BP Northstar Project

Version 30/3/2021

InterDam designed, supplied and installed

- 3 no offshore vertical lift garage and workshop doors
- 6 no offshore arctic all-weather personnel and escape doors
- 3 no offshore arctic windows
- 3,500 m2 blast resistant cladding- and roofing system

Project description

The Northstar island is an artificial offshore island, located in the Beaufort Sea, off the north coast of Alaska. It is subjected to extreme Arctic conditions, and access and escape is in winter often very difficult or even impossible. In order to enhance safety and comfort for the workers on the island, Worley Parsons in Los Angeles designed an additional building for BP, which was built by McDermott in New Orleans.

Project challenges

Due to the remoteness and inaccessability of the island the protective requirements were enhanched in comparison with normal off-shore standards, such as to:

Fire resistance
In case of fire on the island the new module provides shelter for a long time to the personnel. It therefore has an H120 fire rating all around, including the windows and doors.
On two sides the walls, doors and windows are also resistant to a 30 minute jetfire. In addition, the garage doors are designed to operate even after such a fire in order to allow the escape vehicles to leave the island safely after a disaster.

Blast resistance
The entire building envelope is designed to resist a blast pressure of 0.5 bar without plastic deformations. This means that after such a blast all exposed components, including fire insulations, doors and windows remain fully intact.

Thermal insulation
External temperature at the island varies from -45 up to +30 degrees Celcius. In addition, wind velocities of up to 200 km/hr can occur. Under these extreme conditions doors still have to be operable.

Ice build-up prevention
Snowloads at this location can add up to 250 kg/m2. Also, waves may hit the module and generate a pressure at the lower part of the walls of 0.2 bar. In winter this will result in ice build-up. Doors have to remain operable under these conditions as well.

Applicable rules and regulations
All equipment and constructions had to comply with US standards and requirements, as well as those of the state of Alaska.

As many specific components had to be sourced outside the USA, these components were made to different standards that included sometimes contradicting requirements.

InterDam solutions

The challenges were analysed and standard solutions were selected and modified to suit the extra requirements. This resulted in the following cost-effective solutions:

Doors
InterDam has standard doors in its product portfolio that meet the fire and blast requirements applicable. These doors are in addition provided with modified seals that are resistant to the low temperatures. Moreover, all door frames are provided with heat tracing around, without modification to the type approved details.

Walls and roof
Standard panels with high thermal and wind resisting properties have been selected and provided with an upgraded panel-to-panel joint detail. The panel fixing system is completely redesigned by InterDam in order to cope with the extreme pressure and suction forces on the walls and roof.

Windows
Standard fire rated windows were applied, upgraded with extra strong external glass panes to resist the blast pressures. These panes were provided with an electrically heated foil in order to keep them clear during an arctic blizzard.
Automatic protection hatches in front of the windows were provided at the side where a jetfire resistance is required.

Third party verifications

The entire proces of design, manufacturing, installation and commissioning was controlled by InterDams in-house QA/QC department. Independent inspections were carried out by Worley Parsons LA and by Det Norske Veritas. Finally, all components were tested and commissioned at site and found in compliance with all requirements.

InterDam

www.interdam.com

Klompenmakerstraat 12
2984 BB Ridderkerk
T. +31 (0) 180-470030

P.O. Box 299
2980 AG Ridderkerk
info@interdam.com