

## 2. Commerzbank-Tower, Frankfurt

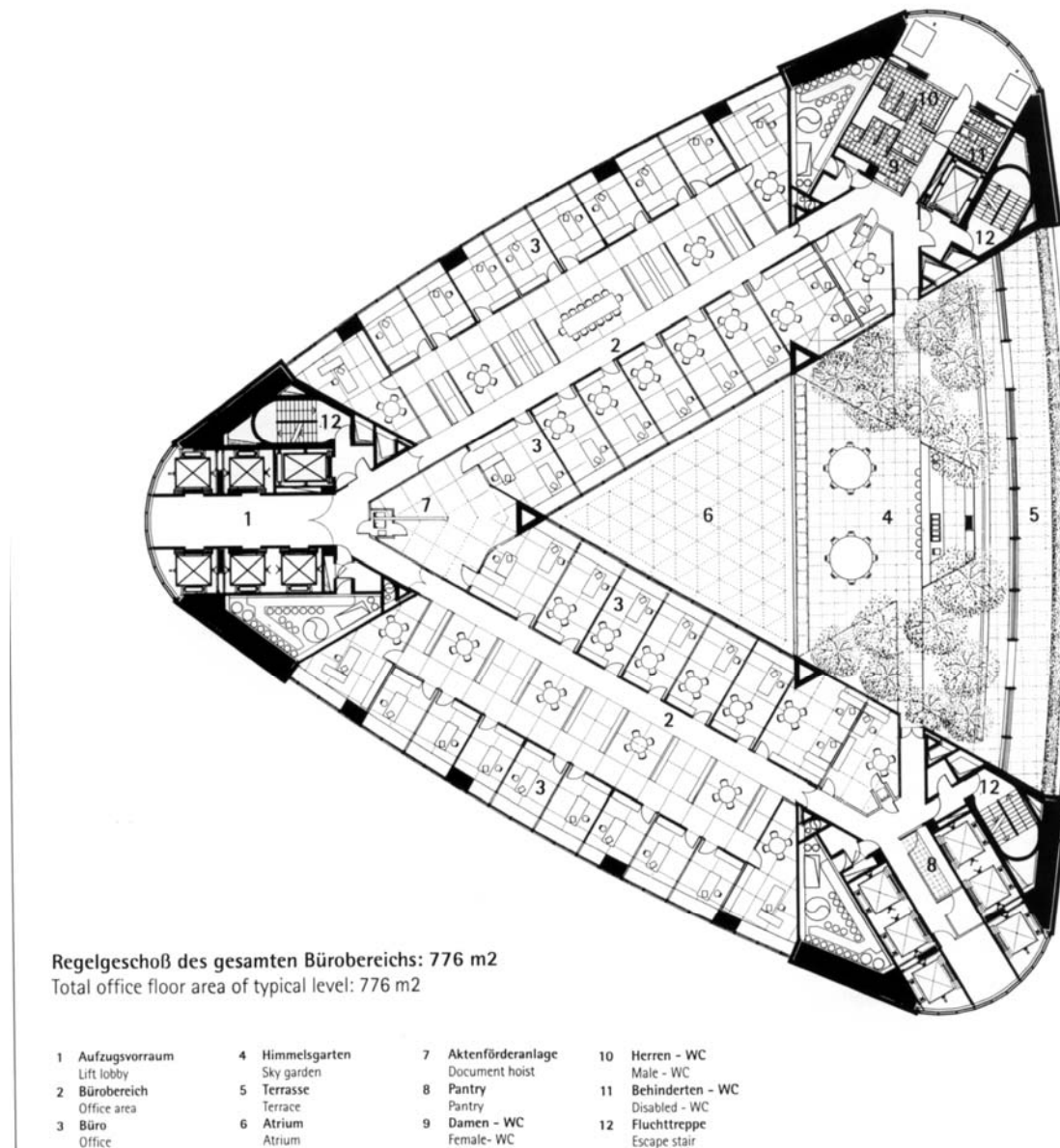
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**Bild 2.1** Commerzbank Tower

### 2.1 Conception

The Commerzbank head-office building not only adds an impressive feature to Frankfurt's skyline. Viewed from close quarters as well, the building is more than merely another high-rise bank.



**Bild 2.2** Total office floor area of typical level

Visitors enter the almost 259 m-high tower from Kaiserplatz by means of stairs covered by a glass roof. This entrance blends harmoniously with the adjacent perimeter buildings. On the first floor, a generous PLAZA with an integrated restaurant welcomes bankers and the public alike – at weekends as well.

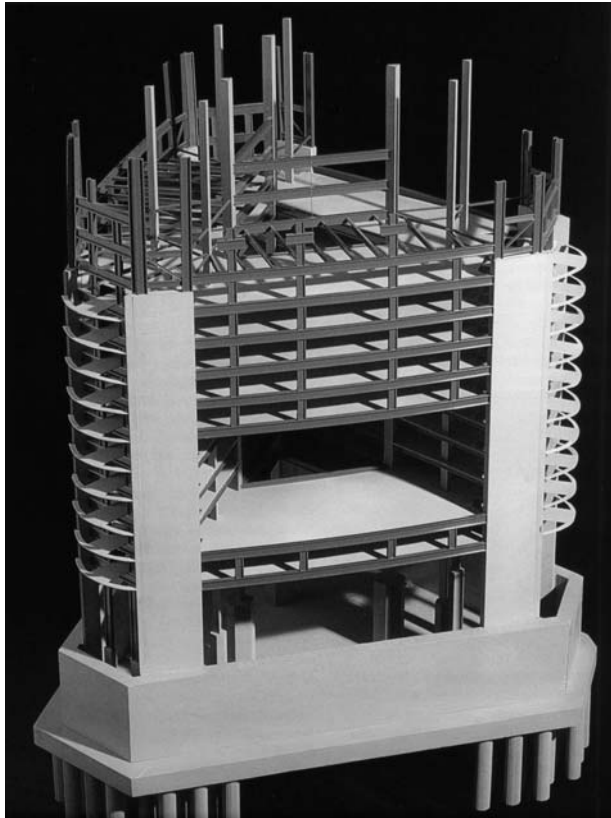
Here, the observant visitor already senses the central architectural idea of combining transparency and functionality in a balanced manner.

Above the lobby leading off the PLAZA, an atrium allowing daylight to penetrate rises through all the floors, creating a bright, friendly atmosphere. The nine sky gardens – the building's “green lungs” – can be used by employees as communication and recreation areas.

This made possible by an innovative conception produced by the architects Forster and Partners. The central core that is usual in high-rise buildings was replaced by a 160 m-high atrium and the technical risers were accommodated in the three corners of the building.

## 2.2 Structural system

The bearing system is a “Tube with outside bracing system” (fig. 2.3). The slabs have a span of 26.5 m width. There are 16 elevators at the corners each one can carry 1600 kg. In the south core exists an outside glass elevator. The foundations of the tower are also exceptional. In order to prevent settlement, it rests on 111 reinforced concrete piles which were driven up to 48.5 m deep into the Frankfurt ground. The foundation slab has a thickness of 1.5 to 2.0 m.



**Bild 2.3** Commerzbank Tower

## 2.3 Architecture

### 1) New high-rise generation

The floor plan of the new tower is an equilateral triangle with rounded corners and slightly convex sides (see fig. 2.2). The approximate width is 60 m. The floors of the building as well as the cores at the three corners are organised around the central atrium. The inside atrium region has a height of 160 m (43 storeys) with a length of 17 m. Each floor has three wings, two of which serve as office space; the third forms part of one of the 4-storey-high gardens. The tower makes an open and transparent impression thanks to the atrium, which is also triangular in shape; natural light and the nine gardens give it its slender appearance. The gardens have an area of 480 m<sup>2</sup> and a height of 15 m, and are distributed in a spiral form along the building height. A unique frame construction enhances this impression by spanning the gardens, which are more than 34 m wide, without the use of columns.

### 2) Design of the tower

The stepped top of the building makes a strong visual impact even from a distance. The guiding principle, developed with the city of Frankfurt, was to create a striking symbol for the banking district.

### 3) Facade

For substantial energy-saving and natural ventilation, the building is enclosed in a two-layer façade. The outer skin has slots through which fresh air is able to enter the cavity between the layers.

The window of the inner façade, even those on the highest floors, may be opened, ensuring that natural ventilation is possible right up to the 50<sup>th</sup> floor. The windows on the atrium side can also be opened.

## 2.4 Sky gardens



**Bild 2.4** Sky Garden

Sir Norman Foster envisaged the gardens as being more than mere decoration. In fact, the generous gardens are a fundamental element in his conception.

In spiral form, nine sky gardens rise up the tower (three each facing eastwards, southwards and westwards). Botanically, the vegetation reflects the geographical orientation.

- Eastward-facing: Asian vegetation
- Southward-facing: Mediterranean vegetation
- Westward-facing: North American vegetation

The gardens provide the inner offices with plenty of daylight. In addition, they can be used by employees for communication purposes and for breaks; they create a feeling of openness and space and form part of the sophisticated system of natural ventilation.

## 2.5 Services

The building services are designed to meet the needs of employees, while attaining a high degree of energy efficiency. This is achieved by means of an “intelligent” building management system, which ensures that ventilation, heating and cooling are all optimal, yet also allows employees to regulate their working environment individually.

### 1) Light

The planning team set great store by making the best possible use of daylight. As a result, the transparency of the building and the glass partition walls between offices and corridors provide all workplaces with high daylight values.

### 2) Climate control

The building is cooled by a water-filled chilled ceiling system instead of the normal, problematic air-conditioning system. The rooms are heated by conventional convectors. Employees are able to control the temperature in their office individually within a given range.

### 3) Ventilation

On roughly three-quarters of the days in a year, employees can regulate ventilation themselves by opening or closing the windows individually. Only under extreme weather conditions does the building management system activate the ventilation equipment.

## 2.6 Facts

- First so-called "ecological skyscraper" in the world because of new technology used for heating and cooling.
- There is a signal light on top of the mast which makes the building officially 300.10 m tall.
- A triangular atrium rises through the entire building from the ground floor, divided by glass partitions. The atrium opens to the exterior wall at different levels, forming 9 very large gardens.
- Only the plaza level of Commerzbank's tower is accessible to the public. There is no observatory or open area on top.
- At night the building is illuminated in a changing yellow light scheme by artist Thomas Emde. The scheme is the winning result of a competition.
- This is the 2nd tallest high-rise building in Europe. In 1997 it overtook the 'MesseTurm' in Frankfurt by 2 meters (7 feet). In December 2003 the Triumph-Palace in Moscow overtook Commerzbank's tower as Europe's tallest high-rise building by structural height.

**Figures**

<b>Building materials</b>	Steel, concrete, glass
<b>Gross floor area</b>	
Tower	85,503 m <sup>2</sup>
Basements	12,724 m <sup>2</sup>
Each storey area	1600 m <sup>2</sup>
Car park	9,579 m <sup>2</sup>
Perimeter buildings	
- shops	2,171 m <sup>2</sup>
- apartments	4,025 m <sup>2</sup>
Kaiserstrasse 18	1,719 m <sup>2</sup>
Auditorium	2,626 m <sup>2</sup>
Plaza catering	1,264 m <sup>2</sup>
Public plaza	1,125 m <sup>2</sup>
Gross floor area	120,000 m <sup>2</sup>
Total	120,736 m <sup>2</sup>
<b>Height</b>	
-Excluding antenna	259 m
-with antenna	300 m
<b>Car parking spaces</b>	300
Bicycle-parking spaces	Approx. 200
<b>Levels in tower</b>	
Entrance hall	3 levels
Offices	45 levels
Technical equipment	14 levels
<b>Main usable area</b>	52,700 m <sup>2</sup>
(excluding apartments and car park)	
<b>Gross volume, total</b>	538,000 m <sup>3</sup>
<b>Workplaces</b>	2,400
<b>Demolition permit</b>	December 2, 1993
Building permits	Dec.23, 1993/ Dec.12 1994
Site start	May 1994
Completion	May 1997
<b>Tower foundation</b>	Lead-bearing piles
111 large piles	Φ 1.8 m / 1.5 m
	Length: max. 48.5 m
	Depth: 40 m under the earth face
Raft	Thickness: 2.20 – 4.50 m
Basements	Reinforced concrete torsion frame
Tower superstructure	Steel frame with quadrilateral frame system

**Further informations:**

[www.emporis.com](http://www.emporis.com)

[www.Wikipedia.org](http://www.Wikipedia.org)

Brochures distributed by the Tower management.

Photos from the internet and taken during a visit to the tower.