Top of the world!
A spectacular view of the team celebrating the topping out of the North Tower in October. This was followed by the topping out of the South Tower in November. And, in December, a major milestone for the Queensferry Crossing Project was achieved with the topping out of the Centre Tower, meaning that the construction of all three tower structures has now been completed. The towers are now at their full height of about 210 metres above mean sea level. This makes them the tallest bridge structures in the UK.
Welcome to the first edition of the Queensferry Crossing “Project Update” of 2016. Once again, we return to a “photo special” format, believing in the old adage that a picture is worth a thousand words. As always, a great deal of construction activity has taken place since the last issue so, first of all, here’s a brief summary of the significant progress made across the Project over the past three months. Please turn to the Centre Spread for the photographic evidence!

In December, the Centre Tower topped out at a staggering 210 metres above average sea level. The North and South towers topped out in October and November respectively. Completing all three towers (the highest bridge towers anywhere in the UK) is a major milestone for the Project and congratulations go to our tower construction colleagues and the concrete batching and delivery team on a job well done. The focus now is on completing the internal access infrastructure which includes the installation of an elevator system in each tower as well as the completion of the internal stairways. The enormous yellow cranes next to each tower (also the highest in the country) will stay in place for many months yet as they are being used for the installation of the 288 stay-cables which will support the road deck below.

Talking of the road deck, the complex operations to lift the deck segments into position are now in full swing. At the time of writing, we have installed 26 deck segments since the first was lifted up on to the North Tower in early September. In total, 110 deck segments, weighing on average about 750 tonnes each, will be installed before the bridge is completed. It is very exciting for all of us involved in the construction programme – and, we hope, for members of the public, too – to see the gaps between the towers steadily narrowing as the road deck begins to emerge and the “fans” created by the stay-cables take shape. Again, congratulations to all involved. This is leading edge civil engineering technology at its best.

Also at the forefront of civil engineering know-how is the imminent launch of the northern approach viaduct into position. Though shorter than its counterpart on the south shore, which was launched out incrementally over several months, the 5,600 tonnes north viaduct will be launched in a single, technically challenging operation which, we believe, will break new ground in terms of moving such a vast structure out over piers. Turn to the back page for details of how the launch will be achieved.

Turning to the network connections, the major demolition of the old B800 bridge over the A90 dual carriageway outside South Queensferry was successfully completed on schedule in October. We are grateful to local residents and the wider travelling public who heeded the advance notices about this operation and minimised any traffic disruption by staying away from the area over the two weekends concerned. On the north side, construction of the new Ferrytoll gyratory is proceeding well and late October saw one northbound lane of A90 traffic successfully diverted on to the first stretch of the new M90 motorway on the Project, supported by new structures recently completed for the new gyratory below. The second northbound lane was diverted at Christmas.

So, as you can see, it is full steam ahead on the Queensferry Crossing! After a fairly wild summer; it was good to have a relatively calm early autumn which allowed us to make excellent progress on all fronts. Weather, and especially wind, is the main factor with which we have to contend. Conducting operations at great heights in such exposed conditions means we are constantly at the mercy of the wind, so let us hope for an easy-going winter as we maintain our schedule to have traffic flowing over the bridge by the end of 2016.

In the interests of safety, may we urge everybody with children in their care to remind them to stay well away from our sites on both sides of the Forth. Construction sites may seem like attractive playgrounds to youngsters but they can be dangerous places to unauthorised, unaccompanied visitors. Our sites are fenced off and monitored 24/7 by CCTV cameras and security staff to keep people safe.

Finally, as part of our on-going community liaison initiatives, it was a pleasure in the autumn to welcome the 10,000th school pupil to visit the Contact & Exhibition Centre since it opened in 2013. On behalf of everybody on the Project, we wish you a very Happy New Year.

Concrete evidence of success: some statistics

The topping out of the Queensferry Crossing’s three towers is an excellent time to mark the outstanding contribution which FCBC’s concrete batching and logistics colleagues have made to the towers’ successful construction. Here are some impressive statistics which put our concrete operations at the forefront of the industry:

- A total of 170,000m³ produced at 99.8% compliance
- The batching plant has operated for 3.5 years without a significant breakdown
- A total of 107,000m³ delivered to the marine structures on concrete delivery barges. That’s more than 1,500 trips!
- Over 20,000 concrete deliveries by the FCBC fleet of 11 mixer trucks
- Over 2,500 concrete pours executed across the Project since June 2012
- 21 of the pours in excess of 1,000m³
- A world record continuous underwater pour of 16,869m³ achieved in 2013 (15 days non-stop)
- All tower concrete successfully pumped up to a height of over 200 metres for each tower

Hats off to the concrete team – always top of the range!
ROADS: A major view of the Queensferry Crossing’s three towers and proof that we had some sunny days during the summer. The deck section at the bottom of the towers will be removed to just below the lowest live level when the new bridge is complete, so that the towers will not stick out of the water. Seasons of mist and reed foulness... the autumn rain may be for days or for long, but at least it provides the opportunity for seeing the new bridge, many different views, and a view of the North Road Bridge in the background.

VIADUCTS: A view of the Approach Viaduct South and view of its supporting piers. Looking out, almost unlike a hillside Spanish fort, the towers are taking shape. The overall engineering is well underway.

TOWERS: A major view of the Queensferry Crossing’s three towers and proof that we had some sunny days during the summer. The deck section at the bottom of the towers will be removed to just below the lowest live level when the new bridge is complete, so that the towers will not stick out of the water. Seasons of mist and reed foulness... the autumn rain may be for days or for long, but at least it provides the opportunity for seeing the new bridge, many different views, and a view of the North Road Bridge in the background.

DECK: A view of road deck segments working up in the Forth Road Bridge to have reinforced concrete decks fitted to the newly fabricated Yards - and bolted segments living up to be transported by large barges to the town in the valley. Notice the section of the deck at the end of the bridge, and at the top of the bridge, the main deck and the new deck segments being successfully installed in the middle.

TOWERS: A view of the Approach Viaduct South and view of its supporting piers. Looking out, almost unlike a hillside Spanish fort, the towers spread its wings. The final section of the deck at the top of the bridge is the first of the three towers that will carry motorway traffic to and from the new crossing with the Ferrytoll Park & Ride facility in the top right.

DECK: A concrete achievement: a view of the approach Viaduct South and view of its supporting piers. Looking out, the new bridge deck sections being successfully installed. The new bridge deck sections being successfully installed. A concrete achievement: a view of the approach Viaduct South and view of its supporting piers. Looking out, the new bridge deck sections being successfully installed.
A Bridge to the Future

Thousands of school pupils have visited the Project to learn all about the Queensferry Crossing construction programme.

The visit of fifty S4–S6 pupils from Greenfaulds High School, North Lanarkshire, in October 2015 marked a milestone for the Project – the 10,000th pupil to visit the Contact & Education Centre (CEC). This has been achieved in only two full academic years, a mark of Transport Scotland’s commitment to forging a lasting educational legacy. Since the Schools Programme began in 2013, over 400 primary and secondary school visits have taken place with schools from all over Scotland coming on-site to find out more about the construction of the Queensferry Crossing and undertake Science, Technology, Engineering and Mathematics (STEM) related challenges.

Cabinet Secretary Keith Brown presented the group with photographs of the construction of the new bridge and special Queensferry Crossing souvenirs. Helping the pupils with a group exercise, he said: “The Queensferry Crossing continues to be a remarkable project for a whole host of reasons and one of the most pleasing for me is an outstanding commitment to capturing imaginations and fostering an educational legacy among our young people. It has been great to meet pupils from Greenfaulds High School today. They join over 10,000 of their fellow young people from Scotland who’ll one day be able to tell their children and grandchildren about the day they visited the construction of the world famous bridge. Hopefully, many of them will go on to build bridges of their own in the future.”

“We have never lost sight of how inspiring the construction of the Queensferry Crossing would be, especially being situated alongside the other two iconic Forth Bridges. The popularity of the CEC has been a real vindication of the importance we have placed in community engagement from day one. The Outreach and Education Programme, which includes school visits, technical presentations and a public exhibition, has attracted over 40,000 people so far and we anticipate interest growing further as the bridge reaches its final stages.”

Prior to the start of the 2015/16 academic year, Transport Scotland again wrote to invite schools from across Scotland to participate in the Education Programme and slots are filling up. This year, Transport Scotland has also developed lesson plans for teachers and associated distance learning materials which are available to schools to use in conjunction with, or independent of, a visit to the Project.

In November, 100 Galliford Try graduate civil engineers and apprentices visited the Project during a two-day induction programme. Morrison Construction, one of FCBC’s partner companies, is a subsidiary of Galliford Try. FCBC’s Community Liaison Manager, Ewen Macdonell, gave the group a full technical presentation on current progress on the new bridge.
The operation to launch out the Queensferry Crossing’s Approach Viaduct North (AVN) is set to get underway soon. Here, Juan Jose Consuegra Perez, FCBC Approach Viaducts Manager, explains why this is one of the most technically challenging tasks in the whole construction programme.

Firstly, the AVN is actually a combination of the relatively short viaduct itself (76m of twin box girders) and a 146m length of full width main crossing deck (12 deck segments which had to be delivered flat packed, then welded and bolted together on the north shore). These segments cannot be lifted conventionally from a barge by erection traveller hoists since they are too close to the shallow north shoreline or over dry land.

This explains the presence of the very visible large white tent on the north shore which provided a weather-proof workshop for our welders over the past nine months.

The nett result is a 222m long structural steel superstructure with 40m of the reinforced concrete deck cast on the twin box girders at the north end to provide vital ballast during the critical launching process.

The second main challenge lies in the fact that the leading edge of the North Launch has to be lifted up by 2m during the launch process so that the whole structure is positioned at the correct angle to meet the constructed deck coming from the North Tower. This will be achieved by “pivoting” the structure (rather like a see-saw) by using the first of the two supporting piers (Pier N2) as a fulcrum. Once the viaduct has been launched out beyond N2, the trailing, ballasted end of the structure will travel down temporary “ramp walls” at the North Abutment. This, with the help of a king post and cable set-up similar to that used in the Approach Viaduct South launch, will lift the leading edge sufficiently to allow the structure to continue its journey over the second pier (Pier N1) and on towards the road deck emerging northwards from the North Tower.

The AVN is an enormous structure. It will be pulled out using the same hugely powerful, hydraulic ‘strand jack’ system which successfully launched the Approach Viaduct South. With a total weight well in excess of 5,000 tonnes, this will be an extremely challenging engineering process, one of the largest and most complex operations of this type ever attempted.

Its successful completion will mark another significant milestone in the construction of the amazing Queensferry Crossing.