Higher

TRIGONOMETRY

MEET ELEANOR

Senior Engineer (Bridges), WSP

SUBJECTS STUDIED AT SCHOOL

Maths • Physics • Graphic Communication

English • French • Art • Product Design

FURTHER EDUCATION: MEng Civil Engineering with Architecture

CAREER JOURNEY SO FAR

Joined WSP after graduating from university

4 years later qualified as a Chartered Engineer with the Institution of Civil Engineers

FUTURE ASPIRATIONS

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One day I would love to design a brand new bridge!

Q&A WITH ELEANOR

What does your company/organisation do?

WSP provides a huge range of services, mostly to do with civil engineering and other construction activities. Our work ranges from design and maintenance of roads, railways and buildings to urban planning, sustainable development, water management and power generation and distribution.

What types of activities do you do in your job?

So far my work has included inspecting bridges to make sure they are in good condition, and assessing them to make sure they are able to carry the traffic loads which are applied to them. I have also been involved in the design of refurbishment of bridges to make them stronger.

What does a typical day at work look like for you?

Usually I sit at my desk doing things like calculations, report writing, interpreting old drawings of existing bridges, or planning out the tasks that need to be done on a project. Sometimes I go out on site to inspect bridges which involves taking photographs, measurements and notes. Before I go to site, I also have to undertake planning and assessment of health & safety risks.

What are your favourite things about your job?

I enjoy bridge inspections as I get to be outdoors and up close to the structures my work centres around. I also enjoy the challenge of problem solving as part of the calculations I do, which allows me to be creative in finding solutions.

HOW ELEANOR USES TRIGONOMETRY AT WORK

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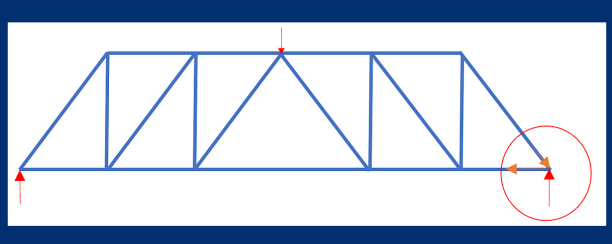
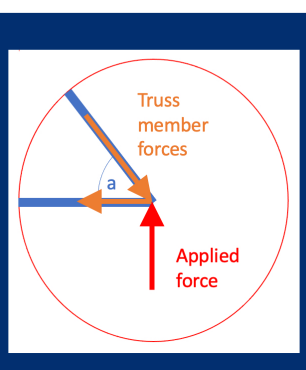
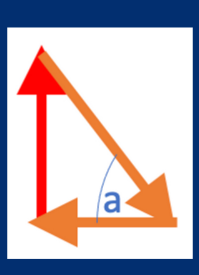
I use trigonometry when I am assessing existing bridges. For, example, a truss bridge is made up of lots of right-angled triangles and we need to know what forces are in the members of the truss for a given loading scenario. We can then compare those forces with the allowable force in the material the truss is made of to know whether or not the bridge will need to be strengthened.

ACTIVITIES

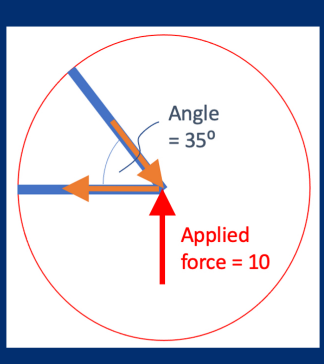


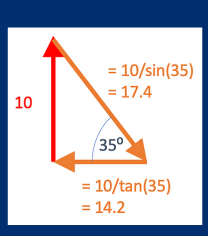


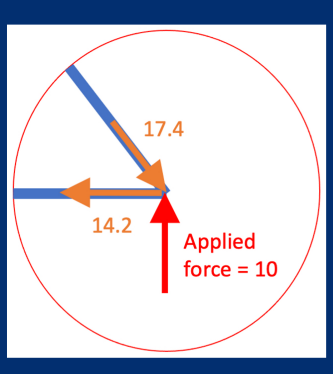
If we know the angles in the truss, and we know the applied force, then we can work out the forces in all of the members. Imagine these forces are rearranged into a triangle with the lengths equal in length to the forces:



...then you can use trigonometry to work out the hypotenuse and adjacent side.







And we can check our answers using Pythagoras!