

Athlone Town Centre and Spencer Dock Apartments, Dublin

Oran Precast's Twin Wall System

Two major projects, Athlone Town Centre, Co. Westmeath and Spencer Dock apartment complex in Dublin, are currently under construction using Oran Precast's Twin Wall system. Based in Oranmore Co. Galway, Oran manufactures Twin Walls in a €15 million state of the art, automated plant. The factory produces approximately 2,500 square metres of wall per week, based on an 8 hour shift.

Twin Wall is a concrete formwork comprising two 60mm thick concrete plates, separated using a steel lattice girder to form a core between the plates. When in place the Twin Wall is filled with concrete. Prior to placing of the insitu concrete, services can be installed in the core. The thickness of the wall varies from 200mm to 400mm, depending on structural requirements. Wall units are manufactured to a maximum size of 12.5m x 3.5m and all linear wall geometry can be accommodated within these limits. Each plate carries the required wall reinforcement obtained from traditional reinforced concrete wall analysis and design theory for both loadbearing and non-loadbearing walls. The manufacturing process is highly flexible and dimensionally accurate and all windows doors and service openings are designed into each wall element. Electrical services can also be accommodated if required.

Twin walls have a number of advantages over single wall systems. The wall is lighter because of the cavity between the plates and therefore it is possible to manufacture and handle larger single units. The outer and inner faces of the wall are smooth and a paint finish can be applied to the inside



View of site - Athlone Town Centre
Oran Precast



Athlone Town Centre

Oran Precast



Oran Precast Twin Wall

without the need for plasterboard. Using Twin Wall with an exposed concrete internal face is thermally efficient, since the thermal mass of the wall is maximised. Another advantage is that the system is inherently waterproof and in many instances it is possible to build underground facilities such as car parking without the need for a tanking membrane. In the Athlone Town Centre, Twin Walls form a car park 3 storeys below ground level.



Manufacturing Process

Twin Wall Panels are manufactured on flat bed, mobile tables which move on rails through the factory. All details in relation to the wall are digitised from the architect's, structural engineer's and services engineer's drawings. The outline of the wall panel is then painted onto the steel face of the table with an inkjet. A magnetic steel edge-shuttering is manually then placed in position on the outline formed by the inkjet. The table then moves to the next station where steel reinforcement is automatically placed in position by a robotic arm. If required, service trunking and electrical sockets can be manually positioned prior to the placement of concrete. When the concrete is placed, the steel table vibrates at high frequency until the concrete is completely level. The plate is then sent to a drying oven to cure. The computer tracks the position of the table at all stages in the process and recovers the cured plate from the oven which is placed on top of an identical unit to form a Twin Wall.

Delivery to Site and Storage

Once manufactured, Twin Walls are stored in Oran Precast's yard in steel cages which are supported on collapsible stilts. Due to the tight working conditions on the Athlone Town Centre project, wall units for one week's construction were delivered to the builder's holding yard where they were temporarily stored. The cages were then transported to site by the builder using a hydraulic flat back truck. This system greatly enhances the efficiency of the delivery since there is no delay in



gaining access to the site or waiting for cranes to become available.

Twin Wall Erection Procedure

The set out lines for the Twin Walls are marked out on the floor slab with timber battens. The walls are then craned into position and placed on 25mm metal levelling shims and subsequently grouted at vertical and horizontal joints. Continuity reinforcement from the floor and side walls projects into the Twin Wall cavity to create a fully tied-in structure. Walls are temporarily supported in position by push-pull props (2 per panel). Corner joints are restrained externally with right angle metal straps and site reinforcement is fitted at all horizontal and vertical joints. The cavity of the Twin Wall is then filled with C30/37 concrete (with 10mm aggregate) at a fill rate of 750mm per hour to complete composite wall construction.



Plate Flooring System

Oran Precast also manufactures a plate floor panel using the same precast technology and process as per the walling system. The floor consists of 65mm thick reinforced concrete plate incorporating a steel lattice girder. The plate floor, which acts as a shutter, is supported in the temporary state by lattice girders and temporary propping prior to placing of insitu concrete. Plumbing and other services can be cast into the floor screed and propping

is removed once the concrete has reached the required strength. In the case of the Spencer Dock project, services cast-in the floor screed are attached to bathroom pods.



Advantages

All of the advantages which apply to single leaf precast walls apply also to Twin Walls, including considerable time saving, reduced labour on site, reduced drying out time for buildings and excellent sound and fire resistance. The reduced time spent on site and the reduced number of operatives also produces Health & Safety benefits. One of the challenges for designers is to take advantage of the thermal mass of the Twin Wall by avoiding the use of plasterboard on the inner face. To achieve this, a high level of pre-site organisation is required and this requires liaison of the project principals, and particularly services engineers, with the precast manufacturer's design team. Time spent on identifying the location of electrical and other services within the wall panels at the early design stage can greatly enhance the overall efficiency and speed of delivery of the project.

Project Principals:

Architects: Murray O' Laoire

Engineers: O' Connor Sutton Cronin

Builders: J.J. Rhatigan Galway

The Spencer Dock development is the biggest and most ambitious urban regeneration project in Ireland's history and will include the National Conference Centre, luxury waterside apartments, distinctive offices, retail, a linear park and local amenities for leisure activities. The development is located on the River Liffey, adjacent to the world renowned International Financial Services Centre.



Spencer Dock Dublin – Apartments



Services to bathroom pods in floor screed