

## MATERIAL REPLACEMENT AND TOPOLOGY OPTIMIZATION STUDY ON A PVC CUTTING MACHINE COMPONENT

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### Abstract

In this study, it is aimed to lighten the aluminum body of the PVC cutting machine, reduce the production cost and shorten the production time. With this purpose, firstly, literature researches of composite materials were made and the PVC machine was introduced. Then, alternative designs of this body were made in Fusion360, and material selection was discussed in line with the analyzes made on the designs in ANSYS. Designs of this body were reexamined by topology optimization of designs created with selected materials. Test and analyzes are shown step-by-step in order to achieve the final result with the necessary changes to mitigate. As a result the body part has lightened up to %70 with the choice of different materials and design.

**Keywords:**Lightening project, polymer composite, mass reduction, finite element, reinforced composites