

# Pushover analysis first steps

Tutorial	
Name:	Pushover analysis first steps
Description:	Guidelines for performing pushover analysis.
Program:	SAP2000
Version:	12.0.1
Model ID:	na

This tutorial was initially written for [SAP2000](#), though the general procedure also applies to [CSiBridge](#).

## On this page:

An overview of the procedure for **pushover analysis** is given as follows:

## Create the computational model

- Create the computational model, without pushover data, using conventional [modeling](#) techniques.
- Define properties for pushover [hinges](#) using Define > Section Properties > Hinge Properties. Hinges may be defined manually or by using one of several default specifications which are available.
- Assign the pushover hinges to selected [frame](#) objects using Assign > Frame > Hinges.
- Select Define > Load Patterns to define [load patterns](#) which will contain the loads applied during pushover analysis.

## Define a nonlinear static load case

- Select Define > Load Cases > Add New Load Case to define a [nonlinear](#) static [Load case](#) which will apply the previously-defined load pattern. This load case may be force-controlled (pushed to a specified force level) or displacement-controlled (pushed to a specified displacement).
- Select Other Parameters > Results Saved to Multiple States such that various parameters may be plotted for each increment of applied loading.

## Run the analysis

- Select Analyze > Run Analysis to run the static-pushover analysis.

## Review results

- To plot base shear vs. monitored displacement, select Display > Show Static Pushover Curve. Additional variables are also available for plotting.
- To plot hinge deformation vs. applied loading, select Display > Show Hinge Results. Moment as a function of plastic rotation is one such option.
- To review displacement and the step-by-step sequence of hinge formation, select Display > Show Deformed Shape.
- To review member forces on a step-by-step basis, select Display > Show Forces/Stresses > Frames/Cables.
- Select Display > Show Plot Functions to plot response at each step of the pushover analysis, including joint displacement, frame member forces, etc.

## See Also

- [CSI Analysis Reference Manual](#) (Nonlinear Static Analysis > Static Pushover Analysis, page 394)
- Habibullah, A., Pyle, S. (1998). *Practical Three Dimensional Nonlinear Static Pushover Analysis*, Computers and Structures, Inc., Berkeley, CA
- CSI [Watch & Learn](#) video series, [SAP2000 Tutorial 21](#), Static Pushover Analysis