

project update

February 2015



Technical Focus

The height of the Queensferry Crossing's three main towers has passed the halfway point. We take a look at the processes underway as we reach for the sky.

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Working in the Community

Latest news from the Community Liaison team and details of forthcoming Family Days and Project Exhibition opening times at the Contact & Education Centre.

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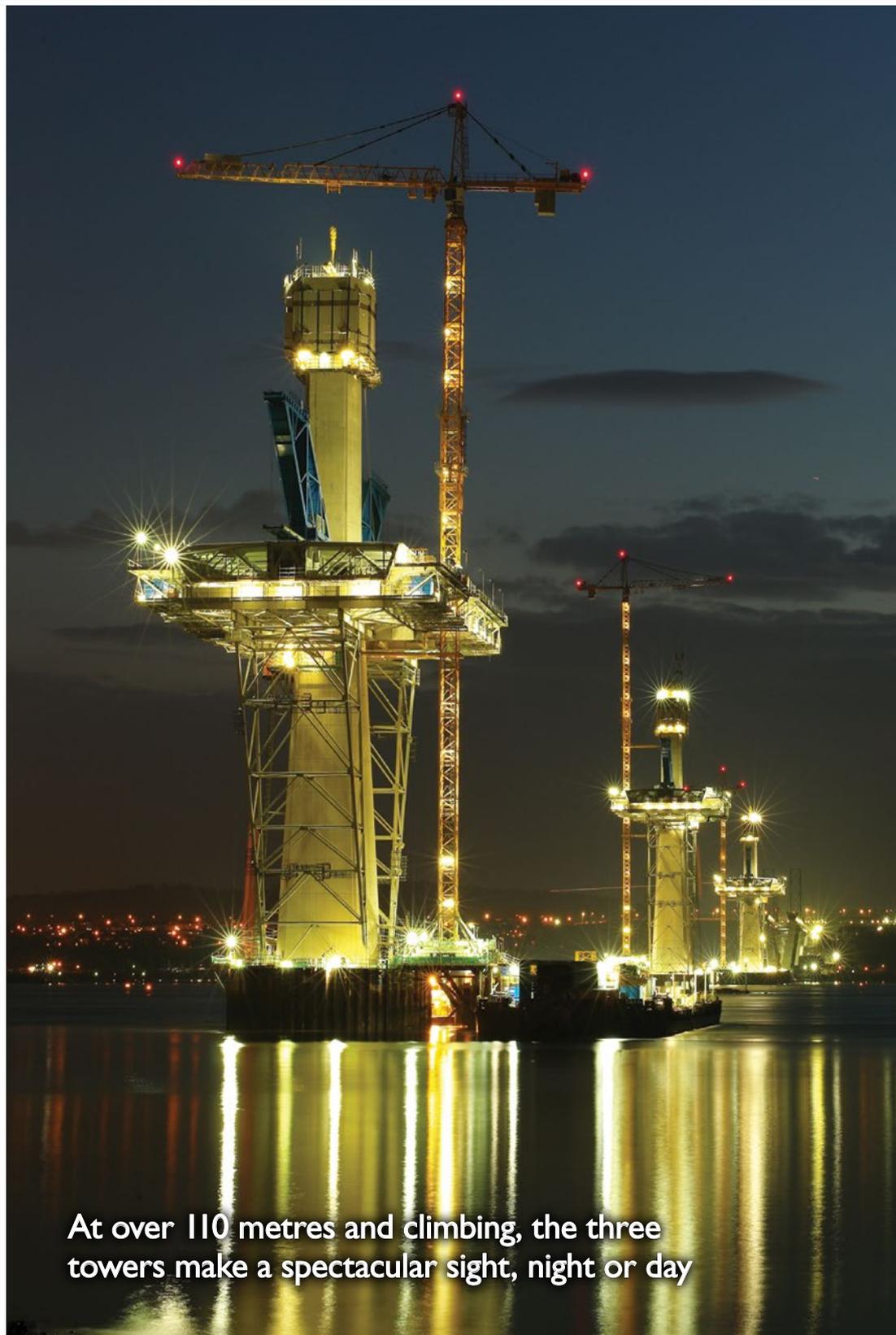
Network Connections

North and south of the Forth, operations are progressing well on the all-important road works which will connect the new bridge to the existing roads network. Learn more about what's going on at the moment.

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An agency of  The Scottish Government



At over 110 metres and climbing, the three towers make a spectacular sight, night or day

Working day and night in all weathers

As if we needed reminding of the often hostile environment in which the Queensferry Crossing is being built, 2015 started with some wild and stormy weather matched by prolonged sub zero temperatures. The poor weather certainly added to the challenges of constructing such a huge structure out in the middle of an estuary, especially up high on top of the towers where poor weather is accentuated. However, these are the challenges we have to face and overcome in order to keep the Project on programme and on budget.



Michael Martin & David Climie

That means we are planning for the new bridge to be open to traffic by the end of next year, a phrase which can't fail to concentrate the minds of all of us involved in this iconic project. Right across the board – from towers and road deck to approach viaducts and the network road connections – we continue to make good progress.

Since the last issue, for example, we have now completed the installation of the first road deck segments on the North and South Towers to complement similar activity carried out on the Central Tower in the autumn. Four more blue erection traveller 'cranes' have been installed, two on each tower. Later in the year, these will be used to lift subsequent deck segments into place. Work is continuing apace on the installation of the individual segments' reinforced concrete deck in the shore-based Fabrication Yard.

Meanwhile, it is hard not to notice the rapid increase in the height of the towers. Each is going upwards at an average rate of about 4 metres every week. At 112 metres at the time of writing, the towers are now over half way to their final height of 210 metres. Turn to page 3 for more information on current activity at the towers. The next major milestone on the towers will be later this year with the positioning of the first of the steel boxes which will anchor the bridge's signature feature – the steel cable stays – which, in turn, will support the road deck.

On the South Approach Viaduct, which will carry traffic to and from the bridge, work is progressing well on the construction of the one remaining pier which, with its five neighbours, will eventually support the entire length and weight of the viaduct. Construction work on the two steel box girder structures which form the viaduct (one for northbound traffic, the other for southbound) is now virtually complete. On the north side of the Forth, passing motorists and local residents will have noticed a large, white tented structure inside which the welding of the North Approach Viaduct sections is being carried out. There are only two supporting piers on the north side, the first of which

Michael Martin writes: *It is an honour to have taken over from Carlo Germani as FCBC Project Director from December. The team's priorities on the Project remain what they have always been: to work safely, to finish on time and on budget, to deliver a final product we can all be proud of, to support the local community where we can – and to achieve all this in an environment which allows us to enjoy our work and leave a lasting legacy.*

was completed before Christmas and the second will be complete in the next few weeks. We will launch the viaduct out over the piers as a single section in late summer.

Finally, on the road works, the new South Queensferry junction roundabout has been opened to traffic in both directions. Works on the nearby B924 at Echline Corner are well underway and scheduled for final completion in the early Spring. The earthworks on the new stretch of M90 motorway to the south of South Queensferry are now substantially complete, the installation of new gantry signs on the existing M90 (formerly known as the M9 Spur) was achieved and the beam lifts for the new B800 bridge were successfully carried out in November 2014. To the north, just before going to print, the first of the steel beams forming the new Ferrytoll motorway viaduct were successfully lifted into place and the realigned B981 out of North Queensferry opened to traffic on schedule. Turn to page 5 for more information on the network roads connections.

On all fronts, it continues full steam ahead!

David Climie
Transport Scotland
Project Director

Michael Martin
FCBC
Project Director



Tower construction “journey” reaches halfway stage

Constructing the towers for a major bridge is a journey, says **Meinolf Droste, FCBC Head of Foundations & Towers**. It starts way down beneath the waves on the seabed and finishes high up in the sky. It takes hard work, careful planning, a highly skilled and determined group of people, world class engineering and excellent teamwork to succeed since it is a journey full of challenges.

On the Queensferry Crossing project, spectacular progress was made during 2014 on the new bridge's three towers. Following the successful completion of the foundations, we started building the towers in autumn 2013. In January this year, the tower team successfully reached the halfway mark: 27 “lifts”, each 4 metres in height, were completed on each tower with 27 lifts to go until completion. A milestone for the whole Project team.

Careful planning is crucial. Logistics are the backbone of the entire operation. The higher we go, and the more the momentum builds, the more important logistics become. The concrete for the towers needs to be pumped higher and higher using powerful Putzmeister pumps. Other construction materials, such as steel reinforcement and fuel for machinery, are taken out to the construction barges, permanently moored to the foundation caissons, by Multicat service vessels. Teams of personnel, working in shifts, have to be transferred to and from site on crew boats, including joiners, steel-fixers, tower crane operators, surveyors, designers and many others involved in the actual construction of the towers. It is a constant flow of people, concrete and materials. And the enormous

tower cranes and man-hoists need to be extended upwards step-by-step and kept in constant readiness to lift materials to the top of the towers. Around the clock. The success of the operation relies on detailed logistical planning and execution.

The steel reinforcement for the concrete is now substantially pre-fabricated on shore in the marine yard in order to speed up the cycles. In Spring this year, we will reach the stage where we can begin installing the cable anchor boxes. The anchor boxes will be cast into the towers and will eventually anchor the cable stays which will support the road deck segments below.

Weather conditions are challenging,



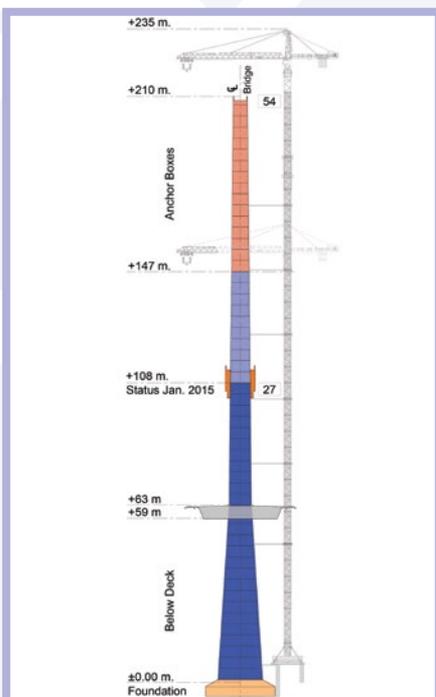
especially now that winter is here. The Forth Estuary is known for its relentless wind. The first half of January was particularly stormy with frequent horizontal rain and sleet affecting what operations we could carry out. The higher we reach, the more wind we get. It is a grind but the tower construction teams are up for the challenge.

At present, we are gaining four metres in height on average per week on each of the three towers. With the altitude gain comes an ever changing and spectacular perspective on the landscape. On clear



days, we will soon be able to see to St. Andrews in Fife to the east and as far as the famous Cobbler mountain near Loch Lomond to the west. A fantastic view.

Tower construction is a journey. Ours is a special journey since we are building the highest bridge towers in the UK – and no fewer than three of them at the same time – in a very hostile environment. This challenging civil engineering feat demands Champions' League levels of expertise, dedication and planning as well as a constant focus on safety and quality. We are well on track to arrive successfully at our destination in the sky – the completion of the towers – during the coming summer.



DID YOU KNOW:

- The completed Centre Tower will be 210m high.
- The two flanking towers will be 202m high.
- At 50% of the final height, we have already installed 75% of the steel reinforcement (total 7300 tonnes).
- To date, we have poured 17,000 m³ of the total tower concrete of 25,700m³ (67%)
- The footprint of the tower reduces from 16m x 14m at the bottom to 7.5m x 5m at the top.
- We are building a permanent staircase and lift shaft inside the tower as we go up.
- Each tower crane can lift the equivalent of 6 elephants (35tonnes).
- Our man-hoists can transport 22 persons at a time to the top of the towers.

FCBC donates gifts to Fife families



Some of the gifts donated by staff

FCBC staff helped make Christmas special for local families by donating gifts for children up to 16 years old. The Dunfermline branch of the Salvation Army was delighted to receive a variety of gifts – such as toys and teddy bears, books, games and puzzles, hats and scarves – as part of their annual Christmas Present appeal. This excellent initiative supports local children and families in Fife who would otherwise have little or nothing 'under the tree' on Christmas morning.

Colin Scott from the Dunfermline Salvation Army commented: "Without the support of organisations such as yours, we would not be able to meet the increasing demands at Christmas time. This year, over 100 families in the Dunfermline area received support and your donation really helped make their Christmas special."

Christmas raffle raises funds for children's hospice

FCBC's Charity Christmas Raffle raised a grand total of £530 for the Rachel House Hospice in Kinross, part of CHAS (Children's Hospice Association Scotland). The charity provides hospice services for children who have life shortening conditions for which there is no known cure. Each year, all festive gifts kindly given to FCBC staff by suppliers are put into a staff raffle and the money raised is donated to a local charity.

Thank you to environmental Monitor Hosts

Environmental monitoring plays an important part in the FRC Project and FCBC is extremely grateful to local residents who host technical monitoring instruments in or near their gardens and provide the power source to operate them. Since the beginning of the Project, 16 local residents have volunteered to assist and, as part of this initiative, each year they are asked to identify a good cause to receive a donation from FCBC. This year, £500 is being donated to each of the organisations nominated. At the end of January, FCBC welcomed the "Monitor Hosts" to the Contact & Education Centre for a project update and site tour.



The Monitor Hosts enjoying their site tour



FRC Contact & Education Centre: Some dates for your Diary!

From March to October this year, members of the public will once again be welcome to visit the Project Exhibition at the FRC Contact & Education Centre to learn more about the Project, view the exhibition and 3D models, take in a presentation and ask questions of engineers from the Project.

The CEC provides spectacular panoramic views of the existing Forth Bridge and Forth Road Bridge as well as the chance to see construction progress on the Queensferry Crossing. Staff will be on hand to answer your questions and explain more about the work being undertaken. Here are some dates for your diary:

- **Starting March 7th**, the Project Exhibition will be open every Saturday (10am – 4pm) until the end of October.
- **Starting March 27th**, the FRC Presentation Series on the last Friday of every month gets underway again: presentations on the Project every 1.5 hours from 10am.
- **On 10th and 17th April**, Family Days will be held from 10am until 4pm with lots of fun, construction related activities for all the family.

We look forward to seeing you there! Directions to the CEC on back page. And, remember, plenty of information on the building of the new bridge is only a click away on the Project website:

www.forthreplacementcrossing.info

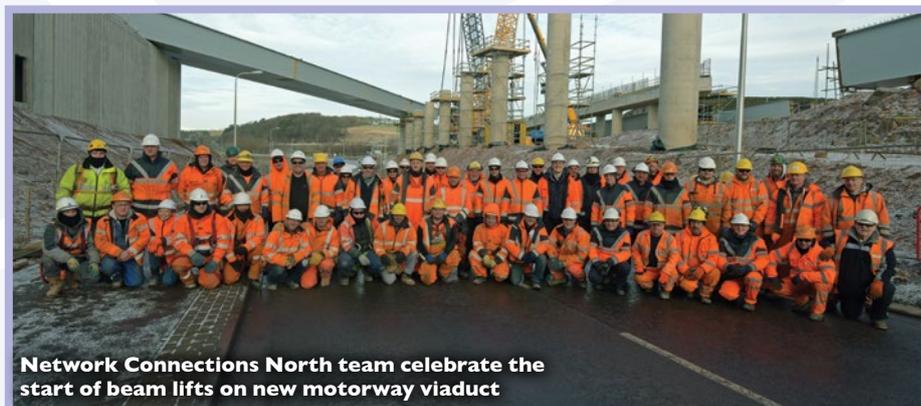
Linking to the rest of the country

The construction works on the new roads infrastructure which will connect the Queensferry Crossing to the existing roads network is gathering pace as several milestones are reached. Here, **Ross Glendinning**, FCBC Head of Network Connections, explains what's been happening recently and what we can expect to see in the weeks ahead.

New road links from the bridge site to the existing roads and motorways north and south of the Forth Estuary are fast becoming a reality. It is only when looking at aerial photographs that the complexity of what we are doing and the progress we are making become clear. New stretches of motorway, new slip roads, new junctions, new bridges, new roundabouts, new embankments and cuttings, public utility diversions, ground strengthening and comprehensive drainage schemes... all are part and parcel of the daily mix for the Network Connections team.

Turning to the north side first, the end of 2014 saw the completion of the construction of 35 reinforced concrete columns which will support the new M90 motorway viaduct carrying traffic heading to and from the new bridge over the complex system of roads in the Ferrytoll area beneath. In late January, we started the operation to lift the massive structural steel viaduct beams into place on which the road surface will sit. The nine beams involved weigh a total of almost 2000 tonnes. During the lifting operations, which will take several weeks to complete, traffic on the newly realigned B981 out of North Queensferry will be diverted back on to a part of the old road to ensure minimum disruption to local residents.

Talking of the B981, the realigned road and the new junction with King Malcolm Drive opened at the end of November last year. The new stretch of road brings drivers and pedestrians right into the heart of the works in this area, generating a lot of interest. Nearby, we are reconstructing and widening King Malcolm Drive west of the new junction with the B981. During rush hour, this is a busy length of road so, in the months ahead, we will also be realigning the



road east of the junction as it approaches what will become a new and re-sited Ferrytoll roundabout in order to ensure smooth traffic flows.

Nearby, work is progressing well on Castlandhill Road where several hundred concrete columns are being installed. These are designed to strengthen the ground which will carry the new embankment from the new bridge up to its tie-in with the existing A90 near to Dunfermline Wynd overbridge.

On the south side, a key milestone was reached before Christmas with the installation of the enormous steel beams which will form a new B800 bridge over the M90 near the point where it ties in with the A90 and what was formerly known as the M9 Spur. The lifting and positioning of the six 110 metre long beams, which have a total weight of 525 tonnes, took place at night over the course of eight days and was a sensitive operation due not only to its position over existing busy roads and the bus lane, but also due to the existence of a number of major public utilities. On completion of the new B800 bridge, the existing bridge will be demolished.

Also before the end of last year, we successfully installed three 'Intelligent Transport System' gantries over the A90 and the M90 in an operation which took six nights.

Looking west from the B800, the course of new motorway leading to the new South Queensferry Junction (with the A904) and the Queensferry Crossing itself is rapidly taking shape. The earthworks

creating the necessary cuttings and embankments are substantially complete, as is the surface water drainage system. Noise barriers, earth screening bunds and associated planting are also progressing well whilst road surfacing is due to start in the middle of the year. Although not yet fully functioning as a roundabout, the new gyratory (roundabout) at the South Queensferry Junction was opened to traffic in both directions at the end of 2014.

The next few weeks will see the opening of the new B924 junction with the A904, just to the east of the new gyratory. This operation has involved the diversion of a full range of public utilities including power, water, gas and telecoms infrastructure. Its completion will allow us to remove the remaining "plug" of ground under the existing road when, for the first time, we will have "connectivity" in the whole length of the new M90 route west and south of South Queensferry.

So, there is a huge amount of "off-line" construction activity happening on - and in - the ground to ensure that the Queensferry Crossing will have excellent connections to the existing road networks.





An opportunity for professional development

At periods of peak construction activity, a total of around 1,200 people are employed on the Forth Replacement Crossing project. Here, we speak to **Euan Lucas** (22) from Falkirk, Graduate Engineer on the north side Network Connections, about his experiences since joining FCBC straight from University.

Q What made you decide on a career in construction?

A My dad had always said that I should think about civil engineering. I wasn't all that keen but one day at school we had a talk on the construction industry from a civil engineer and I thought "Right, that's what I'm going to do!" Simple as that.

Q How did you get involved with the Queensferry Crossing?

A I had just completed my BSc in Environmental Civil Engineering at Glasgow Caledonian University and was taken on by FCBC in May 2013 for a three month student placement working with the Environmental team. I was involved with monitoring groundwater quality, essentially checking that none of our construction activities was having a detrimental effect on neighbouring land such as the St Margaret's Marsh near Rosyth. I also helped with the regular maintenance of FCBC's noise and vibration monitors which are placed around the site.

Q What happened next?

A In August 2013, I was offered a permanent position with the FCBC team as Environmental Technician. After years of being a student, I was really enjoying the hands-on, practical

role out in the field, so I jumped at the opportunity. For a first proper job, it doesn't get any better than working on this amazing project! My job description expanded to cover waste management throughout the construction site as well as implementing a new, improved system for reporting on groundwater conditions and vibration monitoring. I was out on-site over 50% of the time which was great. That's where it all happens.

Q You then moved to the Quality Department. What was your new role?

A In March last year, I was offered a job as Quality Technical Engineer which saw me get involved with monitoring the quality standards which the teams constructing the bridge's towers and approach viaducts are required to follow. I particularly enjoyed getting more sharp-end construction experience to build on my environmental knowledge.

Q And your rapid career development has recently taken another turn, is that right?

A Yes, at the end of last year I moved to become a Graduate Engineer on the road works on the north side to connect the new bridge to the existing roads network. This is giving me lots more



Beam lift operations underway on new motorway viaduct on north side

hands-on civil engineering experience. I've been working on the re-routed B981 out of North Queensferry and also on soil stabilisation beneath the re-positioned Castlandhill Road. I am also working on the Ferrytoll embankment to the north of the new bridge which is set to be one of the highest motorway embankments in the UK.

Q So, what's next?

A Well, I'm really grateful for all the encouragement and help I have received from the FCBC team, so I would hope to stay on this project until it's completed. But after that... I don't know. I would like to work abroad at some stage – Australia maybe. What I do know is that I will definitely be staying in construction. It's an industry where you can really leave your mark.



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

