FY-35 August 10, 1995
[Filename: TENNIS.DOC]

Five Gallon Bucket Tennis Ball Hopper

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Type: Design Problem
Time: 2 weeks
Location: Take home

Summary

This open ended design problem may be an appropriate assignment for a freshman course during the first or second semester. It is suggested that it be assigned to individual students and that students have approximately two weeks to work on it and respond with a report and an oral presentation to explain and defend the work.

For a company that manufactures a variety of kits popular among "do-it-your-self" individuals, the student is required to design a kit package that the purchaser can, along with a fairly standard, plastic, five gallon bucket, produce a very sturdy, effective, and useful tennis ball hopper. Ball hoppers are considered a staple item among tennis enthusiasts, and are used typically to hold a large quantity of balls while practicing serve and also used for helping recover the loose balls on the court.

Students are required to reflect good use of the engineering methods and analysis and graphics they have learned so far. They are required to give a written report and an oral presentation of the project.

ABET Descriptors

Engr Sci Content: First Year Engineering
Type: Component
Functions: Define objectives, develop performance specs, evaluate concepts, communication, testing
Features: Design methodology, creativity
Constraints: Time, performance within specified criteria
Effort: Individual

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For a company that markets lots of kits for the "do-it-yourself" person, you are asked to design a kit that can be sold for converting a common, plastic, five gallon bucket into a sturdy, effective, and useful tennis ball hopper. Using the kit materials, the ball hopper should not be difficult to assemble by the purchaser. The ball hopper should be able to assist with picking up loose tennis balls as well as holding the balls approximately waist high while the user practices his/her tennis serve.

At the end of two weeks you are to submit a written report of the project, including a description of the application of all design procedures and efforts which you applied during the project. You must also present the kit, as well as a model of the ball hopper assembled from the kit, to the class using a viewgraph, and explain and defend the design used to accomplish the requirements. (Fifteen minutes)(instructor will help you produce a viewgraph and handouts for the class showing your design drawing.

You are to demonstrate good understanding of all design methodology, graphics, and engineering analysis you have been taught so far in your courses.

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Engineering Notes:

Materials for experimenting in this project are usually easily found, inexpensive, and easy to use. Several mail order companies offer kits used for converting five gallon buckets into useful items, such as work seats that hold tools, etc. Students who don't play tennis can get a good view of the common ones available at the gym, tennis courts, or at sports equipment stores.

The instructors expectations of the students' ability to demonstrate good use of the design methodology and analysis that the student has covered should be thoroughly explained at the beginning of assignment. The project is usually an interesting activity for engineering students whether or not 'heavy duty' design methodology and procedures must be followed.

Expected Results:

Those students who continually have access to shops, tools, etc. will have much less difficulty getting started. The instructor can help by attempting to provide a shop or laboratory where the students can have access to some basic tools they may need. Occasionally a student will choose a five gallon bucket that is not a very common variety. Before the assignment, it may be a good idea to let the class help find a good supply of buckets. They seem to be used a lot for farm chemicals, sheet rock 'mud', and cafeteria oils, dressings, etc.

Discussion/Follow-on:

Lots of opportunities for discussion of design methodology usually result from the use of such a design project with a freshman class. Packages of kits usually include basic assembly instructions. If the instructor did not require those in the original assignment, the student may be given a technical writing assignment to prepare these later.

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NEATSTUFF INCORPORATED
1500 Broad Street
Nashville, Tennessee 37201

INTERNAL MEMO

TO: C. Lovas, V.P. Product Development

FM: C. Callis, V.P. Marketing Research

Chuck, our customer who publishes a catalog of tennis items has asked if we can produce a kit his company can advertise that can be used to convert a fairly common five gallon bucket into a useful tennis ball hopper. Since he sells several hoppers already in a price range from $25 to $45, he plans to sell the kit for approximately $10 or less.

The desired hopper should perform the same two basic functions as the ones commonly sold at sports equipment stores, i.e. hold the balls conveniently for serving and help pick up the balls strewn around the court. I believe the company got the idea from farm equipment catalogs which advertise kits to convert buckets into seats and other items.

Please schedule a meeting in my conference room for you, Paul, Troy, and myself to discuss this as soon as possible.

Copies to: Paul Packman, V.P. Manufacturing
Troy Henson, V.P. Development Engineer