Concept 6 Glossary

THAYER SCHOOL OF ENGINEERING AT DARTMOUTH

bending:
the curved form taken by a slender element when subjected to loads perpendicular to the element

braced frame:
an assembly, typically triangulated, of structural elements used to resist lateral/horizontal loads

buckling:
an outward or lateral displacement of a structural element, typically a column when too much load has been applied

compression:
“pushing” force on a member that causes it to shorten or buckle

deflected shape:
the shape a member or structure takes when subjected to a load

frequency:
cycles per second of motion, often used to described the motion of a building

lateral force-resisting system:
a system (shearwall, braced frame, or moment-resisting frame) used to resist lateral loads

lateral load:
a load applied horizontally on a system; wind and earthquakes are two of the most common lateral loads on buildings and bridges

moment-resisting frame:
an assembly of structural elements used to resist lateral loads; the connections between members of a moment-resisting frame are rigid, meaning the members that are connected translate and rotate together

moment of inertia:
a property of a cross-section related to resistance to bending

multi-degree of freedom model:
a linear model used by engineers to represent a multi-story building. The columns are collapsed into a single line and the mass of the building is lumped at the floor levels.

natural frequency:
the frequency or rate at which a building tends to want to oscillate; based on stiffness and mass

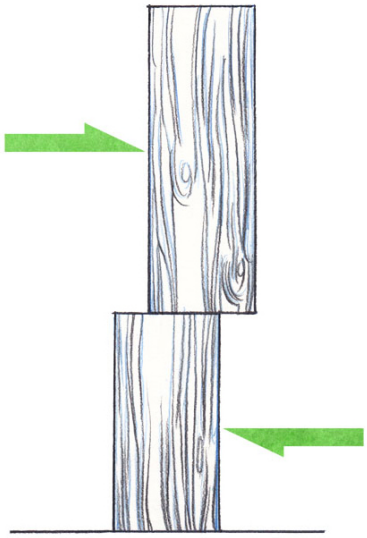
oscillation:
one cycle of response; when an object returns to its original position it has completed one oscillation

overturning:
a failure mode of a building due to tipping or rotating

period:
the time required for one oscillation of motion (of a building or other object)

resonance:
resonance occurs when the frequency of an applied motion matches the frequency of the system (building or bridge in this case); the result is that the motions will be amplified

shear: a set of parallel, non-collinear forces acting across an element



shearwall:
a wall used to resist lateral loads

single-degree of freedom (SDOF) model:
a linear model used by engineers to represent a one-story building. The columns are collapsed into a single line and the mass of the building is lumped at the floor level.

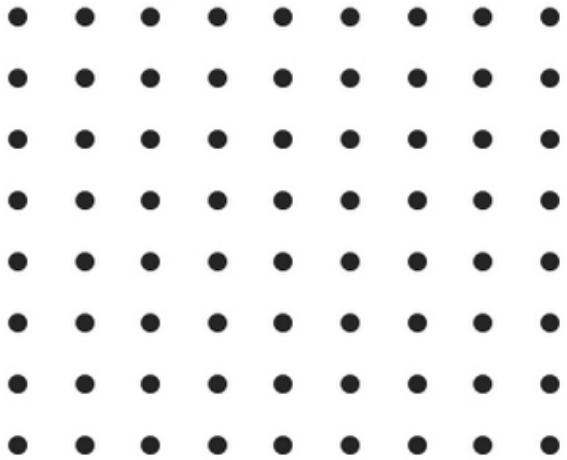
sliding:
a failure mode that results in the structure translating or moving horizontally

stiffness:
the capacity of a structure to resist deflections; a stiffer structure will deflect less

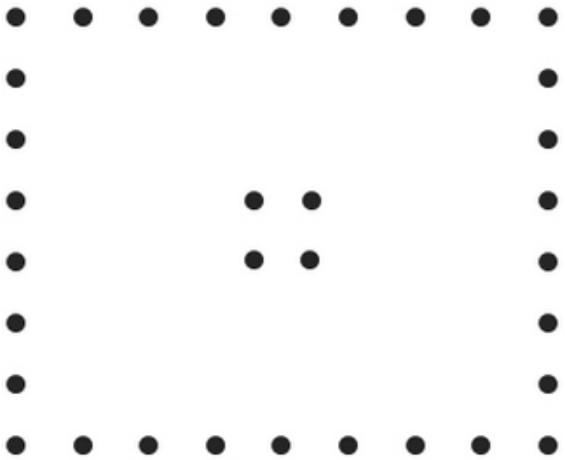
strength:
the capacity of a structure to resist loads before breaking or failing.

tension:
force or stress “pulling” on a member

tube-framed structure:
a pattern of columns such that the columns are clustered in tubes, rather than evenly dispersed throughout the building



Traditional arrangement of columns
(plan view)



Tube-framed arrangement of columns
(plan view)

vertical load:
a load or force applied vertically on a structure; common vertical loads include loads due to snow, people, materials, etc.

wind load:
a load or force applied horizontally or laterally on a structure due to wind