TMJ 3-4 M
Design Challenge
Volley Ball Judges Stand; Prototype Design and Fabrication

Ministry of Education Curriculum Expectations

OVERALL EXPECTATIONS; Fundamentals

A1. demonstrate an understanding of design and other problem-solving processes used to develop solutions and products in response to challenges in manufacturing technology;
A2. demonstrate an understanding of the steps and processes required to produce a product;

OVERALL EXPECTATIONS; Skills

B1. identify and use appropriate processes to organize and control the manufacturing of products;
B2. demonstrate an understanding of the appropriate selection of materials to manufacture products to meet specific needs;
B3. demonstrate the safe and appropriate use of tools and equipment in the manufacture of a product or the development of a production process;
B4. analyse, properly operate, and maintain quality in a manufacturing system or process

The goal of this assignment and project is to apply the design process theory to fabricate a physical product (i.e. Design, build, and test a prototype)

To accomplish this, the project is divided into 3 phases:

Design and planning
Fabrication
Post production analysis

Challenge

Using the steps/stages of the engineering design process (as discussed in class), design a volleyball judges stand that meets the following criteria:

-must be light weight

-must be portable (easily moved and folded for storage

-must be able to support a 250 lb (110kg), person

-must be stable when in use

-must be easily accessible (e.g. open back)

-must have a protective rail that is at least waist high (based upon the average person)

-must be made from tubular steel

Phase 1; Design and Planning

In this section you will research, design, and plan the build of your project.

Research (T /6), expectation B1:

Using an internet search engine (e.g. Google), search for volleyball judges stands. List the associated web addresses of your 3 favourite selections.

Task B, Idea Development and Selection (T /15) expectation B1:

Using the research from the above task and team discussions:

-develop 3 design ideas and in 1-2 paragraphs briefly describe explain why they were chosen.

-from the 3 ideas, select the one that will be used to complete the challenge

Task C, Engineering Sketches/Drawings (App /20) expectation B2:

Using AutoCAD or hand sketching techniques, create a graphical representation of your idea that could be used to present the concept (remember to include all information necessary e.g. length, width, height, labels, material descriptions, safety considerations, etc.).

Task D, Project Plan (T /25) expectation B1:

Bill of Materials (B.O.M.) (T /5)-create a bill of materials for your selected design

Skills (T /5)- create a point form list of the skills required to fabricate the project

Time line (T /15)-create a time line that lists the major points of the project (e.g. start date, fabrication process steps, testing, reporting, and end date)

Phase 2, Prototype Construction (App /30) expectation B3:

Safety Notes / /Before starting on the project you must:

-have successfully completed the general safety portion of the course (e.g. shop use, WHMIS, general safety rules, tool use and care)
-be licensed on the specific equipment to be used in the completion of the project (e.g. MIG welder, cut-off saw, pedestal grinder, hand grinder, pipe bender)
-have your design approved by the instructor

Once your design has been approved, and with the assistance of the instructor, create a full size working prototype

Task F, Quality Assurance Final Inspection and Testing of the Device (T /15) expectation B3:

Develop a method to final inspect and test your device.

Conduct the inspection and test (complete an inspection report)

Task J Report (Com /10) expectation B4:

Write a summary report the results of your inspection and test (e.g. how did the device perform? What worked? What modifications would you suggest?), and submit them to the instructor.