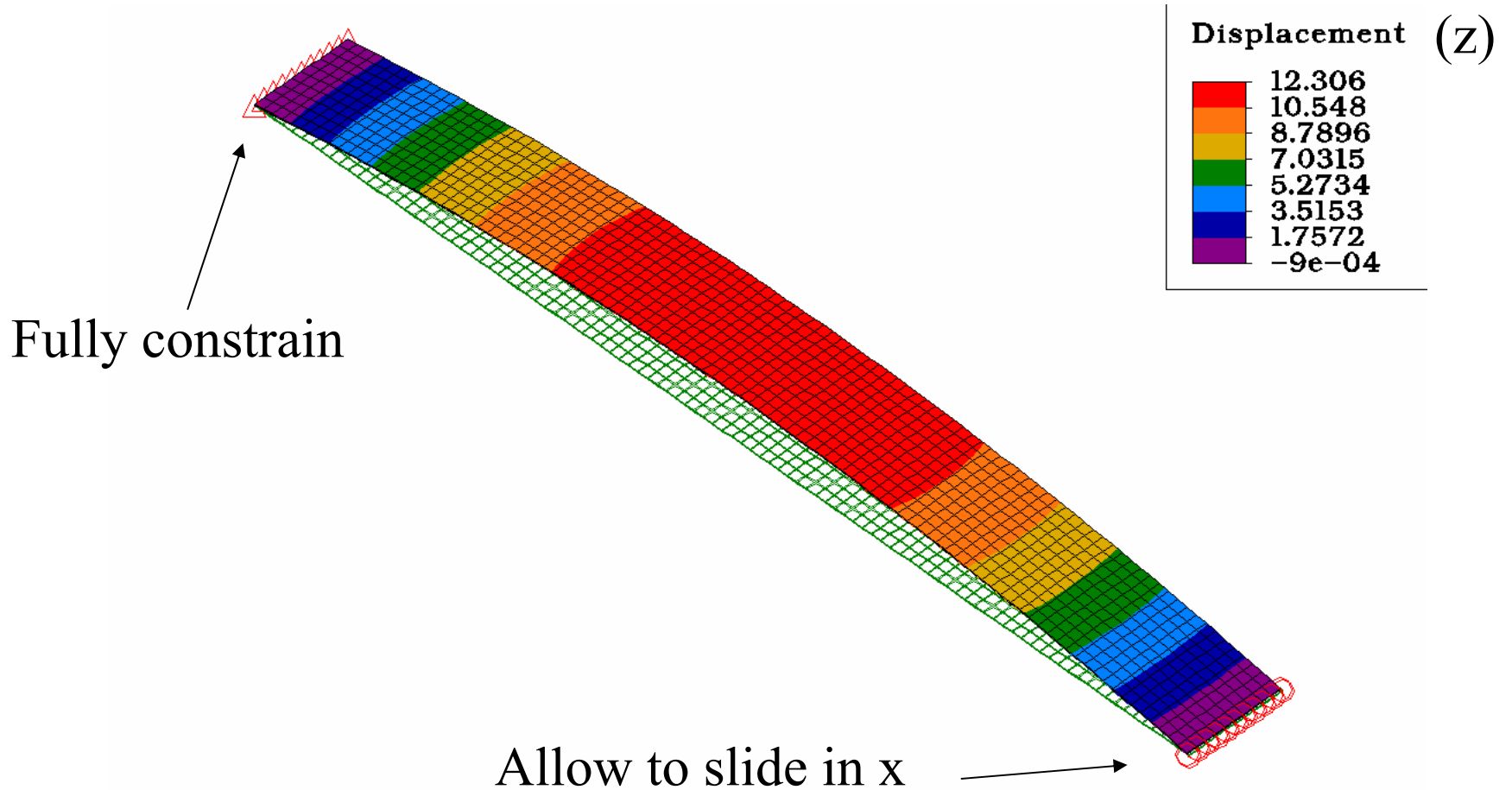# FEA Ladder Simulations
Glenn Christian, Wing Lau

- <u>Aim</u> is to model semi-supported ladders as a function of substrate thickness and tensioning for all viable material options

- <u>First step</u> is compare glass/stainless steel models to prototype 'real-life' models

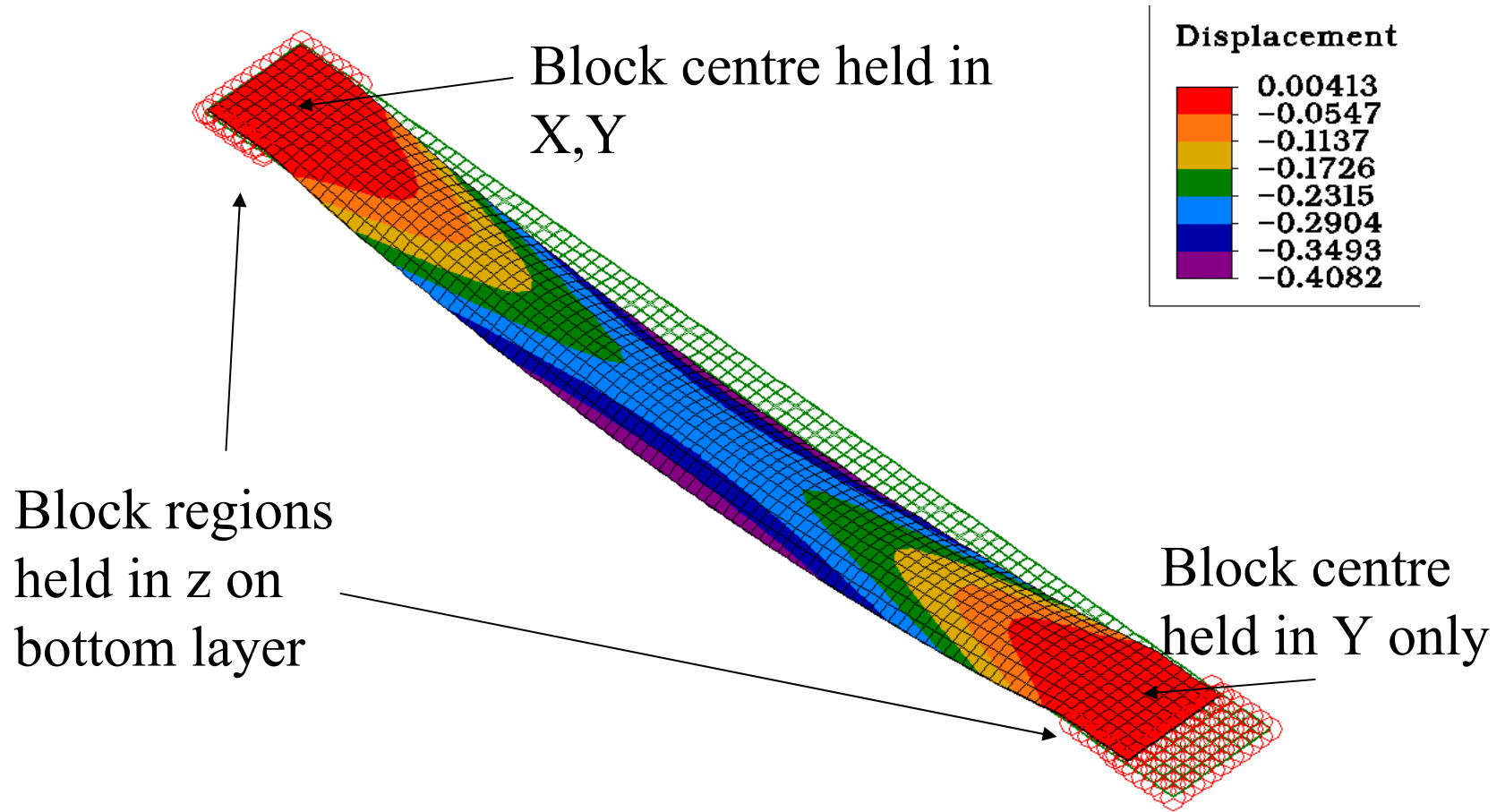- From Erik : glass thickness 50 micron, StSt 300 micron

Considerations

- Parameters - need trustworthy numbers (also as a function of T)

- Glue layer - Assume that a 3 micron glue layer produces negligible effects - needs to be tested!

- Constraints - Results of models depend a lot on how they are constrained

- Element size - trade-off between no. of elements and time taken to run as a mechanical event simulation
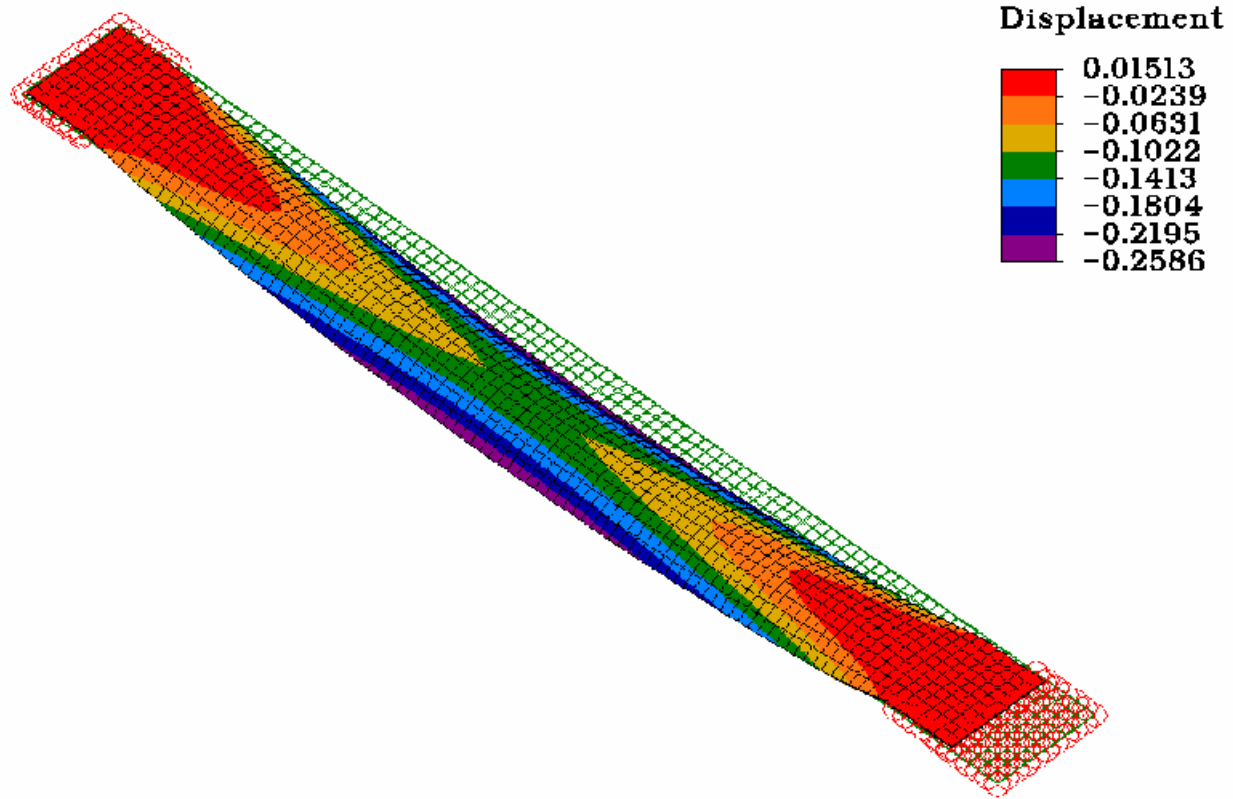
Constraints - Hold down at edges

Displacement (z)

	12.306
	10.548
	8.7896
	7.0315
	5.2734
	3.5153
	1.7572
	-9e-04

Fully constrain

Allow to slide in x

Constraints - Assume glued to blocks

Block centre held in X,Y

Displacement

■ (red)	0.00413
■ (orange)	-0.0547
■ (yellow)	-0.1137
■ (green)	-0.1726
■ (cyan)	-0.2315
■ (blue)	-0.2904
■ (dark blue)	-0.3493
■ (purple)	-0.4082

Block regions held in z on bottom layer

Block centre held in Y only

Linear model run for Si/Be

Displacement

■ (red)	0.01513
■ (orange-red)	−0.0239
■ (orange)	−0.0631
■ (green)	−0.1022
■ (light blue)	−0.1413
■ (blue)	−0.1804
■ (dark blue)	−0.2195
■ (purple)	−0.2586

Simpler model - ran as MES

Time: 1.2 secs.

Displacement

	0
	−0.0611
	−0.1221
	−0.1832
	−0.2443
	−0.3054
	−0.3665
	−0.4276
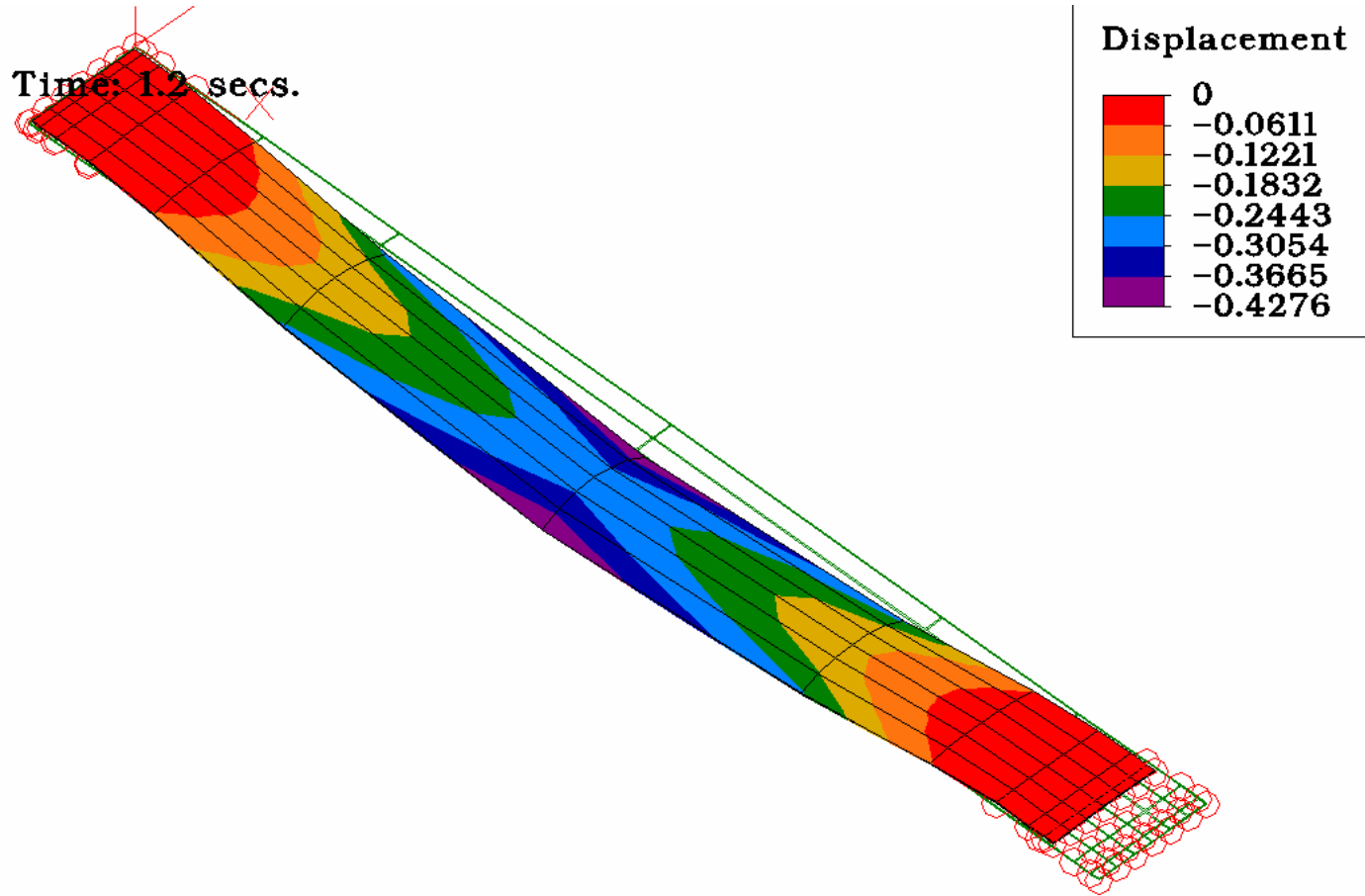
Displacement vs Temperature for 50 um glass on 300 um StSt