

## **Anchoring System for an Offshore Construction Vessel**

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**Type:** Design Problem  
**Student Time:** Six weeks  
**Location:** Classroom/Home

### **Summary**

The purpose of this design project is to create a conceptual design of a conventional anchoring system consisting of anchors, dead weights, chains and cable hardware that will anchor an offshore construction vessel in an open ocean environment, enabling it to stay on site and proceed with such required functions as pipelaying , pipe pick-up etc. The intent here is to understand and develop the general concept of vessel mooring and stationkeeping rather than a specific design.

### **ABET Descriptors**

**Engr Sci Content:** First Year Engineering  
**Type:** System, component  
**Elements:** Conceptualization, synthesis  
**Features:** Creativity, open-ended, design methodology  
**Constraints:** Time, resources  
**Effort:** Team

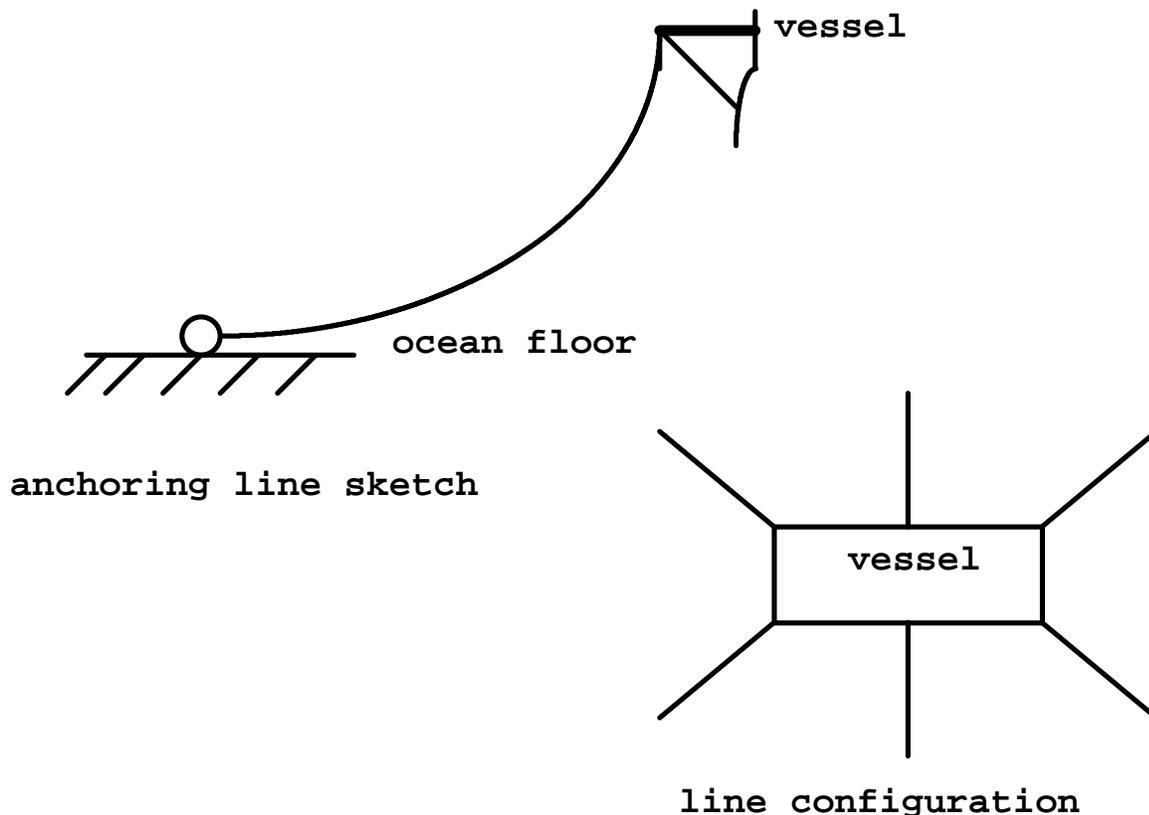
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### Description and Requirements:

A floating ocean structure requires some form of an anchoring system to limit vessel excursions within imposed operational constraints. In order for the vessel to stay on site then and be able to perform its designated functions such as pipelaying or pipe pickup, a proper choice of anchors, clump weights, chains and cables needs to be employed.

This project will require students to do a library literature search that should enable them to come up with sketches and descriptions of the functional roles of each component of the anchoring system identified. The class will be divided into working teams of 3-4 students in each. A design review meeting with the instructor will be conducted after three weeks while the final written report will be due in six weeks at the time of an oral presentation. The report should document the different kinds of anchoring systems that can be employed and discuss their merits and demerits. The inclusion of a cost analysis section based on information obtained from vendors would also be appropriate. Each team member will participate in the oral presentation by having individual presentation responsibilities as determined by the team.

The project will be subjected to an evaluation by the instructor as well as to a review by peers.



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### **Engineering Notes:**

### **Objectives/Comments:**

This project is intended to encourage team efforts to satisfy a design objective with time and resource constraints.

The instructor should compare the reporting formats used with accepted Engineering Report Formats and the sketches submitted with industry drawing practice. The instructor must also determine if the student team has indeed made a comprehensive search of the technical literature for current technologies available.

### **Expected Outcomes:**

Group interactions and effective time management on the part of the student teams should be encouraged. The student groups may also wish to look into the anchoring of OTEC platforms and consider alternative forms of anchoring such as the use of thrusters. Basic differences between conventional mooring systems and the alternative designs suggested may be identified and discussed.

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

The potential for this project in follow-up courses such as Statics, Dynamics, Finite-Element Methods, Vibrations and Capstone Design etc, where a greater depth of design, analysis, and conceptualization will be needed, should be kept in mind. Follow-on work could include generation of mooring system designs for specific environmental and loading conditions, and for OTEC applications.