

FY-36  
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## **Fishing Reel With Selectable Drag Feature**

Contributor: Charles P. Callis  
Affiliation: School of Engineering  
Address: University of Tennessee At Martin  
Martin Tennessee 38238  
Telephone: (901) 587-7381(office) 587-5679 (home)  
FAX: (901) 587-7375  
E-mail: e ccallis@UTM.EDU

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. Students are not required to produce a working model, but rather required to use 'reverse engineering' techniques applied to existing, standard reels; followed by early stage design efforts to respond to the product change requested.

Any prior course material the students may have covered in graphics, design methodology, or analysis will certainly be of help to the students and should be reflected in the student report associated with the project. Students' initial response to disassembly of a product and examination of the product design (reverse engineering) is usually good and fear of the total design responsibility of the overall project is reduced.

Both written and oral reports are required.

### **ABET Descriptors**

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

### **Fishing Reel With Selectable Drag Feature**

You are to design a drag set mechanism for either a spinning or a spin-cast type fishing reel that will permit the user to set a specific tension of the fishing line that will feed the line from the reel when the tension exceeds the selected tension value. The user should be able to easily set the desired tension, ranging from 2# to 32# in 5# increments or less.

Since the time constraint is very short, and you do not have machinists and technicians to assist with the construction of a prototype of a reel with this modification installed on it, a working model is not required. Instead, you are to apply reverse engineering principles by disassembling an existing reel, carefully examining each part, listing the materials and function of each part, and investigating the design of the friction set mechanism. Then you are to produce a drawing showing a design of a selectable friction drag mechanism that could be incorporated into the reel.

At the end of two weeks you must submit a report of the effort, describing the design methods applied, and make an oral presentation of the design. (Use viewgraphs)

## **Fishing Reel With Selectable Drag Feature**

### **Engineering Notes:**

Few experiments seem to exist for the students to obtain hands-on experience regarding differences in static and sliding friction or which permit them to actually measure coefficients of friction. This exercise will involve the students in determining such measurements. The disassembly of an existing product usually reduces student anxiety concerning the apparently large responsibility of the design aspects of the assignment and helps get him started and interested in the activity.

Depending on the importance of introducing and teaching design methodology in the course, the student can be required to demonstrate more or less knowledge of proper design techniques that may have been covered in the class. The project reports offer a good place for the instructor to begin to require the student to effectively use his new design terminology and abilities.

### **Discussion/Follow-on:**

Student experiences during this activity should produce lots of opportunities for discussion of the great applicability of design methods, technical writing skills, need for further development of a strong engineering and technology vocabulary, and increased knowledge in engineering graphics and analysis.

**Fishing Reel With Selectable Drag Feature**

**The Zebco Company**

August 9, 1995

MEMORANDUM

TO: Paul Packman, VP Product Development and Manufacturing

FM: Charles Callis, VP Marketing

Paul, as you know our spinning and spincast fishing reels all have the standard hand-tightened screw for adjusting line drag. Because of many refinements appearing on the reels of our competitors, and the recent technological advances in available fishing line materials, our group leaders feel we should ask you to consider developing a drag set mechanism with specific selectable drag settings for our more sophisticated reels.

We'd like to offer a reel with a range of drag settings varying from approximately 2# to 30# in increments of 5# or less. We'd like for the actual reel slip to occur within half pound of the selected value.

Please go ahead and schedule a meeting for discussion of this idea with all appropriate staff as soon as possible.

Copy to: C. Lovas, Development Engineer  
T. Henson, Customer Partnership & Internal Consultant