

Temperature Induced Eigen Stresses

Program: CSiBridge
Version: 17.3.0
Date: 12/1/2015
Author: ok

Model version: run1

Purpose

- Illustrate how to model temperature induced eigen stresses

Model Description

Z



1m

X

10m

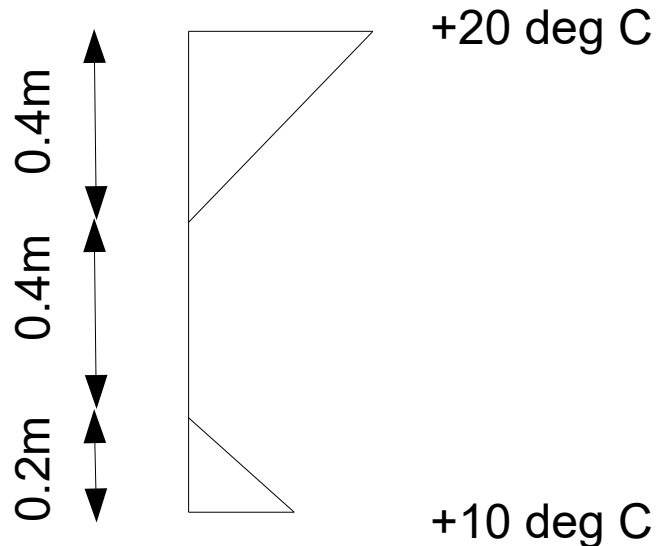
Beam Elevation (model by 0.1m x 0.1m shells,
0.1m thick made of concrete with $E = 33\text{GPa}$)

[X=0, Z=0]

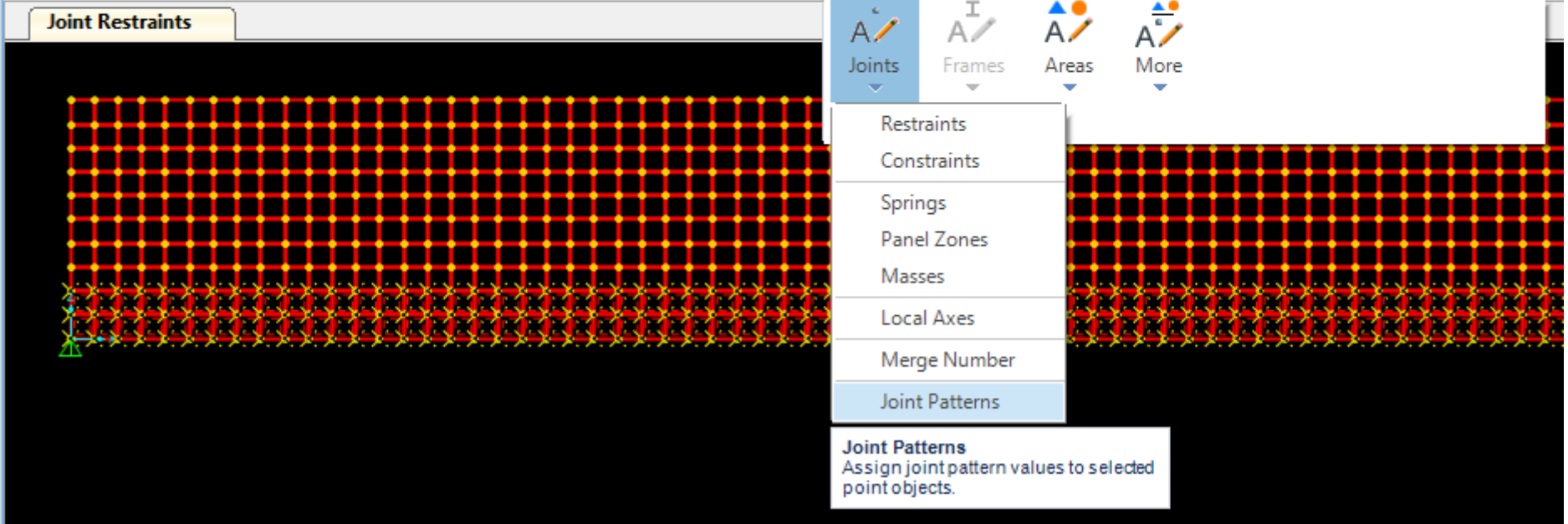
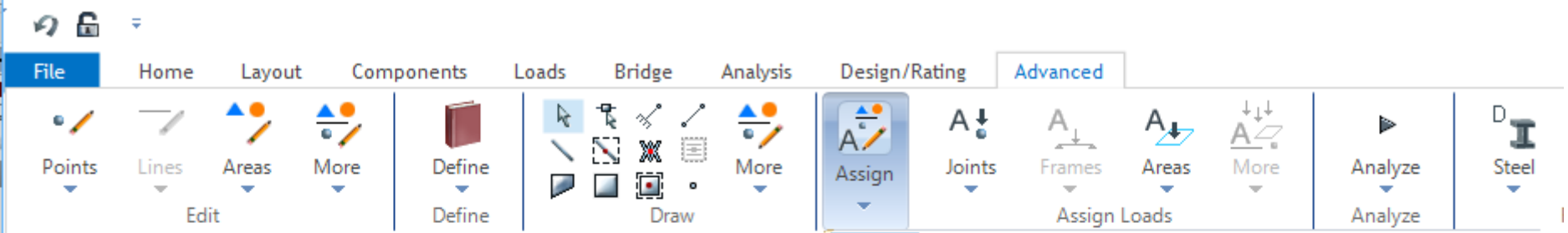
$$T = (Z-0.6)*50$$

$$T = 0$$

$$T = 10-(Z)*50$$



Temperature Loading Profile



Pattern Data

Pattern Name: TG

Pattern Assignment Type

- X, Y, Z Multipliers (Pattern Value = $Ax + By + Cz + D$)
- Z Coordinate at Zero Pressure and Weight Per Unit Volume

Pattern Value = $Ax + By + Cz + D$

Constant A	0.
Constant B	0.
Constant C	-50
Constant D	10

Restrictions

- Use all values
- Zero Negative values
- Zero Positive values

Options

- Add to existing values
- Replace existing values
- Delete existing values

OK Cancel

Pattern Name: TG

Pattern Assignment Type:
 X, Y, Z Multipliers (Pattern Value = Ax + By + Cz + D)
 Z Coordinate at Zero Pressure and Weight Per Unit Volume

Pattern Value = Ax + By + Cz + D

Constant A	0.
Constant B	0.
Constant C	50
Constant D	-30

Restrictions:
 Use all values
 Zero Negative values
 Zero Positive values

Options:
 Add to existing values
 Replace existing values
 Delete existing values

OK Cancel

Pattern Data

Pattern Name: TG

Pattern Assignment Type

- X, Y, Z Multipliers (Pattern Value = $Ax + By + Cz + D$)
- Z Coordinate at Zero Pressure and Weight Per Unit Volume

Pattern Value = $Ax + By + Cz + D$

Constant A: 0.

Constant B: 0.

Constant C: 0

Constant D: 0

Restrictions

- Use all values
- Zero Negative values
- Zero Positive values

Options

- Add to existing values
- Replace existing values
- Delete existing values

OK Cancel

Area Temperature Loading

Load Pattern Name + TG

- Type
- Temperature
 - Gradient 3-3

- Options
- Add to Existing Loads
 - Replace Existing Loads
 - Delete Existing Loads

Temperature

- By Element
Temperature
- By Joint Pattern
Pattern TG
Multiplier 1.

OK

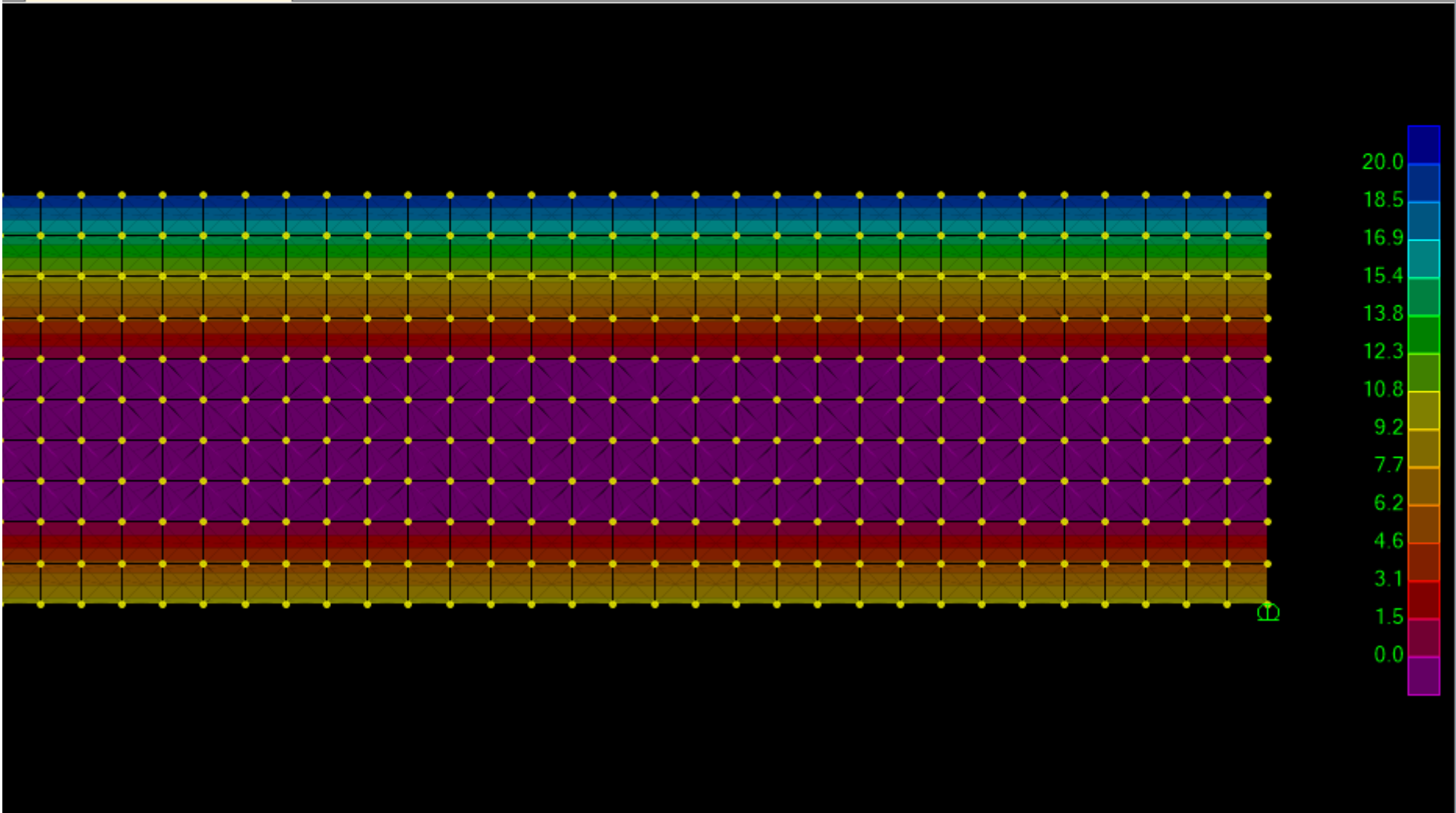
Cancel



File Home Layout Components Loads Bridge Analysis Design/Rating Advanced

Bridge Wizard Wizard | XY XZ YZ View | Snap | ALL PS CLR | Select Deselect More | Display Named Display More

Area Temperatures (TG)



Discussion of Results

File Home Layout Components Loads Bridge Analysis Design/Rating Advanced

Bridge Wizard Wizard

View: XY XZ YZ xyz View

Snap: ALL PS CLR

Select: Select Deselect More

Display: Named Display More

Deformed Shape (TG)



Joint Displacements

	Joint Object 611			Joint Element 611		
	1	2	3	1	2	3
Trans	-2.459E-05	0.00000	0.00158	0.00000	0.00000	0.00000
Rotn	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

File Home Layout Components Loads Bridge Analysis Design/Rating Advanced

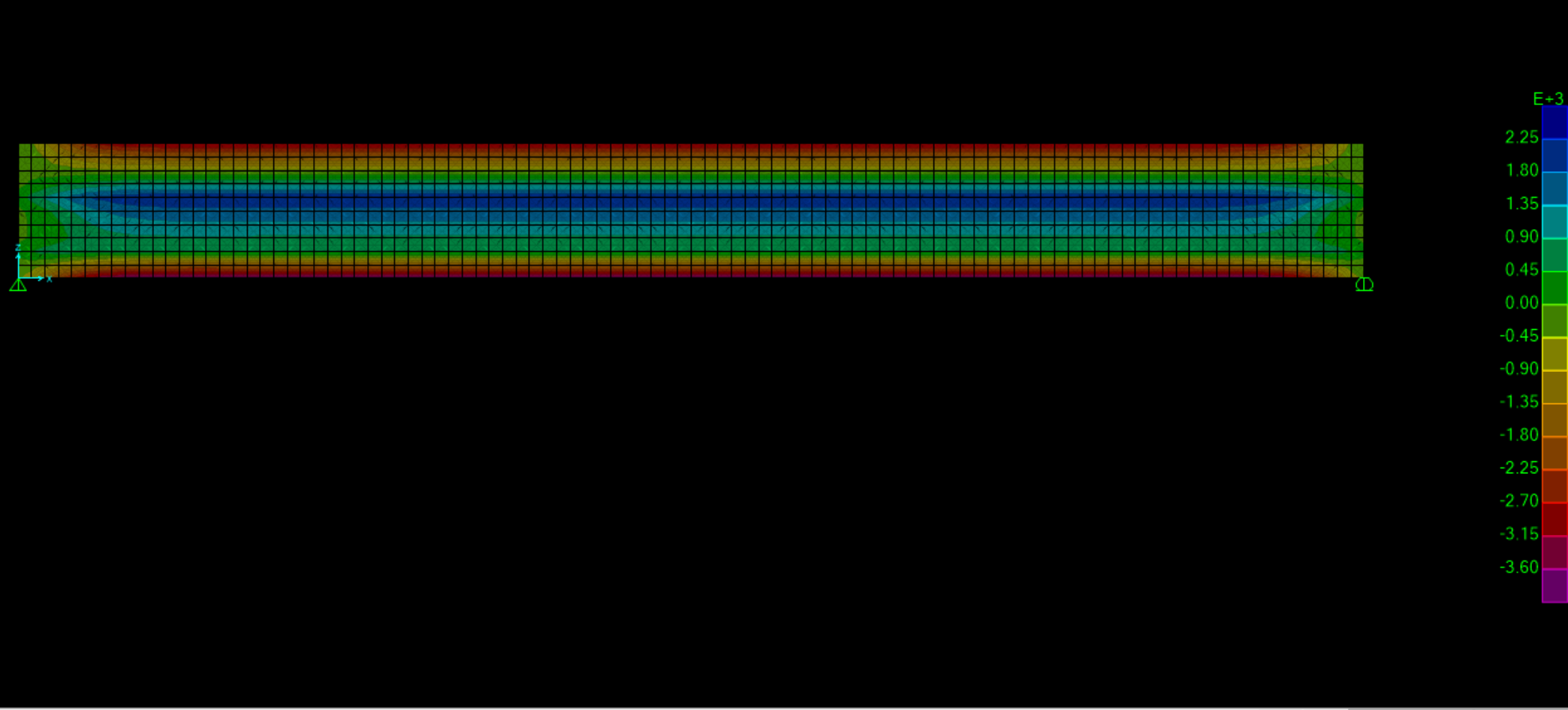
Bridge Wizard Wizard

View: XY XZ YZ xyz ↑ ↓ More

Snap: ALL PS CLR Select Deselect More

Display: (name) Display More

Stress S11 Diagram - Visible Face (TG)



MIN=-3974.171, MAX=2305.954, Right Click on any Area Element for detailed diagram