N22BBM NUASHONRÚ SUÍOMH GRÉASÁIN

23 Feabhra, 2021

Mór-dhoirteadh coincréite do Dhroichead Abhann na Biochaille S03 i mBaile Bhuirne

Bhain *Jons Civil Engineering/John Cradock JV (CJV)* amach cloch mhíle mhór eile le déanaí ar an tionscadal. Is é Droichead Abhann na Biochaille an droichead is faide ar an scéim agus gabhann sé thar Abha na Biochaille chomh maith leis an mbóthar áitiúil ag an gCeapach Thiar, díreach ó thuaidh ó shráidbhaile Bhaile Mhic Íre. Droichead dhá-réise is ea é atá 121m ar fhaid.

An Doirteadh:

Struchtúr mór coincréite treisithe atá mar phiara idirmheánach an droichid ar theastaigh an t-aon doirteadh dúshlánach leanúnach amháin uaidh. Tharla an doirteadh seo ar an 10 Nollaig agus b'é an doirteadh leanúnach coincréite ba mhó ar an tionscadal go dtí seo é, inar cuireadh 232 méadar ciúbach coincréite a raibh 560 tona meáchana ann. Cuireadh 12 km de bharraí treisithe isteach sa phiara chomh maith rud a chuir 28 tona leis an meáchan. Dúshlán breise ab ea méid an phiara, bhí se 10.5m ar airde agus 18.9m ar leithead ag a bharr, le cuar ag caolú go leithead 8m ag a bhonn agus tiús 2m tríd síos. Lean an doirteadh coincréite ar aghaidh gan bhriseadh ar feadh 12 uair an chloig, ag tosnú ag 09:00 ar maidin agus ag críochnú ag 21:00 ar an lá, le roinnt ama ina theannta roimhré agus ina dhiaidh don suiteáil agus don níochán ar threallamh agus uirlisí.

An Dúshlán:

Bhí móráin dúshláin le sárú chun rath a bheith ar an doirteadh seo. An chéad dúshlán ab ea dearadh na foirmeánachta a theastódh chun an coincréit úr a choinneáil don phiara agus go háirithe an dá shleaschuar gathach sa phiara, áit a mbeadh brú ollmhór cruthaithe ag an gcoincréit úr. An tarna dúshlán mór ab ea conas a chinntiú a dhéanfaí creathadh agus dlúthú coincréite go sásúil, ag gach leibhéal laistigh den bpiara atá 10.5m ar airde.

Ceapadh *MRG Consulting Engineers* chun an fhoirmeánacht ghathach a dhearadh agus i gcomhpháirt le foireann an chonraitheora, thángthas ar réiteach a bhí praiticiúil agus intógtha ar an gcéad dul síos agus a shásaigh an riachtanas go gcuirfeadh sé suas le ardbhrú coincréite. Baineadh é seo amach ag úsáid sár-bhogearraí mion samhlaithe.

Bhain an tarna dúshlán le creathadh na coincréite laistigh don fhoirmeánacht sna réimsí is sia síos agus bhí mórán pleanála ag teastáil so seo. Bhí roinnt roghanna á meas a sheachnódh an gá a bheadh le oibrithe dreapadh síos isteach sa bhfoirmeánacht don chreathadh coincréite ach cuireadh iad seo ar fad as an áireamh mar go raibh a mbaol féin ag baint leo. Deineadh measúnú riosca ar an rogha ina mbeadh oibrithe ag obair laistigh den bhfoirmeánacht agus smachtanna cuí i bhfeidhm a chinnteodh sábháilteacht na n-oibrithe an t-am ar fad. Mar shampla, cuimsíodh sa bheart smachtaithe a úsáideadh go mbeadh triúr oibrí ceangailte in úimeanna agus láinnéir agus iad á n-ísliú anuas laistigh den bhfoirmeánacht 10.5m ar airde. Deineadh monatóireacht leanúnach ar ghás le linn an doirteadh coincréite agus chinntigh an séidire aeir faoi bhrú go raibh aer úr á sholáthar chucu an t-am ar fad agus iad laistigh den bhfoirmeánacht. Bhí pleananna éigeandála i bhfeidhm chomh maith ar eagla na heagla.

Bhí an-tábhacht le cruinneas maidir le láithriú agus diminsin an struchtúir, le lamháltais láithreach 10mm i ngach treo le baint amach.

An Suíomh:

Suíomh atá íogair go maith is ea suíomh phiara an droichid seo. Éiríonn freagrachtaí suntasacha timpeallachta as a bheith ag obair chomh gar do Abhainn na Biochaille, go háirithe maidir le cosaint a thabhairt do na speicis salmainid atá san abhainn, speicis iad seo atá ríthábhachtach i gcothú na ndiúilicíní péarla fionnuisce. Cuireadh dian bhearta i bhfeidhm ionas nach bhféadfadh ábhair shalaithe dul isteach san abhainn.

Déanadh forbairt ar mórán pleananna ardaithe chun ardú isteach agus chun ardú amach as an bhfoirmeánacht a dhéanamh agus an dála céanna don caidéal coincréite úsáidte sa doirteadh. Le cur san áireamh chomh maith bhí na línte cumhachta 110kv lastuas atá gar don suíomh agus is ceart dúinn an cúnamh a thug Bord Soláthair an Leictreachais dúinn i maolú an riosca seo a aithint.

Bhí na dálaí aimsire tábhachtach sa scéal seo chomh maith fachtóir ab ea é seo a bhí le cur san áireamh chomh maith. Deineadh staidéar cúramach ar réamhaisnéis na haimsire sna laethanta roimh an doirteadh. Ní fhéadfaí pumpáil choincréite a dhéanamh dá mbeadh luas na gaoithe níos airde ná 11m sa soicind agus deineadh monatóireacht ghéar ar an teocht chomhthimpeallach le linn an doirteadh coincréite féin.

An Choincréit:
Roadstone i gCill Airne ab ea foinse na coincréite agus tugadh lá 33 ualach leoraí de choincréit go dtí an láthair le linn an tréimhse doirteadh a mhair 12 uair an chloig. Cuireadh mórán dua isteach i bpleanáil na céime seo den obair le foireann an CJV agus ionadaithe ó *Roadstone* ag obair as lámha a chéile ionas go mbeadh an uile ghné den tasc pleanáilte roimhré agus go mbeadh rath ar an doirteadh coincréite ar an lá.

Bhí neart comhbhrúiteach de 45 Niútan ag an gcoincréit a úsáideadh, sin coincréit struchtúrach normálta. Úsáideadh breiseáin sa chumasc coincréite a chabhródh le laghdú uisce agus a fheabhsódh inoibritheacht na coincréite. Ina theannta sin, malartaíodh 50% de chion stroighne le GGBS (slaig foirnéise soinneáin meilte gráinneach) chun rialú a dhéanamh ar ardú teochta na coincréite le linn di bheith ag leasú mar mhaolú ar scoilteadh.

Ar mhaithe le ardchaighdeán a chinntiú, deineadh tástáil ar gach uile ualach coincréite chun comhsheasmhacht an tsoláthair a chinntiú agus ina theannta sin, tógadh ciúbanna coincréite chun iad a bhrú ag am eile níos faide anonn ar mhaithe arís lena chinntiú go sásódh gnóthú nirt na coincréite na caighdeáin riachtanacha.

Conclúid:

Tá áthas ar an gconraitheoir go bhfuil an eilimint chasta seo de na hoibreacha curtha i gcrích gan aon fhadhb mhór. Is féidir an rath seo a bhí ar an obair seo a chur síos go dea-phleanáil sonrach rud a theastaíonn le go mbeadh rath ar aon tasc casta. Chinntigh sé seo gur aithníodh ag céim luath na guaiseacha agus na rioscaí féideartha go léir rud a cheadaigh go bhféadfaí na nithe seo a chur as an áireamh ar fad, n más amhlaidh ná féadfaí iad a chur as an áireamh ar fad, go bhféadfaí maolú a dhéanamh ar aon droch-imbhualadh. Tá tábhacht an-ard le sábháilteacht ár n-oibrithe agus bhí sé seo ina fhachtóir rí-thábhachtach i gcur i gcrích na hoibre seo

go rathúil. Cuireadh táirge ard-cháilíochta ar fáil trí chinntiú go raibh soláthar agus socrú na coincréite ag teacht leis na caighdeáin.

Tá an conraitheoir anois ag súil le brú ar aghaidh le críochnú an droichid seo ag úsáid bíomaí droichid a déanadh i Sevilla na Spáinne agus beifear á gcur san i bhfearas le seoladh deice an droichid go gairid.

Deireadh na teachtaireachta le buíochas ag dul do Kevin McSweeney BE.

N22BBM: WEBSITE UPDATE

23rd February 2021

Large Concrete Pour for the Bohill River Bridge S03 at Ballyvourney

Another significant milestone was achieved on the project recently by Jons Civil Engineering/John Cradock JV (the CJV). The bridge in question, S03 Bohill River Bridge, is the longest on the scheme and traverses the Bohill River as well as the local road at Cappagh West, just north of Ballyvourney village. It is a two-span bridge of total length 121m, comprising a span of 80.5m and a second span of 40.5m.

The Pour:

The intermediate pier of the bridge is a large reinforced concrete structure in it's own right, and to pour this structure in a single continuous pour was always going to be a challenge. This pour, which took place on 10th December last, was the largest continuous concrete pour on the project to date, comprising 232 cubic metres of concrete, which weighed 560 tonnes. 12 km of steel reinforcing bars, weighing an additional 28 tonnes, were also incorporated into the bridge pier. The size of the pier was an additional challenge, being 10.5m high and 18.9m wide at the top, being curved down to a width of 8m at the base and having a thickness of 2m throughout. The concrete pour was scheduled to commence at 9.00 a.m. and to be completed by 9.00 p.m. on the day, with some additional time beforehand and afterwards for set up and clean down of all equipment and tools.

The Challenge:

There were many challenges to be overcome if this pour were to be completed successfully. The first major challenge was the design of the formwork to contain the fresh concrete for the pier and in particular the two radial side curves where the pressure imposed by the fresh concrete was immense. The second major challenge was to determine how concrete vibration and compaction could be achieved at all levels within the 10.5m high pier.

MRG Consulting Engineers were engaged for the design of the radial formwork and, in collaboration with the contractor's staff, devised a solution that was both practical and constructable in the first instance, and also satisfied the requirement to withstand high concrete pressures, the latter being achieved through the use of advanced modelling software.

The second challenge of concrete vibration inside the formwork in it's lower reaches was one which required a lot of careful planning. A number of options were considered which would have avoided the need for operatives to climb down inside the formwork for concrete vibration but these were ultimately discounted because they all came with their own risks. The option of having operatives working within the formwork was risk assessed and suitable control measures devised so as to ensure their safety at all times. For example, the control measures employed included having three operatives secured with harnesses and lanyards while climbing down in the 10.5m high formwork. Gas monitoring was continuously employed during the concrete pour and the use of a forced air blower ensured that there was a supply of fresh air inside the formwork at all times. Rescue plans were also in place as a precaution.

Precision in the location and dimensions of the structure were critical with locational tolerances of 10mm in all directions to be achieved.


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The Site:
The site of the bridge pier is a particularly sensitive one. Working in close proximity to the Bohill River carries significant environmental responsibilities, especially for the protection of the salmonid species in the river, which are vital to sustaining the endangered Freshwater Pearl Mussel. Stringent measures were put in place to ensure that no contaminants could make their way into the river.

Numerous lift plans were developed for the lifting in and for lifting out of the formwork and the concrete pump used to pour the concrete. This was in the context of the adjacent overhead 110kv power lines and the assistance of the ESB has to be acknowledged in helping us in safely mitigating this risk.

Weather conditions were also a factor that had to be taken into consideration and the weather forecast was carefully studied in the days leading up to the pour. Concrete pumping could not take place in wind speeds greater than 11m per second and ambient temperatures were closely monitored during the concrete pour itself.

The Concrete:
Concrete was sourced from Roadstone in Killarney with 33 truck-loads of concrete being delivered over the 12-hour period of the pour. A significant amount of planning had gone into this aspect of the job between CJV staff and Roadstone representatives so that all aspects of the task were planned in advance ensuring that the concrete pour could be a seamless process on the day.

The concrete used had a compressive strength of 45 Newton, which is a normal structural concrete. Additives to allow water reduction in the concrete mix and for improved workability were used in the concrete. In addition, 50% of the cement content of the concrete was replaced with GGBS(Ground Granular Blast-furnace Slag) to regulate the rise in temperature of the concrete in the curing process, so as to mitigate against cracking.

In order to ensure quality, each truck load of concrete was tested to confirm consistency in the supply and further to this, cubes of concrete were taken for crushing at a later date, again to confirm that the concrete strength gain complied with the required standard.

Conclusion:

The contractor is delighted that this complex element of the works has been executed without any significant problem. This can be put down to detailed planning, which is the key to any complex task. This ensuring that all the hazards and potential problems were identified at an early stage. This allowed these items to be eliminated, or if this were not possible, that any adverse impacts were mitigated against. Safety of our workers is always of utmost importance and completing this task safely was a very important success factor. Thereafter, as the achievement of a high quality product is always a requirement and this was achieved by ensuring that both delivery and placement of concrete are up to standard.

The contractor is now looking forward to progressing with the completion of this bridge using bridge beams manufactured in Seville in Spain, and due for installation by launching of the bridge deck, very shortly.

End of note with thanks to Kevin McSweeney BE.