WORLD WIDE WEAVE

Shining architecture of busy transit spaces

Façades made of stainless steel wire mesh in transport architecture: aesthetic design and extreme durability

"What interests me is the question of when architecture disappears and when it appears. The most important aspect of architectural work is controlling the presence and the absence of architecture.“ With these words, the French architect Dominique Perrault describes the two poles of interaction between architecture and its surroundings. Architecture either integrates itself into its context, or enters into open, active dialogue with it. This philosophy is also reflected in Perrault's intensive preoccupation with stainless steel wire mesh and its specific properties. After the National Library in Paris and the Velodrome in Berlin, Perrault's latest creation in which the architectural concept revolves around stainless steel wire mesh is the new US works building in Maryland of the manufacturer of this versatile architectural design material, GKD - Gebr. Kufferath AG. And the boom stainless steel wire mesh is currently experiencing as a material for interior and façade design is not limited to the USA with its new outlet. All over the world, one of the greatest growth markets is for buildings in the field of transport architecture. Numerous international projects have recently been accomplished, or are being accomplished, in which aesthetic use is made of a controlled balance between the two poles mentioned by Perrault. Nevertheless, the prime factor in the choice of stainless steel wire mesh is its extreme mechanical strength and durability, qualities which currently have particular significance when it comes to transport architecture. With a new type of mesh, GKD has even come up with an answer to the problem of constructing bomb-proof façades.

Carpark façades at Barcelona Airport:
Sensual aesthetics and highly robust structures

Mobility is a must in today's cities. Modern people spend a large portion of their time in "transit spaces" like railway stations, airports and, of course, in cars and carparks. The buildings which make up this architectonic infrastructure are the most exposed to strain through environment, people and machines. Yet they count as the most chronically neglected structures in terms

of aesthetics – in spite of the fact that they are regular and prominent features of modern cities. There is a great need for architectural concepts which combine aesthetics and functionality, and stainless steel wire mesh is one of the most innovative choices of material to meet the frequent demand for a "quality boost" for transport architecture. Stainless steel wire mesh offers optimal design potential for façades and interiors while at the same time providing robustness and durability far beyond the limits of other materials.

Of all the large-scale architectural projects accomplished among others at Cologne/Bonn, Singapore, Basle, Paris or La Réunion Airports, two carpark façades at Barcelona Airport count as the most interesting constructions of recent times. Here, too, the mobility factor demands that carparks are located in the immediate vicinity of the airport terminals, to ensure travellers the shortest possible way from their cars to the planes with the greatest possible comfort. Such pure utility structures, previously unlikely to be objects of architectonic consideration, must now, as direct neighbours of the main buildings, also become visually convincing through transformation of what was previously an "ancillary" and subordinated architecture into an aesthetic highlight. In Barcelona, the architect Junquera Perez Pita has achieved this aim by cloaking the complete façades of the carparks with GKD's wire mesh. The fire- and vandal-proof, robust and maintenance-free wire mesh façade creates an extraordinary visual effect in the way it contrasts with the black stone of the terminal's wings which provide the frame for the symmetrical, square structural concept of the complex. Following the example of Europe's largest carpark at Cologn/Bonn Airport, innovatively clad in stainless steel wire mesh by Helmut Jahn, the building mantles in Barcelona also unite integration with interaction. On the one hand, they transform the carparks into subtly shimmering, integral components of the building complex. On the other hand, they vividly reflect their surroundings – light, colours and movement, both natural and artificial. Furthermore, there are plans to exploit the mesh surfaces commercially as advertising space through projection of corporate ads, logos and other messages. The technical preconditions for this have already been achieved through integration of the necessary projectors.

Solution to an urgent problem: terror-proof façades

More than for any other type of public building, there is a great demand on airports, railway stations and carparks to use materials which meet the highest technical and ecological standards. Stainless steel wire mesh offers a wide range of technically valuable properties for such highly frequented types of buildings. Thanks to its practically unlimited service life, its complete recyclability and its self-cleaning properties, it meets the modern demands for sustainable and resource-conserving architecture. But there is another aspect which is increasingly gaining in significance: security. Carparks, especially those in the immediate vicinity of airports, railway stations or government buildings, are prime targets for terrorist attacks. Protection against car bombs is one of the most urgent problems confronting public security all over the world.

Against this backdrop, GKD has developed a mesh type which can withstand explosions. Normally not permanently deformable, the mesh is designed to deform in this context in order to absorb the pressure impact of an explosion and to pass on as little of the energy as possible to the substructure while at the same time capturing flying fragments. Whereas rigid materials do not bend under pressure but rather pass the energy on when they burst, stainless steel wire mesh is elastic and yet at the same time robust enough to absorb immense impact. The new mesh type is currently still being tested and there are plans to use it as a mantle for the large-scale glass façade of a court building in Los Angeles. There, it would protect the façade from being fragmented by detonations outside the building. In the case of carparks, the priority is protection against the effects of detonations of car bombs inside the building and the consequences for neighbouring buildings. Apart from the development of the specific mesh construction, one of the greatest challenges to GKD's innovation capabilities was to develop devices to fasten the mesh which are flexible enough to withstand extreme vibrations without losing their fastening capacities. Although it looks delicate and filigree, the stainless steel wire mesh weighs tons and the fasteners must hold this immense weight regardless of the degree of vibration. Final tests under realistic conditions are currently being conducted in the USA, partly with public funding.

Proven robustness also under "everyday" extreme conditions

Apart from in such extreme conditions, stainless steel wire mesh has also proven its robustness in "everyday" transport architecture. On façades exposed to great strain through wind, it stands up to wind speeds of 136 km per hour, as for example in the particularly exposed Wells Fargo carpark in Des Moines, Iowa. The 170 meter long façade of the St. Anton Railway Station at Arlberg is unaffected by the turbulence caused by express trains passing through the station at speeds of 100 kilometers per hour. Ventilation, angle of light and protective screening are further aspects. "Tigris", the mesh type chosen for Barcelona from a range of more than 23 architectural design fabrics, ensures natural ventilation and daylight illumination. On the other hand, the wire mesh is so robust and closely woven that it provides optimal protection against wind and rain and also functions as a safety ballustrade. Protection against fire is one of the material's most important security functions. It is non-flammable and allows sprinkler systems to perform their function unhindered through the mesh apertures. Especially on exterior surfaces, stainless steel is maintenance-free since wind and rain get rid of any deposits of dust, soot or dirt. Protection against vandalism is also extremely relevant in public transit spaces. The wire mesh surface is scratch-resistant and spray paint, if it manages to adhere at all to the material in the first place, is very easy to remove.

Tailor-made standards for international large-scale architectural projects

It is these properties in combination with a unique aesthetic character which make stainless steel wire mesh one of the most interesting interior and exterior design materials available for the demanding field of transport architecture. As well as in Barcelona, the material has been and is currently being used for façades at Basle, Charles de Gaulles, Paris and La Réunion Airports and as ceiling and wall cladding at Dusseldorf and Singapore Airports. In the meantime, GKD has accumulated a sufficiently high level of standardization and project competence that the company and its branches all over the world can offer "off-the-shelf" façade solutions – with all the asssociated quality and price advantages. Due to its many years of experience with project work, GKD has learnt how to adapt its proven ready-made standard sizes flexibly to

individual requirements, and can thus supply solutions which are, metaphorically speaking and in the case of façades quite literally speaking, "tailor-made".

The importance of mobility and the increasing trend towards decentralization of cities increase the significance of well-designed public transit spaces and call for increasing security standards. Materials which increase the value of civic spaces both functionally and aesthetically and which re-integrate previously unattractive types of architecture like carparks as aesthetic highlights reflect the demands of the modern world. It is for this very reason that large-scale projects in transport architecture currently count as worldwide overproportionally successful areas of application for the products of GKD - Gebr. Kufferath AG. This development is also the result of the increasing international presence of the Dueren-based German company, which has branches in Europe, Asia and the USA, thus allowing even more efficient and direct locally-based planning and execution of projects.

GKD – WORLD WIDE WEAVE

As a privately owned technical weaver, GKD - Gebr. Kufferath AG is the world market leader in metal, synthetic and spiral mesh solutions. Four independent business divisions bundle their expertise under one roof: Industrial Mesh (woven metal mesh and filter solutions), Process Belts (belts made of mesh and spirals), Architectural meshes (façades, safety and interior design made of metal fabrics) and Mediamesh® (Transparent media façades). With its headquarter in Germany and five other facilities in the US, South Africa, China, India and Chile – as well as its branches in France, Spain, Dubai and worldwide representatives, GKD is close to markets anywhere in the world.

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