Problem

Design a Combination Utility Ladder and Stool per the concept sketch shown. Key specifications:

- Dimensions to accommodate the 50th percentile range of U.S. adults.
- Load to accommodate the 95th percentile range for weight of U.S. adults.
- Height of the seat to be accessible for seating to the 50th percentile range of U.S. adults from the lowest step.
- Compact storage is highly desirable.
- Structural materials: metal is preferred, but plastic materials will be accepted if grip dimensions do not exceed specifications.
- Deflections must not exceed 1/64 inch under normal load.
- The set must ship disassembled and be able to be assembled using basic household tools.
- Safety factors are 1.3 for material yielding and 2.2 for buckling.

Design objective

The design objective is low cost, but not at a loss in appearance. (Costs are to be estimated using nominal retail prices.)

Special concerns

- Joints made by commercially available connectors must be adequate.
- Safety in general is a major concern. The Stool should be stable under normal use.
Report
The design will be done in U.S. Customary Units. Follow the “Design Project Report Format for E Mch 013 with Design”.

References

Due date: 17 April 2000 at the start of class.

Grade (This and peer evaluations may vary dependent upon instructor.)
The project will receive a report grade based upon quality of work. Individual grades may be lower than the report grade dependent upon the Team Peer Evaluation; the criteria for this is in a form which can be found on the course design website. The weight of the individual grade is presented on the course description sheet distributed at the start of the semester.