

# STRUCTURAL BASICS GUIDE

Key structural concepts every homeowner should understand before designing.

## KEY VOCABULARY

### Load-Bearing Wall

A wall that supports weight from the structure above it - roof, floors, or other walls. Cannot be removed without adding a beam or header.

### Header / Lintel

A horizontal structural member that spans an opening (door, window, or pass-through) and transfers the load above to the sides.

### Span

The distance a beam, joist, or rafter can cover without intermediate support. Longer spans require deeper or stronger members.

### Point Load

A concentrated force applied at a single location, such as where a beam rests on a column. Requires adequate support below.

### Foundation

The structural base that transfers the building weight to the ground. Type depends on soil conditions, climate, and building loads.

### Shear Wall

A wall designed to resist lateral forces from wind or seismic activity. Typically uses plywood or structural sheathing.

## SPAN GUIDELINES

**Up to 12 ft** Standard wood joists and rafters. No special engineering typically required.

**12 - 20 ft** Engineered lumber (LVL, TJI), doubled-up members, or steel beams may be needed.

**20 - 30 ft** Steel beams, engineered trusses, or glulam beams required. Engineer involvement recommended.

**30 ft +** Steel frame, heavy timber trusses, or specialized structural systems. Engineer required.

## FOUNDATION TYPES

### Slab-on-Grade

**Best for:** Warm climates, flat lots, cost-effective builds

**Limitations:** No crawl space access, harder to modify plumbing later

### Full Basement

**Best for:** Cold climates (frost depth), bonus living or storage space

**Limitations:** Higher cost, waterproofing critical, not ideal for high water tables

### Crawl Space

**Best for:** Sloped sites, access to plumbing and HVAC, moisture-prone areas

**Limitations:** Requires ventilation and moisture control, limited headroom

### Pier and Post

**Best for:** Steep terrain, flood zones, decks, and light structures

**Limitations:** Limited insulation options, exposed underside, pier spacing matters

## WHEN TO CONSULT AN ENGINEER

- Spans over 20 feet in any direction
- Removing or modifying a load-bearing wall
- Large window walls or openings over 8 feet wide
- Cantilevered sections (overhangs beyond the foundation)
- Multi-story construction or unusual roof loads
- Uncertain soil conditions or steep building sites
- Rooftop decks, green roofs, or heavy mechanical equipment