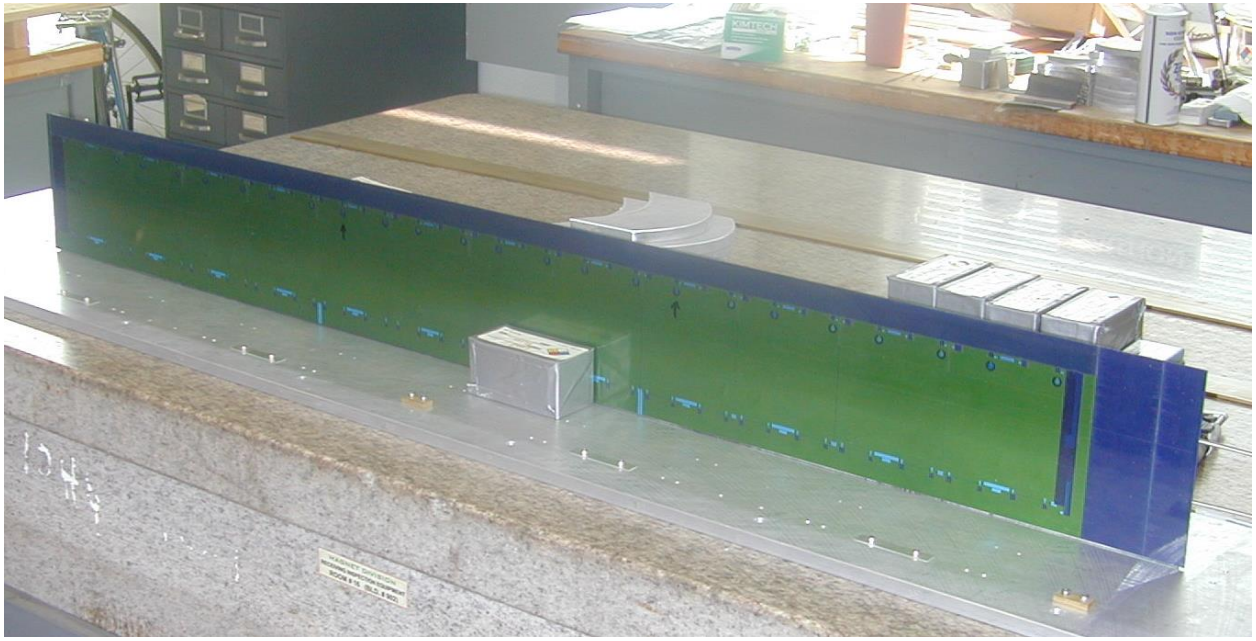
Summary of DC-DC Stave Core Measurements

- Profile Measurements
- Bend Tests
- Resonant Frequency Measurements
- Thermal Imaging

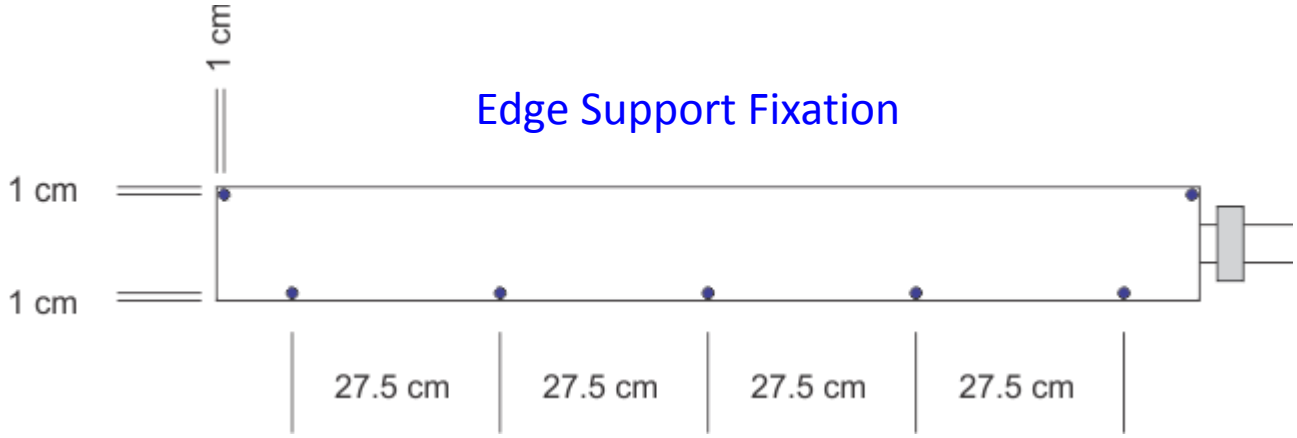


Fixation Locations for Profile Measurements

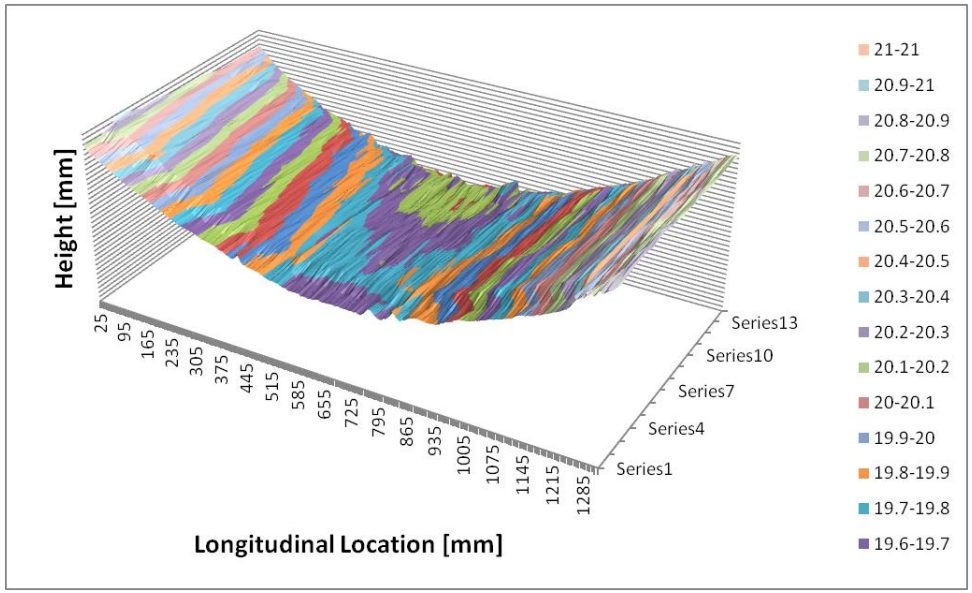
Stave Size 1300 mm x 151 mm

Simple Support Fixation

Edge Support Fixation

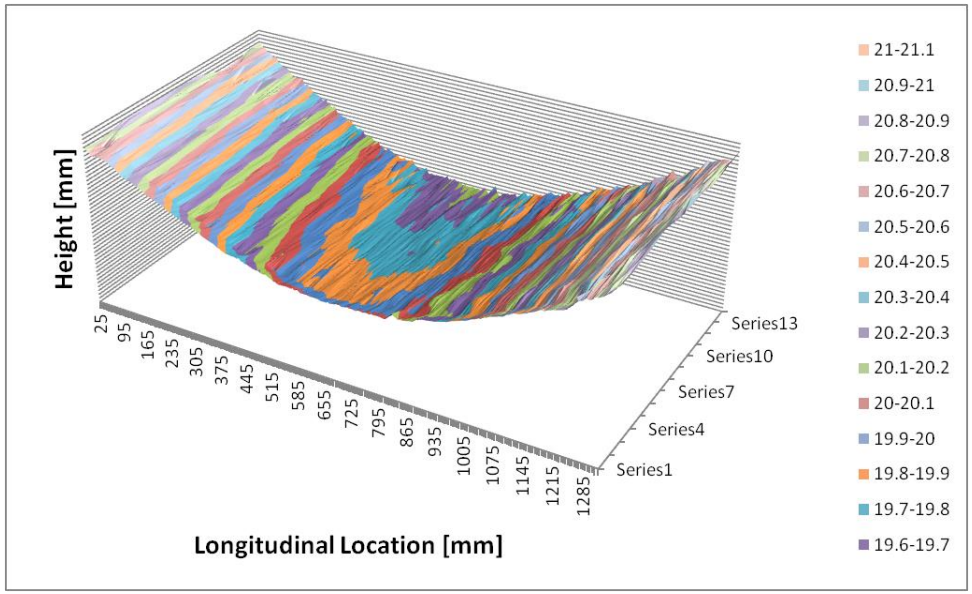


Simply Supported DC-DC Stave Core Measurements



Color binning in 100 μm increments.
14 longitudinal scans spaced 1 cm apart.
Step size 5 mm in longitudinal direction.

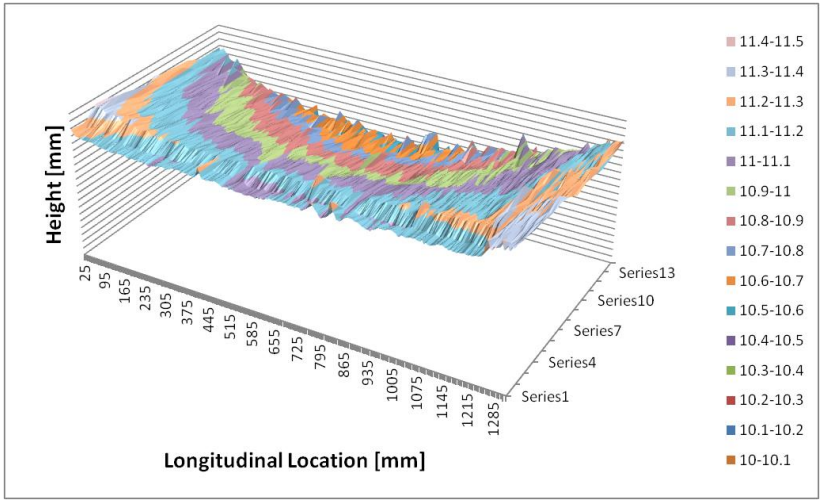
Side 1 Simple Support



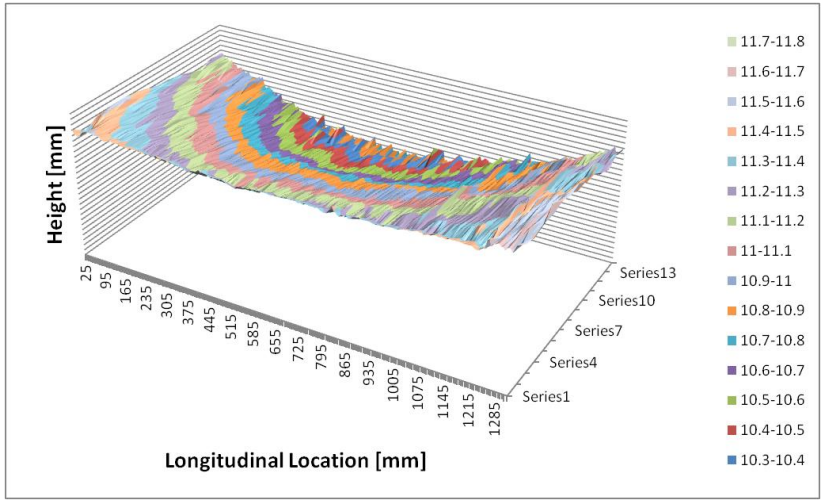
Side 2 Simple Support

Edge Supported DC-DC Stave Core Measurements

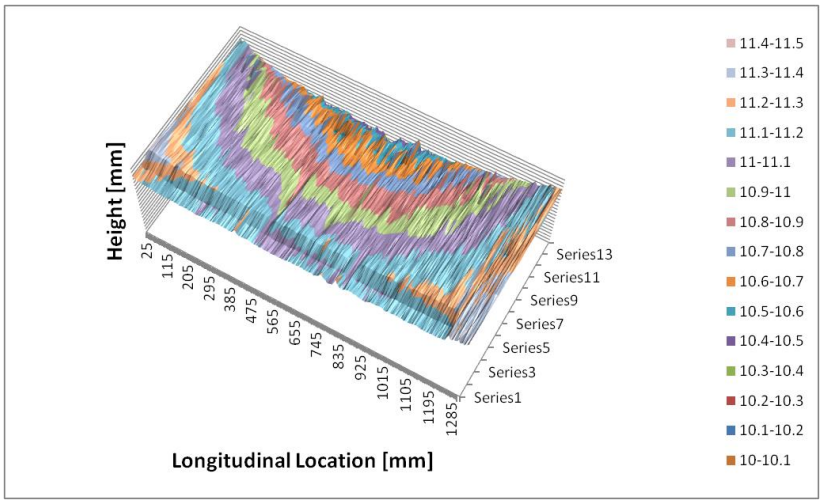
Side 1 Edge Support



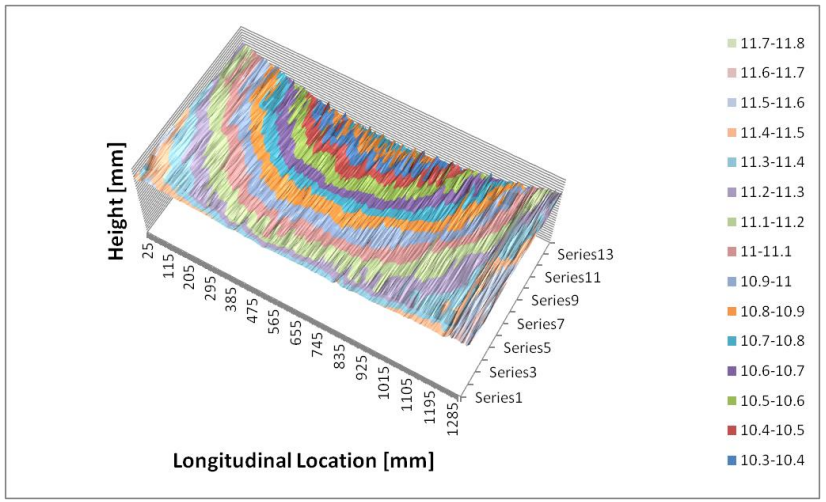
Side 2 Edge Support



Side 1 Edge Support

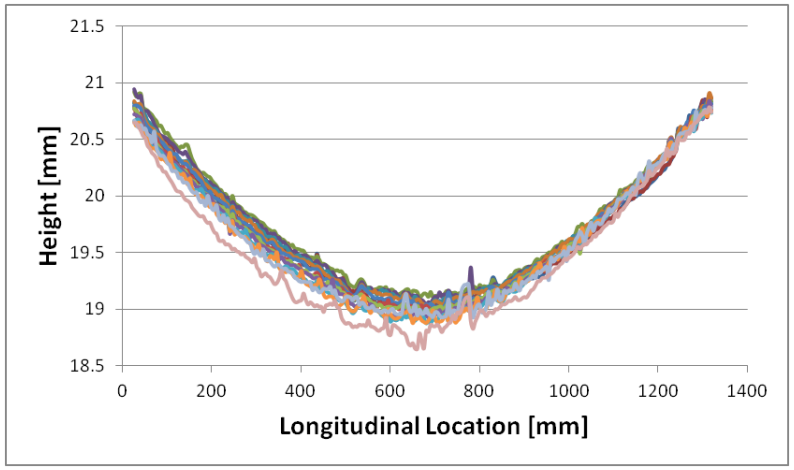


Side 2 Edge Support

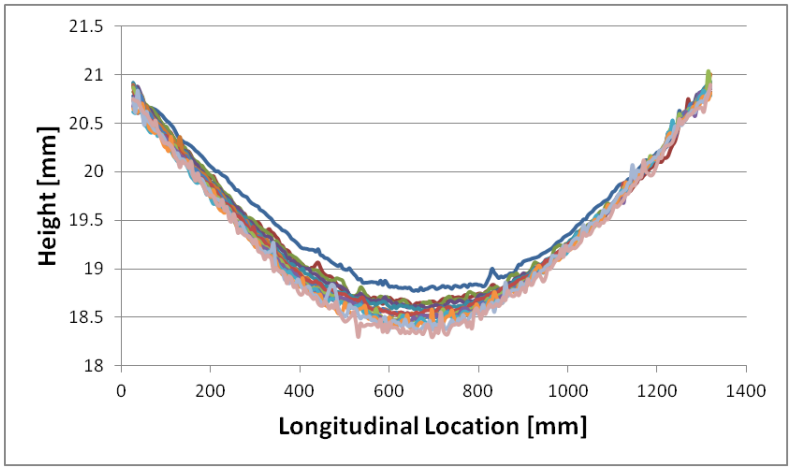


Edge Supported DC-DC Stave Core Measurements

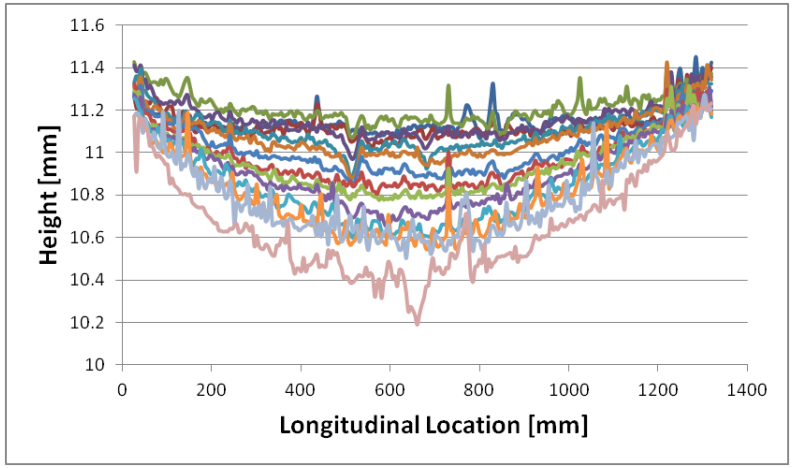
Side 1 Simple Support



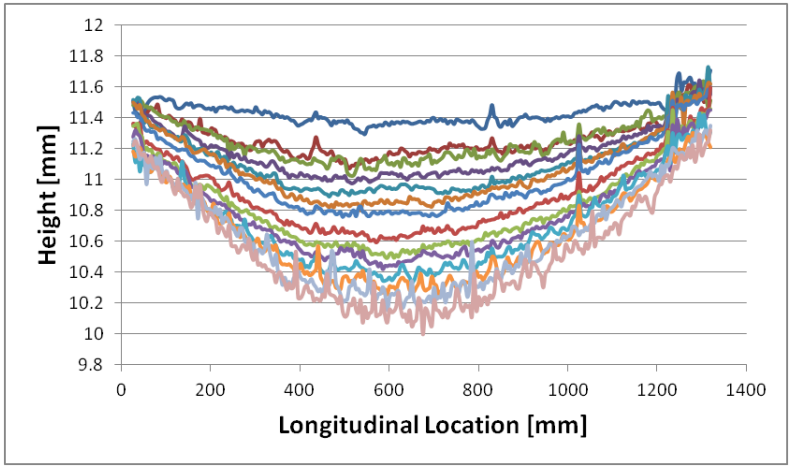
Side 2 Simple Support



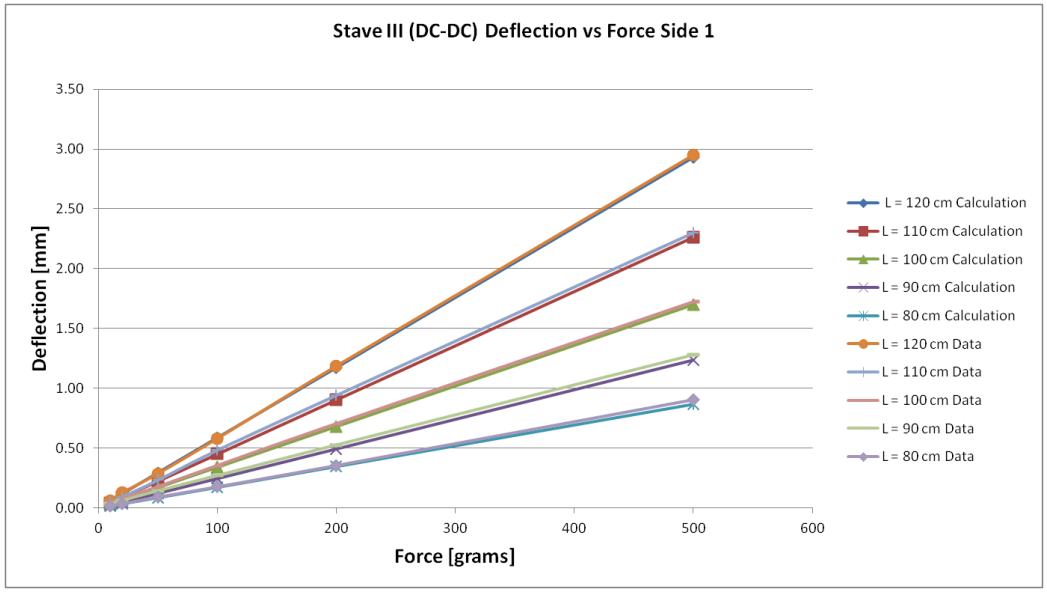
Side 1 Edge Support

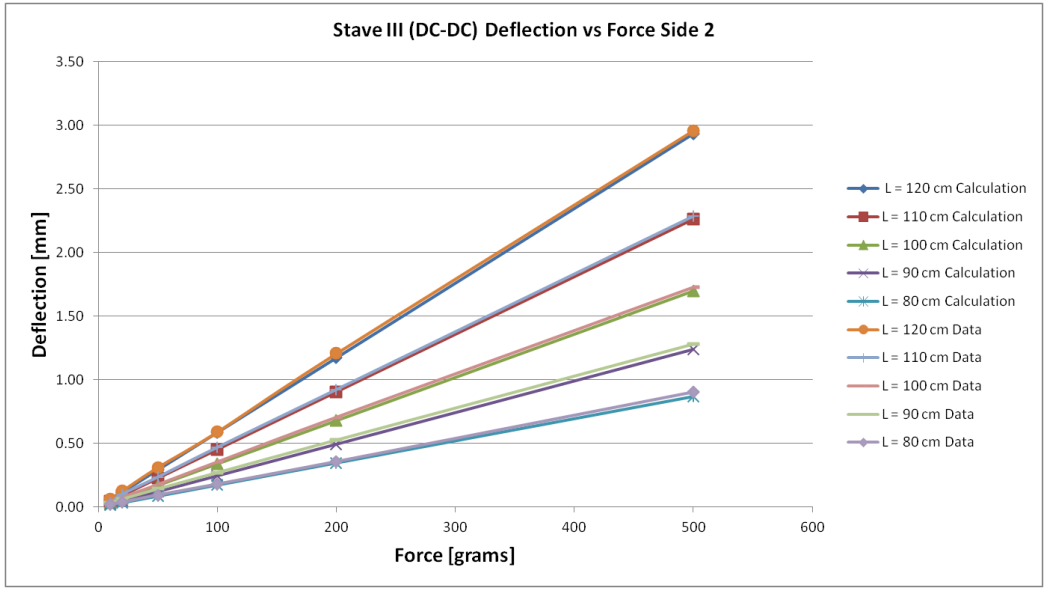


Side 2 Edge Support



Simply Supported Bend Tests with Variable Support Spacing

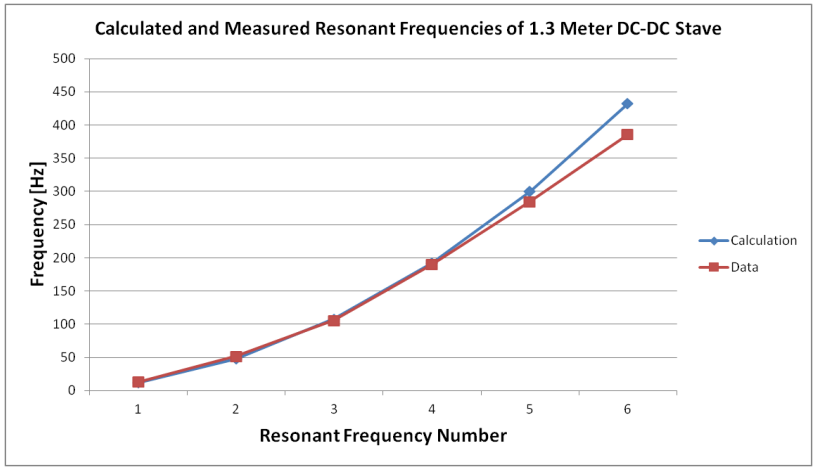




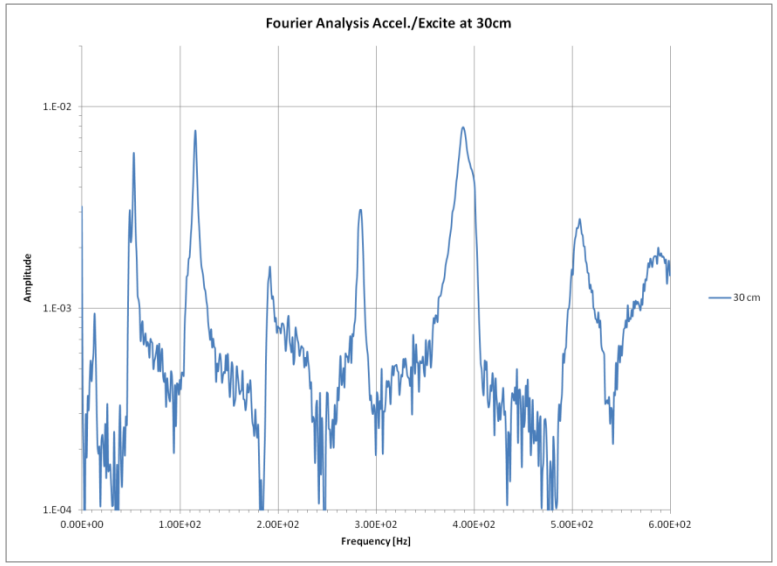
- Facing thickness measured pre-assembly to be ~ 430 μm.
- "Calculation" shown in both plots show results for a bending stiffness D = 60 Nm^2 and a effective facing modulus of 95 GPa.
- Side 1 and 2 give identical results as expected.

"L" = spacing between simple supports

Simply Supported Resonant Frequency Measurements



	Resonant Frequencies [Hz]	
Mode #	Predicted	Measured
1	12	13
2	48	52
3	108	106
4	192	190
5	300	285
6	432	386



$\delta = \frac{1}{48}\frac{P L^3}{D}$, D = bending stiffness [Nm^2], P = Load [N], L = stave length [m], δ = deflection [m]

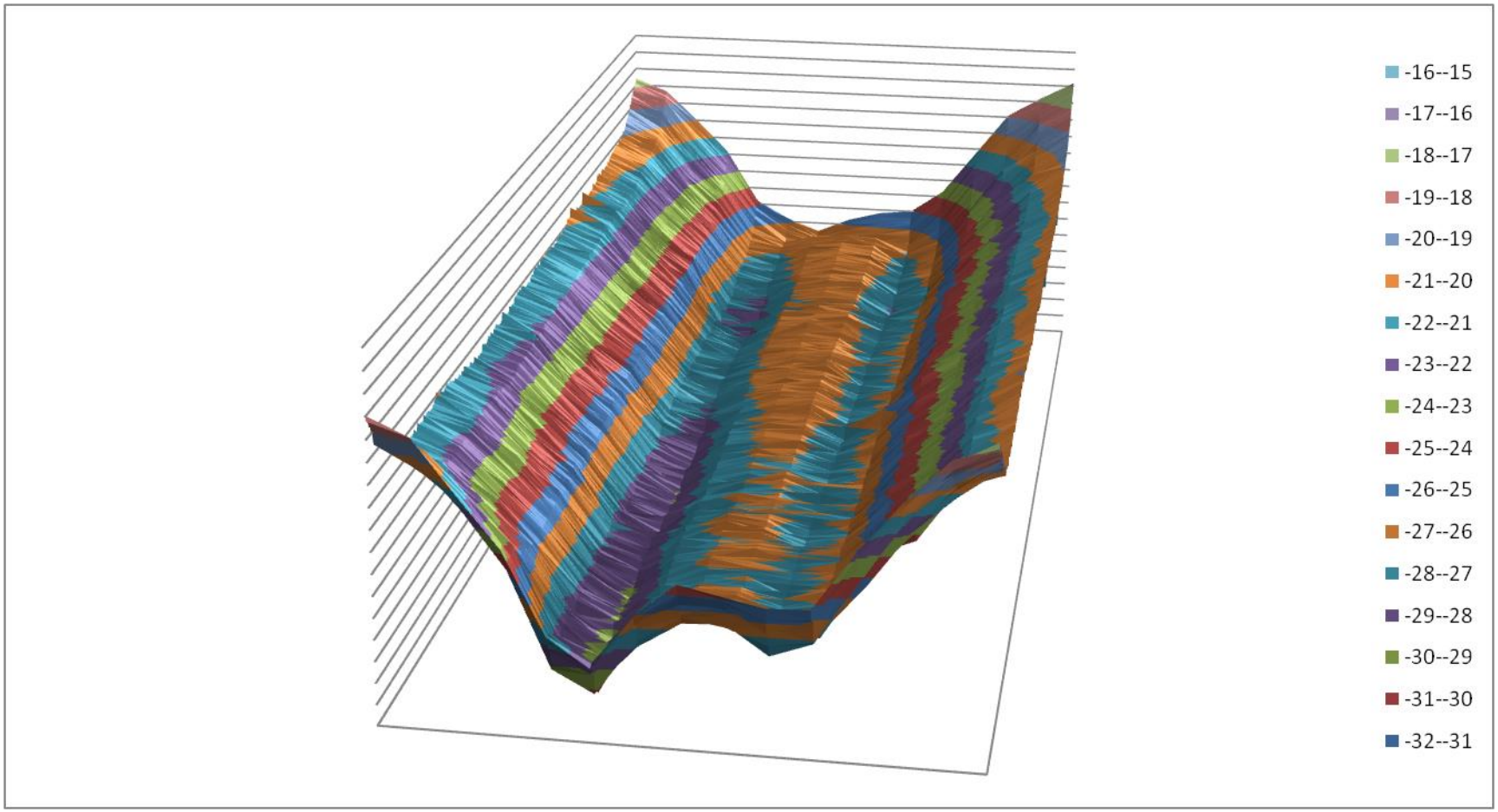
Bend test to measure "D" permits calculation of stave resonant frequencies

Simply Supported Stave Resonant Frequencies Equation

MEMs accelerometers used to measure stave resonant frequencies

$$f_n = \frac{n^2 \pi}{2}\sqrt{\frac{D}{M L^3}}$$

Approximate Side 1 Thermal Image (Camera is out of calibration)



Shape is as expected. No obvious defects.

Approximate Side 2 Thermal Image (Camera is out of calibration)