Lintel Load from Masonry Arching (Triangular Load)

Load on a lintel from the masonry above, as the 60° equilateral triangle when arching can develop or the full rectangle otherwise, with moment and shear.

Method: Lintel loading with arching action

Input parameters

Unit system: SI

Parameter	Value	Unit
Effective span of the lintel	1.8000	m
Wall thickness	230.00	mm
Unit weight of masonry	19.000	kN/m³
Height of masonry above the lintel	2.4000	m

Calculated results

Parameter	Value	Unit
Height of the equilateral load triangle	1.5588	m
Arching possible (1 = yes)	1.0000	
Total load on the lintel	6.1309	kN
Maximum bending moment	1.8393	kN·m
End shear	3.0655	kN

Notes for this case

• Masonry over an opening arches over it once mortar has set, so the lintel carries only the wedge of masonry under the arch, taken as an equilateral triangle on the span (sides at 60°, height L√3/2). The arch needs enough masonry above the triangle to develop; a common rule asks for about 1.25 times the triangle height. Otherwise the lintel carries the full rectangle of masonry up to that height. A triangular load W on a simple span gives M = WL/6; a uniform load gives WL/8. Floor or roof loads within the triangle, and openings close to the lintel ends, need separate checks.

Formula and method

$$h_t = \frac{\sqrt{3}}{2} L, \quad W = \frac{1}{2} L h_t t \gamma, \quad M = \frac{WL}{6}$$

Variables

L	Effective span of the lintel	m
t	Wall thickness	m
γ	Unit weight of masonry	N/m³
h_w	Height of masonry above the lintel	m
h_t	Height of the equilateral load triangle	m
$\mathrm{arching}$	Arching possible (1 = yes)	-
W	Total load on the lintel	N
M	Maximum bending moment	N·m
V	End shear	N

Method and standards

Lintel load.

Assumptions and limits

- Simply supported lintel; uniform masonry; arching rule as stated.

References

Lintel loading with arching action

Report details

Report reference	FCC-D9D4-6AQJ (the same inputs always give the same reference)
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Release checks	3 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/concrete/lintel-arching-load

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.