | 0.00  | 34.13  | -75.78  |
| 19    | 20   | 21.15 | 0.00  | 37.70  | -117.98 |
| 20    | 20   | 21.15 | 0.00  | 37.70  | -117.98 |
| 20    | 21   | 22.33 | 0.00  | 41.27  | -164.38 |
| 21    | 21   | 22.33 | 0.00  | 41.27  | -164.38 |
| 21    | 22   | 22.50 | 0.00  | 41.80  | -171.65 |
| 22    | 22   | 22.50 | 0.00  | 41.80  | -171.65 |
| 22    | 23   | 23.50 | 0.00  | 44.84  | -214.97 |
| 23    | 1023 | 23.50 | 0.00  | -44.22 | -214.97 |
| 23    | 24   | 24.50 | 0.00  | -41.19 | -172.26 |
| 24    | 24   | 24.50 | 0.00  | -41.19 | -172.26 |
| 24    | 25   | 24.95 | 0.00  | -39.82 | -154.04 |
| 25    | 25   | 24.95 | 0.00  | -39.82 | -154.04 |
| 25    | 26   | 26.40 | 0.00  | -35.42 | -99.49  |
| 26    | 26   | 26.40 | 0.00  | -35.42 | -99.49  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

**CMRESTO****Resto Carga Muerta**

[1; 1]CMRESTO

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | -31.01 | -51.33  |
| 27    | 27   | 27.85 | 0.00  | -31.01 | -51.33  |
| 27    | 28   | 29.30 | 0.00  | -26.61 | -9.56   |
| 28    | 28   | 29.30 | -0.26 | -26.61 | -9.56   |
| 28    | 29   | 30.75 | -0.21 | -22.20 | 25.83   |
| 29    | 29   | 30.75 | -0.21 | -22.20 | 25.83   |
| 29    | 30   | 32.20 | -0.17 | -17.80 | 54.83   |
| 30    | 30   | 32.20 | 0.00  | -17.80 | 54.83   |
| 30    | 31   | 33.65 | 0.00  | -13.39 | 77.44   |
| 31    | 31   | 33.65 | 0.00  | -13.39 | 77.44   |
| 31    | 32   | 35.10 | 0.00  | -8.99  | 93.67   |
| 32    | 32   | 35.10 | 0.00  | -8.99  | 93.67   |
| 32    | 33   | 36.55 | 0.00  | -4.58  | 103.51  |
| 33    | 33   | 36.55 | 0.00  | -4.58  | 103.51  |
| 33    | 34   | 38.00 | 0.00  | -0.18  | 106.96  |
| 34    | 34   | 38.00 | 0.00  | -0.18  | 106.96  |
| 34    | 35   | 39.45 | 0.00  | 4.22   | 104.03  |
| 35    | 35   | 39.45 | 0.00  | 4.22   | 104.03  |
| 35    | 36   | 40.90 | 0.00  | 8.63   | 94.71   |
| 36    | 36   | 40.90 | 0.00  | 8.63   | 94.71   |
| 36    | 37   | 42.35 | 0.00  | 13.03  | 79.00   |
| 37    | 37   | 42.35 | 0.00  | 13.03  | 79.00   |
| 37    | 38   | 43.80 | 0.00  | 17.44  | 56.91   |
| 38    | 38   | 43.80 | -0.17 | 17.44  | 56.91   |
| 38    | 39   | 45.25 | -0.21 | 21.84  | 28.43   |
| 39    | 39   | 45.25 | -0.21 | 21.84  | 28.43   |
| 39    | 40   | 46.70 | -0.25 | 26.25  | -6.43   |
| 40    | 40   | 46.70 | 0.00  | 26.25  | -6.43   |
| 40    | 41   | 48.15 | 0.00  | 30.65  | -47.68  |
| 41    | 41   | 48.15 | 0.00  | 30.65  | -47.68  |
| 41    | 42   | 49.60 | 0.00  | 35.06  | -95.32  |
| 42    | 42   | 49.60 | 0.00  | 35.06  | -95.32  |
| 42    | 43   | 51.05 | 0.00  | 39.46  | -149.35 |
| 43    | 43   | 51.05 | 0.00  | 39.46  | -149.35 |
| 43    | 44   | 51.50 | 0.00  | 40.83  | -167.41 |
| 44    | 44   | 51.50 | 0.00  | 40.83  | -167.41 |
| 44    | 45   | 52.50 | 0.00  | 43.86  | -209.76 |
| 45    | 1045 | 52.50 | 0.00  | -43.24 | -209.76 |
| 45    | 46   | 53.50 | 0.00  | -40.20 | -168.04 |
| 46    | 46   | 53.50 | 0.00  | -40.20 | -168.04 |
| 46    | 47   | 53.95 | 0.00  | -38.83 | -150.25 |
| 47    | 47   | 53.95 | 0.00  | -38.83 | -150.25 |
| 47    | 48   | 55.40 | 0.00  | -34.43 | -97.14  |
| 48    | 48   | 55.40 | 0.00  | -34.43 | -97.14  |
| 48    | 49   | 56.85 | 0.00  | -30.03 | -50.41  |
| 49    | 49   | 56.85 | 0.00  | -30.03 | -50.41  |
| 49    | 50   | 58.30 | 0.00  | -25.62 | -10.06  |
| 50    | 50   | 58.30 | -0.25 | -25.62 | -10.06  |
| 50    | 51   | 59.75 | -0.20 | -21.22 | 23.89   |
| 51    | 51   | 59.75 | -0.20 | -21.22 | 23.89   |
| 51    | 52   | 61.20 | -0.16 | -16.81 | 51.46   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

**CMRESTO****Resto Carga Muerta**

[1; 1]CMRESTO

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | -16.81 | 51.46   |
| 52    | 53   | 62.65 | 0.00  | -12.41 | 72.65   |
| 53    | 53   | 62.65 | 0.00  | -12.41 | 72.65   |
| 53    | 54   | 64.10 | 0.00  | -8.00  | 87.45   |
| 54    | 54   | 64.10 | 0.00  | -8.00  | 87.45   |
| 54    | 55   | 65.55 | 0.00  | -3.60  | 95.86   |
| 55    | 55   | 65.55 | 0.00  | -3.60  | 95.86   |
| 55    | 56   | 67.00 | 0.00  | 0.81   | 97.88   |
| 56    | 56   | 67.00 | 0.00  | 0.81   | 97.88   |
| 56    | 57   | 68.45 | 0.00  | 5.21   | 93.52   |
| 57    | 57   | 68.45 | 0.00  | 5.21   | 93.52   |
| 57    | 58   | 69.90 | 0.00  | 9.61   | 82.77   |
| 58    | 58   | 69.90 | 0.00  | 9.61   | 82.77   |
| 58    | 59   | 71.35 | 0.00  | 14.02  | 65.64   |
| 59    | 59   | 71.35 | 0.00  | 14.02  | 65.64   |
| 59    | 60   | 72.80 | 0.00  | 18.42  | 42.12   |
| 60    | 60   | 72.80 | -0.18 | 18.42  | 42.12   |
| 60    | 61   | 74.25 | -0.22 | 22.83  | 12.21   |
| 61    | 61   | 74.25 | -0.22 | 22.83  | 12.21   |
| 61    | 62   | 75.70 | -0.26 | 27.23  | -24.08  |
| 62    | 62   | 75.70 | 0.00  | 27.23  | -24.08  |
| 62    | 63   | 77.15 | 0.00  | 31.64  | -66.76  |
| 63    | 63   | 77.15 | 0.00  | 31.64  | -66.76  |
| 63    | 64   | 78.60 | 0.00  | 36.04  | -115.83 |
| 64    | 64   | 78.60 | 0.00  | 36.04  | -115.83 |
| 64    | 65   | 80.05 | 0.00  | 40.45  | -171.28 |
| 65    | 65   | 80.05 | 0.00  | 40.45  | -171.28 |
| 65    | 66   | 80.50 | 0.00  | 41.81  | -189.79 |
| 66    | 66   | 80.50 | 0.00  | 41.81  | -189.79 |
| 66    | 67   | 81.50 | 0.00  | 44.85  | -233.12 |
| 67    | 1067 | 81.50 | 0.00  | -46.88 | -233.12 |
| 67    | 68   | 82.50 | 0.00  | -43.84 | -187.76 |
| 68    | 68   | 82.50 | 0.00  | -43.84 | -187.76 |
| 68    | 69   | 83.08 | 0.00  | -42.10 | -163.05 |
| 69    | 69   | 83.08 | 0.00  | -42.10 | -163.05 |
| 69    | 70   | 84.65 | 0.00  | -37.31 | -100.51 |
| 70    | 70   | 84.65 | 0.00  | -37.31 | -100.51 |
| 70    | 71   | 86.23 | 0.00  | -32.53 | -45.51  |
| 71    | 71   | 86.23 | 0.00  | -32.53 | -45.51  |
| 71    | 72   | 87.80 | 0.00  | -27.75 | 1.95    |
| 72    | 72   | 87.80 | -0.24 | -27.74 | 1.95    |
| 72    | 73   | 89.38 | -0.20 | -22.96 | 41.88   |
| 73    | 73   | 89.38 | -0.20 | -22.96 | 41.88   |
| 73    | 74   | 90.95 | -0.16 | -18.18 | 74.28   |
| 74    | 74   | 90.95 | 0.00  | -18.18 | 74.28   |
| 74    | 75   | 92.53 | 0.00  | -13.39 | 99.14   |
| 75    | 75   | 92.53 | 0.00  | -13.39 | 99.14   |
| 75    | 76   | 94.10 | 0.00  | -8.61  | 116.46  |
| 76    | 76   | 94.10 | 0.00  | -8.61  | 116.46  |
| 76    | 77   | 95.68 | 0.00  | -3.82  | 126.25  |
| 77    | 77   | 95.68 | 0.00  | -3.82  | 126.25  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

**CMRESTO****Resto Carga Muerta**

[1; 1]CMRESTO

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 0.96   | 128.51  |
| 78    | 78   | 97.25  | 0.00  | 0.96   | 128.51  |
| 78    | 79   | 98.83  | 0.00  | 5.74   | 123.23  |
| 79    | 79   | 98.83  | 0.00  | 5.74   | 123.23  |
| 79    | 80   | 100.40 | 0.00  | 10.53  | 110.42  |
| 80    | 80   | 100.40 | 0.00  | 10.53  | 110.42  |
| 80    | 81   | 101.98 | 0.00  | 15.31  | 90.07   |
| 81    | 81   | 101.98 | 0.00  | 15.31  | 90.07   |
| 81    | 82   | 103.55 | 0.00  | 20.10  | 62.19   |
| 82    | 82   | 103.55 | -0.18 | 20.10  | 62.19   |
| 82    | 83   | 105.13 | -0.22 | 24.88  | 26.77   |
| 83    | 83   | 105.13 | -0.22 | 24.88  | 26.77   |
| 83    | 84   | 106.70 | -0.26 | 29.66  | -16.19  |
| 84    | 84   | 106.70 | 0.00  | 29.66  | -16.19  |
| 84    | 85   | 108.28 | 0.00  | 34.45  | -66.68  |
| 85    | 85   | 108.28 | 0.00  | 34.45  | -66.68  |
| 85    | 86   | 109.85 | 0.00  | 39.23  | -124.70 |
| 86    | 86   | 109.85 | 0.00  | 39.23  | -124.70 |
| 86    | 87   | 111.43 | 0.00  | 44.02  | -190.26 |
| 87    | 87   | 111.43 | 0.00  | 44.02  | -190.26 |
| 87    | 88   | 112.00 | 0.00  | 45.76  | -216.07 |
| 88    | 88   | 112.00 | 0.00  | 45.76  | -216.07 |
| 88    | 89   | 113.00 | 0.00  | 48.80  | -263.35 |
| 89    | 1089 | 113.00 | 0.00  | -48.81 | -263.35 |
| 89    | 90   | 114.00 | 0.00  | -45.77 | -216.05 |
| 90    | 90   | 114.00 | 0.00  | -45.77 | -216.05 |
| 90    | 91   | 114.58 | 0.00  | -44.03 | -190.24 |
| 91    | 91   | 114.58 | 0.00  | -44.03 | -190.24 |
| 91    | 92   | 116.15 | 0.00  | -39.24 | -124.67 |
| 92    | 92   | 116.15 | 0.00  | -39.24 | -124.67 |
| 92    | 93   | 117.73 | 0.00  | -34.46 | -66.63  |
| 93    | 93   | 117.73 | 0.00  | -34.46 | -66.63  |
| 93    | 94   | 119.30 | 0.00  | -29.67 | -16.12  |
| 94    | 94   | 119.30 | -0.26 | -29.67 | -16.12  |
| 94    | 95   | 120.88 | -0.22 | -24.89 | 26.85   |
| 95    | 95   | 120.88 | -0.22 | -24.89 | 26.85   |
| 95    | 96   | 122.45 | -0.18 | -20.11 | 62.28   |
| 96    | 96   | 122.45 | 0.00  | -20.11 | 62.28   |
| 96    | 97   | 124.03 | 0.00  | -15.32 | 90.18   |
| 97    | 97   | 124.03 | 0.00  | -15.32 | 90.18   |
| 97    | 98   | 125.60 | 0.00  | -10.54 | 110.55  |
| 98    | 98   | 125.60 | 0.00  | -10.54 | 110.55  |
| 98    | 99   | 127.18 | 0.00  | -5.75  | 123.38  |
| 99    | 99   | 127.18 | 0.00  | -5.75  | 123.38  |
| 99    | 100  | 128.75 | 0.00  | -0.97  | 128.67  |
| 100   | 100  | 128.75 | 0.00  | -0.97  | 128.67  |
| 100   | 101  | 130.33 | 0.00  | 3.81   | 126.43  |
| 101   | 101  | 130.33 | 0.00  | 3.81   | 126.43  |
| 101   | 102  | 131.90 | 0.00  | 8.60   | 116.66  |
| 102   | 102  | 131.90 | 0.00  | 8.60   | 116.66  |
| 102   | 103  | 133.48 | 0.00  | 13.38  | 99.35   |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

**CMRESTO****Resto Carga Muerta**

[ 1; 1]CMRESTO

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | 13.38  | 99.35   |
| 103   | 104  | 135.05 | 0.00  | 18.17  | 74.50   |
| 104   | 104  | 135.05 | -0.16 | 18.17  | 74.50   |
| 104   | 105  | 136.63 | -0.20 | 22.95  | 42.12   |
| 105   | 105  | 136.63 | -0.20 | 22.95  | 42.12   |
| 105   | 106  | 138.20 | -0.24 | 27.73  | 2.21    |
| 106   | 106  | 138.20 | 0.00  | 27.74  | 2.21    |
| 106   | 107  | 139.78 | 0.00  | 32.52  | -45.24  |
| 107   | 107  | 139.78 | 0.00  | 32.52  | -45.24  |
| 107   | 108  | 141.35 | 0.00  | 37.30  | -100.23 |
| 108   | 108  | 141.35 | 0.00  | 37.30  | -100.23 |
| 108   | 109  | 142.93 | 0.00  | 42.09  | -162.75 |
| 109   | 109  | 142.93 | 0.00  | 42.09  | -162.75 |
| 109   | 110  | 143.50 | 0.00  | 43.83  | -187.46 |
| 110   | 110  | 143.50 | 0.00  | 43.83  | -187.46 |
| 110   | 111  | 144.50 | 0.00  | 46.87  | -232.80 |
| 111   | 111  | 144.50 | 0.00  | -45.60 | -232.80 |
| 111   | 112  | 145.50 | 0.00  | -42.56 | -188.72 |
| 112   | 112  | 145.50 | 0.00  | -42.56 | -188.72 |
| 112   | 113  | 145.68 | 0.00  | -42.03 | -181.32 |
| 113   | 113  | 145.68 | 0.00  | -42.03 | -181.32 |
| 113   | 114  | 146.85 | 0.00  | -38.46 | -134.04 |
| 114   | 114  | 146.85 | 0.00  | -38.46 | -134.04 |
| 114   | 115  | 148.03 | 0.00  | -34.89 | -90.94  |
| 115   | 115  | 148.03 | 0.00  | -34.89 | -90.94  |
| 115   | 116  | 149.20 | 0.00  | -31.32 | -52.04  |
| 116   | 116  | 149.20 | -0.37 | -31.32 | -52.04  |
| 116   | 117  | 150.38 | -0.33 | -27.75 | -17.34  |
| 117   | 117  | 150.38 | -0.33 | -27.75 | -17.34  |
| 117   | 118  | 151.55 | -0.29 | -24.18 | 13.17   |
| 118   | 118  | 151.55 | 0.00  | -24.18 | 13.17   |
| 118   | 119  | 152.73 | 0.00  | -20.61 | 39.49   |
| 119   | 119  | 152.73 | 0.00  | -20.61 | 39.49   |
| 119   | 120  | 153.90 | 0.00  | -17.04 | 61.61   |
| 120   | 120  | 153.90 | 0.00  | -17.04 | 61.61   |
| 120   | 121  | 155.08 | 0.00  | -13.48 | 79.55   |
| 121   | 121  | 155.08 | 0.00  | -13.48 | 79.55   |
| 121   | 122  | 156.25 | 0.00  | -9.91  | 93.28   |
| 122   | 122  | 156.25 | 0.00  | -9.91  | 93.28   |
| 122   | 123  | 157.43 | 0.00  | -6.34  | 102.83  |
| 123   | 123  | 157.43 | 0.00  | -6.34  | 102.83  |
| 123   | 124  | 158.60 | 0.00  | -2.77  | 108.17  |
| 124   | 124  | 158.60 | 0.00  | -2.77  | 108.17  |
| 124   | 125  | 159.78 | 0.00  | 0.80   | 109.33  |
| 125   | 125  | 159.78 | 0.00  | 0.80   | 109.33  |
| 125   | 126  | 160.95 | 0.00  | 4.37   | 106.29  |
| 126   | 126  | 160.95 | 0.00  | 4.37   | 106.29  |
| 126   | 127  | 162.13 | 0.00  | 7.94   | 99.06   |
| 127   | 127  | 162.13 | 0.00  | 7.94   | 99.06   |
| 127   | 128  | 163.30 | 0.00  | 11.51  | 87.64   |
| 128   | 128  | 163.30 | 0.00  | 11.51  | 87.64   |

**CÁLCULO TENSIONAL**

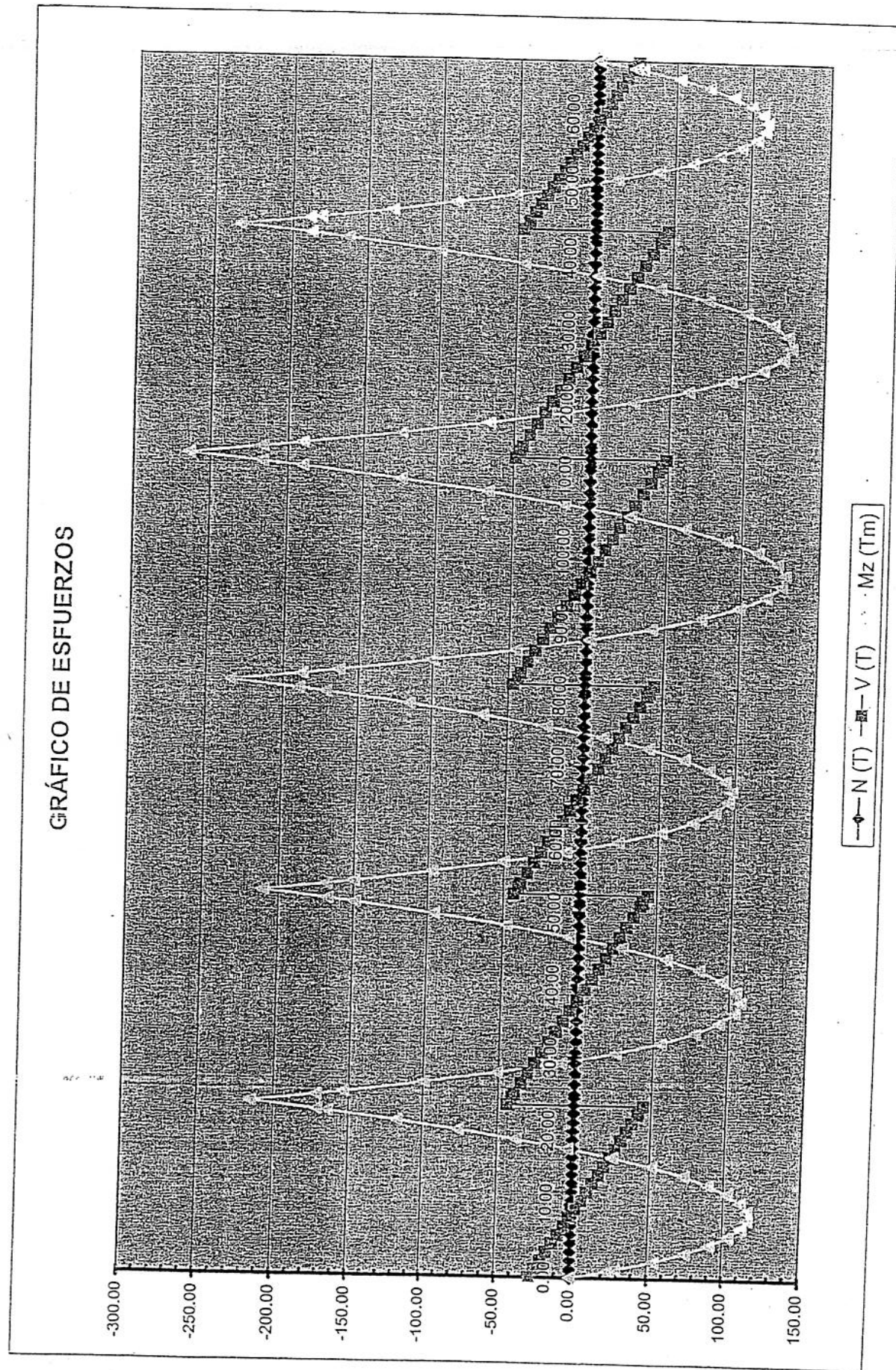
Hipótesis de cálculo:

**CMRESTO****Resto Carga Muerta**

[ 1; 1]CMRESTO

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 15.08  | 72.02   |
| 129   | 129  | 164.48 | 0.00  | 15.08  | 72.02   |
| 129   | 130  | 165.65 | 0.00  | 18.65  | 52.21   |
| 130   | 130  | 165.65 | 0.00  | 18.65  | 52.21   |
| 130   | 131  | 166.83 | 0.00  | 22.22  | 28.20   |
| 131   | 131  | 166.83 | 0.00  | 22.22  | 28.20   |
| 131   | 132  | 167.00 | 0.00  | 22.75  | 24.26   |
| 132   | 132  | 167.00 | 0.00  | 22.75  | 24.26   |
| 132   | 133  | 168.00 | 0.00  | 25.78  | 0.00    |



### CÁLCULO TENSIONAL

Hipótesis de cálculo:

GRAD

Gradiente termico

[1; 1]GRAD

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | -11.31 | 0.00    |
| 1     | 2    | 1.00  | 0.00  | -11.31 | 11.31   |
| 2     | 2    | 1.00  | 0.00  | -11.31 | 11.31   |
| 2     | 3    | 1.18  | 0.00  | -11.31 | 13.28   |
| 3     | 3    | 1.18  | 0.00  | -11.31 | 13.28   |
| 3     | 4    | 2.35  | 0.00  | -11.31 | 26.57   |
| 4     | 4    | 2.35  | 0.00  | -11.31 | 26.57   |
| 4     | 5    | 3.53  | 0.00  | -11.31 | 39.85   |
| 5     | 5    | 3.53  | 0.00  | -11.31 | 39.85   |
| 5     | 6    | 4.70  | 0.00  | -11.31 | 53.14   |
| 6     | 6    | 4.70  | 0.00  | -11.31 | 53.14   |
| 6     | 7    | 5.88  | 0.00  | -11.31 | 66.42   |
| 7     | 7    | 5.88  | 0.00  | -11.31 | 66.42   |
| 7     | 8    | 7.05  | 0.00  | -11.31 | 79.71   |
| 8     | 8    | 7.05  | 0.00  | -11.31 | 79.71   |
| 8     | 9    | 8.23  | 0.00  | -11.31 | 92.99   |
| 9     | 9    | 8.23  | 0.00  | -11.31 | 92.99   |
| 9     | 10   | 9.40  | 0.00  | -11.31 | 106.28  |
| 10    | 10   | 9.40  | 0.00  | -11.31 | 106.28  |
| 10    | 11   | 10.58 | 0.00  | -11.31 | 119.56  |
| 11    | 11   | 10.58 | 0.00  | -11.31 | 119.56  |
| 11    | 12   | 11.75 | 0.00  | -11.31 | 132.85  |
| 12    | 12   | 11.75 | 0.00  | -11.31 | 132.85  |
| 12    | 13   | 12.93 | 0.00  | -11.31 | 146.13  |
| 13    | 13   | 12.93 | 0.00  | -11.31 | 146.13  |
| 13    | 14   | 14.10 | 0.00  | -11.31 | 159.42  |
| 14    | 14   | 14.10 | 0.00  | -11.31 | 159.42  |
| 14    | 15   | 15.28 | 0.00  | -11.31 | 172.70  |
| 15    | 15   | 15.28 | 0.00  | -11.31 | 172.70  |
| 15    | 16   | 16.45 | 0.00  | -11.31 | 185.99  |
| 16    | 16   | 16.45 | 0.13  | -11.31 | 185.99  |
| 16    | 17   | 17.63 | 0.13  | -11.31 | 199.27  |
| 17    | 17   | 17.63 | 0.13  | -11.31 | 199.27  |
| 17    | 18   | 18.80 | 0.13  | -11.31 | 212.56  |
| 18    | 18   | 18.80 | 0.00  | -11.31 | 212.56  |
| 18    | 19   | 19.98 | 0.00  | -11.31 | 225.84  |
| 19    | 19   | 19.98 | 0.00  | -11.31 | 225.84  |
| 19    | 20   | 21.15 | 0.00  | -11.31 | 239.13  |
| 20    | 20   | 21.15 | 0.00  | -11.31 | 239.13  |
| 20    | 21   | 22.33 | 0.00  | -11.31 | 252.41  |
| 21    | 21   | 22.33 | 0.00  | -11.31 | 252.41  |
| 21    | 22   | 22.50 | 0.00  | -11.31 | 254.39  |
| 22    | 22   | 22.50 | 0.00  | -11.31 | 254.39  |
| 22    | 23   | 23.50 | 0.00  | -11.31 | 265.70  |
| 23    | 1023 | 23.50 | 0.00  | 2.33   | 265.70  |
| 23    | 24   | 24.50 | 0.00  | 2.33   | 263.37  |
| 24    | 24   | 24.50 | 0.00  | 2.33   | 263.37  |
| 24    | 25   | 24.95 | 0.00  | 2.33   | 262.32  |
| 25    | 25   | 24.95 | 0.00  | 2.33   | 262.32  |
| 25    | 26   | 26.40 | 0.00  | 2.33   | 258.94  |
| 26    | 26   | 26.40 | 0.00  | 2.33   | 258.94  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

GRAD

Gradiente termico

[ 1: 1]GRAD

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | 2.33   | 255.55  |
| 27    | 27   | 27.85 | 0.00  | 2.33   | 255.55  |
| 27    | 28   | 29.30 | 0.00  | 2.33   | 252.17  |
| 28    | 28   | 29.30 | 0.02  | 2.33   | 252.17  |
| 28    | 29   | 30.75 | 0.02  | 2.33   | 248.79  |
| 29    | 29   | 30.75 | 0.02  | 2.33   | 248.79  |
| 29    | 30   | 32.20 | 0.02  | 2.33   | 245.41  |
| 30    | 30   | 32.20 | 0.00  | 2.33   | 245.41  |
| 30    | 31   | 33.65 | 0.00  | 2.33   | 242.03  |
| 31    | 31   | 33.65 | 0.00  | 2.33   | 242.03  |
| 31    | 32   | 35.10 | 0.00  | 2.33   | 238.65  |
| 32    | 32   | 35.10 | 0.00  | 2.33   | 238.65  |
| 32    | 33   | 36.55 | 0.00  | 2.33   | 235.27  |
| 33    | 33   | 36.55 | 0.00  | 2.33   | 235.27  |
| 33    | 34   | 38.00 | 0.00  | 2.33   | 231.88  |
| 34    | 34   | 38.00 | 0.00  | 2.33   | 231.88  |
| 34    | 35   | 39.45 | 0.00  | 2.33   | 228.50  |
| 35    | 35   | 39.45 | 0.00  | 2.33   | 228.50  |
| 35    | 36   | 40.90 | 0.00  | 2.33   | 225.12  |
| 36    | 36   | 40.90 | 0.00  | 2.33   | 225.12  |
| 36    | 37   | 42.35 | 0.00  | 2.33   | 221.74  |
| 37    | 37   | 42.35 | 0.00  | 2.33   | 221.74  |
| 37    | 38   | 43.80 | 0.00  | 2.33   | 218.36  |
| 38    | 38   | 43.80 | -0.02 | 2.33   | 218.36  |
| 38    | 39   | 45.25 | -0.02 | 2.33   | 214.98  |
| 39    | 39   | 45.25 | -0.02 | 2.33   | 214.98  |
| 39    | 40   | 46.70 | -0.02 | 2.33   | 211.60  |
| 40    | 40   | 46.70 | 0.00  | 2.33   | 211.60  |
| 40    | 41   | 48.15 | 0.00  | 2.33   | 208.22  |
| 41    | 41   | 48.15 | 0.00  | 2.33   | 208.22  |
| 41    | 42   | 49.60 | 0.00  | 2.33   | 204.83  |
| 42    | 42   | 49.60 | 0.00  | 2.33   | 204.83  |
| 42    | 43   | 51.05 | 0.00  | 2.33   | 201.45  |
| 43    | 43   | 51.05 | 0.00  | 2.33   | 201.45  |
| 43    | 44   | 51.50 | 0.00  | 2.33   | 200.40  |
| 44    | 44   | 51.50 | 0.00  | 2.33   | 200.40  |
| 44    | 45   | 52.50 | 0.00  | 2.33   | 198.07  |
| 45    | 1045 | 52.50 | 0.00  | -0.78  | 198.07  |
| 45    | 46   | 53.50 | 0.00  | -0.78  | 198.85  |
| 46    | 46   | 53.50 | 0.00  | -0.78  | 198.85  |
| 46    | 47   | 53.95 | 0.00  | -0.78  | 199.21  |
| 47    | 47   | 53.95 | 0.00  | -0.78  | 199.21  |
| 47    | 48   | 55.40 | 0.00  | -0.78  | 200.34  |
| 48    | 48   | 55.40 | 0.00  | -0.78  | 200.34  |
| 48    | 49   | 56.85 | 0.00  | -0.78  | 201.48  |
| 49    | 49   | 56.85 | 0.00  | -0.78  | 201.48  |
| 49    | 50   | 58.30 | 0.00  | -0.78  | 202.61  |
| 50    | 50   | 58.30 | -0.01 | -0.78  | 202.61  |
| 50    | 51   | 59.75 | -0.01 | -0.78  | 203.75  |
| 51    | 51   | 59.75 | -0.01 | -0.78  | 203.75  |
| 51    | 52   | 61.20 | -0.01 | -0.78  | 204.88  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

GRAD

Gradiente termico

[ 1: 1]GRAD

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | -0.78  | 204.88  |
| 52    | 53   | 62.65 | 0.00  | -0.78  | 206.02  |
| 53    | 53   | 62.65 | 0.00  | -0.78  | 206.02  |
| 53    | 54   | 64.10 | 0.00  | -0.78  | 207.15  |
| 54    | 54   | 64.10 | 0.00  | -0.78  | 207.15  |
| 54    | 55   | 65.55 | 0.00  | -0.78  | 208.29  |
| 55    | 55   | 65.55 | 0.00  | -0.78  | 208.29  |
| 55    | 56   | 67.00 | 0.00  | -0.78  | 209.42  |
| 56    | 56   | 67.00 | 0.00  | -0.78  | 209.42  |
| 56    | 57   | 68.45 | 0.00  | -0.78  | 210.56  |
| 57    | 57   | 68.45 | 0.00  | -0.78  | 210.56  |
| 57    | 58   | 69.90 | 0.00  | -0.78  | 211.69  |
| 58    | 58   | 69.90 | 0.00  | -0.78  | 211.69  |
| 58    | 59   | 71.35 | 0.00  | -0.78  | 212.83  |
| 59    | 59   | 71.35 | 0.00  | -0.78  | 212.83  |
| 59    | 60   | 72.80 | 0.00  | -0.78  | 213.96  |
| 60    | 60   | 72.80 | 0.01  | -0.78  | 213.96  |
| 60    | 61   | 74.25 | 0.01  | -0.78  | 215.10  |
| 61    | 61   | 74.25 | 0.01  | -0.78  | 215.10  |
| 61    | 62   | 75.70 | 0.01  | -0.78  | 216.23  |
| 62    | 62   | 75.70 | 0.00  | -0.78  | 216.23  |
| 62    | 63   | 77.15 | 0.00  | -0.78  | 217.37  |
| 63    | 63   | 77.15 | 0.00  | -0.78  | 217.37  |
| 63    | 64   | 78.60 | 0.00  | -0.78  | 218.50  |
| 64    | 64   | 78.60 | 0.00  | -0.78  | 218.50  |
| 64    | 65   | 80.05 | 0.00  | -0.78  | 219.64  |
| 65    | 65   | 80.05 | 0.00  | -0.78  | 219.64  |
| 65    | 66   | 80.50 | 0.00  | -0.78  | 219.99  |
| 66    | 66   | 80.50 | 0.00  | -0.78  | 219.99  |
| 66    | 67   | 81.50 | 0.00  | -0.78  | 220.78  |
| 67    | 1067 | 81.50 | 0.00  | 0.70   | 220.78  |
| 67    | 68   | 82.50 | 0.00  | 0.70   | 220.07  |
| 68    | 68   | 82.50 | 0.00  | 0.70   | 220.07  |
| 68    | 69   | 83.08 | 0.00  | 0.70   | 219.67  |
| 69    | 69   | 83.08 | 0.00  | 0.70   | 219.67  |
| 69    | 70   | 84.65 | 0.00  | 0.70   | 218.56  |
| 70    | 70   | 84.65 | 0.00  | 0.70   | 218.56  |
| 70    | 71   | 86.23 | 0.00  | 0.70   | 217.45  |
| 71    | 71   | 86.23 | 0.00  | 0.70   | 217.45  |
| 71    | 72   | 87.80 | 0.00  | 0.70   | 216.35  |
| 72    | 72   | 87.80 | 0.01  | 0.70   | 216.35  |
| 72    | 73   | 89.38 | 0.01  | 0.70   | 215.24  |
| 73    | 73   | 89.38 | 0.01  | 0.70   | 215.24  |
| 73    | 74   | 90.95 | 0.01  | 0.70   | 214.13  |
| 74    | 74   | 90.95 | 0.00  | 0.70   | 214.13  |
| 74    | 75   | 92.53 | 0.00  | 0.70   | 213.02  |
| 75    | 75   | 92.53 | 0.00  | 0.70   | 213.02  |
| 75    | 76   | 94.10 | 0.00  | 0.70   | 211.92  |
| 76    | 76   | 94.10 | 0.00  | 0.70   | 211.92  |
| 76    | 77   | 95.68 | 0.00  | 0.70   | 210.81  |
| 77    | 77   | 95.68 | 0.00  | 0.70   | 210.81  |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

GRAD

Gradiente termico

[ 1; 1]GRAD

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 0.70   | 209.70  |
| 78    | 78   | 97.25  | 0.00  | 0.70   | 209.70  |
| 78    | 79   | 98.83  | 0.00  | 0.70   | 208.59  |
| 79    | 79   | 98.83  | 0.00  | 0.70   | 208.59  |
| 79    | 80   | 100.40 | 0.00  | 0.70   | 207.49  |
| 80    | 80   | 100.40 | 0.00  | 0.70   | 207.49  |
| 80    | 81   | 101.98 | 0.00  | 0.70   | 206.38  |
| 81    | 81   | 101.98 | 0.00  | 0.70   | 206.38  |
| 81    | 82   | 103.55 | 0.00  | 0.70   | 205.27  |
| 82    | 82   | 103.55 | -0.01 | 0.70   | 205.27  |
| 82    | 83   | 105.13 | -0.01 | 0.70   | 204.16  |
| 83    | 83   | 105.13 | -0.01 | 0.70   | 204.16  |
| 83    | 84   | 106.70 | -0.01 | 0.70   | 203.06  |
| 84    | 84   | 106.70 | 0.00  | 0.70   | 203.06  |
| 84    | 85   | 108.28 | 0.00  | 0.70   | 201.95  |
| 85    | 85   | 108.28 | 0.00  | 0.70   | 201.95  |
| 85    | 86   | 109.85 | 0.00  | 0.70   | 200.84  |
| 86    | 86   | 109.85 | 0.00  | 0.70   | 200.84  |
| 86    | 87   | 111.43 | 0.00  | 0.70   | 199.73  |
| 87    | 87   | 111.43 | 0.00  | 0.70   | 199.73  |
| 87    | 88   | 112.00 | 0.00  | 0.70   | 199.33  |
| 88    | 88   | 112.00 | 0.00  | 0.70   | 199.33  |
| 88    | 89   | 113.00 | 0.00  | 0.70   | 198.63  |
| 89    | 1089 | 113.00 | 0.00  | -2.06  | 198.63  |
| 89    | 90   | 114.00 | 0.00  | -2.06  | 200.69  |
| 90    | 90   | 114.00 | 0.00  | -2.06  | 200.69  |
| 90    | 91   | 114.58 | 0.00  | -2.06  | 201.87  |
| 91    | 91   | 114.58 | 0.00  | -2.06  | 201.87  |
| 91    | 92   | 116.15 | 0.00  | -2.06  | 205.11  |
| 92    | 92   | 116.15 | 0.00  | -2.06  | 205.11  |
| 92    | 93   | 117.73 | 0.00  | -2.06  | 208.36  |
| 93    | 93   | 117.73 | 0.00  | -2.06  | 208.36  |
| 93    | 94   | 119.30 | 0.00  | -2.06  | 211.60  |
| 94    | 94   | 119.30 | -0.02 | -2.06  | 211.60  |
| 94    | 95   | 120.88 | -0.02 | -2.06  | 214.85  |
| 95    | 95   | 120.88 | -0.02 | -2.06  | 214.85  |
| 95    | 96   | 122.45 | -0.02 | -2.06  | 218.09  |
| 96    | 96   | 122.45 | 0.00  | -2.06  | 218.09  |
| 96    | 97   | 124.03 | 0.00  | -2.06  | 221.33  |
| 97    | 97   | 124.03 | 0.00  | -2.06  | 221.33  |
| 97    | 98   | 125.60 | 0.00  | -2.06  | 224.58  |
| 98    | 98   | 125.60 | 0.00  | -2.06  | 224.58  |
| 98    | 99   | 127.18 | 0.00  | -2.06  | 227.82  |
| 99    | 99   | 127.18 | 0.00  | -2.06  | 227.82  |
| 99    | 100  | 128.75 | 0.00  | -2.06  | 231.06  |
| 100   | 100  | 128.75 | 0.00  | -2.06  | 231.06  |
| 100   | 101  | 130.33 | 0.00  | -2.06  | 234.31  |
| 101   | 101  | 130.33 | 0.00  | -2.06  | 234.31  |
| 101   | 102  | 131.90 | 0.00  | -2.06  | 237.55  |
| 102   | 102  | 131.90 | 0.00  | -2.06  | 237.55  |
| 102   | 103  | 133.48 | 0.00  | -2.06  | 240.80  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

GRAD

Gradiente termico

[ 1; 1]GRAD

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | -2.06  | 240.80  |
| 103   | 104  | 135.05 | 0.00  | -2.06  | 244.04  |
| 104   | 104  | 135.05 | 0.02  | -2.06  | 244.04  |
| 104   | 105  | 136.63 | 0.02  | -2.06  | 247.28  |
| 105   | 105  | 136.63 | 0.02  | -2.06  | 247.28  |
| 105   | 106  | 138.20 | 0.02  | -2.06  | 250.53  |
| 106   | 106  | 138.20 | 0.00  | -2.06  | 250.53  |
| 106   | 107  | 139.78 | 0.00  | -2.06  | 253.77  |
| 107   | 107  | 139.78 | 0.00  | -2.06  | 253.77  |
| 107   | 108  | 141.35 | 0.00  | -2.06  | 257.02  |
| 108   | 108  | 141.35 | 0.00  | -2.06  | 257.02  |
| 108   | 109  | 142.93 | 0.00  | -2.06  | 260.26  |
| 109   | 109  | 142.93 | 0.00  | -2.06  | 260.26  |
| 109   | 110  | 143.50 | 0.00  | -2.06  | 261.44  |
| 110   | 110  | 143.50 | 0.00  | -2.06  | 261.44  |
| 110   | 111  | 144.50 | 0.00  | -2.06  | 263.50  |
| 111   | 1111 | 144.50 | 0.00  | 11.21  | 263.50  |
| 111   | 112  | 145.50 | 0.00  | 11.21  | 252.29  |
| 112   | 112  | 145.50 | 0.00  | 11.21  | 252.29  |
| 112   | 113  | 145.68 | 0.00  | 11.21  | 250.33  |
| 113   | 113  | 145.68 | 0.00  | 11.21  | 250.33  |
| 113   | 114  | 146.85 | 0.00  | 11.21  | 237.15  |
| 114   | 114  | 146.85 | 0.00  | 11.21  | 237.15  |
| 114   | 115  | 148.03 | 0.00  | 11.21  | 223.98  |
| 115   | 115  | 148.03 | 0.00  | 11.21  | 223.98  |
| 115   | 116  | 149.20 | 0.00  | 11.21  | 210.80  |
| 116   | 116  | 149.20 | 0.13  | 11.21  | 210.80  |
| 116   | 117  | 150.38 | 0.13  | 11.21  | 197.63  |
| 117   | 117  | 150.38 | 0.13  | 11.21  | 197.63  |
| 117   | 118  | 151.55 | 0.13  | 11.21  | 184.45  |
| 118   | 118  | 151.55 | 0.00  | 11.21  | 184.45  |
| 118   | 119  | 152.73 | 0.00  | 11.21  | 171.28  |
| 119   | 119  | 152.73 | 0.00  | 11.21  | 171.28  |
| 119   | 120  | 153.90 | 0.00  | 11.21  | 158.10  |
| 120   | 120  | 153.90 | 0.00  | 11.21  | 158.10  |
| 120   | 121  | 155.08 | 0.00  | 11.21  | 144.93  |
| 121   | 121  | 155.08 | 0.00  | 11.21  | 144.93  |
| 121   | 122  | 156.25 | 0.00  | 11.21  | 131.75  |
| 122   | 122  | 156.25 | 0.00  | 11.21  | 131.75  |
| 122   | 123  | 157.43 | 0.00  | 11.21  | 118.58  |
| 123   | 123  | 157.43 | 0.00  | 11.21  | 118.58  |
| 123   | 124  | 158.60 | 0.00  | 11.21  | 105.40  |
| 124   | 124  | 158.60 | 0.00  | 11.21  | 105.40  |
| 124   | 125  | 159.78 | 0.00  | 11.21  | 92.23   |
| 125   | 125  | 159.78 | 0.00  | 11.21  | 92.23   |
| 125   | 126  | 160.95 | 0.00  | 11.21  | 79.05   |
| 126   | 126  | 160.95 | 0.00  | 11.21  | 79.05   |
| 126   | 127  | 162.13 | 0.00  | 11.21  | 65.88   |
| 127   | 127  | 162.13 | 0.00  | 11.21  | 65.88   |
| 127   | 128  | 163.30 | 0.00  | 11.21  | 52.70   |
| 128   | 128  | 163.30 | 0.00  | 11.21  | 52.70   |

# CÁLCULO TENSIONAL

Hipótesis de cálculo:

GRAD

Gradiente térmico

[1; 1]GRAD

Coef. exc:

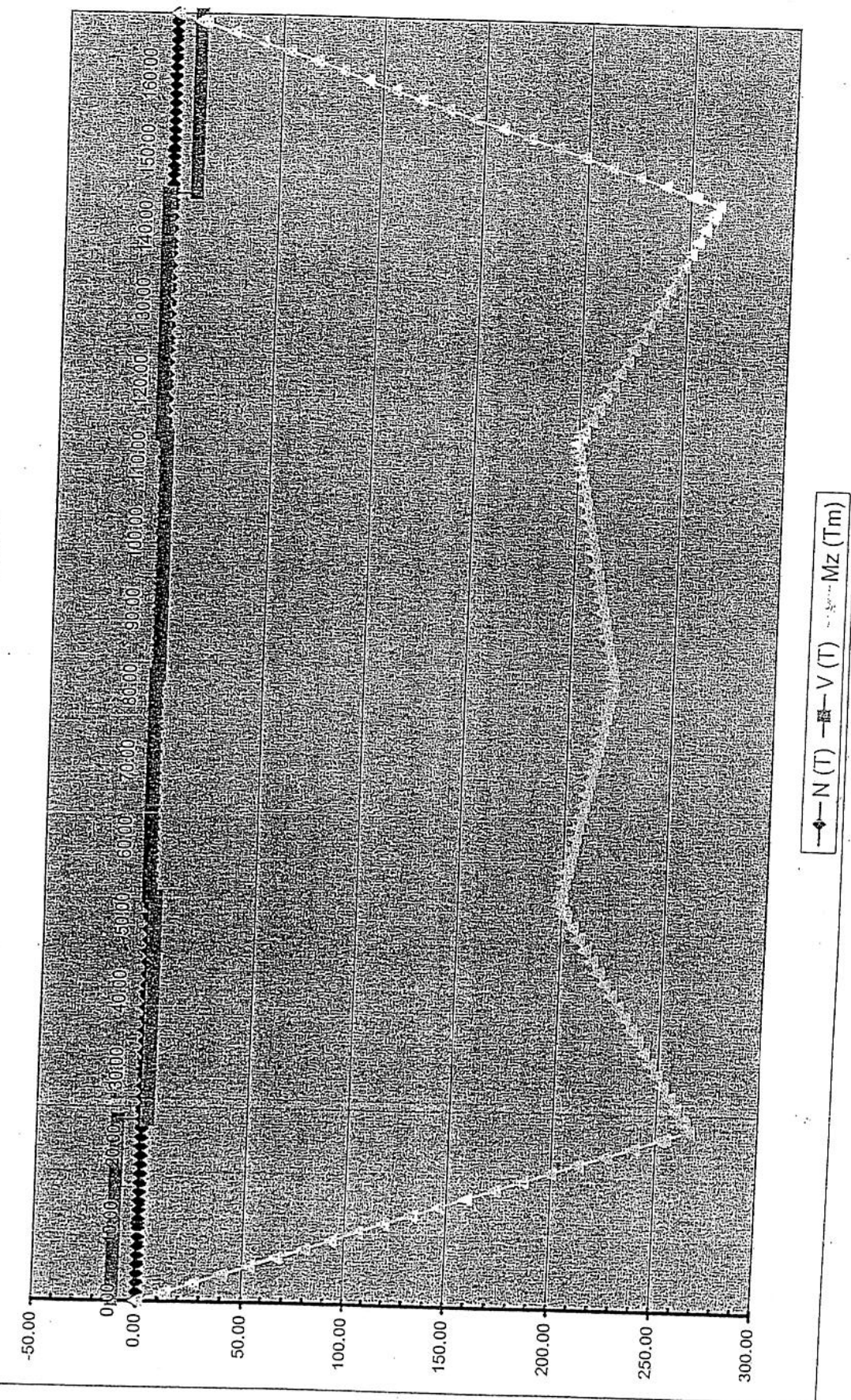
| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 11.21  | 39.53   |
| 129   | 129  | 164.48 | 0.00  | 11.21  | 39.53   |
| 129   | 130  | 165.65 | 0.00  | 11.21  | 26.35   |
| 130   | 130  | 165.65 | 0.00  | 11.21  | 26.35   |
| 130   | 131  | 166.83 | 0.00  | 11.21  | 13.18   |
| 131   | 131  | 166.83 | 0.00  | 11.21  | 13.18   |
| 131   | 132  | 167.00 | 0.00  | 11.21  | 11.21   |
| 132   | 132  | 167.00 | 0.00  | 11.21  | 11.21   |
| 132   | 133  | 168.00 | 0.00  | 11.21  | 0.00    |

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Programa DINTEL IDEAM S.A.  
GRAD

16/08/01

## GRÁFICO DE ESFUERZOS





**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | 2.16   | 0.00    |
| 1     | 2    | 1.00  | 0.00  | 2.18   | -1.68   |
| 2     | 2    | 1.00  | 0.00  | 2.18   | -1.68   |
| 2     | 3    | 1.18  | 0.00  | 2.19   | -1.89   |
| 3     | 3    | 1.18  | 0.00  | 2.19   | -1.89   |
| 3     | 4    | 2.35  | 0.00  | 2.30   | -2.65   |
| 4     | 4    | 2.35  | 0.00  | 2.30   | -2.65   |
| 4     | 5    | 3.53  | 0.00  | 2.49   | -2.55   |
| 5     | 5    | 3.53  | 0.00  | 2.49   | -2.55   |
| 5     | 6    | 4.70  | 0.00  | 2.74   | -1.84   |
| 6     | 6    | 4.70  | 0.00  | 2.74   | -1.84   |
| 6     | 7    | 5.88  | 0.00  | 3.07   | -0.77   |
| 7     | 7    | 5.88  | 0.00  | 3.07   | -0.77   |
| 7     | 8    | 7.05  | 0.00  | 3.46   | 0.43    |
| 8     | 8    | 7.05  | 0.00  | 3.46   | 0.43    |
| 8     | 9    | 8.23  | 0.00  | 3.93   | 1.50    |
| 9     | 9    | 8.23  | 0.00  | 3.93   | 1.50    |
| 9     | 10   | 9.40  | 0.00  | 4.46   | 2.22    |
| 10    | 10   | 9.40  | 0.00  | 4.46   | 2.22    |
| 10    | 11   | 10.58 | 0.00  | 5.06   | 2.36    |
| 11    | 11   | 10.58 | 0.00  | 5.06   | 2.36    |
| 11    | 12   | 11.75 | 0.00  | 5.73   | 1.72    |
| 12    | 12   | 11.75 | 0.00  | 5.73   | 1.72    |
| 12    | 13   | 12.93 | 0.00  | 6.45   | 0.09    |
| 13    | 13   | 12.93 | 0.00  | 6.45   | 0.09    |
| 13    | 14   | 14.10 | 0.00  | 7.24   | -2.71   |
| 14    | 14   | 14.10 | 0.00  | 7.24   | -2.71   |
| 14    | 15   | 15.28 | 0.00  | 8.09   | -6.85   |
| 15    | 15   | 15.28 | 0.00  | 8.09   | -6.85   |
| 15    | 16   | 16.45 | 0.00  | 8.98   | -12.50  |
| 16    | 16   | 16.45 | -0.11 | 8.98   | -12.50  |
| 16    | 17   | 17.63 | -0.12 | 9.93   | -19.79  |
| 17    | 17   | 17.63 | -0.12 | 9.93   | -19.79  |
| 17    | 18   | 18.80 | -0.13 | 10.93  | -28.86  |
| 18    | 18   | 18.80 | 0.00  | 10.93  | -28.86  |
| 18    | 19   | 19.98 | 0.00  | 11.98  | -39.79  |
| 19    | 19   | 19.98 | 0.00  | 11.98  | -39.79  |
| 19    | 20   | 21.15 | 0.00  | 13.07  | -52.69  |
| 20    | 20   | 21.15 | 0.00  | 13.07  | -52.69  |
| 20    | 21   | 22.33 | 0.00  | 14.19  | -67.61  |
| 21    | 21   | 22.33 | 0.00  | 14.19  | -67.61  |
| 21    | 22   | 22.50 | 0.00  | 14.36  | -70.01  |
| 22    | 22   | 22.50 | 0.00  | 14.36  | -70.01  |
| 22    | 23   | 23.50 | 0.00  | 15.35  | -84.60  |
| 23    | 1023 | 23.50 | 0.00  | 2.18   | 13.83   |
| 23    | 24   | 24.50 | 0.00  | 2.20   | 11.89   |
| 24    | 24   | 24.50 | 0.00  | 2.20   | 11.89   |
| 24    | 25   | 24.95 | 0.00  | 2.21   | 11.17   |
| 25    | 25   | 24.95 | 0.00  | 2.21   | 11.17   |
| 25    | 26   | 26.40 | 0.00  | 2.28   | 9.49    |
| 26    | 26   | 26.40 | 0.00  | 2.28   | 9.49    |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | 2.42   | 8.69    |
| 27    | 27   | 27.85 | 0.00  | 2.42   | 8.69    |
| 27    | 28   | 29.30 | 0.00  | 2.62   | 8.64    |
| 28    | 28   | 29.30 | 0.02  | 2.62   | 8.64    |
| 28    | 29   | 30.75 | 0.03  | 2.89   | 9.16    |
| 29    | 29   | 30.75 | 0.03  | 2.89   | 9.16    |
| 29    | 30   | 32.20 | 0.03  | 3.24   | 10.04   |
| 30    | 30   | 32.20 | 0.00  | 3.24   | 10.04   |
| 30    | 31   | 33.65 | 0.00  | 3.66   | 11.04   |
| 31    | 31   | 33.65 | 0.00  | 3.66   | 11.04   |
| 31    | 32   | 35.10 | 0.00  | 4.17   | 11.88   |
| 32    | 32   | 35.10 | 0.00  | 4.17   | 11.88   |
| 32    | 33   | 36.55 | 0.00  | 4.76   | 12.30   |
| 33    | 33   | 36.55 | 0.00  | 4.76   | 12.30   |
| 33    | 34   | 38.00 | 0.00  | 5.44   | 11.98   |
| 34    | 34   | 38.00 | 0.00  | 5.44   | 11.98   |
| 34    | 35   | 39.45 | 0.00  | 6.20   | 10.63   |
| 35    | 35   | 39.45 | 0.00  | 6.20   | 10.63   |
| 35    | 36   | 40.90 | 0.00  | 7.05   | 7.94    |
| 36    | 36   | 40.90 | 0.00  | 7.05   | 7.94    |
| 36    | 37   | 42.35 | 0.00  | 7.98   | 3.61    |
| 37    | 37   | 42.35 | 0.00  | 7.98   | 3.61    |
| 37    | 38   | 43.80 | 0.00  | 9.00   | -2.65   |
| 38    | 38   | 43.80 | -0.09 | 9.00   | -2.65   |
| 38    | 39   | 45.25 | -0.10 | 10.09  | -11.10  |
| 39    | 39   | 45.25 | -0.10 | 10.09  | -11.10  |
| 39    | 40   | 46.70 | -0.11 | 11.27  | -21.99  |
| 40    | 40   | 46.70 | 0.00  | 11.27  | -21.99  |
| 40    | 41   | 48.15 | 0.00  | 12.51  | -35.56  |
| 41    | 41   | 48.15 | 0.00  | 12.51  | -35.56  |
| 41    | 42   | 49.60 | 0.00  | 13.82  | -51.97  |
| 42    | 42   | 49.60 | 0.00  | 13.82  | -51.97  |
| 42    | 43   | 51.05 | 0.00  | 15.19  | -71.39  |
| 43    | 43   | 51.05 | 0.00  | 15.19  | -71.39  |
| 43    | 44   | 51.50 | 0.00  | 15.63  | -78.04  |
| 44    | 44   | 51.50 | 0.00  | 15.63  | -78.04  |
| 44    | 45   | 52.50 | 0.00  | 16.62  | -93.91  |
| 45    | 1045 | 52.50 | 0.00  | 2.93   | 24.86   |
| 45    | 46   | 53.50 | 0.00  | 2.94   | 22.18   |
| 46    | 46   | 53.50 | 0.00  | 2.94   | 22.18   |
| 46    | 47   | 53.95 | 0.00  | 2.95   | 21.13   |
| 47    | 47   | 53.95 | 0.00  | 2.95   | 21.13   |
| 47    | 48   | 55.40 | 0.00  | 3.03   | 18.40   |
| 48    | 48   | 55.40 | 0.00  | 3.03   | 18.40   |
| 48    | 49   | 56.85 | 0.00  | 3.16   | 16.57   |
| 49    | 49   | 56.85 | 0.00  | 3.16   | 16.57   |
| 49    | 50   | 58.30 | 0.00  | 3.36   | 15.50   |
| 50    | 50   | 58.30 | 0.03  | 3.36   | 15.50   |
| 50    | 51   | 59.75 | 0.03  | 3.64   | 15.00   |
| 51    | 51   | 59.75 | 0.03  | 3.64   | 15.00   |
| 51    | 52   | 61.20 | 0.04  | 3.98   | 14.87   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | 3.98   | 14.87   |
| 52    | 53   | 62.65 | 0.00  | 4.41   | 14.85   |
| 53    | 53   | 62.65 | 0.00  | 4.41   | 14.85   |
| 53    | 54   | 64.10 | 0.00  | 4.92   | 14.69   |
| 54    | 54   | 64.10 | 0.00  | 4.92   | 14.69   |
| 54    | 55   | 65.55 | 0.00  | 5.51   | 14.10   |
| 55    | 55   | 65.55 | 0.00  | 5.51   | 14.10   |
| 55    | 56   | 67.00 | 0.00  | 6.18   | 12.78   |
| 56    | 56   | 67.00 | 0.00  | 6.18   | 12.78   |
| 56    | 57   | 68.45 | 0.00  | 6.95   | 10.43   |
| 57    | 57   | 68.45 | 0.00  | 6.95   | 10.43   |
| 57    | 58   | 69.90 | 0.00  | 7.79   | 6.74    |
| 58    | 58   | 69.90 | 0.00  | 7.79   | 6.74    |
| 58    | 59   | 71.35 | 0.00  | 8.72   | 1.43    |
| 59    | 59   | 71.35 | 0.00  | 8.72   | 1.43    |
| 59    | 60   | 72.80 | 0.00  | 9.74   | -5.81   |
| 60    | 60   | 72.80 | -0.09 | 9.74   | -5.81   |
| 60    | 61   | 74.25 | -0.10 | 10.83  | -15.24  |
| 61    | 61   | 74.25 | -0.10 | 10.83  | -15.24  |
| 61    | 62   | 75.70 | -0.12 | 12.00  | -27.12  |
| 62    | 62   | 75.70 | 0.00  | 12.00  | -27.12  |
| 62    | 63   | 77.15 | 0.00  | 13.24  | -41.66  |
| 63    | 63   | 77.15 | 0.00  | 13.24  | -41.66  |
| 63    | 64   | 78.60 | 0.00  | 14.55  | -59.07  |
| 64    | 64   | 78.60 | 0.00  | 14.55  | -59.07  |
| 64    | 65   | 80.05 | 0.00  | 15.92  | -79.49  |
| 65    | 65   | 80.05 | 0.00  | 15.92  | -79.49  |
| 65    | 66   | 80.50 | 0.00  | 16.35  | -86.46  |
| 66    | 66   | 80.50 | 0.00  | 16.35  | -86.46  |
| 66    | 67   | 81.50 | 0.00  | 17.34  | -103.04 |
| 67    | 1067 | 81.50 | 0.00  | 2.59   | 26.30   |
| 67    | 68   | 82.50 | 0.00  | 2.60   | 23.95   |
| 68    | 68   | 82.50 | 0.00  | 2.60   | 23.95   |
| 68    | 69   | 83.08 | 0.00  | 2.62   | 22.81   |
| 69    | 69   | 83.08 | 0.00  | 2.62   | 22.81   |
| 69    | 70   | 84.65 | 0.00  | 2.70   | 20.47   |
| 70    | 70   | 84.65 | 0.00  | 2.70   | 20.47   |
| 70    | 71   | 86.23 | 0.00  | 2.84   | 19.16   |
| 71    | 71   | 86.23 | 0.00  | 2.84   | 19.16   |
| 71    | 72   | 87.80 | 0.00  | 3.06   | 18.74   |
| 72    | 72   | 87.80 | 0.03  | 3.06   | 18.74   |
| 72    | 73   | 89.38 | 0.03  | 3.35   | 18.99   |
| 73    | 73   | 89.38 | 0.03  | 3.35   | 18.99   |
| 73    | 74   | 90.95 | 0.03  | 3.73   | 19.66   |
| 74    | 74   | 90.95 | 0.00  | 3.73   | 19.66   |
| 74    | 75   | 92.53 | 0.00  | 4.19   | 20.48   |
| 75    | 75   | 92.53 | 0.00  | 4.19   | 20.48   |
| 75    | 76   | 94.10 | 0.00  | 4.74   | 21.11   |
| 76    | 76   | 94.10 | 0.00  | 4.74   | 21.11   |
| 76    | 77   | 95.68 | 0.00  | 5.38   | 21.24   |
| 77    | 77   | 95.68 | 0.00  | 5.38   | 21.24   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 6.12   | 20.51   |
| 78    | 78   | 97.25  | 0.00  | 6.12   | 20.51   |
| 78    | 79   | 98.83  | 0.00  | 6.94   | 18.56   |
| 79    | 79   | 98.83  | 0.00  | 6.94   | 18.56   |
| 79    | 80   | 100.40 | 0.00  | 7.87   | 15.02   |
| 80    | 80   | 100.40 | 0.00  | 7.87   | 15.02   |
| 80    | 81   | 101.98 | 0.00  | 8.88   | 9.56    |
| 81    | 81   | 101.98 | 0.00  | 8.88   | 9.56    |
| 81    | 82   | 103.55 | 0.00  | 9.98   | 1.83    |
| 82    | 82   | 103.55 | -0.09 | 9.98   | 1.83    |
| 82    | 83   | 105.13 | -0.10 | 11.17  | -8.50   |
| 83    | 83   | 105.13 | -0.10 | 11.17  | -8.50   |
| 83    | 84   | 106.70 | -0.11 | 12.45  | -21.71  |
| 84    | 84   | 106.70 | 0.00  | 12.45  | -21.71  |
| 84    | 85   | 108.28 | 0.00  | 13.80  | -38.06  |
| 85    | 85   | 108.28 | 0.00  | 13.80  | -38.06  |
| 85    | 86   | 109.85 | 0.00  | 15.22  | -57.78  |
| 86    | 86   | 109.85 | 0.00  | 15.22  | -57.78  |
| 86    | 87   | 111.43 | 0.00  | 16.71  | -81.04  |
| 87    | 87   | 111.43 | 0.00  | 16.71  | -81.04  |
| 87    | 88   | 112.00 | 0.00  | 17.27  | -90.43  |
| 88    | 88   | 112.00 | 0.00  | 17.27  | -90.43  |
| 88    | 89   | 113.00 | 0.00  | 18.26  | -107.95 |
| 89    | 1089 | 113.00 | 0.00  | 1.82   | 21.25   |
| 89    | 90   | 114.00 | 0.00  | 1.83   | 19.68   |
| 90    | 90   | 114.00 | 0.00  | 1.83   | 19.68   |
| 90    | 91   | 114.58 | 0.00  | 1.85   | 19.00   |
| 91    | 91   | 114.58 | 0.00  | 1.85   | 19.00   |
| 91    | 92   | 116.15 | 0.00  | 1.93   | 17.92   |
| 92    | 92   | 116.15 | 0.00  | 1.93   | 17.92   |
| 92    | 93   | 117.73 | 0.00  | 2.08   | 17.91   |
| 93    | 93   | 117.73 | 0.00  | 2.08   | 17.91   |
| 93    | 94   | 119.30 | 0.00  | 2.31   | 18.77   |
| 94    | 94   | 119.30 | 0.02  | 2.31   | 18.77   |
| 94    | 95   | 120.88 | 0.02  | 2.61   | 20.29   |
| 95    | 95   | 120.88 | 0.02  | 2.61   | 20.29   |
| 95    | 96   | 122.45 | 0.03  | 3.00   | 22.21   |
| 96    | 96   | 122.45 | 0.00  | 3.00   | 22.21   |
| 96    | 97   | 124.03 | 0.00  | 3.48   | 24.22   |
| 97    | 97   | 124.03 | 0.00  | 3.48   | 24.22   |
| 97    | 98   | 125.60 | 0.00  | 4.04   | 26.01   |
| 98    | 98   | 125.60 | 0.00  | 4.04   | 26.01   |
| 98    | 99   | 127.18 | 0.00  | 4.70   | 27.23   |
| 99    | 99   | 127.18 | 0.00  | 4.70   | 27.23   |
| 99    | 100  | 128.75 | 0.00  | 5.45   | 27.54   |
| 100   | 100  | 128.75 | 0.00  | 5.45   | 27.54   |
| 100   | 101  | 130.33 | 0.00  | 6.30   | 26.56   |
| 101   | 101  | 130.33 | 0.00  | 6.30   | 26.56   |
| 101   | 102  | 131.90 | 0.00  | 7.24   | 23.94   |
| 102   | 102  | 131.90 | 0.00  | 7.24   | 23.94   |
| 102   | 103  | 133.48 | 0.00  | 8.27   | 19.34   |

# CÁLCULO TENSIONAL

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[0; 1]SC1.SCuniTpos.Barra1.Mx+ + [0; 1]SC1.SCuniTpos.Barra2.Mx+ + [0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | 8.27   | 19.34   |
| 103   | 104  | 135.05 | 0.00  | 9.39   | 12.41   |
| 104   | 104  | 135.05 | -0.08 | 9.39   | 12.41   |
| 104   | 105  | 136.63 | -0.09 | 10.59  | 2.85    |
| 105   | 105  | 136.63 | -0.09 | 10.59  | 2.85    |
| 105   | 106  | 138.20 | -0.10 | 11.88  | -9.63   |
| 106   | 106  | 138.20 | 0.00  | 11.88  | -9.63   |
| 106   | 107  | 139.78 | 0.00  | 13.24  | -25.25  |
| 107   | 107  | 139.78 | 0.00  | 13.24  | -25.25  |
| 107   | 108  | 141.35 | 0.00  | 14.67  | -44.24  |
| 108   | 108  | 141.35 | 0.00  | 14.67  | -44.24  |
| 108   | 109  | 142.93 | 0.00  | 16.17  | -66.73  |
| 109   | 109  | 142.93 | 0.00  | 16.17  | -66.73  |
| 109   | 110  | 143.50 | 0.00  | 16.73  | -75.83  |
| 110   | 110  | 143.50 | 0.00  | 16.73  | -75.83  |
| 110   | 111  | 144.50 | 0.00  | 17.72  | -92.82  |
| 111   | 111  | 144.50 | 0.00  | 0.69   | 16.17   |
| 111   | 112  | 145.50 | 0.00  | 0.70   | 15.75   |
| 112   | 112  | 145.50 | 0.00  | 0.70   | 15.75   |
| 112   | 113  | 145.68 | 0.00  | 0.70   | 15.73   |
| 113   | 113  | 145.68 | 0.00  | 0.70   | 15.73   |
| 113   | 114  | 146.85 | 0.00  | 0.76   | 16.00   |
| 114   | 114  | 146.85 | 0.00  | 0.76   | 16.00   |
| 114   | 115  | 148.03 | 0.00  | 0.85   | 16.93   |
| 115   | 115  | 148.03 | 0.00  | 0.85   | 16.93   |
| 115   | 116  | 149.20 | 0.00  | 0.98   | 18.44   |
| 116   | 116  | 149.20 | 0.01  | 0.98   | 18.44   |
| 116   | 117  | 150.38 | 0.01  | 1.16   | 20.45   |
| 117   | 117  | 150.38 | 0.01  | 1.16   | 20.45   |
| 117   | 118  | 151.55 | 0.02  | 1.39   | 22.85   |
| 118   | 118  | 151.55 | 0.00  | 1.39   | 22.85   |
| 118   | 119  | 152.73 | 0.00  | 1.67   | 25.50   |
| 119   | 119  | 152.73 | 0.00  | 1.67   | 25.50   |
| 119   | 120  | 153.90 | 0.00  | 2.00   | 28.27   |
| 120   | 120  | 153.90 | 0.00  | 2.00   | 28.27   |
| 120   | 121  | 155.08 | 0.00  | 2.40   | 30.99   |
| 121   | 121  | 155.08 | 0.00  | 2.40   | 30.99   |
| 121   | 122  | 156.25 | 0.00  | 2.85   | 33.50   |
| 122   | 122  | 156.25 | 0.00  | 2.85   | 33.50   |
| 122   | 123  | 157.43 | 0.00  | 3.37   | 35.60   |
| 123   | 123  | 157.43 | 0.00  | 3.37   | 35.60   |
| 123   | 124  | 158.60 | 0.00  | 3.95   | 37.08   |
| 124   | 124  | 158.60 | 0.00  | 3.95   | 37.08   |
| 124   | 125  | 159.78 | 0.00  | 4.59   | 37.76   |
| 125   | 125  | 159.78 | 0.00  | 4.59   | 37.76   |
| 125   | 126  | 160.95 | 0.00  | 5.30   | 37.39   |
| 126   | 126  | 160.95 | 0.00  | 5.30   | 37.39   |
| 126   | 127  | 162.13 | 0.00  | 6.08   | 35.75   |
| 127   | 127  | 162.13 | 0.00  | 6.08   | 35.75   |
| 127   | 128  | 163.30 | 0.00  | 6.94   | 32.60   |
| 128   | 128  | 163.30 | 0.00  | 6.94   | 32.60   |

# CÁLCULO TENSIONAL

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

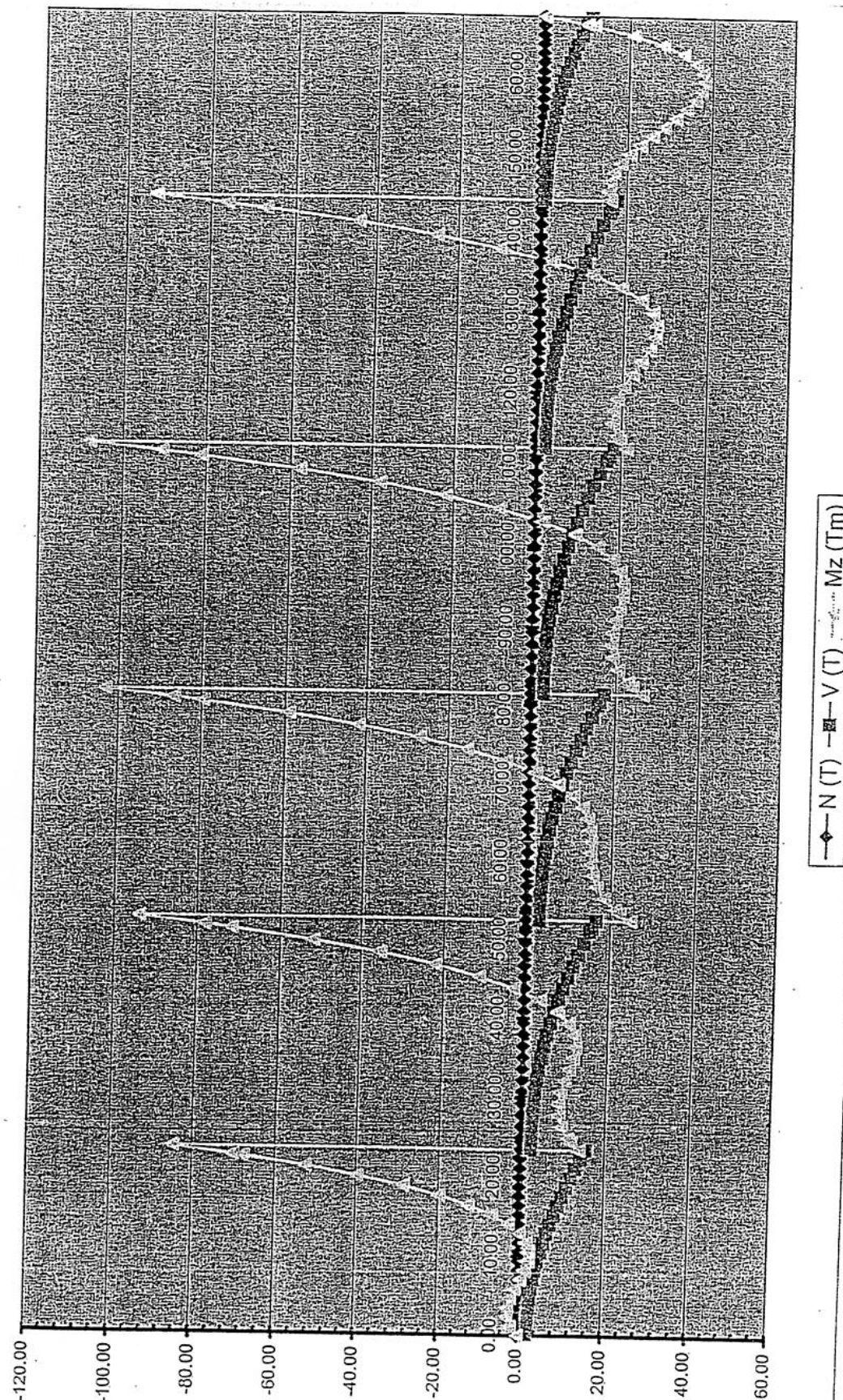
[0; 1]SC1.SCuniTpos.Barra1.Mx+ + [0; 1]SC1.SCuniTpos.Barra2.Mx+ + [0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 7.86   | 27.70   |
| 129   | 129  | 164.48 | 0.00  | 7.86   | 27.70   |
| 129   | 130  | 165.65 | 0.00  | 8.85   | 20.80   |
| 130   | 130  | 165.65 | 0.00  | 8.85   | 20.80   |
| 130   | 131  | 166.83 | 0.00  | 9.92   | 11.65   |
| 131   | 131  | 166.83 | 0.00  | 9.92   | 11.65   |
| 131   | 132  | 167.00 | 0.00  | 10.08  | 10.08   |
| 132   | 132  | 167.00 | 0.00  | 10.08  | 10.08   |
| 132   | 133  | 168.00 | 0.00  | 11.06  | 0.00    |



# GRÁFICO DE ESFUERZOS



## CÁLCULO TENSIONAL

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[0; 1]SC1.SCuniTpos.Barra1.Mx+ + [0; 1]SC1.SCuniTpos.Barra2.Mx+ + [0; 1]SC1.SCuniTpos.Barra3.  
Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | 0.00   | 0.00    |
| 1     | 2    | 1.00  | 0.00  | -9.90  | 10.40   |
| 2     | 2    | 1.00  | 0.00  | -9.90  | 10.40   |
| 2     | 3    | 1.18  | 0.00  | -9.72  | 12.11   |
| 3     | 3    | 1.18  | 0.00  | -9.72  | 12.11   |
| 3     | 4    | 2.35  | 0.00  | -8.55  | 22.85   |
| 4     | 4    | 2.35  | 0.00  | -8.55  | 22.85   |
| 4     | 5    | 3.53  | 0.00  | -7.37  | 32.20   |
| 5     | 5    | 3.53  | 0.00  | -7.37  | 32.20   |
| 5     | 6    | 4.70  | 0.00  | -6.20  | 40.17   |
| 6     | 6    | 4.70  | 0.00  | -6.20  | 40.17   |
| 6     | 7    | 5.88  | 0.00  | -5.02  | 46.76   |
| 7     | 7    | 5.88  | 0.00  | -5.02  | 46.76   |
| 7     | 8    | 7.05  | 0.00  | -3.85  | 51.97   |
| 8     | 8    | 7.05  | 0.00  | -3.85  | 51.97   |
| 8     | 9    | 8.23  | 0.00  | -2.67  | 55.80   |
| 9     | 9    | 8.23  | 0.00  | -2.67  | 55.80   |
| 9     | 10   | 9.40  | 0.00  | -1.50  | 58.25   |
| 10    | 10   | 9.40  | 0.00  | -1.50  | 58.25   |
| 10    | 11   | 10.58 | 0.00  | -0.32  | 59.32   |
| 11    | 11   | 10.58 | 0.00  | -0.32  | 59.32   |
| 11    | 12   | 11.75 | 0.00  | 0.85   | 59.00   |
| 12    | 12   | 11.75 | 0.00  | 0.85   | 59.00   |
| 12    | 13   | 12.93 | 0.00  | 2.03   | 57.31   |
| 13    | 13   | 12.93 | 0.00  | 2.03   | 57.31   |
| 13    | 14   | 14.10 | 0.00  | 3.20   | 54.24   |
| 14    | 14   | 14.10 | 0.00  | 3.20   | 54.24   |
| 14    | 15   | 15.28 | 0.00  | 4.38   | 49.78   |
| 15    | 15   | 15.28 | 0.00  | 4.38   | 49.78   |
| 15    | 16   | 16.45 | 0.00  | 5.55   | 43.95   |
| 16    | 16   | 16.45 | -0.07 | 5.55   | 43.95   |
| 16    | 17   | 17.63 | -0.08 | 6.73   | 36.73   |
| 17    | 17   | 17.63 | -0.08 | 6.73   | 36.73   |
| 17    | 18   | 18.80 | -0.09 | 7.90   | 28.14   |
| 18    | 18   | 18.80 | 0.00  | 7.90   | 28.14   |
| 18    | 19   | 19.98 | 0.00  | 4.78   | 20.47   |
| 19    | 19   | 19.98 | 0.00  | 4.78   | 20.47   |
| 19    | 20   | 21.15 | 0.00  | 2.48   | 15.98   |
| 20    | 20   | 21.15 | 0.00  | 2.48   | 15.98   |
| 20    | 21   | 22.33 | 0.00  | 0.52   | 13.93   |
| 21    | 21   | 22.33 | 0.00  | 0.52   | 13.93   |
| 21    | 22   | 22.50 | 0.00  | 0.70   | 13.82   |
| 22    | 22   | 22.50 | 0.00  | 0.70   | 13.82   |
| 22    | 23   | 23.50 | 0.00  | -0.59  | 13.83   |
| 23    | 1023 | 23.50 | 0.00  | 2.18   | 13.83   |
| 23    | 24   | 24.50 | 0.00  | 1.76   | 12.06   |
| 24    | 24   | 24.50 | 0.00  | 1.76   | 12.06   |
| 24    | 25   | 24.95 | 0.00  | 0.83   | 11.75   |
| 25    | 25   | 24.95 | 0.00  | 0.83   | 11.75   |
| 25    | 26   | 26.40 | 0.00  | -1.46  | 12.27   |
| 26    | 26   | 26.40 | 0.00  | -1.46  | 12.27   |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | -3.94  | 15.87   |
| 27    | 27   | 27.85 | 0.00  | -3.94  | 15.87   |
| 27    | 28   | 29.30 | 0.00  | -5.50  | 22.71   |
| 28    | 28   | 29.30 | -0.05 | -5.50  | 22.71   |
| 28    | 29   | 30.75 | -0.08 | -8.01  | 33.63   |
| 29    | 29   | 30.75 | -0.08 | -8.01  | 33.63   |
| 29    | 30   | 32.20 | -0.06 | -6.56  | 44.19   |
| 30    | 30   | 32.20 | 0.00  | -6.56  | 44.19   |
| 30    | 31   | 33.65 | 0.00  | -5.11  | 52.65   |
| 31    | 31   | 33.65 | 0.00  | -5.11  | 52.65   |
| 31    | 32   | 35.10 | 0.00  | -3.66  | 59.00   |
| 32    | 32   | 35.10 | 0.00  | -3.66  | 59.00   |
| 32    | 33   | 36.55 | 0.00  | -2.21  | 63.26   |
| 33    | 33   | 36.55 | 0.00  | -2.21  | 63.26   |
| 33    | 34   | 38.00 | 0.00  | -0.76  | 65.41   |
| 34    | 34   | 38.00 | 0.00  | -0.76  | 65.41   |
| 34    | 35   | 39.45 | 0.00  | 0.69   | 65.46   |
| 35    | 35   | 39.45 | 0.00  | 0.69   | 65.46   |
| 35    | 36   | 40.90 | 0.00  | 2.14   | 63.40   |
| 36    | 36   | 40.90 | 0.00  | 2.14   | 63.40   |
| 36    | 37   | 42.35 | 0.00  | 3.59   | 59.24   |
| 37    | 37   | 42.35 | 0.00  | 3.59   | 59.24   |
| 37    | 38   | 43.80 | 0.00  | 5.04   | 52.99   |
| 38    | 38   | 43.80 | -0.05 | 5.04   | 52.99   |
| 38    | 39   | 45.25 | -0.06 | 6.49   | 44.62   |
| 39    | 39   | 45.25 | -0.06 | 6.49   | 44.62   |
| 39    | 40   | 46.70 | -0.06 | 5.75   | 34.83   |
| 40    | 40   | 46.70 | 0.00  | 5.75   | 34.83   |
| 40    | 41   | 48.15 | 0.00  | 3.89   | 27.62   |
| 41    | 41   | 48.15 | 0.00  | 3.89   | 27.62   |
| 41    | 42   | 49.60 | 0.00  | 1.45   | 23.63   |
| 42    | 42   | 49.60 | 0.00  | 1.45   | 23.63   |
| 42    | 43   | 51.05 | 0.00  | -0.83  | 22.85   |
| 43    | 43   | 51.05 | 0.00  | -0.83  | 22.85   |
| 43    | 44   | 51.50 | 0.00  | -0.38  | 23.12   |
| 44    | 44   | 51.50 | 0.00  | -0.38  | 23.12   |
| 44    | 45   | 52.50 | 0.00  | -2.18  | 24.86   |
| 45    | 1045 | 52.50 | 0.00  | 2.93   | 24.86   |
| 45    | 46   | 53.50 | 0.00  | 2.50   | 22.36   |
| 46    | 46   | 53.50 | 0.00  | 2.50   | 22.36   |
| 46    | 47   | 53.95 | 0.00  | 1.58   | 21.74   |
| 47    | 47   | 53.95 | 0.00  | 1.58   | 21.74   |
| 47    | 48   | 55.40 | 0.00  | -0.71  | 21.37   |
| 48    | 48   | 55.40 | 0.00  | -0.71  | 21.37   |
| 48    | 49   | 56.85 | 0.00  | -3.19  | 24.17   |
| 49    | 49   | 56.85 | 0.00  | -3.19  | 24.17   |
| 49    | 50   | 58.30 | 0.00  | -5.12  | 30.27   |
| 50    | 50   | 58.30 | -0.05 | -5.12  | 30.27   |
| 50    | 51   | 59.75 | -0.07 | -7.58  | 40.91   |
| 51    | 51   | 59.75 | -0.07 | -7.58  | 40.91   |
| 51    | 52   | 61.20 | -0.06 | -6.13  | 50.85   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | -6.13  | 50.85   |
| 52    | 53   | 62.65 | 0.00  | -4.68  | 58.68   |
| 53    | 53   | 62.65 | 0.00  | -4.68  | 58.68   |
| 53    | 54   | 64.10 | 0.00  | -3.23  | 64.42   |
| 54    | 54   | 64.10 | 0.00  | -3.23  | 64.42   |
| 54    | 55   | 65.55 | 0.00  | -1.78  | 68.05   |
| 55    | 55   | 65.55 | 0.00  | -1.78  | 68.05   |
| 55    | 56   | 67.00 | 0.00  | -0.33  | 69.58   |
| 56    | 56   | 67.00 | 0.00  | -0.33  | 69.58   |
| 56    | 57   | 68.45 | 0.00  | 1.12   | 69.01   |
| 57    | 57   | 68.45 | 0.00  | 1.12   | 69.01   |
| 57    | 58   | 69.90 | 0.00  | 2.57   | 66.34   |
| 58    | 58   | 69.90 | 0.00  | 2.57   | 66.34   |
| 58    | 59   | 71.35 | 0.00  | 4.02   | 61.56   |
| 59    | 59   | 71.35 | 0.00  | 4.02   | 61.56   |
| 59    | 60   | 72.80 | 0.00  | 5.47   | 54.68   |
| 60    | 60   | 72.80 | -0.05 | 5.47   | 54.68   |
| 60    | 61   | 74.25 | -0.07 | 6.92   | 45.70   |
| 61    | 61   | 74.25 | -0.07 | 6.92   | 45.70   |
| 61    | 62   | 75.70 | -0.06 | 5.80   | 35.13   |
| 62    | 62   | 75.70 | 0.00  | 5.80   | 35.13   |
| 62    | 63   | 77.15 | 0.00  | 3.47   | 28.02   |
| 63    | 63   | 77.15 | 0.00  | 3.47   | 28.02   |
| 63    | 64   | 78.60 | 0.00  | 1.04   | 24.21   |
| 64    | 64   | 78.60 | 0.00  | 1.04   | 24.21   |
| 64    | 65   | 80.05 | 0.00  | -1.23  | 23.77   |
| 65    | 65   | 80.05 | 0.00  | -1.23  | 23.77   |
| 65    | 66   | 80.50 | 0.00  | -0.78  | 24.22   |
| 66    | 66   | 80.50 | 0.00  | -0.78  | 24.22   |
| 66    | 67   | 81.50 | 0.00  | -2.58  | 26.30   |
| 67    | 1067 | 81.50 | 0.00  | 2.59   | 26.30   |
| 67    | 68   | 82.50 | 0.00  | 2.04   | 24.15   |
| 68    | 68   | 82.50 | 0.00  | 2.04   | 24.15   |
| 68    | 69   | 83.08 | 0.00  | 1.12   | 23.47   |
| 69    | 69   | 83.08 | 0.00  | 1.12   | 23.47   |
| 69    | 70   | 84.65 | 0.00  | -1.37  | 23.67   |
| 70    | 70   | 84.65 | 0.00  | -1.37  | 23.67   |
| 70    | 71   | 86.23 | 0.00  | -4.07  | 27.44   |
| 71    | 71   | 86.23 | 0.00  | -4.07  | 27.44   |
| 71    | 72   | 87.80 | 0.00  | -5.77  | 35.05   |
| 72    | 72   | 87.80 | -0.05 | -5.77  | 35.05   |
| 72    | 73   | 89.38 | -0.07 | -7.84  | 46.77   |
| 73    | 73   | 89.38 | -0.07 | -7.84  | 46.77   |
| 73    | 74   | 90.95 | -0.06 | -6.27  | 57.89   |
| 74    | 74   | 90.95 | 0.00  | -6.27  | 57.89   |
| 74    | 75   | 92.53 | 0.00  | -4.69  | 66.52   |
| 75    | 75   | 92.53 | 0.00  | -4.69  | 66.52   |
| 75    | 76   | 94.10 | 0.00  | -3.12  | 72.67   |
| 76    | 76   | 94.10 | 0.00  | -3.12  | 72.67   |
| 76    | 77   | 95.68 | 0.00  | -1.54  | 76.34   |
| 77    | 77   | 95.68 | 0.00  | -1.54  | 76.34   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.  
Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 0.03   | 77.53   |
| 78    | 78   | 97.25  | 0.00  | 0.03   | 77.53   |
| 78    | 79   | 98.83  | 0.00  | 1.61   | 76.24   |
| 79    | 79   | 98.83  | 0.00  | 1.61   | 76.24   |
| 79    | 80   | 100.40 | 0.00  | 3.18   | 72.47   |
| 80    | 80   | 100.40 | 0.00  | 3.18   | 72.47   |
| 80    | 81   | 101.98 | 0.00  | 4.76   | 66.22   |
| 81    | 81   | 101.98 | 0.00  | 4.76   | 66.22   |
| 81    | 82   | 103.55 | 0.00  | 6.33   | 57.49   |
| 82    | 82   | 103.55 | -0.06 | 6.33   | 57.49   |
| 82    | 83   | 105.13 | -0.07 | 7.91   | 46.28   |
| 83    | 83   | 105.13 | -0.07 | 7.91   | 46.28   |
| 83    | 84   | 106.70 | -0.06 | 6.41   | 33.78   |
| 84    | 84   | 106.70 | 0.00  | 6.41   | 33.78   |
| 84    | 85   | 108.28 | 0.00  | 4.40   | 25.12   |
| 85    | 85   | 108.28 | 0.00  | 4.40   | 25.12   |
| 85    | 86   | 109.85 | 0.00  | 1.74   | 20.25   |
| 86    | 86   | 109.85 | 0.00  | 1.74   | 20.25   |
| 86    | 87   | 111.43 | 0.00  | -0.73  | 19.12   |
| 87    | 87   | 111.43 | 0.00  | -0.73  | 19.12   |
| 87    | 88   | 112.00 | 0.00  | -1.65  | 19.51   |
| 88    | 88   | 112.00 | 0.00  | -1.65  | 19.51   |
| 88    | 89   | 113.00 | 0.00  | -2.20  | 21.25   |
| 89    | 1089 | 113.00 | 0.00  | 1.82   | 21.25   |
| 89    | 90   | 114.00 | 0.00  | 1.27   | 19.89   |
| 90    | 90   | 114.00 | 0.00  | 1.27   | 19.89   |
| 90    | 91   | 114.58 | 0.00  | 0.36   | 19.73   |
| 91    | 91   | 114.58 | 0.00  | 0.36   | 19.73   |
| 91    | 92   | 116.15 | 0.00  | -2.11  | 21.48   |
| 92    | 92   | 116.15 | 0.00  | -2.11  | 21.48   |
| 92    | 93   | 117.73 | 0.00  | -4.75  | 27.00   |
| 93    | 93   | 117.73 | 0.00  | -4.75  | 27.00   |
| 93    | 94   | 119.30 | 0.00  | -6.73  | 36.26   |
| 94    | 94   | 119.30 | -0.06 | -6.73  | 36.26   |
| 94    | 95   | 120.88 | -0.06 | -7.22  | 48.16   |
| 95    | 95   | 120.88 | -0.06 | -7.22  | 48.16   |
| 95    | 96   | 122.45 | -0.05 | -5.64  | 58.29   |
| 96    | 96   | 122.45 | 0.00  | -5.64  | 58.29   |
| 96    | 97   | 124.03 | 0.00  | -4.07  | 65.94   |
| 97    | 97   | 124.03 | 0.00  | -4.07  | 65.94   |
| 97    | 98   | 125.60 | 0.00  | -2.49  | 71.10   |
| 98    | 98   | 125.60 | 0.00  | -2.49  | 71.10   |
| 98    | 99   | 127.18 | 0.00  | -0.92  | 73.79   |
| 99    | 99   | 127.18 | 0.00  | -0.92  | 73.79   |
| 99    | 100  | 128.75 | 0.00  | 0.66   | 74.00   |
| 100   | 100  | 128.75 | 0.00  | 0.66   | 74.00   |
| 100   | 101  | 130.33 | 0.00  | 2.23   | 71.73   |
| 101   | 101  | 130.33 | 0.00  | 2.23   | 71.73   |
| 101   | 102  | 131.90 | 0.00  | 3.81   | 66.97   |
| 102   | 102  | 131.90 | 0.00  | 3.81   | 66.97   |
| 102   | 103  | 133.48 | 0.00  | 5.38   | 59.74   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.  
Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | 5.38   | 59.74   |
| 103   | 104  | 135.05 | 0.00  | 6.96   | 50.03   |
| 104   | 104  | 135.05 | -0.06 | 6.96   | 50.03   |
| 104   | 105  | 136.63 | -0.07 | 8.53   | 37.83   |
| 105   | 105  | 136.63 | -0.07 | 8.53   | 37.83   |
| 105   | 106  | 138.20 | -0.05 | 6.13   | 25.80   |
| 106   | 106  | 138.20 | 0.00  | 6.13   | 25.80   |
| 106   | 107  | 139.78 | 0.00  | 3.47   | 18.15   |
| 107   | 107  | 139.78 | 0.00  | 3.47   | 18.15   |
| 107   | 108  | 141.35 | 0.00  | 1.69   | 14.20   |
| 108   | 108  | 141.35 | 0.00  | 1.69   | 14.20   |
| 108   | 109  | 142.93 | 0.00  | -0.82  | 13.76   |
| 109   | 109  | 142.93 | 0.00  | -0.82  | 13.76   |
| 109   | 110  | 143.50 | 0.00  | -1.74  | 14.31   |
| 110   | 110  | 143.50 | 0.00  | -1.74  | 14.31   |
| 110   | 111  | 144.50 | 0.00  | -2.29  | 16.17   |
| 111   | 1111 | 144.50 | 0.00  | 0.69   | 16.17   |
| 111   | 112  | 145.50 | 0.00  | -0.59  | 16.11   |
| 112   | 112  | 145.50 | 0.00  | -0.59  | 16.11   |
| 112   | 113  | 145.68 | 0.00  | -0.42  | 16.20   |
| 113   | 113  | 145.68 | 0.00  | -0.42  | 16.20   |
| 113   | 114  | 146.85 | 0.00  | -3.31  | 18.33   |
| 114   | 114  | 146.85 | 0.00  | -3.31  | 18.33   |
| 114   | 115  | 148.03 | 0.00  | -5.37  | 23.12   |
| 115   | 115  | 148.03 | 0.00  | -5.37  | 23.12   |
| 115   | 116  | 149.20 | 0.00  | -7.74  | 31.15   |
| 116   | 116  | 149.20 | -0.09 | -7.74  | 31.15   |
| 116   | 117  | 150.38 | -0.08 | -6.57  | 39.56   |
| 117   | 117  | 150.38 | -0.08 | -6.57  | 39.56   |
| 117   | 118  | 151.55 | -0.06 | -5.39  | 46.59   |
| 118   | 118  | 151.55 | 0.00  | -5.39  | 46.59   |
| 118   | 119  | 152.73 | 0.00  | -4.22  | 52.23   |
| 119   | 119  | 152.73 | 0.00  | -4.22  | 52.23   |
| 119   | 120  | 153.90 | 0.00  | -3.04  | 56.50   |
| 120   | 120  | 153.90 | 0.00  | -3.04  | 56.50   |
| 120   | 121  | 155.08 | 0.00  | -1.87  | 59.38   |
| 121   | 121  | 155.08 | 0.00  | -1.87  | 59.38   |
| 121   | 122  | 156.25 | 0.00  | -0.69  | 60.89   |
| 122   | 122  | 156.25 | 0.00  | -0.69  | 60.89   |
| 122   | 123  | 157.43 | 0.00  | 0.48   | 61.01   |
| 123   | 123  | 157.43 | 0.00  | 0.48   | 61.01   |
| 123   | 124  | 158.60 | 0.00  | 1.66   | 59.76   |
| 124   | 124  | 158.60 | 0.00  | 1.66   | 59.76   |
| 124   | 125  | 159.78 | 0.00  | 2.83   | 57.12   |
| 125   | 125  | 159.78 | 0.00  | 2.83   | 57.12   |
| 125   | 126  | 160.95 | 0.00  | 4.01   | 53.10   |
| 126   | 126  | 160.95 | 0.00  | 4.01   | 53.10   |
| 126   | 127  | 162.13 | 0.00  | 5.18   | 47.70   |
| 127   | 127  | 162.13 | 0.00  | 5.18   | 47.70   |
| 127   | 128  | 163.30 | 0.00  | 6.36   | 40.92   |
| 128   | 128  | 163.30 | 0.00  | 6.36   | 40.92   |



# **CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.  
Coef. exc:

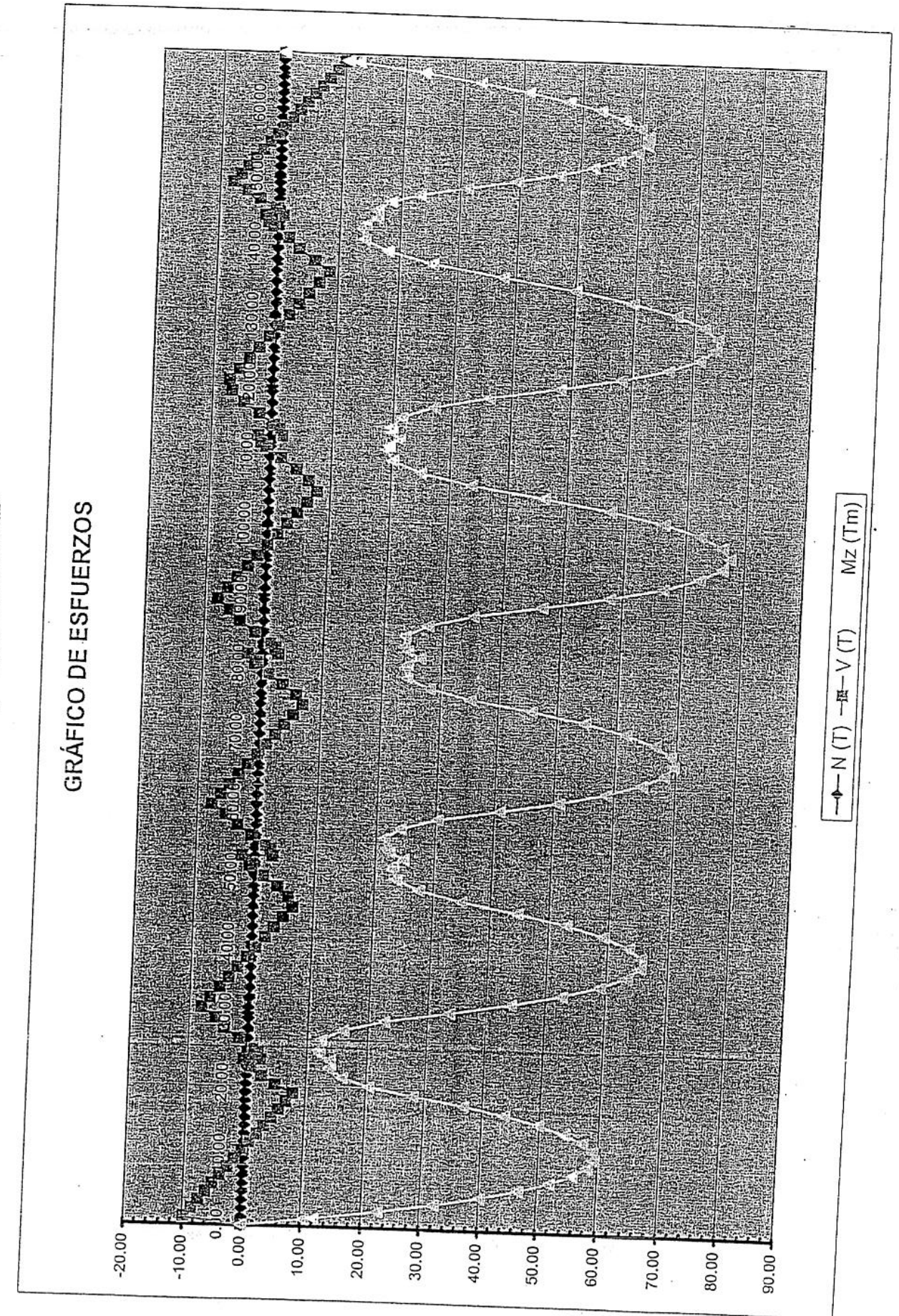
| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 7.53   | 32.76   |
| 129   | 129  | 164.48 | 0.00  | 7.53   | 32.76   |
| 129   | 130  | 165.65 | 0.00  | 8.71   | 23.22   |
| 130   | 130  | 165.65 | 0.00  | 8.71   | 23.22   |
| 130   | 131  | 166.83 | 0.00  | 9.88   | 12.30   |
| 131   | 131  | 166.83 | 0.00  | 9.88   | 12.30   |
| 131   | 132  | 167.00 | 0.00  | 10.06  | 10.56   |
| 132   | 132  | 167.00 | 0.00  | 10.06  | 10.56   |
| 132   | 133  | 168.00 | 0.00  | 0.00   | 0.00    |

esf f7.xls

Programa DINTEL IDEAM S.A.  
SC1.ENV\_TREN\_GENERICO.MZ+

16/08/01

## **GRÁFICO DE ESFUERZOS**



### CÁLCULO TENSIONAL

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | -10.90 | 0.00    |
| 1     | 2    | 1.00  | 0.00  | -9.92  | 9.92    |
| 2     | 2    | 1.00  | 0.00  | -9.92  | 9.92    |
| 2     | 3    | 1.18  | 0.00  | -9.76  | 11.47   |
| 3     | 3    | 1.18  | 0.00  | -9.76  | 11.47   |
| 3     | 4    | 2.35  | 0.00  | -8.69  | 20.43   |
| 4     | 4    | 2.35  | 0.00  | -8.69  | 20.43   |
| 4     | 5    | 3.53  | 0.00  | -7.70  | 27.14   |
| 5     | 5    | 3.53  | 0.00  | -7.70  | 27.14   |
| 5     | 6    | 4.70  | 0.00  | -6.78  | 31.87   |
| 6     | 6    | 4.70  | 0.00  | -6.78  | 31.87   |
| 6     | 7    | 5.88  | 0.00  | -5.93  | 34.85   |
| 7     | 7    | 5.88  | 0.00  | -5.93  | 34.85   |
| 7     | 8    | 7.05  | 0.00  | -5.15  | 36.33   |
| 8     | 8    | 7.05  | 0.00  | -5.15  | 36.33   |
| 8     | 9    | 8.23  | 0.00  | -4.44  | 36.55   |
| 9     | 9    | 8.23  | 0.00  | -4.44  | 36.55   |
| 9     | 10   | 9.40  | 0.00  | -3.80  | 35.75   |
| 10    | 10   | 9.40  | 0.00  | -3.80  | 35.75   |
| 10    | 11   | 10.58 | 0.00  | -3.23  | 34.13   |
| 11    | 11   | 10.58 | 0.00  | -3.23  | 34.13   |
| 11    | 12   | 11.75 | 0.00  | -2.72  | 31.93   |
| 12    | 12   | 11.75 | 0.00  | -2.72  | 31.93   |
| 12    | 13   | 12.93 | 0.00  | -2.27  | 29.33   |
| 13    | 13   | 12.93 | 0.00  | -2.27  | 29.33   |
| 13    | 14   | 14.10 | 0.00  | -1.88  | 26.52   |
| 14    | 14   | 14.10 | 0.00  | -1.88  | 26.52   |
| 14    | 15   | 15.28 | 0.00  | -1.55  | 23.67   |
| 15    | 15   | 15.28 | 0.00  | -1.55  | 23.67   |
| 15    | 16   | 16.45 | 0.00  | -1.27  | 20.95   |
| 16    | 16   | 16.45 | 0.01  | -1.27  | 20.95   |
| 16    | 17   | 17.63 | 0.01  | -1.05  | 18.49   |
| 17    | 17   | 17.63 | 0.01  | -1.05  | 18.49   |
| 17    | 18   | 18.80 | 0.01  | -0.87  | 16.42   |
| 18    | 18   | 18.80 | 0.00  | -0.87  | 16.42   |
| 18    | 19   | 19.98 | 0.00  | -0.74  | 14.84   |
| 19    | 19   | 19.98 | 0.00  | -0.74  | 14.84   |
| 19    | 20   | 21.15 | 0.00  | -0.65  | 13.85   |
| 20    | 20   | 21.15 | 0.00  | -0.65  | 13.85   |
| 20    | 21   | 22.33 | 0.00  | -0.60  | 13.49   |
| 21    | 21   | 22.33 | 0.00  | -0.60  | 13.49   |
| 21    | 22   | 22.50 | 0.00  | -0.60  | 13.50   |
| 22    | 22   | 22.50 | 0.00  | -0.60  | 13.50   |
| 22    | 23   | 23.50 | 0.00  | -0.59  | 13.83   |
| 23    | 1023 | 23.50 | 0.00  | -16.74 | -84.60  |
| 23    | 24   | 24.50 | 0.00  | -15.75 | -68.60  |
| 24    | 24   | 24.50 | 0.00  | -15.75 | -68.60  |
| 24    | 25   | 24.95 | 0.00  | -15.32 | -61.88  |
| 25    | 25   | 24.95 | 0.00  | -15.32 | -61.88  |
| 25    | 26   | 26.40 | 0.00  | -13.94 | -42.24  |
| 26    | 26   | 26.40 | 0.00  | -13.94 | -42.24  |

### CÁLCULO TENSIONAL

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | -12.63 | -25.59  |
| 27    | 27   | 27.85 | 0.00  | -12.63 | -25.59  |
| 27    | 28   | 29.30 | 0.00  | -11.38 | -11.79  |
| 28    | 28   | 29.30 | -0.11 | -11.38 | -11.79  |
| 28    | 29   | 30.75 | -0.10 | -10.20 | -0.66   |
| 29    | 29   | 30.75 | -0.10 | -10.20 | -0.66   |
| 29    | 30   | 32.20 | -0.09 | -9.10  | 8.01    |
| 30    | 30   | 32.20 | 0.00  | -9.10  | 8.01    |
| 30    | 31   | 33.65 | 0.00  | -8.07  | 14.46   |
| 31    | 31   | 33.65 | 0.00  | -8.07  | 14.46   |
| 31    | 32   | 35.10 | 0.00  | -7.13  | 18.95   |
| 32    | 32   | 35.10 | 0.00  | -7.13  | 18.95   |
| 32    | 33   | 36.55 | 0.00  | -6.27  | 21.78   |
| 33    | 33   | 36.55 | 0.00  | -6.27  | 21.78   |
| 33    | 34   | 38.00 | 0.00  | -5.50  | 23.23   |
| 34    | 34   | 38.00 | 0.00  | -5.50  | 23.23   |
| 34    | 35   | 39.45 | 0.00  | -4.81  | 23.62   |
| 35    | 35   | 39.45 | 0.00  | -4.81  | 23.62   |
| 35    | 36   | 40.90 | 0.00  | -4.21  | 23.24   |
| 36    | 36   | 40.90 | 0.00  | -4.21  | 23.24   |
| 36    | 37   | 42.35 | 0.00  | -3.69  | 22.40   |
| 37    | 37   | 42.35 | 0.00  | -3.69  | 22.40   |
| 37    | 38   | 43.80 | 0.00  | -3.26  | 21.38   |
| 38    | 38   | 43.80 | 0.03  | -3.26  | 21.38   |
| 38    | 39   | 45.25 | 0.03  | -2.90  | 20.46   |
| 39    | 39   | 45.25 | 0.03  | -2.90  | 20.46   |
| 39    | 40   | 46.70 | 0.02  | -2.63  | 19.88   |
| 40    | 40   | 46.70 | 0.00  | -2.63  | 19.88   |
| 40    | 41   | 48.15 | 0.00  | -2.42  | 19.86   |
| 41    | 41   | 48.15 | 0.00  | -2.42  | 19.86   |
| 41    | 42   | 49.60 | 0.00  | -2.28  | 20.59   |
| 42    | 42   | 49.60 | 0.00  | -2.28  | 20.59   |
| 42    | 43   | 51.05 | 0.00  | -2.20  | 22.22   |
| 43    | 43   | 51.05 | 0.00  | -2.20  | 22.22   |
| 43    | 44   | 51.50 | 0.00  | -2.19  | 22.93   |
| 44    | 44   | 51.50 | 0.00  | -2.19  | 22.93   |
| 44    | 45   | 52.50 | 0.00  | -2.18  | 24.86   |
| 45    | 1045 | 52.50 | 0.00  | -17.16 | -93.91  |
| 45    | 46   | 53.50 | 0.00  | -16.17 | -77.50  |
| 46    | 46   | 53.50 | 0.00  | -16.17 | -77.50  |
| 46    | 47   | 53.95 | 0.00  | -15.74 | -70.60  |
| 47    | 47   | 53.95 | 0.00  | -15.74 | -70.60  |
| 47    | 48   | 55.40 | 0.00  | -14.36 | -50.38  |
| 48    | 48   | 55.40 | 0.00  | -14.36 | -50.38  |
| 48    | 49   | 56.85 | 0.00  | -13.05 | -33.17  |
| 49    | 49   | 56.85 | 0.00  | -13.05 | -33.17  |
| 49    | 50   | 58.30 | 0.00  | -11.80 | -18.81  |
| 50    | 50   | 58.30 | -0.11 | -11.80 | -18.81  |
| 50    | 51   | 59.75 | -0.10 | -10.62 | -7.14   |
| 51    | 51   | 59.75 | -0.10 | -10.62 | -7.14   |
| 51    | 52   | 61.20 | -0.09 | -9.52  | 2.07    |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | -9.52  | 2.07    |
| 52    | 53   | 62.65 | 0.00  | -8.50  | 9.06    |
| 53    | 53   | 62.65 | 0.00  | -8.50  | 9.06    |
| 53    | 54   | 64.10 | 0.00  | -7.55  | 14.10   |
| 54    | 54   | 64.10 | 0.00  | -7.55  | 14.10   |
| 54    | 55   | 65.55 | 0.00  | -6.69  | 17.46   |
| 55    | 55   | 65.55 | 0.00  | -6.69  | 17.46   |
| 55    | 56   | 67.00 | 0.00  | -5.92  | 19.45   |
| 56    | 56   | 67.00 | 0.00  | -5.92  | 19.45   |
| 56    | 57   | 68.45 | 0.00  | -5.23  | 20.36   |
| 57    | 57   | 68.45 | 0.00  | -5.23  | 20.36   |
| 57    | 58   | 69.90 | 0.00  | -4.63  | 20.51   |
| 58    | 58   | 69.90 | 0.00  | -4.63  | 20.51   |
| 58    | 59   | 71.35 | 0.00  | -4.11  | 20.18   |
| 59    | 59   | 71.35 | 0.00  | -4.11  | 20.18   |
| 59    | 60   | 72.80 | 0.00  | -3.67  | 19.68   |
| 60    | 60   | 72.80 | 0.04  | -3.67  | 19.68   |
| 60    | 61   | 74.25 | 0.03  | -3.31  | 19.26   |
| 61    | 61   | 74.25 | 0.03  | -3.31  | 19.26   |
| 61    | 62   | 75.70 | 0.03  | -3.03  | 19.19   |
| 62    | 62   | 75.70 | 0.00  | -3.03  | 19.19   |
| 62    | 63   | 77.15 | 0.00  | -2.82  | 19.68   |
| 63    | 63   | 77.15 | 0.00  | -2.82  | 19.68   |
| 63    | 64   | 78.60 | 0.00  | -2.68  | 20.93   |
| 64    | 64   | 78.60 | 0.00  | -2.68  | 20.93   |
| 64    | 65   | 80.05 | 0.00  | -2.60  | 23.10   |
| 65    | 65   | 80.05 | 0.00  | -2.60  | 23.10   |
| 65    | 66   | 80.50 | 0.00  | -2.59  | 23.98   |
| 66    | 66   | 80.50 | 0.00  | -2.59  | 23.98   |
| 66    | 67   | 81.50 | 0.00  | -2.58  | 26.30   |
| 67    | 1067 | 81.50 | 0.00  | -18.02 | -103.04 |
| 67    | 68   | 82.50 | 0.00  | -17.03 | -85.76  |
| 68    | 68   | 82.50 | 0.00  | -17.03 | -85.76  |
| 68    | 69   | 83.08 | 0.00  | -16.47 | -76.49  |
| 69    | 69   | 83.08 | 0.00  | -16.47 | -76.49  |
| 69    | 70   | 84.65 | 0.00  | -14.98 | -53.56  |
| 70    | 70   | 84.65 | 0.00  | -14.98 | -53.56  |
| 70    | 71   | 86.23 | 0.00  | -13.55 | -34.15  |
| 71    | 71   | 86.23 | 0.00  | -13.55 | -34.15  |
| 71    | 72   | 87.80 | 0.00  | -12.19 | -18.10  |
| 72    | 72   | 87.80 | -0.11 | -12.19 | -18.10  |
| 72    | 73   | 89.38 | -0.10 | -10.91 | -5.20   |
| 73    | 73   | 89.38 | -0.10 | -10.91 | -5.20   |
| 73    | 74   | 90.95 | -0.09 | -9.71  | 4.79    |
| 74    | 74   | 90.95 | 0.00  | -9.71  | 4.79    |
| 74    | 75   | 92.53 | 0.00  | -8.60  | 12.16   |
| 75    | 75   | 92.53 | 0.00  | -8.60  | 12.16   |
| 75    | 76   | 94.10 | 0.00  | -7.57  | 17.23   |
| 76    | 76   | 94.10 | 0.00  | -7.57  | 17.23   |
| 76    | 77   | 95.68 | 0.00  | -6.64  | 20.33   |
| 77    | 77   | 95.68 | 0.00  | -6.64  | 20.33   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | -5.80  | 21.80   |
| 78    | 78   | 97.25  | 0.00  | -5.80  | 21.80   |
| 78    | 79   | 98.83  | 0.00  | -5.05  | 22.01   |
| 79    | 79   | 98.83  | 0.00  | -5.05  | 22.01   |
| 79    | 80   | 100.40 | 0.00  | -4.40  | 21.33   |
| 80    | 80   | 100.40 | 0.00  | -4.40  | 21.33   |
| 80    | 81   | 101.98 | 0.00  | -3.84  | 20.09   |
| 81    | 81   | 101.98 | 0.00  | -3.84  | 20.09   |
| 81    | 82   | 103.55 | 0.00  | -3.37  | 18.65   |
| 82    | 82   | 103.55 | 0.03  | -3.37  | 18.65   |
| 82    | 83   | 105.13 | 0.03  | -2.98  | 17.31   |
| 83    | 83   | 105.13 | 0.03  | -2.98  | 17.31   |
| 83    | 84   | 106.70 | 0.02  | -2.68  | 16.38   |
| 84    | 84   | 106.70 | 0.00  | -2.68  | 16.38   |
| 84    | 85   | 108.28 | 0.00  | -2.46  | 16.11   |
| 85    | 85   | 108.28 | 0.00  | -2.46  | 16.11   |
| 85    | 86   | 109.85 | 0.00  | -2.31  | 16.73   |
| 86    | 86   | 109.85 | 0.00  | -2.31  | 16.73   |
| 86    | 87   | 111.43 | 0.00  | -2.22  | 18.40   |
| 87    | 87   | 111.43 | 0.00  | -2.22  | 18.40   |
| 87    | 88   | 112.00 | 0.00  | -2.21  | 19.30   |
| 88    | 88   | 112.00 | 0.00  | -2.21  | 19.30   |
| 88    | 89   | 113.00 | 0.00  | -2.20  | 21.25   |
| 89    | 1089 | 113.00 | 0.00  | -17.89 | -107.95 |
| 89    | 90   | 114.00 | 0.00  | -16.90 | -90.81  |
| 90    | 90   | 114.00 | 0.00  | -16.90 | -90.81  |
| 90    | 91   | 114.58 | 0.00  | -16.34 | -81.63  |
| 91    | 91   | 114.58 | 0.00  | -16.34 | -81.63  |
| 91    | 92   | 116.15 | 0.00  | -14.85 | -58.97  |
| 92    | 92   | 116.15 | 0.00  | -14.85 | -58.97  |
| 92    | 93   | 117.73 | 0.00  | -13.43 | -39.84  |
| 93    | 93   | 117.73 | 0.00  | -13.43 | -39.84  |
| 93    | 94   | 119.30 | 0.00  | -12.08 | -24.08  |
| 94    | 94   | 119.30 | -0.11 | -12.08 | -24.08  |
| 94    | 95   | 120.88 | -0.10 | -10.81 | -11.45  |
| 95    | 95   | 120.88 | -0.10 | -10.81 | -11.45  |
| 95    | 96   | 122.45 | -0.08 | -9.62  | -1.70   |
| 96    | 96   | 122.45 | 0.00  | -9.62  | -1.70   |
| 96    | 97   | 124.03 | 0.00  | -8.52  | 5.47    |
| 97    | 97   | 124.03 | 0.00  | -8.52  | 5.47    |
| 97    | 98   | 125.60 | 0.00  | -7.51  | 10.38   |
| 98    | 98   | 125.60 | 0.00  | -7.51  | 10.38   |
| 98    | 99   | 127.18 | 0.00  | -6.60  | 13.38   |
| 99    | 99   | 127.18 | 0.00  | -6.60  | 13.38   |
| 99    | 100  | 128.75 | 0.00  | -5.77  | 14.82   |
| 100   | 100  | 128.75 | 0.00  | -5.77  | 14.82   |
| 100   | 101  | 130.33 | 0.00  | -5.04  | 15.06   |
| 101   | 101  | 130.33 | 0.00  | -5.04  | 15.06   |
| 101   | 102  | 131.90 | 0.00  | -4.41  | 14.46   |
| 102   | 102  | 131.90 | 0.00  | -4.41  | 14.46   |
| 102   | 103  | 133.48 | 0.00  | -3.86  | 13.37   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | -3.86  | 13.37   |
| 103   | 104  | 135.05 | 0.00  | -3.41  | 12.12   |
| 104   | 104  | 135.05 | 0.03  | -3.41  | 12.12   |
| 104   | 105  | 136.63 | 0.03  | -3.04  | 11.02   |
| 105   | 105  | 136.63 | 0.03  | -3.04  | 11.02   |
| 105   | 106  | 138.20 | 0.02  | -2.75  | 10.35   |
| 106   | 106  | 138.20 | 0.00  | -2.75  | 10.35   |
| 106   | 107  | 139.78 | 0.00  | -2.53  | 10.36   |
| 107   | 107  | 139.78 | 0.00  | -2.53  | 10.36   |
| 107   | 108  | 141.35 | 0.00  | -2.39  | 11.24   |
| 108   | 108  | 141.35 | 0.00  | -2.39  | 11.24   |
| 108   | 109  | 142.93 | 0.00  | -2.31  | 13.15   |
| 109   | 109  | 142.93 | 0.00  | -2.31  | 13.15   |
| 109   | 110  | 143.50 | 0.00  | -2.30  | 14.12   |
| 110   | 110  | 143.50 | 0.00  | -2.30  | 14.12   |
| 110   | 111  | 144.50 | 0.00  | -2.29  | 16.17   |
| 111   | 111  | 144.50 | 0.00  | -15.70 | -92.82  |
| 111   | 112  | 145.50 | 0.00  | -14.71 | -77.88  |
| 112   | 112  | 145.50 | 0.00  | -14.71 | -77.88  |
| 112   | 113  | 145.68 | 0.00  | -14.54 | -75.43  |
| 113   | 113  | 145.68 | 0.00  | -14.54 | -75.43  |
| 113   | 114  | 146.85 | 0.00  | -13.42 | -60.13  |
| 114   | 114  | 146.85 | 0.00  | -13.42 | -60.13  |
| 114   | 115  | 148.03 | 0.00  | -12.33 | -46.87  |
| 115   | 115  | 148.03 | 0.00  | -12.33 | -46.87  |
| 115   | 116  | 149.20 | 0.00  | -11.29 | -35.57  |
| 116   | 116  | 149.20 | -0.13 | -11.29 | -35.57  |
| 116   | 117  | 150.38 | -0.12 | -10.30 | -26.16  |
| 117   | 117  | 150.38 | -0.12 | -10.30 | -26.16  |
| 117   | 118  | 151.55 | -0.11 | -9.35  | -18.51  |
| 118   | 118  | 151.55 | 0.00  | -9.35  | -18.51  |
| 118   | 119  | 152.73 | 0.00  | -8.46  | -12.50  |
| 119   | 119  | 152.73 | 0.00  | -8.46  | -12.50  |
| 119   | 120  | 153.90 | 0.00  | -7.62  | -7.98   |
| 120   | 120  | 153.90 | 0.00  | -7.62  | -7.98   |
| 120   | 121  | 155.08 | 0.00  | -6.83  | -4.80   |
| 121   | 121  | 155.08 | 0.00  | -6.83  | -4.80   |
| 121   | 122  | 156.25 | 0.00  | -6.11  | -2.79   |
| 122   | 122  | 156.25 | 0.00  | -6.11  | -2.79   |
| 122   | 123  | 157.43 | 0.00  | -5.45  | -1.74   |
| 123   | 123  | 157.43 | 0.00  | -5.45  | -1.74   |
| 123   | 124  | 158.60 | 0.00  | -4.86  | -1.47   |
| 124   | 124  | 158.60 | 0.00  | -4.86  | -1.47   |
| 124   | 125  | 159.78 | 0.00  | -4.33  | -1.76   |
| 125   | 125  | 159.78 | 0.00  | -4.33  | -1.76   |
| 125   | 126  | 160.95 | 0.00  | -3.86  | -2.39   |
| 126   | 126  | 160.95 | 0.00  | -3.86  | -2.39   |
| 126   | 127  | 162.13 | 0.00  | -3.47  | -3.13   |
| 127   | 127  | 162.13 | 0.00  | -3.47  | -3.13   |
| 127   | 128  | 163.30 | 0.00  | -3.15  | -3.75   |
| 128   | 128  | 163.30 | 0.00  | -3.15  | -3.75   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | -2.89  | -3.99   |
| 129   | 129  | 164.48 | 0.00  | -2.89  | -3.99   |
| 129   | 130  | 165.65 | 0.00  | -2.71  | -3.62   |
| 130   | 130  | 165.65 | 0.00  | -2.71  | -3.62   |
| 130   | 131  | 166.83 | 0.00  | -2.60  | -2.37   |
| 131   | 131  | 166.83 | 0.00  | -2.60  | -2.37   |
| 131   | 132  | 167.00 | 0.00  | -2.59  | -2.09   |
| 132   | 132  | 167.00 | 0.00  | -2.59  | -2.09   |
| 132   | 133  | 168.00 | 0.00  | -2.57  | 0.00    |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

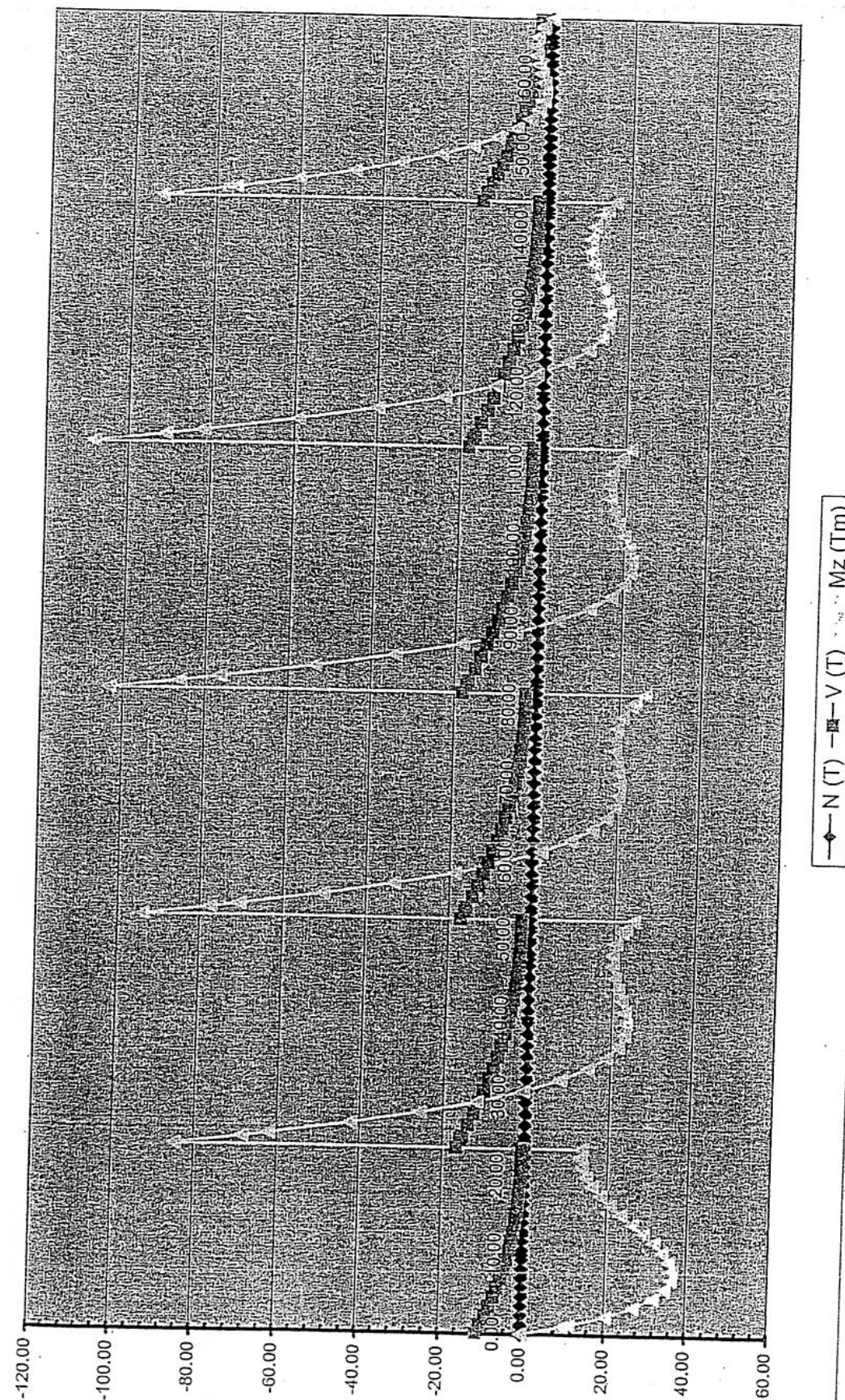
SC1.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[0; 1]SC1.SCuniTpos.Barra1.Mx+ + [0; 1]SC1.SCuniTpos.Barra2.Mx+ + [0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | 0.00   | 0.00    |
| 1     | 2    | 1.00  | 0.00  | 2.16   | -2.16   |
| 2     | 2    | 1.00  | 0.00  | 2.16   | -2.16   |
| 2     | 3    | 1.18  | 0.00  | 2.16   | -2.54   |
| 3     | 3    | 1.18  | 0.00  | 2.16   | -2.54   |
| 3     | 4    | 2.35  | 0.00  | 2.16   | -5.07   |
| 4     | 4    | 2.35  | 0.00  | 2.16   | -5.07   |
| 4     | 5    | 3.53  | 0.00  | 2.16   | -7.61   |
| 5     | 5    | 3.53  | 0.00  | 2.16   | -7.61   |
| 5     | 6    | 4.70  | 0.00  | 2.16   | -10.14  |
| 6     | 6    | 4.70  | 0.00  | 2.16   | -10.14  |
| 6     | 7    | 5.88  | 0.00  | 2.16   | -12.68  |
| 7     | 7    | 5.88  | 0.00  | 2.16   | -12.68  |
| 7     | 8    | 7.05  | 0.00  | 2.16   | -15.21  |
| 8     | 8    | 7.05  | 0.00  | 2.16   | -15.21  |
| 8     | 9    | 8.23  | 0.00  | 2.16   | -17.75  |
| 9     | 9    | 8.23  | 0.00  | 2.16   | -17.75  |
| 9     | 10   | 9.40  | 0.00  | 2.16   | -20.29  |
| 10    | 10   | 9.40  | 0.00  | 2.16   | -20.29  |
| 10    | 11   | 10.58 | 0.00  | 2.16   | -22.82  |
| 11    | 11   | 10.58 | 0.00  | 2.16   | -22.82  |
| 11    | 12   | 11.75 | 0.00  | 2.16   | -25.36  |
| 12    | 12   | 11.75 | 0.00  | 2.16   | -25.36  |
| 12    | 13   | 12.93 | 0.00  | 2.16   | -27.89  |
| 13    | 13   | 12.93 | 0.00  | 2.16   | -27.89  |
| 13    | 14   | 14.10 | 0.00  | 2.16   | -30.43  |
| 14    | 14   | 14.10 | 0.00  | 2.16   | -30.43  |
| 14    | 15   | 15.28 | 0.00  | 2.16   | -32.97  |
| 15    | 15   | 15.28 | 0.00  | 2.16   | -32.97  |
| 15    | 16   | 16.45 | 0.00  | 2.16   | -35.50  |
| 16    | 16   | 16.45 | -0.03 | 2.16   | -35.50  |
| 16    | 17   | 17.63 | -0.03 | 2.16   | -38.04  |
| 17    | 17   | 17.63 | -0.03 | 2.16   | -38.04  |
| 17    | 18   | 18.80 | -0.03 | 2.16   | -40.57  |
| 18    | 18   | 18.80 | 0.00  | 2.16   | -40.57  |
| 18    | 19   | 19.98 | 0.00  | 6.45   | -45.42  |
| 19    | 19   | 19.98 | 0.00  | 6.45   | -45.42  |
| 19    | 20   | 21.15 | 0.00  | 9.94   | -54.82  |
| 20    | 20   | 21.15 | 0.00  | 9.94   | -54.82  |
| 20    | 21   | 22.33 | 0.00  | 13.07  | -68.04  |
| 21    | 21   | 22.33 | 0.00  | 13.07  | -68.04  |
| 21    | 22   | 22.50 | 0.00  | 13.07  | -70.33  |
| 22    | 22   | 22.50 | 0.00  | 13.07  | -70.33  |
| 22    | 23   | 23.50 | 0.00  | 15.35  | -84.60  |
| 23    | 1023 | 23.50 | 0.00  | -16.74 | -84.60  |
| 23    | 24   | 24.50 | 0.00  | -15.32 | -68.77  |
| 24    | 24   | 24.50 | 0.00  | -15.32 | -68.77  |
| 24    | 25   | 24.95 | 0.00  | -13.94 | -62.46  |
| 25    | 25   | 24.95 | 0.00  | -13.94 | -62.46  |
| 25    | 26   | 26.40 | 0.00  | -10.20 | -45.03  |
| 26    | 26   | 26.40 | 0.00  | -10.20 | -45.03  |

**GRÁFICO DE ESFUERZOS**

◆ N (T)    ■ V (T)    ● Mz (Tm)



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | -6.27  | -32.77  |
| 27    | 27   | 27.85 | 0.00  | -6.27  | -32.77  |
| 27    | 28   | 29.30 | 0.00  | -3.26  | -25.86  |
| 28    | 28   | 29.30 | -0.03 | -3.26  | -25.86  |
| 28    | 29   | 30.75 | 0.01  | 0.70   | -25.12  |
| 29    | 29   | 30.75 | 0.01  | 0.70   | -25.12  |
| 29    | 30   | 32.20 | 0.01  | 0.70   | -26.14  |
| 30    | 30   | 32.20 | 0.00  | 0.70   | -26.14  |
| 30    | 31   | 33.65 | 0.00  | 0.70   | -27.15  |
| 31    | 31   | 33.65 | 0.00  | 0.70   | -27.15  |
| 31    | 32   | 35.10 | 0.00  | 0.70   | -28.17  |
| 32    | 32   | 35.10 | 0.00  | 0.70   | -28.17  |
| 32    | 33   | 36.55 | 0.00  | 0.70   | -29.18  |
| 33    | 33   | 36.55 | 0.00  | 0.70   | -29.18  |
| 33    | 34   | 38.00 | 0.00  | 0.70   | -30.19  |
| 34    | 34   | 38.00 | 0.00  | 0.70   | -30.19  |
| 34    | 35   | 39.45 | 0.00  | 0.70   | -31.21  |
| 35    | 35   | 39.45 | 0.00  | 0.70   | -31.21  |
| 35    | 36   | 40.90 | 0.00  | 0.70   | -32.22  |
| 36    | 36   | 40.90 | 0.00  | 0.70   | -32.22  |
| 36    | 37   | 42.35 | 0.00  | 0.70   | -33.24  |
| 37    | 37   | 42.35 | 0.00  | 0.70   | -33.24  |
| 37    | 38   | 43.80 | 0.00  | 0.70   | -34.25  |
| 38    | 38   | 43.80 | -0.01 | 0.70   | -34.25  |
| 38    | 39   | 45.25 | -0.01 | 0.70   | -35.26  |
| 39    | 39   | 45.25 | -0.01 | 0.70   | -35.26  |
| 39    | 40   | 46.70 | -0.03 | 2.89   | -36.94  |
| 40    | 40   | 46.70 | 0.00  | 2.89   | -36.94  |
| 40    | 41   | 48.15 | 0.00  | 6.20   | -43.32  |
| 41    | 41   | 48.15 | 0.00  | 6.20   | -43.32  |
| 41    | 42   | 49.60 | 0.00  | 10.09  | -55.01  |
| 42    | 42   | 49.60 | 0.00  | 10.09  | -55.01  |
| 42    | 43   | 51.05 | 0.00  | 13.82  | -72.01  |
| 43    | 43   | 51.05 | 0.00  | 13.82  | -72.01  |
| 43    | 44   | 51.50 | 0.00  | 13.82  | -78.23  |
| 44    | 44   | 51.50 | 0.00  | 13.82  | -78.23  |
| 44    | 45   | 52.50 | 0.00  | 16.62  | -93.91  |
| 45    | 1045 | 52.50 | 0.00  | -17.16 | -93.91  |
| 45    | 46   | 53.50 | 0.00  | -15.74 | -77.68  |
| 46    | 46   | 53.50 | 0.00  | -15.74 | -77.68  |
| 46    | 47   | 53.95 | 0.00  | -14.36 | -71.21  |
| 47    | 47   | 53.95 | 0.00  | -14.36 | -71.21  |
| 47    | 48   | 55.40 | 0.00  | -10.62 | -53.34  |
| 48    | 48   | 55.40 | 0.00  | -10.62 | -53.34  |
| 48    | 49   | 56.85 | 0.00  | -6.69  | -40.77  |
| 49    | 49   | 56.85 | 0.00  | -6.69  | -40.77  |
| 49    | 50   | 58.30 | 0.00  | -3.31  | -33.59  |
| 50    | 50   | 58.30 | -0.03 | -3.31  | -33.59  |
| 50    | 51   | 59.75 | 0.01  | 0.60   | -33.04  |
| 51    | 51   | 59.75 | 0.01  | 0.60   | -33.04  |
| 51    | 52   | 61.20 | 0.01  | 0.60   | -33.90  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | 0.60   | -33.90  |
| 52    | 53   | 62.65 | 0.00  | 0.60   | -34.77  |
| 53    | 53   | 62.65 | 0.00  | 0.60   | -34.77  |
| 53    | 54   | 64.10 | 0.00  | 0.60   | -35.63  |
| 54    | 54   | 64.10 | 0.00  | 0.60   | -35.63  |
| 54    | 55   | 65.55 | 0.00  | 0.60   | -36.50  |
| 55    | 55   | 65.55 | 0.00  | 0.60   | -36.50  |
| 55    | 56   | 67.00 | 0.00  | 0.60   | -37.36  |
| 56    | 56   | 67.00 | 0.00  | 0.60   | -37.36  |
| 56    | 57   | 68.45 | 0.00  | 0.60   | -38.22  |
| 57    | 57   | 68.45 | 0.00  | 0.60   | -38.22  |
| 57    | 58   | 69.90 | 0.00  | 0.60   | -39.09  |
| 58    | 58   | 69.90 | 0.00  | 0.60   | -39.09  |
| 58    | 59   | 71.35 | 0.00  | 0.60   | -39.95  |
| 59    | 59   | 71.35 | 0.00  | 0.60   | -39.95  |
| 59    | 60   | 72.80 | 0.00  | 0.60   | -40.82  |
| 60    | 60   | 72.80 | -0.01 | 0.60   | -40.82  |
| 60    | 61   | 74.25 | -0.01 | 0.60   | -41.68  |
| 61    | 61   | 74.25 | -0.01 | 0.60   | -41.68  |
| 61    | 62   | 75.70 | -0.03 | 3.16   | -43.06  |
| 62    | 62   | 75.70 | 0.00  | 3.16   | -43.06  |
| 62    | 63   | 77.15 | 0.00  | 6.95   | -50.00  |
| 63    | 63   | 77.15 | 0.00  | 6.95   | -50.00  |
| 63    | 64   | 78.60 | 0.00  | 10.83  | -62.35  |
| 64    | 64   | 78.60 | 0.00  | 10.83  | -62.35  |
| 64    | 65   | 80.05 | 0.00  | 14.55  | -80.16  |
| 65    | 65   | 80.05 | 0.00  | 14.55  | -80.16  |
| 65    | 66   | 80.50 | 0.00  | 14.55  | -86.70  |
| 66    | 66   | 80.50 | 0.00  | 14.55  | -86.70  |
| 66    | 67   | 81.50 | 0.00  | 17.34  | -103.04 |
| 67    | 1067 | 81.50 | 0.00  | -18.02 | -103.04 |
| 67    | 68   | 82.50 | 0.00  | -16.47 | -85.96  |
| 68    | 68   | 82.50 | 0.00  | -16.47 | -85.96  |
| 68    | 69   | 83.08 | 0.00  | -14.98 | -77.15  |
| 69    | 69   | 83.08 | 0.00  | -14.98 | -77.15  |
| 69    | 70   | 84.65 | 0.00  | -10.91 | -56.77  |
| 70    | 70   | 84.65 | 0.00  | -10.91 | -56.77  |
| 70    | 71   | 86.23 | 0.00  | -6.64  | -42.43  |
| 71    | 71   | 86.23 | 0.00  | -6.64  | -42.43  |
| 71    | 72   | 87.80 | 0.00  | -3.37  | -34.41  |
| 72    | 72   | 87.80 | -0.03 | -3.37  | -34.41  |
| 72    | 73   | 89.38 | 0.00  | 0.28   | -32.99  |
| 73    | 73   | 89.38 | 0.00  | 0.28   | -32.99  |
| 73    | 74   | 90.95 | 0.00  | 0.28   | -33.43  |
| 74    | 74   | 90.95 | 0.00  | 0.28   | -33.43  |
| 74    | 75   | 92.53 | 0.00  | 0.28   | -33.88  |
| 75    | 75   | 92.53 | 0.00  | 0.28   | -33.88  |
| 75    | 76   | 94.10 | 0.00  | 0.28   | -34.33  |
| 76    | 76   | 94.10 | 0.00  | 0.28   | -34.33  |
| 76    | 77   | 95.68 | 0.00  | 0.28   | -34.78  |
| 77    | 77   | 95.68 | 0.00  | 0.28   | -34.78  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 0.28   | -35.23  |
| 78    | 78   | 97.25  | 0.00  | 0.28   | -35.23  |
| 78    | 79   | 98.83  | 0.00  | 0.28   | -35.67  |
| 79    | 79   | 98.83  | 0.00  | 0.28   | -35.67  |
| 79    | 80   | 100.40 | 0.00  | 0.28   | -36.12  |
| 80    | 80   | 100.40 | 0.00  | 0.28   | -36.12  |
| 80    | 81   | 101.98 | 0.00  | 0.28   | -36.57  |
| 81    | 81   | 101.98 | 0.00  | 0.28   | -36.57  |
| 81    | 82   | 103.55 | 0.00  | 0.28   | -37.02  |
| 82    | 82   | 103.55 | 0.00  | 0.28   | -37.02  |
| 82    | 83   | 105.13 | 0.00  | 0.28   | -37.47  |
| 83    | 83   | 105.13 | 0.00  | 0.28   | -37.47  |
| 83    | 84   | 106.70 | -0.03 | 3.35   | -39.11  |
| 84    | 84   | 106.70 | 0.00  | 3.35   | -39.11  |
| 84    | 85   | 108.28 | 0.00  | 6.94   | -47.07  |
| 85    | 85   | 108.28 | 0.00  | 6.94   | -47.07  |
| 85    | 86   | 109.85 | 0.00  | 11.18  | -61.30  |
| 86    | 86   | 109.85 | 0.00  | 11.18  | -61.30  |
| 86    | 87   | 111.43 | 0.00  | 15.22  | -81.76  |
| 87    | 87   | 111.43 | 0.00  | 15.22  | -81.76  |
| 87    | 88   | 112.00 | 0.00  | 16.71  | -90.65  |
| 88    | 88   | 112.00 | 0.00  | 16.71  | -90.65  |
| 88    | 89   | 113.00 | 0.00  | 18.26  | -107.95 |
| 89    | 1089 | 113.00 | 0.00  | -17.89 | -107.95 |
| 89    | 90   | 114.00 | 0.00  | -16.34 | -91.02  |
| 90    | 90   | 114.00 | 0.00  | -16.34 | -91.02  |
| 90    | 91   | 114.58 | 0.00  | -14.85 | -82.36  |
| 91    | 91   | 114.58 | 0.00  | -14.85 | -82.36  |
| 91    | 92   | 116.15 | 0.00  | -10.81 | -62.53  |
| 92    | 92   | 116.15 | 0.00  | -10.81 | -62.53  |
| 92    | 93   | 117.73 | 0.00  | -6.60  | -48.93  |
| 93    | 93   | 117.73 | 0.00  | -6.60  | -48.93  |
| 93    | 94   | 119.30 | 0.00  | -3.04  | -41.57  |
| 94    | 94   | 119.30 | -0.03 | -3.04  | -41.57  |
| 94    | 95   | 120.88 | -0.01 | -0.98  | -39.32  |
| 95    | 95   | 120.88 | -0.01 | -0.98  | -39.32  |
| 95    | 96   | 122.45 | -0.01 | -0.98  | -37.78  |
| 96    | 96   | 122.45 | 0.00  | -0.98  | -37.78  |
| 96    | 97   | 124.03 | 0.00  | -0.98  | -36.25  |
| 97    | 97   | 124.03 | 0.00  | -0.98  | -36.25  |
| 97    | 98   | 125.60 | 0.00  | -0.98  | -34.71  |
| 98    | 98   | 125.60 | 0.00  | -0.98  | -34.71  |
| 98    | 99   | 127.18 | 0.00  | -0.98  | -33.18  |
| 99    | 99   | 127.18 | 0.00  | -0.98  | -33.18  |
| 99    | 100  | 128.75 | 0.00  | -0.98  | -31.64  |
| 100   | 100  | 128.75 | 0.00  | -0.98  | -31.64  |
| 100   | 101  | 130.33 | 0.00  | -0.98  | -30.10  |
| 101   | 101  | 130.33 | 0.00  | -0.98  | -30.10  |
| 101   | 102  | 131.90 | 0.00  | -0.98  | -28.57  |
| 102   | 102  | 131.90 | 0.00  | -0.98  | -28.57  |
| 102   | 103  | 133.48 | 0.00  | -0.98  | -27.03  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC1.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | -0.98  | -27.03  |
| 103   | 104  | 135.05 | 0.00  | -0.98  | -25.50  |
| 104   | 104  | 135.05 | 0.01  | -0.98  | -25.50  |
| 104   | 105  | 136.63 | 0.01  | -0.98  | -23.96  |
| 105   | 105  | 136.63 | 0.01  | -0.98  | -23.96  |
| 105   | 106  | 138.20 | -0.03 | 3.00   | -25.07  |
| 106   | 106  | 138.20 | 0.00  | 3.00   | -25.07  |
| 106   | 107  | 139.78 | 0.00  | 7.24   | -33.04  |
| 107   | 107  | 139.78 | 0.00  | 7.24   | -33.04  |
| 107   | 108  | 141.35 | 0.00  | 10.59  | -47.20  |
| 108   | 108  | 141.35 | 0.00  | 10.59  | -47.20  |
| 108   | 109  | 142.93 | 0.00  | 14.67  | -67.34  |
| 109   | 109  | 142.93 | 0.00  | 14.67  | -67.34  |
| 109   | 110  | 143.50 | 0.00  | 16.17  | -76.02  |
| 110   | 110  | 143.50 | 0.00  | 16.17  | -76.02  |
| 110   | 111  | 144.50 | 0.00  | 17.72  | -92.82  |
| 111   | 1111 | 144.50 | 0.00  | -15.70 | -92.82  |
| 111   | 112  | 145.50 | 0.00  | -13.42 | -78.24  |
| 112   | 112  | 145.50 | 0.00  | -13.42 | -78.24  |
| 112   | 113  | 145.68 | 0.00  | -13.42 | -75.89  |
| 113   | 113  | 145.68 | 0.00  | -13.42 | -75.89  |
| 113   | 114  | 146.85 | 0.00  | -9.35  | -62.46  |
| 114   | 114  | 146.85 | 0.00  | -9.35  | -62.46  |
| 114   | 115  | 148.03 | 0.00  | -6.11  | -53.06  |
| 115   | 115  | 148.03 | 0.00  | -6.11  | -53.06  |
| 115   | 116  | 149.20 | 0.00  | -2.57  | -48.29  |
| 116   | 116  | 149.20 | -0.03 | -2.57  | -48.29  |
| 116   | 117  | 150.38 | -0.03 | -2.57  | -45.27  |
| 117   | 117  | 150.38 | -0.03 | -2.57  | -45.27  |
| 117   | 118  | 151.55 | -0.03 | -2.57  | -42.25  |
| 118   | 118  | 151.55 | 0.00  | -2.57  | -42.25  |
| 118   | 119  | 152.73 | 0.00  | -2.57  | -39.23  |
| 119   | 119  | 152.73 | 0.00  | -2.57  | -39.23  |
| 119   | 120  | 153.90 | 0.00  | -2.57  | -36.21  |
| 120   | 120  | 153.90 | 0.00  | -2.57  | -36.21  |
| 120   | 121  | 155.08 | 0.00  | -2.57  | -33.20  |
| 121   | 121  | 155.08 | 0.00  | -2.57  | -33.20  |
| 121   | 122  | 156.25 | 0.00  | -2.57  | -30.18  |
| 122   | 122  | 156.25 | 0.00  | -2.57  | -30.18  |
| 122   | 123  | 157.43 | 0.00  | -2.57  | -27.16  |
| 123   | 123  | 157.43 | 0.00  | -2.57  | -27.16  |
| 123   | 124  | 158.60 | 0.00  | -2.57  | -24.14  |
| 124   | 124  | 158.60 | 0.00  | -2.57  | -24.14  |
| 124   | 125  | 159.78 | 0.00  | -2.57  | -21.12  |
| 125   | 125  | 159.78 | 0.00  | -2.57  | -21.12  |
| 125   | 126  | 160.95 | 0.00  | -2.57  | -18.11  |
| 126   | 126  | 160.95 | 0.00  | -2.57  | -18.11  |
| 126   | 127  | 162.13 | 0.00  | -2.57  | -15.09  |
| 127   | 127  | 162.13 | 0.00  | -2.57  | -15.09  |
| 127   | 128  | 163.30 | 0.00  | -2.57  | -12.07  |
| 128   | 128  | 163.30 | 0.00  | -2.57  | -12.07  |



CÁLCULO TENSIONAL

Hipótesis de cálculo:  
SC1.ENV\_TREN\_GENERICO.MZ-

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Envolvente de tren de cargas plano genérico. MZ-

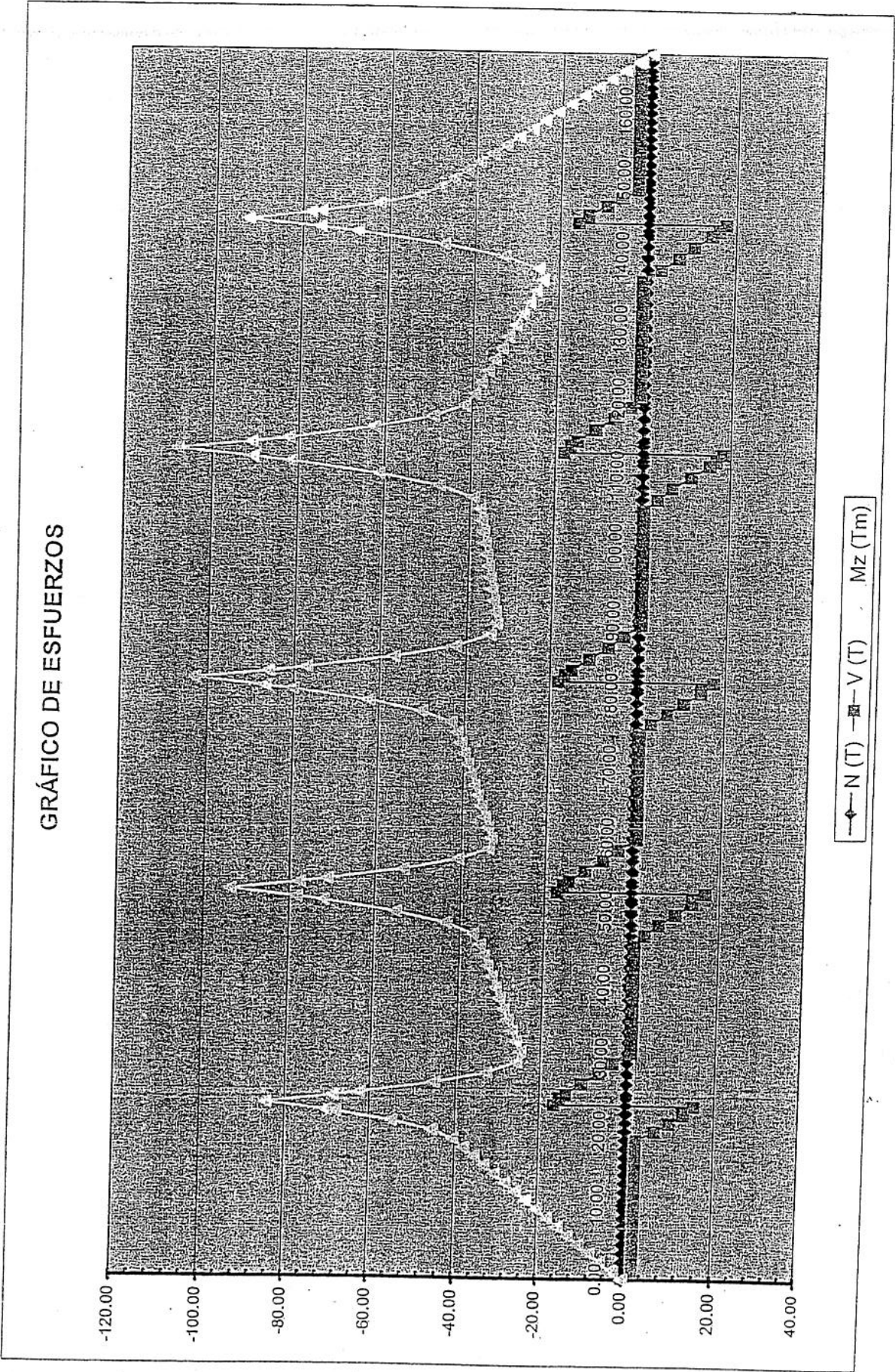
[ 0; 1]SC1.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC1.SCuniTpos.Barra3.  
Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | -2.57  | -9.05   |
| 129   | 129  | 164.48 | 0.00  | -2.57  | -9.05   |
| 129   | 130  | 165.65 | 0.00  | -2.57  | -6.04   |
| 130   | 130  | 165.65 | 0.00  | -2.57  | -6.04   |
| 130   | 131  | 166.83 | 0.00  | -2.57  | -3.02   |
| 131   | 131  | 166.83 | 0.00  | -2.57  | -3.02   |
| 131   | 132  | 167.00 | 0.00  | -2.57  | -2.57   |
| 132   | 132  | 167.00 | 0.00  | -2.57  | -2.57   |
| 132   | 133  | 168.00 | 0.00  | 0.00   | 0.00    |

Programa DINTEL IDEAM S.A.  
SC1.ENV\_TREN\_GENERICO.MZ-

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**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | 19.42  | 0.00    |
| 1     | 2    | 1.00  | 0.00  | 19.66  | -15.16  |
| 2     | 2    | 1.00  | 0.00  | 19.66  | -15.16  |
| 2     | 3    | 1.18  | 0.00  | 19.75  | -17.00  |
| 3     | 3    | 1.18  | 0.00  | 19.75  | -17.00  |
| 3     | 4    | 2.35  | 0.00  | 20.74  | -23.89  |
| 4     | 4    | 2.35  | 0.00  | 20.74  | -23.89  |
| 4     | 5    | 3.53  | 0.00  | 22.38  | -22.98  |
| 5     | 5    | 3.53  | 0.00  | 22.38  | -22.98  |
| 5     | 6    | 4.70  | 0.00  | 24.68  | -16.57  |
| 6     | 6    | 4.70  | 0.00  | 24.68  | -16.57  |
| 6     | 7    | 5.88  | 0.00  | 27.61  | -6.89   |
| 7     | 7    | 5.88  | 0.00  | 27.61  | -6.89   |
| 7     | 8    | 7.05  | 0.00  | 31.18  | 3.84    |
| 8     | 8    | 7.05  | 0.00  | 31.18  | 3.84    |
| 8     | 9    | 8.23  | 0.00  | 35.37  | 13.47   |
| 9     | 9    | 8.23  | 0.00  | 35.37  | 13.47   |
| 9     | 10   | 9.40  | 0.00  | 40.18  | 19.94   |
| 10    | 10   | 9.40  | 0.00  | 40.18  | 19.94   |
| 10    | 11   | 10.58 | 0.00  | 45.58  | 21.24   |
| 11    | 11   | 10.58 | 0.00  | 45.58  | 21.24   |
| 11    | 12   | 11.75 | 0.00  | 51.56  | 15.47   |
| 12    | 12   | 11.75 | 0.00  | 51.56  | 15.47   |
| 12    | 13   | 12.93 | 0.00  | 58.10  | 0.83    |
| 13    | 13   | 12.93 | 0.00  | 58.10  | 0.83    |
| 13    | 14   | 14.10 | 0.00  | 65.18  | -24.37  |
| 14    | 14   | 14.10 | 0.00  | 65.18  | -24.37  |
| 14    | 15   | 15.28 | 0.00  | 72.78  | -61.68  |
| 15    | 15   | 15.28 | 0.00  | 72.78  | -61.68  |
| 15    | 16   | 16.45 | 0.00  | 80.87  | -112.52 |
| 16    | 16   | 16.45 | -0.96 | 80.86  | -112.52 |
| 16    | 17   | 17.63 | -1.06 | 89.41  | -178.16 |
| 17    | 17   | 17.63 | -1.06 | 89.41  | -178.16 |
| 17    | 18   | 18.80 | -1.16 | 98.41  | -259.71 |
| 18    | 18   | 18.80 | 0.00  | 98.41  | -259.71 |
| 18    | 19   | 19.98 | 0.00  | 107.82 | -358.13 |
| 19    | 19   | 19.98 | 0.00  | 107.82 | -358.13 |
| 19    | 20   | 21.15 | 0.00  | 117.60 | -474.20 |
| 20    | 20   | 21.15 | 0.00  | 117.60 | -474.20 |
| 20    | 21   | 22.33 | 0.00  | 127.72 | -608.50 |
| 21    | 21   | 22.33 | 0.00  | 127.72 | -608.50 |
| 21    | 22   | 22.50 | 0.00  | 129.25 | -630.09 |
| 22    | 22   | 22.50 | 0.00  | 129.25 | -630.09 |
| 22    | 23   | 23.50 | 0.00  | 138.15 | -761.43 |
| 23    | 1023 | 23.50 | 0.00  | 19.66  | 124.50  |
| 23    | 24   | 24.50 | 0.00  | 19.76  | 107.01  |
| 24    | 24   | 24.50 | 0.00  | 19.76  | 107.01  |
| 24    | 25   | 24.95 | 0.00  | 19.87  | 100.54  |
| 25    | 25   | 24.95 | 0.00  | 19.87  | 100.54  |
| 25    | 26   | 26.40 | 0.00  | 20.56  | 85.37   |
| 26    | 26   | 26.40 | 0.00  | 20.56  | 85.37   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | 21.77  | 78.19   |
| 27    | 27   | 27.85 | 0.00  | 21.77  | 78.19   |
| 27    | 28   | 29.30 | 0.00  | 23.58  | 77.75   |
| 28    | 28   | 29.30 | 0.23  | 23.57  | 77.75   |
| 28    | 29   | 30.75 | 0.25  | 26.01  | 82.44   |
| 29    | 29   | 30.75 | 0.25  | 26.01  | 82.44   |
| 29    | 30   | 32.20 | 0.28  | 29.13  | 90.36   |
| 30    | 30   | 32.20 | 0.00  | 29.13  | 90.36   |
| 30    | 31   | 33.65 | 0.00  | 32.96  | 99.32   |
| 31    | 31   | 33.65 | 0.00  | 32.96  | 99.32   |
| 31    | 32   | 35.10 | 0.00  | 37.52  | 106.94  |
| 32    | 32   | 35.10 | 0.00  | 37.52  | 106.94  |
| 32    | 33   | 36.55 | 0.00  | 42.84  | 110.66  |
| 33    | 33   | 36.55 | 0.00  | 42.84  | 110.66  |
| 33    | 34   | 38.00 | 0.00  | 48.94  | 107.81  |
| 34    | 34   | 38.00 | 0.00  | 48.94  | 107.81  |
| 34    | 35   | 39.45 | 0.00  | 55.80  | 95.65   |
| 35    | 35   | 39.45 | 0.00  | 55.80  | 95.65   |
| 35    | 36   | 40.90 | 0.00  | 63.44  | 71.44   |
| 36    | 36   | 40.90 | 0.00  | 63.44  | 71.44   |
| 36    | 37   | 42.35 | 0.00  | 71.84  | 32.48   |
| 37    | 37   | 42.35 | 0.00  | 71.84  | 32.48   |
| 37    | 38   | 43.80 | 0.00  | 80.99  | -23.81  |
| 38    | 38   | 43.80 | -0.78 | 80.98  | -23.81  |
| 38    | 39   | 45.25 | -0.87 | 90.85  | -99.88  |
| 39    | 39   | 45.25 | -0.87 | 90.85  | -99.88  |
| 39    | 40   | 46.70 | -0.97 | 101.39 | -197.95 |
| 40    | 40   | 46.70 | 0.00  | 101.40 | -197.95 |
| 40    | 41   | 48.15 | 0.00  | 112.59 | -320.01 |
| 41    | 41   | 48.15 | 0.00  | 112.59 | -320.01 |
| 41    | 42   | 49.60 | 0.00  | 124.39 | -467.75 |
| 42    | 42   | 49.60 | 0.00  | 124.39 | -467.75 |
| 42    | 43   | 51.05 | 0.00  | 136.73 | -642.52 |
| 43    | 43   | 51.05 | 0.00  | 136.73 | -642.52 |
| 43    | 44   | 51.50 | 0.00  | 140.66 | -702.40 |
| 44    | 44   | 51.50 | 0.00  | 140.66 | -702.40 |
| 44    | 45   | 52.50 | 0.00  | 149.56 | -845.21 |
| 45    | 1045 | 52.50 | 0.00  | 26.33  | 223.72  |
| 45    | 46   | 53.50 | 0.00  | 26.44  | 199.61  |
| 46    | 46   | 53.50 | 0.00  | 26.44  | 199.61  |
| 46    | 47   | 53.95 | 0.00  | 26.55  | 190.19  |
| 47    | 47   | 53.95 | 0.00  | 26.55  | 190.19  |
| 47    | 48   | 55.40 | 0.00  | 27.24  | 165.63  |
| 48    | 48   | 55.40 | 0.00  | 27.24  | 165.63  |
| 48    | 49   | 56.85 | 0.00  | 28.47  | 149.16  |
| 49    | 49   | 56.85 | 0.00  | 28.47  | 149.16  |
| 49    | 50   | 58.30 | 0.00  | 30.29  | 139.50  |
| 50    | 50   | 58.30 | 0.29  | 30.28  | 139.50  |
| 50    | 51   | 59.75 | 0.31  | 32.73  | 135.04  |
| 51    | 51   | 59.75 | 0.31  | 32.73  | 135.04  |
| 51    | 52   | 61.20 | 0.34  | 35.86  | 133.82  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | 35.86  | 133.82  |
| 52    | 53   | 62.65 | 0.00  | 39.69  | 133.67  |
| 53    | 53   | 62.65 | 0.00  | 39.69  | 133.67  |
| 53    | 54   | 64.10 | 0.00  | 44.26  | 132.20  |
| 54    | 54   | 64.10 | 0.00  | 44.26  | 132.20  |
| 54    | 55   | 65.55 | 0.00  | 49.57  | 126.87  |
| 55    | 55   | 65.55 | 0.00  | 49.57  | 126.87  |
| 55    | 56   | 67.00 | 0.00  | 55.66  | 114.99  |
| 56    | 56   | 67.00 | 0.00  | 55.66  | 114.99  |
| 56    | 57   | 68.45 | 0.00  | 62.51  | 93.84   |
| 57    | 57   | 68.45 | 0.00  | 62.51  | 93.84   |
| 57    | 58   | 69.90 | 0.00  | 70.13  | 60.69   |
| 58    | 58   | 69.90 | 0.00  | 70.13  | 60.69   |
| 58    | 59   | 71.35 | 0.00  | 78.51  | 12.84   |
| 59    | 59   | 71.35 | 0.00  | 78.51  | 12.84   |
| 59    | 60   | 72.80 | 0.00  | 87.62  | -52.30  |
| 60    | 60   | 72.80 | -0.84 | 87.62  | -52.30  |
| 60    | 61   | 74.25 | -0.93 | 97.45  | -137.17 |
| 61    | 61   | 74.25 | -0.93 | 97.45  | -137.17 |
| 61    | 62   | 75.70 | -1.04 | 107.97 | -244.04 |
| 62    | 62   | 75.70 | 0.00  | 107.98 | -244.04 |
| 62    | 63   | 77.15 | 0.00  | 119.15 | -374.94 |
| 63    | 63   | 77.15 | 0.00  | 119.15 | -374.94 |
| 63    | 64   | 78.60 | 0.00  | 130.92 | -531.59 |
| 64    | 64   | 78.60 | 0.00  | 130.92 | -531.59 |
| 64    | 65   | 80.05 | 0.00  | 143.25 | -715.41 |
| 65    | 65   | 80.05 | 0.00  | 143.25 | -715.41 |
| 65    | 66   | 80.50 | 0.00  | 147.18 | -778.16 |
| 66    | 66   | 80.50 | 0.00  | 147.18 | -778.16 |
| 66    | 67   | 81.50 | 0.00  | 156.07 | -927.40 |
| 67    | 1067 | 81.50 | 0.00  | 23.31  | 236.68  |
| 67    | 68   | 82.50 | 0.00  | 23.40  | 215.53  |
| 68    | 68   | 82.50 | 0.00  | 23.40  | 215.53  |
| 68    | 69   | 83.08 | 0.00  | 23.54  | 205.29  |
| 69    | 69   | 83.08 | 0.00  | 23.54  | 205.29  |
| 69    | 70   | 84.65 | 0.00  | 24.27  | 184.19  |
| 70    | 70   | 84.65 | 0.00  | 24.27  | 184.19  |
| 70    | 71   | 86.23 | 0.00  | 25.59  | 172.47  |
| 71    | 71   | 86.23 | 0.00  | 25.59  | 172.47  |
| 71    | 72   | 87.80 | 0.00  | 27.54  | 168.67  |
| 72    | 72   | 87.80 | 0.24  | 27.54  | 168.67  |
| 72    | 73   | 89.38 | 0.27  | 30.18  | 170.93  |
| 73    | 73   | 89.38 | 0.27  | 30.18  | 170.93  |
| 73    | 74   | 90.95 | 0.30  | 33.56  | 176.98  |
| 74    | 74   | 90.95 | 0.00  | 33.56  | 176.98  |
| 74    | 75   | 92.53 | 0.00  | 37.71  | 184.28  |
| 75    | 75   | 92.53 | 0.00  | 37.71  | 184.28  |
| 75    | 76   | 94.10 | 0.00  | 42.66  | 190.01  |
| 76    | 76   | 94.10 | 0.00  | 42.66  | 190.01  |
| 76    | 77   | 95.68 | 0.00  | 48.43  | 191.16  |
| 77    | 77   | 95.68 | 0.00  | 48.43  | 191.16  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 55.05  | 184.56  |
| 78    | 78   | 97.25  | 0.00  | 55.05  | 184.56  |
| 78    | 79   | 98.83  | 0.00  | 62.50  | 167.00  |
| 79    | 79   | 98.83  | 0.00  | 62.50  | 167.00  |
| 79    | 80   | 100.40 | 0.00  | 70.80  | 135.22  |
| 80    | 80   | 100.40 | 0.00  | 70.80  | 135.22  |
| 80    | 81   | 101.98 | 0.00  | 79.93  | 86.05   |
| 81    | 81   | 101.98 | 0.00  | 79.93  | 86.05   |
| 81    | 82   | 103.55 | 0.00  | 89.86  | 16.44   |
| 82    | 82   | 103.55 | -0.79 | 89.86  | 16.44   |
| 82    | 83   | 105.13 | -0.89 | 100.57 | -76.50  |
| 83    | 83   | 105.13 | -0.89 | 100.57 | -76.50  |
| 83    | 84   | 106.70 | -0.99 | 112.03 | -195.38 |
| 84    | 84   | 106.70 | 0.00  | 112.04 | -195.38 |
| 84    | 85   | 108.28 | 0.00  | 124.20 | -342.56 |
| 85    | 85   | 108.28 | 0.00  | 124.20 | -342.56 |
| 85    | 86   | 109.85 | 0.00  | 137.02 | -520.02 |
| 86    | 86   | 109.85 | 0.00  | 137.02 | -520.02 |
| 86    | 87   | 111.43 | 0.00  | 150.42 | -729.32 |
| 87    | 87   | 111.43 | 0.00  | 150.42 | -729.32 |
| 87    | 88   | 112.00 | 0.00  | 155.46 | -813.90 |
| 88    | 88   | 112.00 | 0.00  | 155.46 | -813.90 |
| 88    | 89   | 113.00 | 0.00  | 164.36 | -971.52 |
| 89    | 1089 | 113.00 | 0.00  | 16.37  | 191.22  |
| 89    | 90   | 114.00 | 0.00  | 16.47  | 177.09  |
| 90    | 90   | 114.00 | 0.00  | 16.47  | 177.09  |
| 90    | 91   | 114.58 | 0.00  | 16.61  | 170.97  |
| 91    | 91   | 114.58 | 0.00  | 16.61  | 170.97  |
| 91    | 92   | 116.15 | 0.00  | 17.39  | 161.31  |
| 92    | 92   | 116.15 | 0.00  | 17.39  | 161.31  |
| 92    | 93   | 117.73 | 0.00  | 18.76  | 161.17  |
| 93    | 93   | 117.73 | 0.00  | 18.76  | 161.17  |
| 93    | 94   | 119.30 | 0.00  | 20.79  | 168.95  |
| 94    | 94   | 119.30 | 0.18  | 20.79  | 168.95  |
| 94    | 95   | 120.88 | 0.21  | 23.53  | 182.64  |
| 95    | 95   | 120.88 | 0.21  | 23.53  | 182.64  |
| 95    | 96   | 122.45 | 0.24  | 27.02  | 199.87  |
| 96    | 96   | 122.45 | 0.00  | 27.02  | 199.87  |
| 96    | 97   | 124.03 | 0.00  | 31.29  | 217.98  |
| 97    | 97   | 124.03 | 0.00  | 31.29  | 217.98  |
| 97    | 98   | 125.60 | 0.00  | 36.38  | 234.09  |
| 98    | 98   | 125.60 | 0.00  | 36.38  | 234.09  |
| 98    | 99   | 127.18 | 0.00  | 42.30  | 245.10  |
| 99    | 99   | 127.18 | 0.00  | 42.30  | 245.10  |
| 99    | 100  | 128.75 | 0.00  | 49.07  | 247.83  |
| 100   | 100  | 128.75 | 0.00  | 49.07  | 247.83  |
| 100   | 101  | 130.33 | 0.00  | 56.68  | 239.04  |
| 101   | 101  | 130.33 | 0.00  | 56.68  | 239.04  |
| 101   | 102  | 131.90 | 0.00  | 65.13  | 215.48  |
| 102   | 102  | 131.90 | 0.00  | 65.13  | 215.48  |
| 102   | 103  | 133.48 | 0.00  | 74.40  | 174.02  |

### CÁLCULO TENSIONAL

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | 74.40  | 174.02  |
| 103   | 104  | 135.05 | 0.00  | 84.47  | 111.66  |
| 104   | 104  | 135.05 | -0.75 | 84.47  | 111.66  |
| 104   | 105  | 136.63 | -0.84 | 95.32  | 25.61   |
| 105   | 105  | 136.63 | -0.84 | 95.32  | 25.61   |
| 105   | 106  | 138.20 | -0.94 | 106.89 | -86.63  |
| 106   | 106  | 138.20 | 0.00  | 106.90 | -86.63  |
| 106   | 107  | 139.78 | 0.00  | 119.15 | -227.27 |
| 107   | 107  | 139.78 | 0.00  | 119.15 | -227.27 |
| 107   | 108  | 141.35 | 0.00  | 132.04 | -398.13 |
| 108   | 108  | 141.35 | 0.00  | 132.04 | -398.13 |
| 108   | 109  | 142.93 | 0.00  | 145.50 | -600.55 |
| 109   | 109  | 142.93 | 0.00  | 145.50 | -600.55 |
| 109   | 110  | 143.50 | 0.00  | 150.54 | -682.50 |
| 110   | 110  | 143.50 | 0.00  | 150.54 | -682.50 |
| 110   | 111  | 144.50 | 0.00  | 159.45 | -835.35 |
| 111   | 111  | 144.50 | 0.00  | 6.19   | 145.57  |
| 111   | 112  | 145.50 | 0.00  | 6.30   | 141.77  |
| 112   | 112  | 145.50 | 0.00  | 6.30   | 141.77  |
| 112   | 113  | 145.68 | 0.00  | 6.34   | 141.59  |
| 113   | 113  | 145.68 | 0.00  | 6.34   | 141.59  |
| 113   | 114  | 146.85 | 0.00  | 6.81   | 143.99  |
| 114   | 114  | 146.85 | 0.00  | 6.81   | 143.99  |
| 114   | 115  | 148.03 | 0.00  | 7.63   | 152.34  |
| 115   | 115  | 148.03 | 0.00  | 7.63   | 152.34  |
| 115   | 116  | 149.20 | 0.00  | 8.83   | 165.96  |
| 116   | 116  | 149.20 | 0.10  | 8.83   | 165.96  |
| 116   | 117  | 150.38 | 0.12  | 10.44  | 184.06  |
| 117   | 117  | 150.38 | 0.12  | 10.44  | 184.06  |
| 117   | 118  | 151.55 | 0.15  | 12.50  | 205.62  |
| 118   | 118  | 151.55 | 0.00  | 12.50  | 205.62  |
| 118   | 119  | 152.73 | 0.00  | 15.02  | 229.50  |
| 119   | 119  | 152.73 | 0.00  | 15.02  | 229.50  |
| 119   | 120  | 153.90 | 0.00  | 18.04  | 254.42  |
| 120   | 120  | 153.90 | 0.00  | 18.04  | 254.42  |
| 120   | 121  | 155.08 | 0.00  | 21.58  | 278.94  |
| 121   | 121  | 155.08 | 0.00  | 21.58  | 278.94  |
| 121   | 122  | 156.25 | 0.00  | 25.66  | 301.48  |
| 122   | 122  | 156.25 | 0.00  | 25.66  | 301.48  |
| 122   | 123  | 157.43 | 0.00  | 30.29  | 320.36  |
| 123   | 123  | 157.43 | 0.00  | 30.29  | 320.36  |
| 123   | 124  | 158.60 | 0.00  | 35.51  | 333.76  |
| 124   | 124  | 158.60 | 0.00  | 35.51  | 333.76  |
| 124   | 125  | 159.78 | 0.00  | 41.31  | 339.80  |
| 125   | 125  | 159.78 | 0.00  | 41.31  | 339.80  |
| 125   | 126  | 160.95 | 0.00  | 47.73  | 336.47  |
| 126   | 126  | 160.95 | 0.00  | 47.73  | 336.47  |
| 126   | 127  | 162.13 | 0.00  | 54.76  | 321.71  |
| 127   | 127  | 162.13 | 0.00  | 54.76  | 321.71  |
| 127   | 128  | 163.30 | 0.00  | 62.42  | 293.38  |
| 128   | 128  | 163.30 | 0.00  | 62.42  | 293.38  |

### CÁLCULO TENSIONAL

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 70.72  | 249.30  |
| 129   | 129  | 164.48 | 0.00  | 70.72  | 249.30  |
| 129   | 130  | 165.65 | 0.00  | 79.67  | 187.22  |
| 130   | 130  | 165.65 | 0.00  | 79.67  | 187.22  |
| 130   | 131  | 166.83 | 0.00  | 89.26  | 104.89  |
| 131   | 131  | 166.83 | 0.00  | 89.26  | 104.89  |
| 131   | 132  | 167.00 | 0.00  | 90.75  | 90.74   |
| 132   | 132  | 167.00 | 0.00  | 90.75  | 90.74   |
| 132   | 133  | 168.00 | 0.00  | 99.51  | 0.00    |



CÁLCULO TENSIONAL

Hipótesis de cálculo:

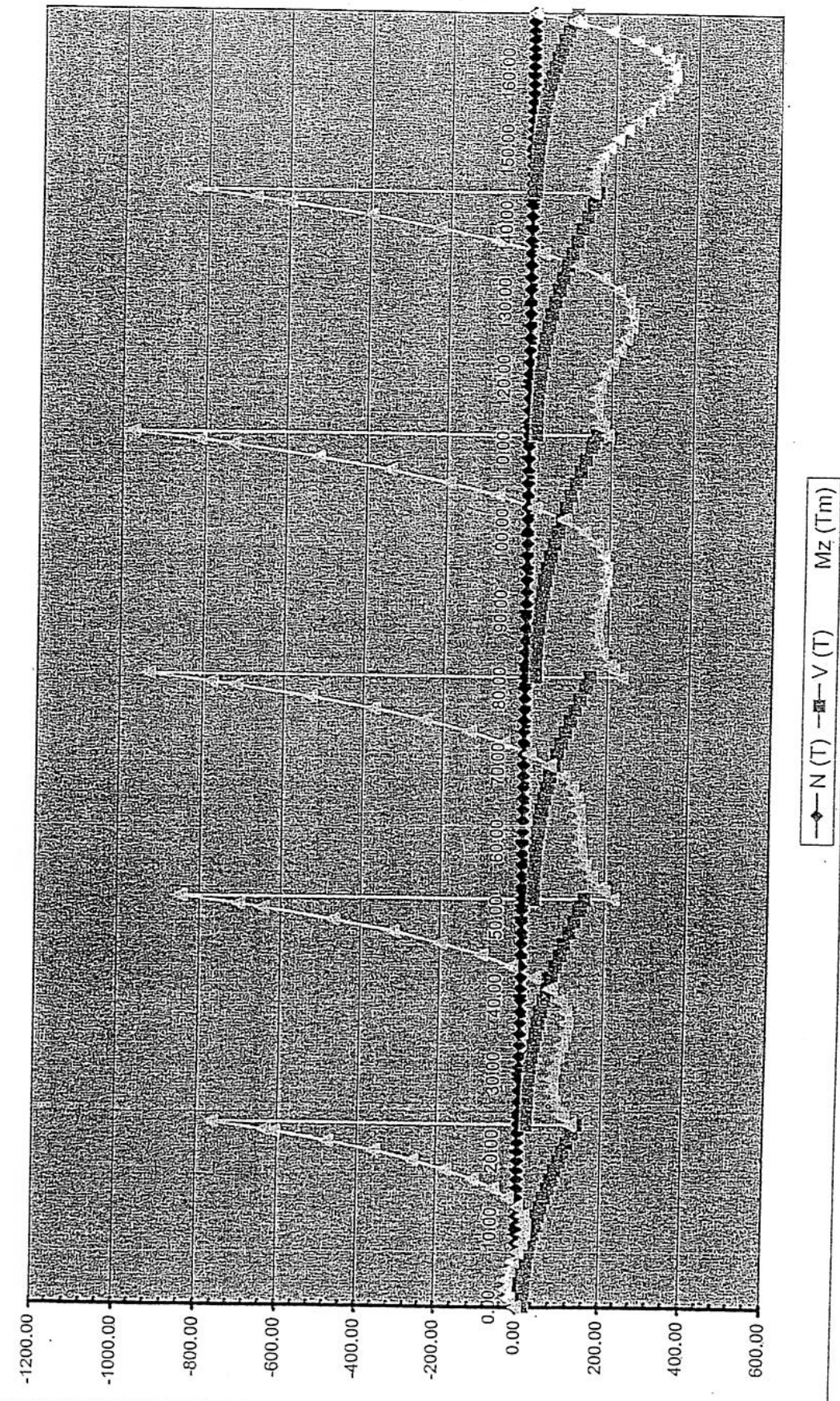
SC9.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

GRÁFICO DE ESFUERZOS



| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | 0.00   | 0.00    |
| 1     | 2    | 1.00  | 0.00  | -89.07 | 93.57   |
| 2     | 2    | 1.00  | 0.00  | -89.07 | 93.57   |
| 2     | 3    | 1.18  | 0.00  | -87.49 | 109.02  |
| 3     | 3    | 1.18  | 0.00  | -87.49 | 109.02  |
| 3     | 4    | 2.35  | 0.00  | -76.92 | 205.61  |
| 4     | 4    | 2.35  | 0.00  | -76.92 | 205.61  |
| 4     | 5    | 3.53  | 0.00  | -66.34 | 289.78  |
| 5     | 5    | 3.53  | 0.00  | -66.34 | 289.78  |
| 5     | 6    | 4.70  | 0.00  | -55.77 | 361.52  |
| 6     | 6    | 4.70  | 0.00  | -55.77 | 361.52  |
| 6     | 7    | 5.88  | 0.00  | -45.19 | 420.84  |
| 7     | 7    | 5.88  | 0.00  | -45.19 | 420.84  |
| 7     | 8    | 7.05  | 0.00  | -34.62 | 467.73  |
| 8     | 8    | 7.05  | 0.00  | -34.62 | 467.73  |
| 8     | 9    | 8.23  | 0.00  | -24.04 | 502.20  |
| 9     | 9    | 8.23  | 0.00  | -24.04 | 502.20  |
| 9     | 10   | 9.40  | 0.00  | -13.47 | 524.24  |
| 10    | 10   | 9.40  | 0.00  | -13.47 | 524.24  |
| 10    | 11   | 10.58 | 0.00  | -2.89  | 533.85  |
| 11    | 11   | 10.58 | 0.00  | -2.89  | 533.85  |
| 11    | 12   | 11.75 | 0.00  | 7.68   | 531.04  |
| 12    | 12   | 11.75 | 0.00  | 7.68   | 531.04  |
| 12    | 13   | 12.93 | 0.00  | 18.26  | 515.80  |
| 13    | 13   | 12.93 | 0.00  | 18.26  | 515.80  |
| 13    | 14   | 14.10 | 0.00  | 28.83  | 488.14  |
| 14    | 14   | 14.10 | 0.00  | 28.83  | 488.14  |
| 14    | 15   | 15.28 | 0.00  | 39.41  | 448.05  |
| 15    | 15   | 15.28 | 0.00  | 39.41  | 448.05  |
| 15    | 16   | 16.45 | 0.00  | 49.98  | 395.54  |
| 16    | 16   | 16.45 | -0.59 | 49.98  | 395.54  |
| 16    | 17   | 17.63 | -0.72 | 60.55  | 330.60  |
| 17    | 17   | 17.63 | -0.72 | 60.55  | 330.60  |
| 17    | 18   | 18.80 | -0.84 | 71.13  | 253.23  |
| 18    | 18   | 18.80 | 0.00  | 71.13  | 253.23  |
| 18    | 19   | 19.98 | 0.00  | 43.03  | 184.22  |
| 19    | 19   | 19.98 | 0.00  | 43.03  | 184.22  |
| 19    | 20   | 21.15 | 0.00  | 22.28  | 143.79  |
| 20    | 20   | 21.15 | 0.00  | 22.28  | 143.79  |
| 20    | 21   | 22.33 | 0.00  | 4.68   | 125.33  |
| 21    | 21   | 22.33 | 0.00  | 4.68   | 125.33  |
| 21    | 22   | 22.50 | 0.00  | 6.26   | 124.37  |
| 22    | 22   | 22.50 | 0.00  | 6.26   | 124.37  |
| 22    | 23   | 23.50 | 0.00  | -5.30  | 124.50  |
| 23    | 1023 | 23.50 | 0.00  | 19.66  | 124.50  |
| 23    | 24   | 24.50 | 0.00  | 15.82  | 108.57  |
| 24    | 24   | 24.50 | 0.00  | 15.82  | 108.57  |
| 24    | 25   | 24.95 | 0.00  | 7.51   | 105.72  |
| 25    | 25   | 24.95 | 0.00  | 7.51   | 105.72  |
| 25    | 26   | 26.40 | 0.00  | -13.14 | 110.46  |
| 26    | 26   | 26.40 | 0.00  | -13.14 | 110.46  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ+Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | -35.46 | 142.80  |
| 27    | 27   | 27.85 | 0.00  | -35.46 | 142.80  |
| 27    | 28   | 29.30 | 0.00  | -49.51 | 204.39  |
| 28    | 28   | 29.30 | -0.47 | -49.51 | 204.39  |
| 28    | 29   | 30.75 | -0.69 | -72.07 | 302.64  |
| 29    | 29   | 30.75 | -0.69 | -72.07 | 302.64  |
| 29    | 30   | 32.20 | -0.57 | -59.02 | 397.69  |
| 30    | 30   | 32.20 | 0.00  | -59.03 | 397.69  |
| 30    | 31   | 33.65 | 0.00  | -45.98 | 473.82  |
| 31    | 31   | 33.65 | 0.00  | -45.98 | 473.82  |
| 31    | 32   | 35.10 | 0.00  | -32.93 | 531.02  |
| 32    | 32   | 35.10 | 0.00  | -32.93 | 531.02  |
| 32    | 33   | 36.55 | 0.00  | -19.88 | 569.30  |
| 33    | 33   | 36.55 | 0.00  | -19.88 | 569.30  |
| 33    | 34   | 38.00 | 0.00  | -6.83  | 588.66  |
| 34    | 34   | 38.00 | 0.00  | -6.83  | 588.66  |
| 34    | 35   | 39.45 | 0.00  | 6.22   | 589.10  |
| 35    | 35   | 39.45 | 0.00  | 6.22   | 589.10  |
| 35    | 36   | 40.90 | 0.00  | 19.27  | 570.61  |
| 36    | 36   | 40.90 | 0.00  | 19.27  | 570.61  |
| 36    | 37   | 42.35 | 0.00  | 32.32  | 533.21  |
| 37    | 37   | 42.35 | 0.00  | 32.32  | 533.21  |
| 37    | 38   | 43.80 | 0.00  | 45.37  | 476.87  |
| 38    | 38   | 43.80 | -0.44 | 45.37  | 476.87  |
| 38    | 39   | 45.25 | -0.56 | 58.42  | 401.62  |
| 39    | 39   | 45.25 | -0.56 | 58.42  | 401.62  |
| 39    | 40   | 46.70 | -0.50 | 51.75  | 313.43  |
| 40    | 40   | 46.70 | 0.00  | 51.75  | 313.43  |
| 40    | 41   | 48.15 | 0.00  | 35.01  | 248.56  |
| 41    | 41   | 48.15 | 0.00  | 35.01  | 248.56  |
| 41    | 42   | 49.60 | 0.00  | 13.02  | 212.65  |
| 42    | 42   | 49.60 | 0.00  | 13.02  | 212.65  |
| 42    | 43   | 51.05 | 0.00  | -7.47  | 205.61  |
| 43    | 43   | 51.05 | 0.00  | -7.47  | 205.61  |
| 43    | 44   | 51.50 | 0.00  | -3.42  | 208.06  |
| 44    | 44   | 51.50 | 0.00  | -3.42  | 208.06  |
| 44    | 45   | 52.50 | 0.00  | -19.59 | 223.72  |
| 45    | 1045 | 52.50 | 0.00  | 26.33  | 223.72  |
| 45    | 46   | 53.50 | 0.00  | 22.50  | 201.23  |
| 46    | 46   | 53.50 | 0.00  | 22.50  | 201.23  |
| 46    | 47   | 53.95 | 0.00  | 14.19  | 195.67  |
| 47    | 47   | 53.95 | 0.00  | 14.19  | 195.67  |
| 47    | 48   | 55.40 | 0.00  | -6.41  | 192.29  |
| 48    | 48   | 55.40 | 0.00  | -6.41  | 192.29  |
| 48    | 49   | 56.85 | 0.00  | -28.73 | 217.55  |
| 49    | 49   | 56.85 | 0.00  | -28.73 | 217.55  |
| 49    | 50   | 58.30 | 0.00  | -46.09 | 272.47  |
| 50    | 50   | 58.30 | -0.44 | -46.09 | 272.47  |
| 50    | 51   | 59.75 | -0.65 | -68.22 | 368.15  |
| 51    | 51   | 59.75 | -0.65 | -68.22 | 368.15  |
| 51    | 52   | 61.20 | -0.53 | -55.17 | 457.62  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ+Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | -55.18 | 457.62  |
| 52    | 53   | 62.65 | 0.00  | -42.13 | 528.16  |
| 53    | 53   | 62.65 | 0.00  | -42.13 | 528.16  |
| 53    | 54   | 64.10 | 0.00  | -29.08 | 579.78  |
| 54    | 54   | 64.10 | 0.00  | -29.08 | 579.78  |
| 54    | 55   | 65.55 | 0.00  | -16.03 | 612.48  |
| 55    | 55   | 65.55 | 0.00  | -16.03 | 612.48  |
| 55    | 56   | 67.00 | 0.00  | -2.98  | 626.25  |
| 56    | 56   | 67.00 | 0.00  | -2.98  | 626.25  |
| 56    | 57   | 68.45 | 0.00  | 10.07  | 621.11  |
| 57    | 57   | 68.45 | 0.00  | 10.07  | 621.11  |
| 57    | 58   | 69.90 | 0.00  | 23.12  | 597.04  |
| 58    | 58   | 69.90 | 0.00  | 23.12  | 597.04  |
| 58    | 59   | 71.35 | 0.00  | 36.17  | 554.05  |
| 59    | 59   | 71.35 | 0.00  | 36.17  | 554.05  |
| 59    | 60   | 72.80 | 0.00  | 49.22  | 492.13  |
| 60    | 60   | 72.80 | -0.47 | 49.22  | 492.13  |
| 60    | 61   | 74.25 | -0.60 | 62.27  | 411.30  |
| 61    | 61   | 74.25 | -0.60 | 62.27  | 411.30  |
| 61    | 62   | 75.70 | -0.50 | 52.21  | 316.15  |
| 62    | 62   | 75.70 | 0.00  | 52.22  | 316.15  |
| 62    | 63   | 77.15 | 0.00  | 31.23  | 252.18  |
| 63    | 63   | 77.15 | 0.00  | 31.23  | 252.18  |
| 63    | 64   | 78.60 | 0.00  | 9.33   | 217.92  |
| 64    | 64   | 78.60 | 0.00  | 9.33   | 217.92  |
| 64    | 65   | 80.05 | 0.00  | -11.08 | 213.93  |
| 65    | 65   | 80.05 | 0.00  | -11.08 | 213.93  |
| 65    | 66   | 80.50 | 0.00  | -7.03  | 218.01  |
| 66    | 66   | 80.50 | 0.00  | -7.03  | 218.01  |
| 66    | 67   | 81.50 | 0.00  | -23.18 | 236.68  |
| 67    | 1067 | 81.50 | 0.00  | 23.31  | 236.68  |
| 67    | 68   | 82.50 | 0.00  | 18.36  | 217.34  |
| 68    | 68   | 82.50 | 0.00  | 18.36  | 217.34  |
| 68    | 69   | 83.08 | 0.00  | 10.10  | 211.26  |
| 69    | 69   | 83.08 | 0.00  | 10.10  | 211.26  |
| 69    | 70   | 84.65 | 0.00  | -12.34 | 213.07  |
| 70    | 70   | 84.65 | 0.00  | -12.34 | 213.07  |
| 70    | 71   | 86.23 | 0.00  | -36.62 | 246.99  |
| 71    | 71   | 86.23 | 0.00  | -36.62 | 246.99  |
| 71    | 72   | 87.80 | 0.00  | -51.89 | 315.47  |
| 72    | 72   | 87.80 | -0.46 | -51.89 | 315.47  |
| 72    | 73   | 89.38 | -0.62 | -70.59 | 420.97  |
| 73    | 73   | 89.38 | -0.62 | -70.59 | 420.97  |
| 73    | 74   | 90.95 | -0.50 | -56.41 | 520.99  |
| 74    | 74   | 90.95 | 0.00  | -56.42 | 520.99  |
| 74    | 75   | 92.53 | 0.00  | -42.24 | 598.68  |
| 75    | 75   | 92.53 | 0.00  | -42.24 | 598.68  |
| 75    | 76   | 94.10 | 0.00  | -28.07 | 654.05  |
| 76    | 76   | 94.10 | 0.00  | -28.07 | 654.05  |
| 76    | 77   | 95.68 | 0.00  | -13.89 | 687.09  |
| 77    | 77   | 95.68 | 0.00  | -13.89 | 687.09  |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 0.28   | 697.80  |
| 78    | 78   | 97.25  | 0.00  | 0.28   | 697.80  |
| 78    | 79   | 98.83  | 0.00  | 14.46  | 686.19  |
| 79    | 79   | 98.83  | 0.00  | 14.46  | 686.19  |
| 79    | 80   | 100.40 | 0.00  | 28.63  | 652.26  |
| 80    | 80   | 100.40 | 0.00  | 28.63  | 652.26  |
| 80    | 81   | 101.98 | 0.00  | 42.81  | 596.00  |
| 81    | 81   | 101.98 | 0.00  | 42.81  | 596.00  |
| 81    | 82   | 103.55 | 0.00  | 56.98  | 517.41  |
| 82    | 82   | 103.55 | -0.50 | 56.98  | 517.41  |
| 82    | 83   | 105.13 | -0.63 | 71.16  | 416.50  |
| 83    | 83   | 105.13 | -0.63 | 71.16  | 416.50  |
| 83    | 84   | 106.70 | -0.51 | 57.71  | 304.00  |
| 84    | 84   | 106.70 | 0.00  | 57.71  | 304.00  |
| 84    | 85   | 108.28 | 0.00  | 39.56  | 226.11  |
| 85    | 85   | 108.28 | 0.00  | 39.56  | 226.11  |
| 85    | 86   | 109.85 | 0.00  | 15.67  | 182.25  |
| 86    | 86   | 109.85 | 0.00  | 15.67  | 182.25  |
| 86    | 87   | 111.43 | 0.00  | -6.60  | 172.10  |
| 87    | 87   | 111.43 | 0.00  | -6.60  | 172.10  |
| 87    | 88   | 112.00 | 0.00  | -14.83 | 175.61  |
| 88    | 88   | 112.00 | 0.00  | -14.83 | 175.61  |
| 88    | 89   | 113.00 | 0.00  | -19.77 | 191.22  |
| 89    | 1089 | 113.00 | 0.00  | 16.37  | 191.22  |
| 89    | 90   | 114.00 | 0.00  | 11.44  | 179.03  |
| 90    | 90   | 114.00 | 0.00  | 11.44  | 179.03  |
| 90    | 91   | 114.58 | 0.00  | 3.21   | 177.53  |
| 91    | 91   | 114.58 | 0.00  | 3.21   | 177.53  |
| 91    | 92   | 116.15 | 0.00  | -19.00 | 193.35  |
| 92    | 92   | 116.15 | 0.00  | -19.00 | 193.35  |
| 92    | 93   | 117.73 | 0.00  | -42.75 | 242.99  |
| 93    | 93   | 117.73 | 0.00  | -42.75 | 242.99  |
| 93    | 94   | 119.30 | 0.00  | -60.61 | 326.32  |
| 94    | 94   | 119.30 | -0.54 | -60.60 | 326.32  |
| 94    | 95   | 120.88 | -0.57 | -64.97 | 433.40  |
| 95    | 95   | 120.88 | -0.57 | -64.97 | 433.40  |
| 95    | 96   | 122.45 | -0.45 | -50.80 | 524.57  |
| 96    | 96   | 122.45 | 0.00  | -50.80 | 524.57  |
| 96    | 97   | 124.03 | 0.00  | -36.62 | 593.42  |
| 97    | 97   | 124.03 | 0.00  | -36.62 | 593.42  |
| 97    | 98   | 125.60 | 0.00  | -22.45 | 639.94  |
| 98    | 98   | 125.60 | 0.00  | -22.45 | 639.94  |
| 98    | 99   | 127.18 | 0.00  | -8.27  | 664.14  |
| 99    | 99   | 127.18 | 0.00  | -8.27  | 664.14  |
| 99    | 100  | 128.75 | 0.00  | 5.90   | 666.01  |
| 100   | 100  | 128.75 | 0.00  | 5.90   | 666.01  |
| 100   | 101  | 130.33 | 0.00  | 20.08  | 645.55  |
| 101   | 101  | 130.33 | 0.00  | 20.08  | 645.55  |
| 101   | 102  | 131.90 | 0.00  | 34.25  | 602.77  |
| 102   | 102  | 131.90 | 0.00  | 34.25  | 602.77  |
| 102   | 103  | 133.48 | 0.00  | 48.43  | 537.66  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | 48.43  | 537.66  |
| 103   | 104  | 135.05 | 0.00  | 62.60  | 450.23  |
| 104   | 104  | 135.05 | -0.55 | 62.60  | 450.23  |
| 104   | 105  | 136.63 | -0.68 | 76.77  | 340.47  |
| 105   | 105  | 136.63 | -0.68 | 76.77  | 340.47  |
| 105   | 106  | 138.20 | -0.49 | 55.16  | 232.19  |
| 106   | 106  | 138.20 | 0.00  | 55.16  | 232.19  |
| 106   | 107  | 139.78 | 0.00  | 31.23  | 163.32  |
| 107   | 107  | 139.78 | 0.00  | 31.23  | 163.32  |
| 107   | 108  | 141.35 | 0.00  | 15.21  | 127.80  |
| 108   | 108  | 141.35 | 0.00  | 15.21  | 127.80  |
| 108   | 109  | 142.93 | 0.00  | -7.34  | 123.88  |
| 109   | 109  | 142.93 | 0.00  | -7.34  | 123.88  |
| 109   | 110  | 143.50 | 0.00  | -15.62 | 128.80  |
| 110   | 110  | 143.50 | 0.00  | -15.62 | 128.80  |
| 110   | 111  | 144.50 | 0.00  | -20.57 | 145.57  |
| 111   | 1111 | 144.50 | 0.00  | 6.19   | 145.57  |
| 111   | 112  | 145.50 | 0.00  | -5.34  | 144.99  |
| 112   | 112  | 145.50 | 0.00  | -5.34  | 144.99  |
| 112   | 113  | 145.68 | 0.00  | -3.77  | 145.78  |
| 113   | 113  | 145.68 | 0.00  | -3.77  | 145.78  |
| 113   | 114  | 146.85 | 0.00  | -29.80 | 164.96  |
| 114   | 114  | 146.85 | 0.00  | -29.80 | 164.96  |
| 114   | 115  | 148.03 | 0.00  | -48.37 | 208.09  |
| 115   | 115  | 148.03 | 0.00  | -48.37 | 208.09  |
| 115   | 116  | 149.20 | 0.00  | -69.69 | 280.36  |
| 116   | 116  | 149.20 | -0.83 | -69.68 | 280.36  |
| 116   | 117  | 150.38 | -0.70 | -59.11 | 356.03  |
| 117   | 117  | 150.38 | -0.70 | -59.11 | 356.03  |
| 117   | 118  | 151.55 | -0.57 | -48.53 | 419.27  |
| 118   | 118  | 151.55 | 0.00  | -48.54 | 419.27  |
| 118   | 119  | 152.73 | 0.00  | -37.96 | 470.09  |
| 119   | 119  | 152.73 | 0.00  | -37.96 | 470.09  |
| 119   | 120  | 153.90 | 0.00  | -27.39 | 508.48  |
| 120   | 120  | 153.90 | 0.00  | -27.39 | 508.48  |
| 120   | 121  | 155.08 | 0.00  | -16.81 | 534.45  |
| 121   | 121  | 155.08 | 0.00  | -16.81 | 534.45  |
| 121   | 122  | 156.25 | 0.00  | -6.24  | 547.99  |
| 122   | 122  | 156.25 | 0.00  | -6.24  | 547.99  |
| 122   | 123  | 157.43 | 0.00  | 4.34   | 549.11  |
| 123   | 123  | 157.43 | 0.00  | 4.34   | 549.11  |
| 123   | 124  | 158.60 | 0.00  | 14.91  | 537.80  |
| 124   | 124  | 158.60 | 0.00  | 14.91  | 537.80  |
| 124   | 125  | 159.78 | 0.00  | 25.49  | 514.06  |
| 125   | 125  | 159.78 | 0.00  | 25.49  | 514.06  |
| 125   | 126  | 160.95 | 0.00  | 36.06  | 477.90  |
| 126   | 126  | 160.95 | 0.00  | 36.06  | 477.90  |
| 126   | 127  | 162.13 | 0.00  | 46.64  | 429.32  |
| 127   | 127  | 162.13 | 0.00  | 46.64  | 429.32  |
| 127   | 128  | 163.30 | 0.00  | 57.21  | 368.30  |
| 128   | 128  | 163.30 | 0.00  | 57.21  | 368.30  |



CÁLCULO TENSIONAL

Hipótesis de cálculo:  
SC9.ENV\_TREN\_GENERICO.MZ+

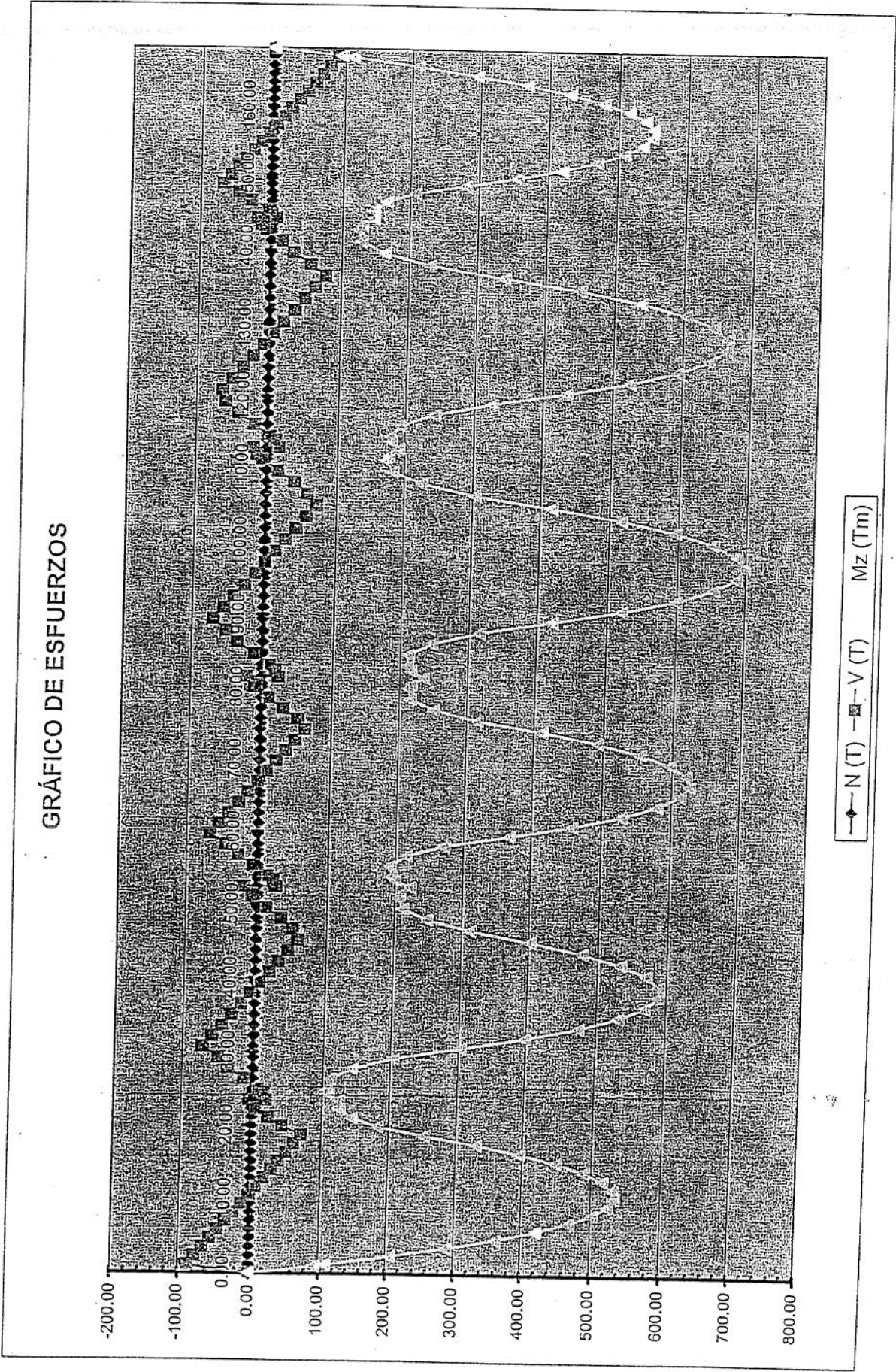
Envolvente de tren de cargas plano genérico. MZ+  
[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.  
Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 67.79  | 294.87  |
| 129   | 129  | 164.48 | 0.00  | 67.79  | 294.87  |
| 129   | 130  | 165.65 | 0.00  | 78.36  | 209.00  |
| 130   | 130  | 165.65 | 0.00  | 78.36  | 209.00  |
| 130   | 131  | 166.83 | 0.00  | 88.94  | 110.71  |
| 131   | 131  | 166.83 | 0.00  | 88.94  | 110.71  |
| 131   | 132  | 167.00 | 0.00  | 90.51  | 95.00   |
| 132   | 132  | 167.00 | 0.00  | 90.51  | 95.00   |
| 132   | 133  | 168.00 | 0.00  | 0.00   | 0.00    |

16/08/01

Programa DINTEL IDEAM S.A.  
SC9.ENV\_TREN\_GENERICO.MZ+

GRÁFICO DE ESFUERZOS



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|-------|-------|---------|---------|
| 1     | 1    | 0.00  | 0.00  | -98.07  | 0.00    |
| 1     | 2    | 1.00  | 0.00  | -89.31  | 89.31   |
| 2     | 2    | 1.00  | 0.00  | -89.31  | 89.31   |
| 2     | 3    | 1.18  | 0.00  | -87.82  | 103.19  |
| 3     | 3    | 1.18  | 0.00  | -87.82  | 103.19  |
| 3     | 4    | 2.35  | 0.00  | -78.24  | 183.86  |
| 4     | 4    | 2.35  | 0.00  | -78.24  | 183.86  |
| 4     | 5    | 3.53  | 0.00  | -69.30  | 244.30  |
| 5     | 5    | 3.53  | 0.00  | -69.30  | 244.30  |
| 5     | 6    | 4.70  | 0.00  | -61.02  | 286.80  |
| 6     | 6    | 4.70  | 0.00  | -61.02  | 286.80  |
| 6     | 7    | 5.88  | 0.00  | -53.38  | 313.62  |
| 7     | 7    | 5.88  | 0.00  | -53.38  | 313.62  |
| 7     | 8    | 7.05  | 0.00  | -46.38  | 326.96  |
| 8     | 8    | 7.05  | 0.00  | -46.38  | 326.96  |
| 8     | 9    | 8.23  | 0.00  | -40.00  | 328.97  |
| 9     | 9    | 8.23  | 0.00  | -40.00  | 328.97  |
| 9     | 10   | 9.40  | 0.00  | -34.22  | 321.72  |
| 10    | 10   | 9.40  | 0.00  | -34.22  | 321.72  |
| 10    | 11   | 10.58 | 0.00  | -29.05  | 307.21  |
| 11    | 11   | 10.58 | 0.00  | -29.05  | 307.21  |
| 11    | 12   | 11.75 | 0.00  | -24.45  | 287.34  |
| 12    | 12   | 11.75 | 0.00  | -24.45  | 287.34  |
| 12    | 13   | 12.93 | 0.00  | -20.42  | 263.93  |
| 13    | 13   | 12.93 | 0.00  | -20.42  | 263.93  |
| 13    | 14   | 14.10 | 0.00  | -16.92  | 238.64  |
| 14    | 14   | 14.10 | 0.00  | -16.92  | 238.64  |
| 14    | 15   | 15.28 | 0.00  | -13.95  | 213.04  |
| 15    | 15   | 15.28 | 0.00  | -13.95  | 213.04  |
| 15    | 16   | 16.45 | 0.00  | -11.46  | 188.54  |
| 16    | 16   | 16.45 | 0.14  | -11.46  | 188.54  |
| 16    | 17   | 17.63 | 0.11  | -9.44   | 166.42  |
| 17    | 17   | 17.63 | 0.11  | -9.44   | 166.42  |
| 17    | 18   | 18.80 | 0.09  | -7.86   | 147.79  |
| 18    | 18   | 18.80 | 0.00  | -7.86   | 147.79  |
| 18    | 19   | 19.98 | 0.00  | -6.69   | 133.59  |
| 19    | 19   | 19.98 | 0.00  | -6.69   | 133.59  |
| 19    | 20   | 21.15 | 0.00  | -5.89   | 124.62  |
| 20    | 20   | 21.15 | 0.00  | -5.89   | 124.62  |
| 20    | 21   | 22.33 | 0.00  | -5.44   | 121.46  |
| 21    | 21   | 22.33 | 0.00  | -5.44   | 121.46  |
| 21    | 22   | 22.50 | 0.00  | -5.40   | 121.51  |
| 22    | 22   | 22.50 | 0.00  | -5.40   | 121.51  |
| 22    | 23   | 23.50 | 0.00  | -5.30   | 124.50  |
| 23    | 1023 | 23.50 | 0.00  | -150.69 | -761.43 |
| 23    | 24   | 24.50 | 0.00  | -141.79 | -617.41 |
| 24    | 24   | 24.50 | 0.00  | -141.79 | -617.41 |
| 24    | 25   | 24.95 | 0.00  | -137.85 | -556.94 |
| 25    | 25   | 24.95 | 0.00  | -137.85 | -556.94 |
| 25    | 26   | 26.40 | 0.00  | -125.49 | -380.16 |
| 26    | 26   | 26.40 | 0.00  | -125.49 | -380.16 |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|-------|-------|---------|---------|
| 26    | 27   | 27.85 | 0.00  | -113.65 | -230.28 |
| 27    | 27   | 27.85 | 0.00  | -113.65 | -230.28 |
| 27    | 28   | 29.30 | 0.00  | -102.41 | -106.07 |
| 28    | 28   | 29.30 | -0.98 | -102.40 | -106.07 |
| 28    | 29   | 30.75 | -0.88 | -91.79  | -5.92   |
| 29    | 29   | 30.75 | -0.88 | -91.79  | -5.92   |
| 29    | 30   | 32.20 | -0.79 | -81.86  | 72.09   |
| 30    | 30   | 32.20 | 0.00  | -81.86  | 72.09   |
| 30    | 31   | 33.65 | 0.00  | -72.64  | 130.12  |
| 31    | 31   | 33.65 | 0.00  | -72.64  | 130.12  |
| 31    | 32   | 35.10 | 0.00  | -64.15  | 170.58  |
| 32    | 32   | 35.10 | 0.00  | -64.15  | 170.58  |
| 32    | 33   | 36.55 | 0.00  | -56.43  | 196.02  |
| 33    | 33   | 36.55 | 0.00  | -56.43  | 196.02  |
| 33    | 34   | 38.00 | 0.00  | -49.47  | 209.10  |
| 34    | 34   | 38.00 | 0.00  | -49.47  | 209.10  |
| 34    | 35   | 39.45 | 0.00  | -43.29  | 212.57  |
| 35    | 35   | 39.45 | 0.00  | -43.29  | 212.57  |
| 35    | 36   | 40.90 | 0.00  | -37.88  | 209.17  |
| 36    | 36   | 40.90 | 0.00  | -37.88  | 209.17  |
| 36    | 37   | 42.35 | 0.00  | -33.23  | 201.60  |
| 37    | 37   | 42.35 | 0.00  | -33.23  | 201.60  |
| 37    | 38   | 43.80 | 0.00  | -29.32  | 192.44  |
| 38    | 38   | 43.80 | 0.28  | -29.32  | 192.44  |
| 38    | 39   | 45.25 | 0.25  | -26.13  | 184.12  |
| 39    | 39   | 45.25 | 0.25  | -26.13  | 184.12  |
| 39    | 40   | 46.70 | 0.23  | -23.63  | 178.89  |
| 40    | 40   | 46.70 | 0.00  | -23.63  | 178.89  |
| 40    | 41   | 48.15 | 0.00  | -21.78  | 178.72  |
| 41    | 41   | 48.15 | 0.00  | -21.78  | 178.72  |
| 41    | 42   | 49.60 | 0.00  | -20.52  | 185.32  |
| 42    | 42   | 49.60 | 0.00  | -20.52  | 185.32  |
| 42    | 43   | 51.05 | 0.00  | -19.81  | 200.01  |
| 43    | 43   | 51.05 | 0.00  | -19.81  | 200.01  |
| 43    | 44   | 51.50 | 0.00  | -19.69  | 206.38  |
| 44    | 44   | 51.50 | 0.00  | -19.69  | 206.38  |
| 44    | 45   | 52.50 | 0.00  | -19.59  | 223.72  |
| 45    | 1045 | 52.50 | 0.00  | -154.45 | -845.21 |
| 45    | 46   | 53.50 | 0.00  | -145.55 | -697.49 |
| 46    | 46   | 53.50 | 0.00  | -145.55 | -697.49 |
| 46    | 47   | 53.95 | 0.00  | -141.61 | -635.38 |
| 47    | 47   | 53.95 | 0.00  | -141.61 | -635.38 |
| 47    | 48   | 55.40 | 0.00  | -129.26 | -453.44 |
| 48    | 48   | 55.40 | 0.00  | -129.26 | -453.44 |
| 48    | 49   | 56.85 | 0.00  | -117.43 | -298.51 |
| 49    | 49   | 56.85 | 0.00  | -117.43 | -298.51 |
| 49    | 50   | 58.30 | 0.00  | -106.20 | -169.32 |
| 50    | 50   | 58.30 | -1.02 | -106.19 | -169.32 |
| 50    | 51   | 59.75 | -0.92 | -95.59  | -64.24  |
| 51    | 51   | 59.75 | -0.92 | -95.59  | -64.24  |
| 51    | 52   | 61.20 | -0.82 | -85.67  | 18.66   |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|-------|-------|---------|---------|
| 52    | 52   | 61.20 | 0.00  | -85.67  | 18.66   |
| 52    | 53   | 62.65 | 0.00  | -76.45  | 81.58   |
| 53    | 53   | 62.65 | 0.00  | -76.45  | 81.58   |
| 53    | 54   | 64.10 | 0.00  | -67.97  | 126.89  |
| 54    | 54   | 64.10 | 0.00  | -67.97  | 126.89  |
| 54    | 55   | 65.55 | 0.00  | -60.24  | 157.15  |
| 55    | 55   | 65.55 | 0.00  | -60.24  | 157.15  |
| 55    | 56   | 67.00 | 0.00  | -53.27  | 175.03  |
| 56    | 56   | 67.00 | 0.00  | -53.27  | 175.03  |
| 56    | 57   | 68.45 | 0.00  | -47.07  | 183.26  |
| 57    | 57   | 68.45 | 0.00  | -47.07  | 183.26  |
| 57    | 58   | 69.90 | 0.00  | -41.64  | 184.56  |
| 58    | 58   | 69.90 | 0.00  | -41.64  | 184.56  |
| 58    | 59   | 71.35 | 0.00  | -36.97  | 181.64  |
| 59    | 59   | 71.35 | 0.00  | -36.97  | 181.64  |
| 59    | 60   | 72.80 | 0.00  | -33.04  | 177.09  |
| 60    | 60   | 72.80 | 0.32  | -33.04  | 177.09  |
| 60    | 61   | 74.25 | 0.29  | -29.82  | 173.35  |
| 61    | 61   | 74.25 | 0.29  | -29.82  | 173.35  |
| 61    | 62   | 75.70 | 0.26  | -27.29  | 172.69  |
| 62    | 62   | 75.70 | 0.00  | -27.29  | 172.69  |
| 62    | 63   | 77.15 | 0.00  | -25.41  | 177.12  |
| 63    | 63   | 77.15 | 0.00  | -25.41  | 177.12  |
| 63    | 64   | 78.60 | 0.00  | -24.13  | 188.40  |
| 64    | 64   | 78.60 | 0.00  | -24.13  | 188.40  |
| 64    | 65   | 80.05 | 0.00  | -23.41  | 207.92  |
| 65    | 65   | 80.05 | 0.00  | -23.41  | 207.92  |
| 65    | 66   | 80.50 | 0.00  | -23.29  | 215.82  |
| 66    | 66   | 80.50 | 0.00  | -23.29  | 215.82  |
| 66    | 67   | 81.50 | 0.00  | -23.18  | 236.68  |
| 67    | 1067 | 81.50 | 0.00  | -162.21 | -927.40 |
| 67    | 68   | 82.50 | 0.00  | -153.30 | -771.84 |
| 68    | 68   | 82.50 | 0.00  | -153.30 | -771.84 |
| 68    | 69   | 83.08 | 0.00  | -148.27 | -688.40 |
| 69    | 69   | 83.08 | 0.00  | -148.27 | -688.40 |
| 69    | 70   | 84.65 | 0.00  | -134.83 | -482.01 |
| 70    | 70   | 84.65 | 0.00  | -134.83 | -482.01 |
| 70    | 71   | 86.23 | 0.00  | -121.97 | -307.32 |
| 71    | 71   | 86.23 | 0.00  | -121.97 | -307.32 |
| 71    | 72   | 87.80 | 0.00  | -109.75 | -162.89 |
| 72    | 72   | 87.80 | -0.97 | -109.74 | -162.89 |
| 72    | 73   | 89.38 | -0.87 | -98.21  | -46.83  |
| 73    | 73   | 89.38 | -0.87 | -98.21  | -46.83  |
| 73    | 74   | 90.95 | -0.77 | -87.41  | 43.10   |
| 74    | 74   | 90.95 | 0.00  | -87.41  | 43.10   |
| 74    | 75   | 92.53 | 0.00  | -77.39  | 109.46  |
| 75    | 75   | 92.53 | 0.00  | -77.39  | 109.46  |
| 75    | 76   | 94.10 | 0.00  | -68.16  | 155.06  |
| 76    | 76   | 94.10 | 0.00  | -68.16  | 155.06  |
| 76    | 77   | 95.68 | 0.00  | -59.76  | 182.93  |
| 77    | 77   | 95.68 | 0.00  | -59.76  | 182.93  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY-

Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|--------|-------|---------|---------|
| 77    | 78   | 97.25  | 0.00  | -52.20  | 196.21  |
| 78    | 78   | 97.25  | 0.00  | -52.20  | 196.21  |
| 78    | 79   | 98.83  | 0.00  | -45.49  | 198.13  |
| 79    | 79   | 98.83  | 0.00  | -45.49  | 198.13  |
| 79    | 80   | 100.40 | 0.00  | -39.61  | 191.94  |
| 80    | 80   | 100.40 | 0.00  | -39.61  | 191.94  |
| 80    | 81   | 101.98 | 0.00  | -34.56  | 180.82  |
| 81    | 81   | 101.98 | 0.00  | -34.56  | 180.82  |
| 81    | 82   | 103.55 | 0.00  | -30.32  | 167.81  |
| 82    | 82   | 103.55 | 0.27  | -30.32  | 167.81  |
| 82    | 83   | 105.13 | 0.24  | -26.86  | 155.81  |
| 83    | 83   | 105.13 | 0.24  | -26.86  | 155.81  |
| 83    | 84   | 106.70 | 0.21  | -24.14  | 147.42  |
| 84    | 84   | 106.70 | 0.00  | -24.14  | 147.42  |
| 84    | 85   | 108.28 | 0.00  | -22.13  | 145.01  |
| 85    | 85   | 108.28 | 0.00  | -22.13  | 145.01  |
| 85    | 86   | 109.85 | 0.00  | -20.77  | 150.55  |
| 86    | 86   | 109.85 | 0.00  | -20.77  | 150.55  |
| 86    | 87   | 111.43 | 0.00  | -20.01  | 165.60  |
| 87    | 87   | 111.43 | 0.00  | -20.01  | 165.60  |
| 87    | 88   | 112.00 | 0.00  | -19.86  | 173.69  |
| 88    | 88   | 112.00 | 0.00  | -19.86  | 173.69  |
| 88    | 89   | 113.00 | 0.00  | -19.77  | 191.22  |
| 89    | 1089 | 113.00 | 0.00  | -160.99 | -971.52 |
| 89    | 90   | 114.00 | 0.00  | -152.09 | -817.25 |
| 90    | 90   | 114.00 | 0.00  | -152.09 | -817.25 |
| 90    | 91   | 114.58 | 0.00  | -147.06 | -734.64 |
| 91    | 91   | 114.58 | 0.00  | -147.06 | -734.64 |
| 91    | 92   | 116.15 | 0.00  | -133.66 | -530.69 |
| 92    | 92   | 116.15 | 0.00  | -133.66 | -530.69 |
| 92    | 93   | 117.73 | 0.00  | -120.86 | -358.58 |
| 93    | 93   | 117.73 | 0.00  | -120.86 | -358.58 |
| 93    | 94   | 119.30 | 0.00  | -108.71 | -216.72 |
| 94    | 94   | 119.30 | -0.96 | -108.71 | -216.72 |
| 94    | 95   | 120.88 | -0.86 | -97.27  | -103.09 |
| 95    | 95   | 120.88 | -0.86 | -97.27  | -103.09 |
| 95    | 96   | 122.45 | -0.76 | -86.59  | -15.33  |
| 96    | 96   | 122.45 | 0.00  | -86.59  | -15.33  |
| 96    | 97   | 124.03 | 0.00  | -76.69  | 49.22   |
| 97    | 97   | 124.03 | 0.00  | -76.69  | 49.22   |
| 97    | 98   | 125.60 | 0.00  | -67.60  | 93.45   |
| 98    | 98   | 125.60 | 0.00  | -67.60  | 93.45   |
| 98    | 99   | 127.18 | 0.00  | -59.35  | 120.45  |
| 99    | 99   | 127.18 | 0.00  | -59.35  | 120.45  |
| 99    | 100  | 128.75 | 0.00  | -51.94  | 133.41  |
| 100   | 100  | 128.75 | 0.00  | -51.94  | 133.41  |
| 100   | 101  | 130.33 | 0.00  | -45.37  | 135.57  |
| 101   | 101  | 130.33 | 0.00  | -45.37  | 135.57  |
| 101   | 102  | 131.90 | 0.00  | -39.65  | 130.16  |
| 102   | 102  | 131.90 | 0.00  | -39.65  | 130.16  |
| 102   | 103  | 133.48 | 0.00  | -34.75  | 120.33  |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY-Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|--------|-------|---------|---------|
| 103   | 103  | 133.48 | 0.00  | -34.75  | 120.33  |
| 103   | 104  | 135.05 | 0.00  | -30.65  | 109.08  |
| 104   | 104  | 135.05 | 0.27  | -30.65  | 109.08  |
| 104   | 105  | 136.63 | 0.24  | -27.32  | 99.19   |
| 105   | 105  | 136.63 | 0.24  | -27.32  | 99.19   |
| 105   | 106  | 138.20 | 0.22  | -24.72  | 93.17   |
| 106   | 106  | 138.20 | 0.00  | -24.72  | 93.17   |
| 106   | 107  | 139.78 | 0.00  | -22.80  | 93.22   |
| 107   | 107  | 139.78 | 0.00  | -22.80  | 93.22   |
| 107   | 108  | 141.35 | 0.00  | -21.52  | 101.16  |
| 108   | 108  | 141.35 | 0.00  | -21.52  | 101.16  |
| 108   | 109  | 142.93 | 0.00  | -20.80  | 118.33  |
| 109   | 109  | 142.93 | 0.00  | -20.80  | 118.33  |
| 109   | 110  | 143.50 | 0.00  | -20.66  | 127.08  |
| 110   | 110  | 143.50 | 0.00  | -20.66  | 127.08  |
| 110   | 111  | 144.50 | 0.00  | -20.57  | 145.57  |
| 111   | 111  | 144.50 | 0.00  | -141.30 | -835.35 |
| 111   | 112  | 145.50 | 0.00  | -132.40 | -700.94 |
| 112   | 112  | 145.50 | 0.00  | -132.40 | -700.94 |
| 112   | 113  | 145.68 | 0.00  | -130.87 | -678.84 |
| 113   | 113  | 145.68 | 0.00  | -130.87 | -678.84 |
| 113   | 114  | 146.85 | 0.00  | -120.76 | -541.14 |
| 114   | 114  | 146.85 | 0.00  | -120.76 | -541.14 |
| 114   | 115  | 148.03 | 0.00  | -111.00 | -421.80 |
| 115   | 115  | 148.03 | 0.00  | -111.00 | -421.80 |
| 115   | 116  | 149.20 | 0.00  | -101.63 | -320.17 |
| 116   | 116  | 149.20 | -1.20 | -101.62 | -320.17 |
| 116   | 117  | 150.38 | -1.10 | -92.66  | -235.43 |
| 117   | 117  | 150.38 | -1.10 | -92.66  | -235.43 |
| 117   | 118  | 151.55 | -1.00 | -84.15  | -166.59 |
| 118   | 118  | 151.55 | 0.00  | -84.15  | -166.59 |
| 118   | 119  | 152.73 | 0.00  | -76.10  | -112.50 |
| 119   | 119  | 152.73 | 0.00  | -76.10  | -112.50 |
| 119   | 120  | 153.90 | 0.00  | -68.55  | -71.86  |
| 120   | 120  | 153.90 | 0.00  | -68.55  | -71.86  |
| 120   | 121  | 155.08 | 0.00  | -61.51  | -43.25  |
| 121   | 121  | 155.08 | 0.00  | -61.51  | -43.25  |
| 121   | 122  | 156.25 | 0.00  | -55.01  | -25.09  |
| 122   | 122  | 156.25 | 0.00  | -55.01  | -25.09  |
| 122   | 123  | 157.43 | 0.00  | -49.07  | -15.69  |
| 123   | 123  | 157.43 | 0.00  | -49.07  | -15.69  |
| 123   | 124  | 158.60 | 0.00  | -43.71  | -13.25  |
| 124   | 124  | 158.60 | 0.00  | -43.71  | -13.25  |
| 124   | 125  | 159.78 | 0.00  | -38.94  | -15.85  |
| 125   | 125  | 159.78 | 0.00  | -38.94  | -15.85  |
| 125   | 126  | 160.95 | 0.00  | -34.78  | -21.53  |
| 126   | 126  | 160.95 | 0.00  | -34.78  | -21.53  |
| 126   | 127  | 162.13 | 0.00  | -31.24  | -28.19  |
| 127   | 127  | 162.13 | 0.00  | -31.24  | -28.19  |
| 127   | 128  | 163.30 | 0.00  | -28.32  | -33.72  |
| 128   | 128  | 163.30 | 0.00  | -28.32  | -33.72  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.VY-Envolvente de tren de cargas plano genérico. VY-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | -26.05 | -35.91  |
| 129   | 129  | 164.48 | 0.00  | -26.05 | -35.91  |
| 129   | 130  | 165.65 | 0.00  | -24.42 | -32.54  |
| 130   | 130  | 165.65 | 0.00  | -24.42 | -32.54  |
| 130   | 131  | 166.83 | 0.00  | -23.44 | -21.33  |
| 131   | 131  | 166.83 | 0.00  | -23.44 | -21.33  |
| 131   | 132  | 167.00 | 0.00  | -23.35 | -18.85  |
| 132   | 132  | 167.00 | 0.00  | -23.35 | -18.85  |
| 132   | 133  | 168.00 | 0.00  | -23.12 | 0.00    |

# CÁLCULO TENSIONAL

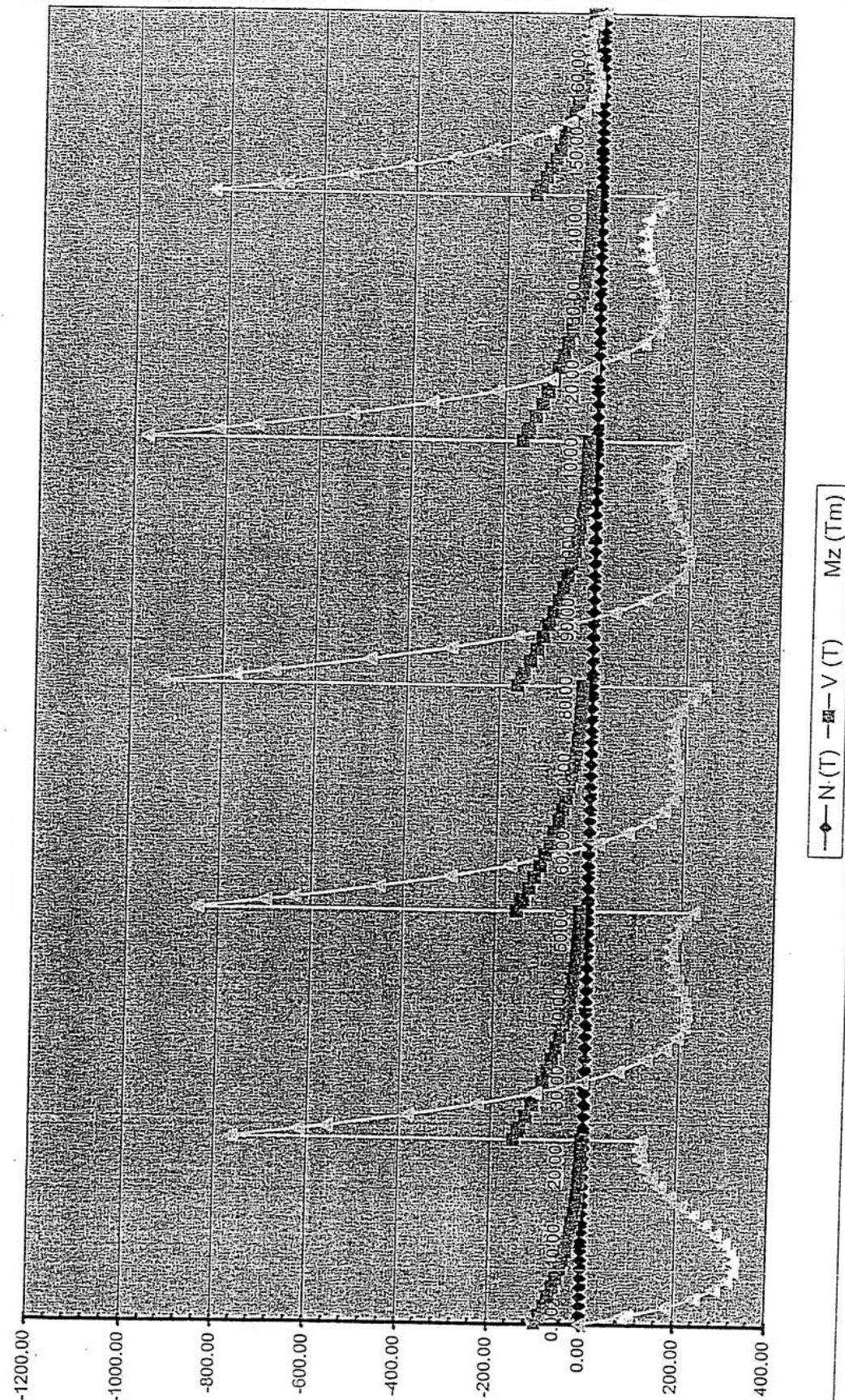
Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:



| Barra | Nudo | X     | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|-------|-------|---------|---------|
| 1     | 1    | 0.00  | 0.00  | 0.00    | 0.00    |
| 1     | 2    | 1.00  | 0.00  | 19.42   | -19.42  |
| 2     | 2    | 1.00  | 0.00  | 19.42   | -19.42  |
| 2     | 3    | 1.18  | 0.00  | 19.42   | -22.82  |
| 3     | 3    | 1.18  | 0.00  | 19.42   | -22.82  |
| 3     | 4    | 2.35  | 0.00  | 19.42   | -45.64  |
| 4     | 4    | 2.35  | 0.00  | 19.42   | -45.64  |
| 4     | 5    | 3.53  | 0.00  | 19.42   | -68.47  |
| 5     | 5    | 3.53  | 0.00  | 19.42   | -68.47  |
| 5     | 6    | 4.70  | 0.00  | 19.42   | -91.29  |
| 6     | 6    | 4.70  | 0.00  | 19.42   | -91.29  |
| 6     | 7    | 5.88  | 0.00  | 19.42   | -114.11 |
| 7     | 7    | 5.88  | 0.00  | 19.42   | -114.11 |
| 7     | 8    | 7.05  | 0.00  | 19.42   | -136.93 |
| 8     | 8    | 7.05  | 0.00  | 19.42   | -136.93 |
| 8     | 9    | 8.23  | 0.00  | 19.42   | -159.76 |
| 9     | 9    | 8.23  | 0.00  | 19.42   | -159.76 |
| 9     | 10   | 9.40  | 0.00  | 19.42   | -182.58 |
| 10    | 10   | 9.40  | 0.00  | 19.42   | -182.58 |
| 10    | 11   | 10.58 | 0.00  | 19.42   | -205.40 |
| 11    | 11   | 10.58 | 0.00  | 19.42   | -205.40 |
| 11    | 12   | 11.75 | 0.00  | 19.42   | -228.22 |
| 12    | 12   | 11.75 | 0.00  | 19.42   | -228.22 |
| 12    | 13   | 12.93 | 0.00  | 19.42   | -251.05 |
| 13    | 13   | 12.93 | 0.00  | 19.42   | -251.05 |
| 13    | 14   | 14.10 | 0.00  | 19.42   | -273.87 |
| 14    | 14   | 14.10 | 0.00  | 19.42   | -273.87 |
| 14    | 15   | 15.28 | 0.00  | 19.42   | -296.69 |
| 15    | 15   | 15.28 | 0.00  | 19.42   | -296.69 |
| 15    | 16   | 16.45 | 0.00  | 19.42   | -319.51 |
| 16    | 16   | 16.45 | -0.23 | 19.42   | -319.51 |
| 16    | 17   | 17.63 | -0.23 | 19.42   | -342.33 |
| 17    | 17   | 17.63 | -0.23 | 19.42   | -342.33 |
| 17    | 18   | 18.80 | -0.23 | 19.42   | -365.16 |
| 18    | 18   | 18.80 | 0.00  | 19.42   | -365.16 |
| 18    | 19   | 19.98 | 0.00  | 58.10   | -408.76 |
| 19    | 19   | 19.98 | 0.00  | 58.10   | -408.76 |
| 19    | 20   | 21.15 | 0.00  | 89.42   | -493.37 |
| 20    | 20   | 21.15 | 0.00  | 89.42   | -493.37 |
| 20    | 21   | 22.33 | 0.00  | 117.60  | -612.37 |
| 21    | 21   | 22.33 | 0.00  | 117.60  | -612.37 |
| 21    | 22   | 22.50 | 0.00  | 117.60  | -632.95 |
| 22    | 22   | 22.50 | 0.00  | 117.60  | -632.95 |
| 22    | 23   | 23.50 | 0.00  | 138.15  | -761.43 |
| 23    | 1023 | 23.50 | 0.00  | -150.69 | -761.43 |
| 23    | 24   | 24.50 | 0.00  | -137.85 | -618.97 |
| 24    | 24   | 24.50 | 0.00  | -137.85 | -618.97 |
| 24    | 25   | 24.95 | 0.00  | -125.49 | -562.11 |
| 25    | 25   | 24.95 | 0.00  | -125.49 | -562.11 |
| 25    | 26   | 26.40 | 0.00  | -91.80  | -405.24 |
| 26    | 26   | 26.40 | 0.00  | -91.80  | -405.24 |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|-------|-------|---------|---------|
| 26    | 27   | 27.85 | 0.00  | -56.43  | -294.89 |
| 27    | 27   | 27.85 | 0.00  | -56.43  | -294.89 |
| 27    | 28   | 29.30 | 0.00  | -29.32  | -232.71 |
| 28    | 28   | 29.30 | -0.28 | -29.32  | -232.71 |
| 28    | 29   | 30.75 | 0.06  | 6.29    | -226.12 |
| 29    | 29   | 30.75 | 0.06  | 6.29    | -226.12 |
| 29    | 30   | 32.20 | 0.06  | 6.29    | -235.24 |
| 30    | 30   | 32.20 | 0.00  | 6.29    | -235.24 |
| 30    | 31   | 33.65 | 0.00  | 6.29    | -244.37 |
| 31    | 31   | 33.65 | 0.00  | 6.29    | -244.37 |
| 31    | 32   | 35.10 | 0.00  | 6.29    | -253.50 |
| 32    | 32   | 35.10 | 0.00  | 6.29    | -253.50 |
| 32    | 33   | 36.55 | 0.00  | 6.29    | -262.62 |
| 33    | 33   | 36.55 | 0.00  | 6.29    | -262.62 |
| 33    | 34   | 38.00 | 0.00  | 6.29    | -271.75 |
| 34    | 34   | 38.00 | 0.00  | 6.29    | -271.75 |
| 34    | 35   | 39.45 | 0.00  | 6.29    | -280.88 |
| 35    | 35   | 39.45 | 0.00  | 6.29    | -280.88 |
| 35    | 36   | 40.90 | 0.00  | 6.29    | -290.00 |
| 36    | 36   | 40.90 | 0.00  | 6.29    | -290.00 |
| 36    | 37   | 42.35 | 0.00  | 6.29    | -299.13 |
| 37    | 37   | 42.35 | 0.00  | 6.29    | -299.13 |
| 37    | 38   | 43.80 | 0.00  | 6.29    | -308.25 |
| 38    | 38   | 43.80 | -0.06 | 6.29    | -308.25 |
| 38    | 39   | 45.25 | -0.06 | 6.29    | -317.38 |
| 39    | 39   | 45.25 | -0.06 | 6.29    | -317.38 |
| 39    | 40   | 46.70 | -0.25 | 26.01   | -332.49 |
| 40    | 40   | 46.70 | 0.00  | 26.01   | -332.49 |
| 40    | 41   | 48.15 | 0.00  | 55.80   | -389.84 |
| 41    | 41   | 48.15 | 0.00  | 55.80   | -389.84 |
| 41    | 42   | 49.60 | 0.00  | 90.85   | -495.08 |
| 42    | 42   | 49.60 | 0.00  | 90.85   | -495.08 |
| 42    | 43   | 51.05 | 0.00  | 124.39  | -648.11 |
| 43    | 43   | 51.05 | 0.00  | 124.39  | -648.11 |
| 43    | 44   | 51.50 | 0.00  | 124.39  | -704.09 |
| 44    | 44   | 51.50 | 0.00  | 124.39  | -704.09 |
| 44    | 45   | 52.50 | 0.00  | 149.56  | -845.21 |
| 45    | 1045 | 52.50 | 0.00  | -154.45 | -845.21 |
| 45    | 46   | 53.50 | 0.00  | -141.61 | -699.11 |
| 46    | 46   | 53.50 | 0.00  | -141.61 | -699.11 |
| 46    | 47   | 53.95 | 0.00  | -129.26 | -640.86 |
| 47    | 47   | 53.95 | 0.00  | -129.26 | -640.86 |
| 47    | 48   | 55.40 | 0.00  | -95.60  | -480.10 |
| 48    | 48   | 55.40 | 0.00  | -95.60  | -480.10 |
| 48    | 49   | 56.85 | 0.00  | -60.24  | -366.91 |
| 49    | 49   | 56.85 | 0.00  | -60.24  | -366.91 |
| 49    | 50   | 58.30 | 0.00  | -29.82  | -302.29 |
| 50    | 50   | 58.30 | -0.29 | -29.82  | -302.29 |
| 50    | 51   | 59.75 | 0.05  | 5.36    | -297.36 |
| 51    | 51   | 59.75 | 0.05  | 5.36    | -297.36 |
| 51    | 52   | 61.20 | 0.05  | 5.36    | -305.14 |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|-------|-------|---------|---------|
| 52    | 52   | 61.20 | 0.00  | 5.36    | -305.14 |
| 52    | 53   | 62.65 | 0.00  | 5.36    | -312.91 |
| 53    | 53   | 62.65 | 0.00  | 5.36    | -312.91 |
| 53    | 54   | 64.10 | 0.00  | 5.36    | -320.69 |
| 54    | 54   | 64.10 | 0.00  | 5.36    | -320.69 |
| 54    | 55   | 65.55 | 0.00  | 5.36    | -328.46 |
| 55    | 55   | 65.55 | 0.00  | 5.36    | -328.46 |
| 55    | 56   | 67.00 | 0.00  | 5.36    | -336.24 |
| 56    | 56   | 67.00 | 0.00  | 5.36    | -336.24 |
| 56    | 57   | 68.45 | 0.00  | 5.36    | -344.01 |
| 57    | 57   | 68.45 | 0.00  | 5.36    | -344.01 |
| 57    | 58   | 69.90 | 0.00  | 5.36    | -351.79 |
| 58    | 58   | 69.90 | 0.00  | 5.36    | -351.79 |
| 58    | 59   | 71.35 | 0.00  | 5.36    | -359.56 |
| 59    | 59   | 71.35 | 0.00  | 5.36    | -359.56 |
| 59    | 60   | 72.80 | 0.00  | 5.36    | -367.34 |
| 60    | 60   | 72.80 | -0.05 | 5.36    | -367.34 |
| 60    | 61   | 74.25 | -0.05 | 5.36    | -375.12 |
| 61    | 61   | 74.25 | -0.05 | 5.36    | -375.12 |
| 61    | 62   | 75.70 | -0.27 | 28.47   | -387.50 |
| 62    | 62   | 75.70 | 0.00  | 28.47   | -387.50 |
| 62    | 63   | 77.15 | 0.00  | 62.51   | -449.99 |
| 63    | 63   | 77.15 | 0.00  | 62.51   | -449.99 |
| 63    | 64   | 78.60 | 0.00  | 97.46   | -561.12 |
| 64    | 64   | 78.60 | 0.00  | 97.46   | -561.12 |
| 64    | 65   | 80.05 | 0.00  | 130.92  | -721.43 |
| 65    | 65   | 80.05 | 0.00  | 130.92  | -721.43 |
| 65    | 66   | 80.50 | 0.00  | 130.92  | -780.34 |
| 66    | 66   | 80.50 | 0.00  | 130.92  | -780.34 |
| 66    | 67   | 81.50 | 0.00  | 156.07  | -927.40 |
| 67    | 1067 | 81.50 | 0.00  | -162.21 | -927.40 |
| 67    | 68   | 82.50 | 0.00  | -148.27 | -773.65 |
| 68    | 68   | 82.50 | 0.00  | -148.27 | -773.65 |
| 68    | 69   | 83.08 | 0.00  | -134.83 | -694.37 |
| 69    | 69   | 83.08 | 0.00  | -134.83 | -694.37 |
| 69    | 70   | 84.65 | 0.00  | -98.21  | -510.89 |
| 70    | 70   | 84.65 | 0.00  | -98.21  | -510.89 |
| 70    | 71   | 86.23 | 0.00  | -59.76  | -381.85 |
| 71    | 71   | 86.23 | 0.00  | -59.76  | -381.85 |
| 71    | 72   | 87.80 | 0.00  | -30.32  | -309.68 |
| 72    | 72   | 87.80 | -0.27 | -30.32  | -309.68 |
| 72    | 73   | 89.38 | 0.02  | 2.56    | -296.88 |
| 73    | 73   | 89.38 | 0.02  | 2.56    | -296.88 |
| 73    | 74   | 90.95 | 0.02  | 2.56    | -300.91 |
| 74    | 74   | 90.95 | 0.00  | 2.56    | -300.91 |
| 74    | 75   | 92.53 | 0.00  | 2.56    | -304.94 |
| 75    | 75   | 92.53 | 0.00  | 2.56    | -304.94 |
| 75    | 76   | 94.10 | 0.00  | 2.56    | -308.97 |
| 76    | 76   | 94.10 | 0.00  | 2.56    | -308.97 |
| 76    | 77   | 95.68 | 0.00  | 2.56    | -313.00 |
| 77    | 77   | 95.68 | 0.00  | 2.56    | -313.00 |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|--------|-------|---------|---------|
| 77    | 78   | 97.25  | 0.00  | 2.56    | -317.04 |
| 78    | 78   | 97.25  | 0.00  | 2.56    | -317.04 |
| 78    | 79   | 98.83  | 0.00  | 2.56    | -321.07 |
| 79    | 79   | 98.83  | 0.00  | 2.56    | -321.07 |
| 79    | 80   | 100.40 | 0.00  | 2.56    | -325.10 |
| 80    | 80   | 100.40 | 0.00  | 2.56    | -325.10 |
| 80    | 81   | 101.98 | 0.00  | 2.56    | -329.13 |
| 81    | 81   | 101.98 | 0.00  | 2.56    | -329.13 |
| 81    | 82   | 103.55 | 0.00  | 2.56    | -333.16 |
| 82    | 82   | 103.55 | -0.02 | 2.56    | -333.16 |
| 82    | 83   | 105.13 | -0.02 | 2.56    | -337.19 |
| 83    | 83   | 105.13 | -0.02 | 2.56    | -337.19 |
| 83    | 84   | 106.70 | -0.27 | 30.18   | -351.96 |
| 84    | 84   | 106.70 | 0.00  | 30.18   | -351.96 |
| 84    | 85   | 108.28 | 0.00  | 62.50   | -423.66 |
| 85    | 85   | 108.28 | 0.00  | 62.50   | -423.66 |
| 85    | 86   | 109.85 | 0.00  | 100.58  | -551.72 |
| 86    | 86   | 109.85 | 0.00  | 100.58  | -551.72 |
| 86    | 87   | 111.43 | 0.00  | 137.02  | -735.82 |
| 87    | 87   | 111.43 | 0.00  | 137.02  | -735.82 |
| 87    | 88   | 112.00 | 0.00  | 150.42  | -815.83 |
| 88    | 88   | 112.00 | 0.00  | 150.42  | -815.83 |
| 88    | 89   | 113.00 | 0.00  | 164.36  | -971.52 |
| 89    | 1089 | 113.00 | 0.00  | -160.99 | -971.52 |
| 89    | 90   | 114.00 | 0.00  | -147.06 | -819.19 |
| 90    | 90   | 114.00 | 0.00  | -147.06 | -819.19 |
| 90    | 91   | 114.58 | 0.00  | -133.66 | -741.21 |
| 91    | 91   | 114.58 | 0.00  | -133.66 | -741.21 |
| 91    | 92   | 116.15 | 0.00  | -97.28  | -562.73 |
| 92    | 92   | 116.15 | 0.00  | -97.28  | -562.73 |
| 92    | 93   | 117.73 | 0.00  | -59.35  | -440.40 |
| 93    | 93   | 117.73 | 0.00  | -59.35  | -440.40 |
| 93    | 94   | 119.30 | 0.00  | -27.32  | -374.09 |
| 94    | 94   | 119.30 | -0.24 | -27.32  | -374.09 |
| 94    | 95   | 120.88 | -0.08 | -8.77   | -353.86 |
| 95    | 95   | 120.88 | -0.08 | -8.77   | -353.86 |
| 95    | 96   | 122.45 | -0.08 | -8.77   | -340.04 |
| 96    | 96   | 122.45 | 0.00  | -8.77   | -340.04 |
| 96    | 97   | 124.03 | 0.00  | -8.77   | -326.22 |
| 97    | 97   | 124.03 | 0.00  | -8.77   | -326.22 |
| 97    | 98   | 125.60 | 0.00  | -8.77   | -312.40 |
| 98    | 98   | 125.60 | 0.00  | -8.77   | -312.40 |
| 98    | 99   | 127.18 | 0.00  | -8.77   | -298.58 |
| 99    | 99   | 127.18 | 0.00  | -8.77   | -298.58 |
| 99    | 100  | 128.75 | 0.00  | -8.77   | -284.76 |
| 100   | 100  | 128.75 | 0.00  | -8.77   | -284.76 |
| 100   | 101  | 130.33 | 0.00  | -8.77   | -270.94 |
| 101   | 101  | 130.33 | 0.00  | -8.77   | -270.94 |
| 101   | 102  | 131.90 | 0.00  | -8.77   | -257.13 |
| 102   | 102  | 131.90 | 0.00  | -8.77   | -257.13 |
| 102   | 103  | 133.48 | 0.00  | -8.77   | -243.31 |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

SC9.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T)  | Mz (Tm) |
|-------|------|--------|-------|---------|---------|
| 103   | 103  | 133.48 | 0.00  | -8.77   | -243.31 |
| 103   | 104  | 135.05 | 0.00  | -8.77   | -229.49 |
| 104   | 104  | 135.05 | 0.08  | -8.77   | -229.49 |
| 104   | 105  | 136.63 | 0.08  | -8.77   | -215.67 |
| 105   | 105  | 136.63 | 0.08  | -8.77   | -215.67 |
| 105   | 106  | 138.20 | -0.24 | 27.02   | -225.65 |
| 106   | 106  | 138.20 | 0.00  | 27.02   | -225.65 |
| 106   | 107  | 139.78 | 0.00  | 65.13   | -297.38 |
| 107   | 107  | 139.78 | 0.00  | 65.13   | -297.38 |
| 107   | 108  | 141.35 | 0.00  | 95.32   | -424.77 |
| 108   | 108  | 141.35 | 0.00  | 95.32   | -424.77 |
| 108   | 109  | 142.93 | 0.00  | 132.04  | -606.10 |
| 109   | 109  | 142.93 | 0.00  | 132.04  | -606.10 |
| 109   | 110  | 143.50 | 0.00  | 145.50  | -684.22 |
| 110   | 110  | 143.50 | 0.00  | 145.50  | -684.22 |
| 110   | 111  | 144.50 | 0.00  | 159.45  | -835.35 |
| 111   | 1111 | 144.50 | 0.00  | -141.30 | -835.35 |
| 111   | 112  | 145.50 | 0.00  | -120.76 | -704.15 |
| 112   | 112  | 145.50 | 0.00  | -120.76 | -704.15 |
| 112   | 113  | 145.68 | 0.00  | -120.76 | -683.03 |
| 113   | 113  | 145.68 | 0.00  | -120.76 | -683.03 |
| 113   | 114  | 146.85 | 0.00  | -84.15  | -562.10 |
| 114   | 114  | 146.85 | 0.00  | -84.15  | -562.10 |
| 114   | 115  | 148.03 | 0.00  | -55.01  | -477.55 |
| 115   | 115  | 148.03 | 0.00  | -55.01  | -477.55 |
| 115   | 116  | 149.20 | 0.00  | -23.12  | -434.56 |
| 116   | 116  | 149.20 | -0.27 | -23.11  | -434.56 |
| 116   | 117  | 150.38 | -0.27 | -23.11  | -407.40 |
| 117   | 117  | 150.38 | -0.27 | -23.11  | -407.40 |
| 117   | 118  | 151.55 | -0.27 | -23.11  | -380.24 |
| 118   | 118  | 151.55 | 0.00  | -23.12  | -380.24 |
| 118   | 119  | 152.73 | 0.00  | -23.12  | -353.08 |
| 119   | 119  | 152.73 | 0.00  | -23.12  | -353.08 |
| 119   | 120  | 153.90 | 0.00  | -23.12  | -325.92 |
| 120   | 120  | 153.90 | 0.00  | -23.12  | -325.92 |
| 120   | 121  | 155.08 | 0.00  | -23.12  | -298.76 |
| 121   | 121  | 155.08 | 0.00  | -23.12  | -298.76 |
| 121   | 122  | 156.25 | 0.00  | -23.12  | -271.60 |
| 122   | 122  | 156.25 | 0.00  | -23.12  | -271.60 |
| 122   | 123  | 157.43 | 0.00  | -23.12  | -244.44 |
| 123   | 123  | 157.43 | 0.00  | -23.12  | -244.44 |
| 123   | 124  | 158.60 | 0.00  | -23.12  | -217.28 |
| 124   | 124  | 158.60 | 0.00  | -23.12  | -217.28 |
| 124   | 125  | 159.78 | 0.00  | -23.12  | -190.12 |
| 125   | 125  | 159.78 | 0.00  | -23.12  | -190.12 |
| 125   | 126  | 160.95 | 0.00  | -23.12  | -162.96 |
| 126   | 126  | 160.95 | 0.00  | -23.12  | -162.96 |
| 126   | 127  | 162.13 | 0.00  | -23.12  | -135.80 |
| 127   | 127  | 162.13 | 0.00  | -23.12  | -135.80 |
| 127   | 128  | 163.30 | 0.00  | -23.12  | -108.64 |
| 128   | 128  | 163.30 | 0.00  | -23.12  | -108.64 |

CÁLCULO TENSIONAL

Hipótesis de cálculo:  
SC9.ENV\_TREN\_GENERICO.MZ-

Envolvente de tren de cargas plano genérico. MZ-

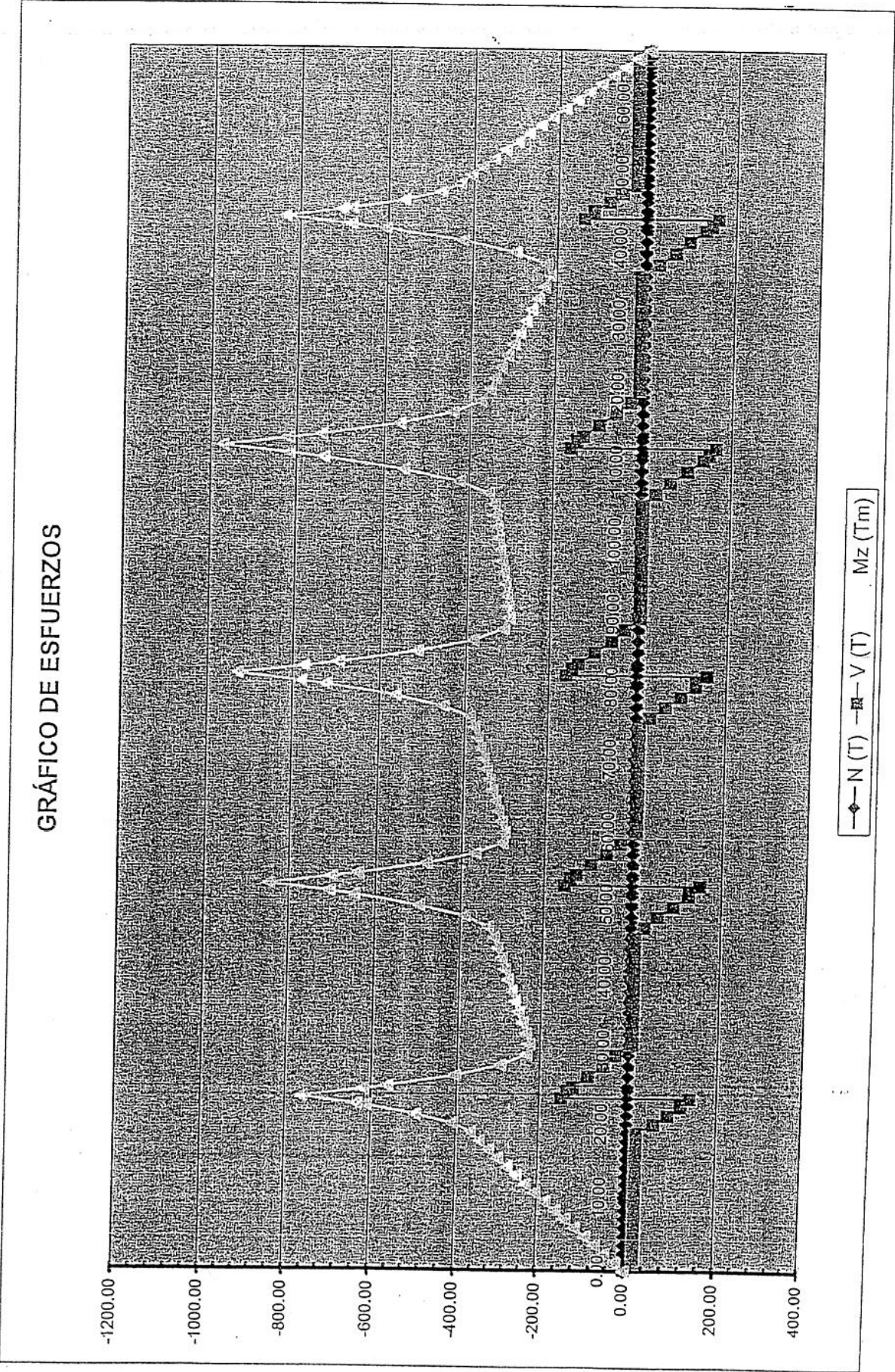
[ 0; 1]SC9.SCuniTpos.Barra1.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra2.Mx+ + [ 0; 1]SC9.SCuniTpos.Barra3.  
Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | -23.12 | -81.48  |
| 129   | 129  | 164.48 | 0.00  | -23.12 | -81.48  |
| 129   | 130  | 165.65 | 0.00  | -23.12 | -54.32  |
| 130   | 130  | 165.65 | 0.00  | -23.12 | -54.32  |
| 130   | 131  | 166.83 | 0.00  | -23.12 | -27.16  |
| 131   | 131  | 166.83 | 0.00  | -23.12 | -27.16  |
| 131   | 132  | 167.00 | 0.00  | -23.12 | -23.11  |
| 132   | 132  | 167.00 | 0.00  | -23.12 | -23.11  |
| 132   | 133  | 168.00 | 0.00  | 0.00   | 0.00    |

16/08/01

Programa DINTEL IDEAM S.A.  
SC9.ENV\_TREN\_GENERICO.MZ-

GRÁFICO DE ESFUERZOS





**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

TREN30.EnvTrenGen.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [ 0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [ 0; 1]TRE

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | 3.39   | 0.00    |
| 1     | 2    | 1.00  | 0.00  | 3.39   | -3.39   |
| 2     | 2    | 1.00  | 0.00  | 3.39   | -3.39   |
| 2     | 3    | 1.18  | 0.00  | 3.39   | -3.99   |
| 3     | 3    | 1.18  | 0.00  | 3.39   | -3.99   |
| 3     | 4    | 2.35  | 0.00  | 3.39   | -7.97   |
| 4     | 4    | 2.35  | 0.00  | 3.39   | -7.97   |
| 4     | 5    | 3.53  | 0.00  | 3.39   | -11.96  |
| 5     | 5    | 3.53  | 0.00  | 3.39   | -11.96  |
| 5     | 6    | 4.70  | 0.00  | 3.39   | -15.94  |
| 6     | 6    | 4.70  | 0.00  | 3.39   | -15.94  |
| 6     | 7    | 5.88  | 0.00  | 3.39   | -19.93  |
| 7     | 7    | 5.88  | 0.00  | 3.39   | -19.93  |
| 7     | 8    | 7.05  | 0.00  | 3.39   | -23.91  |
| 8     | 8    | 7.05  | 0.00  | 3.39   | -23.91  |
| 8     | 9    | 8.23  | 0.00  | 3.39   | -27.90  |
| 9     | 9    | 8.23  | 0.00  | 3.39   | -27.90  |
| 9     | 10   | 9.40  | 0.00  | 3.57   | 73.47   |
| 10    | 10   | 9.40  | 0.00  | 3.57   | 73.47   |
| 10    | 11   | 10.58 | 0.00  | 5.47   | 66.82   |
| 11    | 11   | 10.58 | 0.00  | 5.47   | 66.82   |
| 11    | 12   | 11.75 | 0.00  | 7.23   | 57.32   |
| 12    | 12   | 11.75 | 0.00  | 7.23   | 57.32   |
| 12    | 13   | 12.93 | 0.00  | 9.07   | 75.98   |
| 13    | 13   | 12.93 | 0.00  | 9.07   | 75.98   |
| 13    | 14   | 14.10 | 0.00  | 11.07  | 52.61   |
| 14    | 14   | 14.10 | 0.00  | 11.07  | 52.61   |
| 14    | 15   | 15.28 | 0.00  | 12.97  | 37.03   |
| 15    | 15   | 15.28 | 0.00  | 12.97  | 37.03   |
| 15    | 16   | 16.45 | 0.00  | 14.98  | 19.07   |
| 16    | 16   | 16.45 | -0.18 | 14.98  | 19.07   |
| 16    | 17   | 17.63 | -0.20 | 17.15  | 29.74   |
| 17    | 17   | 17.63 | -0.20 | 17.15  | 29.74   |
| 17    | 18   | 18.80 | -0.23 | 19.57  | 8.13    |
| 18    | 18   | 18.80 | 0.00  | 19.57  | 8.13    |
| 18    | 19   | 19.98 | 0.00  | 21.87  | -16.66  |
| 19    | 19   | 19.98 | 0.00  | 21.87  | -16.66  |
| 19    | 20   | 21.15 | 0.00  | 24.04  | -44.10  |
| 20    | 20   | 21.15 | 0.00  | 24.04  | -44.10  |
| 20    | 21   | 22.33 | 0.00  | 26.07  | -73.69  |
| 21    | 21   | 22.33 | 0.00  | 26.07  | -73.69  |
| 21    | 22   | 22.50 | 0.00  | 26.07  | -78.25  |
| 22    | 22   | 22.50 | 0.00  | 26.07  | -78.25  |
| 22    | 23   | 23.50 | 0.00  | 27.97  | -104.88 |
| 23    | 1023 | 23.50 | 0.00  | 3.45   | 21.86   |
| 23    | 24   | 24.50 | 0.00  | 3.45   | 18.41   |
| 24    | 24   | 24.50 | 0.00  | 3.45   | 18.41   |
| 24    | 25   | 24.95 | 0.00  | 3.45   | 16.85   |
| 25    | 25   | 24.95 | 0.00  | 3.45   | 16.85   |
| 25    | 26   | 26.40 | 0.00  | 3.45   | 11.85   |
| 26    | 26   | 26.40 | 0.00  | 3.45   | 11.85   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

TREN30.EnvTrenGen.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [ 0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [ 0; 1]TRE

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | 3.45   | 6.84    |
| 27    | 27   | 27.85 | 0.00  | 3.45   | 6.84    |
| 27    | 28   | 29.30 | 0.00  | 3.45   | 1.84    |
| 28    | 28   | 29.30 | 0.03  | 3.45   | 1.84    |
| 28    | 29   | 30.75 | 0.03  | 3.45   | -3.17   |
| 29    | 29   | 30.75 | 0.03  | 3.45   | -3.17   |
| 29    | 30   | 32.20 | 0.03  | 3.45   | -8.17   |
| 30    | 30   | 32.20 | 0.00  | 3.45   | -8.17   |
| 30    | 31   | 33.65 | 0.00  | 3.45   | -13.18  |
| 31    | 31   | 33.65 | 0.00  | 3.45   | -13.18  |
| 31    | 32   | 35.10 | 0.00  | 3.45   | -18.18  |
| 32    | 32   | 35.10 | 0.00  | 3.45   | -18.18  |
| 32    | 33   | 36.55 | 0.00  | 3.45   | -23.18  |
| 33    | 33   | 36.55 | 0.00  | 3.45   | -23.18  |
| 33    | 34   | 38.00 | 0.00  | 4.80   | 47.09   |
| 34    | 34   | 38.00 | 0.00  | 4.80   | 47.09   |
| 34    | 35   | 39.45 | 0.00  | 5.93   | 49.87   |
| 35    | 35   | 39.45 | 0.00  | 5.93   | 49.87   |
| 35    | 36   | 40.90 | 0.00  | 8.35   | 77.07   |
| 36    | 36   | 40.90 | 0.00  | 8.35   | 77.07   |
| 36    | 37   | 42.35 | 0.00  | 10.83  | 76.44   |
| 37    | 37   | 42.35 | 0.00  | 10.83  | 76.44   |
| 37    | 38   | 43.80 | 0.00  | 13.40  | 58.02   |
| 38    | 38   | 43.80 | -0.13 | 13.40  | 58.02   |
| 38    | 39   | 45.25 | -0.15 | 15.85  | 35.56   |
| 39    | 39   | 45.25 | -0.15 | 15.85  | 35.56   |
| 39    | 40   | 46.70 | -0.18 | 18.33  | 23.62   |
| 40    | 40   | 46.70 | 0.00  | 18.33  | 23.62   |
| 40    | 41   | 48.15 | 0.00  | 20.90  | -5.97   |
| 41    | 41   | 48.15 | 0.00  | 20.90  | -5.97   |
| 41    | 42   | 49.60 | 0.00  | 23.35  | -39.10  |
| 42    | 42   | 49.60 | 0.00  | 23.35  | -39.10  |
| 42    | 43   | 51.05 | 0.00  | 25.83  | -62.36  |
| 43    | 43   | 51.05 | 0.00  | 25.83  | -62.36  |
| 43    | 44   | 51.50 | 0.00  | 25.83  | -73.98  |
| 44    | 44   | 51.50 | 0.00  | 25.83  | -73.98  |
| 44    | 45   | 52.50 | 0.00  | 28.92  | -75.65  |
| 45    | 1045 | 52.50 | 0.00  | 4.24   | 26.34   |
| 45    | 46   | 53.50 | 0.00  | 4.24   | 22.09   |
| 46    | 46   | 53.50 | 0.00  | 4.24   | 22.09   |
| 46    | 47   | 53.95 | 0.00  | 4.24   | 20.18   |
| 47    | 47   | 53.95 | 0.00  | 4.24   | 20.18   |
| 47    | 48   | 55.40 | 0.00  | 4.24   | 14.03   |
| 48    | 48   | 55.40 | 0.00  | 4.24   | 14.03   |
| 48    | 49   | 56.85 | 0.00  | 4.24   | 7.87    |
| 49    | 49   | 56.85 | 0.00  | 4.24   | 7.87    |
| 49    | 50   | 58.30 | 0.00  | 4.24   | 1.72    |
| 50    | 50   | 58.30 | 0.04  | 4.24   | 1.72    |
| 50    | 51   | 59.75 | 0.04  | 4.24   | -4.44   |
| 51    | 51   | 59.75 | 0.04  | 4.24   | -4.44   |
| 51    | 52   | 61.20 | 0.04  | 4.24   | -10.59  |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

TREN30.EnvTrenGen.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [ 0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [ 0; 1]TRE

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | 4.24   | -10.59  |
| 52    | 53   | 62.65 | 0.00  | 4.24   | -16.75  |
| 53    | 53   | 62.65 | 0.00  | 4.24   | -16.75  |
| 53    | 54   | 64.10 | 0.00  | 4.24   | -22.90  |
| 54    | 54   | 64.10 | 0.00  | 4.24   | -22.90  |
| 54    | 55   | 65.55 | 0.00  | 4.24   | -29.06  |
| 55    | 55   | 65.55 | 0.00  | 4.24   | -29.06  |
| 55    | 56   | 67.00 | 0.00  | 4.51   | 45.22   |
| 56    | 56   | 67.00 | 0.00  | 4.51   | 45.22   |
| 56    | 57   | 68.45 | 0.00  | 5.94   | 89.77   |
| 57    | 57   | 68.45 | 0.00  | 5.94   | 89.77   |
| 57    | 58   | 69.90 | 0.00  | 8.42   | 77.49   |
| 58    | 58   | 69.90 | 0.00  | 8.42   | 77.49   |
| 58    | 59   | 71.35 | 0.00  | 10.85  | 77.63   |
| 59    | 59   | 71.35 | 0.00  | 10.85  | 77.63   |
| 59    | 60   | 72.80 | 0.00  | 13.44  | 58.75   |
| 60    | 60   | 72.80 | -0.13 | 13.44  | 58.75   |
| 60    | 61   | 74.25 | -0.15 | 15.92  | 35.68   |
| 61    | 61   | 74.25 | -0.15 | 15.92  | 35.68   |
| 61    | 62   | 75.70 | -0.18 | 18.35  | 24.71   |
| 62    | 62   | 75.70 | 0.00  | 18.35  | 24.71   |
| 62    | 63   | 77.15 | 0.00  | 20.94  | -5.42   |
| 63    | 63   | 77.15 | 0.00  | 20.94  | -5.42   |
| 63    | 64   | 78.60 | 0.00  | 23.42  | -39.28  |
| 64    | 64   | 78.60 | 0.00  | 23.42  | -39.28  |
| 64    | 65   | 80.05 | 0.00  | 25.85  | -61.35  |
| 65    | 65   | 80.05 | 0.00  | 25.85  | -61.35  |
| 65    | 66   | 80.50 | 0.00  | 25.85  | -72.99  |
| 66    | 66   | 80.50 | 0.00  | 25.85  | -72.99  |
| 66    | 67   | 81.50 | 0.00  | 28.89  | -73.33  |
| 67    | 1067 | 81.50 | 0.00  | 3.72   | 25.81   |
| 67    | 68   | 82.50 | 0.00  | 3.72   | 22.09   |
| 68    | 68   | 82.50 | 0.00  | 3.72   | 22.09   |
| 68    | 69   | 83.08 | 0.00  | 3.72   | 19.95   |
| 69    | 69   | 83.08 | 0.00  | 3.72   | 19.95   |
| 69    | 70   | 84.65 | 0.00  | 3.72   | 14.08   |
| 70    | 70   | 84.65 | 0.00  | 3.72   | 14.08   |
| 70    | 71   | 86.23 | 0.00  | 3.72   | 8.21    |
| 71    | 71   | 86.23 | 0.00  | 3.72   | 8.21    |
| 71    | 72   | 87.80 | 0.00  | 3.72   | 2.35    |
| 72    | 72   | 87.80 | 0.03  | 3.72   | 2.35    |
| 72    | 73   | 89.38 | 0.03  | 3.72   | -3.52   |
| 73    | 73   | 89.38 | 0.03  | 3.72   | -3.52   |
| 73    | 74   | 90.95 | 0.03  | 3.72   | -9.39   |
| 74    | 74   | 90.95 | 0.00  | 3.72   | -9.39   |
| 74    | 75   | 92.53 | 0.00  | 3.72   | -15.25  |
| 75    | 75   | 92.53 | 0.00  | 3.72   | -15.25  |
| 75    | 76   | 94.10 | 0.00  | 3.72   | -21.12  |
| 76    | 76   | 94.10 | 0.00  | 3.72   | -21.12  |
| 76    | 77   | 95.68 | 0.00  | 4.08   | 49.15   |
| 77    | 77   | 95.68 | 0.00  | 4.08   | 49.15   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

TREN30.EnvTrenGen.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [ 0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [ 0; 1]TRE

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | 5.14   | 53.97   |
| 78    | 78   | 97.25  | 0.00  | 5.14   | 53.97   |
| 78    | 79   | 98.83  | 0.00  | 6.96   | 62.77   |
| 79    | 79   | 98.83  | 0.00  | 6.96   | 62.77   |
| 79    | 80   | 100.40 | 0.00  | 8.96   | 67.89   |
| 80    | 80   | 100.40 | 0.00  | 8.96   | 67.89   |
| 80    | 81   | 101.98 | 0.00  | 11.29  | 74.42   |
| 81    | 81   | 101.98 | 0.00  | 11.29  | 74.42   |
| 81    | 82   | 103.55 | 0.00  | 13.87  | 71.55   |
| 82    | 82   | 103.55 | -0.12 | 13.87  | 71.55   |
| 82    | 83   | 105.13 | -0.15 | 16.60  | 70.42   |
| 83    | 83   | 105.13 | -0.15 | 16.60  | 70.42   |
| 83    | 84   | 106.70 | -0.17 | 19.46  | 48.05   |
| 84    | 84   | 106.70 | 0.00  | 19.46  | 48.05   |
| 84    | 85   | 108.28 | 0.00  | 22.36  | 19.30   |
| 85    | 85   | 108.28 | 0.00  | 22.36  | 19.30   |
| 85    | 86   | 109.85 | 0.00  | 25.27  | -15.58  |
| 86    | 86   | 109.85 | 0.00  | 25.27  | -15.58  |
| 86    | 87   | 111.43 | 0.00  | 28.15  | -56.22  |
| 87    | 87   | 111.43 | 0.00  | 28.15  | -56.22  |
| 87    | 88   | 112.00 | 0.00  | 28.87  | -84.61  |
| 88    | 88   | 112.00 | 0.00  | 28.87  | -84.61  |
| 88    | 89   | 113.00 | 0.00  | 31.25  | -91.12  |
| 89    | 1089 | 113.00 | 0.00  | 2.31   | 15.58   |
| 89    | 90   | 114.00 | 0.00  | 2.31   | 13.27   |
| 90    | 90   | 114.00 | 0.00  | 2.31   | 13.27   |
| 90    | 91   | 114.58 | 0.00  | 2.31   | 11.94   |
| 91    | 91   | 114.58 | 0.00  | 2.31   | 11.94   |
| 91    | 92   | 116.15 | 0.00  | 2.31   | 8.30    |
| 92    | 92   | 116.15 | 0.00  | 2.31   | 8.30    |
| 92    | 93   | 117.73 | 0.00  | 2.31   | 4.66    |
| 93    | 93   | 117.73 | 0.00  | 2.31   | 4.66    |
| 93    | 94   | 119.30 | 0.00  | 2.31   | 1.03    |
| 94    | 94   | 119.30 | 0.02  | 2.31   | 1.03    |
| 94    | 95   | 120.88 | 0.02  | 2.31   | -2.61   |
| 95    | 95   | 120.88 | 0.02  | 2.31   | -2.61   |
| 95    | 96   | 122.45 | 0.02  | 2.31   | -6.25   |
| 96    | 96   | 122.45 | 0.00  | 2.31   | -6.25   |
| 96    | 97   | 124.03 | 0.00  | 2.31   | -9.89   |
| 97    | 97   | 124.03 | 0.00  | 2.31   | -9.89   |
| 97    | 98   | 125.60 | 0.00  | 2.31   | -13.53  |
| 98    | 98   | 125.60 | 0.00  | 2.31   | -13.53  |
| 98    | 99   | 127.18 | 0.00  | 3.93   | 46.65   |
| 99    | 99   | 127.18 | 0.00  | 3.93   | 46.65   |
| 99    | 100  | 128.75 | 0.00  | 5.04   | 51.89   |
| 100   | 100  | 128.75 | 0.00  | 5.04   | 51.89   |
| 100   | 101  | 130.33 | 0.00  | 6.95   | 60.99   |
| 101   | 101  | 130.33 | 0.00  | 6.95   | 60.99   |
| 101   | 102  | 131.90 | 0.00  | 9.14   | 113.71  |
| 102   | 102  | 131.90 | 0.00  | 9.14   | 113.71  |
| 102   | 103  | 133.48 | 0.00  | 11.51  | 90.82   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

TREN30.EnvTrenGen.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [ 0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [ 0; 1]TRE

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | 11.51  | 90.82   |
| 103   | 104  | 135.05 | 0.00  | 14.14  | 83.19   |
| 104   | 104  | 135.05 | -0.12 | 14.14  | 83.19   |
| 104   | 105  | 136.63 | -0.15 | 16.97  | 66.46   |
| 105   | 105  | 136.63 | -0.15 | 16.97  | 66.46   |
| 105   | 106  | 138.20 | -0.18 | 19.85  | 43.37   |
| 106   | 106  | 138.20 | 0.00  | 19.85  | 43.37   |
| 106   | 107  | 139.78 | 0.00  | 22.76  | 14.00   |
| 107   | 107  | 139.78 | 0.00  | 22.76  | 14.00   |
| 107   | 108  | 141.35 | 0.00  | 25.66  | -21.33  |
| 108   | 108  | 141.35 | 0.00  | 25.66  | -21.33  |
| 108   | 109  | 142.93 | 0.00  | 28.51  | -62.15  |
| 109   | 109  | 142.93 | 0.00  | 28.51  | -62.15  |
| 109   | 110  | 143.50 | 0.00  | 29.09  | -87.81  |
| 110   | 110  | 143.50 | 0.00  | 29.09  | -87.81  |
| 110   | 111  | 144.50 | 0.00  | 31.64  | -98.21  |
| 111   | 111  | 144.50 | 0.00  | 1.14   | 26.79   |
| 111   | 112  | 145.50 | 0.00  | 1.14   | 25.65   |
| 112   | 112  | 145.50 | 0.00  | 1.14   | 25.65   |
| 112   | 113  | 145.68 | 0.00  | 1.14   | 25.45   |
| 113   | 113  | 145.68 | 0.00  | 1.14   | 25.45   |
| 113   | 114  | 146.85 | 0.00  | 1.14   | 24.11   |
| 114   | 114  | 146.85 | 0.00  | 1.14   | 24.11   |
| 114   | 115  | 148.03 | 0.00  | 1.14   | 22.77   |
| 115   | 115  | 148.03 | 0.00  | 1.14   | 22.77   |
| 115   | 116  | 149.20 | 0.00  | 1.14   | 21.43   |
| 116   | 116  | 149.20 | 0.01  | 1.14   | 21.43   |
| 116   | 117  | 150.38 | 0.01  | 1.14   | 20.10   |
| 117   | 117  | 150.38 | 0.01  | 1.14   | 20.10   |
| 117   | 118  | 151.55 | 0.01  | 1.14   | 18.76   |
| 118   | 118  | 151.55 | 0.00  | 1.14   | 18.76   |
| 118   | 119  | 152.73 | 0.00  | 1.14   | 17.42   |
| 119   | 119  | 152.73 | 0.00  | 1.14   | 17.42   |
| 119   | 120  | 153.90 | 0.00  | 1.14   | 16.08   |
| 120   | 120  | 153.90 | 0.00  | 1.14   | 16.08   |
| 120   | 121  | 155.08 | 0.00  | 1.14   | 14.74   |
| 121   | 121  | 155.08 | 0.00  | 1.14   | 14.74   |
| 121   | 122  | 156.25 | 0.00  | 1.14   | 13.40   |
| 122   | 122  | 156.25 | 0.00  | 1.14   | 13.40   |
| 122   | 123  | 157.43 | 0.00  | 3.14   | 96.56   |
| 123   | 123  | 157.43 | 0.00  | 3.14   | 96.56   |
| 123   | 124  | 158.60 | 0.00  | 4.62   | 43.45   |
| 124   | 124  | 158.60 | 0.00  | 4.62   | 43.45   |
| 124   | 125  | 159.78 | 0.00  | 6.97   | 88.51   |
| 125   | 125  | 159.78 | 0.00  | 6.97   | 88.51   |
| 125   | 126  | 160.95 | 0.00  | 9.02   | 85.92   |
| 126   | 126  | 160.95 | 0.00  | 9.02   | 85.92   |
| 126   | 127  | 162.13 | 0.00  | 11.15  | 79.06   |
| 127   | 127  | 162.13 | 0.00  | 11.15  | 79.06   |
| 127   | 128  | 163.30 | 0.00  | 13.37  | 67.56   |
| 128   | 128  | 163.30 | 0.00  | 13.37  | 67.56   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

TREN30.EnvTrenGen.VY+

Envolvente de tren de cargas plano genérico. VY+

[ 0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [ 0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [ 0; 1]TRE

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 15.45  | 54.46   |
| 129   | 129  | 164.48 | 0.00  | 15.45  | 54.46   |
| 129   | 130  | 165.65 | 0.00  | 17.35  | 40.77   |
| 130   | 130  | 165.65 | 0.00  | 17.35  | 40.77   |
| 130   | 131  | 166.83 | 0.00  | 19.31  | 22.69   |
| 131   | 131  | 166.83 | 0.00  | 19.31  | 22.69   |
| 131   | 132  | 167.00 | 0.00  | 19.61  | 19.61   |
| 132   | 132  | 167.00 | 0.00  | 19.61  | 19.61   |
| 132   | 133  | 168.00 | 0.00  | 21.33  | 0.00    |

**CÁLCULO TENSIONAL**

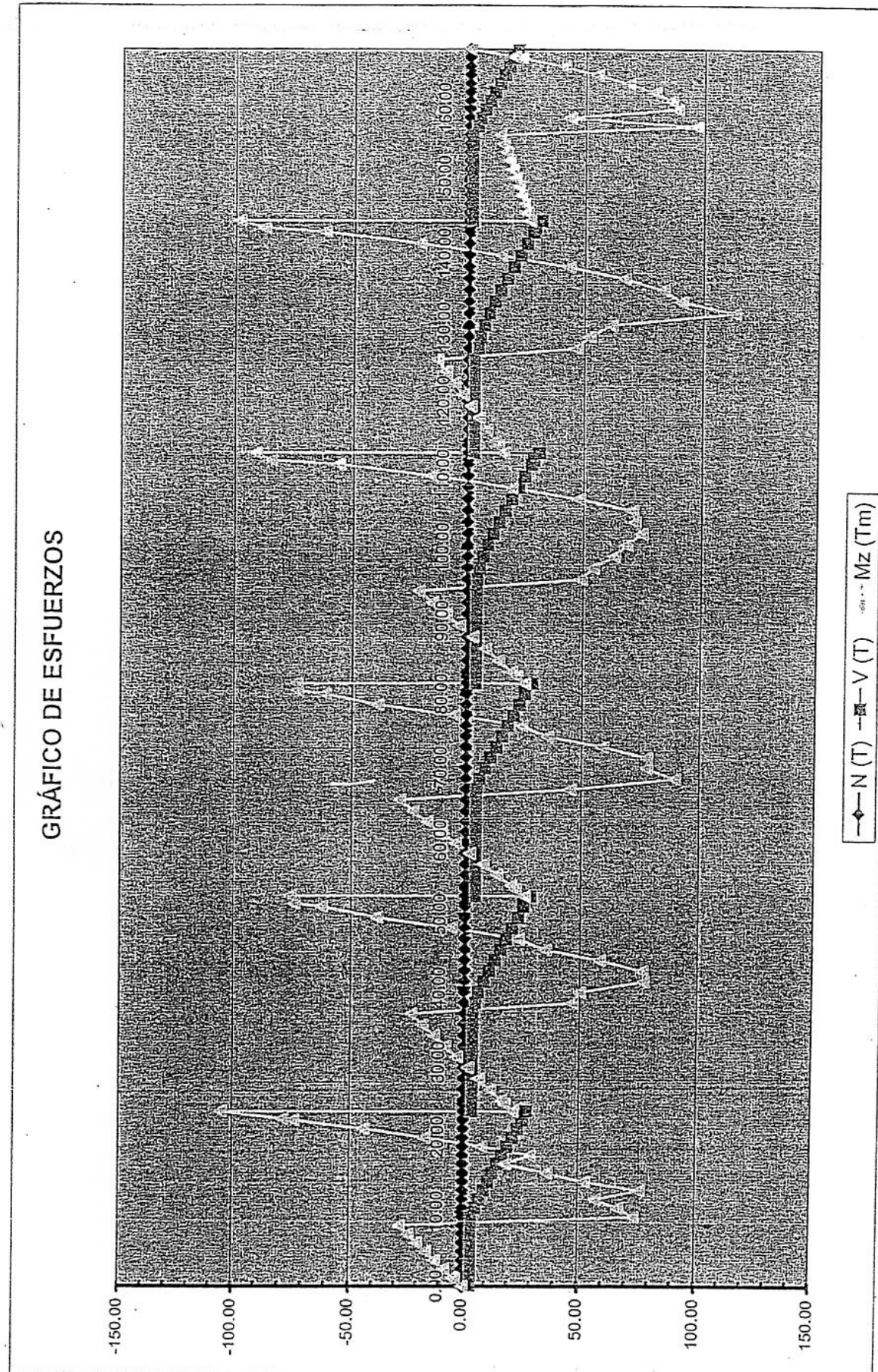
Hipótesis de cálculo:

TREN30.EnvTrenGen.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [0; 1]TRE

Coef. exc:



| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 1     | 1    | 0.00  | 0.00  | 0.00   | 0.00    |
| 1     | 2    | 1.00  | 0.00  | -19.53 | 19.53   |
| 2     | 2    | 1.00  | 0.00  | -19.53 | 19.53   |
| 2     | 3    | 1.18  | 0.00  | -19.21 | 22.57   |
| 3     | 3    | 1.18  | 0.00  | -19.21 | 22.57   |
| 3     | 4    | 2.35  | 0.00  | -17.24 | 40.52   |
| 4     | 4    | 2.35  | 0.00  | -17.24 | 40.52   |
| 4     | 5    | 3.53  | 0.00  | -15.34 | 54.08   |
| 5     | 5    | 3.53  | 0.00  | -15.34 | 54.08   |
| 5     | 6    | 4.70  | 0.00  | -13.26 | 67.06   |
| 6     | 6    | 4.70  | 0.00  | -13.26 | 67.06   |
| 6     | 7    | 5.88  | 0.00  | -11.05 | 78.44   |
| 7     | 7    | 5.88  | 0.00  | -11.05 | 78.44   |
| 7     | 8    | 7.05  | 0.00  | -2.24  | 86.30   |
| 8     | 8    | 7.05  | 0.00  | -2.24  | 86.30   |
| 8     | 9    | 8.23  | 0.00  | -0.34  | 90.93   |
| 9     | 9    | 8.23  | 0.00  | -0.34  | 90.93   |
| 9     | 10   | 9.40  | 0.00  | 1.74   | 94.15   |
| 10    | 10   | 9.40  | 0.00  | 1.74   | 94.15   |
| 10    | 11   | 10.58 | 0.00  | -3.04  | 95.45   |
| 11    | 11   | 10.58 | 0.00  | -3.04  | 95.45   |
| 11    | 12   | 11.75 | 0.00  | -0.34  | 92.14   |
| 12    | 12   | 11.75 | 0.00  | -0.34  | 92.14   |
| 12    | 13   | 12.93 | 0.00  | 1.74   | 88.02   |
| 13    | 13   | 12.93 | 0.00  | 1.74   | 88.02   |
| 13    | 14   | 14.10 | 0.00  | 9.24   | 81.26   |
| 14    | 14   | 14.10 | 0.00  | 9.24   | 81.26   |
| 14    | 15   | 15.28 | 0.00  | 5.26   | 73.58   |
| 15    | 15   | 15.28 | 0.00  | 5.26   | 73.58   |
| 15    | 16   | 16.45 | 0.00  | 7.16   | 62.58   |
| 16    | 16   | 16.45 | -0.08 | 7.16   | 62.58   |
| 16    | 17   | 17.63 | -0.11 | 9.24   | 48.70   |
| 17    | 17   | 17.63 | -0.11 | 9.24   | 48.70   |
| 17    | 18   | 18.80 | -0.14 | 11.45  | 31.43   |
| 18    | 18   | 18.80 | 0.00  | 11.45  | 31.43   |
| 18    | 19   | 19.98 | 0.00  | -0.93  | 18.58   |
| 19    | 19   | 19.98 | 0.00  | -0.93  | 18.58   |
| 19    | 20   | 21.15 | 0.00  | -0.93  | 19.67   |
| 20    | 20   | 21.15 | 0.00  | -0.93  | 19.67   |
| 20    | 21   | 22.33 | 0.00  | -0.93  | 20.76   |
| 21    | 21   | 22.33 | 0.00  | -0.93  | 20.76   |
| 21    | 22   | 22.50 | 0.00  | -0.93  | 20.93   |
| 22    | 22   | 22.50 | 0.00  | -0.93  | 20.93   |
| 22    | 23   | 23.50 | 0.00  | -0.93  | 21.86   |
| 23    | 1023 | 23.50 | 0.00  | 3.45   | 21.86   |
| 23    | 24   | 24.50 | 0.00  | 3.45   | 18.41   |
| 24    | 24   | 24.50 | 0.00  | 3.45   | 18.41   |
| 24    | 25   | 24.95 | 0.00  | 3.45   | 16.85   |
| 25    | 25   | 24.95 | 0.00  | 3.45   | 16.85   |
| 25    | 26   | 26.40 | 0.00  | 3.45   | 11.85   |
| 26    | 26   | 26.40 | 0.00  | 3.45   | 11.85   |



**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

TREN30.EnvTrenGen.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [0; 1]TRE

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 26    | 27   | 27.85 | 0.00  | -14.32 | 15.26   |
| 27    | 27   | 27.85 | 0.00  | -14.32 | 15.26   |
| 27    | 28   | 29.30 | 0.00  | -12.32 | 38.39   |
| 28    | 28   | 29.30 | -0.12 | -12.32 | 38.39   |
| 28    | 29   | 30.75 | -0.09 | -9.55  | 58.71   |
| 29    | 29   | 30.75 | -0.09 | -9.55  | 58.71   |
| 29    | 30   | 32.20 | -0.06 | -6.65  | 75.67   |
| 30    | 30   | 32.20 | 0.00  | -6.65  | 75.67   |
| 30    | 31   | 33.65 | 0.00  | -4.82  | 87.34   |
| 31    | 31   | 33.65 | 0.00  | -4.82  | 87.34   |
| 31    | 32   | 35.10 | 0.00  | -8.58  | 96.89   |
| 32    | 32   | 35.10 | 0.00  | -8.58  | 96.89   |
| 32    | 33   | 36.55 | 0.00  | 0.85   | 103.17  |
| 33    | 33   | 36.55 | 0.00  | 0.85   | 103.17  |
| 33    | 34   | 38.00 | 0.00  | -2.90  | 103.20  |
| 34    | 34   | 38.00 | 0.00  | -2.90  | 103.20  |
| 34    | 35   | 39.45 | 0.00  | -1.08  | 103.52  |
| 35    | 35   | 39.45 | 0.00  | -1.08  | 103.52  |
| 35    | 36   | 40.90 | 0.00  | 8.35   | 97.51   |
| 36    | 36   | 40.90 | 0.00  | 8.35   | 97.51   |
| 36    | 37   | 42.35 | 0.00  | 4.60   | 88.37   |
| 37    | 37   | 42.35 | 0.00  | 4.60   | 88.37   |
| 37    | 38   | 43.80 | 0.00  | 6.42   | 76.99   |
| 38    | 38   | 43.80 | -0.06 | 6.42   | 76.99   |
| 38    | 39   | 45.25 | -0.09 | 9.34   | 60.38   |
| 39    | 39   | 45.25 | -0.09 | 9.34   | 60.38   |
| 39    | 40   | 46.70 | -0.12 | 12.10  | 40.39   |
| 40    | 40   | 46.70 | 0.00  | 12.10  | 40.39   |
| 40    | 41   | 48.15 | 0.00  | -1.16  | 21.28   |
| 41    | 41   | 48.15 | 0.00  | -1.16  | 21.28   |
| 41    | 42   | 49.60 | 0.00  | -1.16  | 22.97   |
| 42    | 42   | 49.60 | 0.00  | -1.16  | 22.97   |
| 42    | 43   | 51.05 | 0.00  | -1.16  | 24.65   |
| 43    | 43   | 51.05 | 0.00  | -1.16  | 24.65   |
| 43    | 44   | 51.50 | 0.00  | -1.16  | 25.18   |
| 44    | 44   | 51.50 | 0.00  | -1.16  | 25.18   |
| 44    | 45   | 52.50 | 0.00  | -1.16  | 26.34   |
| 45    | 1045 | 52.50 | 0.00  | 4.24   | 26.34   |
| 45    | 46   | 53.50 | 0.00  | 4.24   | 22.09   |
| 46    | 46   | 53.50 | 0.00  | 4.24   | 22.09   |
| 46    | 47   | 53.95 | 0.00  | 4.24   | 20.18   |
| 47    | 47   | 53.95 | 0.00  | 4.24   | 20.18   |
| 47    | 48   | 55.40 | 0.00  | 0.70   | 14.14   |
| 48    | 48   | 55.40 | 0.00  | 0.70   | 14.14   |
| 48    | 49   | 56.85 | 0.00  | -14.32 | 16.80   |
| 49    | 49   | 56.85 | 0.00  | -14.32 | 16.80   |
| 49    | 50   | 58.30 | 0.00  | -12.34 | 40.00   |
| 50    | 50   | 58.30 | -0.12 | -12.34 | 40.00   |
| 50    | 51   | 59.75 | -0.09 | -9.56  | 60.31   |
| 51    | 51   | 59.75 | -0.09 | -9.56  | 60.31   |
| 51    | 52   | 61.20 | -0.06 | -6.68  | 77.33   |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

TREN30.EnvTrenGen.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [0; 1]TRE

Coef. exc:

| Barra | Nudo | X     | N (T) | Vy (T) | Mz (Tm) |
|-------|------|-------|-------|--------|---------|
| 52    | 52   | 61.20 | 0.00  | -6.68  | 77.33   |
| 52    | 53   | 62.65 | 0.00  | -4.84  | 89.03   |
| 53    | 53   | 62.65 | 0.00  | -4.84  | 89.03   |
| 53    | 54   | 64.10 | 0.00  | -8.61  | 98.62   |
| 54    | 54   | 64.10 | 0.00  | -8.61  | 98.62   |
| 54    | 55   | 65.55 | 0.00  | 0.82   | 104.95  |
| 55    | 55   | 65.55 | 0.00  | 0.82   | 104.95  |
| 55    | 56   | 67.00 | 0.00  | -2.94  | 105.01  |
| 56    | 56   | 67.00 | 0.00  | -2.94  | 105.01  |
| 56    | 57   | 68.45 | 0.00  | -1.11  | 105.40  |
| 57    | 57   | 68.45 | 0.00  | -1.11  | 105.40  |
| 57    | 58   | 69.90 | 0.00  | 8.32   | 99.42   |
| 58    | 58   | 69.90 | 0.00  | 8.32   | 99.42   |
| 58    | 59   | 71.35 | 0.00  | 4.56   | 90.35   |
| 59    | 59   | 71.35 | 0.00  | 4.56   | 90.35   |
| 59    | 60   | 72.80 | 0.00  | 6.39   | 79.02   |
| 60    | 60   | 72.80 | -0.06 | 6.39   | 79.02   |
| 60    | 61   | 74.25 | -0.09 | 9.29   | 62.44   |
| 61    | 61   | 74.25 | -0.09 | 9.29   | 62.44   |
| 61    | 62   | 75.70 | -0.12 | 12.06  | 42.54   |
| 62    | 62   | 75.70 | 0.00  | 12.06  | 42.54   |
| 62    | 63   | 77.15 | 0.00  | -1.13  | 20.89   |
| 63    | 63   | 77.15 | 0.00  | -1.13  | 20.89   |
| 63    | 64   | 78.60 | 0.00  | -1.13  | 22.53   |
| 64    | 64   | 78.60 | 0.00  | -1.13  | 22.53   |
| 64    | 65   | 80.05 | 0.00  | -1.13  | 24.17   |
| 65    | 65   | 80.05 | 0.00  | -1.13  | 24.17   |
| 65    | 66   | 80.50 | 0.00  | -1.13  | 24.68   |
| 66    | 66   | 80.50 | 0.00  | -1.13  | 24.68   |
| 66    | 67   | 81.50 | 0.00  | -1.13  | 25.81   |
| 67    | 1067 | 81.50 | 0.00  | 3.72   | 25.81   |
| 67    | 68   | 82.50 | 0.00  | 3.72   | 22.09   |
| 68    | 68   | 82.50 | 0.00  | 3.72   | 22.09   |
| 68    | 69   | 83.08 | 0.00  | 3.72   | 19.95   |
| 69    | 69   | 83.08 | 0.00  | 3.72   | 19.95   |
| 69    | 70   | 84.65 | 0.00  | 0.81   | 17.43   |
| 70    | 70   | 84.65 | 0.00  | 0.81   | 17.43   |
| 70    | 71   | 86.23 | 0.00  | -22.64 | 16.32   |
| 71    | 71   | 86.23 | 0.00  | -22.64 | 16.32   |
| 71    | 72   | 87.80 | 0.00  | -19.73 | 45.49   |
| 72    | 72   | 87.80 | -0.17 | -19.73 | 45.49   |
| 72    | 73   | 89.38 | -0.15 | -16.85 | 68.34   |
| 73    | 73   | 89.38 | -0.15 | -16.85 | 68.34   |
| 73    | 74   | 90.95 | -0.07 | -7.64  | 89.37   |
| 74    | 74   | 90.95 | 0.00  | -7.64  | 89.37   |
| 74    | 75   | 92.53 | 0.00  | -4.73  | 104.82  |
| 75    | 75   | 92.53 | 0.00  | -4.73  | 104.82  |
| 75    | 76   | 94.10 | 0.00  | -9.02  | 115.04  |
| 76    | 76   | 94.10 | 0.00  | -9.02  | 115.04  |
| 76    | 77   | 95.68 | 0.00  | -6.25  | 122.34  |
| 77    | 77   | 95.68 | 0.00  | -6.25  | 122.34  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

*TREN30.EnvTrenGen.MZ+**Envolvente de tren de cargas plano genérico. MZ+*

[ 0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [ 0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [ 0; 1]TRE

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 77    | 78   | 97.25  | 0.00  | -3.04  | 122.97  |
| 78    | 78   | 97.25  | 0.00  | -3.04  | 122.97  |
| 78    | 79   | 98.83  | 0.00  | 5.98   | 122.78  |
| 79    | 79   | 98.83  | 0.00  | 5.98   | 122.78  |
| 79    | 80   | 100.40 | 0.00  | 8.75   | 115.87  |
| 80    | 80   | 100.40 | 0.00  | 8.75   | 115.87  |
| 80    | 81   | 101.98 | 0.00  | 4.46   | 106.11  |
| 81    | 81   | 101.98 | 0.00  | 4.46   | 106.11  |
| 81    | 82   | 103.55 | 0.00  | 7.36   | 91.08   |
| 82    | 82   | 103.55 | -0.07 | 7.36   | 91.08   |
| 82    | 83   | 105.13 | -0.15 | 16.60  | 70.42   |
| 83    | 83   | 105.13 | -0.15 | 16.60  | 70.42   |
| 83    | 84   | 106.70 | -0.17 | 19.46  | 48.05   |
| 84    | 84   | 106.70 | 0.00  | 19.46  | 48.05   |
| 84    | 85   | 108.28 | 0.00  | 22.36  | 19.30   |
| 85    | 85   | 108.28 | 0.00  | 22.36  | 19.30   |
| 85    | 86   | 109.85 | 0.00  | -0.63  | 13.59   |
| 86    | 86   | 109.85 | 0.00  | -0.63  | 13.59   |
| 86    | 87   | 111.43 | 0.00  | -2.99  | 15.50   |
| 87    | 87   | 111.43 | 0.00  | -2.99  | 15.50   |
| 87    | 88   | 112.00 | 0.00  | -2.99  | 17.22   |
| 88    | 88   | 112.00 | 0.00  | -2.99  | 17.22   |
| 88    | 89   | 113.00 | 0.00  | -2.99  | 20.22   |
| 89    | 1089 | 113.00 | 0.00  | 0.83   | 20.22   |
| 89    | 90   | 114.00 | 0.00  | 0.83   | 19.39   |
| 90    | 90   | 114.00 | 0.00  | 0.83   | 19.39   |
| 90    | 91   | 114.58 | 0.00  | 0.83   | 18.91   |
| 91    | 91   | 114.58 | 0.00  | 0.83   | 18.91   |
| 91    | 92   | 116.15 | 0.00  | 0.83   | 17.61   |
| 92    | 92   | 116.15 | 0.00  | 0.83   | 17.61   |
| 92    | 93   | 117.73 | 0.00  | -22.24 | 19.70   |
| 93    | 93   | 117.73 | 0.00  | -22.24 | 19.70   |
| 93    | 94   | 119.30 | 0.00  | -19.34 | 48.25   |
| 94    | 94   | 119.30 | -0.17 | -19.34 | 48.25   |
| 94    | 95   | 120.88 | -0.15 | -16.49 | 70.44   |
| 95    | 95   | 120.88 | -0.15 | -16.49 | 70.44   |
| 95    | 96   | 122.45 | -0.06 | -7.24  | 90.89   |
| 96    | 96   | 122.45 | 0.00  | -7.24  | 90.89   |
| 96    | 97   | 124.03 | 0.00  | -4.34  | 105.75  |
| 97    | 97   | 124.03 | 0.00  | -4.34  | 105.75  |
| 97    | 98   | 125.60 | 0.00  | -8.63  | 115.30  |
| 98    | 98   | 125.60 | 0.00  | -8.63  | 115.30  |
| 98    | 99   | 127.18 | 0.00  | -5.86  | 122.03  |
| 99    | 99   | 127.18 | 0.00  | -5.86  | 122.03  |
| 99    | 100  | 128.75 | 0.00  | 3.16   | 122.04  |
| 100   | 100  | 128.75 | 0.00  | 3.16   | 122.04  |
| 100   | 101  | 130.33 | 0.00  | 6.37   | 121.18  |
| 101   | 101  | 130.33 | 0.00  | 6.37   | 121.18  |
| 101   | 102  | 131.90 | 0.00  | 9.14   | 113.71  |
| 102   | 102  | 131.90 | 0.00  | 9.14   | 113.71  |
| 102   | 103  | 133.48 | 0.00  | 4.85   | 103.28  |

**CÁLCULO TENSIONAL**

Hipótesis de cálculo:

*TREN30.EnvTrenGen.MZ+**Envolvente de tren de cargas plano genérico. MZ+*

[ 0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [ 0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [ 0; 1]TRE

Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 103   | 103  | 133.48 | 0.00  | 4.85   | 103.28  |
| 103   | 104  | 135.05 | 0.00  | 7.76   | 87.64   |
| 104   | 104  | 135.05 | -0.07 | 7.76   | 87.64   |
| 104   | 105  | 136.63 | -0.15 | 16.97  | 66.46   |
| 105   | 105  | 136.63 | -0.15 | 16.97  | 66.46   |
| 105   | 106  | 138.20 | -0.18 | 19.85  | 43.37   |
| 106   | 106  | 138.20 | 0.00  | 19.85  | 43.37   |
| 106   | 107  | 139.78 | 0.00  | 22.76  | 14.00   |
| 107   | 107  | 139.78 | 0.00  | 22.76  | 14.00   |
| 107   | 108  | 141.35 | 0.00  | -3.79  | 14.86   |
| 108   | 108  | 141.35 | 0.00  | -3.79  | 14.86   |
| 108   | 109  | 142.93 | 0.00  | -3.79  | 20.83   |
| 109   | 109  | 142.93 | 0.00  | -3.79  | 20.83   |
| 109   | 110  | 143.50 | 0.00  | -3.79  | 23.01   |
| 110   | 110  | 143.50 | 0.00  | -3.79  | 23.01   |
| 110   | 111  | 144.50 | 0.00  | -3.79  | 26.79   |
| 111   | 1111 | 144.50 | 0.00  | 1.14   | 26.79   |
| 111   | 112  | 145.50 | 0.00  | 1.14   | 25.65   |
| 112   | 112  | 145.50 | 0.00  | 1.14   | 25.65   |
| 112   | 113  | 145.68 | 0.00  | 1.14   | 25.45   |
| 113   | 113  | 145.68 | 0.00  | 1.14   | 25.45   |
| 113   | 114  | 146.85 | 0.00  | 1.14   | 24.11   |
| 114   | 114  | 146.85 | 0.00  | 1.14   | 24.11   |
| 114   | 115  | 148.03 | 0.00  | 1.14   | 22.77   |
| 115   | 115  | 148.03 | 0.00  | 1.14   | 22.77   |
| 115   | 116  | 149.20 | 0.00  | -11.35 | 33.41   |
| 116   | 116  | 149.20 | -0.13 | -11.35 | 33.41   |
| 116   | 117  | 150.38 | -0.11 | -9.13  | 50.58   |
| 117   | 117  | 150.38 | -0.11 | -9.13  | 50.58   |
| 117   | 118  | 151.55 | -0.08 | -7.05  | 64.34   |
| 118   | 118  | 151.55 | 0.00  | -7.05  | 64.34   |
| 118   | 119  | 152.73 | 0.00  | -5.15  | 75.19   |
| 119   | 119  | 152.73 | 0.00  | -5.15  | 75.19   |
| 119   | 120  | 153.90 | 0.00  | -9.13  | 82.76   |
| 120   | 120  | 153.90 | 0.00  | -9.13  | 82.76   |
| 120   | 121  | 155.08 | 0.00  | -1.63  | 89.40   |
| 121   | 121  | 155.08 | 0.00  | -1.63  | 89.40   |
| 121   | 122  | 156.25 | 0.00  | 0.45   | 93.39   |
| 122   | 122  | 156.25 | 0.00  | 0.45   | 93.39   |
| 122   | 123  | 157.43 | 0.00  | 3.14   | 96.56   |
| 123   | 123  | 157.43 | 0.00  | 3.14   | 96.56   |
| 123   | 124  | 158.60 | 0.00  | -1.63  | 95.15   |
| 124   | 124  | 158.60 | 0.00  | -1.63  | 95.15   |
| 124   | 125  | 159.78 | 0.00  | 0.45   | 91.81   |
| 125   | 125  | 159.78 | 0.00  | 0.45   | 91.81   |
| 125   | 126  | 160.95 | 0.00  | 2.35   | 87.05   |
| 126   | 126  | 160.95 | 0.00  | 2.35   | 87.05   |
| 126   | 127  | 162.13 | 0.00  | 11.15  | 79.06   |
| 127   | 127  | 162.13 | 0.00  | 11.15  | 79.06   |
| 127   | 128  | 163.30 | 0.00  | 13.37  | 67.56   |
| 128   | 128  | 163.30 | 0.00  | 13.37  | 67.56   |



CÁLCULO TENSIONAL

Hipótesis de cálculo:  
TREN30.EnvTrenGen.MZ+

Envolvente de tren de cargas plano genérico. MZ+

[0; 1]TREN30.PaseoTren.Nudo1.Pos2.Mx+ + [0; 1]TREN30.PaseoTren.Nudo1.Pos3.Mx+ + [0; 1]TRE  
Coef. exc:

| Barra | Nudo | X      | N (T) | Vy (T) | Mz (Tm) |
|-------|------|--------|-------|--------|---------|
| 128   | 129  | 164.48 | 0.00  | 15.45  | 54.46   |
| 129   | 129  | 164.48 | 0.00  | 15.45  | 54.46   |
| 129   | 130  | 165.65 | 0.00  | 17.35  | 40.77   |
| 130   | 130  | 165.65 | 0.00  | 17.35  | 40.77   |
| 130   | 131  | 166.83 | 0.00  | 19.31  | 22.69   |
| 131   | 131  | 166.83 | 0.00  | 19.31  | 22.69   |
| 131   | 132  | 167.00 | 0.00  | 19.61  | 19.61   |
| 132   | 132  | 167.00 | 0.00  | 19.61  | 19.61   |
| 132   | 133  | 168.00 | 0.00  | 0.00   | 0.00    |

16/08/01

Programa DINTEL IDEAM S.A.  
TREN30.EnvTrenGen.MZ+

GRÁFICO DE ESFUERZOS

