

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:

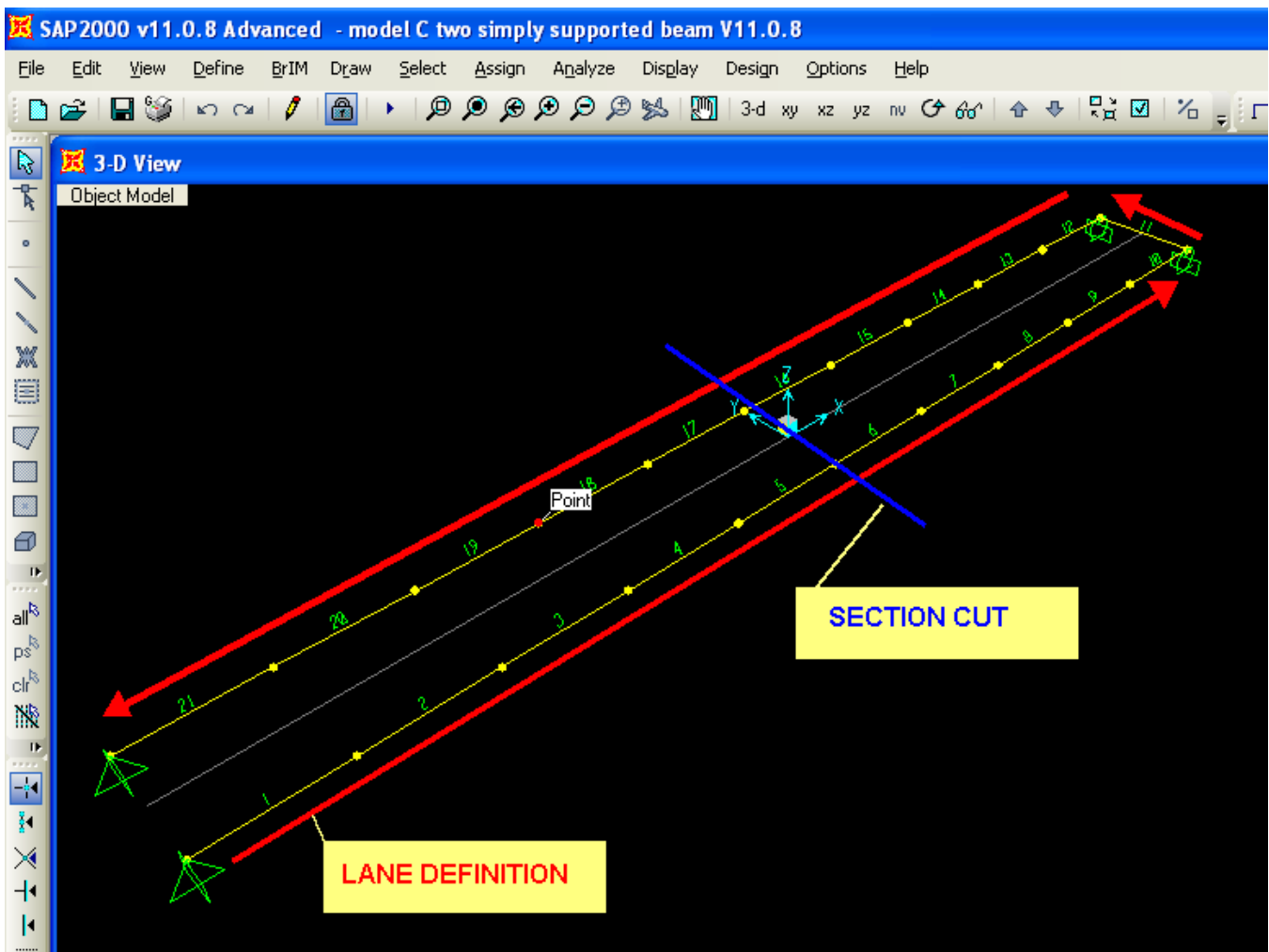


Figure 1 - Lane and section-cut definition

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:

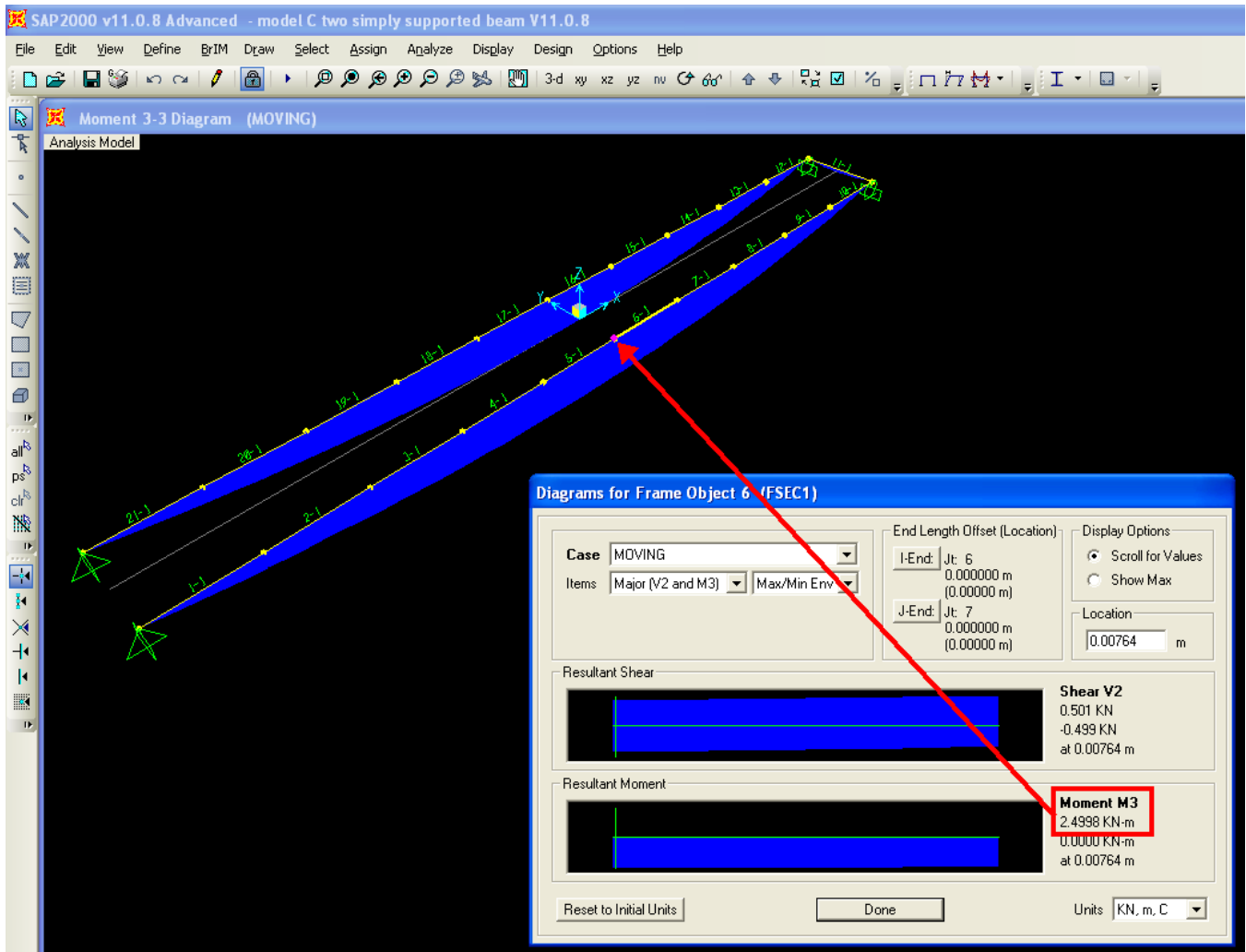


Figure 2 - Moment diagram

Since each girder is 10m long, maximum midspan moment under unit loading is calculated as $0.5\text{kN (reaction)} \times 5\text{m (length)} = 2.5\text{kN-m}$.

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.

Section Cut Forces - Analysis

File View Format-Filter-Sort Select Options

Units: As Noted

Section Cut Forces - Analysis

	SectionCut Text	OutputCase Text	CaseType Text	StepType Text	F1 KN	F2 KN	F3 KN	M1 KN-m	M2 KN-m	M3 KN-m
▶	SC-G1	MOVING	LinMoving	Max	0	0	0.5	0.2499	2.4995	0
	SC-G1	MOVING	LinMoving	Min	0	0	-0.5	-0.25	0	0
	SC-P1	MOVING	LinMoving	Max	0	0	0.5	0.2499	2.4995	0
	SC-P1	MOVING	LinMoving	Min	0	0	-0.5	-0.25	0	0

Record: 1 of 4

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Figure 3 - Section-cut moments reported

Attachments

- [SAP2000 V11.0.8 model](#) (zipped .SDB file)