



ACTIVITIES & INFORMATION

BALLAST & STABILITY LAB EXPERIMENT

Have you ever been in a boat at sea in large waves? The boat moves up and down as the waves pass under the boat.

In the Gulf of Mexico and other areas of the world, waves can be greater than 50 feet high. Imagine trying to drill an offshore well from a vessel that is moving up and down 50 feet each time a wave passes by.

Semi-submersible drilling units utilize water ballast to minimize the up and down motion of waves. They are the most stable floating offshore drilling unit available. How do they work? Conduct this lab experiment to find the answer. Here is what you will need:



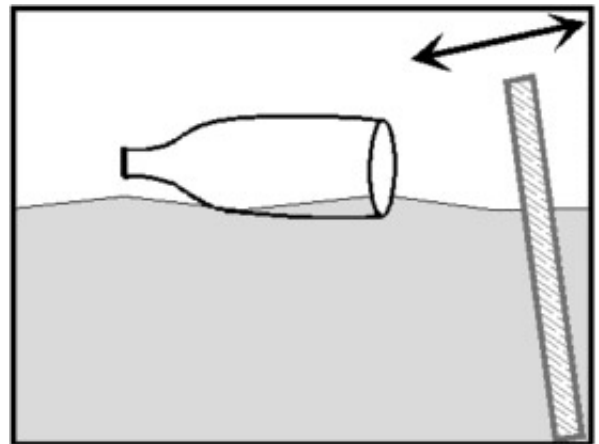
- * An empty plastic soda bottle with cap
- * Bath tub or large kitchen sink
- * Cutting board

Fill a large sink or a bath tub with six to eight inches of water. Screw the cap on the empty bottle and place it in the water. The empty bottle will serve as a model of a ship.

Now take the cutting board and place it near the end of the tub so that it touches the bottom of the sink or tub. Gently move the cutting board back and forth to create small waves.

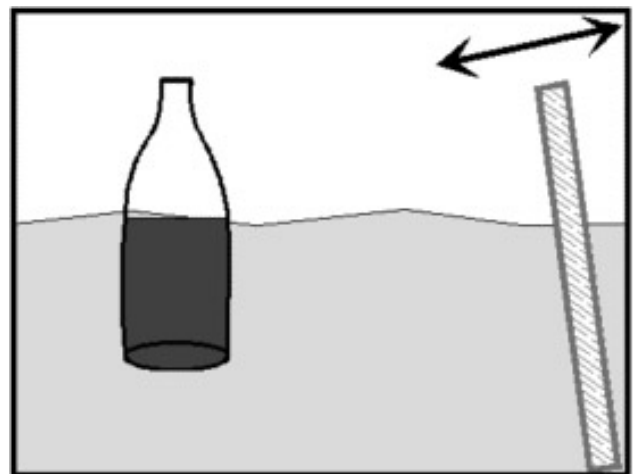
Observe the motion of the bottle. How much does it bob (move up and down)?

Now fill the bottle 3/4 full of water. The partially full bottle will serve as a model of a semi-submersible. Make sure there is enough water in the sink or tub so that the bottle will float.



Create some more waves with the cutting board and observe the motion of the bottle. How much does it bob (move up and down)? Which one would make a more stable drilling platform?

Semi-submersibles use water in the same fashion as the partially full bottle to stabilize them for offshore drilling. The water is stored in the pontoons and columns located under the water. The open area between the upper deck and the water provides an air space so that waves can pass freely through the structure.



Some ships also use ballast to provide stability, but none are as stable as a semi-submersible drilling unit.

A quick reminder: This lab experiment requires the use of precious resources- water and oil. The plastic bottle is made from petroleum and you can help conserve energy by recycling it. Water is also an important resource that shouldn't be wasted. If you conduct this lab test before you do the dishes, give yourself an "A" for helping to conserve water.

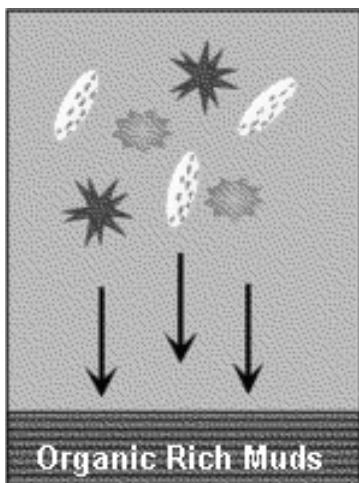




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WHAT IS CRUDE OIL?

Crude oil is a naturally occurring liquid composed mostly of hydrogen and carbon. It is usually found underground but can also be found above ground in oil seeps or tar pits. Crude oil is used to produce fuel for cars, trucks, airplanes, boats and trains. It is also used for a wide variety of other products including asphalt for roads, lubricants for all kinds of machines, plastics for toys, bottles, food wrap and computers.



Crude oil is believed to have been formed from very small plants and animals that lived in ancient seas and oceans a very long time ago. As these plants and animals die, they sink to the bottom of the sea where they mix with mud, sand, and clay.

This mixture of mud and organic (once-living) material is rich in hydrogen and carbon, the building blocks of crude oil. Year-after-year more mud and sediments are deposited on the sea floor. Over millions of years this layer of organic-rich mud becomes buried thousands of feet deep in the earth.

The temperature of the earth becomes hotter as you go deeper into the earth and the weight of all the mud and rocks above increase the pressure. This combination of increased temperature and pressure causes the organic material to change into crude oil. As the temperature increases the crude oil can be changed into natural gas. Both natural gas and crude oil are found in the Gulf of Mexico.

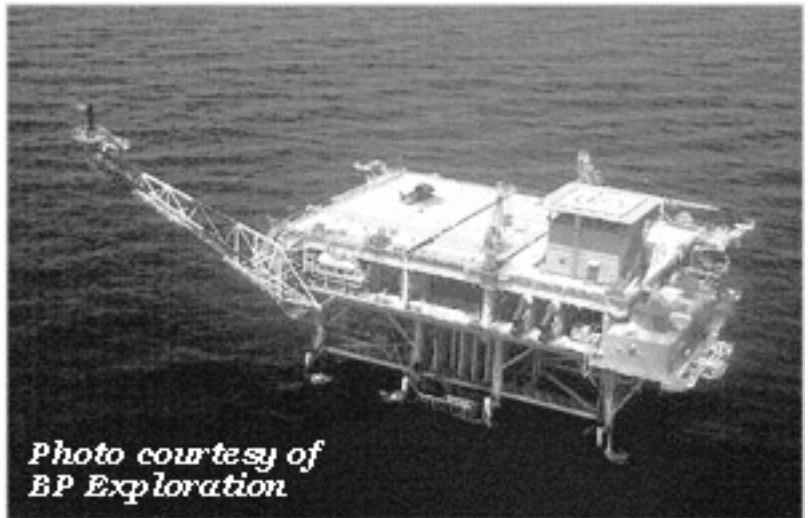




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OFFSHORE OIL & GAS PLATFORM

Have you ever seen an offshore drilling rig or platform? Sometimes they can be spotted off the beaches along the Gulf Coast. These offshore platforms are used to drill for and produce oil and gas that we use in our schools, homes, and cars. Although they may look small when viewed from shore, these offshore rigs are very large and must be strong enough to withstand the huge waves and strong winds that occur during hurricanes. Some of the platforms are in very deep water and are taller than a skyscraper.



*Photo courtesy of
BP Exploration*

Offshore platforms are usually constructed from steel, but sometimes they can be built of concrete. When most of the oil has been recovered, the offshore platform is removed. Some are taken to shore to be dismantled and recycled. Others are converted into artificial reefs to enhance fishing.

Many people work on offshore platforms including welders, mechanics, electricians, engineers, and drilling and production specialists. On some platforms you may also find cooks, firefighters, computer technicians, radio operators and even helicopter pilots. Working on a platform is like working on a ship. Everyone must work together to make sure that everything is done right.

In the Gulf of Mexico, the MMS inspectors fly offshore by helicopter every day to make sure that everything on the platform is working properly.

