Civil Engineering

Introduction to Civil Engineering:

I have been involved in Civil Engineering for 43 years. Why the name Civil Engineering? It is to define it from Military Engineering. Historically engineering work was done by the military.
The first non-military engineer was John Smeaton (c. 1760).

What do Civil Engineers Do?:

Civil Engineering includes …….

- Railways
- Wind Turbines
- Flood Defences
- Coastal protection
- Surveying
- Power Stations
- Tunnels

PLUS:-

Roads
Bridges
Buildings
Airports
Fresh Water Supply
Wastewater treatment

Support life:
Many people still have no daily access to clean drinking water
Charities like Wateraid have made it their aim to get water to undeveloped areas.

Shelter people and keep us safe:
The Thames Flood Barrier was built in 1982 and has been used 186 times since then. That is at least 5 times a year.

Help us get from A to B:
Bridges and roads are vital.

Help us make the best of our resources:
Hoover Dam, USA, built 1932-36. Produced power for Nevada, Arizona and California.
The Hoover dam harnesses the resources of nature to make Electricity. It took 4 years to build and was built during the Depression. Often in these times governments realise it is better to spend money not save money.

Populations are growing:
Civil Engineers are building a better world for us all.
They are building better infrastructure, keeping transport going.

More people are living in cities:
More than 6 billion living in cities by 2050, from 4.2 billion in 2018.

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Natural disasters:
Earthquakes, landslides and floods mean we need civil engineers for major international reconstruction projects.
Civil Engineers design new buildings which will withstand natural disasters.

They work on site and in design offices:
Construct projects on SITE.
Design projects in OFFICE
Or they can flip between them both.

UK Civil Engineers are in demand:
At home and abroad, in developed countries and in fast-growing developing countries.

Who do Civil Engineers work with?
Architects, designers, surveyors, conservationists, planners and lots of different people.
They will work with other professionals, they are multi-disciplined.

For more information:

- ice.org.uk/wice
- careers@ice.org.uk
- ice.org.uk/what-is-civil-engineering

My work:
Lock16, Union Canal, FALKIRK
This is the first bridge I designed in 1960.
Erskine Bridge
For the Erskine Bridge, we had to do excavations, to use rock for the foundations. For the columns, we made a mould of shuttering timber. They weighed 17 tons, and we lifted them with pulleys. This gave a mechanical advantage, but still took 8 hours to move them.
M8 Charing Cross GLASGOW
This was christened “The Bridge to Nowhere” - it was strengthened so that it would be capable of taking the building that has since been built on it.
Stirling University Link Bridge to McRobert Centre Theatre
I designed the structures holding the Link Bridge at Stirling University.
Craigend Interchange PERTH
I worked on the bridgeworks.
A77 KILMARNOCK by-pass

A9 Findhorn Bridge, near INVERNESS
The Findhorn Bridge is 26 metres high. When you take the train to Inverness, you can see it.

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Lerwick Harbour Finger Pier, SHETLAND
M74 Stoneyburn Railway Bridge ABINGTON
This tunnel was 200 metres long.
Tay Wastewater Scheme DUNDEE
For this we used 2 metre diameter pipes, and nylon strapping. We sheet piled the wall to keep the River Tay out and installed 12 pumping stations.
M8 Kingston Bridge Half-Joint strengthening GLASGOW
The joints were deteriorating on this bridge, so this project involved strengthening a live motorway.
Falkirk Wheel Aqueduct FALKIRK
I worked on the aqueduct at the Falkirk Wheel in 2000, which is made of reinforced concrete. Tony Kettle was the architect. These hoops are an architectural feature, they are not necessary or functional but these details make it an iconic structure.
Falkirk Wheel Mechanism FALKIRK
It takes 90 KW of electricity to start up the mechanism but only 10 KW to keep it going. This is because of the balance structure.
Falkirk Wheel Build FALKIRK
You can see the gear teeth here. The aqueduct was built by ARUPS off site and arrived in 5 pieces.
Falkirk Wheel & Visitor Centre FALKIRK
It is interesting to visit the Visitor Centre which explains how it was built. You can also pay to go on the Wheel in a boat.

Questions:

Which University did you go too?
I went to Glasgow University. There are many Civil Engineering courses. I recommend going to the Open Days at the various Universities to decide which course suits you best.

Would you recommend going abroad for a year during your course?
It is always interesting to learn abroad, but some students have found that the course is not as good as the one they are on in the UK. However, it is interesting to learn more about another country in case you want to work there in the future. UK Civil Engineers are highly respected and in demand in many countries such as Dubai.

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