

### **Packaging Design (Egg Drop)**

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Type: Design Project  
Student Time: Two weeks  
Location: Home

#### **Summary**

This is intended to be used with first year engineering students in the first week or two of classes as an introduction to some aspects of engineering design. Students will work individually to design, construct, and test a container that will protect an egg from breaking when dropped from the top floor of a conveniently located building. The package must be light-weight, have a small volume, and be of a regular shape.

#### **ABET Descriptors**

Engr. Sci. Content: First Year Engineering  
Type: Component  
Elements: Synthesis, construction, testing, and evaluation  
Features: Creativity, open-ended, design methodology  
Constraints: Economics, reliability  
Effort: Individual

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**SALUKI ENGINEERING COMPANY**  
**1234 S. Illinois Ave.**  
**Carbondale, IL 62901**

From : James N. Craddock  
Vice-President for Engineering

To: All Engineering Staff  
Manufacturing and Design Groups

Subject: **Packaging Design (Egg Drop)**  
Packaging for Part No. 2001A5

Recently, there have been far too many complaints about Part No. 2001A5 being damaged during shipping. Replacement costs for this product are having a negative economic impact on our company. Preliminary tests have shown that a package that will keep an egg from breaking (i.e. there must be no visible cracks in the egg shell) when dropped from the fourth floor balcony of our building will be sufficient to prevent damage to the part during shipping and handling. Therefore, you are to design a package that will accomplish this task. Due to the seriousness of this problem, **this design must be completed in two weeks.**

This package must be made from commonly available material. To reduce shipping costs this package must be as light-weight as possible. The package must also be as small in size as possible. Finally, the package must be of a regular shape, suitable for stacking and packaging in a larger carton.

The deliverables for this project will include:

1. A model of the package ready for proof testing.
2. A list of parts needed for the package.
3. A drawing or sketch of the packaging assembly.
4. The measured weight and volume of the package.
5. A brief discussion of the design process and any alternatives considered.

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### **Engineering Notes:**

1. Follow on assignments might include the same project with material limitations.
2. The tests (drops) could be videotaped and the results studied in dynamics (kinematics) and fluid mechanics (drag).
3. A one day project could be developed as a lead in to the two week project. The students could be given the same task to do in a one hour class with a finite set of materials. Materials such as cardboard, rubber bands, duct tape, straws, paper clips, pipe cleaners, glue, packing material (bubble wrap and Styrofoam), and toothpicks could be provided. The student could include differences in his/her quick design and the two week design as a discussion item in the report.
4. The instructor should provide the eggs immediately before the test is conducted. After the test the uncracked egg should be broken to indicated that the egg was not altered (hard-boiled etc.).
5. The egg could be enclosed in a zip-lock bag before testing to reduce the mess from failed tests.