



CHAPTER 6

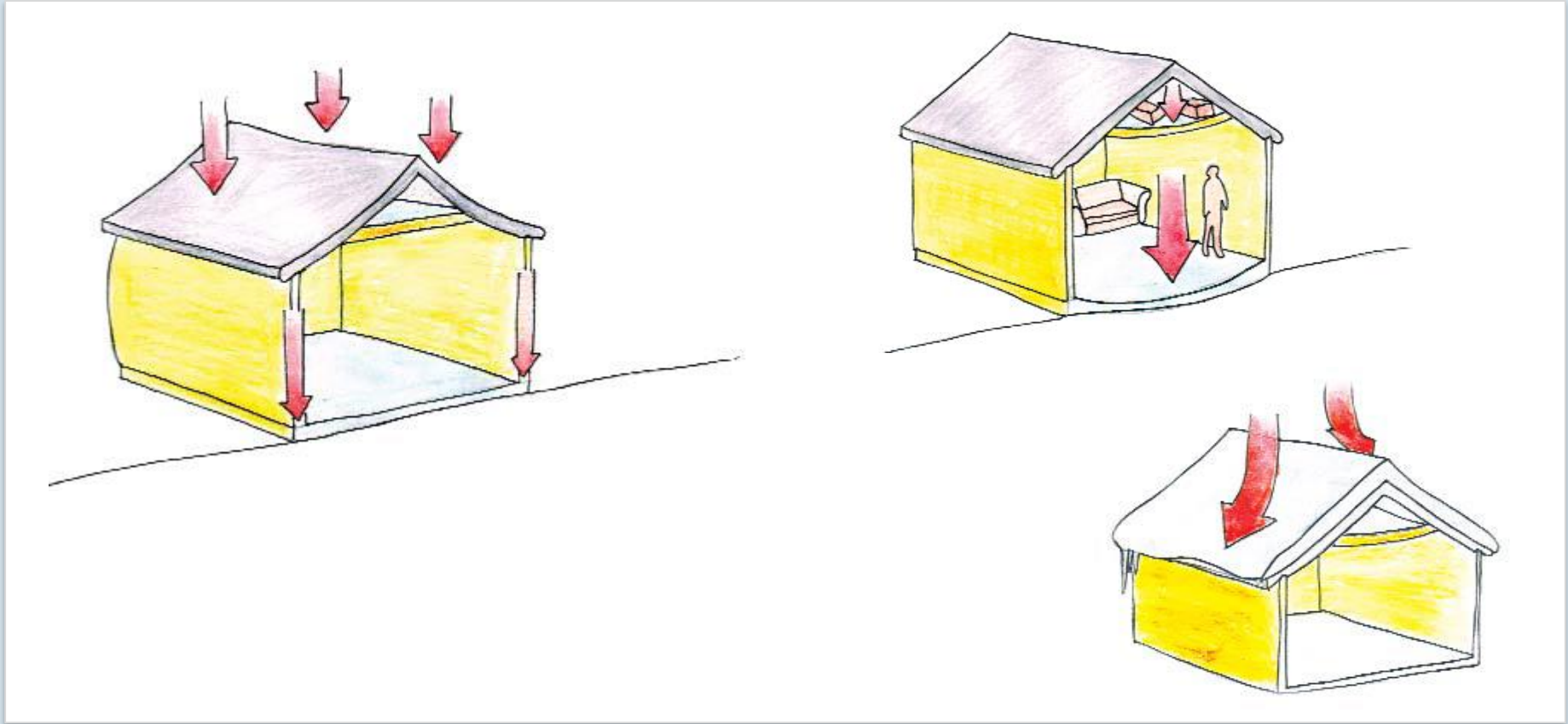
STRUCTURAL FORMS



Structural Integrity: Static Loads

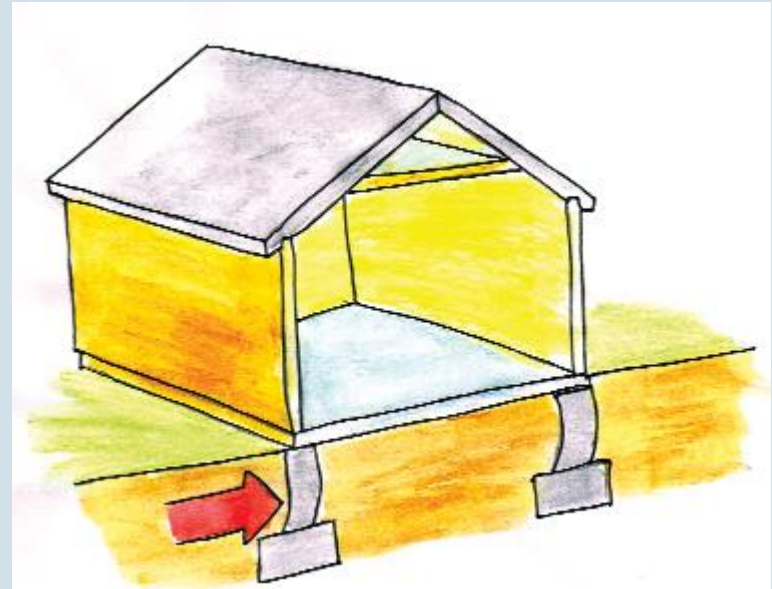
Dead loads

Live loads



Structural Integrity: Static Loads

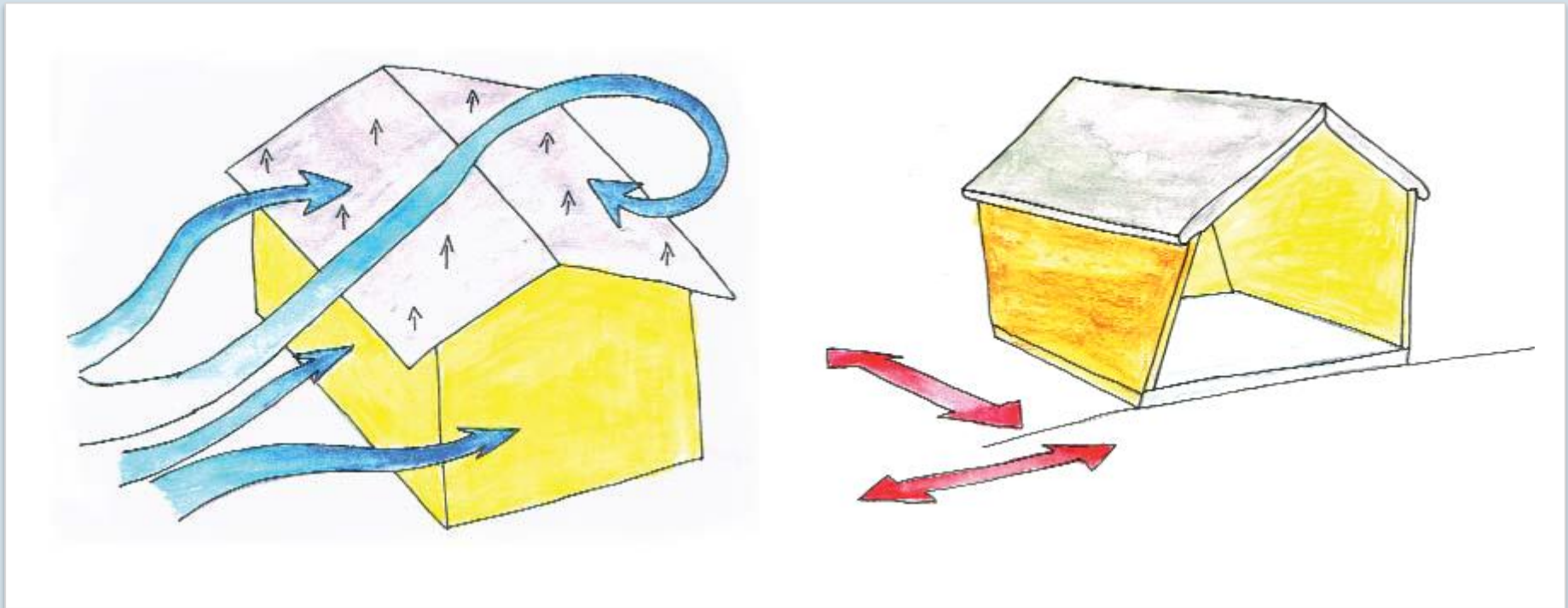
Environmental loads



Structural Integrity: Dynamic Loads

Wind loads

Earthquake loads



Stress and Strain

- Stress
 - Push force (compression)
 - Pull force (tension)
 - Twist force (torsion)
 - Sliding force (shear)
- Strain
 - Displacement of materials



Types of Material Stress

- Compression
- Tension
- Shear
- Torsion

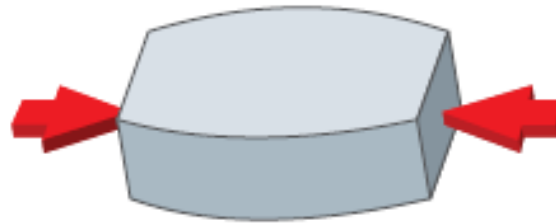


Fig. 6.11 Compression force – the force on the element pressing towards its centre.

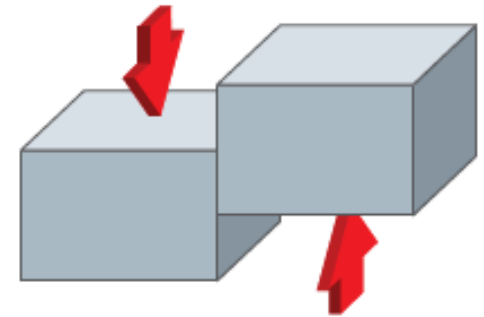


Fig 6.13 Shear force – pressing in opposite directions.

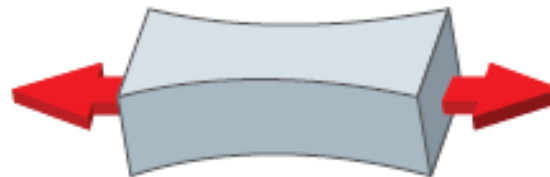


Fig 6.12 Tension force stretches the member away from its centre.

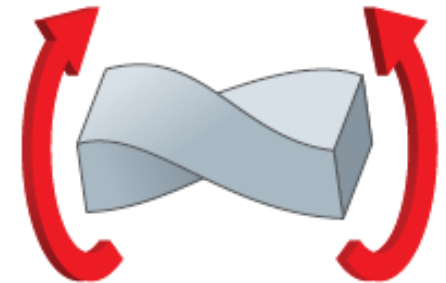
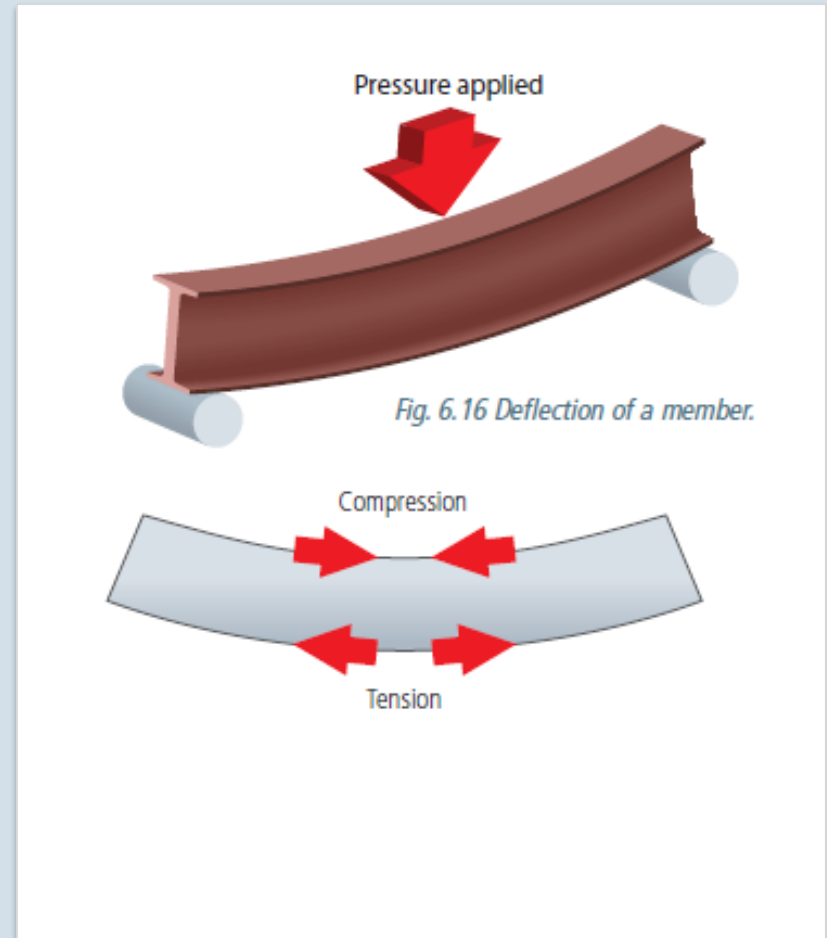


Fig 6.14 Torsion force – a twisting action on a member, pushing in opposite directions.



Reaction to Forces

- Elasticity
- Deflection
- Excessive force causes:
 - Bending
 - Cracking
 - Buckling
 - Crumbling



Classification of Structures

- Structural logic
 - Solid structures
 - Skeletal structures
 - Surface structures
- Structural system forces
 - Compressive structures
 - Tensile structures
 - Truss structures



Struts and Ties

- Strut in compression
- Tie in tension

