

Hand-held Snow/Ice Removal Device

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Type: Design Problem
Time: One Semester
Location: Classroom/Take home

Summary

This project is for students taking the first-year engineering design course. The project is suitable for work in teams of 3 persons. This project relates to the design of a hand-held snow/ice removal device to remove ice and snow as quickly and safely as possible.

ABET Descriptors

Engr SCI Content: First Year Engineering
Type: Component
Elements: Establish objectives/requirements, analysis, synthesis, evaluation
Features: Development of student creativity, use of open-ended problems, formulation of design problems statements and specifications, consideration of alternative solutions, feasibility considerations, production processes, detailed system descriptions
Constraints: Economic factors, human factors, safety, environment, reliability, aesthetics
Effort: Team

Hand-held Snow/Ice Removal Device

You will work with two other students on this project to design a hand-held device to remove snow and ice from sidewalks and driveways as quickly as possible.

CONSTRAINTS:

1. You must examine and comment on the existing technologies for snow and ice removal.
2. Your device must be able to remove an 18 inch wide path of snow and ice at minimum depths of 6 inches and 1/2 inch respectively at a minimum speed of 1 inch/sec.
3. Personal and environmental safety is a critical concern.
4. Don't forget to consider affects on the human body ergonomically.

DELIVERABLES:

Written Report

1. Engineering report explaining your design including the results of your examination of existing the existing ice/snow removal devices or systems. Comment on alternative solutions, feasibility considerations, and production processes (can it be built?)
2. Include all pertinent engineering drawings.
3. Show any calculations that you used in your design.
4. Detailed design and performance specifications for each component used in the construction of your device. (What federal/state/local codes must you comply with?)
5. PERT/Gantt project scheduling and reporting charts.
6. Control Diagram.
7. Material and Labor Cost Estimates (What is your data source?).
8. Preliminary patent application paperwork.

Oral Presentation

1. 10-15 minute oral presentation using Powerpoint or other comparable computer graphics program.

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Engineering Notes:

A multi-discipline approach may be the key to this design.

Objectives/Comments:

The primary objective of this project is to get students use to dealing with open-ended projects and how important teamwork is to the design process. It will also help in understanding the importance of engineering drawing and the transformation of 3-D representation to 2-D. Students will get hands-on training on measurements and dimensioning.

Expected Outcomes:

Detailed report and drawings for ice/snow removal device. Were specifications met?

Discussion/Follow Up:

Discuss the engineering constraints with this type of problem.

Grading:

Grading could be based on the most feasible design (can it be built?), the students' use of the design process, and the design concept (did they meet the specifications?).