

project update

January 2016



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.



Working in the Community

10,000 school pupils have now come to the Project's Contact & Education Centre to learn all about how bridges are built in the modern era.

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Photo Update

Our double page photo spread brings you up-to-speed with all the latest action on-site.

Centre Spread

Technical Focus

We take a look at how the all-important Approach Viaduct North will be launched out into position.

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Spanning the Forth!

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!



David Climie & Michael Martin

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.

David Climie
Transport Scotland Project Director

Michael Martin
FCBC Project Director

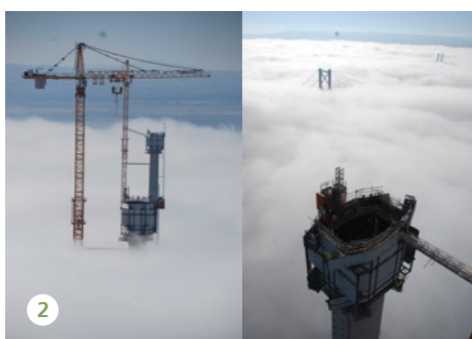
Concrete evidence of success: some statistics

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:

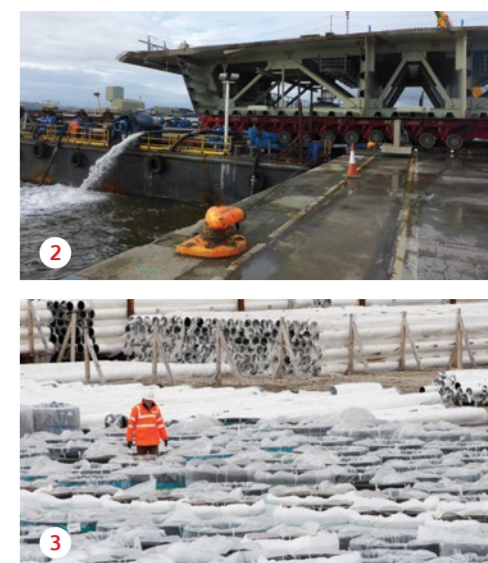
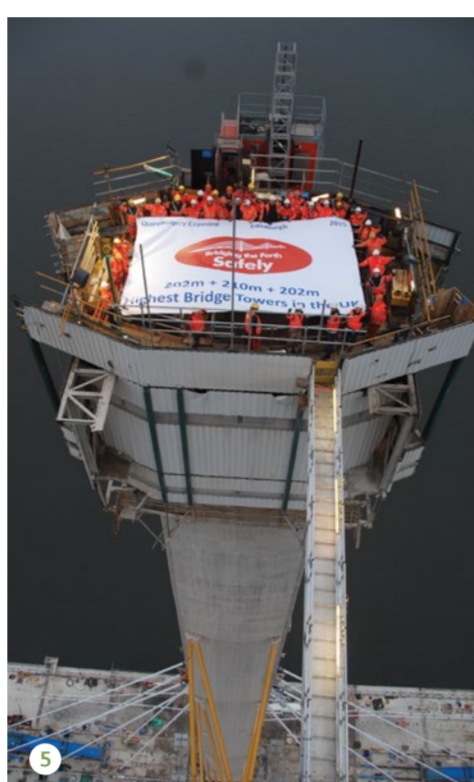
- A total of 170,000m³ produced at 99.8% compliance
- The batching plant has operated for 3.5 years without a significant breakdown
- A total of 107,000m³ delivered to the marine structures on concrete delivery barges. That’s more than 1,500 trips!
- Over 20,000 concrete deliveries by the FCBC fleet 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!

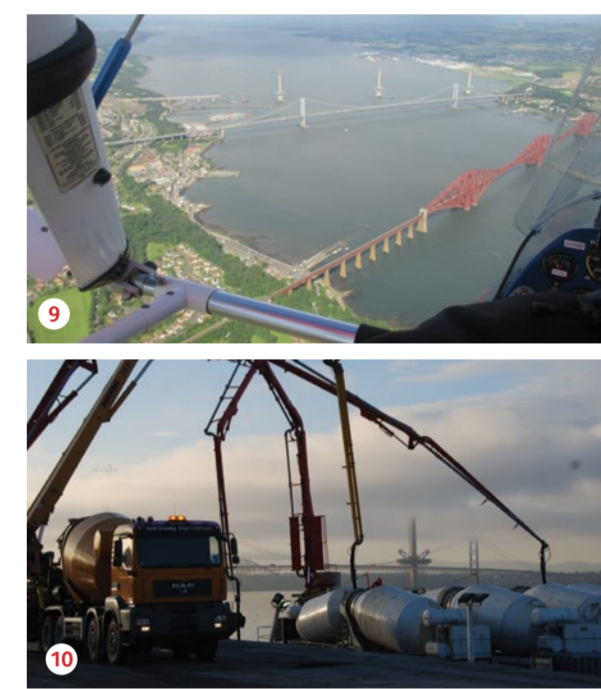




TOWERS: 1 A majestic view of the Queensferry Crossing's three towers and proof that we had some sunny days during the autumn. The steel caissons at the bottom of the towers will be removed to just below the lowest low water level when the new bridge is complete, so that the towers will rise straight out of the waters of the Forth. 2 Season of mists and mellow fruitfulness... the autumn saw more than its fair share of fog, but at least it provides the opportunity for seeing the new bridge in many different lights. Examples are this view of the Centre and South Tower tops and their attendant tower cranes, now the highest cranes in the UK at over 230m high, and another with the Forth Road Bridge in the background. 3 Looking south, sunshine breaking through the towers and viaduct support pier N1. 4 A reinforced concrete pour gets underway on the road deck out at Centre Tower. 5 The North Tower topped out in October, a significant milestone for the whole Project and a cause for celebration by the team. 6 The final cable anchor box is lowered into position at the South Tower in October. 7 October saw the last of 54 concrete pours – or “lifts” – on the North Tower. 8 The North Tower spreads its wings with (at the time of writing) seven deck segments having been successfully installed and the 8th just reaching road deck height on the far side.



DECK: 1 Aerial view of road deck segments waiting in the Rosyth dockside yard to have reinforced concrete decks fitted in the nearby Fabrication Yard - and finished segments lining up to be transported by barge out to the towers in mid estuary. Note the visiting cruise ship! 2 Once the reinforced concrete deck has been fitted, deck segments (weighing up to a maximum of 780 tonnes) are carefully carried on board one of FCBC's barges using a self-propelled modular transporter (SPMT). Then it's off to one of three towers for lifting into place. 3 Hundreds of reels of high tensile steel strands are lined up in the site yard in Rosyth waiting their turn to be taken out to the towers. Up to 109 strands go to make up one of the Queensferry Crossing's signature feature stay-cables. Each reel contains 3km of strands. 4 A beautiful sight for bridge builders, a deck segment is hoisted up into position on the Centre Tower. Another segment awaits its turn on the barge in the background. 5 A powerful self-propelled modular transporter (SPMT) is expertly manoeuvred into place beneath the next deck segment to be taken on to one of FCBC's barges at the start of its journey out to its designated tower. 6 A striking view of individual steel strands, wrapped in high-density polyethylene (HDPE) casings, emerging from a white stay-cable outer pipe as it is lifted into position high up the South Tower. 7 An aerial view of the almost completed North Tower showing the lengthening road deck below and the early stages of the emerging “fans” created by the installation of the stay-cables which support each deck segment. 8 Aerial view from the south. 9 A striking view of the famous three bridges taken from a microlight aircraft by BBC Radio Scotland presenter, Mark Stephen. Thanks, Mark! 10 Fresh concrete from the batching plant is loaded into barge-mounted mixers which keep it at the right consistency for pumping up hundreds of feet to the top of the Queensferry Crossing's three towers.



Recent photographs show the scope of the construction works 'in the round'.



VIADUCTS: 1 A view of the Approach Viaduct South and four of its supporting piers. 2 Looking not unlike a hillside Spanish fort, the North Abutment nears completion in time for the launch of the Approach Viaduct North (see article on back page). 3 The Approach Viaduct South. Note that the steel cofferdams at the foot of the piers will all be removed on completion of the Queensferry Crossing so that the piers will rise straight out of the water. 4 An aerial view of the Approach Viaduct North being prepared for its launch. Note the reinforced concrete deck being laid at the rear end which provided ballast during launch. The rest of the concrete deck will be fitted in situ when the viaduct has been launched into position. 5 Approach Viaduct North: work on-going on laying 40m of reinforced concrete deck on the twin box girders at the north end of the structure prior to launch out over the piers towards the North Tower. 6 The sheer scale of the Approach Viaduct South becomes clear in this aerial view. 7 Looking south from the top of the recently completed South Tower towards the Approach Viaduct South and, in the background, the new stretch of M90 motorway outside South Queensferry which will connect traffic to and from the new bridge to the existing trunk road network.



ROADS: 1 Bird's eye view of the new stretch of M90 motorway taking shape to the west and south of South Queensferry with the new Queensferry motorway junction to the left. 2 Looking north over the on-going roadworks in the Ferrytoll area just north of the new crossing with the Ferrytoll Park & Ride facility in the top right. 3 The size of the new Ferrytoll viaduct which will carry motorway traffic to and from the completed Queensferry Crossing on the northside is obvious from this aerial view. Interestingly, the viaduct is the second biggest bridge construction project currently underway in Scotland - after the Queensferry Crossing itself, of course! 4 The demolition of the old B800 bridge over the A90 dual carriageway took place during the night over two consecutive weekends. The bridge has been replaced by a new FCBC-built bridge which opened to traffic in the summer. 5 Night-time work on-going during the demolition of the old B800 bridge over the A90 dual carriageway which carries traffic between the Forth Road Bridge and Edinburgh. 6 A concrete achievement: the team enjoying spreading concrete on to the embedded steel reinforcements on top of the new Ferrytoll viaduct. 7 Northbound M90 traffic is successfully diverted on to the first stretch of newly aligned M90 to be opened to traffic. The new alignment sits on top of several recently completed structures which will form part of the new, re-sited Ferrytoll gyratory beneath.

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.



Keith Brown MSP welcomes our 10,000th school pupil to the Contact & Education Centre, 23 October 2015



The final sessions in the 2015 CEC Presentation Day series took place in October, attracting over 200 members of the public. The series will re-start in late February.



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.

PROJECT BRIEFING UPDATES AND INFORMATION DAY, JANUARY 2016

The Forth Replacement Crossing (FRC) team will be holding Project Briefing Updates and an Information Day in January 2016 to update members of the public on the progress of the FRC project.

PROJECT BRIEFING UPDATE

Project Briefing updates will be held over the following days:

Tuesday 26 January: 15:00 – 16:30 and 19:00 – 20:30

Wednesday 27 January: 15:00 – 16:30 and 19:00 – 20:30

Members of the project team will be on hand to answer any questions you may have.

PROJECT EXHIBITION & INFORMATION DAY

The Project Exhibition at the CEC will re-open on Saturday 30 January and continue every Saturday from 10:00 – 16:00

Members of the public are invited to attend an Information Day on **30th January** with presentations at **10:30 – 12:00** and **13:00 – 14:30**.

The presentation from senior project staff will give an overview of progress to date on the construction of the Queensferry Crossing, connecting roads and associated project works. The update will also provide information on the changes and developments you can expect to see over the coming year as the Project moves forward towards completion.



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 to be located either 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



222 metres in length and over 5,000 tonnes, the AVN is ready for launch

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

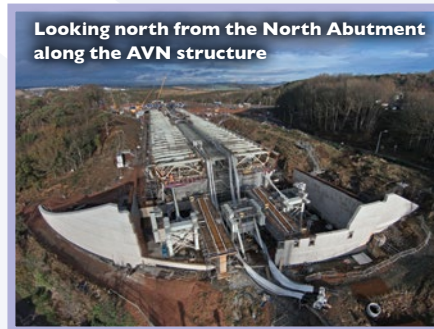
North Abutment. This, with the help of a king post and cable set-up similar to that used in the Approach Viaduct South launch, will lift the leading edge sufficiently to allow the structure to continue its journey over the second pier (Pier N1) and on towards the road deck emerging northwards from the 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.



Aerial view of the AVN and Piers N1 and N2 with Queensferry Hotel in the background



Looking north from the North Abutment along the AVN structure



Contacting the FRC team

There are a number of ways you can contact us to ask questions, provide comments, make a complaint or find out more about the Forth Replacement Crossing project:

Call the dedicated 24 hour Project Hotline **0800 078 6910**

Email the team **enquiries@forthreplacementcrossing.info**

Look for us online:

www.forthreplacementcrossing.info

www.queensferrycrossing.co.uk

@FRC_Queensferry

Or go to the Queensferry Crossing YouTube channel

Or drop into the **Contact & Education Centre**

Adjacent Forth Road Bridge Administration Office,
South Queensferry, Edinburgh EH30 9SF

Opening times

Mon-Thu: 0900-1700, Fri: 0900-1600, Sat: 1000-1600

