

Designing the Frame of an Airplane Seat

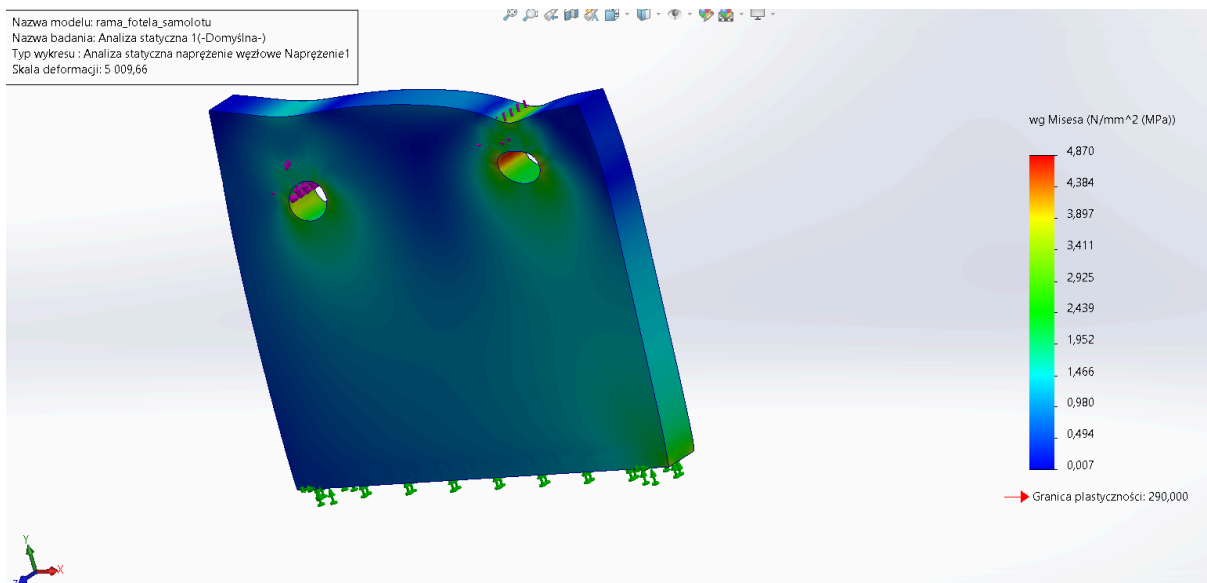
Natalia Borysowska-Ślęczka

Obtained Results:

Simulations

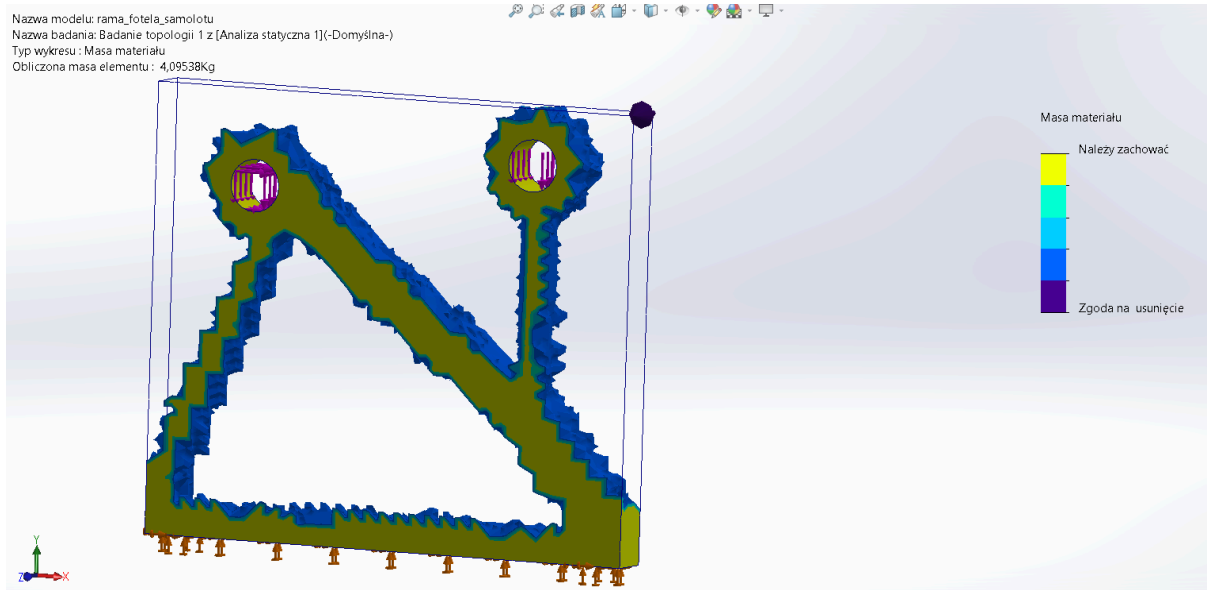
Static Analysis:

Distribution of stress according to the Mises criterion after a static analysis of the BASE MODEL:

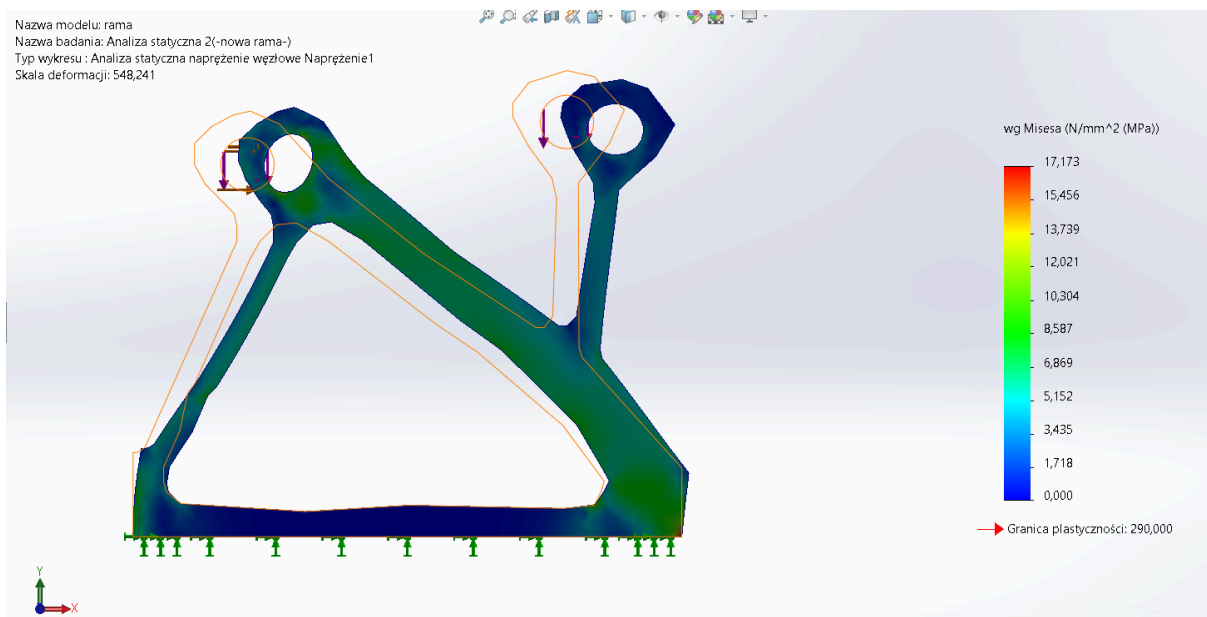


Topology Study:

Mass reduction (by 80%):

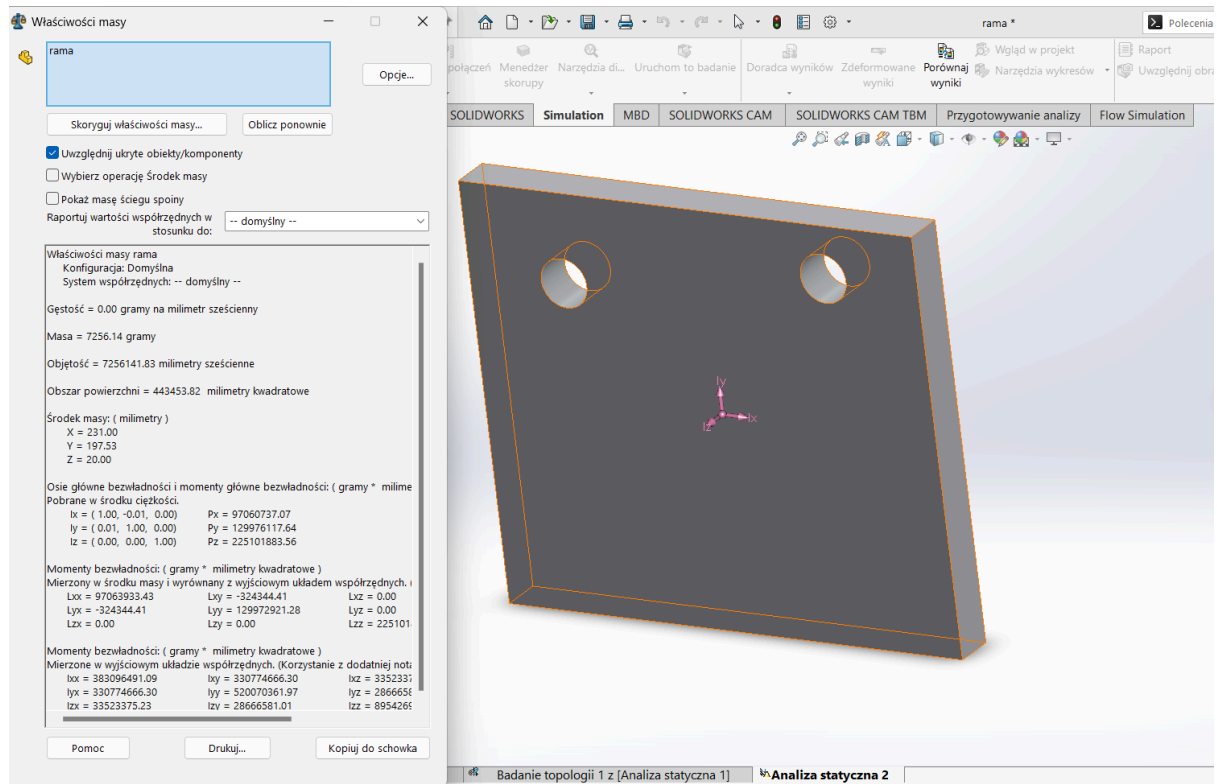


Distribution of stress according to the Mises criterion after a static analysis of the NEW MODEL:

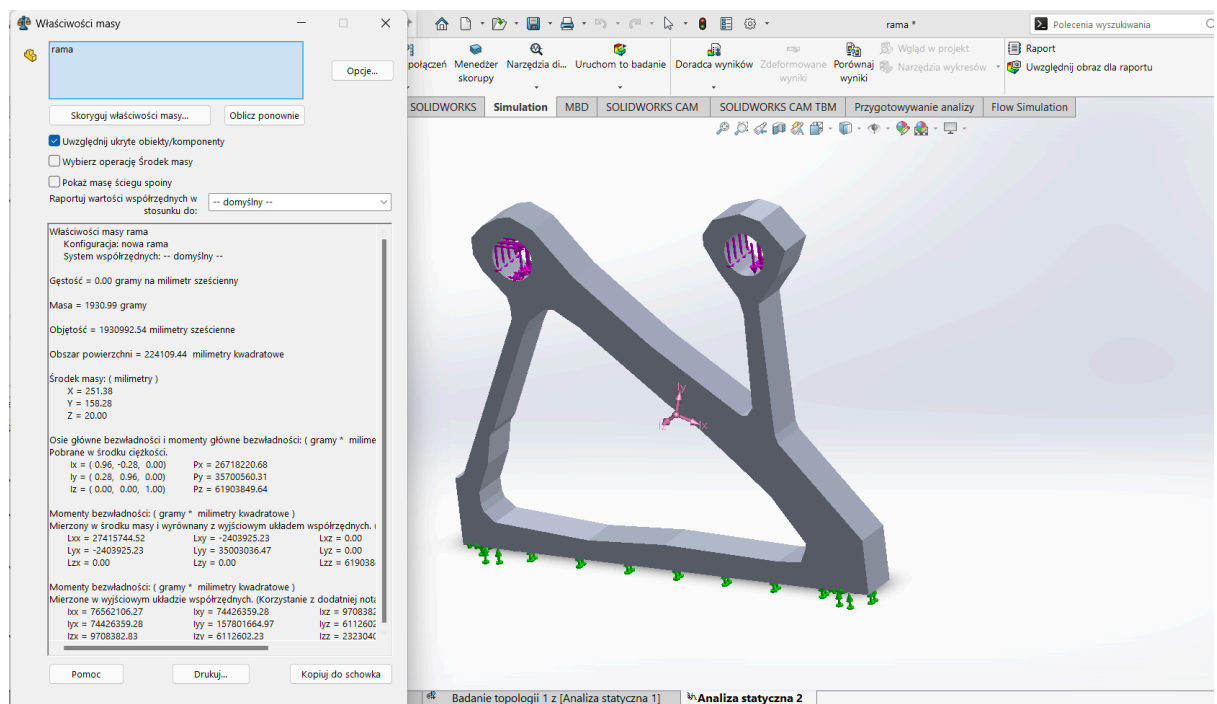


RESULTS:

for the base frame → mass = 7256.14 grams



for the new frame → mass = 1930.99 grams

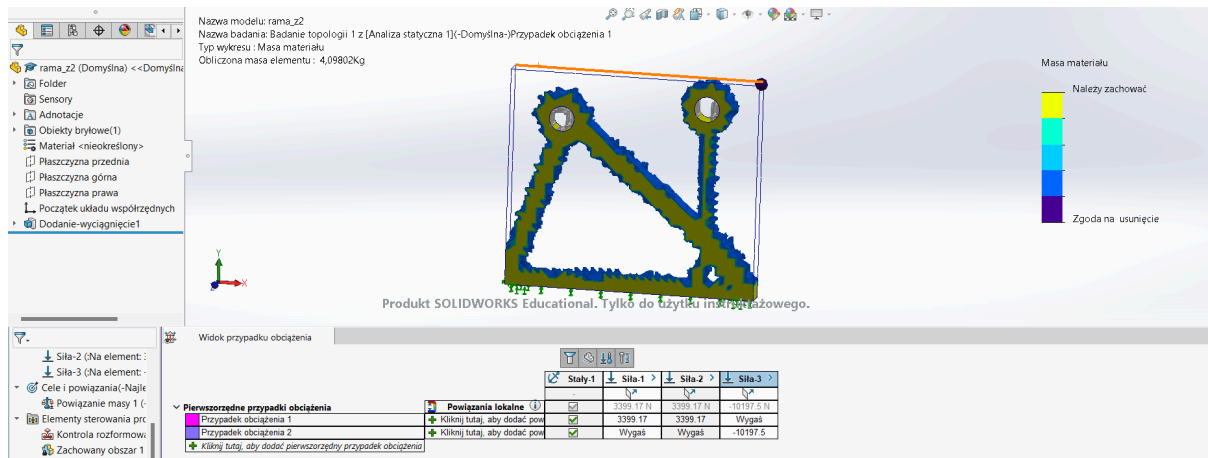


CONSLUSIONS

	Maksymalne napężenie wg Misesa	Masa modelu
Po analizie statycznej modelu bazowego	4.870 Mpa	7256.14 g
Po analizie statycznej nowego modelu	17.173 Mpa	1930.99 g

The new model of the airplane seat frame, designed using topological optimization, shows a significant reduction in mass with an increase in maximum stress. The study allowed for a significant reduction in the weight of the seat frame, which is crucial in aviation for fuel savings and improving aircraft efficiency.

Mass distribution after topological optimization for various load cases:



Mass distribution after topological optimization for various load cases and the area maintained for loads only:

