



Company Information

Company Name	<i>Lowe's Companies</i>	Date Submitted	<i>04/21/2023</i>
Project Title	<i>Design and Manufacture of a Low-Cost Bunkbed (LOWES_BUNK)</i>	Planned Starting Semester	<i>Fall 2023</i>

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	4	Electrical	
Computer		Systems	2

Company and Project Overview:

Lowe's Companies, Inc. specializes in retail home improvement products. Headquartered in Mooresville, North Carolina, the company operates a chain of stores across the United States. As of Oct. 28, 2022, Lowe's and its related businesses operated 2,181 home improvement and hardware stores in North America. Lowe's is the second-largest hardware chain in the United States behind its rival The Home Depot and ahead of Menards.

The core of Lowe's business strategy is SERVICE. There are two levels:

1. At the store level, every Lowe's associate wearing a red vest is considered the highest-level employee. Company leadership states repeatedly that "every Lowe's employee is either serving a customer or serving someone who is serving a customer."



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2. At the corporate level, Lowe's sets a high standard for corporate citizenship by diligently serving the communities in which they reside. Other Fortune 500 companies become involved in many things, but Lowe's considers themselves to be "Stewards for the Greater Good" tasked with improving living conditions in the communities that Lowe's services.



For example, since 2003, Lowe's has contributed more than \$65 million to Habitat for Humanity International, including underwriting the Women Build program, International Women Build Week, and sponsoring Habitat's Neighborhood Revitalization program. Additionally, Lowe's employees have volunteered at home builds for more than 17,000 Habitat families around the country.



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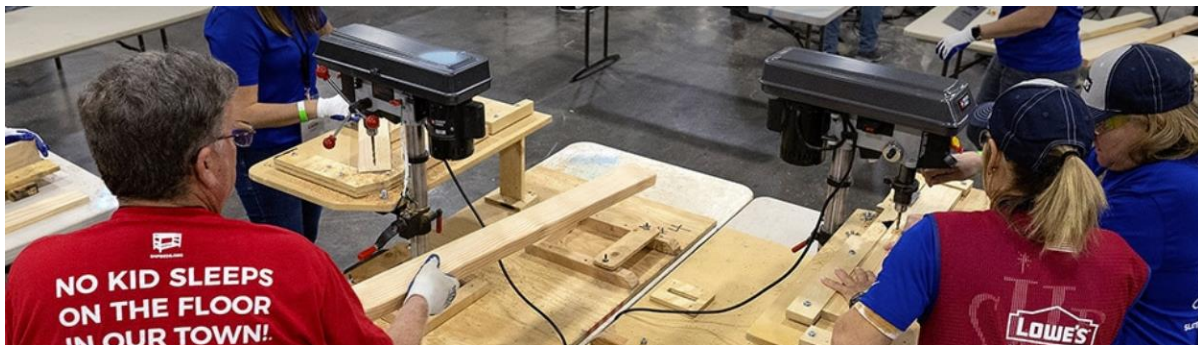




This Senior Design engineering assignment focuses on a scope related to a nonprofit organization called “Sleep in Heavenly Peace” (SHP). SHP’s mission is to use volunteer resources to build, assemble and deliver top-notch bunk beds to children and families in need. Their motto is “No Kid Sleeps on the Floor in Our Town!” You can learn more about Sleep In Heavenly Peace using these resources:

[SHP and Lowes](https://shpbeds.org/)
<https://shpbeds.org/>

Lowes has supported SHP for a number of years and has developed a project scope which will deliver recommendations for design and manufacturing improvements to a low-cost bed for SHP.



Project Requirements:

Lowes has partnered with “Sleep in Heavenly Peace”, a nonprofit tasked with providing beds to underprivileged children who would otherwise sleep on the floor. With Lowes’s support, Sleep in Heavenly Peace (SHP) leadership has successfully grown this endeavor from a weekend project to the largest nonprofit bed maker in the US delivering over 50,000 beds annually across the United States.

Problem: The bed is designed for simple, low-cost, practical functionality. Improvements are sought for strength, sustainability, materials, manufacturing, and logistics.

Objective: Perform a full design and manufacturing study for this product and present recommendations for improvement.

Scope: Design, manufacturing, assembly, logistics, sustainability, materials.

Output: Presentation to management at Lowes’s and Sleep in Heavenly Peace a list of recommendations for improvement with supporting data.



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Expected Deliverables/Results:

- List of recommendations to improve design and manufacture of beds for strength, cost, efficiency, sustainability, manufacturing, and assembly. Each recommendation is to be supported with data.
- List of recommendations to improve SHP build manuals, videos, and printed materials. Each recommendation is to be supported with data.
- Design and Process Failure Modes and Effects Analysis (DFMEA, PFMEA).
- Finite Element Analysis
- Materials Analysis
- Environmental, Sustainability and Governance (ESG) Analysis
- Attend and participate in Charlotte-area SHP Builds as they occur.
- Process Map for existing and proposed SHP manufacturing process.
- Build and Test Bed with all Jigs, Fixtures, and Assembly Aids
- Engineering Drawings for all Components, Assemblies, Jigs, Fixtures, and Assembly Aids
- Project management with schedule and critical path
- Team video and poster.
- Presentations to leadership of Lowe's and Sleep in Heavenly Peace



Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Systems Integration and Analysis
- Mechanical Design and Construction
- Electrical Design and Construction
- Materials Engineering
- Environmental Analysis
- Finite Element Analysis
- Computer-Aided Design (CAD)
- SEGR 4114 is a requirement for SEGR students (co or pre-requisite)