Acceleration loads

Acceleration loads are used to simulate the ground motion of a time-history acceleration record. CSI software assumes complete fixity for all supports, then automatically computes acceleration loads at each node and structural object.

On this page:

- Translational acceleration loads
- Rotational acceleration loads
- Reference

Translational acceleration loads

Translational acceleration loads are the negative product of the assembled joint mass and input acceleration.

At any point in a structure, translational acceleration is given by the cross product of the position vector (relative to the origin of rotation) and the acceleration vector. Resultant force is the negative product of this translational acceleration value and the translational mass. For example, RY acceleration would generate MY, FX, and FZ values.

Rotational acceleration loads

Rotational acceleration is calculated independently from rotational inertia. This is done by applying, at the global origin, a unit rotation about the axis considered for the rotational-acceleration computation.

While applying a rotational-acceleration load during time-history analysis, users may specify a coordinate system and an angle from the vertical Z-axis. Rotational acceleration is then applied at the origin of that coordinate system, about the designated axis. Note that:

- Rotational acceleration is constant through all points in a structure.
- · Rotational inertia may induce negative moment values.

Reference

For additional information, please see the CSI Analysis Reference Manual (Chapter XVII Load Cases, Acceleration Loads).