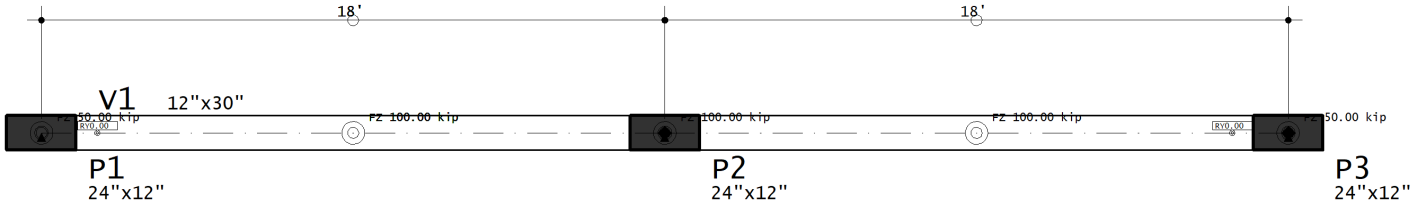
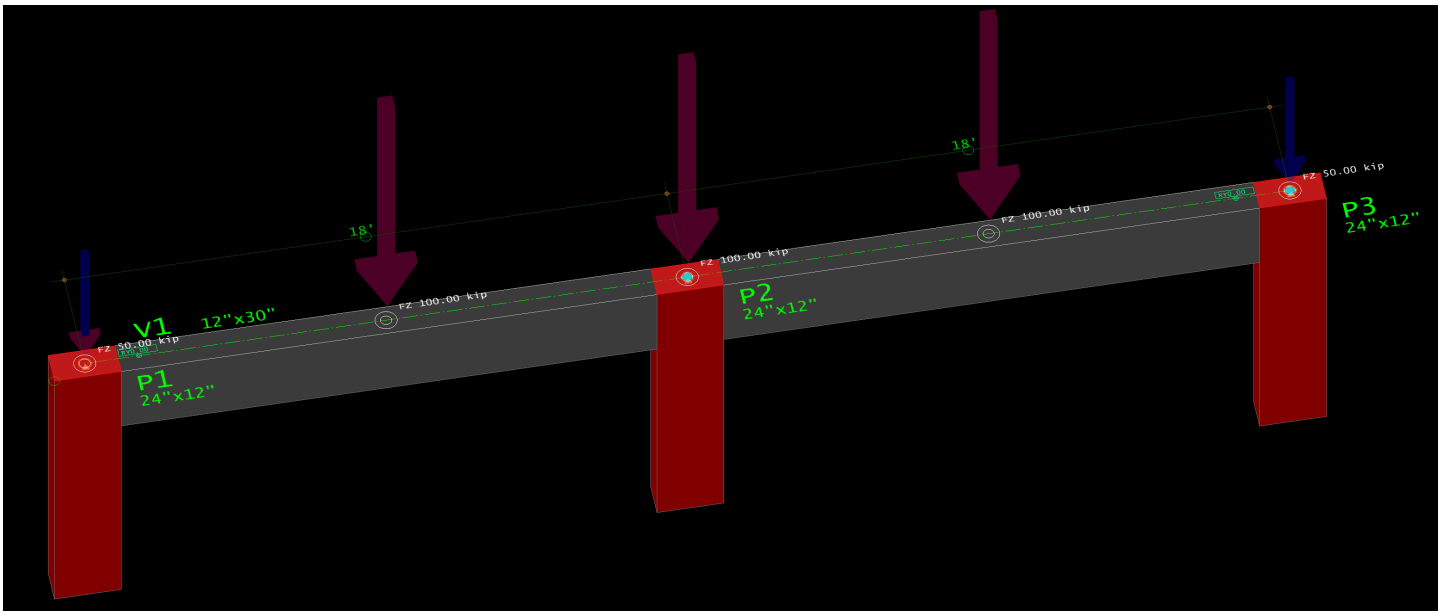
Vigas - Flexão Simples - Esforços

FLEXÃO SIMPLES

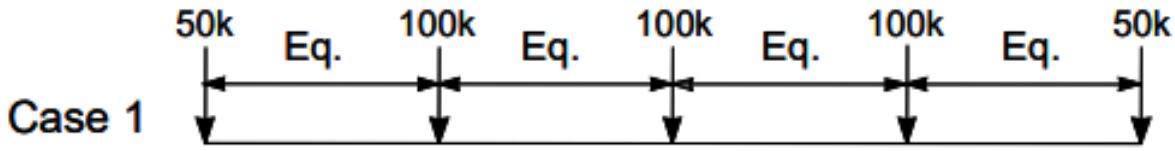
Neste exemplo, será calculados os esforços dos dois casos de carregamento abaixo comparando os resultados obtidos com o cálculo manual e o software ETABS usando a Norma ACI 318-19:

CASE 1:





LOADS:



Material properties

Ec = 3000 ksi

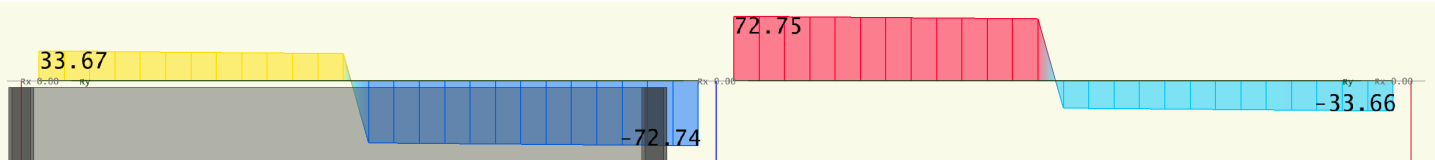
Span length: 18 ft

Beam width: 12 in.

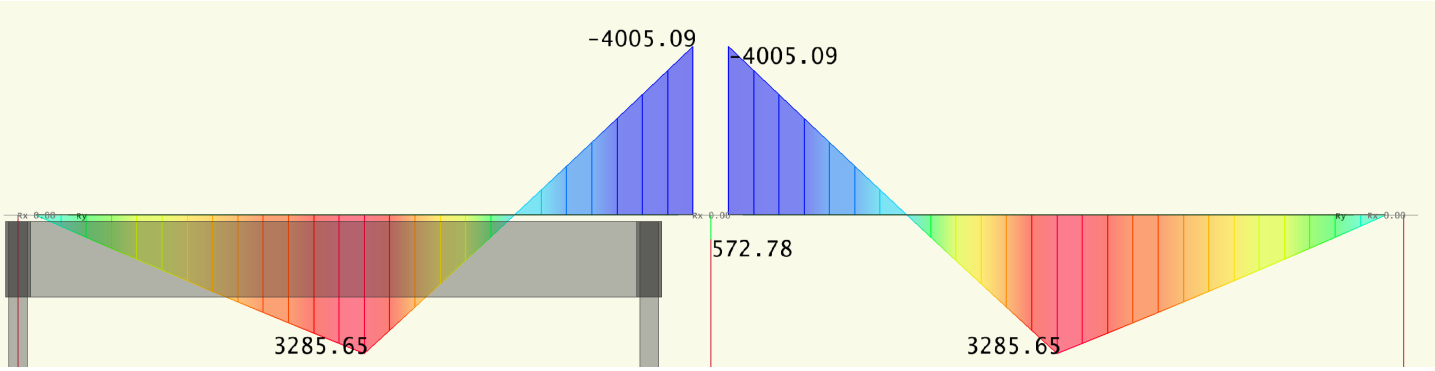
Beam Depth: 30 in

Column dimensions: 24 in. x 12 in

Shear diagram TQS:

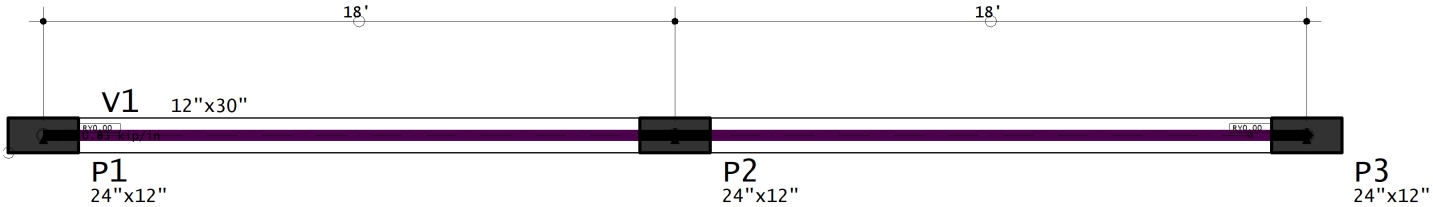


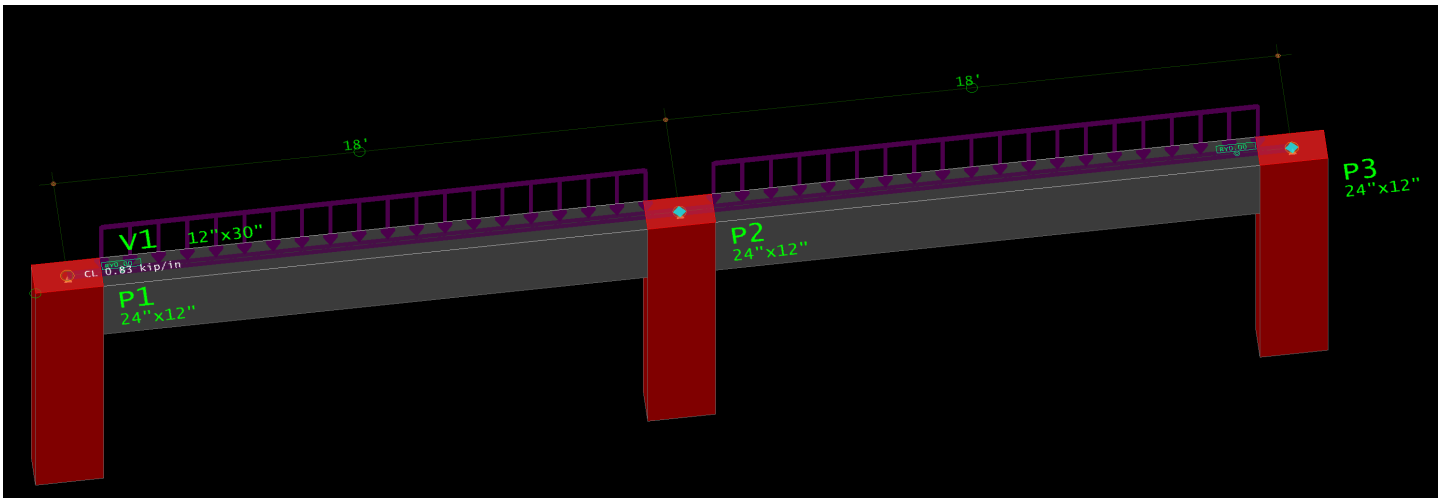
Moment diagram TQS:



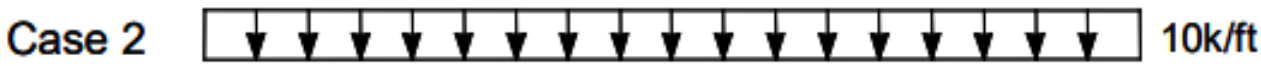
		Load Case I			
		Manual	ETABS	TQS	Dif
Bending Moments (kip.in)	Origin	0	0	0	0
	$^1/_4$ Point	1687,5	1687,5	1644,42	3%
	$^1/_2$ Point	3375	3375	3285,65	3%
	$^3/_4$ Point	-337,5	-337,5	-319,97	5%
	End	-4050	-4050	-4005,09	1%
Shear Forces (kip)	Origin	-31,25	-31,25	-33,67	-7%
	$^1/_4$ Point	-31,25	-31,25	-33,67	-7%
	$^1/_2$ Point	68,75	68,75	72,74	-5%
	$^3/_4$ Point	68,75	68,75	72,74	-5%
	End	68,75	68,75	72,74	-5%

CASE 2:





LOADS:



Material properties

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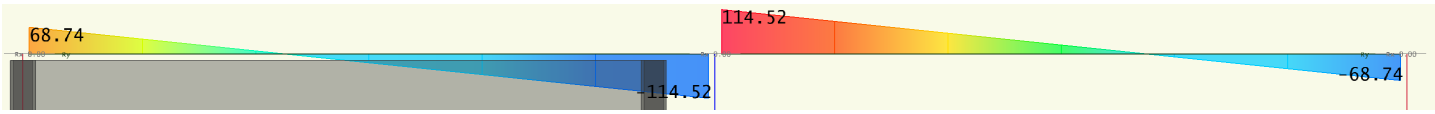
Span length: 18 ft

Beam width: 12 in.

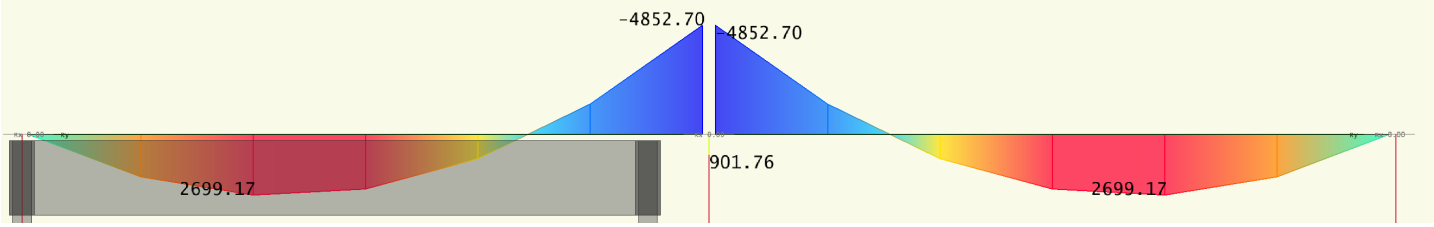
Beam Depth: 30 in

Column dimensions: 24 in. x 12 in

Shear diagram TQS:



Moment diagram TQS:



		Load Case II			
		Manual	ETABS	TQS	Dif
Bending Moments (kip.in)	Origin	0	0	0	0
	$^1/_4$ Point	2430	2430	2453	-1%
	$^1/_2$ Point	2430	2430	2453	-1%
	$^3/_4$ Point	0	0	0	0%
	End	-4860	-4860	-4852,7	0%
Shear Forces (kip)	Origin	-67,5	-67,5	-68,74	-2%
	$^1/_4$ Point	-22,5	-22,5	-22,92	-2%
	$^1/_2$ Point	22,5	22,5	22,92	-2%
	$^3/_4$ Point	67,5	67,5	68,7	-2%
	End	112,5	112,5	114,52	-2%

Conclusão:

Os resultados de esforços obtidos para os dois casos são resultados muito similares com pequenas diferenças.