

611-1831 (40-212) Gyroscopic Stabilizer

Introduction: Ships are important. Besides the world's navies and pleasure boats, they are responsible for most of global trade. Giant vessels carrying thousands of cargo containers ply the world ocean, bringing goods to market.

In recent years cargo ships have gotten truly enormous. A single container ship might be twice the size and three times the displacement of a battleship from 50 years ago. As the vessels get bigger, they can carry more and more valuable cargo.

A nemesis of any ship is *roll*. Rolling is where a ship pitches from side to side due to wave action. This can shake cargo around, potentially breaking it. It also makes the voyage uncomfortable for the crew. The great size of cargo vessels helps to combat roll, but more is needed.

To help, a trick is being borrowed from ice breakers. Ice breakers keep a massive gyroscope in the lower hull. They use this to rock the ship back and forth, breaking the ice. However, it was realized that by installing the gyroscope differently, it could combat rolling, instead of promoting it.

The most advanced vessels today carry a gyroscope with a very heavy rotor. This rotor builds up a large amount of angular momentum. Gimbals allow the gyroscope to swivel freely. As the ship rolls, some of the energy from the motion must go into changing the orientation of the gyroscope. The larger and faster the gyroscope is, the more energy it takes to move it. This steals momentum from the ship, and helps to counteract the roll.

Operation: Using your gyroscopic stabilizer is easy. First, you need to determine if you want to dampen or enhance the roll. Your unit has eight slots, allowing for 4 positions. Remove the two plastic screws on the frame of the stabilizer to release the locking ring. You can now lift the gyroscope and change its orientation.

- · To dampen the roll, place the gyroscope such that the rotor is perpendicular to the long axis of the ship.
- · To enhance the roll, place the gyroscope such that the rotor is parallel with the long axis of the ship.
- · Put the gyroscope at a 45 degree angle to the long axis of the ship. Ask your students to predict the result.

Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up.

This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.