Structural engineering

Pfeifer INTERPLAN CONSULTANTS

OMNITURM
Frankfurt/Main (Germany)

Award of Excellence 2021,
Best Tall Building 100-199 meters

The International Highrise Award
Internationaler Hochhaus Preis
Finalist International Highrise Award 2020

Emporis Skyscraper Award 2019, 9. Platz

PLATINUM

NEW BUILDING

Client: Omniturm Verwaltungsgesellschaft S.à r.l.,
eine Beteiligungsgesellschaft des offenen Immobilienfond
hausInvest der Commerz Real

Project Manager: Tishman Speyer Properties Deutschland GmbH,
Frankfurt (Germany)

Architects design: BIG - Bjarke Ingels Group,
Kopenhagen (Dänemark)

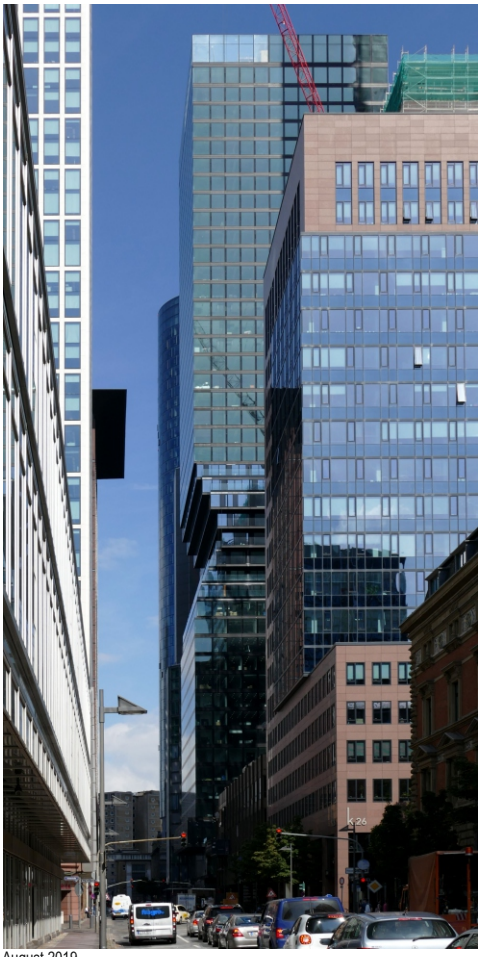
Architects realisation: B&V, Braun Canton Architekten, Frankfurt (Germany)

Principal: Adolf Lupp GmbH + Co KG, Nidda (Germany)

Our services:

Structural design LPH 3 (partly), 4, 5, 6 acc. to HOAI,
for the entire building incl. prefabricated planning (except for partial covers in the basements for the cover construction method)
Structural design LPH 1, 2, 3, 4, 5 acc. to HOAI for the head of the highrise building (incl. precast development and planning).
Structural design for all intermediate construction stages, scaffolding, building aids etc.
Construction progress-dependent column crush calculation during construction and successive planning of compensatory measures.
Special and additional services:

- Structural-physical verification of fire protection of all load-bearing parts
- Design verification of intermediate states of construction, transport and assembly of all steel and prefabricated pre-stressed concrete parts
- Development of a software programme for the optimisation of the floor slab, in particular for the punching shear calculation of the high-rise nucleus
- Development of a software programme for the daily evaluation of column compression during the progress of the building shell, finishing and façade as well as individual creep factors and settlement of all columns and the core, including entering of monitored data enabling continuous correction of the deformation forecasts, definition of storey-wise protrusions of the columns for a set defined value of deformation for a specific point in time with regard to the assembly of the façade.
- Dimensioning and construction of auxiliary building structures, such as windshield, 3D-scaffolding, crane attachment, includingall connections and mounting points, with particular consideration to the considerably laterally displaced floor slabs in the residential storeys
- Compilation of a structural buoyancy safety analysis, in respect to the specified water conservation concept
- Compilation of element plans for all prefabricated parts
- Investigation of the deformation behavioural variants of the precast girders, taking into account a possible pre-stressing process
- Planning of a hording



Under construction: November 2018

August 2019

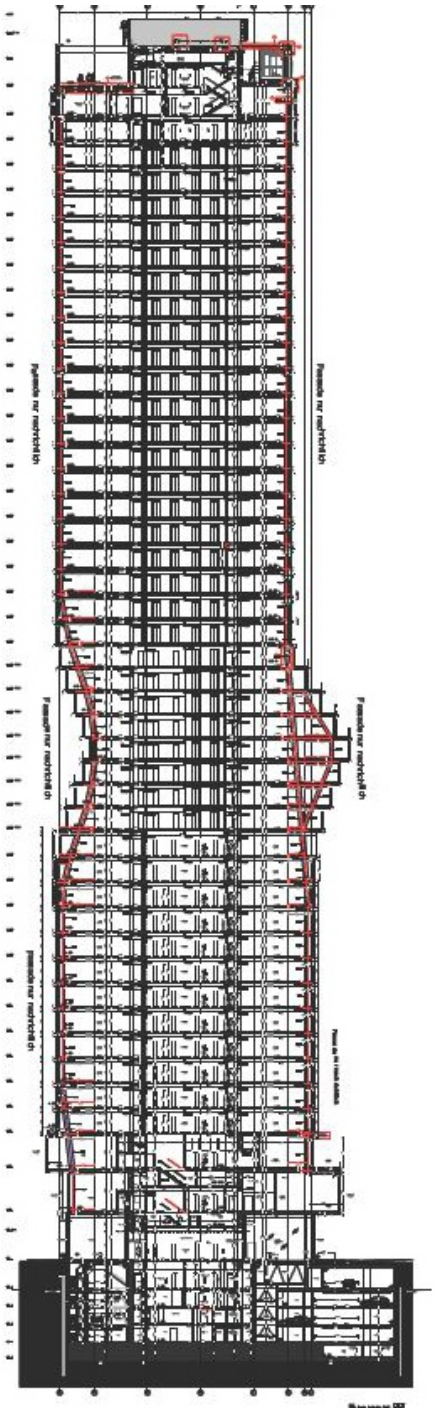
Pictures / Illustrations: ZPP INGENIEURE AG, Tishman Speyer Properties Deutschland GmbH

ZPP INGENIEURE

SOCOTEC

OMNITURM
Frankfurt/Main (Germany)

NEW BUILDING



Brief description:

A new intra-urban high-rise building erected in the city's banking quarters offering office space, apartments, an entertainment hall and catering

- 190 m above ground solid building
- built using in-situ concrete and pre-fabricated concrete units
- 44 aboveground and 4 subterranean floors
- 54,000 m² effective floor space
- built on Frankfurt clay using combined pile-slab foundation with 46 reinforced concrete piles having a diameter of 1.5 or 1.2 m and a length of between 12 and 27 m
- the 2.9 m thick raft forms part of the rigid cellar box
- top-down method of construction due to site constrictions and neighbouring buildings
- reinforced and post-tensioned concrete flat slabs with far-reaching cantilevers for the first three floors, for the 13th to 22nd floors (residential floors) and the geometrically difficult, heavy-loaded top floors which accommodate the building utilities
- slabs as reinforced / pre-stressed pre-fabricated beams with filigree slabs for the other standard floors, with large rectangular openings at regular intervals, up to thirteen per element, to allow extensive mechanical installations throughout the building
- inclined columns on the residential storeys giving a special characteristic architectural eye-catcher with a series of horizontally shifted levels
- extreme heavy horizontal forces due to the inclined columns, which are transferred with the help of steel ties through the slabs into the stiffening core
- columns made of pre-fabricated centrifugal-concrete made from high-strength concrete and high-performance reinforcement steel SAS 670 in butt joint technology with consoles carrying the pre-fabricated beams
- building corners without columns requiring cantilevering beams (pre-fabricated), which are penetrated by considerable column loads of up to 40 NM, heavy load steel fittings, strict deformation limits for the facade
- stiffening through the solid core of 65, 45 and 30 cm thick walls, on the lower floors and from the ground floor to 2nd floor reduced to one side causing a cantilever with considerable load concentrations

Awards:

- CTBUH Award of Excellence Winner 2021, Best Building 100-199 meters
- Internationaler Hochhauspreis 2020, finalist
- Emporis Skyscraper Award 2020, 9. Platz
- Leed in Energy & Enviromental Design (LEED), Platinum

Completion: 2019

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