

# Acceleration load in arbitrary direction

Tutorial	
Name:	Acceleration load in arbitrary direction
Description:	Guidelines for acceleration-load application in an arbitrary direction. Applicable to static, modal, and buckling load cases.
Program:	SAP2000
Version:	14.2.3
Model ID:	na

The orientation of [acceleration load](#) may be specified for certain types of [load cases](#), including [response-spectrum](#) and [time-history](#), as shown for [SAP2000](#) in Figure 1:

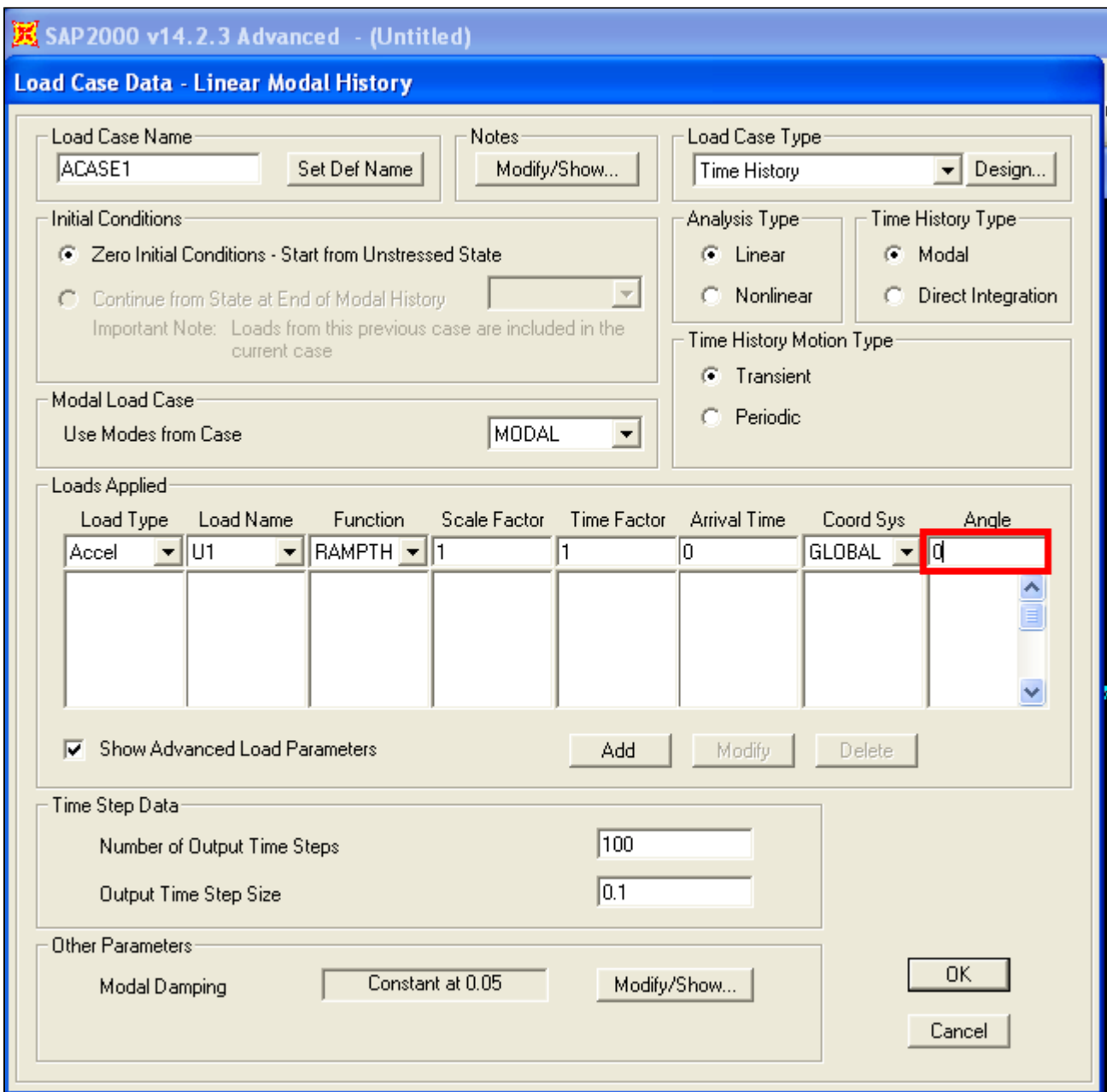


Figure 1 - Angle specification for time-history acceleration load

For other types of load cases, including static, modal, and buckling, acceleration load is specified along the global axes. However, acceleration load may still be applied in an arbitrary direction using either of the following two methods:

- Establish an equivalent system by applying scale factors to acceleration loads which are oriented along global axes. For example, a resultant acceleration load 45° from the global X axis is equivalent to a UX and UY component, each scaled to 0.7071.
- Calculate and apply acceleration loads directly to the joints of a structure, done as follows:
  1. Analyze the model, then display the Assembled Joint Masses table using the Display > Show Tables > Analysis Results > Joint Output > Joint Masses > Table: Assembled Joint Masses option.
  2. Export this table to Excel, then, using joint mass, acceleration magnitude, and acceleration direction, calculate the acceleration-load global-axes components at each joint.
  3. Within a load case, apply the calculated acceleration loads using the Edit > Interactive Database Editing > Model Definition > Joint Assignments > Joint Load Assignments > Table: Joint Loads - Force option. Users may export this table to Excel, edit, then import back to the analysis software.

## See Also

- **Tables** – [Interactive database editing](#)
- [Context Help](#) for acceleration-load application