SBE

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NOMINATION

Middelen

SBE werkt met een 35-tal medewerkers voornamelijk projectingenieurs, studie-ingenieurs en tekenaars.

Historiek

Reeds een 15-tal jaren profileert SBE zich als bouwkundig ontwerper met, afgezien de klassieke stabiliteitsopdrachten, een specifiek accent op water- en havenbouw, geotechnische problemen, staalstructuren en funderingstechnieken.

Vakgebieden en specialisaties

Havenbouw: kaaimuren - sluizen; aanlegsteigers; dijken en oeverbescherming; renovatie.

Burgerlijke bouwkunde en gebouwen: algemene stabiliteitsstudies; speciale funderingen en geotechniek; bruggen in staal, gewapend beton en voorgespannen beton; tunnels, riolering- en wegenwerken; eco-engineering.

Staalconstructies: ontwerp - berekeningen - overzichtstekeningen; werkhuistekeningen CAD - 3D.

Geotechnische en hydraulische modellering: 2D en 3D geotechnische modellen; 2D en 3D grondwaterstromingsmodellen; 1D, 2D en 3D rivier-, kust- en sedimentsimulaties.

Referenties

Havenbouw: Albertkanaal: diverse kaaimuren; containergetijdedok “Waaslandhaven”; verbetering waterkering Afgedamde Maas; Containerkade Noord Antwerpen; aanlegsteigers voor scheepvaart Linker Oevergebied Antwerpen en op de Schelde; Leie Doortocht Kortrijk; nieuw sluizencomplex Panamakanaal; nieuwe sluis Haven van Sevilla; restauratie en herstellingswerken van kaaimuren, sluizen en droogdokken (Zennegatsluis, D’Herbouvillekaai, droogdok Cadiz).

Burgerlijke bouwkunde en gebouwen: Petroleumbrug Antwerpen; Muidebrug Gent; tunnel onder startbaan Zaventem; Tunnels HSL: Centraal Station Antwerpen en Berchem: ondertunneling bestaande sporen; Bureelgebouw en parking Lieven Bauwens Gent; voorgespannen brug over de Leie te Wielsbeke; Appartementsgebouw Parklane II Gent; Parking Astridplein Antwerpen; Mercedes garage Sint-Niklaas; Brug te Halle; Waasland Shopping Center; Commercieel gebouw Wilma; HST-lijn Brussel-Amsterdam - diverse vakken; nieuwe Boulevardbrug Willebroek; Brug westelijke tangent Sint-Niklaas.

Staalconstructies: Verzinkingslijn met koeltoren Sidmar; Kontinugieterij 2; HQ2 Canary Warf; Efteling Kaatsheuvel Nederland; industriële gebouwen Baudour Frankrijk; diverse installaties op Petrochemische bedrijven zoals BASF, 3 m, Solvay; Vliegtuigloods München; Denox-installaties Harelbeke, Houthalen, Brugge, Brussel; LNG-plant Hammerfest.

Geotechnische en hydraulische modellering: Leveren en ijken van numerieke modellen Scheldebekken Antwerpen; Grondwaterstromingsmodel en zettingsberekeningen Antwerpen Containerdok-West; Stabiliteitsberekening caissons Containerkaai Zuid Antwerpen met 3D model; Uitvoeringsstudie Deurganckdok; Stabiliteitsnazicht kaaimuur Verrebroekdok Antwerpen; optimaliseren wachtbekken Webbekom; ontwerp leefbaarheidsbuffer Doel.

Short Description

Launching of a bridge in Trinidad

This project regards the study of the launch of a bridge in Trinidad.
Two situations can be considered:
- *Construction phases: parts of the bridge are connected to each other*
- *Launching phases: the bridge is pushed forward over a certain length*

For each position, the displacements to place the bridge on the temporary supports are calculated. Reactions, section forces, deformations and profile checks are made for each position. All this displacements are determined with ESA-Prima Win.

Project Information

Owner: Republic of Trinidad and Tobago
Architect: n/a
General Contractor: Vinci
Engineering Office: Vinci

Construction Start: 01/2008
Construction End: 09/2008
Location: Port of Spain, Trinidad Tobago

The W-S Ramp Bridge is launched and has supports on the launching way (sliding shoes) and on the piers (temporary supports during the erection). Between two launching phases, parts of the bridge are connected to the end of the part of the bridge that has supports at A0 at that moment (= construction phases).

Two situations can be considered:
- Construction phases (#11): parts of the bridge are connected to each other
- Launching phases (#10): the bridge is pushed forward over a certain length

First, a main model is being build up. This model is used as a starting point to create the calculation models for the different positions of the bridge during the erection phases.

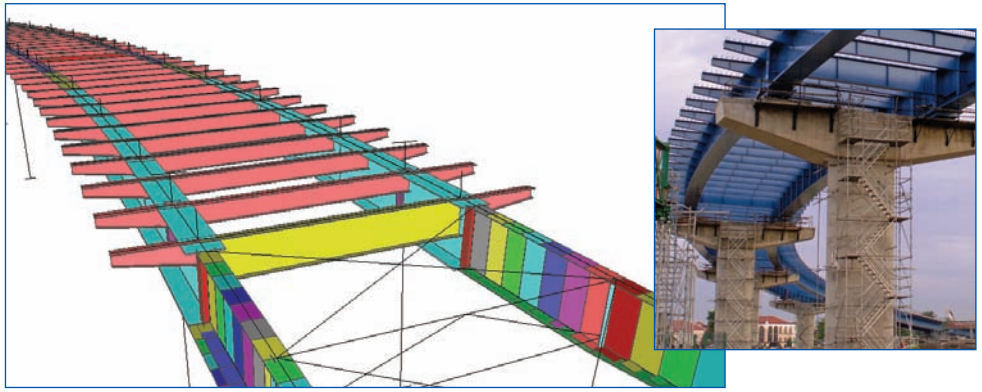
This model contains

Geometry

- The geometry of the total bridge (all parts) in its final position
- The geometry of launching nose, connected to the part T1 in its final position
- The position of the temporary supports (for all phases the same)
- The launching way

Loads

- Load case 1: self weight of the structure
- Load case 2: wind - direction 1 - launching
- Load case 3: wind - direction 2 - launching
- Load case 4: wind - direction 1 - between launching



Used software: ESA-Prima Win

- Load case 5: wind - direction 2 - between launching
- Load case 6: displacements = bridge “fitting”: depends on the position of the bridge and for each calculation model this will be different)

The position of the bridge during the erection is given by a relative parameter αrel.
Following steps are taken to model a certain position of the bridge:

- Calculation of αrel that corresponds with a certain position of the bridge.
- Delete parts of the bridge that are not yet connected in that stage of launching or construction.
- Rotation of the nodes of the bridge (+launching nose). At this point, the form of the bridge is still the same as in the final position. The nodes of the launching way and the temporary supports are not rotated.
- Determination of the intersection points of the south and north girders with the vertical plane of the temporary supports and the launching way.
- Determination of the displacements, so that the part of the bridge is placed on the temporary supports (**) = creating load case 6 (=”bridge fitting” = displacements): the displacements of block 3 (see step 4) are given to the part of the bridge that is being considered. This load case is added to the combinations.
- The model is ready to be calculated.

For each position, the displacements to place the bridge on the temporary supports are calculated (see load case “bridge fitting”). Reactions, section forces, deformations and profile checks are made for each position. All this displacements are determined with ESA-Prima Win with secondary drawing beams.