

Hull Design: electric and i.c.

Task:

To design a hull for your Schools Marine Challenge entry.

Introduction

The hull of your craft is the most fundamental element of any boat. It is the structure that holds in place all other components. It gives the craft its shape size, form and buoyancy. Other fundamental aspects are the influence it has on performance and handling.

Research Section

What different forms of boats have evolved over time?

Produce a time line showing the evolution of basic hull design from simple wood and skin craft to advanced composites used in Formula One power boating. For each list the typical materials, forming systems, jointing processes and the main advantages and disadvantages of each.

What are the key design elements a hull must possess?

Strength

Combinations of Rigidity and flexibility

Resistance to corrosion

Ease of manufacture

For each of the above say why they are important, add more if you can.

Design section

Collect all the information you will need to enable you to start designing your hull and draft a specification.

Scale and size required

Major component locations and fixing methods

Top deck fixing requirements

Material availability

Processing availability

Initial design

Produce a few freehand isometric sketches of ideas then progress to dimensioned drawings appropriate to your design. Remember these must include all necessary information for someone else to manufacture your hull to the correct dimensions and tolerances and using the appropriate materials and manufacturing systems. For example you may want to use GRP or a vacuum forming, both will need a form tool, which will be time consuming to make. They will need to have enough room for all the components and be large enough to be stable on a choppy lake surface. Visit the schools marine web site where there is a hull design section.

Produce full working drawings using the most appropriate system with either manual or a CAD package.

Manufacturing Section

Produce test pieces for any processing skills such as pattern making, from wood or styra-foam

Produce a sequence of operations for manufacturing from cutting materials to finishing and applying a surface finish which will allow the mould to release from the pattern

If your design is produced from polymers, and or composite production show clearly the stages in producing a mould and then the component.

Health and safety

Carry out a risk assessment for one of the processes you plan to use.

Consider: Materials, tools, environment, training, protective equipment and systems, action in case of problems.

Target Areas

KS 3 or 4

Resistant Materials

Material properties and processing

GCSE Engineering

Unit 1

Specifications and Engineering drawings

Unit 2

Production planning, Choosing materials, Using processes

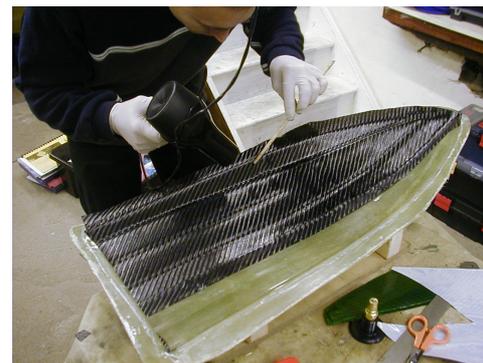
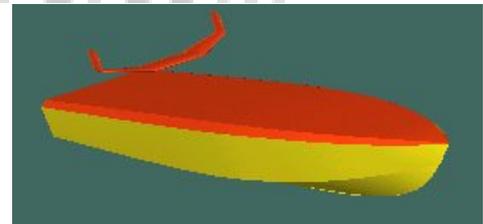
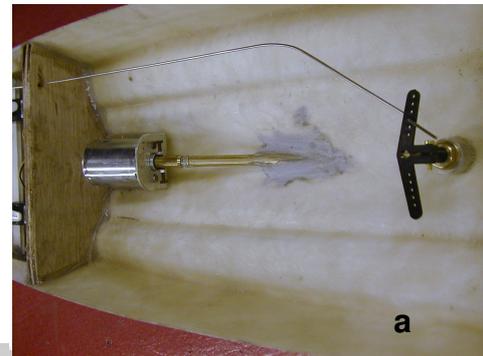
Health and Safety

Unit 3

Investigating Products

Key Skills

Communication, Number, IT



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a Basic hull layout

b Stylised hull design

c laying up a carbon fibre hull