

The completed St Regis Saadiyat  
Island Resort in Abu Dhabi

# St Regis Saadiyat Island Resort

## HIGHLY COMMENDED International Projects Category

### KEY PLAYERS

#### Client

Tourism Development & Investment  
Company of Abu Dhabi

#### Professional team

Aurecon, Mirage Mills Leisure  
Development Inc, Woods Bagot

#### Main contractors

Al Habtoor / Murray & Roberts JV

### OVERVIEW

The St Regis Saadiyat Island Resort is a prestigious development on Saadiyat Island, 500 m off the coast of the capital city of Abu Dhabi. Abu Dhabi's Tourism Development & Investment Company (TDIC) is in the process of transforming the 27 km<sup>2</sup> island into a signature tourist, leisure, residential and cultural destination.

Ideally located on Saadiyat Beach, the St Regis Resort and precinct form part of a master plan, which will eventually see the island become home to the Guggenheim Abu Dhabi and the Louvre Abu Dhabi museums.

The engineering and management challenges that confronted the team began with assessing and developing a solution to the unstable engineering properties of the natural ground profile of the project site. This stabilisation process was critical to ensure proper founding conditions, mitigating the risk of seismic-induced liquefaction and ensuring the

stability of platform side slopes and other excavations envisaged for the proposed developments.

The sheer size of the project meant that the team had to maintain meticulous focus in terms of producing a very large number of design drawings, as well as reviewing shop drawings produced by the contractor. The design programme was extremely challenging, and drawings frequently had to be fast-tracked to construction within hours of being needed.

A year into construction, a significant design variation was announced in the form of a banquet hall to seat 3 000 people. The contract deadline was extended by only three months, with completion of the hotel and banquet hall scheduled to coincide with the Formula 1 Grand Prix event in Abu Dhabi in November 2011.

The banquet hall consists of a three-storey concrete structure inclusive of a single level of basement parking. To

ensure that the strict design and timeline criteria were met, innovative resourcing was necessary. For example, Aurecon resourced the project from the onset by splitting it up and effectively coordinating the work between dedicated teams of engineers across South Africa and the Middle East. This strategy helped the teams to maintain tight control on the different aspects of the project and their accompanying construction programmes.

## DESIGN APPROACH AND AESTHETICS

The ambitious design included 373 rooms with en suite bathrooms, a spa treatment facility, beach club and beach-facing restaurant, banquet hall seating 3 000 people, seven apartment blocks (256 apartments) with a 6 000 m<sup>2</sup> retail component, a three-storey basement parking structure, 33 luxury exclusive villas and extensive landscaping and water features.

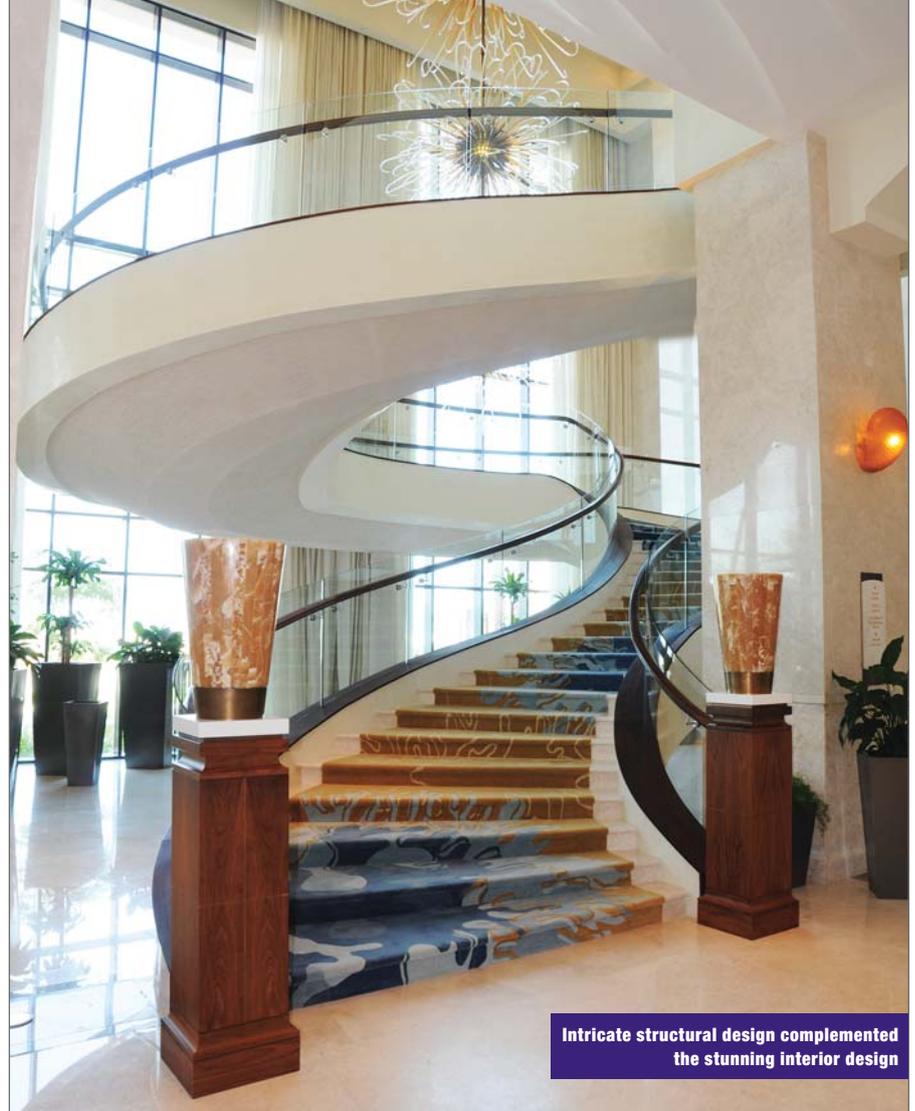
Every component of the structural and civil engineering works was required to contribute to the overall objective of a demanding aesthetic standard, which included detail finishes such as water features, swimming pools, palm tree boxes, a large number of retaining walls, pedestrian ramps, staircases, sidewalks, etc.

Some of the project team's major contributions to the transformation of the Saadiyat Beach site can be summarised as follows:

- Concept design reports provided the basis of the project budget and feasibility.
- Sophisticated geotechnical engineering enabled the site to be raised with dredged material to a level significantly higher than the surrounding land. This was a major and expensive requirement by the owner.
- The construction of a service tunnel to allow delivery/service vehicles to enter the site without interfering with guests or residents.
- An innovative solution for the roof of the banquet hall created a highly successful structure that blended aesthetically with surrounding buildings.

## CONSTRUCTION CHALLENGES

Initiated before the global financial crisis, the project was delayed until August 2009 when the construction team was informed that the project had to be fast-



Intricate structural design complemented the stunning interior design



Construction challenges: dynamic falling-weight compaction being used on site

tracked and completed within 24 months, which led to concerted efforts on all sides to make this a reality. Many construction challenges presented themselves and needed innovative solutions.

A crucial challenge was the fact that the environment of the United Arab Emirates is exceptionally aggressive to any type of construction, requiring sophisticated design and unusual construction methods, such as:

- All structures, together with most of the 3 m retaining walls, were piled. This involved approximately 3 600 piles.
- The entire site was filled with approximately 10 m of marine-dredged fill material.
- All concrete in contact with the ground has a waterproofing membrane to protect it against aggressive chlorides and sulphides.

- High-durability concrete mixes were employed.
- Due to the high water table, all basements had to be constructed with dewatering pumps that run continuously.
- Five of the seven apartment buildings were built over transfer slabs.
- Seismic loading was an important design criterion. The analysis carried out was based on Seismic Zone 3.

Construction was made more complicated by a number of other issues as well:

- Large volumes of drawings had to be processed and transferred between offices. This included 1 600 drawings issued by Aurecon for construction and 8 500 shop drawings and contractor submittals that had to be reviewed.

- The scale of activity in general. During peak construction there were over 10 000 people on site, made up of widely diverse nationalities.

- Communication difficulties.

Two specific challenges had to do with the site's underlying geological structure, and with unexpected design changes, requiring innovative solutions to be developed under considerable time pressure:

#### Stabilising the site's underlying geological structure

Saadiyat Island is founded on natural land. To develop the resort a dry platform had to be established above sea level. The geotechnical team conducted a

thorough assessment of the engineering properties of the natural ground profile underlying the future settlement-sensitive development, and developed a solution to this challenge, which included falling-weight dynamic compaction and roller technologies.

#### Accommodating significant design changes

As had been mentioned above, a year into construction, a significant design variation was announced in the form of a banquet hall to seat 3 000 people, but the contract deadline was extended by only three months.

The main structure is formed in reinforced concrete around the banquet hall space, free of any supporting columns measuring 50.5 m x 63.0 m in plan. Challenging features of the design for the roof structure included the main span of 50.35 m, the high loadings to be catered for, and the limitation on deflection to ensure trouble-free operation of mobile acoustic partitions. These factors resulted in structural steel tonnage per square metre that cannot be compared with that of a normal steel roof structure.

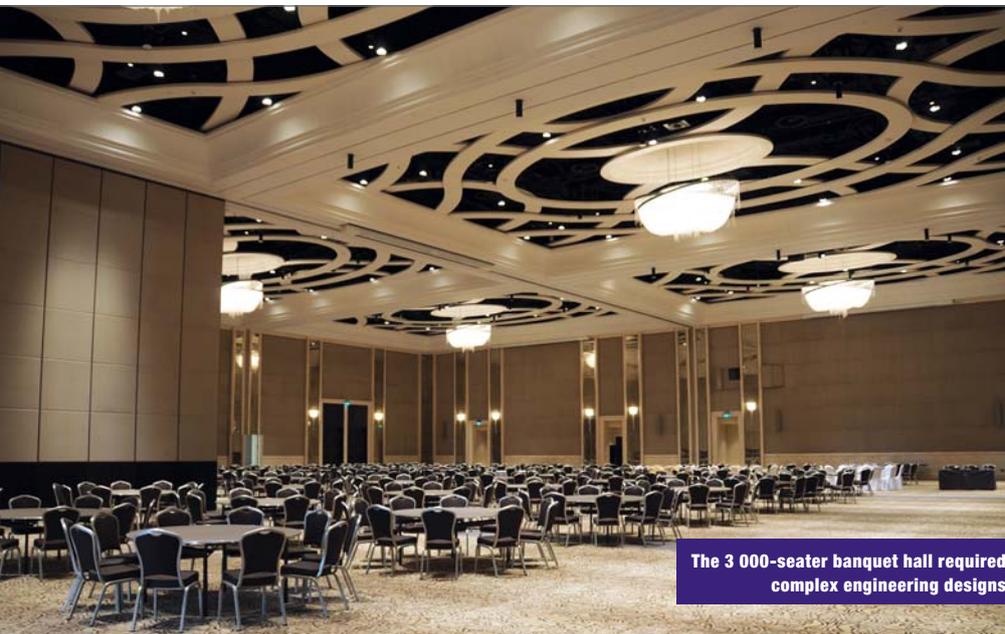
#### ENVIRONMENTAL PRECAUTIONS

TDIC has introduced extensive measures to protect the marine environment surrounding Saadiyat Island. For example, wastewater has to be tested and a quality permit obtained before it can be discharged into the ocean. In addition, the building line is 500 m from the beach to protect the highly sensitive breeding areas of the endangered Hawksbill turtle.

#### CONCLUSION

Innovative, well-coordinated resourcing and the application of international best engineering practices enabled the team to successfully meet the client's budget, timing and aesthetic requirements for the complex St Regis Saadiyat Island Resort development.

Quality control of this challenging project required highly skilled management in view of the large volume of design documentation. Aurecon successfully accomplished this through meticulous attention to detail and putting in place stringent quality check procedures. This exemplary team effort met the challenging contract deadline in time for the official opening in February 2012 of this flagship Saadiyat Island project. ■



The 3 000-seater banquet hall required complex engineering designs



Highly Commended: representatives of the St Regis project team seen here with SAICE president Dr Martin van Veelen at the Institution's awards function in October