

THE FALKIRK WHEEL



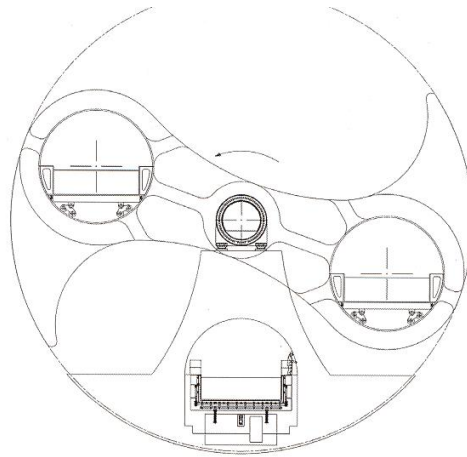
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Canals are sometimes called ‘the motorways of the past’. They were used for linking big towns and for moving goods around the country. They were very busy and important. They had their own special kind of engineering to help them to change levels, to join up together and to get round natural obstacles like hills and valleys.

Canal builders have always had to tackle the problems of keeping the canals level when they go up and down hills. Locks were used to do this, and later on boat lifts were invented. A boat lift was built in Cheshire in 1875 to transfer barges from the River Weaver to the Trent canal which was 50 feet higher up than the river.

In 1998 engineers built another boat lift in Scotland which is a very dramatic sight. £84 million was spent on joining up canals and rivers to make a waterway right from the east to the west coast of Scotland. The Falkirk Wheel joins two canals that had previously needed a boat lift. Boats have to be lifted 82 feet (25m) from one canal to the other, and 11 locks had been needed to do this. The locks were too old to use and they had been closed in 1933. The engineers decided to design a boat lift instead as part of the Millennium Link project.

The Falkirk Wheel takes two boats up and two boats down at the same time. Altogether 400 tons is moved from one canal to the other, including the weight of water. It is both a useful waterway and a tourist attraction, and there is nothing like it anywhere else in the world.

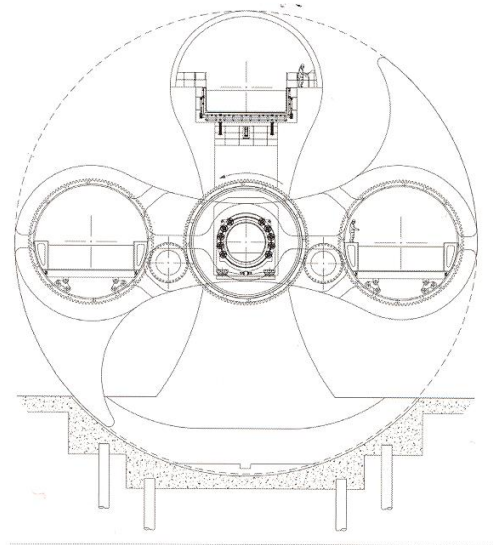


The diagram shows a cross section of the boat lift.

The gondola on the right is going up towards the Union Canal, and the gondola on the left is coming down into the basin.

The boat lift is in the middle of a rotation.

The entrance to the Union Canal can be seen at the top.

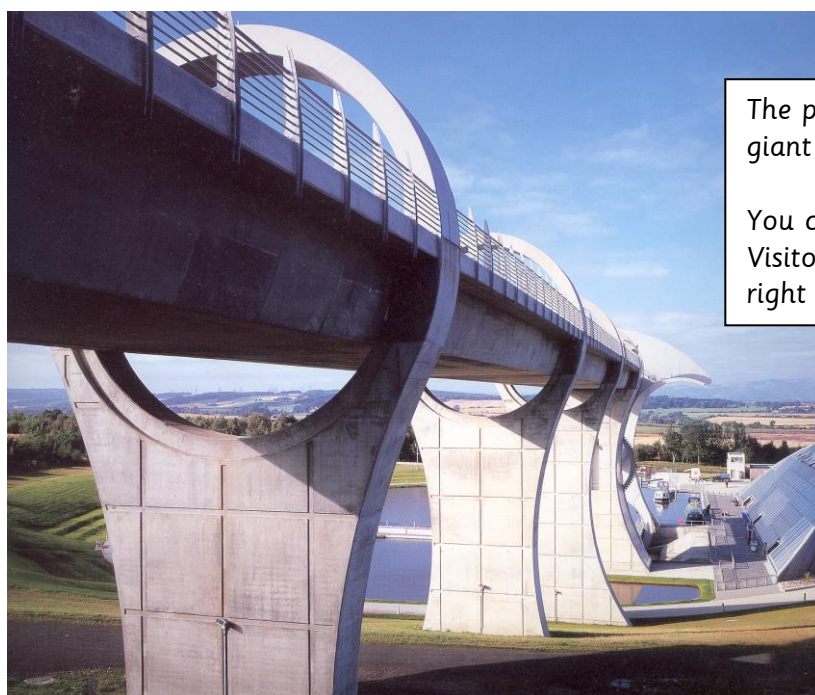


It is very exciting to travel on the canal. Boats come along the Union canal through a tunnel, and then the canal comes out on to an aqueduct. This aqueduct is 330 feet (100m) long and it goes through five piers 25m (82 feet) apart. The piers are like giant concrete needles. The aqueduct ends in a steel caisson (a container a bit like a bath) which takes two 20m (65ft) boats side by side. The bath is rotated half a turn and lowered until it reaches the Forth and Clyde canal below, then the gates are opened and the boat moves on. It takes 15 minutes to use the boat lift, but the old lock system would have taken several hours.

The boats enter when the wheel is standing still, then the gates are closed. The wheel turns round and the boats are lowered (or raised on the other side). While the wheel is turning a set of five gears keeps the bath horizontal. The central gear is fixed to the hub of the wheel and it turns two smaller gears. These two gears mesh with teeth fixed on the bottom of the bath, so that it is impossible for them to rock about. This design was possible because of the way the bath fits closely inside the circular shape of the supports. The design team used Lego models with gears to help them to prove that the idea would work! Ten small motors are fixed round the hub of the wheel to turn it.

The other problem that the designers had to overcome was how to stop the water getting out of the canal when the bath was being lowered and raised. They solved it by using a short steel section to finish the aqueduct, as it is easier to make a seal with the metal than it is to seal off the concrete.

The Falkirk Wheel is stunning to look at, and the designers decided to make a dramatic circular structure so that it would look interesting in the landscape. Lots of visitors come to see it, and there is a big visitor centre nearby which has been made to fit in with the circular look of the boat lift.



The piers look like giant concrete needles

You can see the Visitor Centre on the right of the picture

Things to investigate

Have a look at a video on YouTube which shows the Falkirk Wheel rotating. It is speeded up!

<https://www.youtube.com/watch?v=n61KUGDWz2A&feature=kp>

or: <http://tinyurl.com/odqlkkm>

The website of Scottish Canals has a timeline which tells how the Falkirk Wheel was made:

<https://www.scottishcanals.co.uk/falkirk-wheel/about-the-wheel/>

or: <http://tinyurl.com/zmjoqka>

and there is a link to a video to watch at the end of the timeline.

- 1) What was the circular basin used for before the Falkirk Wheel was built?
- 2) Who opened the Falkirk Wheel and when was it opened?
- 3) Which famous engineer was involved in building the Union Canal around 200 years ago? (clue: there's a town in Shropshire which is named after him)
- 4) Why do the boats need to come through a tunnel to get on to the boat-lift?
- 5) On 13 June 2012 a very special item was carried on the boat-lift. Can you find out what it was and where it was going?



Image from the National Education Network: thanks to Diane Earl
gallery.nen.gov.uk