

# Cargo strip paper essay



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My grateful thanks are also extended to Mr.. Dulcet and Mr.

. Watson for their help in the equipment area needed to successfully do this project. Finally, I wish to thank my peers for their support and encouragement throughout my study. Abstract The research paper is to explain how a cargo ship can be constructed and Incorporate many types of learning. It also helps to understand the opportunities that building a cargo ship offer an easier understanding of how they work.

The aspects explored are the skills and techniques required to make the boat, the environment that boat will be tested in, and the values of the cargo ship itself.

Problem The problem of the RPR is to design a 1: 120 scale radio-controlled model bulk carrier cargo ship that must transport eight 5-b. Bags and travel 4 scale nautical miles in order to demonstrate a solution to the transportation of goods on a cargo ship. There are some restrictions in the RPR such as; the type of ship, the type of motor, the size of the ship, and the rules of the competition. The ship also has to withstand inclement weather and keep the merchandise intact.

Software Any software available that may be useful in constructing a model may be able to aid in the planning, designing, and assembly parts of the project. Hardware Power Drill- used to power the boat motor on and off, turn. As well as build the controllers. Saw- used to cut the wood. Multi-channel Remote Controller- used to steer the cargo ship Limitations We have a certain time limit to complete the modeling of the boat, construction of the

boat, and the testing of the boat. We are also limited in the materials we can use when building the boat.

Materials A propulsion kit Batteries Fiberglass A desire to work Eight 5-b bags of Sugar/Salt Pond for testing Hardener Resin Plywood Hot Glue Rubber Cement Mixtures 10 drops: 16 ounces (Hardener: Resin) 1 sheet: 15 inches (Fiberglass: Surface area Terms and Abbreviations Plastic - a synthetic material made from a wide range of organic polymers Plywood - a type of strong thin wooden board consisting of two or more layers glued and reused together with the direction of the grain alternating Fiberglass - a reinforced plastic material composed of glass fibers embedded in a resin matrix Naval Architecture - the designing of ships.

Cargo ship - a ship designed to carry cargo Buoyancy - the ability or tendency to float in water or air or some other fluid. Propeller - a mechanical device for propelling a boat or aircraft Rudder - a flat piece, us. Of wood, metal, or plastic, hinged vertically near the stern of a boat or ship for steering Chapter Two Hook The group has to design and build a 1: 120 (1 inch to 10 feet) scale replica model for a elk carrier cargo vessel with the required specifications.

This boat has to be radio- controlled and to be tested in the Inner Harbor.

Purpose The purpose for this challenge is to test our ingenuity and skills as engineers in a group setting.

Introduction Maryland engineering challenges have evolved into a number of competitive learning opportunities as a result of the work done by engineers, educators, and people associated with the Baltimore Museum of Industry. My

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designated task is to build a 1: 120 (1 inch to 10 feet) scale model off bulk carrier cargo ship.

The goal is to use the radical thinking and engineering skills that has been learned over the recent years as well as the skills that are being picked up along the way to successfully build this model cargo ship while maintaining the criteria guidelines given for the project. At the end of this project the groups wants to build this cargo ship and make it fully functional and to win the competition as well.

In order to complete this challenge with the most successful outcome, the group must complete the construction on the boat within the time allotted and staying in the constraints of the criteria.

This includes; the construction off mono-hull imposed of a rigid material, use a 12-volt electric motor for propulsion, not exceed the measurement limit of 60 in. Lengthwise, not exceed the measurement limit of 15 in. Width-wise, not exceed the maximum drafting of 4 in. , and the depth of the hull The boat must be marked for identification, hold eight 5-b. Bags of sugar, and demonstrate adequate stability while loaded to represent an actual fully loaded, operational cargo ship.

History Today cargo ships are necessary for the everyday function of society, but unlike the smartened, or touch screen computer the cargo ship is not a modern day invention. In 1902 the largest sailing ship, the German Pressures, which frequented voyages between Germany and Chile (a roughly 13, 200 km trip that took between 58-79 days). Its greatest average speed was 15. 8 MPH (“ Cargo Ships,” n. D.

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). Today the record for biggest cargo ship ever built has not been beat; however, progress has been made in other areas of ship construction such as effectiveness.

In 2009 the Eugene Markers, at an astounding 1, 300 feet securing it a record as the longest ocean freighter, departed the Netherlands cruising at a measly 11. 5 MPH despite its capability to travel at roughly 30 MPH (“ Cargo Ships,” n.

. ). Cargo ships can be traced back to the B. C period, but it’s the contributions by the vessel today that make it important. In history cargo ships weren’t used for transportation until the A. D time period and even then they had to worry about pirates and robberies (Hitches, 2010).

Now that society is aware of how it can benefit from ships and various areas are under different jurisdictions, people can focus on bettering technology and their understanding of the construction of bulk carriers to further benefit the world. The concentrations in this project are the written report, the oral presentation, the sign and fabrication process, the reliability, and the performance demonstration. The written report has to be submitted when entering the competition. The report consists of the designing process, the constructing of the boat, as well as the testing.

Summary In order to be successful in the construction of the cargo ship it is important to understand what it is, its uses, its purpose, its origins, and the methodology to building the model.

Cargo ships are ships that transport products throughout the world. The low price and reliability make sea transportation responsible for one-third of the world's international trade service. Cargo ships have been traced back to the B. C time period, but its role in society now is what encourages the advancement of the ship. The materials used to build the boat are as important as the design.

The material for this particular boat will be fiberglass.

Fiberglass is being worked into the construction because it is the perfect solid material to add to the outer shell to protect the model in the adverse conditions of the testing area. Chapter Three Design Proposal The first design is to have the boat's inner shell be constructed of milk crates and the outer shell's construction being made from fiberglass. This design would ensure that both the inner and outer shells are durable enough to withstand the weather the day of the contest while in the water.

It will also provide the strength to support the weight of the cargo. The stability material of the crate and fiberglass would most likely make it difficult to mold the boat to the desired shape and really constraint the measurements of the structure to near perfection. The second design is to have the boat's inner shell be constructed of foam and the outer shell's construction being added from fiberglass.

This design would ensure that the ship's shape is easy to mold. This will cause the boat to be lightweight which may produce a faster travel rate.

The issue is that the foam might not be able to withstand the weight of the cargo while supporting the model. The third design is to have the boat's inner shell be constructed of wood (most likely plywood) and the outer shell's construction being made from fiberglass. This design would make the inner shell less stressful to design and mold while the outer being strong enough to provide support.

The problem with the wood is that wood absorbs water and make the boat heavier which causes slower travel time. The wood may also not be strong enough to hold the model together.

Chapter Four Error Analysis On the process of completing this project, multiple errors occurred. First, there was a delay in getting the necessary equipment needed to construct the cargo ship. There was no clear communication between Mr.

. Dulcet and the members of the team on who would be purchasing the supplies for the boat. There were multiple errors when the wood was being cut. Some edges weren't straight causing us to spend extra time edifying the wood so that all the pieces can properly fit together.

Overcoming all of these obstacles has been very problematic. This has caused the testing process to be severely delayed.

Pre-post Design Comparison The original design called for a stronger type of adhesive to combine the inner wooden shell. We then realized due to financial issues that we had to use whatever was available. So we went with

hot glue. The original design also called for a thick inner shell, but we with some plywood instead.

This would cause the boat to be lighter and increase the speed.

Programmer's Project Evaluation I have learned that in order for the boat to be effective, we have to find the right material to hold everything in place and be able to travel in water.

The material must be sturdy enough to hold the cargo while being light enough to travel with a substantial speed. Ante and John are taking the boat outside to dry the resin and fiberglass. John is measuring the height of the boat for the fiberglass. Ante is beginning to pour a layer of resin on the boat.

Length of Boat 60" Travel Time 182 s Distance Traveled Required Freight Rate Formula  $(\text{Length} + \text{Time}) / (\text{Distance} \times \text{Cargo}) = \text{REF}$   $(60" + 182 (4 \times 40 \text{ lbs.}))$  Required Freight Rate 1. 5125 This data displays the results of the Required Freight Rate (REF) after the Cargo Ship was tested.

The graph above represents the efficiency of the boat when carrying certain percentages of the cargo Chapter Five: The Conclusion Chapter Five The purpose of the Maryland Engineering Cargo Ship Challenge is to design a 1 : 120 scale radio-controlled model bulk carrier cargo ship that must transport eight solution to the transportation of goods on a cargo ship.

First, the group had to go through serious discussions of which design the cargo boat should be. Next, the boat was constructed. Then the motor was added. Finally, the boat had to go through testing with and without weight in a lake.



Conclusion and Discussions The main hull is now constructed, and this team is currently finishing the motor and steering system of the boat. We shall leave our project behind so that seniors next year may finish the project and compete in the competition since we did not have an adequate amount of time. Recommendations and Future Instructions In the future the team should figure out which Job each member of the team will do in order to avoid confusion about who needs to do what. If done early on in the reject this will help reduce the amount of time wasted by people who do not know what they should be doing.