StoraEnso

Akornanni
Nuuk, Greenland

Cold comfort construction in the Arctic

Construction in the Arctic under heavy storms, freezing rain and piteraqs (300 km/h; 180 mph winds) is an impressive accomplishment.

Vitally needed for the Inuit, who account for 90% of the population, many who, live in mould-infested, overcrowded homes. Greenland is essentially a sheet of ice three times the size of France that is rapidly melting. Everything from moisture management to transportation of building supplies to major labour shortages, are issues here. However, the project team has tackled each one head-on with their application of prefabricated Sylva™ CLT building kits by Stora Enso with impressive results. 'These buildings are very durable and 'have the healthiest indoor air quality in all of Greenland', says Thomas Riis. A bold claim but one backed by the new occupants and likely to be confirmed in a Finnish university study that has the potential to revolutionise communities in the Arctic. Take a quick read of how they did it. After all, if the building solutions can work in this epicentre of climate heating, Sylva™ can work for your construction site too.

TRANSPORTATION

Transportation from Europe requires over 3,000 km of sea or air travel, which is not cheap. Sylva CLT Walls and Floors, however, are significantly lighter than precast concrete and can be placed on flat racks instead of containers, which quickly brings down transport costs. Thomas Riis custom-designed each house so that the elements would fit onto the boats that ship to the island.

LABOUR SHORTAGE AND SAFETY

Nuuk's small community of less than 20,000 is mostly employed in the fishing and hunting industry, making finding a workforce challenging. With a kit-of-parts approach to construction, all the design and milling work is carried out before being shipped, and elements arrive ready to install. Local workers with less experience in the building industry can be trained to work with Sylva kits. This reduces the need for imported (expensive) labour.

EXTREME WEATHER AND HIGH MOISTURE LEVELS ON CONSTRUCTION SITES

Wet weather presents an issue for Greenland construction sites. Strong winds prevent the option of erecting construction tents to keep materials dry. If materials get wet, it is costly and time-consuming to dry them out, and mould can quickly take hold. Because mass timber is so fast to install, it can be lifted from the sealed packages off the boat or truck directly into place, which greatly reduces exposure to moisture. Prefabricated mass timber enables year-round construction. Given construction can be reduced to one or two days, the construction team look at the weather forecast and plan a week in advance of when the installation will take place. Preinstalled lifting devices ensure elements can be safely lifted into place. Heavy cutting equipment is not needed on site in the difficult weather conditions as that's all done in a factory, which results in increased worker safety.

HYGROTHERMAL BUILDING CONDITIONS

The term hygrothermal is the science of heat and moisture movement in buildings. Repeated wetting, drying, freezing and thawing of buildings can lead to problems with condensation, mould, loss of thermal performance and other complications. In Greenland the hygrothermal considerations really matter because temperatures get so low occupants risk losing valuable heating if they even open a window for fresh air, and they often need to block the vents or places where the cold air can get in to stay warm. Wet clothes and fishing gear hung out to dry can rapidly create the ideal breeding ground for mould. With a Sylva CLT building kit and good design, you can optimise wood's excellent thermal and hygroscopic properties. Precision CNC cutting enables snug, airtight homes and with an inventive ventilation system Tomas Riis designed and 3D printed, results in radically improved indoor air quality that is so vital for residents' health and well-being.

THE END RESULT

A new residential community between Nuuk and Nuussuaq is born with cosy apartments, townhouses, semi-detached and single-family houses, with stunning views and a safe area for children to play. The houses are spread over several properties consisting of 3-, 4- and 5-bedroom homes in 3-storey units.

Hats off Lilleheden, Thomas Riss, and everyone who brought these much-needed homes to Greenland/Kalaallit Nunaat.

Read more about the project

General

Delivery year
2023

Building type
1-2 Family Dwellings

Area (m²)
3,000

Storeys
3

Units
20

Photo credit: Lilleheden/arkitekt thomas riis aps

Photo credit: Lilleheden/arkitekt thomas riis aps

Products

Products and Services
Sylva™ CLT Floors and Roofs, Preinserted lifting devices

Product quality
NVI, VI,

Product volume (m³)
1,136

Number of deliveries
5

Team

Developer

akornanni aps (owned by peter kristensen, preben kold and thomas riis)

Architect

arkitekt thomas riis aps

Main contractor

MesterByg ApS

Specialist Timber Subcontractor

Lilleheden A/S

Timber Engineer

Inuplan

Photo credit: Lilleheden/arkitekt thomas riis aps