

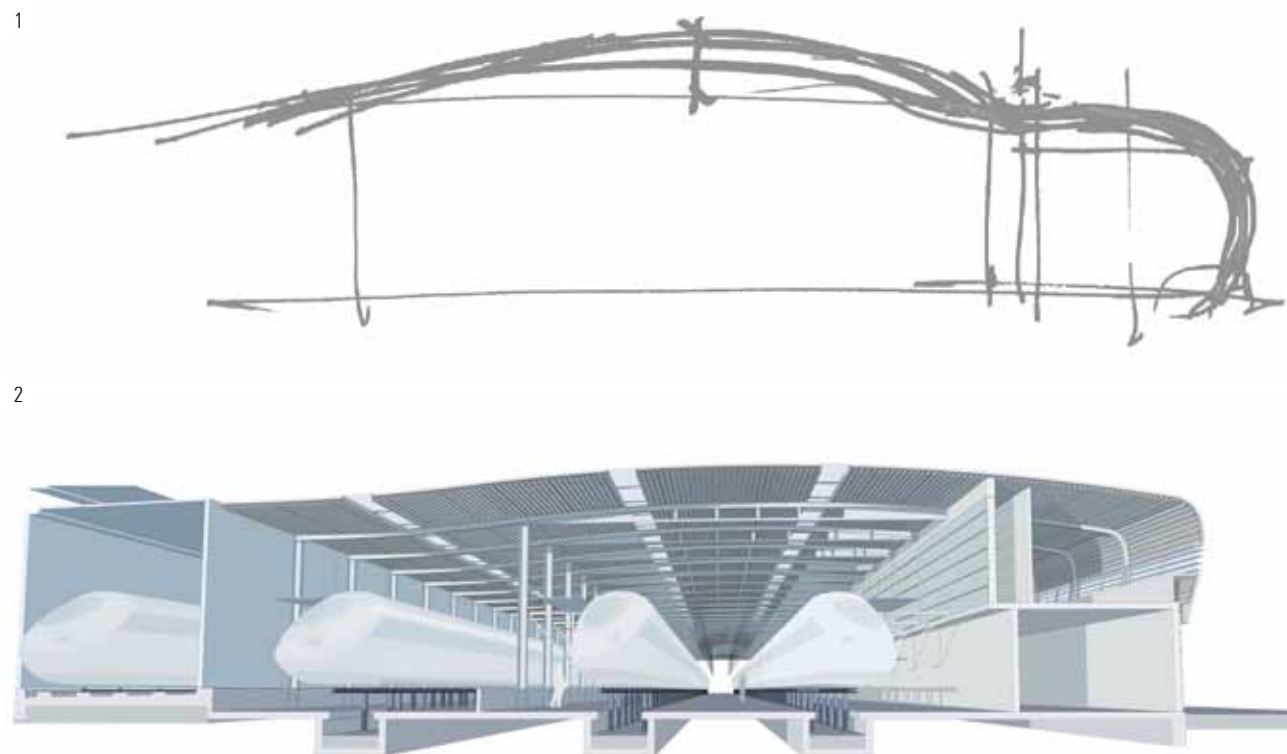
ICE workshop Leipzig

New construction of a maintenance facility



SSF Ingenieure





Concept and Architecture

In the context of the competition launched by the German Railway Company DB AG in February 2006 for new construction of the ICE maintenance workshop, SSF was charged with general planning of the project. The competition was carried out on the basis of a fixed maximum construction budget.

Because of the vicinity of the building to Rackwitzer Straße, the building draft shall – under aspects of urban development – characterize an industrial building with functional relation to the design of trains to be maintained and represent the company DB Mobility Long Distance Traffic. The architectural draft in harmony with the structural design shall already capture both optional stages for installation of a third track as well as the cleaning facility in such way that they can be implemented without extensive interference into the load bearing structure and during operation of the ICE maintenance workshop by reusing at the same time the western exterior façade.

The ICE workshop with operation building is designed as double-tracked train hall arranged in axes A to C and lines 1 to 34. Train hall and operation building form one structure in the lines 6 to 34.

Shortening of the operation building in the first stage of expansion led to the train hall being continued as individual building horizontally coupled to the structure starting from line 6 east up to line 1.

Load-bearing structure

The load-bearing concept of the structure in the areas of lines 6 to 34 includes round reinforced concrete columns in the west wall of axis C. The columns are formed in such way that they are at first used as exterior supports and are transformed to interior supports after extension of the hall. The bossed steel roof girders are placed articulated at axis C on reinforced concrete columns and are connected in axis B to the reinforced concrete framing system of the mutual longitudinal wall at axis B.

Transversal stiffening of the train hall is achieved, according to the stiffening conditions, by the operation building as well as by the

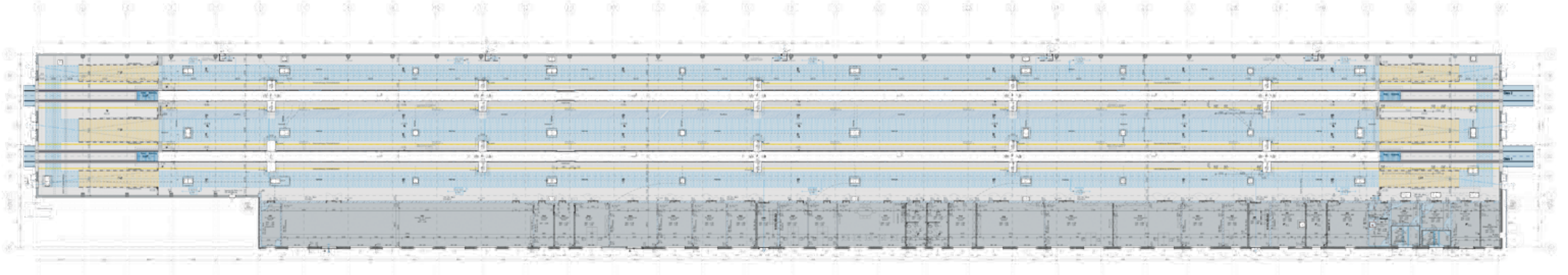
- 1 **Form finding** first drawing
- 2 **Cross-section of train hall and operation room** final state with 3 tracks
- 3 **Complete structure train hall and operation room** with cleaning facility
- 4 **Interior view** with track modules and working platforms



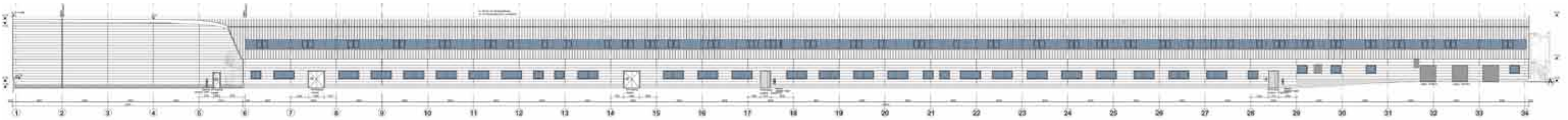
picture credits: Lang Hugger Rampp GmbH Architekten

picture credit: Ulrich Windhofer

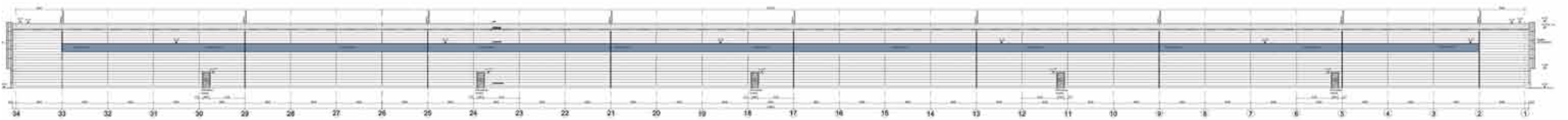
Ground plan basement level 0.95/0.00 – lines 1 to 34



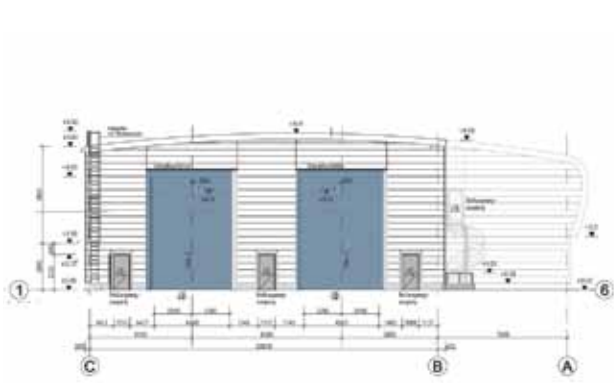
View longitudinal façade Axis A/1-34



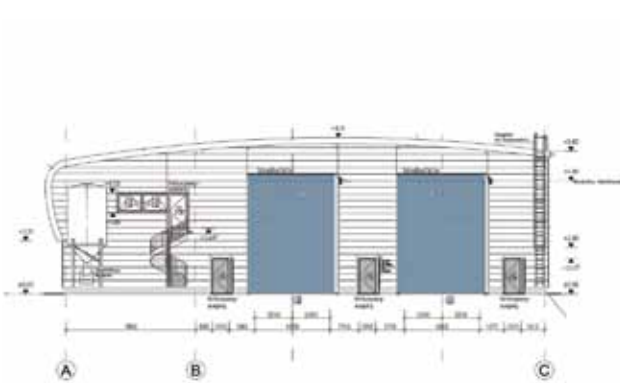
View longitudinal façade Axis C/34-1



View of gabled façade line 1/B – C and line 6/A-B



View of gabled façade line 34



picture credits: SSF Ingenieure GmbH

connected reinforced concrete columns at axis C. The hall’s roof is insulated and contains a load-bearing trapezoidal roof shell with belonging roof superstructure.

The two-storey operation building is conceived with one continuous reinforced concrete wall in axis A and one east of axis B at the ground-floor with approx. 1.30 m displacement. The ground-floor’s ceiling is formed by a reinforced concrete flat slab projecting the longitudinal reinforced concrete walls and lying on the longitudinal ground-floor walls. The longitudinal building wall in axis B is a reinforced concrete framing system connected to the projecting ground-floor ceiling and faced with porous concrete prefabricated elements. Both walls at the ground-floor and the upper floor are

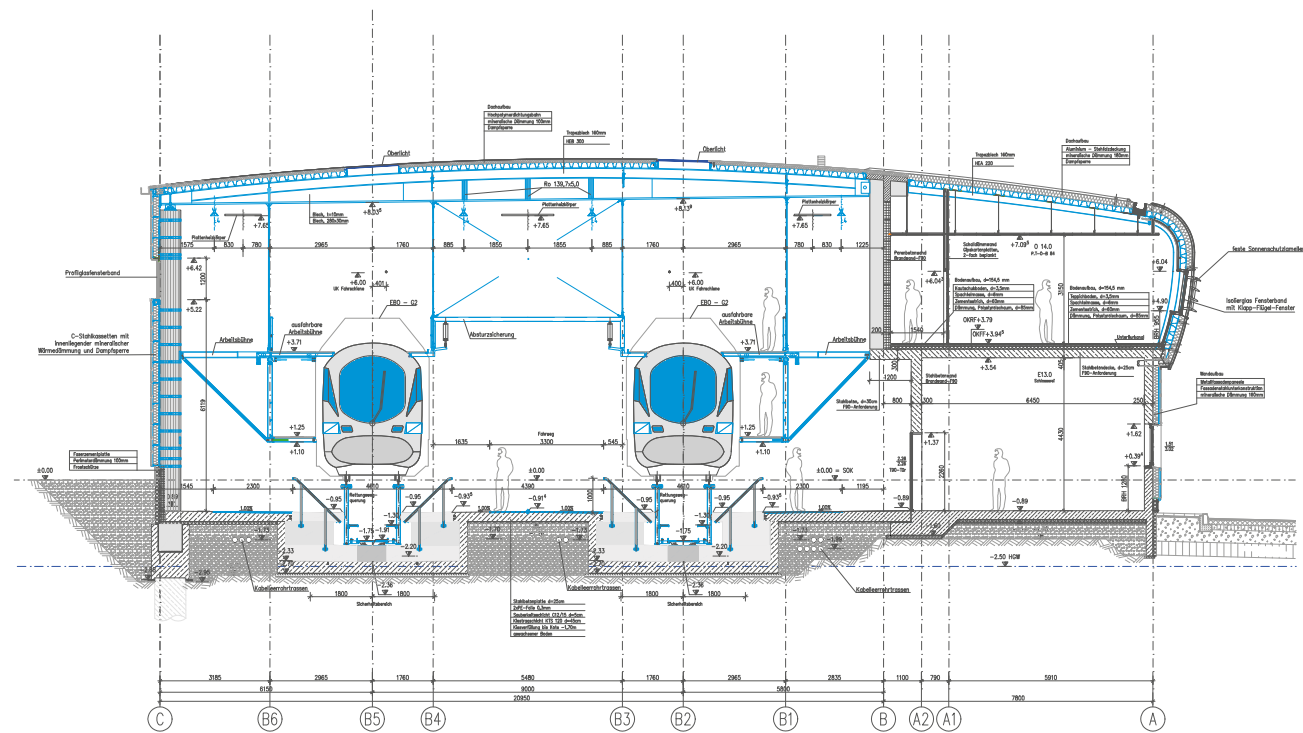
Data and Facts	
Client	DB Fernverkehr AG Berlin
Design	SSF Ingenieure/LANG HUGGER RAMP
General planning:	SSF Ingenieure GmbH, Munich Project planning for buildings, open-air facilities and room-creating interior works, project planning for civil engineering works and transportation facilities, structural engineering, technical outfitting, services relating to thermal building physics
Floor space	11,200 m²
Spans of roof framework	65.00 m
Total length/width	approx. 91 m/74 m
Height	approx. 18.50 m



Detail of roof truss connected roof girders



Roof truss with suspended working platforms and train energy supply



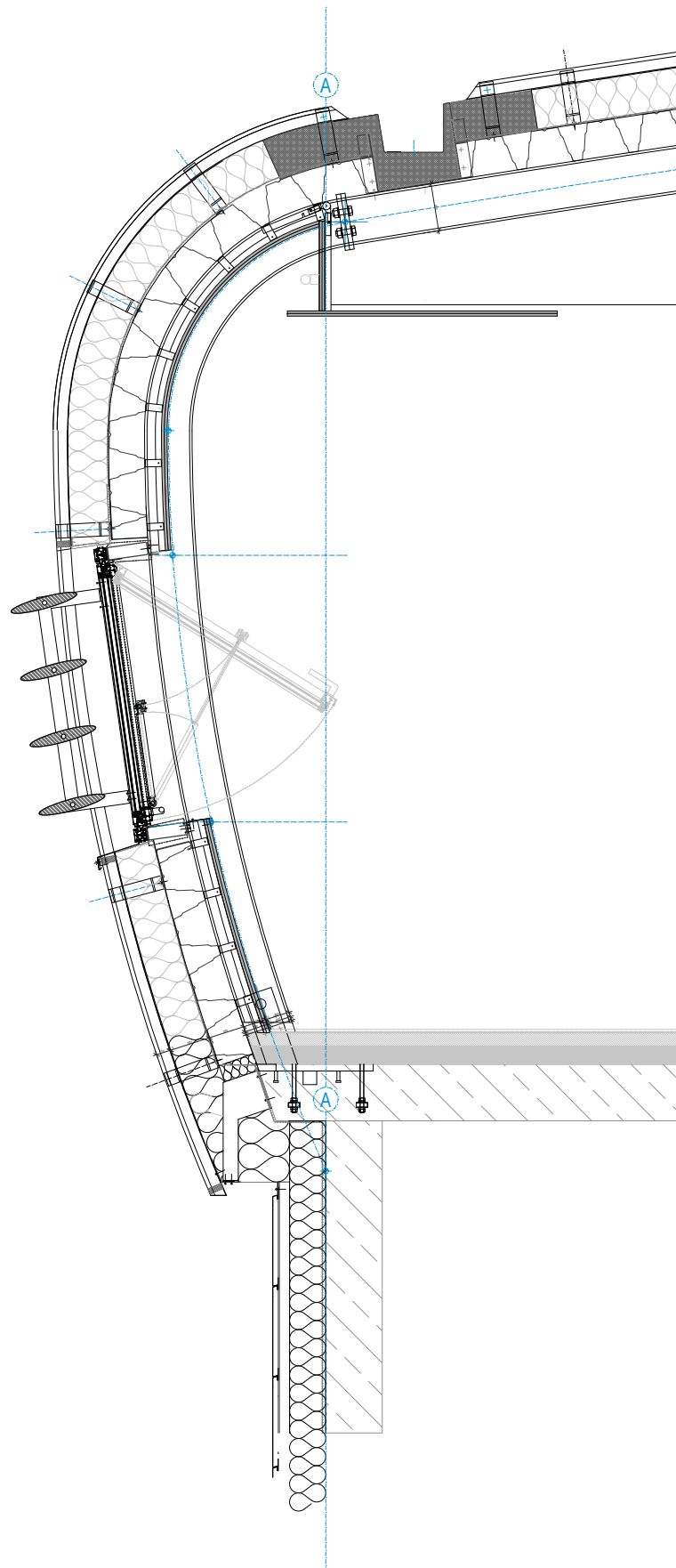
Cross-section regular sections of train halls with operation room

together with the projecting ground-floor ceiling fire protection walls; they separate the train hall from the operation building dividing them in individual fire areas. The transverse stiffening of the operation building is achieved by the ground-floor ceiling, the staircase and the gable walls. The radial roof truss, analogous to the train hall, with integrated façade walls in axis A, consists of bossed steel half-frames at each line, connected to the longitudinal walls in axis B and raising from the ground-floor ceiling in axis A.

Canopy geometry

By its form the canopy links the train hall to the operation room and provides, at the same time, the necessary weather protection for the access doors underneath and the spiral emergency staircases.

The primary construction of the edge girders is a double-bended steel tube. The system axis/main axis of the supporting tube is shaped as three-dimensional curve resulting from the bending of two roofed bodies as section edge.



Façade section operation room axis A

**Roof structure of operation building
Line 6 – 34**

Kalzip profile system 65/400
Surface: stucco patterned with plating
Heat insulation: mineral insulation, resistant 180mm
vapour barrier trapezoidal sheets

Window wall

Aluminium patent glazing system
Raico Therm+ 56A with opening wings to the inside with
pneumatic spring support, opening angle 50° and fixed
glazed sections, exterior sun protection, powder coated
surface colour RAL 9007 metallic on post/bar construction
Post profile: rectangular 60/60
Bar profile: 180/60
Surface: steel/post/bar construction, DB 701
Alternative: powder coated RAL 9007 metallic

Glazing:

Interior: tempered glass/space/tempered glass: 6/16/4
Heat transfer coefficient acc. to construction physics

Sun protection:

Fixed aluminium lamellas w=300mm
System Colt on adequate substructure, surface anodized
aluminium EV 1
Alternative: powder coated RAL 9006 metallic

Façade structure axis A line 6 – 34 – basement:

Sheeting:
Hoesch Planeel Type H400 façade
Surface metallic coating zinc Z275, Galfan ZA255
Tape coating Pladur metallic RAL 9007
on substructure Z50 acc. to static calculations, thermal
separating layer 2mm
substructure + heat insulation: reinforced concrete gabled
wall 250mm with exterior heat insulation 160mm

picture credit: SSF Ingenieure GmbH

picture credits: Ulrich Windoffer



Gabled façade line 34

Interior operation room upper floor

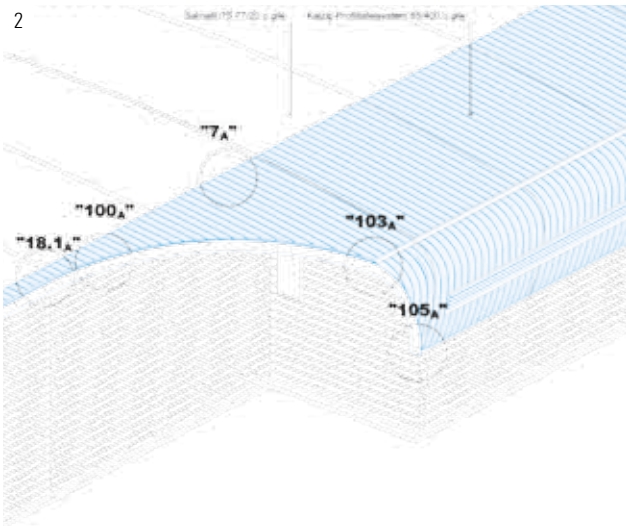


Top-hung window in inclined post/bar façade

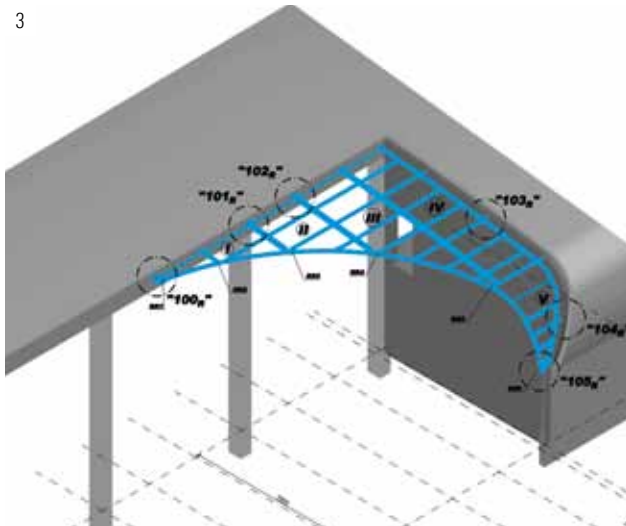




1 Transition train hall to operation building at line 6
2 Canopy geometry roof skin made of profiled metal sheets



3 Canopy edge detail
4 Stationary working platforms with fall protection



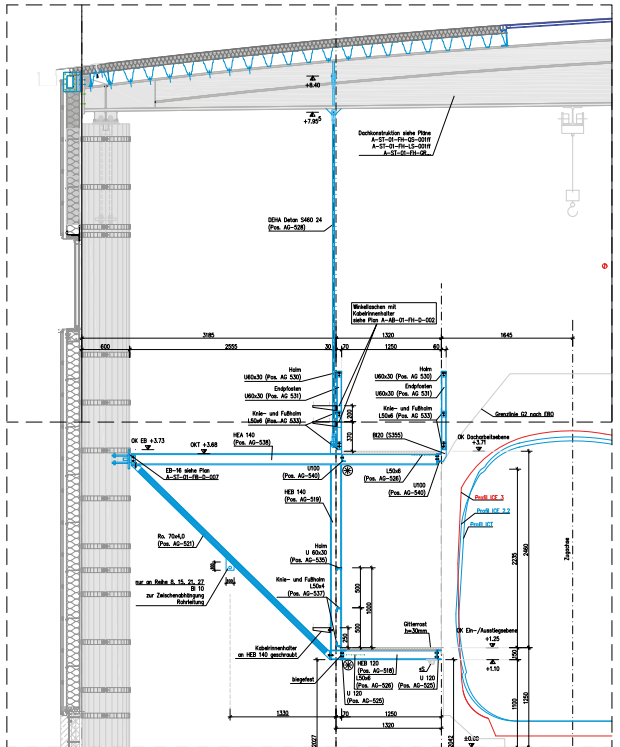
picture credit: Guido Krull
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Stationary working platforms
In the train hall, a stationary working platform is assembled at each track containing a fall protection at the opposite side. The working platforms are arranged on the side facing the outer driveways of track 1 and 2. They are separated in a lower entry/exit level and an upper ceiling level. In work position, movable working stands drive continuously into the clearance gauge up to the train's outer edges.

picture credits: SSF Ingenieure GmbH

Cross-section of stationary working platforms



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