Press release

Waldachtal, February 1, 2019

fischer undercut anchors secure La Grande Arche

Facade construction in the fourth dimension

fischerwerke GmbH & Co. KG
Corporate Communications

Klaus-Fischer-Straße 1
72178 Waldachtal

The multi-storey office building La Grande Arche de la Fraternité is showcasing itself with a new appearance and the same old charm in Puteaux just outside of Paris. The facade's Carrara marble was in a very poor, partially damaged state and was therefore replaced by granite slabs held by approximately 76,000 fischer Zykon panel anchors FZP-II as part of a two-phase renovation project.

At a height of 110.9 metres, a width of 106.9 metres and a length of 112 metres the La Grande Arche office building is almost cube-shaped. The building is made of reinforced concrete while its facade consists of glass and natural stone. The inner and outer corners of the facade form the shape of a tesseract, a four-dimensional hypercube. The structure opens up to the west and east and has the appearance of an arc of triumph when viewed from these points. In fact, the "pillars" on which the frame sits consist of 19-metre wide side walls to the north and south which contain 35 floors that are mostly used as office and conference rooms. They also contain a viewing platform as well as other public spaces on the top floor. The structure is captivating with its clear and elegant alignment. The building marks the optical and geographical start of the modern business district along the Axe historique when viewed from the west. The five-kilometre visual axis passes several historic landmarks: The Arc de Triomphe, the Champs-Elysées, the smaller Arc de Triomphe du Carrousel and the Louvre pyramid. The structure is turned at an

angle of 6.5 degrees about the vertical axis, giving an idea of its spatial depth when viewed from this perspective. This positioning took into account the traffic tunnels that run below.

The building was commissioned by the former French President François Mitterrand in 1984 and was constructed within five years. The Danish national Johan Otto von Spreckelsen was commissioned as architect before the Frenchman Paul Andreu was assigned with the building's completion from 1986 onward. Since its ceremonial inauguration on 14 July 1989, the anniversary of the French Revolution, La Grande Arche has become the landmark of the La Défense business district and a tourist attraction. The building was showing signs of wear after 26 years, however, and was therefore extensively renovated and modernised under the direction of the construction firm EIFFAGE and the associated architecture firm Valode & Pistre. As well as the facade, the renovation work also included the office spaces and the roof. Special emphasis was placed on optimising the building's energy efficiency as well as the modern conveniences and accessibility of the rooms. Upgrading the architecture without losing any of the original charm and recognition value was crucial.

Heat, frost, moisture and air pollution put the white Carrara marble slabs into a poor state, resulting in distortions, spalling and cracks while some of the panels that had been attached with mandrel anchors came loose. The marble was therefore replaced with white granite known as "Bethel White" obtained from a quarry in Vermont, USA. The stone's special surface treatment gives it the same colour and shine as the original marble while being significantly more robust. Mobile access platforms enabled safe and productive replacement work to be carried out on the tesseract facade, optimising the final result.

The EDM – Atelier de France company was commissioned to carry out the facade's first renovation phase while Unimarbres took over the second phase. The fischer Group of Companies in cooperation with a drilling firm was in charge of the attachment using undercut anchors. FZP-II-SO Zykon panel anchors were installed using the stand-off method of installation in order to attach the granite panels to the facade. fischer supplied EDM with 42,500 anchors for the renovation of the south side and decorative surfaces between the end of 2015 until the end of 2017. The second phase lasting from the end of 2017 until the end of 2018 saw 35,500 FZP-II-SO anchors being supplied to Unimarbres in order to exchange the panels on the north surface. "Our undercut anchors convinced the client as they offer higher load values than conventional anchor systems", explains Jérôme Daumur, Head of Technology at the fischer France subsidiary.

fischer Zykon panel anchors FZP-II ensure form-fit and expansion-free installation in the conical undercut drill hole. Their reverse-mounted installation enables fastenings in the 1/5 point of the facade panel. Compared to edge fixings (pin, plug pin and slot fixings) this technique achieves lower panel bending moments and higher load-bearing capacities. This allows the installation of thinner and larger-sized panels compared with installation using edge fixings. In comparison to the previous solutions, individual panels of the facade of the Grand Arches can be replaced thanks to the FZP-II, if required. "The undercut anchors are concealed from the facade's exterior point of view", says Steven-Henrik Maier, Market Manager for the French market at fischer SystemTec, highlighting another advantage. "This combines a secure hold with the harmonic exterior impact of the Grande Arche".

Image captions:

Image 1
An arc of triumph or a cube? The Grande Arche appears differently depending on the perspective. The inner and outer corners of the facade form the shape of a four-dimensional hypercube. The aim of the renovation was to increase safety and functionality without altering the special look.

Image: © pio3 / 123rf

Image 2
La Grande Arche in Puteaux is both monumental and functional following its successful renovation and modernisation which maintained its original appearance.

Image: © Kyrylo-Neiezhmakov / 123rf

Image 3
Transforming old into new while maintaining the same look – this was the precept during the renovation of the Grande Arche. The old Carrara marble slabs were replaced by new granite panels thanks to reverse installation using undercut anchors. This allowed the safety and functionality to be increased without the anchors being visible.

Image: © arenaphotouk / 123rf

Image 4
Still a tourist attraction thanks to undercut technology: the facade's old Carrara marble slabs (see the bottom left of image) were replaced by new granite slabs (see right side of image) and attached with fischer Zykon panel anchors FZP-II.

Image: fischer

Image 5
Flying high during the renovation of the Grande Arche. fischer Zykon-panel anchors FZP-II provide lower slab bending moments and higher load-bearing capacities than conventional anchors and are concealed. They therefore secure the building's new shell while maintaining the original character and recognition value of the world-famous architecture.

Image: © jovannig / 123rf

Image 6
Mobile access platforms enabled safe and productive replacement work to be carried out on the tesseract facade, optimising the final result.

Image: fischer

The fischer group of companies

The fischer group of companies, headquartered in Waldachtal in Germany's Northern Black Forest, generated sales of 812 million Euros in 2017 with a worldwide staff of 5,000 employees. The family-owned enterprise operates 47 of its companies in 35 countries and exports to more than 100 countries. It includes the five divisions: fischer fixing systems, fischer automotive systems, fischertechnik, fischer consulting and LNT Automation.

fischer fixing systems is the technological market leader in important areas of fixing technology. fischer offers products that deliver technical perfection to a wide range of customers, from do-it-yourselfers to craftsmen to key account partners.

fischer automotive systems manufactures high-quality parts for car interiors. The company is highly competent in the plastics processing segment and is an important partner for the automotive industry. fischer automotive systems produces air vents, cup holders, trays and multi-function components.

fischertechnik is active both in the construction kit and in the educational toy sector. As one of the last toy makers, fischertechnik develops and produces exclusively in Germany.

fischer consulting evolved from the competence and skills developed in the company itself, among these the fischer ProcessSystem with its central aim of permanent and continuous improvement for the ultimate benefit of the customer. fischer consulting advises small and medium-sized businesses, government agencies and major companies on their way towards lean and efficient processes.

LNT Automation develops and manufactures custom electronic solutions. The company also develops, produces and distributes custom and capacitive touch systems such as multi-touch solutions made of glass and the corresponding controller units. All electronics are manufactured in-house.

www.fischer.group

Contact partner

Katharina Maria Siegel
Corporate Communications
Telephone: +49 7443 12 – 4217
E-mail: Katharinamaria.Siegel@fischer.de