



Designer residence sets new ICF standards

The Janacek Residence is a 21st Century landmark in Princeton, Texas, USA – approximately 25 miles north-east of Dallas. With 1450m² of indoor space on six levels and an octagonal tower rising more than 33m above the foundations, it is truly a flagship project. Its crowning glory, the observation tower, houses a 3.5m-diameter antique stained-glass dome.

Jean-Marc Bouvier, Nudura, Texas, USA

The residence is an excellent example of how insulated concrete formwork (ICF) lends itself to construction on a grand scale. This designer house took 15 months to build, of which only 60 days were needed to install the ICF. The forms consist of two stay-in-place panels of expanded polystyrene (EPS), which are connected with an innovative folding web that minimises wastage and offers maximum flexibility. The forms are transported flat to site, opened and stacked, reinforcement placed, propped and then

filled with concrete, creating a solid monolithic concrete wall for above- and below-ground applications. The finished structure combines the strength of concrete with the insulating properties of EPS, which stays in place to insulate and protect the walls. This construction method can reduce energy bills by up to 70%, block exterior noise and is disaster resistant.

In total, the scheme used more than 1500m² of Nudura ICF forms (152mm and 305mm core): 186m² as interior

Formwork and Falsework



Structural engineer, Jerry Coombs used transfer beams and cantilevers within the floor deck to collect the floor loads and carry them to the foundation.

walls and an additional 930m² of Insuldeck EPS floor decking, including a 185m² patio.

The project – constructed by Cameron Ware of ICF installer Double Eagle Builders and supplied by distributor FutureStone – was built using 765m³ of concrete. The three key challenges unique to this bespoke project were: the sheer scale of the building, its geometry and the heavy loads amassed by the concrete floors.

Georgia architectural designer, G Frank Dollar teamed

up with the client to design and build this custom-built, energy-efficient dwelling. The house owner acted as main contractor; his requirements were well established in his own mind before appointing Dollar. The design of the mansion, an outcome of an ever-increasingly digital world, was developed in Georgia and client liaison comprised telephone and e-mail conversations, while documents and drawings were couriered overnight. Mr Janacek's vision was to build a luxury home, while retaining the need for durability, all-round efficiency and sustainability.

The house includes six floor elevations, all of which are constructed of concrete: sump room, storm shelter/safe room, first (ground) floor, second floor, attic floor and tower levels. Load calculations for the large weight of the floors and interior ICF walls was a major feat of engineering, especially as the floor plan needed some of the second-floor columns and ICF walls be offset from those below.

Structural engineer Jerry Coombs used transfer beams and cantilevers within the floor deck to collect the floor loads and carry them to the foundation. Beams varied in size from 915 × 510mm to 610 × 430mm and all were poured monolithically with the Insuldeck wall system.

The arched arcade, which surrounds most of the first floor, was cast in place using removable forms. It also supports approximately 185m² of the outdoor patio. Janacek himself designed an ingenious thermal break, which isolates all external concrete decking from the interior concrete floors, which was implemented by the ICF installers.

Each segment of the U-shaped home extends approximately 30m – long enough to cause concerns about floor deck shrinkage. Since an expansion or movement joint was undesirable, special consideration had to be given to floor cracking in the re-entrant corners as well as ensuring that deck shrinkage did not cause excess irregularity to the walls.

The house sits on expansive clay. To compensate for poor site soil conditions, the foundation sits on

Below: The observation deck is the highest point of the building, created with ICF fully around its perimeter, and is supported at the attic level.





Above: This designer home took 15 months to build, of which only 60 days were needed to install Nudura ICF.

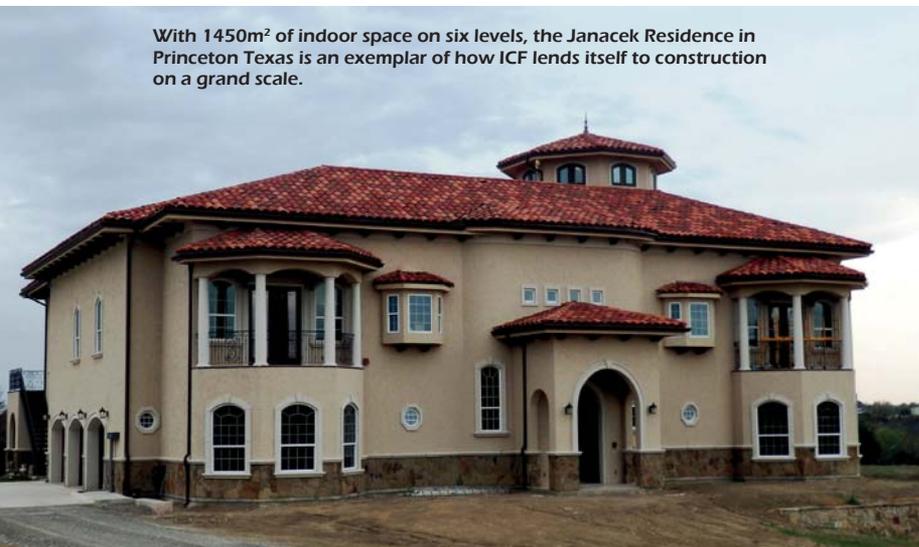
98 concrete piers, each extending 7.6m into the soil. Radius floors and landings in the tower were poured monolithically with the walls. All arches in windows and doors were built out of ICF and poured.

The observation deck is the highest point of the building, created with ICF fully around its perimeter and supported at the attic level. Since a proportion of the walls were supported on the perimeter wall of the house, and the rest on the Insuldeck, the engineer also had to resolve concerns about differential deflection.

The interior is well appointed, a central feature being the broad spiral staircase, which enables access to all floors. The finished house offers outstanding energy efficiency. To date, the house has recorded energy bills on average about \$250 a month. Instead of a typical well system, a lake on the property facilitates a geothermal heating/

cooling system. Some 930m² of living space is conditioned for approximately \$90 per month, which represents a very small sum for a house of this size in the Texan climate.

The Janacek Residence has many other unique features. In addition to ICF construction and the illuminated stained-glass dome, residential home automation and an all-LED interior lighting system have been installed. The project won Annual ICF Builder Awards in the unlimited residential category (over 550m²) on the basis of the project's design complexity, striking architecture and the construction challenges overcome. Janacek has set a new standard for the entire ICF industry and during construction was visited regularly by engineers, architects, and homeowners interested in ICF. The builder discussed the project in detail in an on-line ICF forum, which received more than 50,000 views. ■



With 1450m² of indoor space on six levels, the Janacek Residence in Princeton Texas is an exemplar of how ICF lends itself to construction on a grand scale.

Below: Janacek himself designed an ingenious thermal break which isolates all external concrete decking from the interior concrete floors.

