



PRESS RELEASE

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Flange-tastic progress on Brighton i360

New pictures reveal the latest progress on the Brighton i360 build after one of the attraction's official photographers returned from a factory in northern Spain this week [December 11 2014].

The specialist factory, called Euskal Forging, which is based between Bilbao and Pamplona in north east Spain, has forged 33 giant flanges, which will be bolted to each of 17 steel cans to act as joints to connect them and build the i360 tower.

Each flange is forged from a single ingot of steel, they are machined to make a perfectly flat surface and then bolted inside each end of the steel cans.

During an inspection by engineers from steel specialists Hollandia this week, they were approved for the next stage when they will be transported to a company called Sif Group in Roermond in the south eastern Netherlands, where they will be attached to the steel cans.

Said Eleanor Harris, CEO of Brighton i360, "This technology is what will create the strength in our tower, so that it can withstand high winds and carry up to 200 people in our viewing pod, currently under construction in France.

"The 162 metre high tower is only 4 metres wide and every step of the way requires unique and ground breaking design and engineering."

The steel cans will be finished inside and out at Hollandia's factory in Rotterdam, where they will also be sprayed with molten zinc and painted before being delivered by boat to the Brighton site in 2015.

They will then be bolted together and erected using a giant jacking platform, attaching one can under the other and jacking it up can by can until the operation is complete.

Meantime, groundworks by local firm Mackley have continued on Brighton Beach, though the construction site will close between Christmas and New Year, so people can enjoy the seafront during the festive period. - Ends -

Media enquiries: Paula Seager, Natural PR on Tel: 01273 857242 or Email: paula@naturalpr.biz

Facts on Flanges

What is a flange?

A flange is an external or internal ridge / rim that is welded onto an object so that it can attach more effectively to another. Imagine two gas pipes – you need to keep them firmly together to stop gas escaping, so you would either weld the pipes to create a seal, or weld flanges to the pipes so that they could be moved into and out of position easily, forming a pressure seal once bolted together.

Why do we use flanges?

We have 17 cans for our tower and we need to keep them firmly together! The problem we have is that each one is a perfectly smooth tube with walls that are, in ratio, the thickness of a bean can. We are building from the top down, so as we lift each can we need to attach it to the one below. High strength bolts "clamp" them tightly together so that they are firmly fixed.

Won't the flanges detract from the smooth look of the tower?

No. The flanges are hidden inside the cans.

If they don't need to be moved, why don't we weld?

The best way to attach each can would be to weld them together, but for a tower of this scale we face a welder's biggest problem: moisture. Although the South East may get less rain than the rest of the country, it does get rainfall all year. It also gets some incredible winds – great news for the Rampion Wind Farm, not so great for the welders! We also have the sea air to cope with - anyone who lives close to the coast will tell you, once the salt gets in to your metalwork, it doesn't come out easily. The only way to build the i360 safely would be to do it indoors, which is why we are welding our flanges in a factory.

What do our flanges look like?

The images attached show them. There are 33 of them in total – 16 of the cans need one at each end but the top can only needs a flange at one end.

How are they made?

Each of the 33 flanges is being made by forging a red hot single ingot of steel into a ring shape of the correct diameter. The material used in the ingot is exactly the same strength as the steel used to make the cans.

When the forging is the right shape, the steel is allowed to cool in a very controlled manner. This improves the strength and fatigue resistance of the flange.

Why did we use a factory in Spain?

Because of the very precise nature of our cans, we couldn't just forge them anywhere. The factory we used in Spain is believed to be the only factory in Europe where this operation can be carried out.

How do you ensure they are the right size if they are made in a different location?

The forged flange is only approximately the correct size at the first stage in the manufacturing process, and has to be machined to the exact size required. Now the flanges have arrived in Holland, we join them to the cans and then machine them in another large lathe. This gives them an extremely flat surface that is at exactly 90 degrees to the can. If we did not do this, the i360 could become the Leaning Tower of Brighton!

Let's talk bolts...

Up to 72 bolts are used at each joint, spaced out evenly around the circumference, and the bolts are up to 75mm (about 3 inches) diameter. A single bolt of this size can carry a load of as much as 440 tonnes. If you want an indication of what this means, a single 75mm bolt could lift 30 double decker buses!

How many bolts do you need?

In total more than 1,500 flange bolts are needed at the flanges - the total weight of these bolts is about 100 tonnes.

What happens if a bolt malfunctions?

Each bolt is galvanised (the steel bolt is submerged into a bath of molten zinc) and then wrapped in a special impregnated tape to give long term protection against corrosion. Even so, the bolts form such an important part of the tower structure that randomly selected bolts will be inspected each year. The bolts can be safely removed and replaced (one at a time, of course) if necessary during the lifetime of the tower.

What happens if the bolt holes don't match up during the build?

We've all drilled holes in the walls, only to find we are out by a few mm (or several cm in some cases!). It would be far too late to find a mismatch while the tower is under construction, so we make sure they fit beforehand. The holes through the flanges are drilled in pairs to ensure the bolts will all fit, then each pair of cans is "trial assembled" in the factory. This is done in sequence - can 1 is fitted to can 2, then these two are taken apart and can 2 is fitted to can 3, and so on.

What's next?

Once we have welded all the flanges, we will move the cans to Hollandia's factory in Rotterdam where they will have all the interior steelwork added, including platforms, towers and bull wheels for the cable car etc.

About Brighton i360

At 162 metres high, and with an observation pod rising to 138 metres, the i360 will be the tallest observation tower outside London, a vertical cable car offering a new perspective on the fun loving seaside city of Brighton. Sited at the root end of the historic West Pier on Brighton's seafront, the i360 has a slender, elegant design, with a futuristic pod allowing 200 visitors at a time to enjoy the surrounding view as it slowly unfolds. The visitor centre incorporates a 400 seat restaurant; a shop; exhibition space; and conference and event facilities.

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