

# **ANNEX 3-B**

## **Case study**

**ING BANK HEADQUARTERS,  
AMSTERDAM**

The design team for the prestigious ING Bank headquarters in the Zuiderhof area of Amsterdam chose *Slimdek*® because of its shallow depth for minimum visual impact, speed of installation, and light weight.

## ING BANK HEADQUARTERS, AMSTERDAM



The prestigious ING Bank headquarters in Amsterdam is one of the most exciting examples of steel construction using *Slimdek*. The 9-storey structure is approximately 20,000 m<sup>2</sup> floor area and the whole building is supported on inclined composite steel columns. The ‘nose’ of the building is designed as an auditorium and cantilevers 26 m from the adjoining *Slimdek* structure.

The architect Meyer and van Schooten was keen to use *Slimdek* because of experience on other projects, and because it offered the shallowest structural depth, a common requirement in the Netherlands. The double skin glazed façade required the least depth of floor for minimum visual impact.

The structural grid was approximately 7 m square, making it ideal for *Slimdek*, using ASB steel sections and deep composite decking to create a slab depth of approximately 300 mm. Long span steel trusses were design to support the superstructure and to resist the high forces created by the inclined columns that provide stability to the whole building.

The building is situated near the busy A10 motorway and therefore acoustic insulation and control of vibrations were also important design considerations. The space beneath the building provides access to the building and to the parking below. The architect adopted a sophisticated servicing strategy in which the double skin façade was used to control ‘solar gain’ and internal temperatures. Services were located below the slab, with small pipes and cross-overs passing between the ribs of the deep decking.

All projects in the Netherlands are affected by high ground water level, and so there was an advantage in minimising ground works by concentrating loads at the discrete column positions.

The project was completed in 2002. The erection of the steelwork took only 28 weeks. Other important *Slimdek* projects are under way in the Netherlands.

### Application Benefits

- Speed of construction of the superstructure
- Minimum structural depth for visual impact
- Service integration opportunities
- Reduced self weight for the poor ground conditions
- Reduced craneage requirement
- Limited access to site mitigated against concrete construction

### Project Team

<b>Client:</b>	ING Bank
<b>Architects:</b>	Meyer & Van Schooten, Ellerman, Lucas, Van Vugt Architects
<b>Structural Engineer:</b>	Aronsohn
<b>Steel Construction:</b>	HGO Group
<b>Decking:</b>	Dutch Engineering



*Composite slab used in the auditorium area*

### Construction details

The structure consists of inclined columns of 10 m height which support a super-structure, varying in height from 4 to 9 storeys. The 280 ASB 136 beams span 7.0 m in four approximately equal bays across the building. The super-structure spans between the inclined columns supported by a storey-high truss, which also resists the horizontal forces from the columns. The columns comprise I sections in a cruciform shape, with concrete infills for composite action and for resistance to impact.

The upper floors used deep decking spanning between the bottom flange of the ASB beams. Double lines of temporary props were used to control deflections on the 7.2 m deck span. The overall slab depth was 310 mm, the minimum sensible depth to meet deflection and vibration criteria. The ground floor used precast concrete slabs over the open access and car park area.

The lightweight façade and glazing was attached to the perimeter steelwork and provided a controlled internal environment, minimising on services installations. *Slimdek* also minimised the visual impact of the

structure, which was important for the architectural concept.

The auditorium was conceived as a cantilever structure of 26 m span and 3 storeys height, which was supported by inclined members at each floor. Shallower CF100 decking was used in this cantilevered area, leading to 3.6 m unpropped spans (propping was not practical in this area). Steelwork was supplied by a consortium of 3 steel fabricators, with ASB beams and decking supplied by Dutch Engineering.

Erection of the 1,000 tonnes of steelwork took only 28 weeks, despite the complex structure and site conditions. The congested site meant that the number of vehicles and deliveries had to be minimised. The choice of a lighter weight structure also reduced the amount of costly ground works.