manntech
PART OF ALIMAK GROUP

Four Frankfurt

Germany

Case Study

Facts and Figures

Estimated Completion:
2025

Commencement:
2022

Building Height:
Tower 1 - 233m and Tower 4 - 100m

Number of BMUs:
3

BMU Type:
Type 6.1

Building Type:
Mixed-use

Manntech develops Articulated Mechatronic System for Complex Building Solutions

Located in the heart of Frankfurt, Germany, Ben van Berkel and his team at UNStudio designed the architectural marvel known as FOUR. This project presented unique challenges due to its complex facade and stringent local construction regulations. The proposed initial solution involved a building maintenance unit (BMU) with a telescopic jib, but concerns about its significant dead weight and high manufacturing costs led to exploring alternative solutions. Manntech, a leader in facade access solutions, was approached to provide a more feasible option.

Manntech's response was to provide three Type 6.1 BMUs from the Modular Range, each equipped with a knuckle jib. These facade access systems are designed to be lighter and more compact, whilst maintaining robust functionality. Tower 1 was equipped with a BMU with an outreach of 11.3 metres and 8.1 meters, while Tower 4 featured a BMU with a 12-metre outreach.

Presenting Manntech Articulated Mechatronic System (AMS)

To conform to the building's complex shape without colliding with facade elements, the Manntech **A**rticulated **M**echatronic **S**ystem (AMS) was developed. Equipped with several sensors and through an intelligent synchronization of the drives, the inclined façade sections could be accessed with a linear horizontal motion of the knuckle jib. Additionally, to be able to automatically access the particularly sensitive, transverse façade projections, the hoisting mechanism is also included to the AMS. As the motion sequences can be programmed in all dimensions by this means, it significantly increases safety and prevents collisions with the building.

Another standout feature is the ability to program up to 640 automatic positions for each BMU, minimizing human error and further safeguarding the facade during maintenance tasks.

Technological Innovation and Adaptation

One significant aspect of this project was the need to adhere to local building regulations restricting facade equipment from extending beyond the building's edge. This was particularly challenging given the building's height and the urban setting of the construction site. Manntech overcame these challenges by integrating retractable BMUs over scissor lift platforms, allowing the BMUs to retract below the top of the building when not in use.

Additionally, the transition from steel to concrete surfaces, coupled with the requirement for insulated roofing, necessitated the development of a specialised rail system. This system supported the BMUs effectively and complied with the energy and insulation requirements specified by the client.

Client Satisfaction and Project Outcomes

Manntech's innovative approach and technological adaptability ensured client satisfaction by meeting budgetary constraints and regulatory requirements. Custom-programmed positions and AMS integration enabled safe, efficient facade maintenance without compromising aesthetics. This project underscores Manntech's commitment to custom solutions, reinforcing its leadership in the facade access industry.

For more information

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