

First South Korean Super E[®] Home Pocheon City, South Korea

Description

The first Super E[®] home built in South Korea was intended as a showcase for Canadian technologies and materials. Home to the builder himself, this distinctive home looks very Canadian – from its open concept interior spaces to a log-like exterior.



Setting

Pocheon City is a small city located in Gyeonggi-Do province, the same province as the capital city of Seoul. The area is mountainous with a humid continental climate. Winters are cold, with average January temperatures of -7°C , summers are hot, with average temperatures in August of 26°C . The area is susceptible to monsoons in June and July.

Super E[®] Korean Member

Woorim Lumber was originally a builder of log homes. Woorim President Jay Wan Yu became interested in Canadian housing technology after studying Canadian construction techniques in British Columbia in the late 1980s. Mr. Yu also developed personal connections with members of CMHC International and championed the idea of bringing Super E[®] to Korea.

Super E[®] Canadian Member

Although a number of high-profile Canadian companies participated in the construction and design of this house, the official Super E[®] Member was DAC International. Based near Ottawa, Ontario, DAC has built houses in almost every Super E[®] market.



Detail of the framing work. Note the use of I-joists, engineered framing using OSB rather than traditional solid lumber. The engineered beams are not only straighter and stronger than dimensional lumber, they are much more environmentally responsible.

Member Commentary

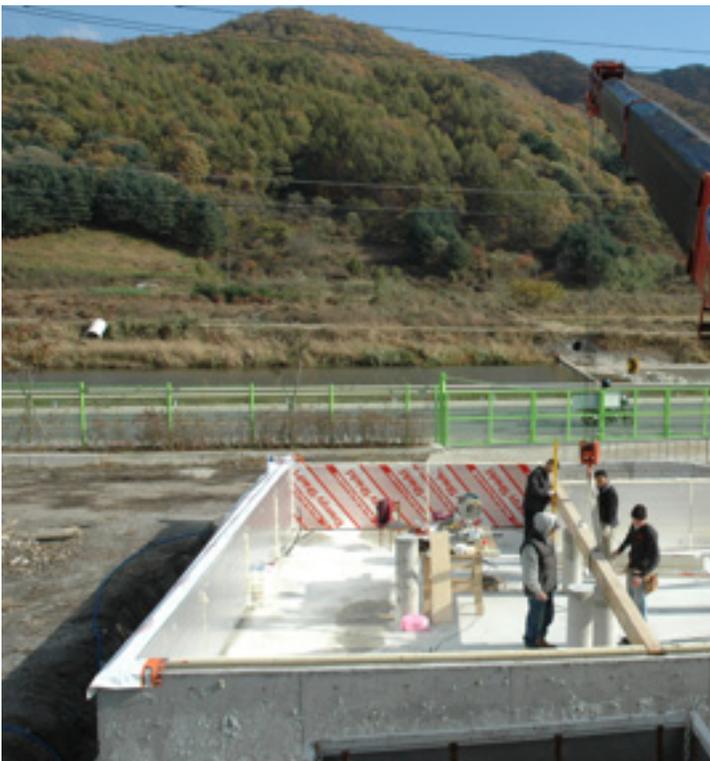
“As Korea’s housing mix evolves, there is a growing interest among sophisticated consumers in homes that are healthier, more energy-efficient and more environmentally responsible,” said Mr. Yu. Changes in Korean housing led Mr. Yu to pursue Super E®.

The architect for the project, Canadian Herb Otto, echoes Mr. Yu’s feelings.

“From the beginning, we had some key objectives for this project,” he said. “Demonstrate a high level of energy efficiency, showcase Canadian design features and incorporate healthy building materials. But the project needed to demonstrate more than just materials and technology. It needed to be a living, working example of Canadian construction expertise.”

Mr. Otto incorporated a number of innovations in the design of the house, which he said is typical of the Super E® approach.

“The Super E® Standard focuses on how a house must perform rather than how it must be built. This provided the flexibility to design a unique home responsive to Korean climate patterns and aesthetics. For example, we created a radiant floor heating system using the crawl space as a plenum for heated air in the winter. This provides warm floors. In the summer, the system is reversed by incorporating a cool air plenum above the second floor ceiling that distributes air down through the house. A large central shaft and fan handles the air exchange,” Mr. Otto explained.



House Performance

Since no building standards exist for wood homes in Korea, energy modeling compared this house to Canadian building codes. The house was found to use 37 percent less energy than it would have, if it had been built to standards used in Canada in 1989.

The unique heating and cooling system uses the crawlspace as a plenum to carry warm air. In order for this to work, the crawlspace needs to be air tight to the outside and very well insulated.

Unique Features

Heating in Korea is always radiant floor for historical reasons. Early Korean housing featured raised floors with fires lit underneath. Consequently, today there is an overwhelming preference for radiant underfloor heating. Rather than installing pipes in a concrete slab to run heated liquid to warm the floor, this house uses the mechanical system to blow warm air through a crawlspace under the floor. This provided considerable cost savings.

Heat is supplied by an electric water tank. A second, solar heated, water tank will pre-heat water for the main tank. When there is a call for heat, hot water from the main tank is circulated to a fan coil unit that supplies heated air through the crawlspace. Warm air flows from grilles in the ground floor, and is channeled to the upper floor using the stairway. There are grilles in the ceiling to allow air into the sealed attic. The fan is located in the attic, allowing the attic to be depressurized.

Summertime cooling uses the same fan coil system, but runs cool (12C) well water through the system. The air flow is reversed.



These large beams are not just structural, they will add a dramatic flair to the Canadian-style open-concept living area and kitchen on the main floor.

Services Provided by Super E[®]

CMHC International provided considerable support to train construction crews who, for the most part, were not familiar working with wood. CMHC also sponsored a dedicated brochure for the official house opening, which was designed by the Super E[®] Office.