

MALIN YOUNG ENGINEERS: EDITION 7



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OUR TEAM WORK ON A VARIETY OF PROJECTS, ACROSS A RANGE OF SECTORS, ALL OVER THE WORLD

INTRODUCING MALIN YOUNG ENGINEERS

The Malin Group consists of a varied mix of talented individuals, who span a number of specialisms, from naval architects, design draughtsmen, structural engineers and project managers, to lifting engineers, heavy haulage experts and marine operations personnel. All have a passion for problem solving and are very creative - and all took a real interest in science, technology, engineering and maths (STEM) at school.

Our team work on designing, building, launching and maintaining ships, as well as calculating how best to move materials from A to B - that may be using a trailer, or maybe a crane. They also test the strength of structures and get involved in 3D modelling. They work on projects all over the world, and work for people such as Rolls Royce, FH Bertling, BP, BAE Systems - even the Ministry of Defence.

We are committed to supporting the next generation of engineers, so have come up with a range of challenges for you - a Malin young engineer - to complete. We hope you enjoy them, and who knows, we may be offering you a job in a few years time!

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CHALLENGE ONE: EGG-CELLENT STRUCTURES

SHAPES IN STRUCTURES

For this challenge you are going to learn about the importance of shapes in making strong structures.

Particular shapes tend to be used by engineers in their designs, as they make much stronger structures than other shapes.

STRONG SHAPES

When an engineer is designing a structure - whether a tower block, bridge or vessel, a lot of consideration is given to how to ensure it is strong - and whether it can bear weight. In other words, they do not want the structure to fall down or break when a force is applied to it, whether it is the cargo loaded to a vessel, or traffic going across a bridge.

Triangles are very good at bearing weight. This is because when weight is placed on the top of the triangle, the two sides are squeezed, or compressed and the third is stretched, or put under tension. This means the weight is distributed across the shape so it doesn't bend or break.

THE CHALLENGE

You are going to build a structure to hold a small chocolate Easter egg using plasticine, toothpicks and paper. The structure must stand independently and hold the chocolate egg without falling over. Think about what shapes to use within your tower to ensure it is sturdy. Are there any shapes alongside triangles that are strong? What about an arched or domed structure?

TOP TIP

Consider the weight of your egg when making your structure - a hollow egg is much lighter than a caramel filled one, and your structure will need to be strong enough to hold the egg and filling!

BONUS QUESTION

Next time you see a bridge, why not count all the shapes you see in it.



CHALLENGE TWO: SINKING THE EGG

INVESTIGATING WEIGHTS

For this challenge you are going to learn about how different materials float or sink.

WHY DO THINGS FLOAT?

Despite being often very large structures, ships, as we know float - but how is this the case? An object will float if the gravitational (downward) force is less than the available (upward) buoyancy force. So, in other words, an object will float if it weighs less than the amount of water it displaces. This explains why a rock will sink while a huge ship will float. The rock is heavy, but it displaces only a little water.

THE CHALLENGE

You are going to collect between eight and ten random small items around the house to place inside plastic eggs. This may be coins, sweets, cotton wool - anything that will fit inside plastic eggs. You then need to guess whether each filled egg will float or sink. Once you have your predictions, fill a basin with water and test them out.

TOP TIP

Use a clear basin or bowl if you have one so you can see if the eggs fully or partially sink. For eggs filled with items such as screws or coins, you can also test out how many of the item is needed inside the egg to make it sink.

BONUS QUESTION

In what year did the Titanic sink?



CHALLENGE THREE: D-EGG-CORATE

MATERIALS MATTER

For this challenge you are going to learn about different materials and how suitable they are for the project you are working on.

MATERIALS MATTER

A key part of any engineering design is selecting the best materials for the job - maybe they need to be lightweight, waterproof, fireproof? And it is not only how they act, it is also what they look like. The design may require transparent materials, for example you may need to let light in but also needs to be private, so you can't use glass.

Cost and availability are also considerations any engineer must take into account when completing a design. Even the most perfect material is no use if it is in short supply or too costly for your budget.

As such, when an engineer is involved in any project, they must consider the range of materials they may use and what the risks and benefits are of each.

THE CHALLENGE

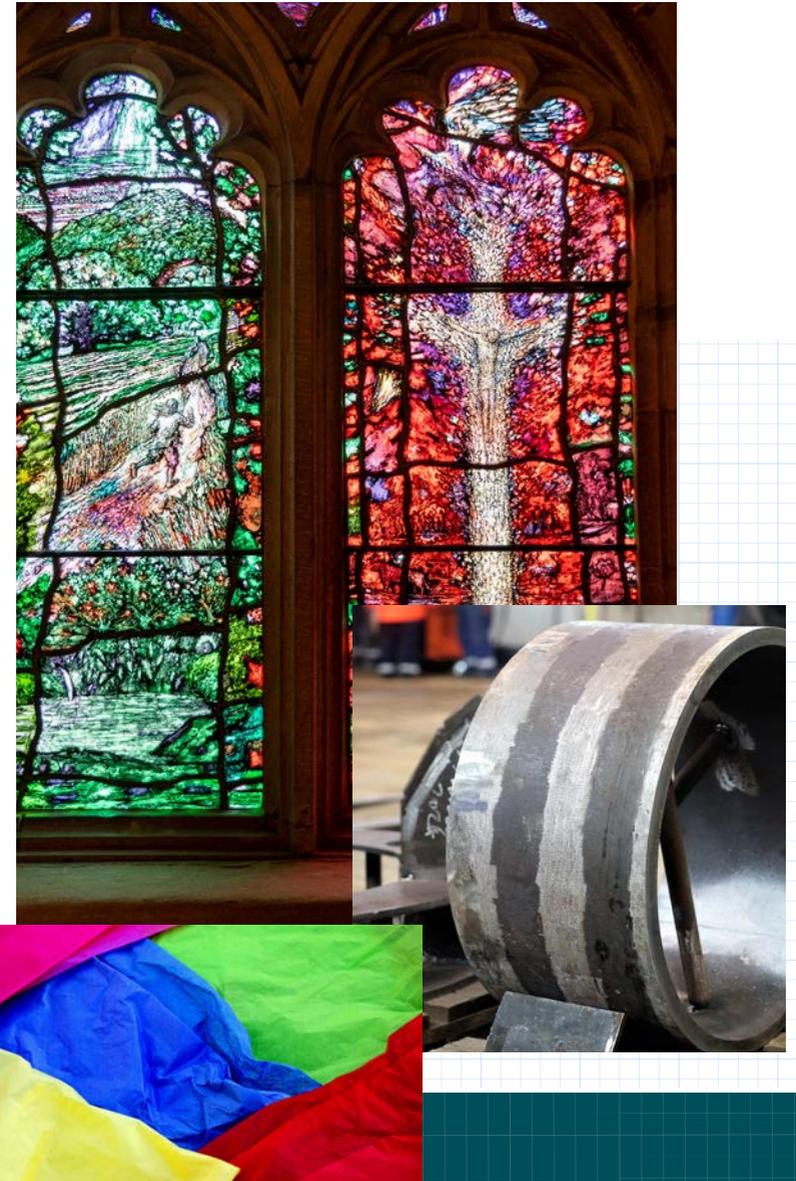
Make a frame shape - maybe an egg or a bunny outline using black paper with strips across the middle joining the sides. Place your frame against a window. You can then look for materials around the house to decorate your frame with and check whether they are opaque, translucent or transparent.

TOP TIP

Sweet wrappers often make a good material or tissue paper.

BONUS QUESTION

Why does it matter what weight a material is on a design?



CHALLENGE FOUR: LOOK AROUND

YOUR SURROUNDINGS MATTER

For this challenge you are going to learn about what impact the environment has on your designs and plans.

THE POWER OF NATURE

When engineers design solutions to a challenge, they need to consider not only what the project has to deliver but also what the environmental conditions will be. For example, if you are transporting something by sea, when are the tides? What will the weather be like? Or if you are designing a structure, how will it work alongside the environment around it? What conditions must it withstand?

THE CHALLENGE

Put on your best boots or trainers, get a pad and pen ready and go for a walk in the great outdoors. With the seasons changing, you need to discover all the signs of Spring. Record all of the changes you see, all the signs of new life and changing environment. See how many things you can list or maybe even draw pictures!

TOP TIP

Think about how the landscape is changing shape but also new colours and sounds.

BONUS QUESTION

Why would the tides changing have an impact on an engineering solution involving a vessel?

GOOD LUCK AND GET ENGINEERING...



WORKING WITH US

THE MALIN GROUP OFFERS YOU AN EXCITING RANGE OF EMPLOYMENT OPPORTUNITIES, FOR THE FUTURE, SPANNING A VARIETY OF SPECIALITIES.

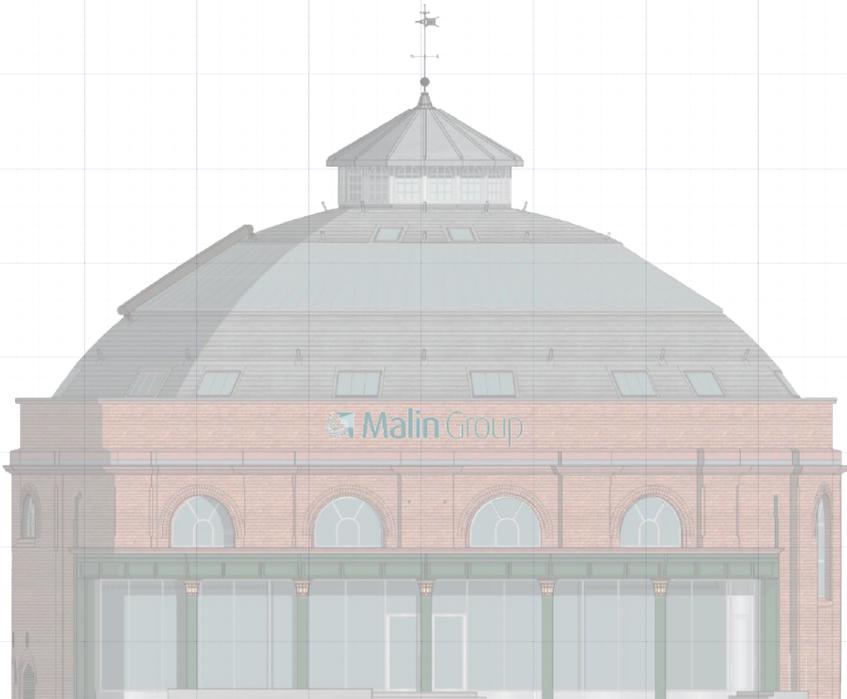
With the Malin Group, you are not just joining a team, you're becoming part of a family. Our headquarters, based in the South Rotunda, Glasgow, reflect our group and culture - heritage teamed with innovation and creativity. Inside this historic building, classic features are teamed with modern facilities for our staff to enjoy - including pool table, ping pong, communal lounge area with fresh fruit and snacks, PS4 and a climbing wall. Our conference room also allows a 360 view of the city centre. We have regular social events, including First Friday Drinks, client football matches, and an Annual Ceilidh - plus we have a few office dogs on occasion, which is always a nice addition!



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