

PROJECT MISSION

Design a sustainable and strong bookshelf to be used in an office with cubicles.

DESIGN GOAL

Bookshelf has stable base, safe, strong shelves, pleasing look, and has a back

This project also uses sustainable materials as well having a high safety factor.

DESIGN CONSTRAINTS

- Maximum bookshelf envelope 5 by 8 by 2 feet
- Maximum book envelope 8 by 10 by 1 inch
- Least amount of shelf material
- Book size 8 by 10 by 1 inch deep
- Factor of Safety over 1.2

PROJECT PLAN

Our furniture has the following components:

- High capacity for books
- Strong and low center of gravity for stability
- Sustainable design
- Sleek look

POSSIBLE SOLUTIONS

- Credenza style bookshelf with drawers at the bottom
- Standard bookshelf with minimum design
- Two sided bookshelf

We choose the two -sided bookshelf because we thought it would help office staff stay organized.

FINAL SOLUTIONS



- ❖ *Factor of Safety (demonstration): 128.533*
- ❖ *Total materials weight (demonstration): 692.60 lbs.*
- ❖ *Demonstration material used: aluminum*
- ❖ *Proposed materials: Eco Friendly MDF*
- ❖ *Total book capacity= 570 (270 each side)*
- ❖ Our MDF building materials are environmentally-friendly, flame retardant, formaldehyde free, made in the United States
- ❖ Design is modern and stylish
- ❖ Base area is large (2 books deep) and therefore stable/safe
- ❖ Dual-function as both bookshelf and cubicle divider
- ❖ Final assembly would include a dust proof top shelf cover

LESSONS LEARNED

- We had technical issues with the stress analysis software, which delayed our work and took away our time to redesign
- We were not able to test our proposed material (MDF) for safety, so we ran a demonstration analysis using aluminum as a baseline
- Because our material was custom, we could not run a sustainability analysis
- We needed to build a larger base for safety
- "Book shelf" could mean Kindle, Nooks, etc.

TAKE AWAYS

- More practice with Solidworks
- An appreciation for the multiple ways a bookshelf can be designed
- Collaborative brainstorming and design processes are beneficial
- Researched environment friendly materials
- Learned to work with a high functioning team of professionals