

A Journey along the Norwegian Coast: Warehouses and Historical Wooden Structures

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Norway has a proud history as a sea-faring nation. With a rugged coastline with fjords and islands, a shoreline of 103 000 km, and a mountainous inland complicating communication on land, the sea served as the main road system through centuries.



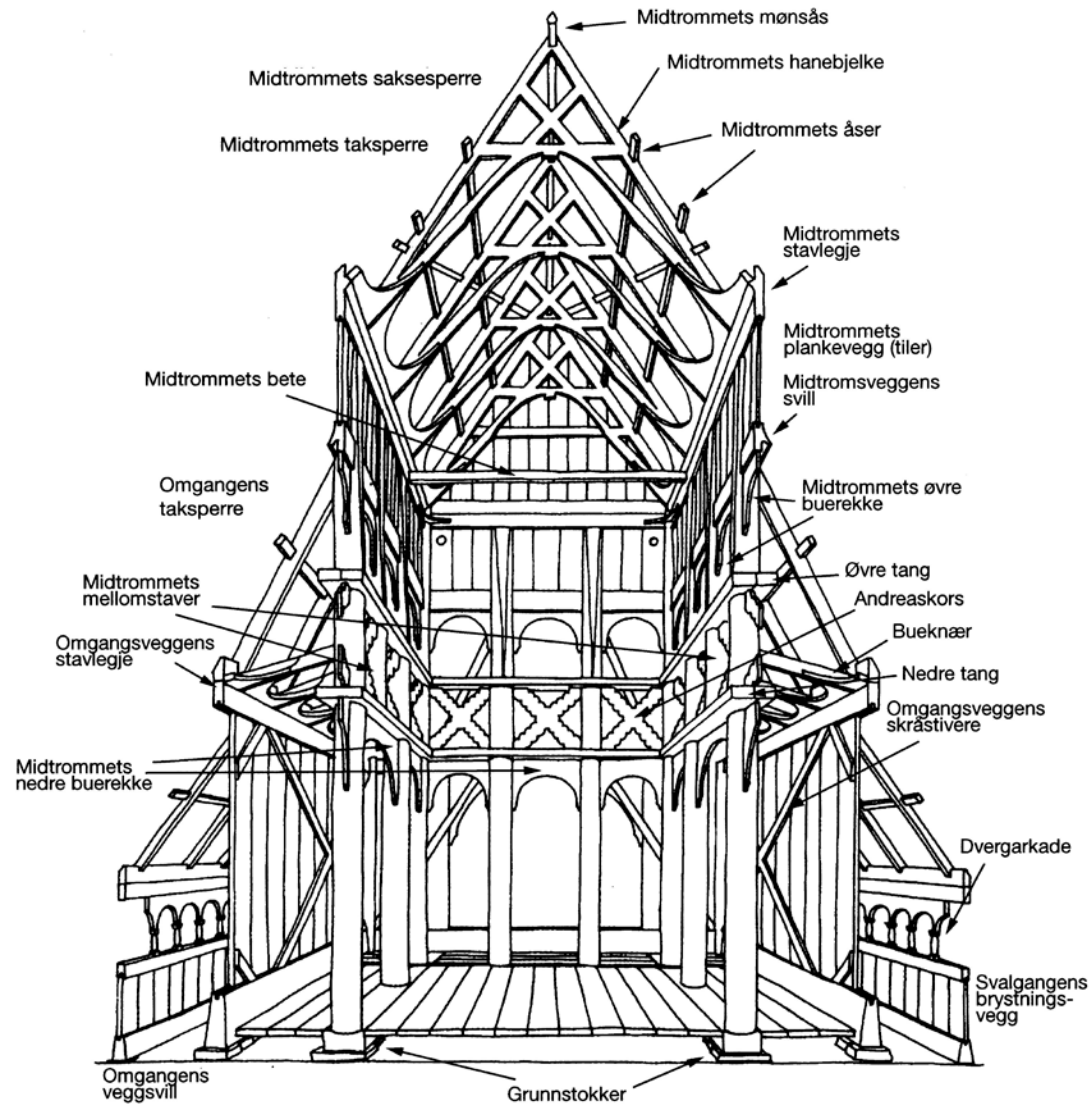
Despite the location at the northern fringe of Europe, Norway has always been an active partner in the international trade. Since Viking Age in the 800s, Norwegian merchants traded with countries both within and outside Europe.

The airdried stockfish was a major export article since medieval times. Later other fish products, and other raw materials as lumber, have been as important for the Norwegian economy as oil and gas is today.

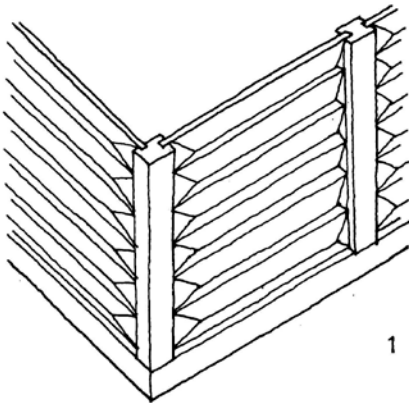


The role as a sea-faring nation, both for local communication and internationally, has made a distinct footprint on the Norwegian built heritage. Today built structures may be found in almost abandoned areas with no road access. They are testimonies over the communication revolution during the 20 Century, when the main transport system shifted from sea to road.

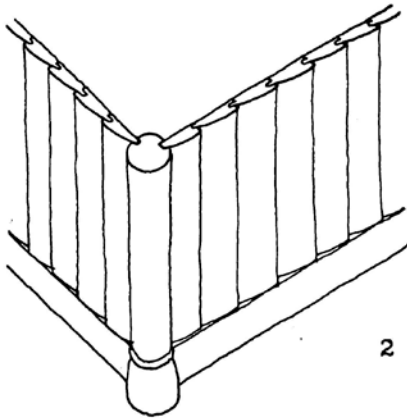




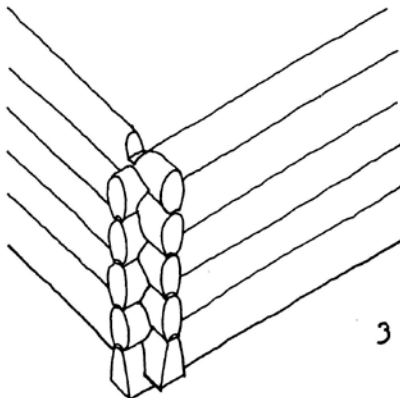
Wood has been the far most important construction material in Norway since Viking times. The wood building technique developed to a very sophisticated level through Medieval period, creating monuments like the stave churches, some of which have survived up to our time.



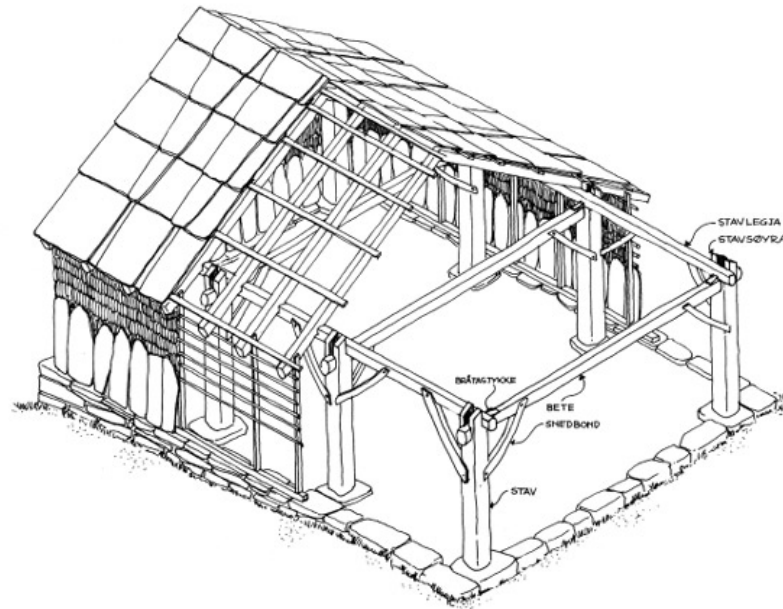
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Various timber construction systems have later been developed, adapted to different functional needs, climate conditions and availability of materials.

The utility buildings at the seashore were always made in timber structures.





A variety of specialized buildings and structures were necessary to serve production, storage and transport on sea. The largest was the warehouse - buildings for production, storage and trading.

Almost all pre-modern business in Norway was related to the seashore. A safe port was an obvious location for urban settlements. Historic urban ports were characterized by a tightly organized seafront of warehouses.



The log-built warehouse

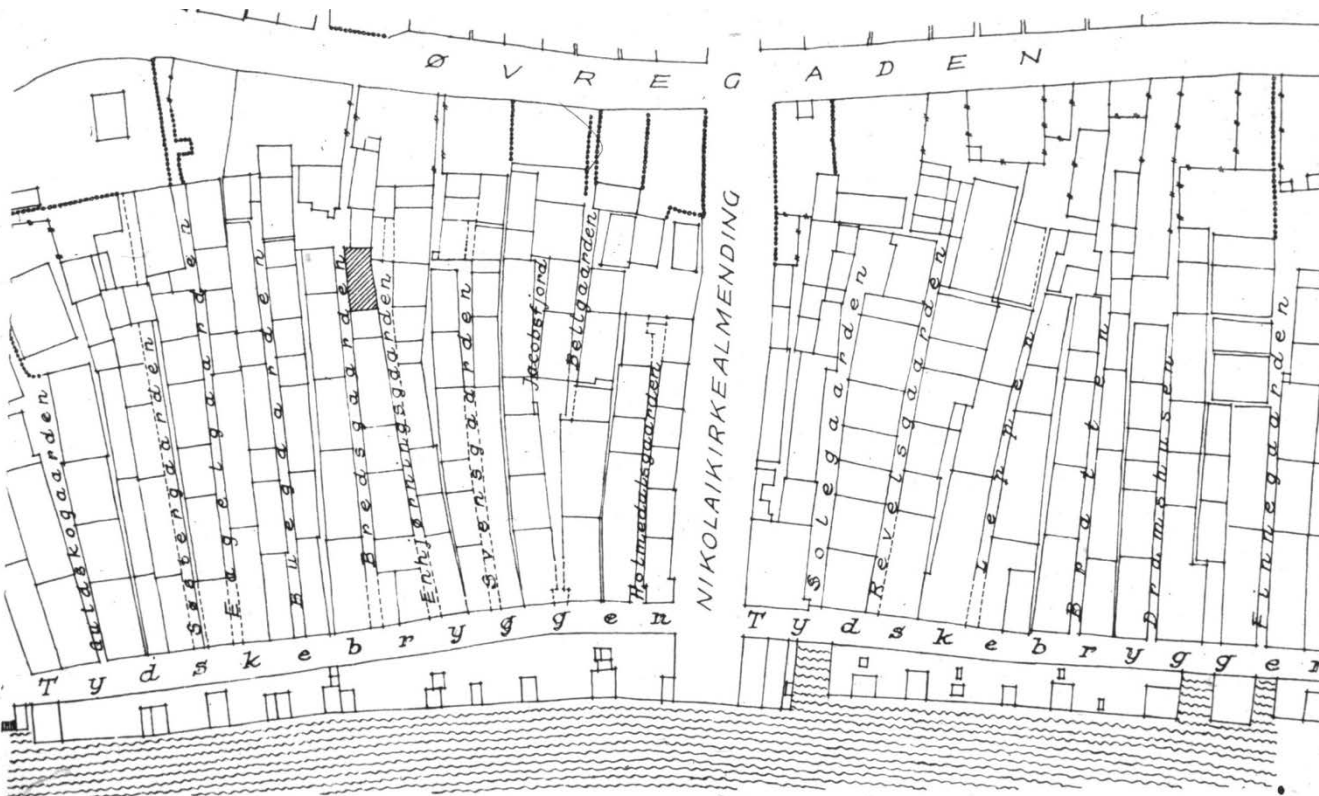
Bergen has a 1000 year old tradition as Norway's most important trading port. The town had the monopoly of trade of stockfish, caught and dried in Lofoten islands in Northern Norway.

The fish was transported by sailing ships to Bergen and stored in the warehouses at Bryggen (the Wharf) before exportation. For several hundred years, Bryggen was one of The German Hanseatic League's overseas posts together with Novgorod, Brugge and London.





The warehouses were organized on narrow and deep lots along the natural harbour in order to give access to the sea for all. Each property consisted of an internal alley with rows of warehouses on each side. The present built structure dates from 1708

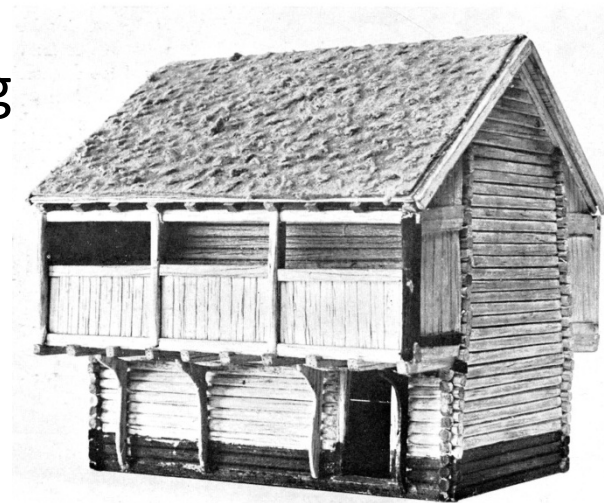


Bryggen etter bykartet fra 1879. M. 1:2000.





The warehouses consisted of log-built single buildings in two or three stories, lined up along the internal alleys. The access to the upper floors was through galleries in timber frame construction. Archaeological excavations show that this structure has a continuing tradition here since the Middle Ages.

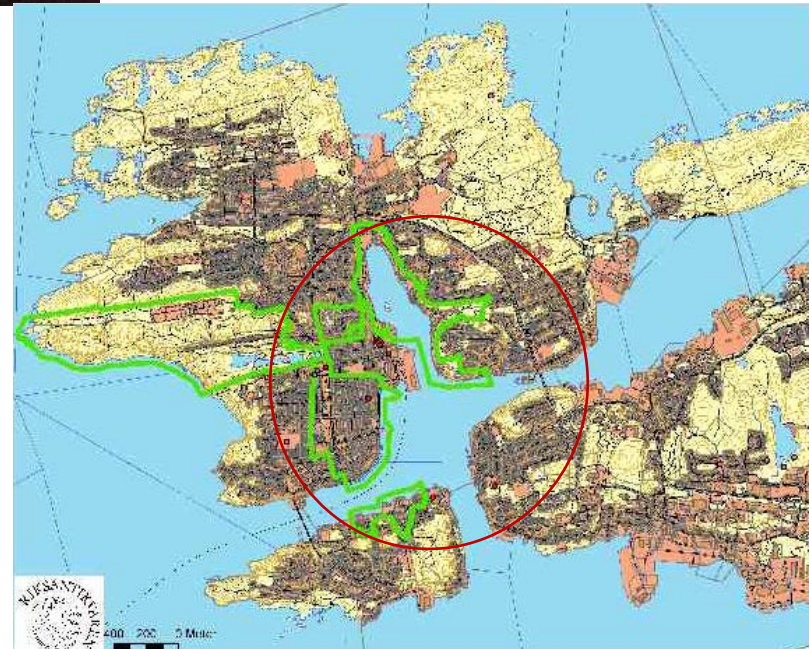




The timber frame warehouse

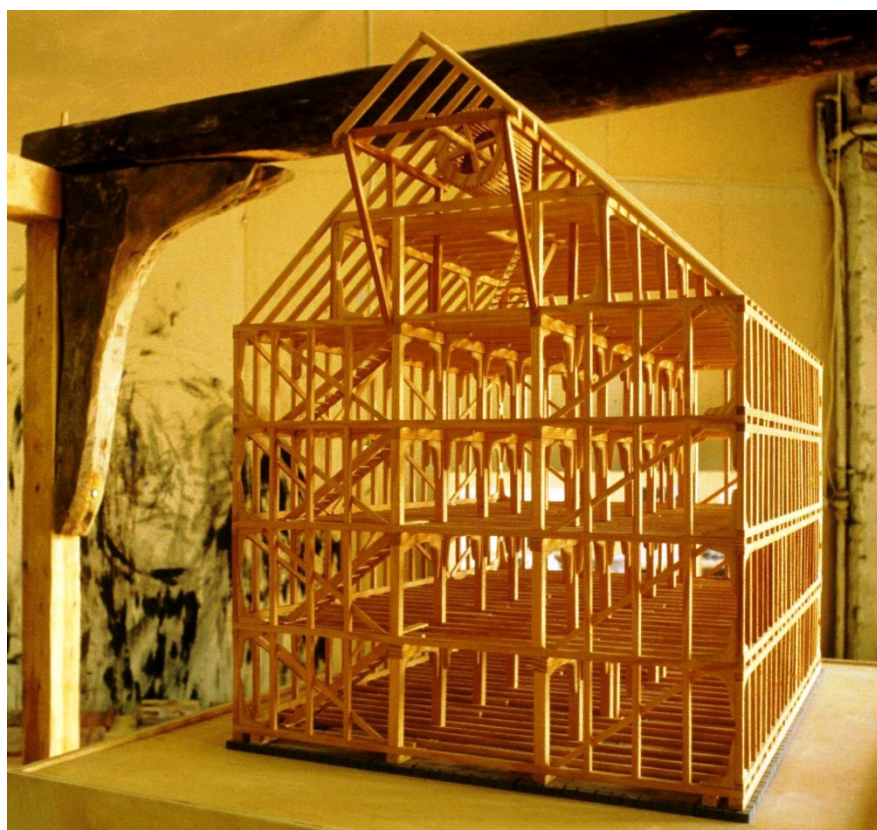
Big booms of fishing industries in certain districts in the 1700s led to rapid urban growth and need for new warehouses for production and storage.

Kristiansund grew up as the center for production and export of klippfish, salted and dried codfish which became an important export article both to Southern Europe and the New World (Latin America).





The salted codfish was dried on naked rocks. The process was dependent on dry weather and must be protected against rain. It was a labour-consuming process engaging the entire local community in the season. The processed klippfish must be stored cool and airy, and large warehouses for salting and storage grew up at the drying cliffs and around the natural harbour basin between Kristiansund's four islands.



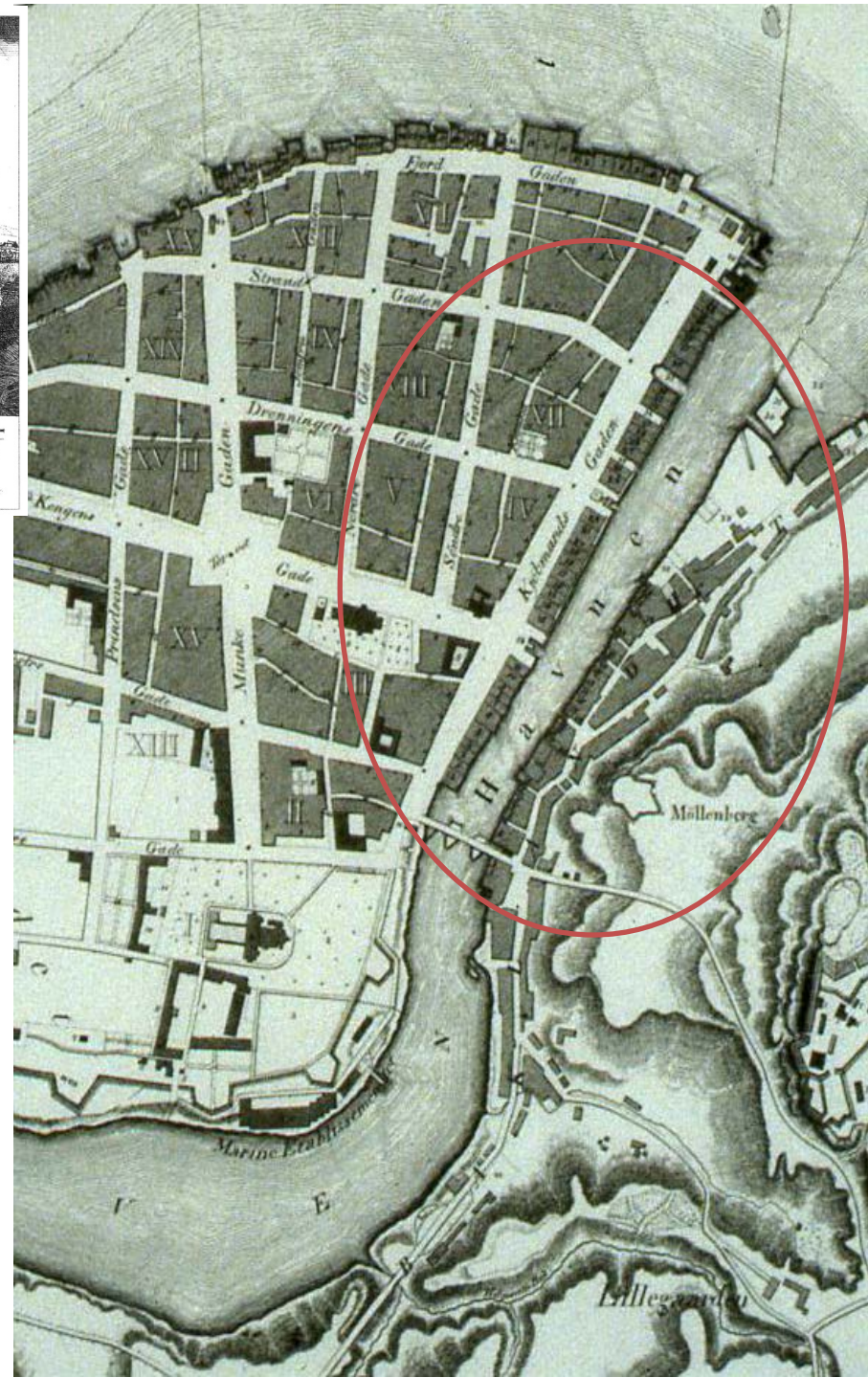
The klippfish industry grew up quickly and created a need for an enormous bulk of buildings for salting and storage in a short time. The European timber frame system was adopted as a lightweight, easy to assemble and material efficient construction principle.





Hybride techniques – log and wood frame

Trondheim is the largest city in Mid-Norway and was since medieval times the trading capital of the region. The river harbour offered a safe port and initiated the urban development at the site. The warehouses of Trondheim have repeatedly been destroyed by fires, but have been continuously rebuilt on the same sites.



The merchants of Trondheim traded with various export and import goods. Rough and bulky products as fish and lumber needed large and airy space, while more precious goods must be stored safe and dry.



The merchant warehouses in Trondheim were therefore erected in a combination of wood frame and log construction. Most warehouses had closed rooms with log walls in the lower floors and large open spaces in the upper floors.



The warehouses were placed in the river on pole foundations. Ships could sail up the river and goods were loaded directly to and from the ships to the warehouse by hoisting devices in the gable. The same hoisting system was found on the street side of the building.

Along the seafront a continuous passageway on open galleries was established, making it possible to move on the outside along the row of buildings.

The future of the warehouses

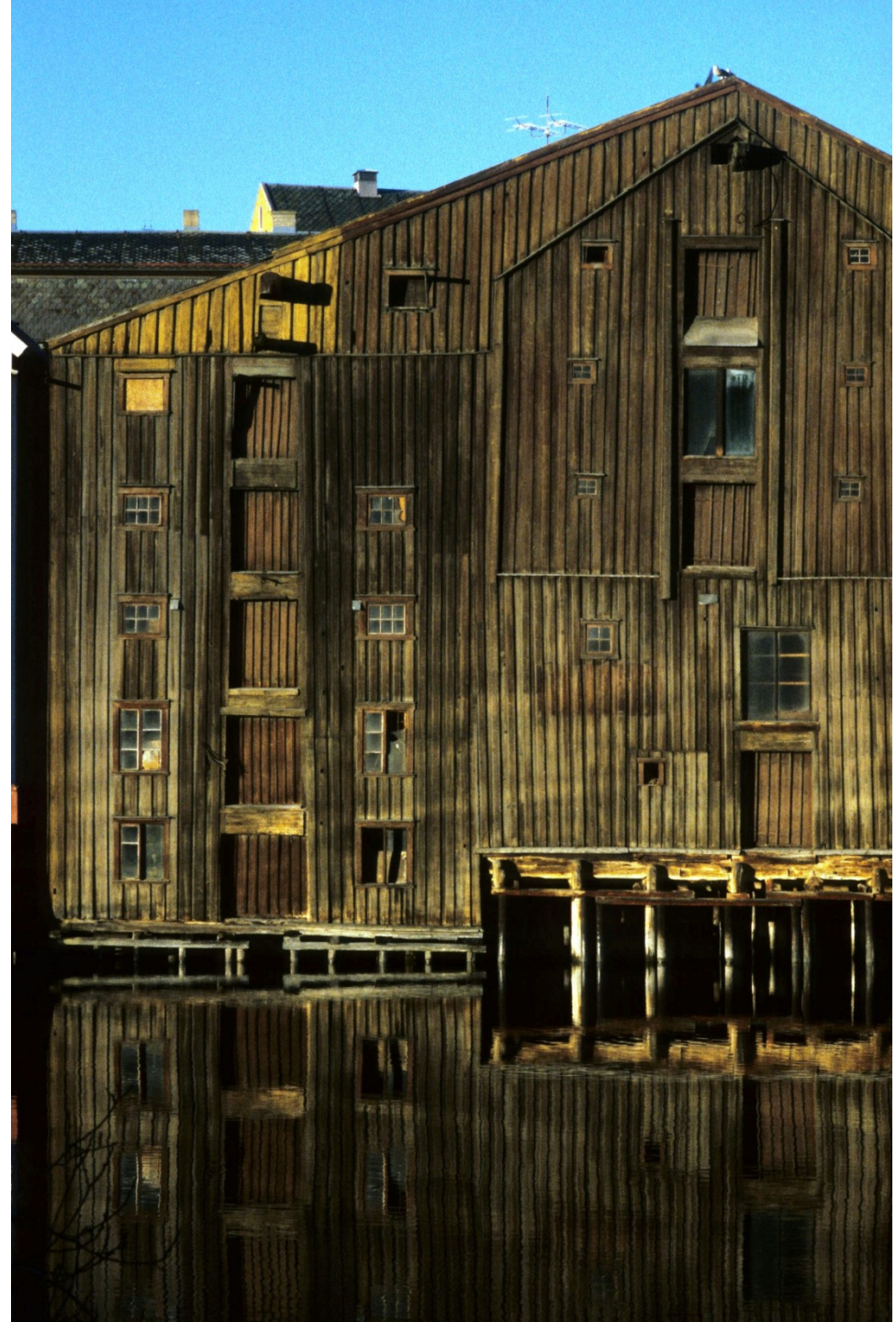
The change of transport from sea to road, and development of trade, transport and population pattern in general, has led to loss of function and accelerating decay on buildings and foundations for a big number of warehouses along the Norwegian coast. It is a common challenge for many historic ports and sites in Europe.

How is it possible to adapt new use to this type of large, unheated utility buildings, bearing the testimony of a past that is vital for the historic understanding of the place – serving new purposes but keeping their historical uniqueness?



Challenges

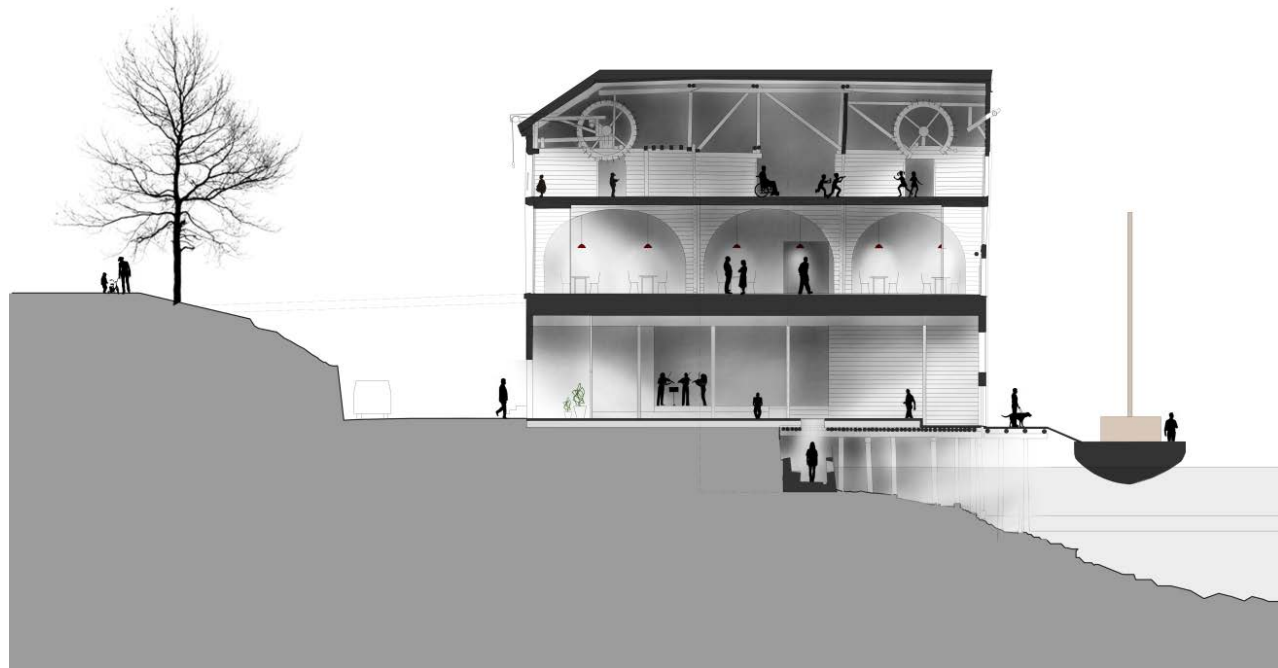
- How to create acceptable indoor climate and reduce energy consumption?
- How to solve the need for daylight in deep buildings with windows only in the gables?
- How to adapt buildings with maybe five floors to the need for accessibility for disabled?
- How to reduce the risk of fire and secure the safety for the users and the buildings?
- How to create usable space in buildings with a ceiling height down to 1.70 m?

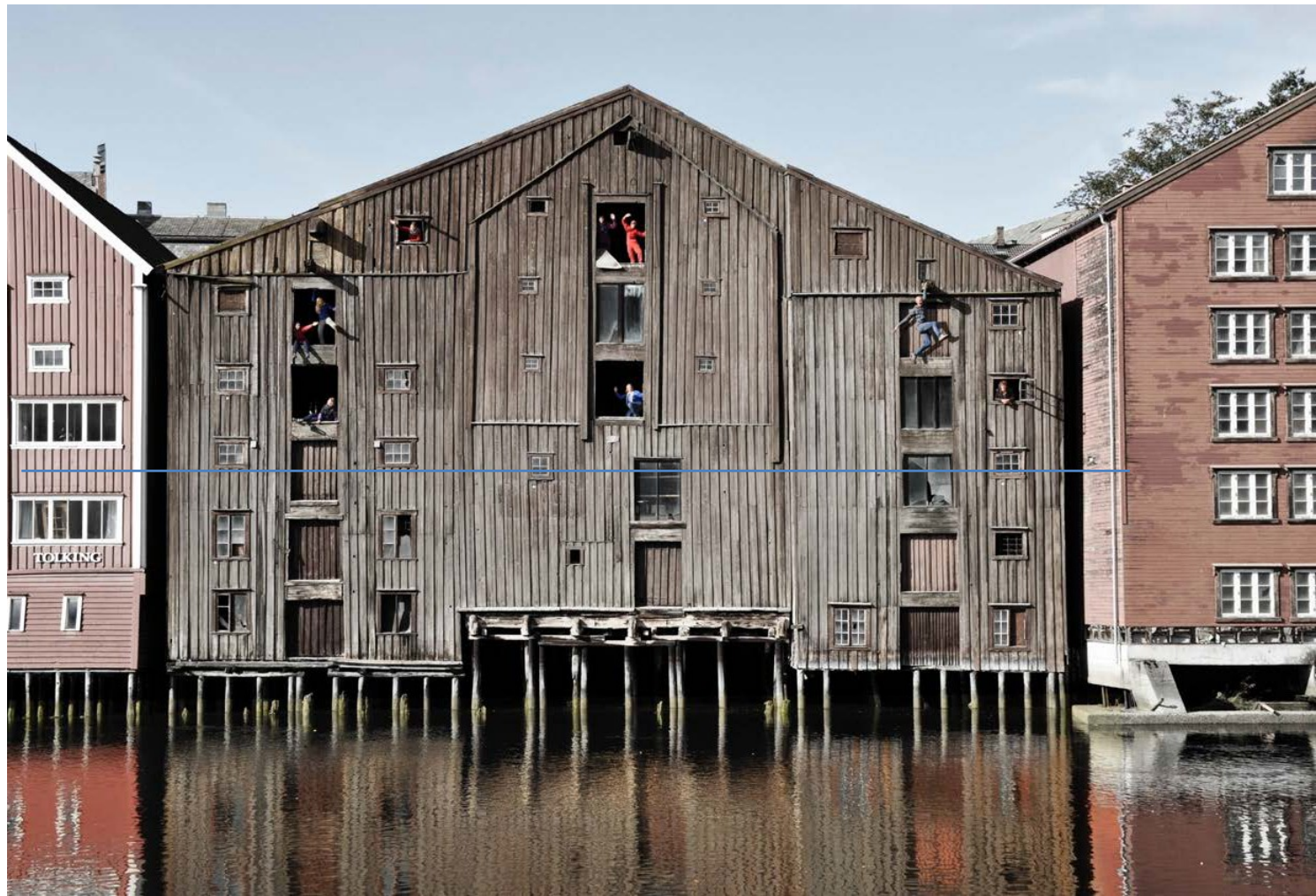




This challenge was addressed by architect students in the 2012 building conservation course at NTNU. The students made design for new use in five warehouses in Trondheim, based on surveys and detailed documentation of the buildings.

In June 2013, the projects were exhibited in one of the warehouses and got much attention.





The students' work made a starting point for a feasibility project for a building conservation center in Trondheim, focusing on challenges for new use in large, empty historic timber structures – of which the warehouses are valuable examples.



Thank you for your attention!