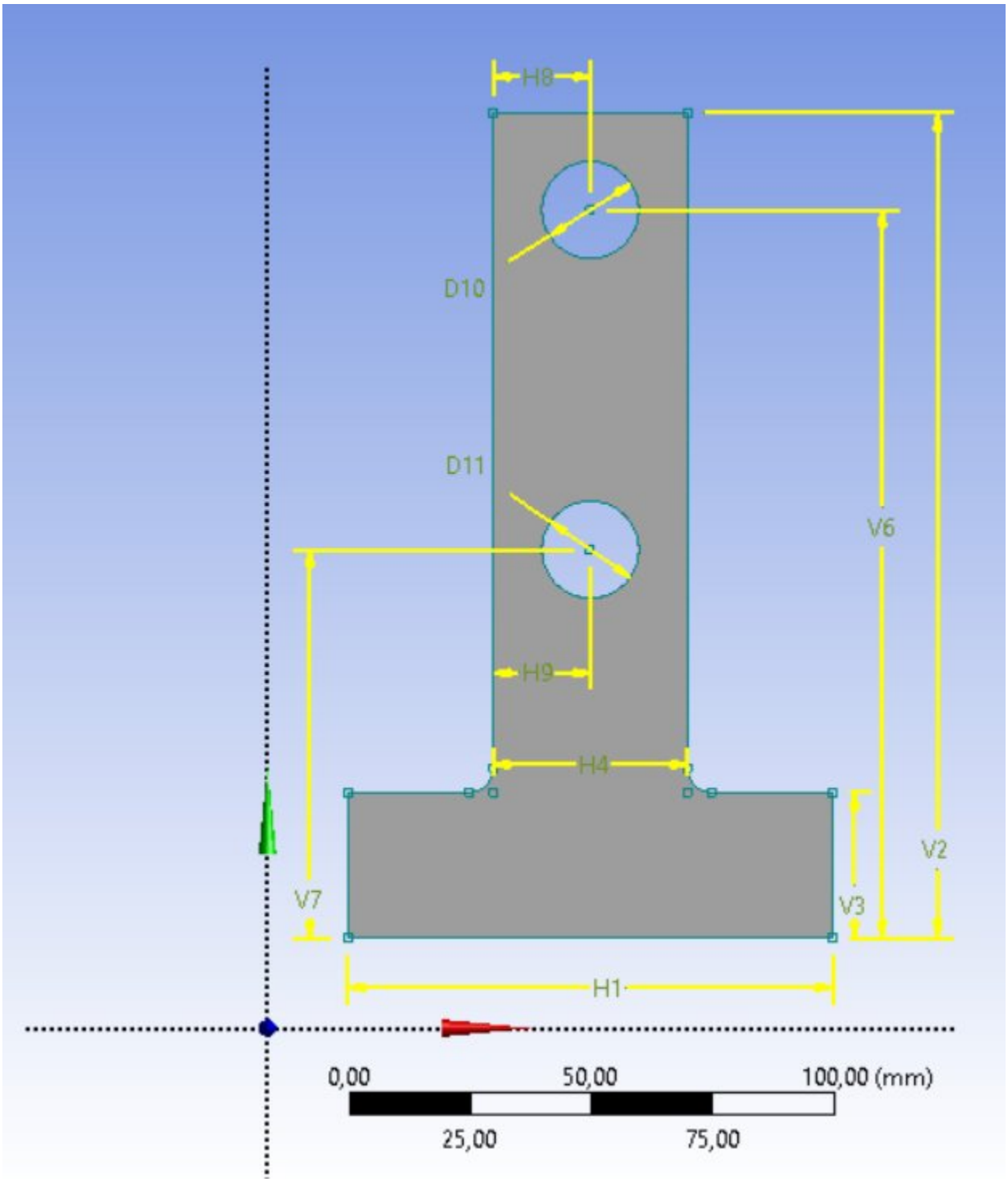
Solutions:

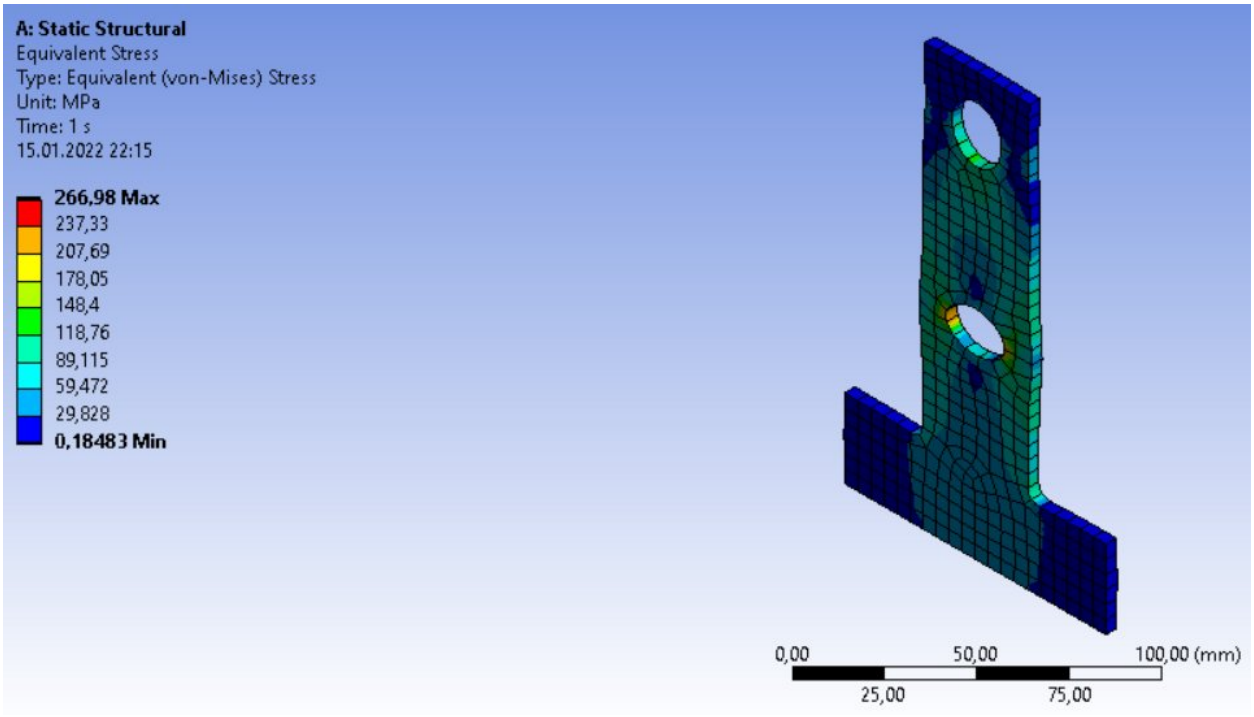
1. Create a 3D model of the connecting lug.

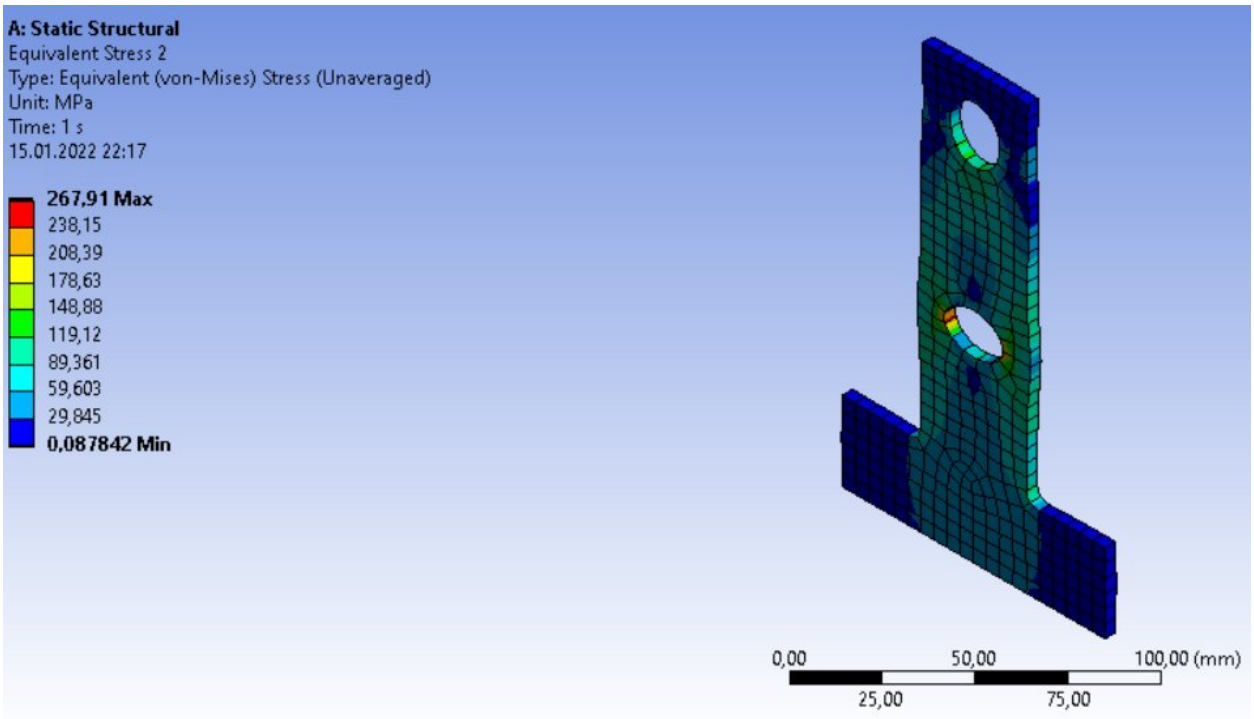


Dimensions: 10	
D10	20 mm
D11	20 mm
H1	100 mm
H4	40 mm
H8	20 mm
H9	20 mm
V2	170 mm
V3	30 mm
V6	150 mm
V7	80 mm

Thickness 4 mm
Material aluminum

2. Perform a rough calculation of the stress, setting the element size of 5 mm.

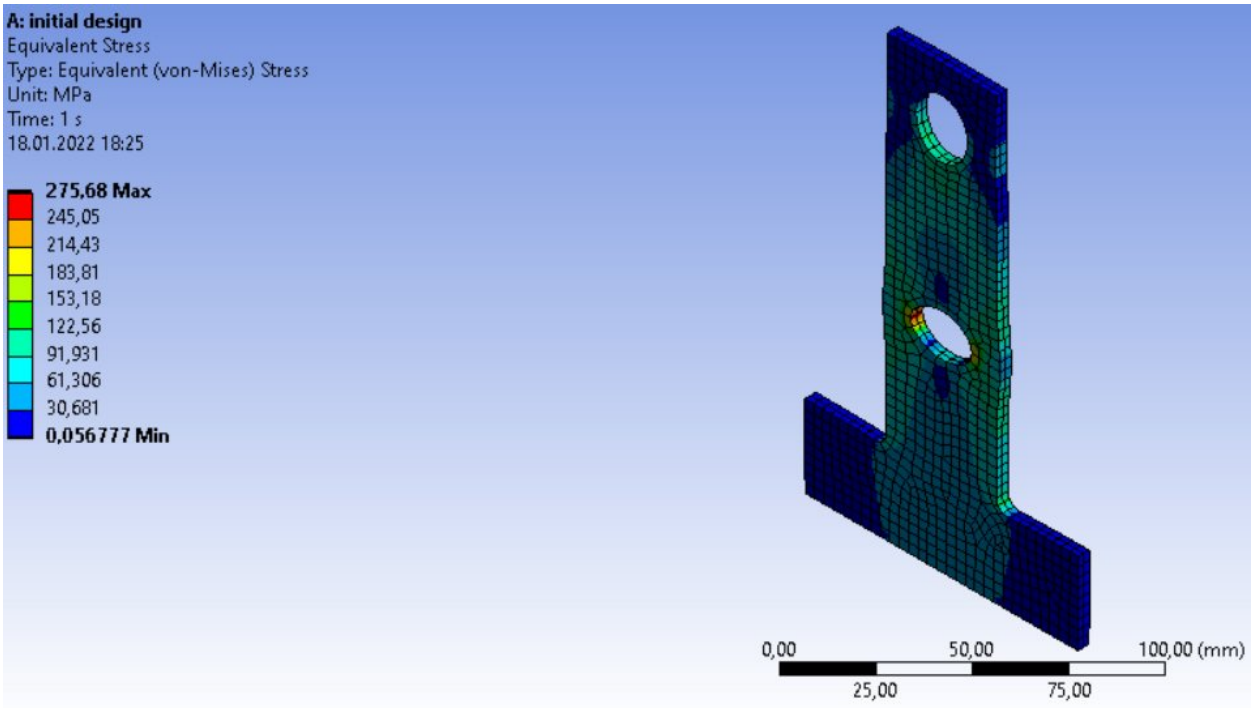


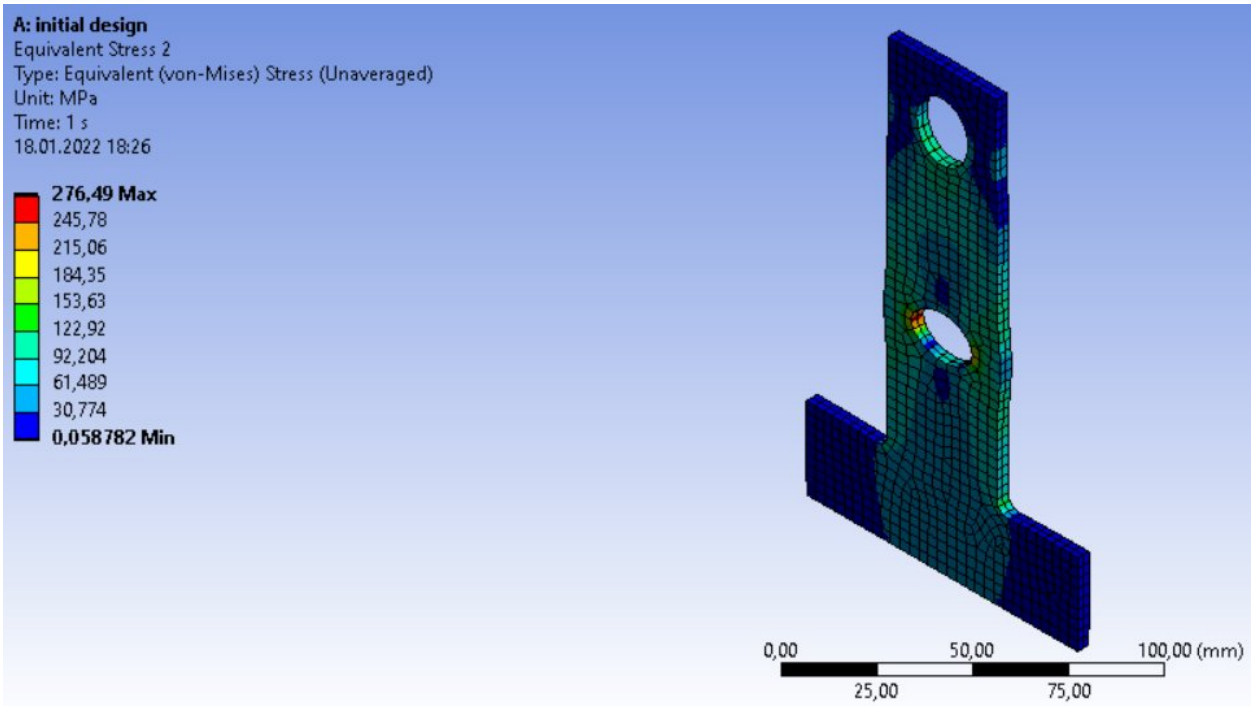


Maximum stress is 267 MPa which is less than yield strength of aluminum alloy (280 MPa).

3. Perform mesh refinements until the desired accuracy is obtained (Figures).

3.5 mm mesh

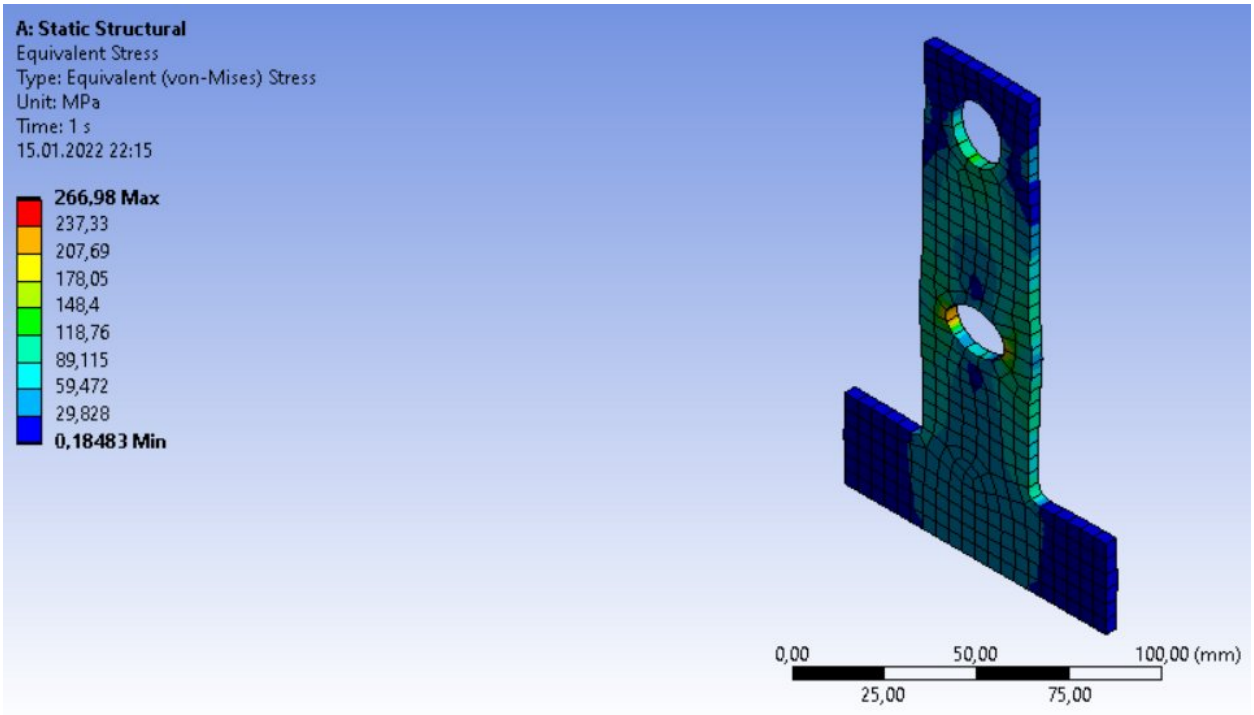




Element size	Averaged stress		Unave. stress
3.5 mm	276 MPa	< 1%	276 MPa
	3%		3%
5 mm	**267 MPa**	**< 1%**	**268 MPa**

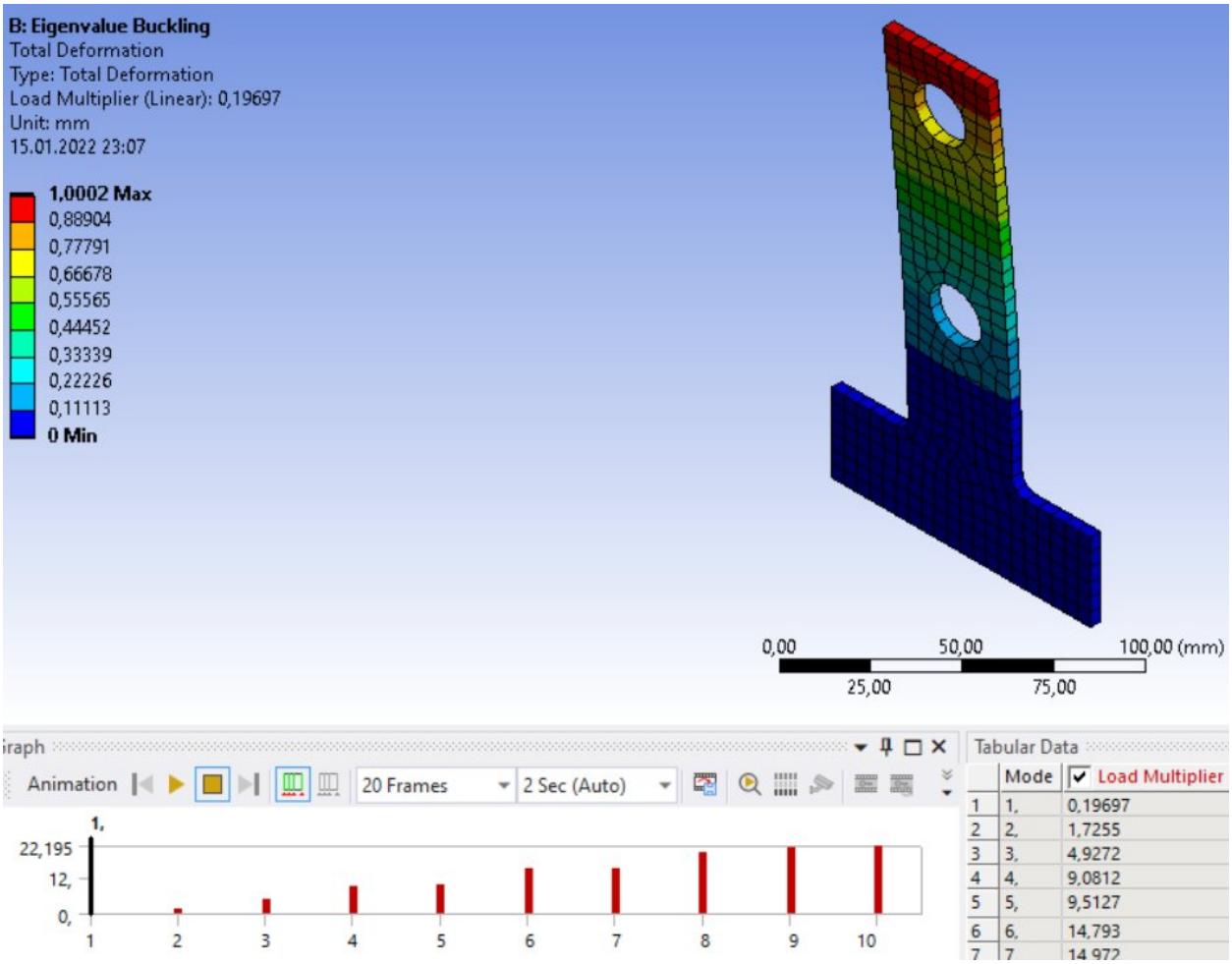
5% accuracy is preserved below 5 mm element size. So we continue with 5 mm.

4. Perform a safety analysis with regard to the stresses. Calculate with a safety factor of 1.3. (Figure)



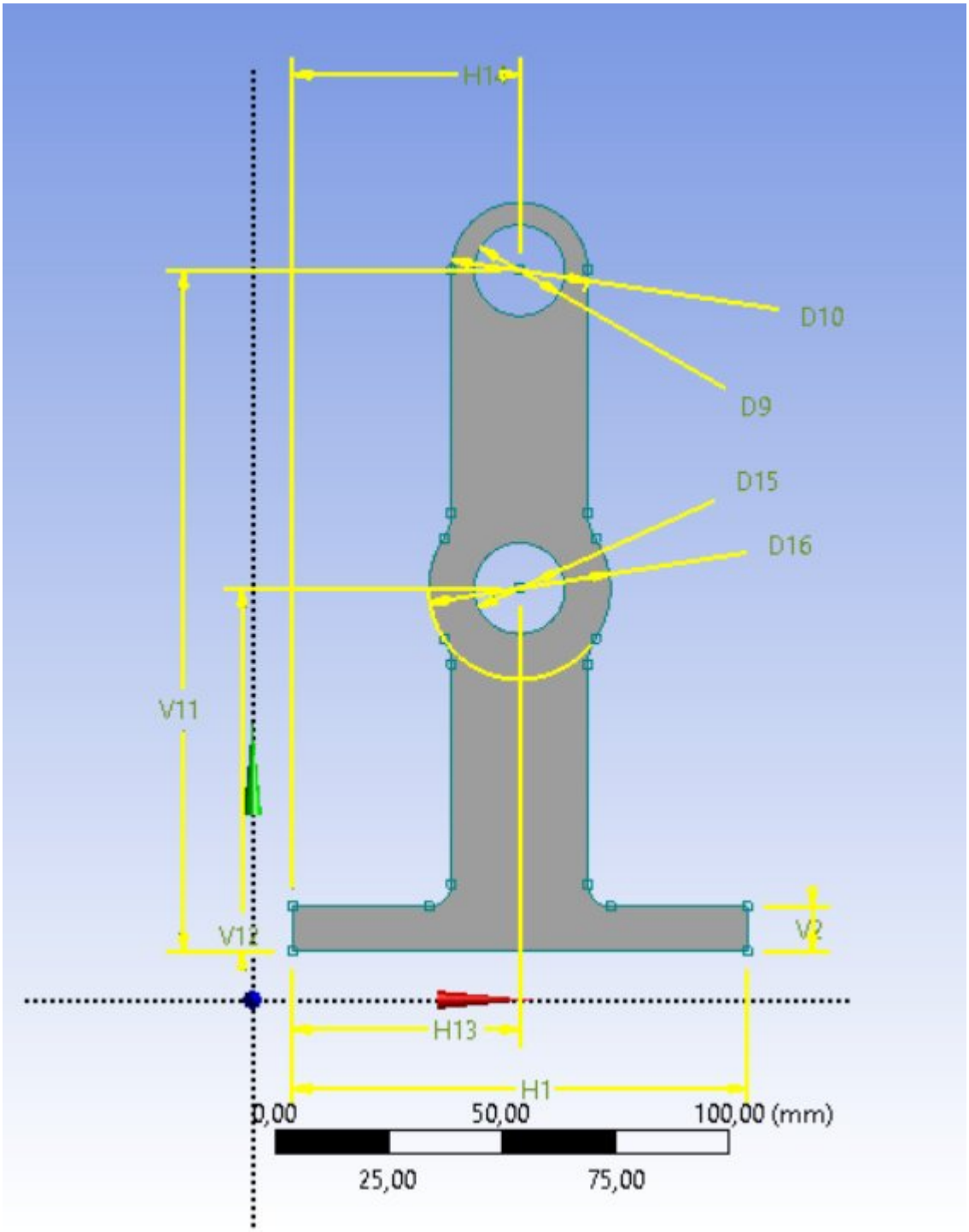
Together with safety factor we have 267 * 1.3 = 347 MPa > 280 MPa yield strength for aluminum alloy. The result is not OK in this case.

5. Perform a safety analysis with regard to the stability (Linear buckling analysis). The safety factor against buckling must also be 1.3. (Figure 1st Buckling mode)



Load multiplier is 0.196 < 1.3 safety factor. The result is not OK here either.

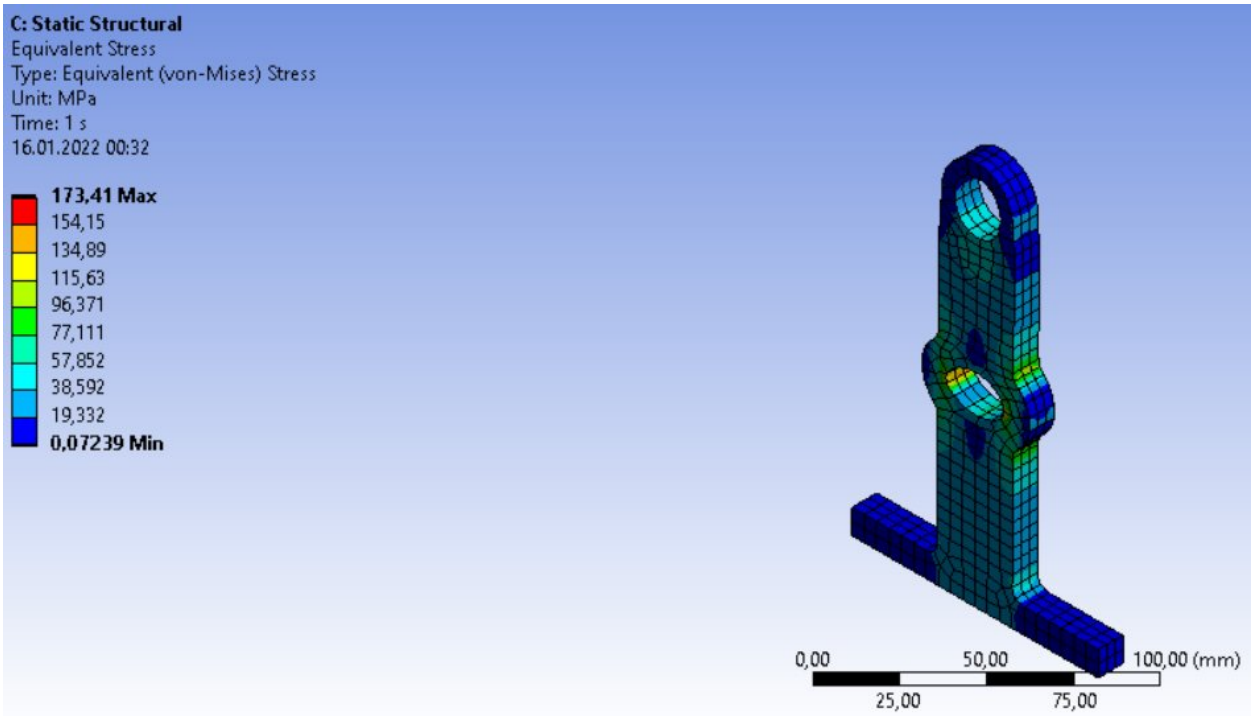
6. Improved design

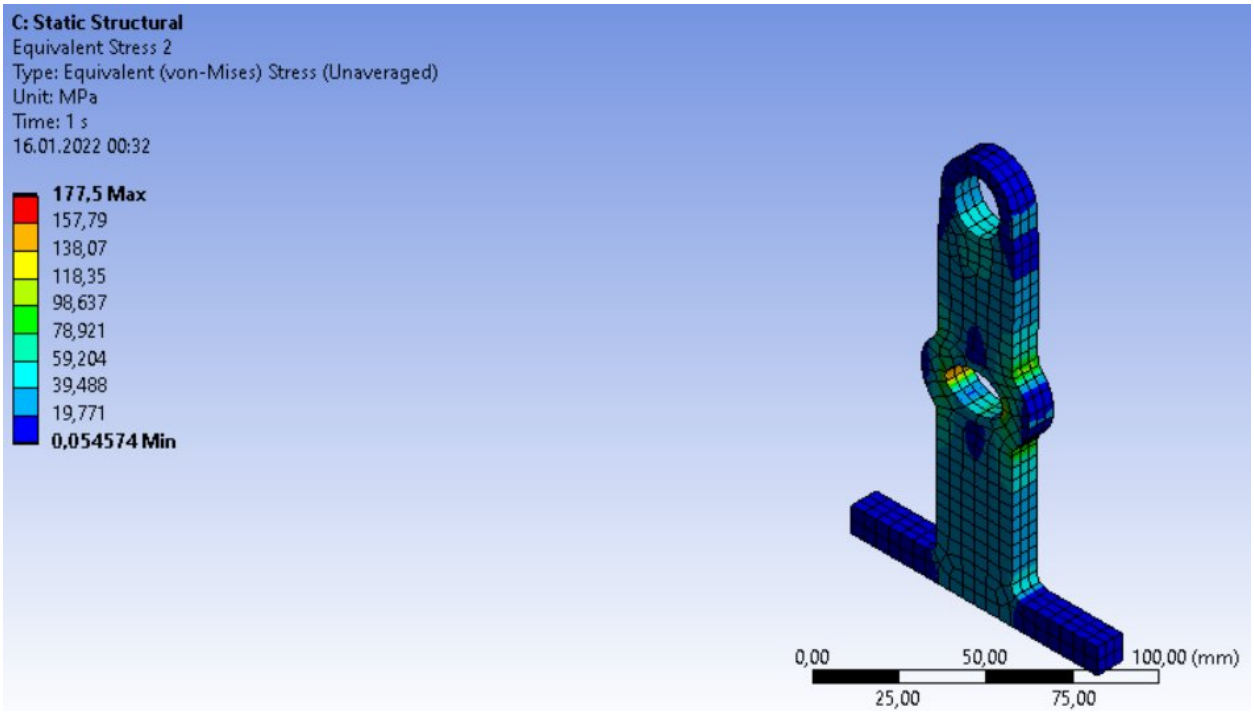


Dimensions: 10	
D10	30 mm
D15	20 mm
D16	40 mm
D9	20 mm
H1	100 mm
H13	50 mm
H14	50 mm
V11	150 mm
V12	80 mm
V2	10 mm

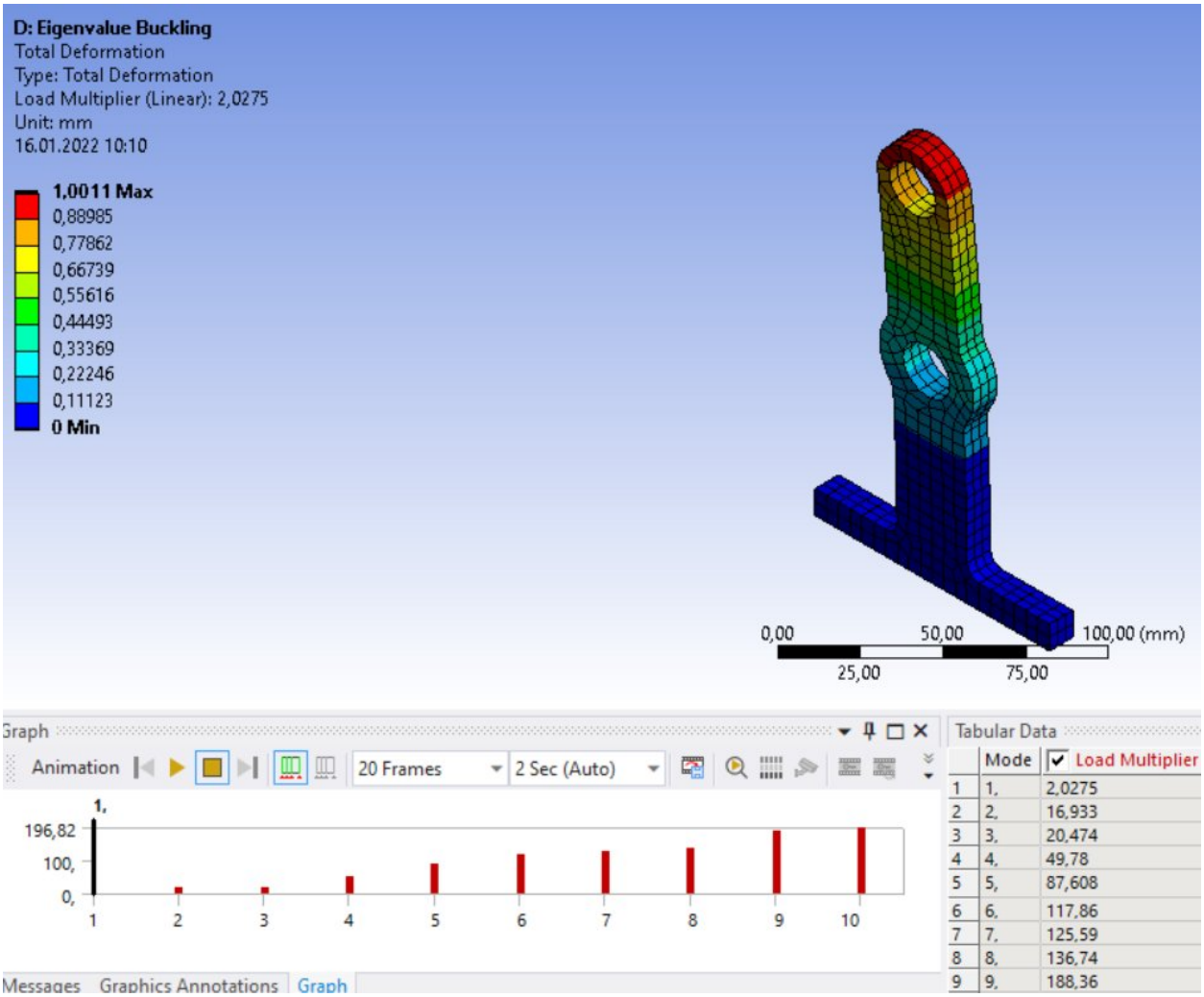
Thickness = 10 mm

Properties	
Volume	51214 mm^3
Mass	0,14186 kg
Centroid X	58,808 mm
Centroid Y	76,77 mm
Centroid Z	5, mm
Moment of Inertia Ip1	335,86 $kg \cdot mm^2$
Moment of Inertia Ip2	34,658 $kg \cdot mm^2$
Moment of Inertia Ip3	368,16 $kg \cdot mm^2$





173 * 1.3 = 225 MPa < 280 MPa yield strength. The stress results of the new design are OK. (with element size 5 mm)



2.03 > 1.3 safety factor. Buckling result is also OK.