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Infrastructure buildings – New design language for urban architecture: Bus stations, tram stations, transfer hubs

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Summary The paper is about a new design language for urban architecture: Bus stations, tram stations, transfer hubs with a view to long-term visual value, low maintenance requirements and recognisability. This modern design language is now associated with formTL.

1 INTRODUCTION

Traffic jams, increased road repairs and missed transfers do not surprise, when we hear that the number of kilometres travelled has doubled in the past 10 years in Germany or in Switzerland.

This needs well-coordinated and realistic time tables, and compact transfer points. So bus stops and tram nodes in the immediate neighbourhood of train stations and airports with their classic cabstands and parking garages.

Cities and municipalities are increasingly investing in high performance hubs where the means of transport can be changed. Depending on the location, supplemented by e-bikes and scooters or car-sharing parking spaces as well as shops for daily needs.

We had the opportunity to work on several special projects in excellent teams as structural engineers for roofs, which simply have to function as functional buildings and, thanks to their architecture, make the location recognizable. Our clients therefore like to speak of functional urban art - of urban identification points with quality of stay for our modern and increasingly mobile society.

2 THE PROJECTS

Our competition entries for the Bus Terminal Fellbach (D, 2005), the Bus Terminal in Hamburg Barmbek (D, 2012), the “Wölkli” in Aarau (CH, 2013), the City Train Station Ulm (D, 2014), the Mobility Hub in Backnang (D, 2017), the Station Square Goldau (CH, 2018) and the ongoing planning for the Bus Terminal in Sursee (CH, 2019-23) provide answers and make suggestions.

All projects are characterized by an encased construction and particularly sustainable surfaces that still look valuable even after years.

Figure 1: Bus Terminal Fellbach

Figure 2: Bus Terminal Hamburg Barmbek

Figure 3: Bus Terminal Aarau

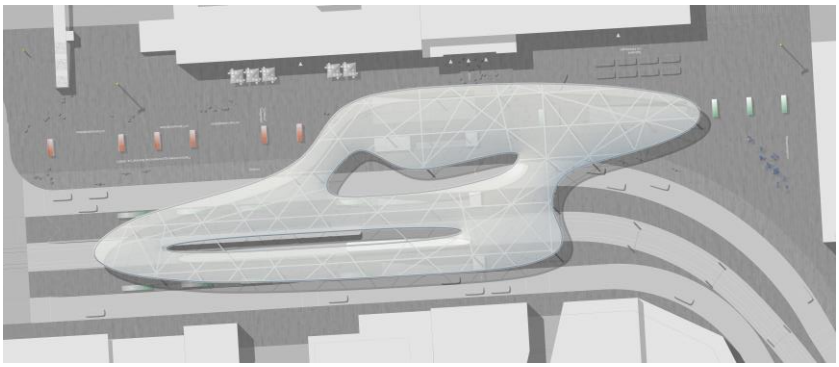

Figure 4: Town Entrance Ulm

Figure 5: Mobilty Hub Backnang

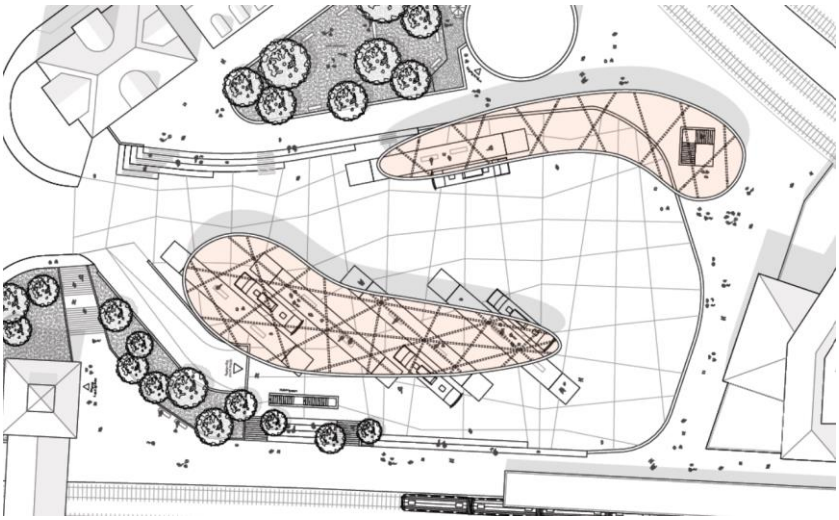

Figure 6: Station Square Goldau

Figure 7: Bus Terminal Sursee

2.1 Analyse

An analysis of roofs in public spaces shows that it is often forgotten that such buildings are rarely cleaned. The glazing and the color-coated metal roofs are dirty, pigeon defense spikes stick to lattice girders in which paper cups, bird feathers and gray cobwebs collect. The buildings only inadequately fulfill their intended task, because lack of care provokes negligent behavior and the public places become more and more inhospitable. It also shows that construction is often carried out with open profiles on which a lot of dirt is deposited and whose flanges offer pigeons space to land and shit. As a result, these roofs often look neglected. It doesn't have to be like that

2.2 Evolution

We therefore use materials that have less dirt adhesion. For example anodized aluminum, ETFE foil and fabric with laminated PTFE foil or PTFE-coated fabric. That is why we use round tube profiles instead of open profiles and, wherever possible, enclose the supporting structure completely with a smooth cover that does not offer pigeons a landing place. We started with the bus roof in Fellbach in 2005. At that time we uses aluminum corrugated sheet on a steel frame. We got the chance of a lateral entry because our special proposal was only half as expensive as a solid roof. The foundation points were already given, which determined the position of the supports.

In our Hamburg Barmbek project, we designed long wing roofs with modular cushions, which we widened in the edge area so that the lighting with linear Fluorescent tubes could be integrated into the edge beams. 2013, with the Aarau bus station roof, we dared to use the ETFE large cushions technology, developed for Tropical Island, on horizontal surfaces. We planned a freely formed steel table and covered it with a pneumatic cover made of rope-reinforced ETFE foil.

In recent times we have also sometimes used PTFE glass fabric for the large pillows. The much higher strength of which enables softly rounded roof surfaces that only arise when there are no ropes that constrict the surfaces.

2.3 Sustainability

We too had to learn first that air supported envelopes do not cause high operating costs. Our roof in Aarau is monitored in this regard. 1 SFR per square meter and year is charged for the power of the support air system, which dehumidifies the large pillow and inflates it with 300 Pascal in summer and up to 850 Pascal under snow. For this we have installed a circulating air system from Elnic, in which a closed air circuit is set up between the support air generator and the cushion roof. We only use exhaust air systems in exceptional cases, for example for temporary use.

2.4 Corrosion protection

Because of the low additional costs for long-term corrosion protection, we plan VH quality corrosion protection systems as standard, that is for 25 years or longer. It takes little effort to convince the customer that this is the most sustainable way to invest his money. Wherever possible, stainless steel components are part of the standard configuration for exposed components such as ropes and rope connectors.

3 EFFECTS

The unusual and surprising design, the table shapes that can be freely adapted to floor plans, the visual lightness and the interaction with artificial light. natural light or the color of the sky create a good and friendly atmosphere on site. This is supported by the cleanliness and quality of the materials.

4. CONCLUSION

The shown design language is of course not only suitable for mobility buildings but basically for all types of buildings in public spaces, where it is important that architecture creates identity and where the town administration often forget to look after their buildings.

With the engineering support from formTL 2018 two encased entrance gates for the Teesside Shopping mall in UK had been designed. And 2020/21 the huge market place roof in Posnan (Poland). This one cushion roof with ETFE-foil and supporting cables is bigger than Aarau, which was the largest one cushion roof until now.

PROJECT PARTICIPANTS: DESIGN & MANFUACTURER

Bus terminal Fellbach: Architecture and structural engineering: formTL
Bus station Hamburg Barmbek: Architecture: ap'plan GmbH, structural engineering: formTL; Manufacturer steel structure: Heinrich Rohlfing GmbH; Manufacturer ETFE-Foil: Temme//Obermeier GmbH
The "Wölkli" Aarau: Architecture: Vehovar & Jauslin AG; General planning: suisseplan Ingenieure AG, light design: Rolf Derrer; structural engineering roof: formTL; Manufacturer steel structure: Ruch AG, Manufacturer ETFE-Foil: Vector Foiltec GmbH
City train station Ulm: Architecture: ap'plan GmbH, landscape architecture: Kienleplan GmbH; Light design: Bartenbach AG; structural engineering roof: formTL
ZOB Backnang: Landscape architecture: Kienleplan GmbH; traffic planning: Koehler, Leutwein und Partner; structural engineering roof: formTL
Station square Goldau: Architecture: Scheitlin Syfrig Architekten AG, General planning: suisseplan Ingenieure AG; structural engineering roof: formTL
Bus station Sursee: Architecture: OSMB Architekten AG; General planning: suisseplan Ingenieure AG; light design: Rolf Derrer; structural engineering roof: formTL

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PICTURE CREDITS

Figure 1: Peter D. Hartung
Figure 2: archimage
Figure 3: Niklaus Spoerri Zürich
Figure 4: ap'plan GmbH
Figure 5: Kienleplan GmbH
Figure 6: suisseplan ingenieure AG
Figure 7: OSMB Architekten GmbH