

AER 1410 Project-2 Proposal

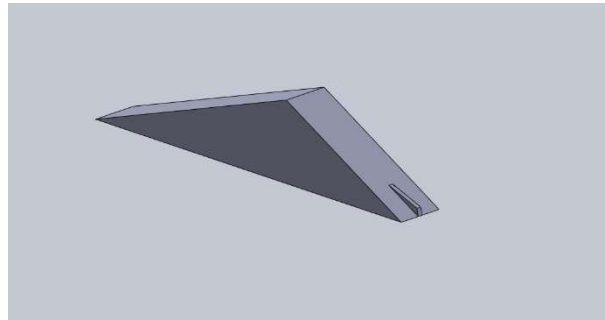
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Proposal Details

Structure:

This is what a regular RC-Plane Landing Gear generally looks like. The LG for different purposes varies but mostly looks a variation of this. The Initial Domain design will be this, which after optimization should produce a more optimized structure as compared to this.



The structure is going to bear loads in all three directions and to counter this, the Landing Gear is made in such a way that there is enough material to bear the loads. But it is important to note that a lot of material reduction is possible by changing the continuous material plates to truss-like structures. The key goal of the topology optimization of this structure is to identify how the truss is formed for the three-dimensional loading condition. I consider that result as interesting as it is not something that will come up intuitively when thought about from the design perspective.

Three Load Cases

As this is mounted to the frame, the thrust on the wheel will be borne by the structure and thus, a three-dimensional force, with three independent loads, each in X, Y, Z direction will be applied to the two large holes seen in the center of the bracket

Geometry Constraint

As can be clearly predicted, the Landing Gear is supposed to hold the structure in place with respect to the force. Thus, the four small holes will be bolted to the wall and thus, the geometry constraint being the displacement of these holes is zero.

Design Requirements

The key design requirement of the optimization is to reduce the weight of the bracket alongside maintaining strength and stiffness.