

The Strepv Thieu Boat Lifts

We're going to take a trip to La Louviere in Belgium as Kay and I did in May!

I'll start with a question "Can you name any World Heritage Sites in Belgium?". Perhaps someone will say "Bruges" - quite right. But I'm sure that no one will say "The Four Lifts at La Louviere"!

Most of you will know about the Falkirk Wheel, the rotating boat-lift, funded as a Millennium project, which re-connected two Scottish canals. Fewer will have heard of the 2002 Strepv Thieu boat-lift in Belgium which is far bigger than the Falkirk Wheel. We visited it while on holiday this year.



The European canals are far more commercially important than ours and the huge barges travelling the Rhine and the Moselle are only part of the picture. The EU decided a long time ago that various canal routes should be upgraded to handle 1350 ton barges. One of these canals is the Belgian Canal du Centre. Near Mons, the terrain rises about 80 metres and the old canal used a series of locks and venerable hydraulic boat-lifts which were incapable of handling big barges. The old section itself is now designated a World

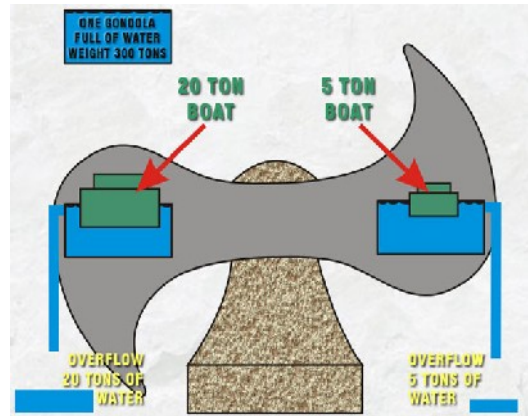
Heritage Site, and I'll return to this. It was decided to bypass this section, and build a boat-lift which would lift 1300 ton barges by 73.5 metres in one 6-minute operation compared with the 25 metre lift of 300 ton barges in 4 minutes for the Falkirk Wheel. This was opened in 2002. - and of course like the Falkirk Wheel it is a tourist attraction.

First, some history, and some basic principles. Edwin Clark built the original Belgian hydraulic boat lifts 130 years ago. Also the similar Anderton boat-lift in Cheshire. A little later, a similar lift was built in Canada. These lifts use a pair of balanced tanks, the rising tank and the descending tank. Here you can see the upper tank, mounted on a hydraulic ram, as is the lower tank..The hydraulic systems are connected.



The tanks hold the same nominal amounts of water, so that the tanks are more or less balanced. This still applies when boats enter the tanks, because Archimedes Principle decrees that boats displace their own mass of water.

Now when Clark designed these lifts, he didn't have today's technology and he designed a clever hydraulic system. What happens is that the stopping point of the upper tank is set so that it takes on extra water from the upper canal increasing its weight. On release, it then descends, driving the lighter lower tank upwards, and at the bottom the extra water is discharged into the lower canal.



The old Belgian "Heritage" lifts still work in this way, and are used for tourist traffic.

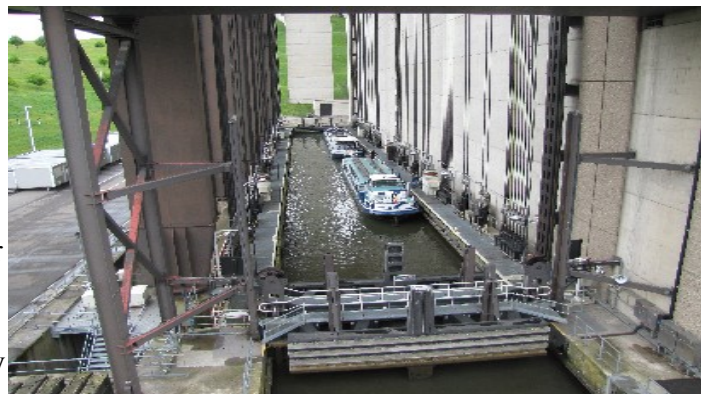
Modern engineers have external power readily available, and so the Falkirk Wheel and Strey Thieu work differently from the old Victorian systems - and from each other.

The Falkirk Wheel stays with a pair of balanced tanks. Balancing is quite precise, with fine adjustments to the water levels, and the wheel is turned using very little power.



At Strey Thieu, the pair of lifts act independently.

Boats enter one of the tanks, or caissons. Because Archimedes Principle states that boats displace their own mass of water, the weight of the tank is always more or less the same, subject to variations in the water level in the canal reaches. So the tanks are nominally balanced by fixed 8000 tonne counterweights connected to the caisson by many cables.



Winding is carried out by large electric motors in the machine room. Unlike the Falkirk Wheel, there doesn't seem to be any system for adjusting the balance by transferring water, and as a result the power consumption per lift operation is a great deal higher.

Today this is the world's highest boat lift - but very soon the Chinese will complete an even bigger one, the Three Gorges Dam lift, which will lift 3000 tonne vessels through 113 metres.

