Obtain results for individual stages of a staged-construction load case

Tutorial	
Name:	Obtain results for individual stages of a staged-construction load case
Description:	Options and an example of how to obtain results for individual stages of a staged-construction load case.
Program:	SAP2000
Version:	14.2.4
Model ID:	na

Results which are reported for the individual stages of a staged-construction load case are cumulative. For example, Stage 2 results contain contribution from both Stage 1 and Stage 2.

To obtain response from load applied only during a particular stage, either of the following two methods are available:

- Post-process SAP2000 output. To obtain results for Stage *n*, for example, subtract Stage *n-1* results from those of Stage *n*.

- Redefine the single staged-construction load case as a chained sequence of load cases, each using stiffness at the end of the previous case. Next, define a load combination which collects results only for a given Stage *n* as follows:

  Stage *n* results = (cumulative Stage *n* results) - (cumulative Stage *n-1* results)

Example

To demonstrate this second method, a point load is applied to the free end of a horizontal cantilever, as shown in Figure 1:
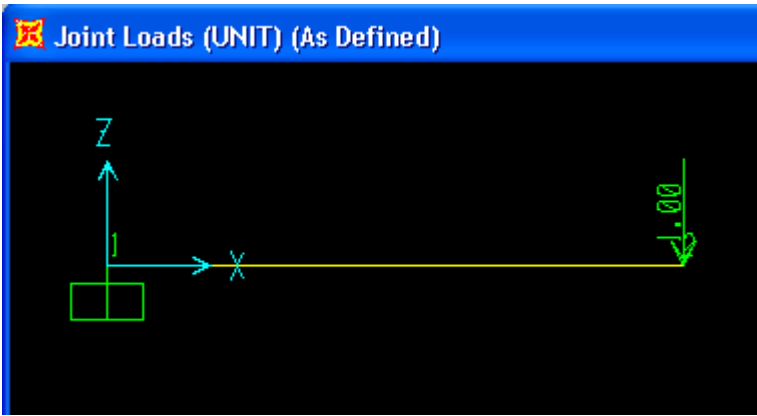

Figure 1 - Horizontal cantilever

A staged-construction load case (STAGED) is defined, then incremental loads of 1kN, 10kN, and 100kN are applied in Stages 1, 2, and 3, as shown in Figure 2:
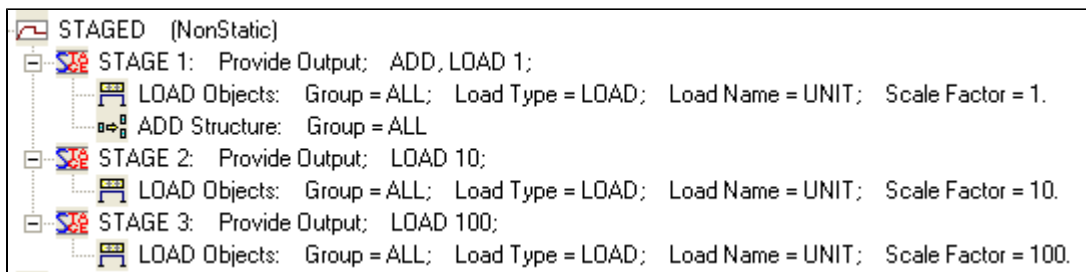
Figure 2 - Staged-construction load case

Noncumulative results are then obtained for Stages 2 and 3 by defining staged-construction load cases which have only single stages. These load cases (named STAGED stage 1, STAGED stage 2, and STAGED stage 3) are equivalent to the original STAGED case except that loading is represented by a chained sequence of individual load cases. Next, load combinations (named stage 1 only, stage 2 only, and stage 3 only) are defined in a similar manner. Once analysis is run, results are obtained for individual stages, as shown in Figure 3:

Figure 3 - Individual stage results

Attachments

- SAP2000 V14.2.4 model (zipped SDB file)