FY-33 August 9, 1995
[Filename: WHLCR_SW.DOC]

Accessible Wheelchair Swing

Contributor:	Lisa A. Riedle
Affiliation:	University of Wisconsin - Platteville
	1 University Plaza
	Platteville, Wisconsin 53818
Phone:	(608) 342 - 1539
Fax:	(608) 342 - 1566
Email:	riedle@uwplatt.edu

Type:	Design
Length:	Semester project or short 2 week project
Location:	Take home

Summary

This project is intended to be used in a first year engineering course to introduce the student to human factors, ADA (Americans with Disabilities Act) considerations, statistics, and design. Students work as a class to gather statistical information then individually or in small groups (2-4) to produce an engineering drawing of a swing for a wheelchair.

Students are then to prepare a written, 2-3 page document describing the swing's operation and usage, design, and costs. An oral presentation is also given reviewing their design.

Follow-up exercises may include: force and strength analysis of materials, cost analysis, construction and testing, safety analysis, manufacturability, liability, risk assessment, and aesthetics.

ABET Descriptors

Engr Sci Content:	First Year Engineering
Type:	Component
Elements:	Design, establishment of objectives and criteria, analysis, evaluation, human factors
Features:	Creativity, statistics, design methodology, open-ended, communication
Constraints:	Human factors, time, economics
Effort:	Entire class: Individual or Team

FY-33 August 9, 1995
[Filename: WHLCR_SW.DOC]

Accessible Wheelchair Swing

The ADA (Americans with Disabilities Act) is posing new design considerations on the engineer. Sidewalks, doorways and restrooms are being re-designed to accommodate the dimensions and capabilities of a wheelchair and the human body. The swing is to be designed for a child who is paraplegic (has use of upper body movement).

You are to design a playground swing to be used by a child in a wheel chair. The child is to be able to get into/onto the swing alone and operate the swing with out assistance.

Objective:

Develop a sketch of a swing for a wheelchair.

Constraints:

You can not provide assistance for removing the person from the wheelchair.

The individual within the wheelchair is to be able to get on the swing independently.

The individual within the wheelchair is to be able to get off the swing without assistance.

The individual within the wheelchair can operate the swing without assistance.

Evaluation Criteria:

A sketch of the swing. Engineering drawing preferred. (Autocad)

List of materials to make the swing (Spreadsheet)

List of material costs (spreadsheet)

Assembly instructions (word processor)

Operating instructions (word processor)

Oral Presentation (Participation by all team members, visual aids required)

Written Report (Word Processor)

FY-33 August 9, 1995
[Filename: WHLCR_SW.DOC]

Accessible Wheelchair Swing

Engineering Notes:

This is an exercise to introduce the student to design, creativity, human factors, statistics, computer usage, and design code considerations.

Standard wheelchair and reach dimensions can be found in the ADA codes and /or a human factors handbook. However, an in-class exercise using a wheelchair can give the student the opportunity to see/feel the constraints on the human body by actually sitting in the wheelchair. Therefore, if a wheelchair is available for use/demonstration from the health services department it is advisable to use the chair to obtain the statistical reach criteria using student participation data.

For safety reasons it may be advisable not to have the chair roll when on the swing.

Procedures:

Entire class: The entire class is to obtain measurements for a typical wheelchair.

While sitting in a wheelchair run a statistical analysis on the reach measurements of the class.

Individual/Teams:

Analyze the movements needed to originally get a swing into motion.
Analyze the movements needed to maintain the swinging motion.
Develop a means of getting the wheelchair on and off the swing.
Develop a means of getting the ADA swing to move and continue motion as desired.

Evaluation:

A major part of engineering design is communication. Therefore, evaluation of the product should be detailed and clear in both the engineering drawing, oral presentation and the written report.