

Arches, Vaults and Domes

Architecture

How curved masonry stands up, and what it does to the walls.

An arch turns a span into pure compression by curving. The price is a horizontal thrust at each springing, which something else has to resist.

PANTHEON SPAN
43.3 m

FORCE IN THE ARCH
compression

- Masonry arches carry compression, not tension.
- The thrust line must stay inside the arch section.
- A flatter arch pushes outward harder.
- Buttresses, walls or ties take that thrust.
- A dome adds hoop tension near its base.
- Chains were added to the Pantheon and St Peter's domes.

LOOK FOR IT

The hanging chain reversed gives the funicular arch: Gaudi hung weighted strings to find his forms directly.

Educational reference. Masonry assessment is a specialist field; historic structures need a conservation engineer.