A TO Z OF ENGINEERING

WORKSHOP 4: Acoustics

Welcome to Engineer Academy where we're exploring an A to Z of Engineering – everything from acoustics to zoos!

So what does engineering actually mean? Well, anything that is built – whether a bridge, building, washing machine and even your smartphone, must first be engineered.

An engineer is a person who designs and builds complex products, machines, systems or structures. They want to know how and why things work, and have scientific training that they use to make practical things. Engineers often specialise in a specific branch of engineering, such as civil, electrical, mechanical and chemical engineering. You can think of engineers as problem solvers - so if you like solving puzzles you might make a great engineer!

Some of the different types of engineers you will come across are...

Civil engineers design and manage construction projects, from bridges and buildings to transport links and sports stadiums. They could work on a construction site or in an office, and they might have to work quite a bit outdoors in all weathers!

Marine engineers design, build and repair boats, ships, submarines, offshore platforms and drilling equipment. They work at shipyards, in offices, on board ships, at a port and even underwater!

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Find out more at www.funkidslive.com/engineer

Engineering through the Ages

From the humble wheel to flushing toilets, the telephone to supersonic jets, engineering has been a big part of human history for thousands of years.

Today's engineers use the most advanced technologies, alongside established scientific principles, to apply cutting edge solutions and innovation to real world challenges.

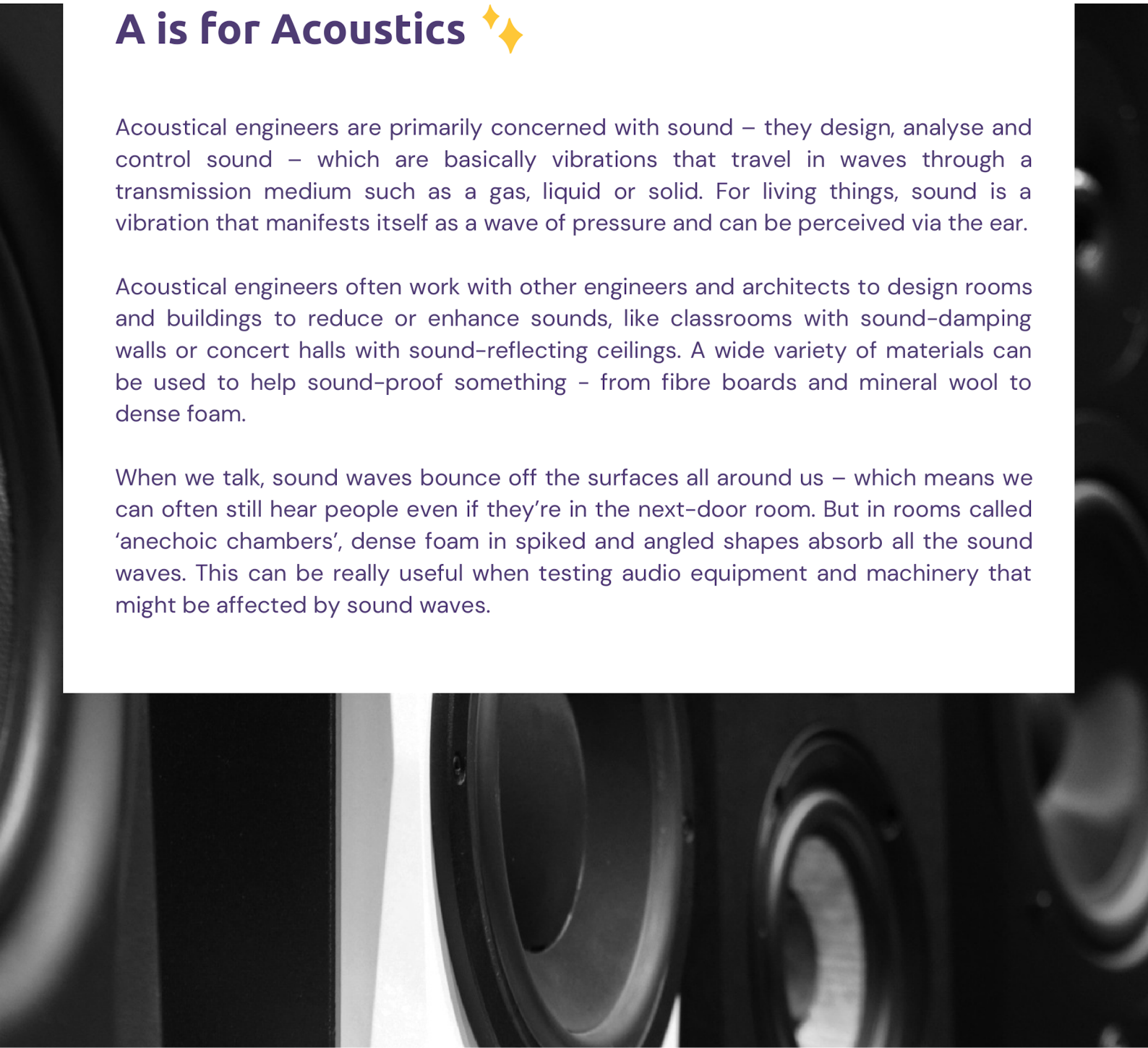
But engineering isn't just about structures or circuits, it's behind everyday things like the music we listen to on our radios, smart speakers and online... and can help us turn the sound UP or DOWN!

A is for Acoustics

Acoustical engineers are primarily concerned with sound – they design, analyse and control sound – which are basically vibrations that travel in waves through a transmission medium such as a gas, liquid or solid. For living things, sound is a vibration that manifests itself as a wave of pressure and can be perceived via the ear.

Acoustical engineers often work with other engineers and architects to design rooms and buildings to reduce or enhance sounds, like classrooms with sound-damping walls or concert halls with sound-reflecting ceilings. A wide variety of materials can be used to help sound-proof something - from fibre boards and mineral wool to dense foam.

When we talk, sound waves bounce off the surfaces all around us – which means we can often still hear people even if they're in the next-door room. But in rooms called 'anechoic chambers', dense foam in spiked and angled shapes absorb all the sound waves. This can be really useful when testing audio equipment and machinery that might be affected by sound waves.



Academy Challenge

Imagine this scenario: Someone has decided to build a music venue next to a hospital – and the patients don't like the noise!

You need to help work out what materials would be best to soundproof the venue so that the most amount of noise is absorbed – and the patients can sleep.

What things around your home you home do you think will be good sound insulators?

How about...

- A sheet of newspaper
- Some metal foil
- Cotton wool
- A bed sheet
- Bubble wrap
- Polystyrene packing
- A blanket
- A duvet
- Or a combination of these

Let's try it out!

Use a mobile phone or small radio to play some music - and use the different materials to cover the music source and see which ones work best.

Can you think of other kinds of rooms and buildings which would benefit from soundproofing?

Did you know?

Our brains interpret sounds in different ways in different situations – like when you're at a party, even if there's a babble of voices, you can still have a conversation with someone nearby because your brain is focusing on their words and not other people's. And the way we interpret sounds from different types of speakers can change depending on what else is going on or where we are. These psycho-acoustic effects are important factors that engineers take into account when designing audio equipment

Wordsearch

H C J B C F X U Q A U K Y S A I S Z
S Y K F M A T E R I A L S C B O O U
N F C U V S J L F C X U I M H B U J
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