Two-Span Continuous Beam (Three-Moment Equation)

Support moment, reactions and maximum span moments of a two-span continuous beam with uniform loads on each span, by Clapeyron's three-moment equation.

Method: Clapeyron's three-moment equation (Timoshenko and Young, Theory of Structures, 2nd ed. (McGraw-Hill))

Input parameters

Unit system: SI

Parameter	Value	Unit
Span 1	6.0000	m
Span 2	8.0000	m
Uniform load on span 1	20.000	kN/m
Uniform load on span 2	20.000	kN/m

Calculated results

Parameter	Value	Unit
Moment at the middle support (hogging)	130.00	kN·m
End reaction A	38.333	kN
Middle reaction B	177.92	kN
End reaction C	63.750	kN
Maximum sagging moment, span 1	36.736	kN·m
Maximum sagging moment, span 2	101.60	kN·m

Notes for this case

- Constant EI, simple end supports, no settlement. For equal spans and loads M_B = wL²/8 and the middle reaction is 1.25wL.

Formula and method

$$M_B = \frac{w_1 L_1^3 + w_2 L_2^3}{8(L_1 + L_2)}, \quad R_A = \frac{w_1 L_1}{2} - \frac{M_B}{L_1}$$

Variables

L_1	Span 1	m
L_2	Span 2	m
w_1	Uniform load on span 1	N/m
w_2	Uniform load on span 2	N/m
M_B	Moment at the middle support (hogging)	N·m
R_A	End reaction A	N
R_B	Middle reaction B	N
R_C	End reaction C	N
M_1	Maximum sagging moment, span 1	N·m
M_2	Maximum sagging moment, span 2	N·m

Method and standards

Three-moment equation with M_A = M_C = 0.

Assumptions and limits

- Both spans fully loaded at once. The largest sagging moment in a span comes from pattern loading (imposed load on that span only, dead load on both), which this page does not check; for floor beams with large imposed loads, run the case with the other span's load reduced to dead load only.

- Constant EI; uniform loads; rigid supports.

References

• Clapeyron's three-moment equation (Timoshenko and Young, Theory of Structures, 2nd ed. (McGraw-Hill))

Report details

Report reference	FCC-91AC-1XRT (the same inputs always give the same reference)
Generated	17 November 2026, 19:48 UTC
Calculator	Two-Span Continuous Beam (Three-Moment Equation)
Method last reviewed	13 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/steel/two-span-continuous-beam

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.