PERMAS
Beads for Optimizing Vibrations

Procedure:
- Selecting bead area
- Selecting width and height of beads
- Maximize eigenfrequencies as objective for optimization
- Element quality as design constraint
- Automatic generation of bead design
- Using optimized model for further analysis
- Export of optimized geometry for new part design

An empty tank is vibrating with its first two eigenfrequencies against the connecting flange at about 6 and 8 Hz, respectively. By an automatic generation of beads around the flange both eigenfrequencies can be raised to about 16 Hz.
VisPER provides the graphically guided definition and evaluation of bead designs:

- Definition of bead area and its symmetry conditions
- Definition of bead orientation
- Indication of bead width and height as well as bead ratio
- Indication of objective function and constraints
- Export of new coordinates

Objective function: Maximize smallest eigenfrequency.

The element error exactly represents the PERMAS element test:
0: element is perfect,
1: element is erroneous, here the element error is limited to 0.8 as constraint.