Moving-load analysis section cuts

Test Problem

Name:	Moving-load analysis section cuts
Description:	Verification of section-cut forces generated during moving-load analysis.
Program:	SAP2000
Version:	11.0.8
Model ID:	na

Section-cut forces for moving-load analysis represent the actual forces which occur at any given section cut. For various configurations of live-load application, extreme resultant forces which occur within a section cut are not combined as this would overestimate section-cut forces. This concept is demonstrated in the attached model, where lanes and section cuts are defined as shown in Figure 1:
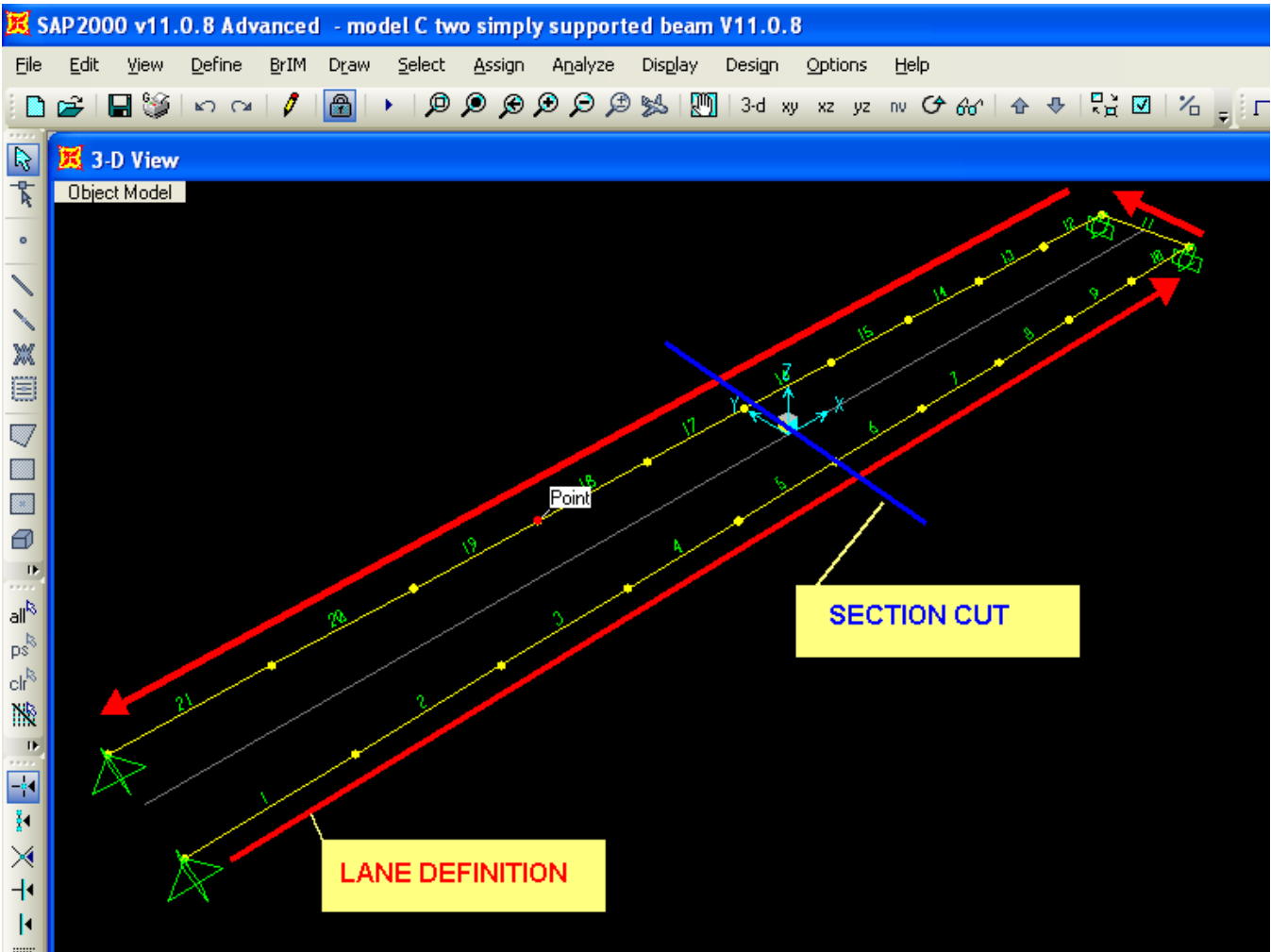

Figure 1 - Lane and section-cut definition

A vehicle of unit load is applied to the structure such that it travels along the lane, producing the moment diagram shown in Figure 2:
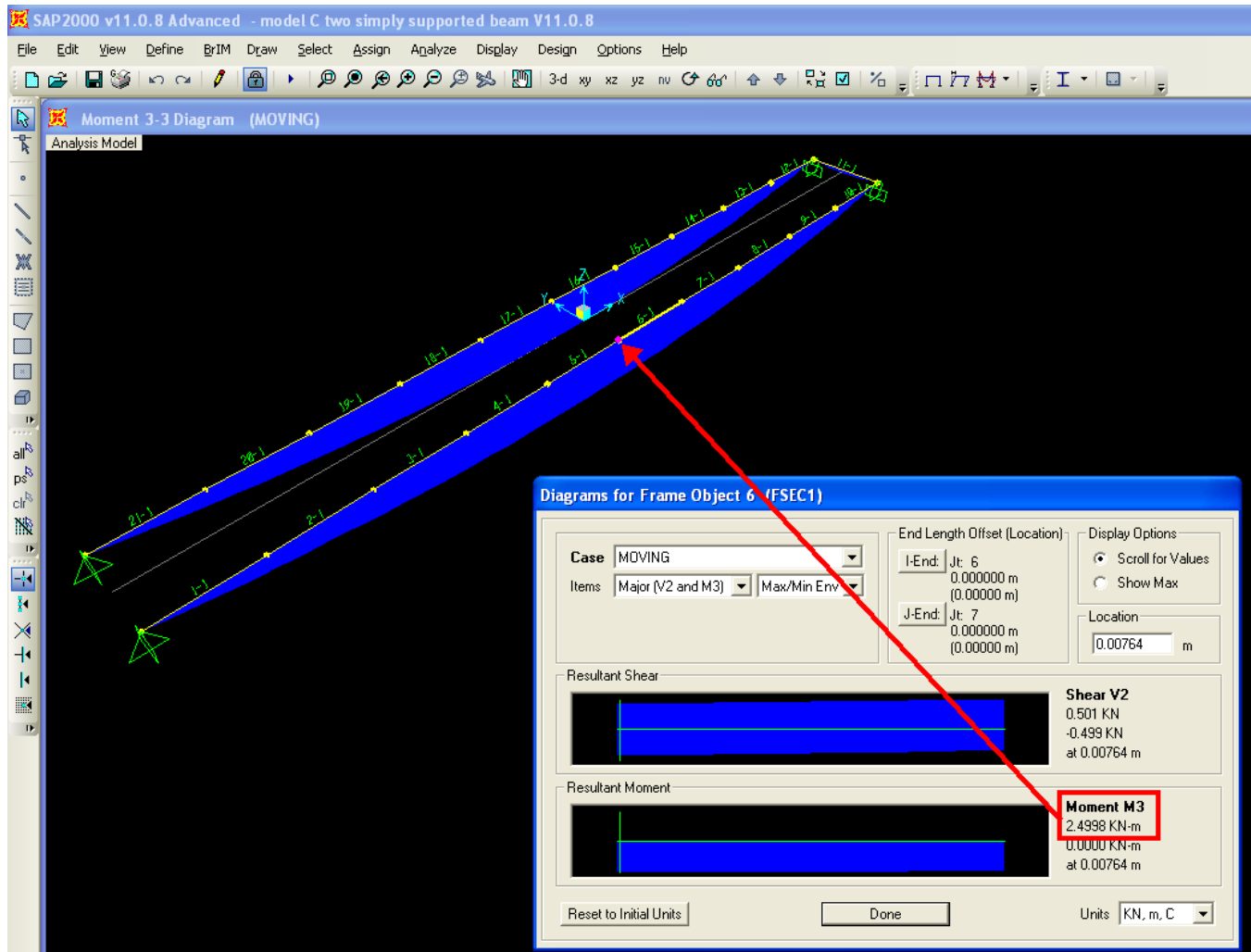
Figure 2 - Moment diagram

Since each girder is 10m long, maximum midspan moment under unit loading is calculated as 0.5kN (reaction) * 5m (length) = 2.5kN-m.

Two section cuts, one using groups and one using a quadrilateral cutting plane, are defined through each midspan location. As expected, the section-cut moments reported are also 2.5kN-m (Figure 3), indicating consistency between theoretical and software-generated results.
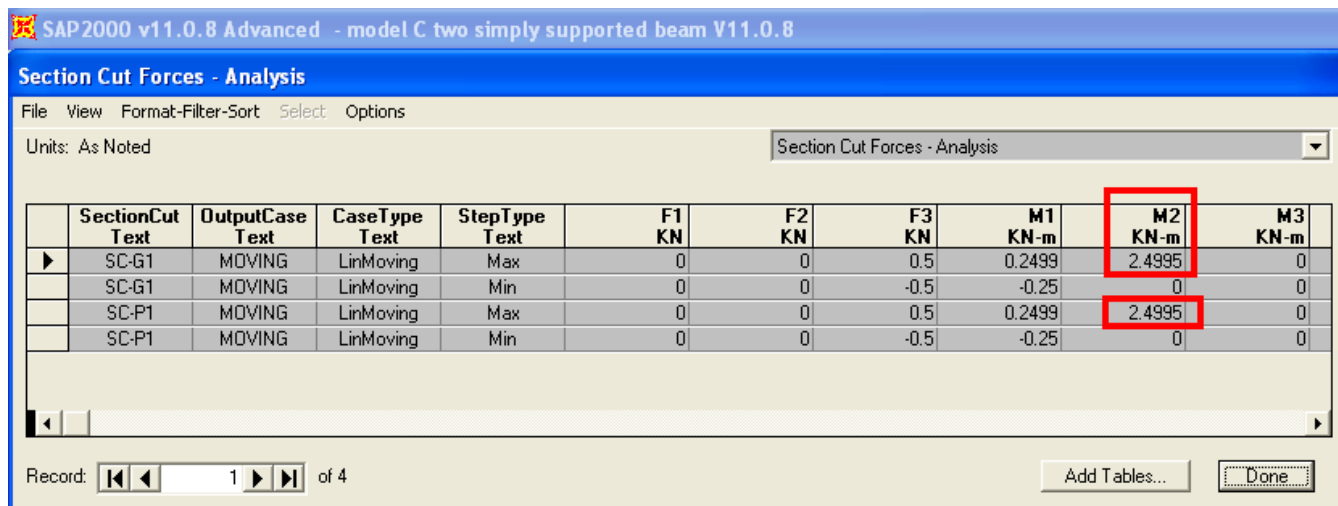
Figure 3 - Section-cut moments reported

Attachments

- SAP2000 V11.0.8 model (zipped .SDB file)