Ian Black Consulting Ltd

Contact Ian Black
Address Wallace Buildings, 23 Market Place, Lisburn
Northern Ireland
BT28 1AN Co Antrum, United Kingdom

Phone +44 28 9267 6500
Email ian.black@ianblackconsulting.co.uk

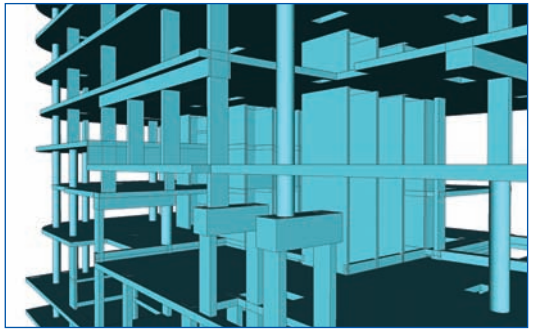
Ian Black Consulting Ltd is a well established Structural and Civil Engineering Company based in Northern Ireland, with a vast breadth of experience, providing engineering services to clients in Northern Ireland, Republic of Ireland and the UK mainland inclusive of considerable experience in Design and Build procurement having completed numerous large schemes ranging from £5 million to £25 million. The services of Structural Engineering, Civil Engineering, Site Appraisals and CDM Co-ordinator are offered in an extremely professional yet personable manner while recognising that quality of design and attention to detail are key issues in realising the aspirations of architects and clients alike.

Structural Engineering forms the primary business and is focussed on providing and delivering a quality package to the client of structures that are functional, durable and economically viable. Fields of expertise cover commercial (office/retail structures), educational buildings, structures for the leisure industry and residential accommodation.
Civil Engineering commissions are undertaken for infrastructure works associated with new residential and commercial developments comprising the design and detail of roads/drainage and liaising with statutory authorities to ensure projects are completed with minimum disruption.

The Company is also experienced in commissions relating to the appraisal of development sites in relation to potential foundation issues, infrastructure difficulties etc and the assessment and refurbishment of existing structures.

Ian Black Consulting Ltd utilizes the very latest in Information Technology and computer aided design resources with considerable expertise in advanced analytical techniques such as Scia Engineer that are constantly developing in line with the progression within the industry.

The Company are Construction Line registered and a member of the Association for Consultancy & Engineering (ACE) and in order to ensure an efficient service to clients operates a Quality and Environmental Management system, attaining and maintaining ISO14001 certification and a Quality system compliant with the requirements of ISO 9001.



Short Description

Swiss Centre, Leicester Square, London

The project regards an 11 storey concrete framed building over 2 storeys of integral basement. The Swiss Centre has an impressive glass façade, in which mixed led illumination will be applied; it is situated on the prestigious Leicester Square and comprises a deluxe 5-star hotel accommodation, high quality retail, leisure facilities (a casino in the basement), restaurants and high specification penthouse apartments with spectacular views over central London.
From foundations to the finished product Ian Black Consulting Ltd realised the structural design of the Swiss Centre. With the latest software and modelling techniques they created a new iconic landmark for the London skyline.

Project Information

Owner: Swiss Centre Ltd
Architect: Jestico & Whiles
General Contractor: McAleer & Rushe
Engineering Office: Ian Black Consulting (Lisburn)

Construction Start: 01/09/2008
Construction End: Spring 2010
Location: London, United Kingdom

Overview

The site occupies approximately 1800 square metres in Leicester Square, London with the project comprising a Design and Build procurement to construct a 200+ bedroom 5 star deluxe hotel over 9 floors, 10 high specification duplex apartments above the hotel structure, retail and commercial use at ground floor and a two storey basement for leisure use (Casino) formed inside the original basement structure. The building façade is to comprise a unitised system with a single glazed glass veil suspended from 8th floor but requiring lateral support at each floor.

Substructure

A piled solution was adopted for the foundation design and due to height restrictions below temporary props piling was constructed utilising low headroom piling rigs which limited the piles to a 450 mm diameter bored pile with a SWL of 1200 kN cored through the existing basement raft and terminating in very stiff London Clays at approximately 25 m. The structural piling and substructures also had to be co-ordinated with 100 mm diameter geothermal piles approximately 100 m long that were used to assist with the heating and cooling of the building.
Due to the close proximity of London Underground tube lines (Piccadilly line) which runs approximately 9 m from the face of the building at a depth of approximately 31.5 m to the crown of the tunnel an extensive design process and subsequent negotiations regarding sequence of work etc had to be undertaken to ensure that the new piled foundations when installed in a controlled manner (inclusive of sleeves to the piles) should not have any detrimental effect on the underground tunnels.

Basement

The basement slabs comprise reinforced concrete flat slabs spanning between reinforced concrete columns and walls with the new basement walls comprising a conventional reinforced concrete structure cast against the existing retaining walls that are being retained, the new wall being propped at floor levels. The basement retaining walls and the lower basement slab are constructed using Caltitite water resisting concrete to provide a dry (Grade 3) environment in the basement areas.

Ground Floor

The ground floor generally comprises a 325 mm reinforced concrete flat slab on two distinct levels to create retail and restaurant usage. A loading bay with a 'break out' zone for future plant replacement had to be incorporated into the slab design, the loading bay being designed for an imposed loading of 15kN/sqm. In order to achieve this, the loading area and 'break out' zone is trimmed by reinforced concrete

Used software: Scia Engineer

downstand beams with the breakout zone comprising a semi-precast concrete system.
Due to the requirements of the utility providers the slab to the transformer room is placed at a depth of 1.1 m below the main slab requiring reinforced concrete beams to achieve acceptable deflection requirements.

Superstructure

The structural frame comprises an in situ reinforced concrete frame utilising a column grid of 7.6 m x 9.0 m. The structure comprises a 325 mm reinforced concrete flat slab spanning between columns varying in size depending on level and location but are generally 800 x 300 mm in bedroom floors and 600 mm diameter in public areas.
Transfer structures are required primarily at first floor level to create an acceptable column layout on the lower floors, the transfer being achieved using in-situ reinforced concrete downstand beams spanning between reinforced concrete columns, all transfer beams being designed to resist blast loadings.
The 8th floor above which the apartment structure commences utilises a 450 mm deep flat slab to transfer the loadings from the apartment levels above to the main frame.

The floor slabs are designed to accommodate the following uniform imposed load set out below.

Guestroom floors

- Bedroom live load: 2.0 kN/m^2
- Partitions: 1.5 kN/m^2
- Corridor and staircase live load: 4.0 kN/m^2
- Ceiling and services: 0.5 kN/m^2

Public /Business/Administration area

- Live load: 5.0 kN/m^2
- Partitions: 1.0 kN/m^2
- Ceiling and services: 0.5 kN/m^2

Other areas in the building will be designed to accommodate the following live loads

- Public toilets: 2.0 kN/m^2
- Kitchen and ancillary areas: 3.0 kN/m^2
- Roof (maintenance access only): 1.0 kN/m^2
- Plant rooms: 7.5 kN/m^2
- Loading bay and car parking areas: 15.0 kN/m^2

The building has an entirely glass façade, the façade and unitised system being contractor designed with the structural frame having to be designed for deflection limits of the lesser of L/500 or 20 mm under imposed loads and creep deflections and L/250 under dead and imposed loads, the deflection limitations being of paramount importance on slab edges due to the glazed façade of the building attaining lateral support at each floor.

Resistance to lateral loads is achieved by the diaphragm action of the reinforced concrete floors transferring the lateral loads to a series of concrete shear walls primarily around the lift cores, the shear walls generally 250-300 mm thick reinforced concrete elements constructed using conventional formwork technology.

The structure is also designed for disproportionate collapse with key elements designed as protected members to provide additional robustness and damage resistance.

The building is currently under construction and is due to be completed in Spring 2010.