Titanic Belfast

10/12

Key Points

New regional tourist attraction has environmental protection as one of its main priorities.

Re-use and decontamination of shipyard spoil to raise surface levels above projected sea level rise

Key efficiencies surrounding water and energy contribute to resilience of building against extreme weather influenced by climate change.

This case study details the adaptation features of Titanic Belfast, a recently constructed tourist attraction and events facility which is the centrepiece of the 'Titanic Quarter Regeneration Project.' It sits within the 'flooding' action category, as featured in the Northern Ireland Climate Adaptation Programme.

This case outlines the adaptation measures incorporated into the construction of Titanic Belfast and some of the sustainable operations it performs. Titanic Belfast is the centrepiece of the 'Titanic Quarter Regeneration Project.' It was constructed on 75 acres of land on the South Bank of the River Lagan. Although it was primarily built as a memorial to the Titanic disaster (1912), it also serves the practical purpose of providing banquet halls and function rooms for up to 1000 people.

Its construction is a model of sustainability and adaptation engineering.
This is due to its reuse of an old shipyard and forward planning in the design to account for the proximity of the River Lagan.

The project was commissioned in 2008 with 50% of funding provided by the Northern Ireland Tourist Board and 50% by the private sector. Todd Architects were appointed as project architect while Harcourt Construction (NI) Ltd oversaw the building stage of the project in co-ordination with RPS Consulting Engineers, Aecom and EC Harris.

Construction began in May 2009 and the project was fully completed and opened to the public in March 2012.

Overview

Titanic Belfast was constructed between 2009 and 2012, incorporating several sustainable features into the design.
It is owned by Titanic Foundation Ltd, a registered charity. Its operations are run from the private sector by Titanic Belfast Ltd, which ensures a proportion of the income generated returns to the charity to deliver social and heritage objectives.

Objective

To create a world-class, iconic landmark attraction that focused on three pillars of sustainability: Economic, Social and Environmental.

Economic

Job creation in both the construction and operational phases (35 of 40 SME sub-contracts are awarded locally).

Increased visitors into Belfast City centre (Victoria Square has seen an 11% increase in footfall).

Development of NI Tourism Industry.

Social

Education about Belfast's maritime heritage to general public.

Specific schools outreach programme, in part through the Ocean Exploration Centre. Within the centre there are workshops which explain the impact of human actions on the oceans.

Environmental

Regeneration of derelict, contaminated Harland & Wolff shipyards. Decontaminating the site involved hydrocarbon removal and soil treatment.

Reuse of over 90% of excavated spoil. After treatment, this was used to raise ground/floor levels by 2m to give allowance for projected future sea level rise. Use of this spoil also minimises future requirements for importation of materials.

Grassing of the surrounding area and tree planting.

Challenges

Technical challenges in the construction of the building itself. The design did not allow for any overlapping of floor plates and several aspects of the building 'lean out,' including the facades and the stair cores.

The logistics of the concrete pour for the basement level slab were a challenge. Measuring 4,200m³, it was the largest single pour ever undertaken in Ireland and took 24 hours to complete.

Successes

Achieved a high rate of buy-in from both government and the private sector.

Predicted cost at contract award (£73 million) was not overrun at contract completion and despite the complexity of the project it was completed one week ahead of the 148 week schedule.

Awarded the 'Aer Lingus Viscount Award for Outstanding Contribution,' recognising the work done in creating Titanic Belfast, job creation/training and its contribution to the economy (the venue attracted 600,000 visitors by 2013.)

Environmental success due to incorporated adaptation features achievement of a BREEAM 'excellent' rating.

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Climate Adaptation

There were a number of examples of climate adaptation in the design and construction of Titanic Belfast: The most obvious example was the raising of the ground/floor level above future projected flood levels and sea-level rise. This forward planning will serve to protect the building from future threats associated with being so close to the River Lagan.

Decontaminating the spoil from the old shipyard serves to protects against the effects of increasingly intense rainfall which may have released toxins into surrounding watercourses and compromised public health. In addition, as spoil was used to raise ground levels, it mitigates the need to import materials through a supply chain which could be disrupted in future.

Grassing of the surrounding area and tree planting allows for vastly enhanced water absorption in case of heavy rainfall.

A number of design features provide resilience for Titanic Belfast, including combined heat and power micro-generation and efficient, low energy intelligent lighting. This combination ensures that in the event of a power shortage, events or exhibitions at Titanic Belfast continue to function.

A 56,000 litre rainwater harvesting facility is not only efficient, but creates water resilience during prolonged periods of warm, dry weather as is projected to be increasingly common in summer months.

Use of tri-generation CCHP (combined cooling, heat and power) and absorption chillers is another example of using fuel efficiently. It allows the building to heat up or cool down as needed using the waste heat from electricity generation.

Lessons learned

Even on the most geometrically complex project, sustainability can remain one of, if not the key concept. Not all adaptation has to be revolutionary. It can be as simple as rainwater gathering, incorporating cooling features or raising a surface level.

Through some of the projects run on-site, such as Ocean Exploration Centre, Titanic Belfast is promoting sustainability to future generations. This is a 'soft' approach compared to the 'hard' physical adaptation involved in its construction.

Taking into account future flooding projections or infrastructure disruptions in the present will safeguard the legacy of Titanic Belfast into the future, much in the same way it seeks to preserve the legacy of its namesake a century before.

The Ocean Expoloration Centre, Titanic Belfast

Case Study

climatenorthernireland.org.uk

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jane@climatenorthernireland.org.uk

@climateni