Technical consultancy for Casino Knokke

Client: Knokke-Heist Municipal Council
Architect: TM Tab Architects – Barozzi Veiga
in collaboration with: Bureau Bouwtechniek nv
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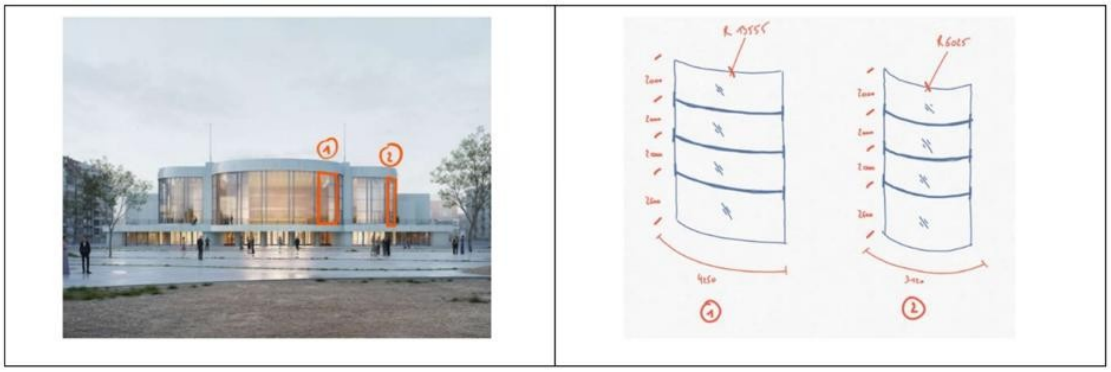
Architects & engineers
with a purpose

The renovation and extension of the Casino-Kursaal in Knokke-Heist is one of the most complex construction projects on the Belgian coast. The **design by Barozzi Veiga and TAB Architects** combines distinctly contemporary architecture with a challenging heritage context, a demanding maritime environment and a highly condensed programme. To provide the technical underpinning for these ambitions, **Bureau Bouwtechniek** by TAB Architects was brought in to provide advice on the façades, roofs and underground spaces.

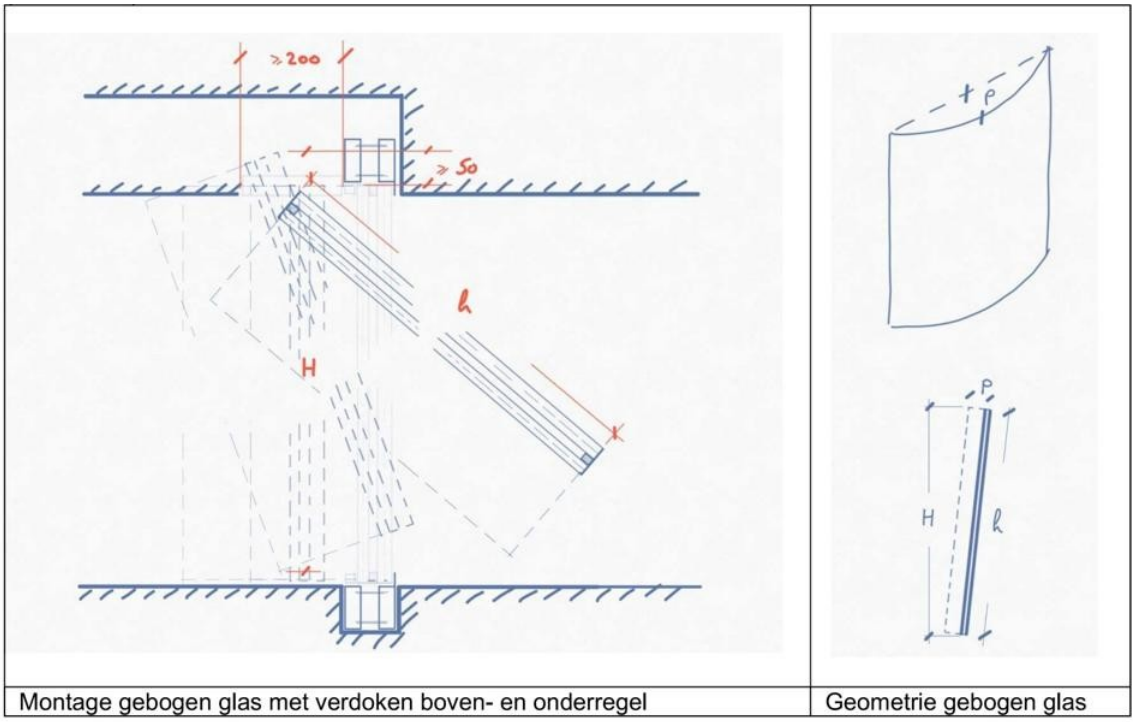
The structural engineering advice did not start from standard details, but from the question of how technical choices could support the architectural quality whilst being sustainably embedded in both construction and use. In doing so, a balance was constantly sought between performance requirements – such as watertightness, daylighting and thermal comfort – on the one hand, and constructability, stability and manageability on the other.

Curved glass and structural movements

One of the most striking features of the design is the façade, with its large curved glass sections combined with substantial cantilevers of the concrete volume. This configuration places high demands on the detailing of the joinery, particularly in terms of deformation capacity, tolerances and installation sequence.



The technical challenge lies in the tension between architecture and physics. Curved glass allows for virtually no deformation, whilst the underlying concrete structure is subject to deflection, creep, shrinkage, thermal effects and wind loads during and after the construction phase. Bureau Bouwtechniek investigated how these movements could be accommodated without compromising the architectural appearance. This involved, amongst other things, feasible radii of curvature, glass thicknesses, glass compositions, installation and replacement strategies, and the detailing of the supporting structure.

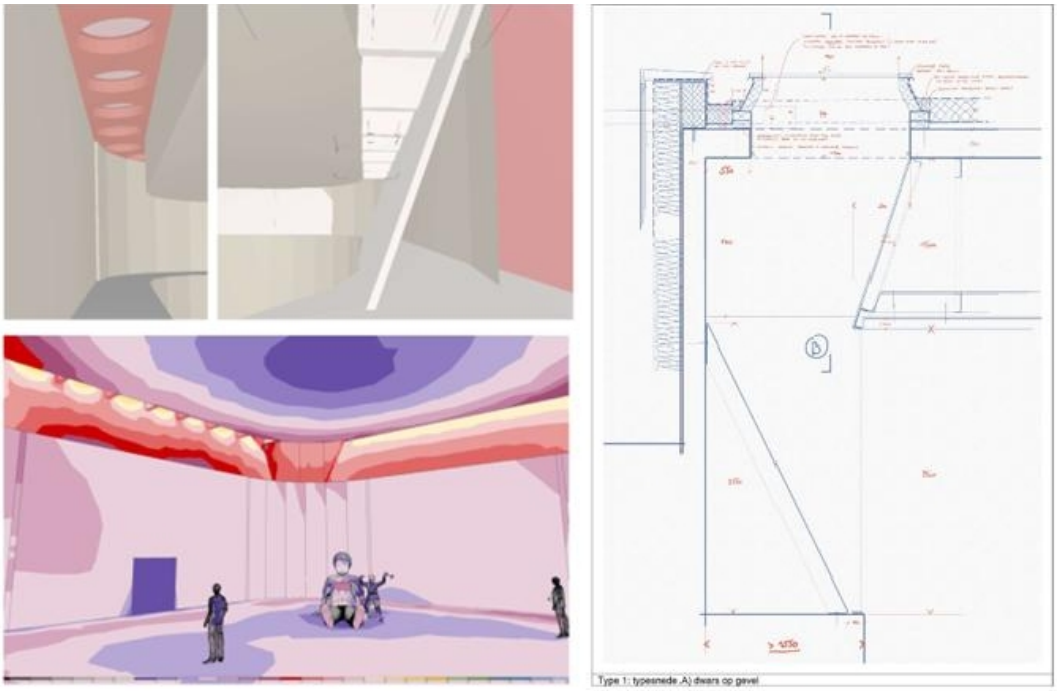


Montage gebogen glas met verdoken boven- en onderregel | Geometrie gebogen glas

Daylight as a design tool

The extensive roof landscape also required a thorough technical study. The design incorporates various skylights that bring natural light deep into the building, including into exhibition and public spaces. In an environment characterised by high wind loads, salt exposure and intense solar radiation, a balance had to be struck between daylight quality, thermal comfort, sustainability and energy performance.

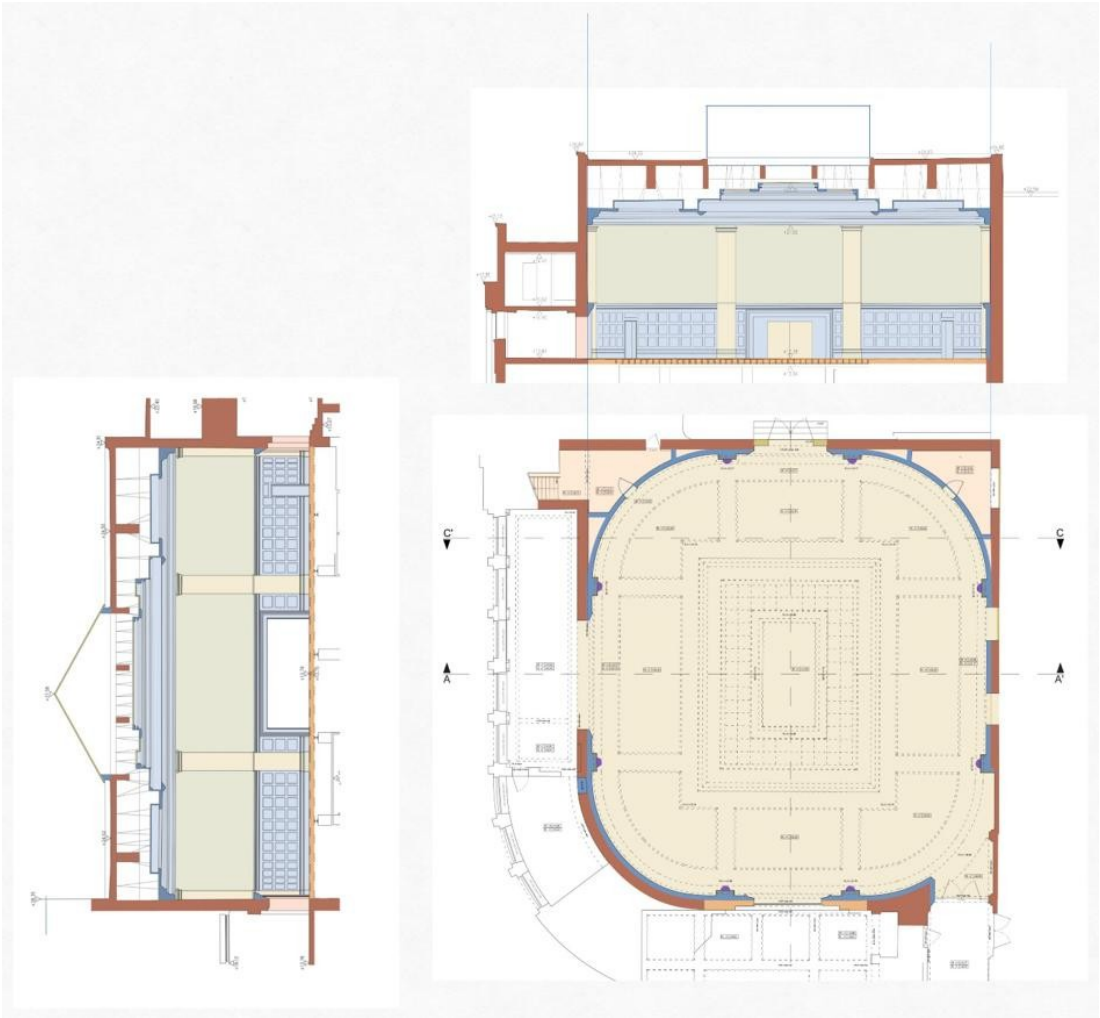
Together with TAB Architects and the other designers, Bureau Bouwtechniek carried out a lighting study in which these various aspects were considered holistically. The central question was how natural light could be utilised to the full without causing glare, overheating or damage to sensitive works of art.



Lighting study and detail showing standard domes and an internal reflector in the Expo space.

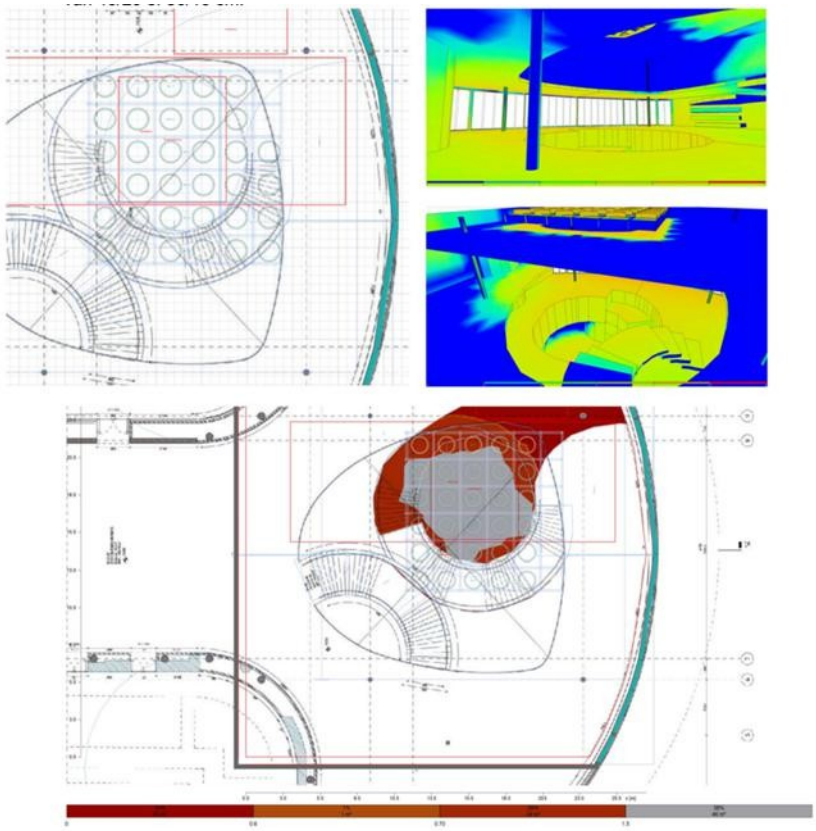
Robust solutions for a coastal environment

The study revealed that traditional solutions involving external sunshades are technically vulnerable and maintenance-intensive in this context. The recommendation therefore focused on a reinterpretation of the skylights, using zenithal solutions that bring in diffused light. In addition, the approach emphasised low-tech principles such as reflective internal surfaces, cove effects and carefully designed geometries, rather than complex moving systems.



Modified skylights.

The lighting strategy was also tailored to the building’s supporting structure and heritage context. This took into account visible structures, cast shadows and potential conflicts with existing roof surfaces. At the same time, the aim was to find robust roof structures capable of withstanding the combination of wind, salt exposure and long-term maintenance.



Aligning the lighting study with the structure for a large span in the architectural HUB.

Waterproofing as a design parameter

Beneath the casino lies a complex system of car park levels, logistics zones and public spaces. Above this will be an urban landscape park with considerable substrate thicknesses, resulting in an exceptionally high load on the underground structure. Together with the other designers, Bureau Bouwtechniek therefore developed a waterproofing concept for the entire underground structure.

Render of car park © Barozzi Veiga – TAB Architects

This concept was based on the structural design featuring diaphragm walls, floor slabs and pre-cast walls, whilst also taking into account the specific usage requirements of the various spaces. The advice included, amongst other things, waterproofing classes tailored to the desired level of finish, detailing of critical connections, injectable waterproofing systems and recommendations regarding inspectability and phasing. By treating waterproofing as a fully-fledged design parameter, the risk of subsequent damage and disputes was significantly reduced.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C
D
E
KLASSE I
KLASSE II
KLASSE III