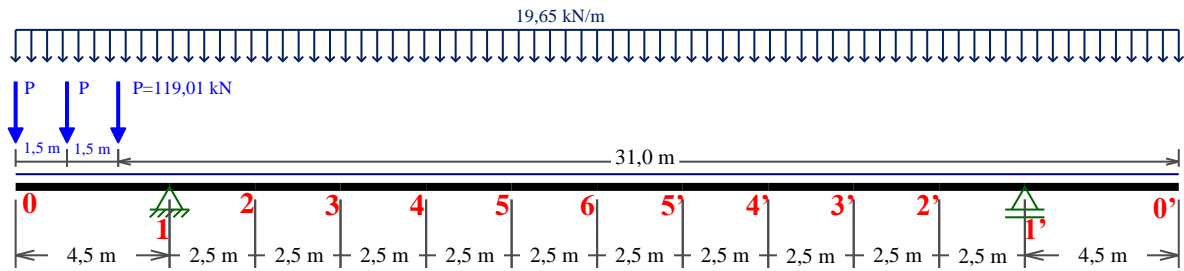
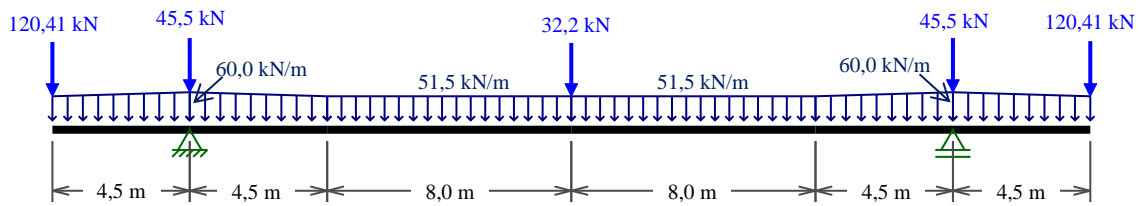


Trem-tipo:



Carga Permanente:



Reações de Apoio:

$$V_1 = V_{1'} = \frac{2 \times 120,41 + 2 \times 45,5 + 32,2 + 34 \times 51,5 + 2 \times \frac{9 \times 8,5}{2}}{2} = 1095,76 \text{ kN}$$

Esforços na seção 2:

$$\sum F_y = 0 \Rightarrow -120,41 - 45,5 - V_2 - 7 \times 51,5 - \frac{4,5 \times 8,5}{2} - \frac{2,5}{2} \times \left(8,5 + \frac{17}{4,5}\right) + 1095,76 = 0$$

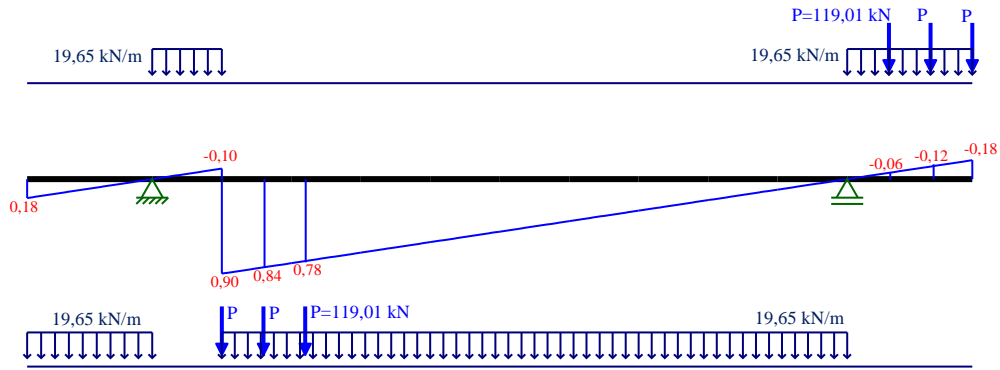
$$\therefore V_2 = 534,88 \text{ kN}$$

$$\sum M_z = 0 \Rightarrow 120,41 \times 7 + 45,5 \times 2,5 + M_2 + (7 \times 51,5) \times \frac{7}{2} + \left(\frac{4,5 \times 8,5}{2}\right) \times 4$$

$$+ \left[\frac{2,5}{2} \times \left(8,5 + \frac{17}{4,5}\right)\right] \times \left[\frac{2,5}{3} \times \left(\frac{17}{4,5} + 2 \times 8,5\right)\right] - 1095,76 \times 2,5 = 0$$

$$\therefore M_2 = 422,89 \text{ kN}$$

Linha de Influência de Esforço Cortante da seção 2:

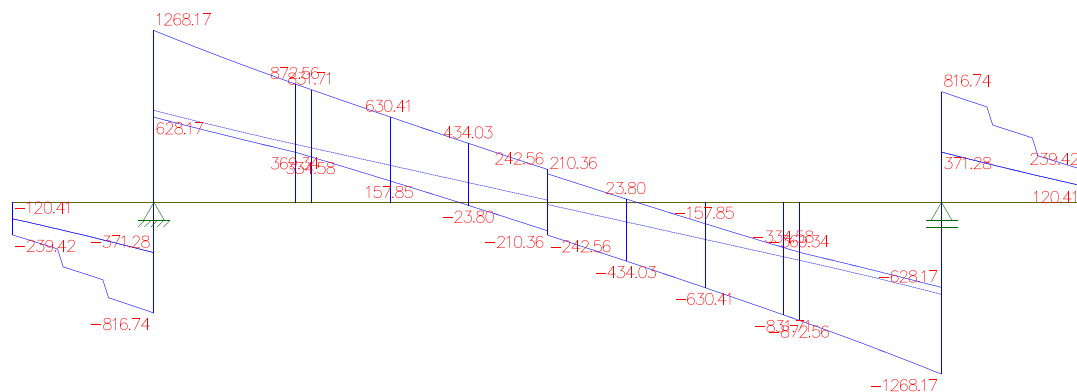


$$V_{\max}^- = 119,01 \times (-0,06 - 0,12 - 0,18) + 19,65 \times \left[\frac{2,5 \times (-0,10)}{2} + \frac{4,5 \times (-0,18)}{2} \right] = -53,26 \text{ kN}$$

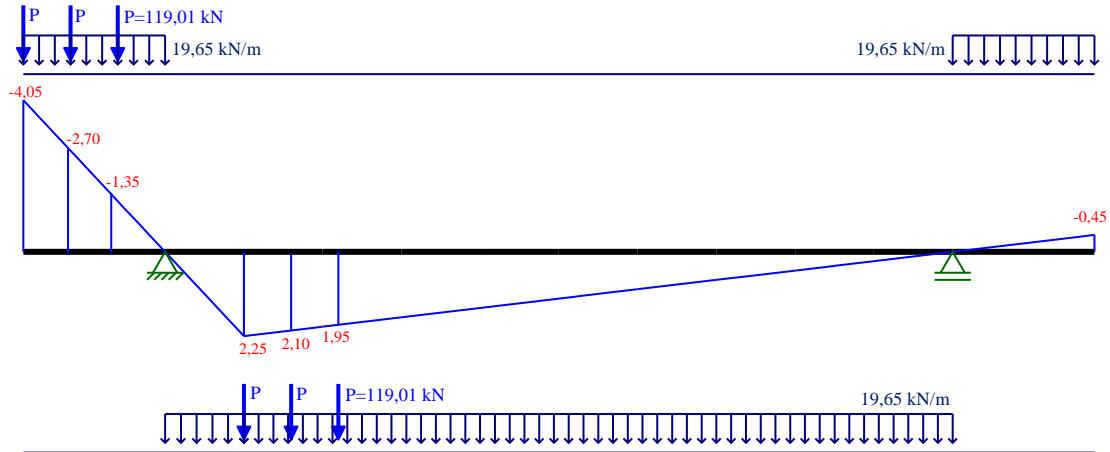
$$V_{\max}^+ = 119,01 \times (0,90 + 0,84 + 0,78) + 19,65 \times \left[\frac{22,5 \times (0,90)}{2} + \frac{4,5 \times (0,18)}{2} \right] = +506,82 \text{ kN}$$

Envoltória de Esforços Cortantes

Seção	Carga Permanente	Carga Móvel		Envoltória	
		+	-	+	-
0	-120,41	0,000	-119,01	-120,41	-239,42
1 _{esq}	-371,29	0,000	-445,46	-371,29	-816,75
1 _{dir}	+678,98	+589,19	-50,80	+1268,17	+628,18
2	+534,88	+506,82	-53,26	+1041,70	+481,62
3	+402,35	+429,36	-67,77	+831,71	+334,58
4	+273,60	+356,81	-115,75	+630,41	+157,85
5	+144,85	+289,18	-168,65	+434,03	-23,80
6 _{esq}	+16,10	+226,46	-226,46	+242,56	-210,36
6 _{dir}	-16,10	+226,46	-226,46	+210,36	-242,56
5'	-144,85	+168,65	-289,18	+23,80	-434,03
4'	-273,60	+115,75	-356,81	-157,85	-630,41
3'	-402,35	+67,77	-429,36	-334,58	-831,71
2'	-534,88	+53,26	-506,82	-481,62	-1041,70
1' _{esq}	-678,98	+50,80	-589,19	-628,18	-1268,17
1' _{dir}	+371,29	+445,46	0,000	+816,75	+371,29
0'	+120,41	+119,01	0,000	+239,42	+120,41



Linha de Influência de Momento Fletor da seção 2:



$$M_{\max}^- = 119,01 \times (-4,05 - 2,70 - 1,35) + 19,65 \times \left[\frac{4,5 \times (-4,05)}{2} + \frac{4,5 \times (-0,45)}{2} \right]$$

$$= -1162,94 \text{ kN.m}$$

$$M_{\max}^+ = 119,01 \times (2,25 + 2,10 + 1,95) + 19,65 \times \left(\frac{25 \times (2,25)}{2} \right) = +1302,42 \text{ kN.m}$$

Envoltória de Momentos Fletores

Seção	Carga Permanente	Carga Móvel		Envoltória	
		+	-	+	-
0	0,00	0,00	0,00	0,00	0,00
1	-1091,97	0,00	-1270,05	-1091,97	-2362,02
2	+422,89	+1302,42	-1162,94	+1725,31	-740,05
3	+1592,22	+2303,51	-1055,83	+3895,73	+536,39
4	+2437,16	+3003,28	-948,72	+5440,44	+1488,44
5	+2960,22	+3437,42	-841,61	+6397,64	+2118,61
6	+3161,41	+3588,08	-734,50	+6749,49	+2426,91
5'	+2960,22	+3437,42	-841,61	+6397,64	+2118,61
4'	+2437,16	+3003,28	-948,72	+5440,44	+1488,44
3'	+1592,22	+2303,51	-1055,83	+3895,73	+536,39
2'	+422,89	+1302,42	-1162,94	+1725,31	-740,05
1'	-1091,97	0,00	-1270,05	-1091,97	-2362,02
0'	0,00	0,00	0,00	0,00	0,00

