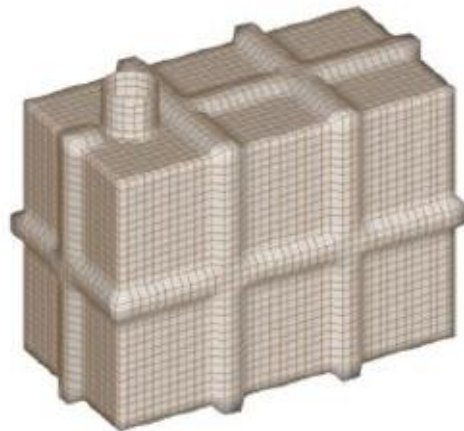


Topography Optimisation

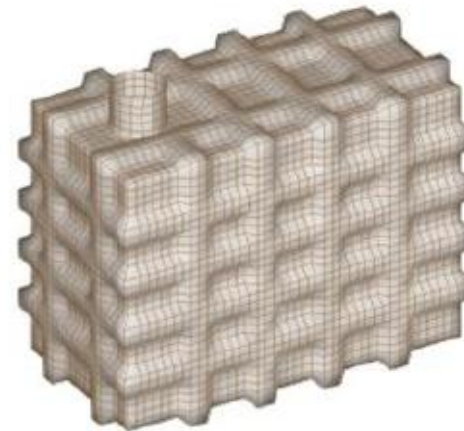
- Typically applied to thin structures to define bead and swage patterns
- Type of shape optimisation
- “free” stiffness



MAX. DEFLECT: 7.54MM



MAX. DEFLECT: 10.80MM

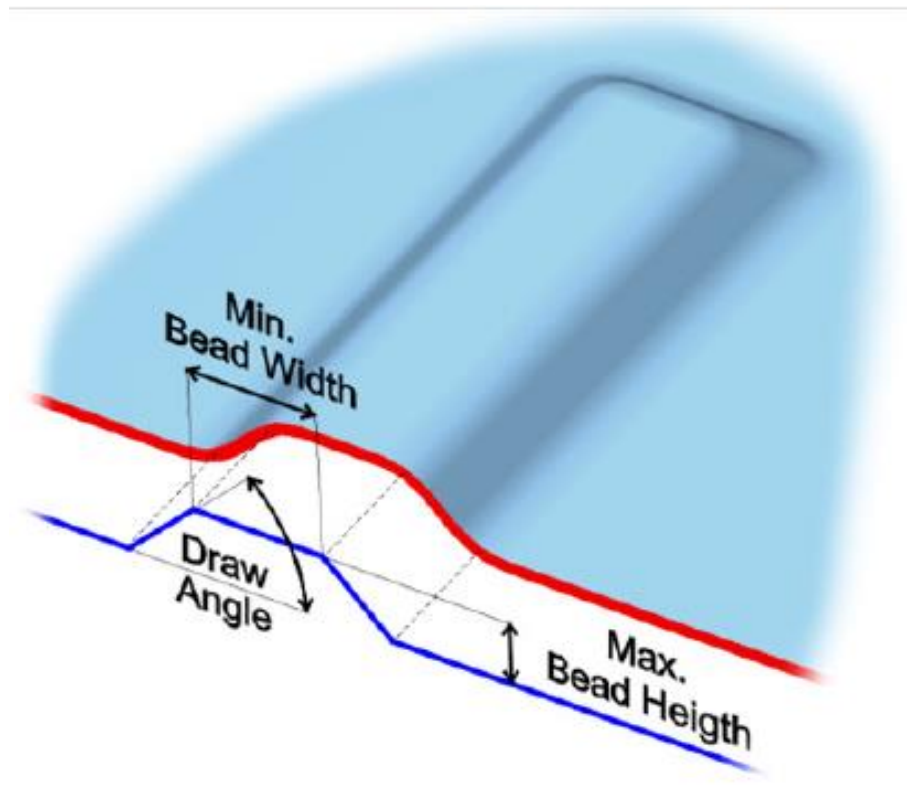


MAX. DEFLECT: 13.90MM

- A tank with internal pressure

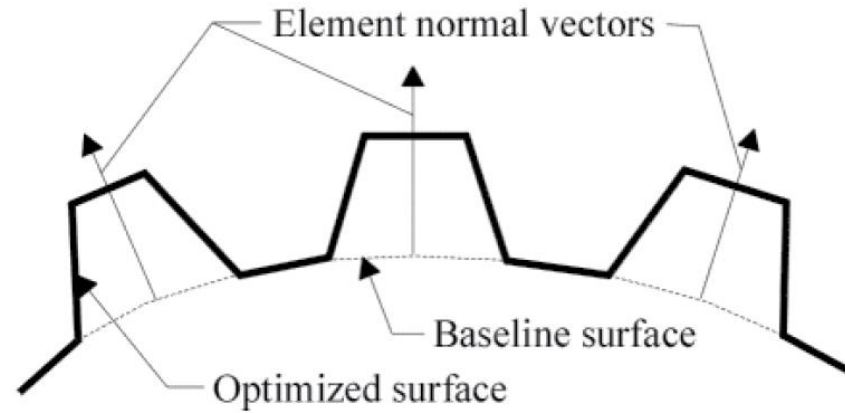
Topography Optimisation - Variables

- Design variables
- Variable
- Objective
- constraints

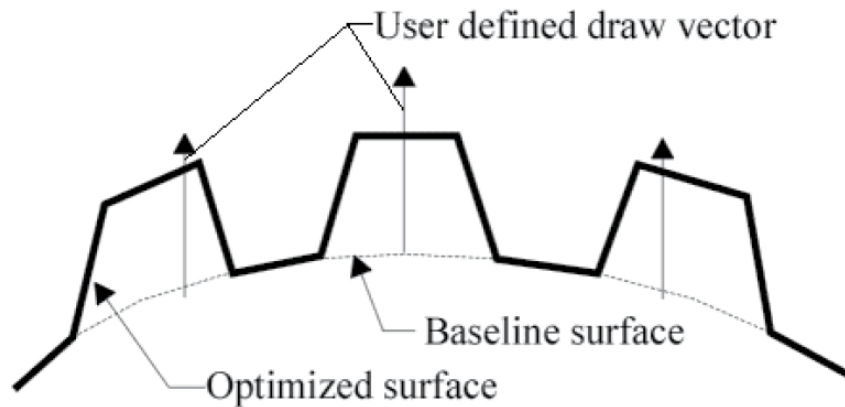


Topography Optimisation – Draw direction

- Element Normals
 - Good for curved surfaces
 - Enclosed volumes etc where beading is normal to the surface

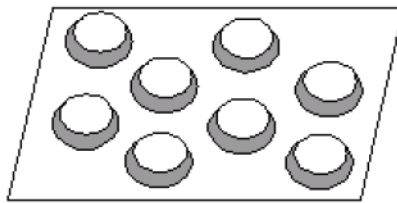


- Vector defined
 - Beads must be in the same direction due to manufacturing.

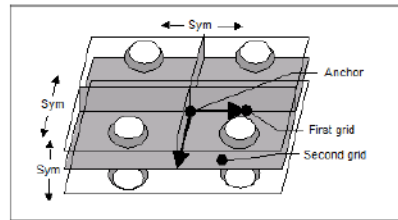


Topography Optimisation - Manufacturing

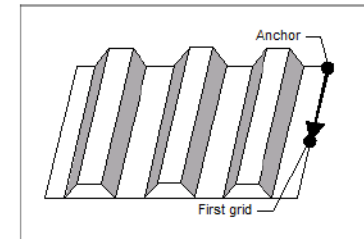
- Manufacturing constraints – pattern grouping
 - Channels that must have a constant cross section
 - Stampings that can not lock the die
 - etc



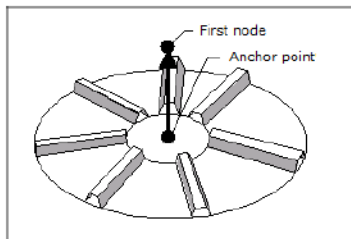
TYP = 0: No Symmetry



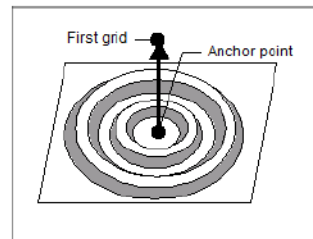
TYP = 30: Three Planes Of Symmetry



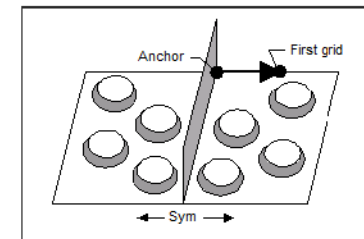
TYP = 1: Linear Pattern Grouping



TYP = 4: Simple Radial (2D) Pattern Grouping

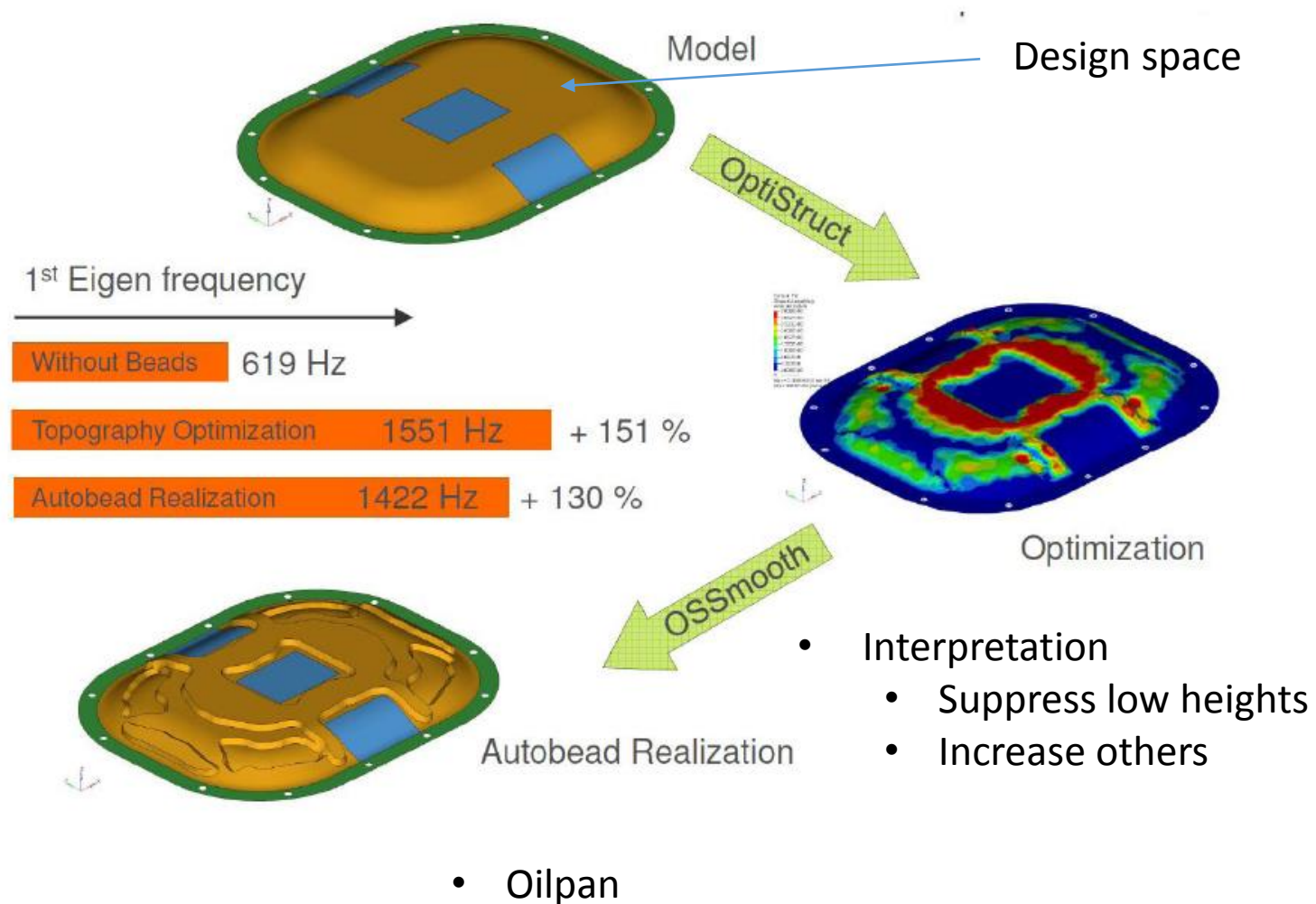


TYP = 2: Circular Pattern Grouping



TYP = 10: One Plane Of Symmetry

Topography Optimisation - Examples



Notes adapted from/Further reading

- Practical Aspects of Structural Optimisation, Altair University, 2014