



Software: Scia Engineer

The project concerns the conceptual design and calculation advice for the Yeongam floating sector gate in South Korea.

A new navigable channel is being built between the lower reaches of the Yeongsan and Yeongam rivers in South Korea as part of an extensive regeneration scheme.

For the water control of this channel, two types of weirs are used. In a bypass a series of vertical lifting doors and for the navigable channel a floating sector gate similar to the "Maeslantkering" sector gate in the Netherlands.

The Yeongam Floating sector gate in Korea is the first weir of this type in South-East Asia.

The navigable channel is 60 m wide. The weight of the gate is approximately 250 tonnes each and it revolves around a spherical bearing to adjust to the varying water levels and buoyancy situations. Each gate is opened and closed by a set of winches. The winch operating wires are guided on the outside face of the gate leaf.

For the engineering company EPS Solutions Co. Ltd., ARCADIS has provided conceptual design and calculation advice for the Yeongam floating sector gate during the detailed design phase. Advice was also given on the engineering items which related to the hydraulic behaviour and the mechanical parts, such as the winch system, the hinge connection and the buoyancy/ballast tank system.

### Structure

For the conceptual design, a model in Scia Engineer has been made. The structure can be divided into the pair of arms and the floating body. The arms come together at the hinge and are connected at two-thirds with an intermediate structure.

The arms decrease in width towards the hinge and are built up out of circular hollow sections. The main outside sections are CHS 508 x 12. The diagonals are CHS 216 with various wall thicknesses. At the connection with the intermediate truss, CHSs are also connected with the floating body. At these locations the main sections have the increased wall thickness of 25 mm.

The weir itself, the floating body, is built as a stiffened plate structure with the height of 7 m. The floating body is divided into 7 segments. The separation between the segments is watertight. Each segment has an upper and bottom part. The bottom part is used for buoyancy and every bottom segment can be individually filled for perfect trim.

For the upper part, only the front plate is the actual separation between the different water levels. In these segments the water can freely come in at the rear side. This also provides stability.

The plate thickness of 16 mm is used for the front plates, most of the other plates in the structure are 12 mm. The stiffeners, bulb-flats, are vertical placed in the front and rear plates. The stiffeners in the top plate are trough shaped.

For the wire of the winch at the top, additional reinforcements are provided.

The housing of the bearing is also built up out of plates.

Scia Engineer has been used for a verification of the forces in the elements.

### Out of the box

New is that Scia Engineer has been used for a 3D visualisation. By making a screenshot from approx. 175 situations, an animation is created.

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Our innovative structural engineering professionals strive to overcome the physical limitations of sites while also meeting the requirements of each project. The teams work with our in-house architects, as well as with clients directly, to develop solutions to the full range of structural needs, in many cases paving the way for the creation of new opportunities for the architect and project owner.

## Project information

Owner	South Korea state
General Contractor	Keum Jeon Industrial Company Ltd
Engineering Office	EPS Solutions co ltd
Location	Yeongam River, Korea
Construction Start	2012

## Short description | Engineering Study - Yeongam River

Korea Yeongsan river Estuary Embankment, development section 3. It concerns flood prevention by means of distributing flood discharge from Yeongsan Lake to Yeongam Lake.

A new navigable channel is being built between the lower reaches of the Yeongsan and Yeongam rivers in South Korea as part of an extensive regeneration scheme. The northern lake (Yeongsan Lake) contains fresh water and the southern lake (Yeongam Lake) contains brackish (slightly salty) water. Water from Yeongam Lake is being used for irrigation purposes. To control the water flow a number of weirs are built in this new channel.

