In the course of the lab research, an experiment was performed to assess possible changes in the porosity and permeability of rocks under the action of aqueous solutions saturated with carbon dioxide on 4 samples with different filtration capacity parameters.

The samples were preserved after exposure to CO2 for 3 months. After that, the porosity and permeability were re-determined by the gas-volumetric method by purging with nitrogen. From the obtained data, we can draw a preliminary conclusion that the effect of carbon dioxide on the investigated sandstones leads to a decrease in their filtration capacity parameters. This is explained by the fact that sandstones consist mainly of quartz fragments. As a result of the reaction of mineral carbonation, there is a decrease in the pH of the water and the substitution of a weak acid in the solution. Therefore, SiO2 is displaced as a weaker acid in the solution, which precipitates in the form of amorphous silica (chalcedony) at increased pH.

To sum up, according to the results of the above complex of studies, it has been established that fine-clastic sandstones of the Nord-Pinyansk area are characterized by increased collector properties (samples NPn-2 (int. 1420-1428m), NPn-3 (int. 1590-1598m), NPn-4 (int. 1780-1788m) These samples are also characterized by a relatively high permeability and low carbonate content. Such sandstones can be promising sites for CO2 storage.

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WHAT IS MODULAR CONSTRUCTION?

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A modular building is a prefabricated building that consists of repeating sections called modules. Modularity involves building sections far from the construction site and then delivering them to the designated location. Assembly of prefabricated sections is completed on site. Prefab sections are sometimes placed using a crane. Modules can be placed side-by-side or in a stack, allowing for a variety of configurations and styles. Once placed, modules are connected using

inter-module connections, also known as inter-module connections. Interconnections connect the individual modules together to form the overall structure of the building.

Uses

Modular buildings can be used for long-term, temporary or permanent facilities such as construction camps, schools and classrooms, civilian and military housing and industrial facilities. Modular buildings are used in remote and rural areas where conventional construction may not be reasonable or possible, such as the Halley VI housing pods used on the BAS Antarctica expedition. Other uses include churches, medical facilities, sales and retail offices, fast food restaurants, and cruise ship construction. They can also be used in areas with weather problems such as hurricanes. Modular buildings are often used to provide temporary facilities, including toilets and ablutions during events. Thanks to their mobility, the buildings are popular with both rental companies and customers. The use of modular buildings makes it possible to hold events in places where existing facilities are unavailable or unable to handle the number of event participants.

Construction process

Construction takes place off-site, using lean manufacturing techniques to prefabricate single or multi-storey buildings in supplied modular sections. The modules are often based on standard 20-foot shipping containers, using the same dimensions, construction and stacking techniques, but with smooth (rather than corrugated) walls, glossy white paint and facilities with windows, electricity, potable water, waste water, wiring, telecommunications and air conditioning. Resilient Modular Construction (PMC) buildings are manufactured under controlled conditions and can be constructed of wood, steel or concrete. Modular components are typically constructed in-house on assembly lines. Building modules can take as little as ten days, but more often one to three months. PMC modules can be integrated into the construction site or into stand-alone projects and can be supplied with MEP, accessories and interior cladding.

Buildings are 60% to 90% completed off-site in a factory-controlled environment, then transported and assembled at the final building site. This may include an entire building or may be components or sub-assemblies of larger structures. In many cases, modular contractors work with traditional general contractors to take advantage of the resources and benefits of each type of construction. The finished modules are transported to the construction site and assembled by crane. Setting up the modules can take a few hours to a few days.

Permanent modular buildings are built to meet or exceed the same building codes and standards as site-built structures, and modular building designs use the same architect-specified materials used in conventionally constructed buildings. A PMC can have as many floors as the building code allows. Unlike movable buildings, PMC structures are designed to remain in one place throughout their lifetime.

Advantages

Modular buildings are considered to have advantages over conventional buildings for various reasons.

Faster construction/faster return on investment. Modular design allows you to complete construction in short time. According to some materials, this can reduce the overall implementation timeline by up to 50%. It also reduces labor, financing and supervision costs. A unique feature of modular construction is also the possibility of simultaneous construction of floors, walls, ceilings, rafters and roofs of the building. This process enables modular construction in half the time of conventional rod construction.

Internal construction. The installation is independent of the weather, which can increase the efficiency of the work and prevent damage to the building material.

Ability to support remote locations. Especially in countries where potential outlets may be far from industrial centers, such as Australia, the cost of building a house on site can be much higher in a remote area or an area experiencing a construction boom such as mining towns. Modular buildings are also beneficial in providing health and hygiene facilities where time, space and money are issues.

Low waste. Since the same plans are created over and over again, the manufacturer has a record of exactly how much material is needed for the job. Consistently, builders can design systems using common lengths of lumber, wallboard, etc., cut pieces with maximum efficiency, or order special lengths in bulk. Materials minimized include wooden pallets, shrink wrap, cardboard, plasterboard, wood, concrete, bricks and cement.

Environmentally friendly construction process. Modular design reduces waste and site disruption compared to site-built structures.

Flexibility. Can be continuously added to a modular building, including creating skyscrapers. When needs change, modular buildings can be dismantled and modules relocated or refurbished for next use, reducing the need for raw materials and minimizing the amount of energy expended to create a building to meet the new need. In principle, in some cases, the entire building can be recycled.

Quality. Commercial modular buildings are built in strict compliance with relevant local, state and national laws and codes, combining traditional construction techniques, quality manufacturing and third party agencies that offer random inspection, testing and quality control certification services. Modular units can also be designed to match the exterior aesthetics of any existing building, and modular units can be virtually indistinguishable from site-built structures when assembled.

Improved air quality. Many of the indoor air quality issues identified in new construction are due to high levels of moisture in the frame materials. Since the modular construction is essentially completed under factory-controlled conditions using dry materials, the potential for high levels of moisture being trapped in the new construction is eliminated.

Disadvantages

Market acceptance. Some home buyers and some lending institutions object to modular homes being equivalent in value to site-built homes. While the homes themselves may be of equal quality, well-established zoning regulations and psychological market factors can create barriers for buyers or builders of modular homes and should be considered as part of the decision-making process when considering this type of home as residential and/or residential option or investment.

Materials. The materials used in modular buildings have the same quality and durability as those used in traditional construction, maintaining properties such as sound insulation and energy efficiency, and their versatility allows for attractive and innovative designs. Steel, wood and concrete are most often used. It is increasingly used as a basic material in these types of buildings due to its various properties such as fire resistance, energy saving, better sound insulation and durability.

Financing. Mobile homes often require special lenders. Modular homes, on the other hand, are financed as site-built homes using a construction loan.

Modular construction is the subject of constant research and development around the world as this technology is used in ever taller buildings. This is one of the directions that deserves attention and implementation.