

Executive Summary

The primary goal of this ME450 project is to redesign a Reverie Dream Supreme bed frame. We will focus on cost reduction by modifying manufacturing methods, materials, and shipping volume while maintaining the aesthetic appeal and current performance standards of the frame.

The main requirement of this redesign is to reduce cost by 20% while maintaining the form, fit, and function of the current product. Other user requirements and engineering specifications include static and cyclic loading resilience and ensuring the prototype delivers the same range of motion as the current product.

We have constructed a full-size prototype with new components integrated into the current adjustable frame. The prototype bed frame incorporates modifications to the wall-hugging rail system, vanity covers, mattress supports, and component interfaces. These components were isolated based on their cost reduction potential while maintaining the original functions.

Our overall cost reductions are reported in Table 1 below.

Strategy	Cost Reduction
Weld Removal	2 %
Material Substitution	3.3 %
Shipping	5 %
Custom Component Removal	1.8 %
TOTAL	12.1 %

Table 1: Percentage cost reductions from each strategy

All new components have been analyzed for maximum stresses and deflections to ensure there is no yield and they will pass the current Reverie structural test of 2500 lbs. distributed across the bed frame. We benchmarked our prototype against the current design used by Reverie to determine success. Validation testing indicates that some of the features of our design may require modification prior to being implemented in a new bed design.

Some design features, such as replacing the OSB mattress supports with polycarbonate sheet, are not recommended. Other suggestions, such as the collapsible linkages, were highly successful and we recommend implementing the design. Features such as removable plastic snaps for the sidewalls or the wall-hugging system show significant potential but will need considerable revision prior to implementation. An in-depth examination of critiques and recommendations of our final design is included in this report.

We sincerely appreciate all the help and resources provided for us by Reverie and hope that our project has provided them with valuable design ideas and feedback.