Topological Optimization

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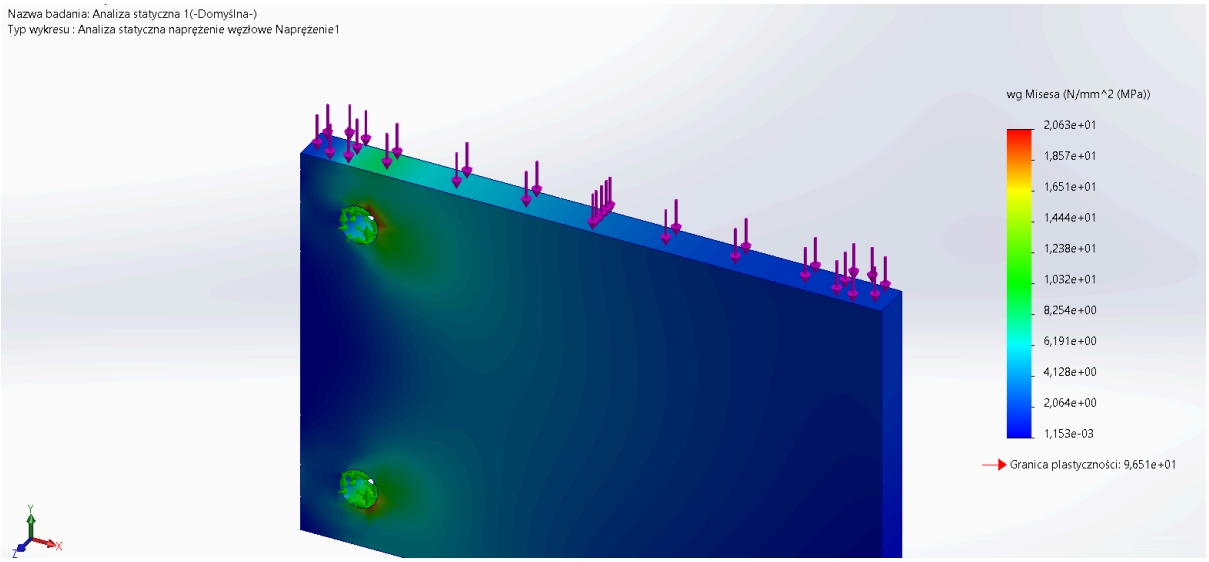
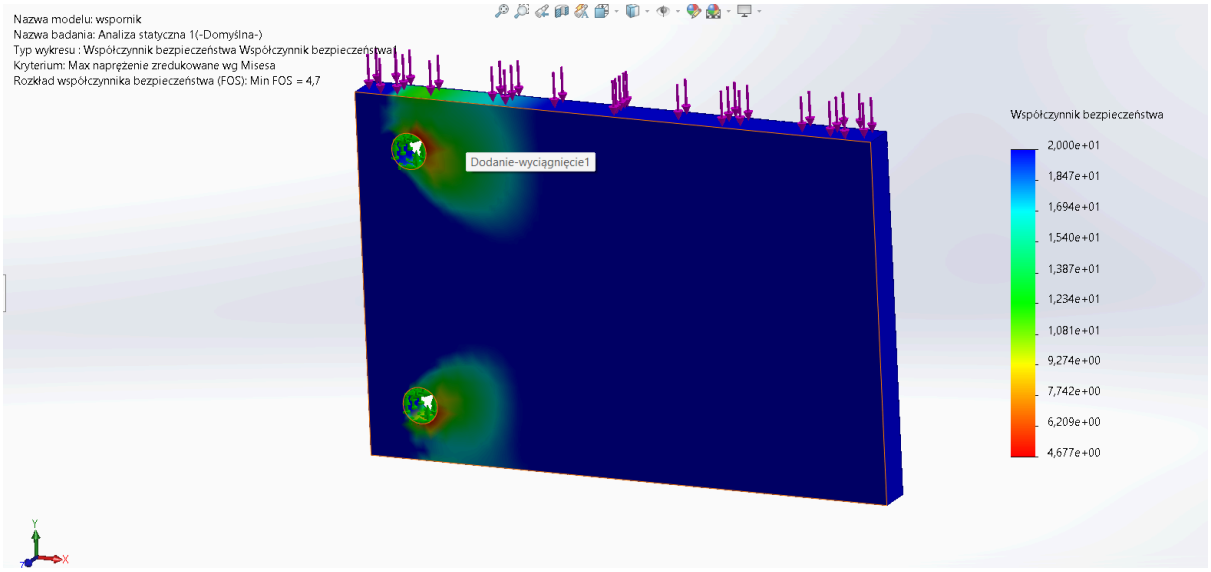
Obrained Results:

SIMULATIONS

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

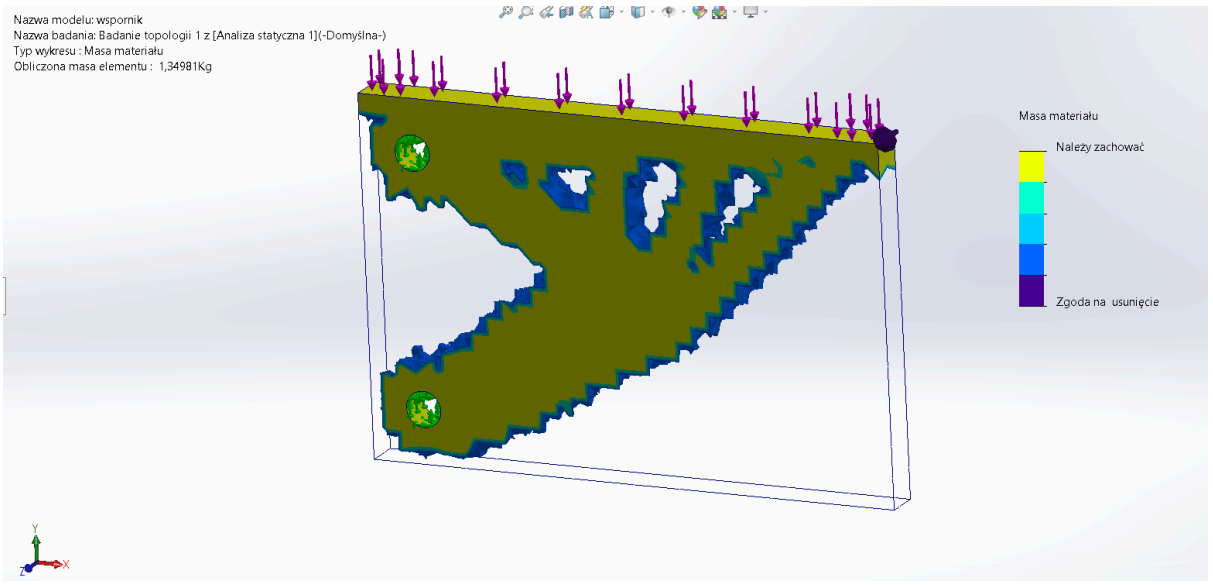


Safe factor after static analysis of the BASE MODEL:

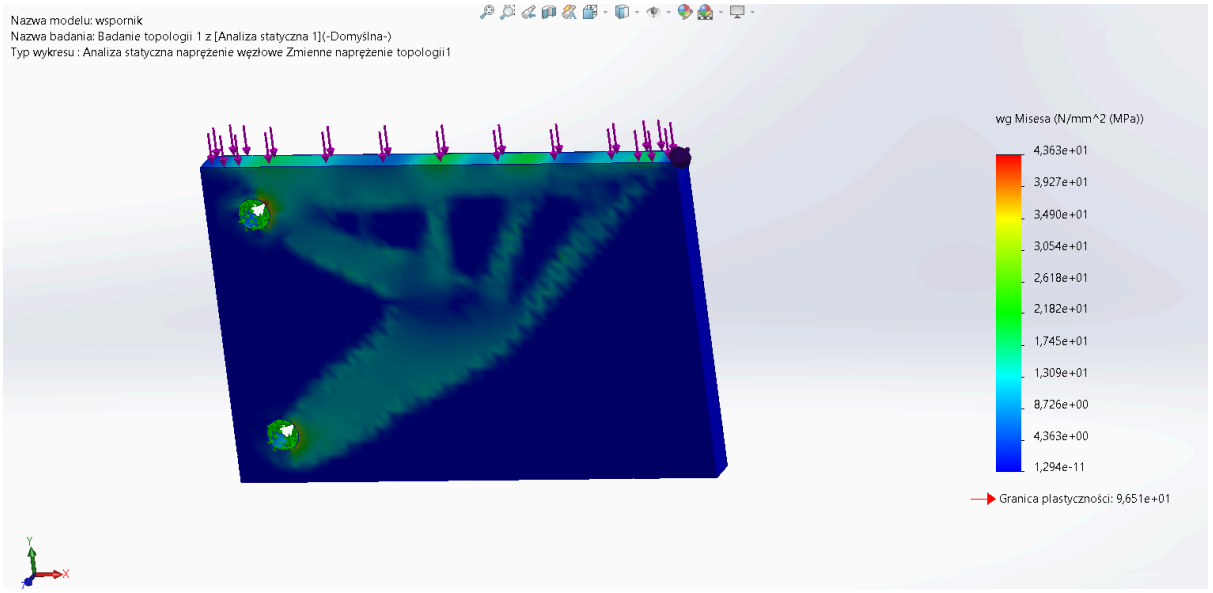


Next stages of topology study:

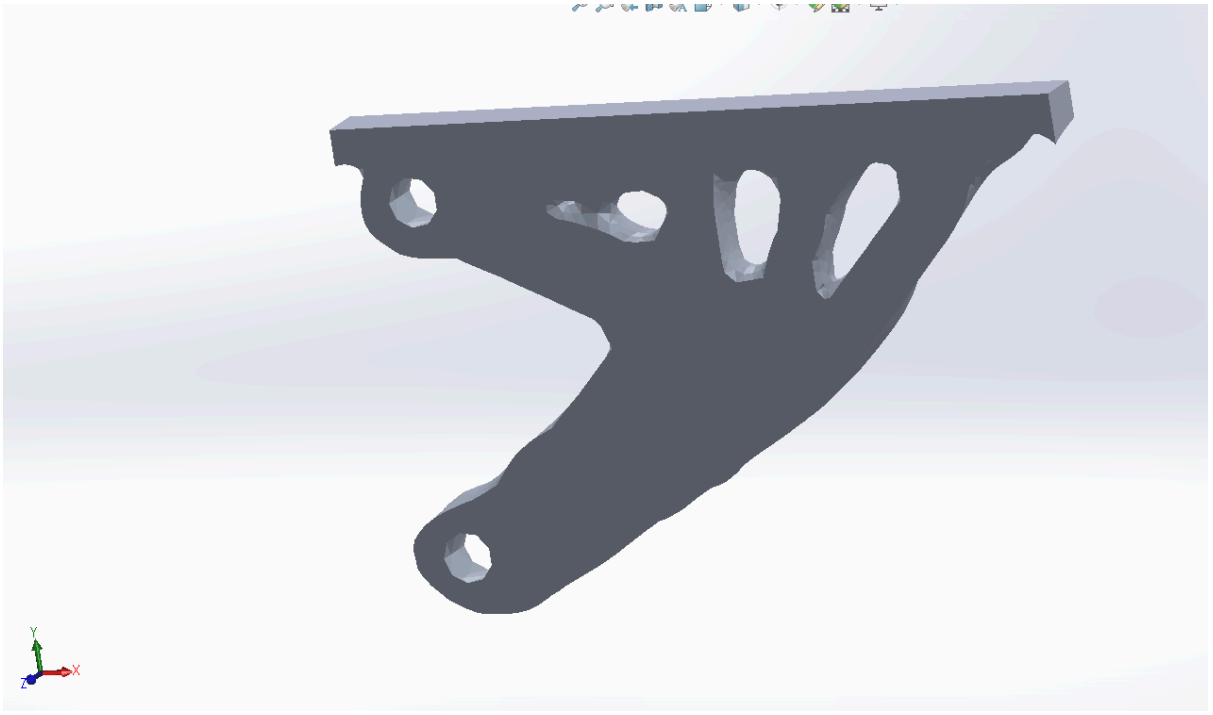
mass reduction (by 60%):



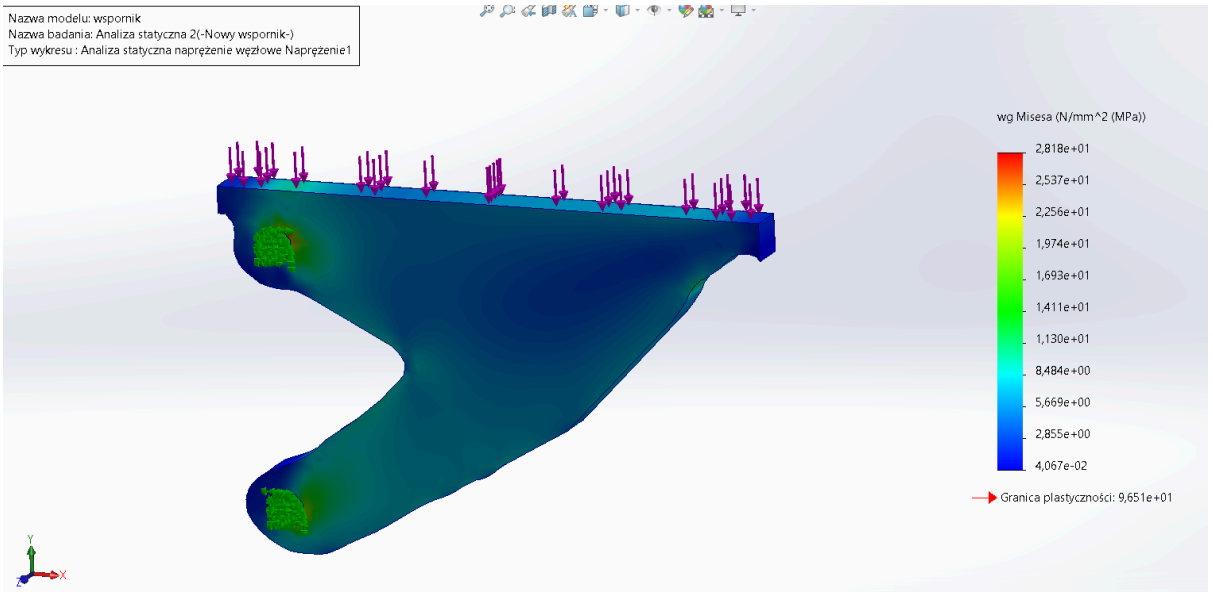
stress according to Mises for the entire model:



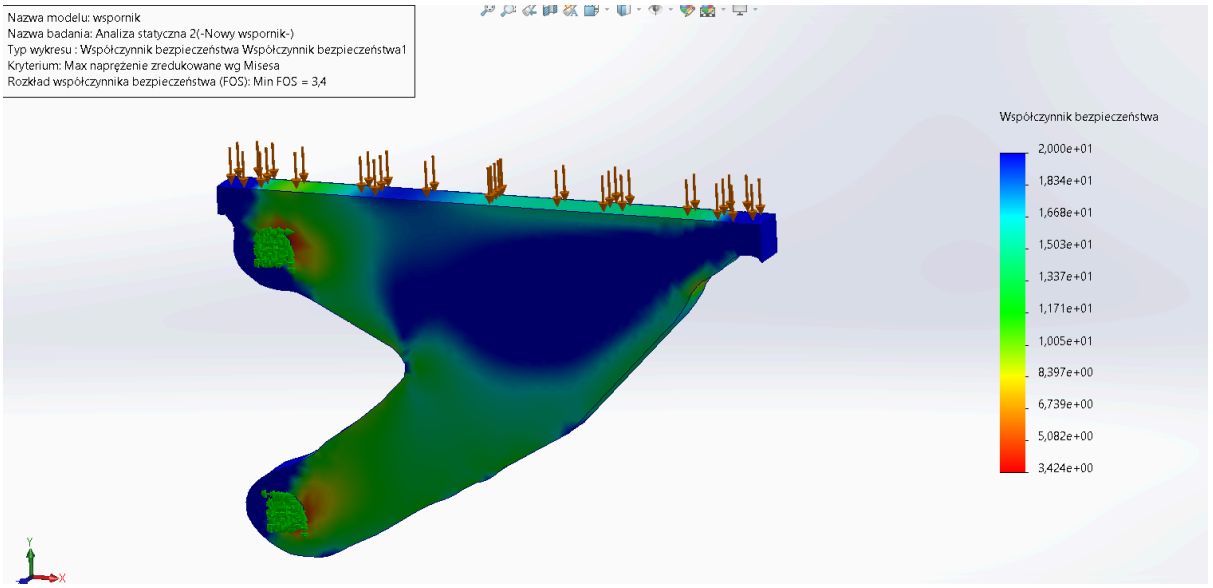
export of the smoothed mesh of the reduced model:



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

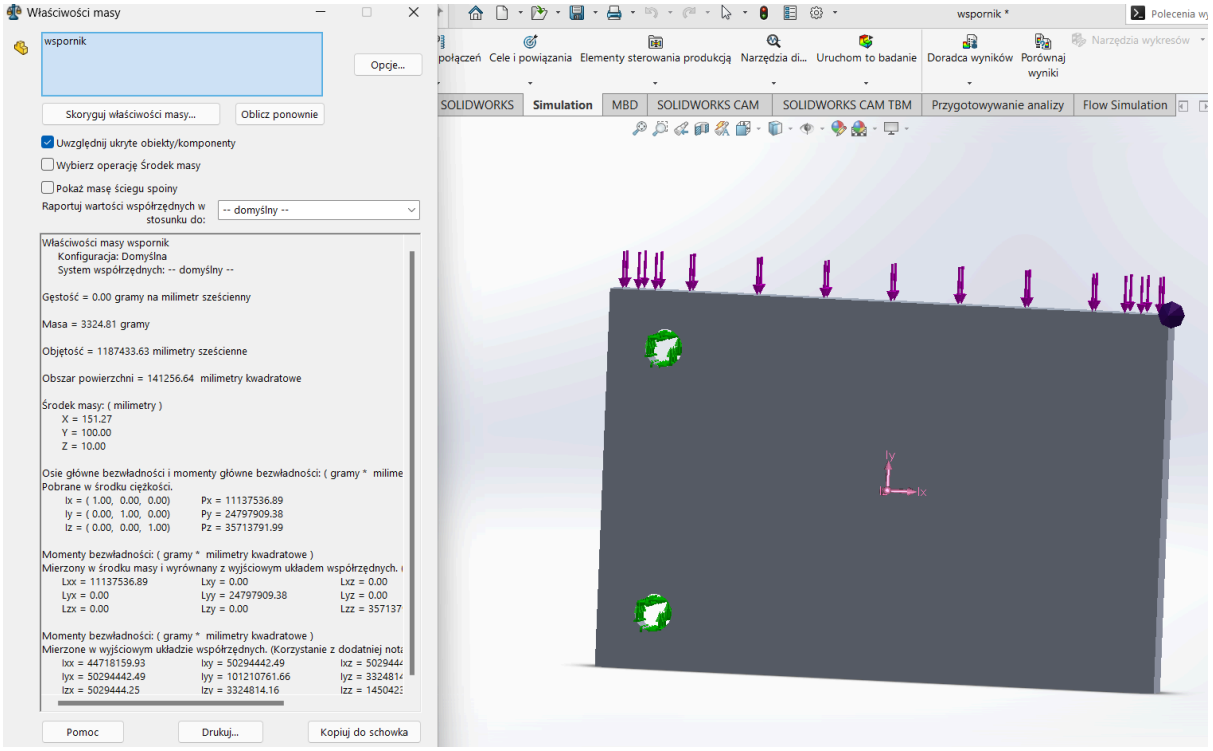


Safety factor after static analysis of the NEW MODEL:

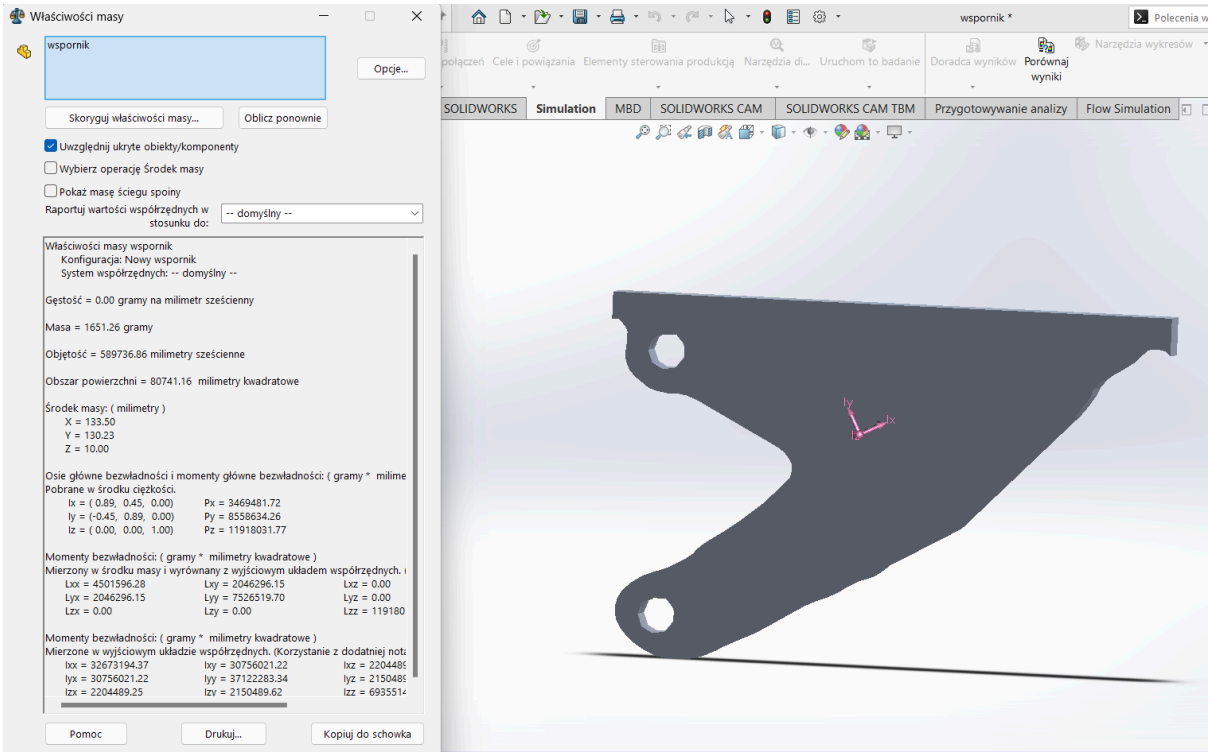


RESULTS

for the base bracket → mass = 3324.81 grams



for the new bracket → mass = 1651.26 grams



	Maksymalne naprężenie wg Misesa	Współczynnik bezpieczeństwa (FOS)	Masa modelu
Po analizie statycznej modelu bazowego	20,634 Mpa	4,7	3324,81 g
Po analizie statycznej nowego modelu wspornika	28,185 Mpa	3,4	1651,26 g

CONCLUSIONS

The new model has higher maximum stress compared to the base model. This means that the new model can bear more load than the base model, which may lead to a higher risk of damage in case of improper loading.

The safety factor for the new model is lower than for the base model. This means that the new model is less safe compared to the base model.

The new bracket model is significantly lighter than the base model. This is advantageous in terms of performance and production costs.

In summary, the new model has higher stress and a lower safety factor. This is due to the topological optimization, which focused on reducing weight while maintaining the required level of strength.