



SSF Ingenieure

# profile

**ENTHUSIASM  
FOR ENGINEERING**

Update 2022

Company profile of SSF Ingenieure AG



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**SSF – Engineers with passion**  
Our corporate video (german)

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About us

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*“As engineers we are committed to finding form and design. Materials from the past and the future, we use steel and concrete in an economic, ecologic and creative way.”*

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**BMW Welt, Munich, Germany**

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BMW AG promotional and distribution centre

**Architects:** COOP HIMMELB(L)AU Wolf  
D. Prix / W. Dreibholz & Partner ZT GmbH

**Site area:** 25,000 m<sup>2</sup>

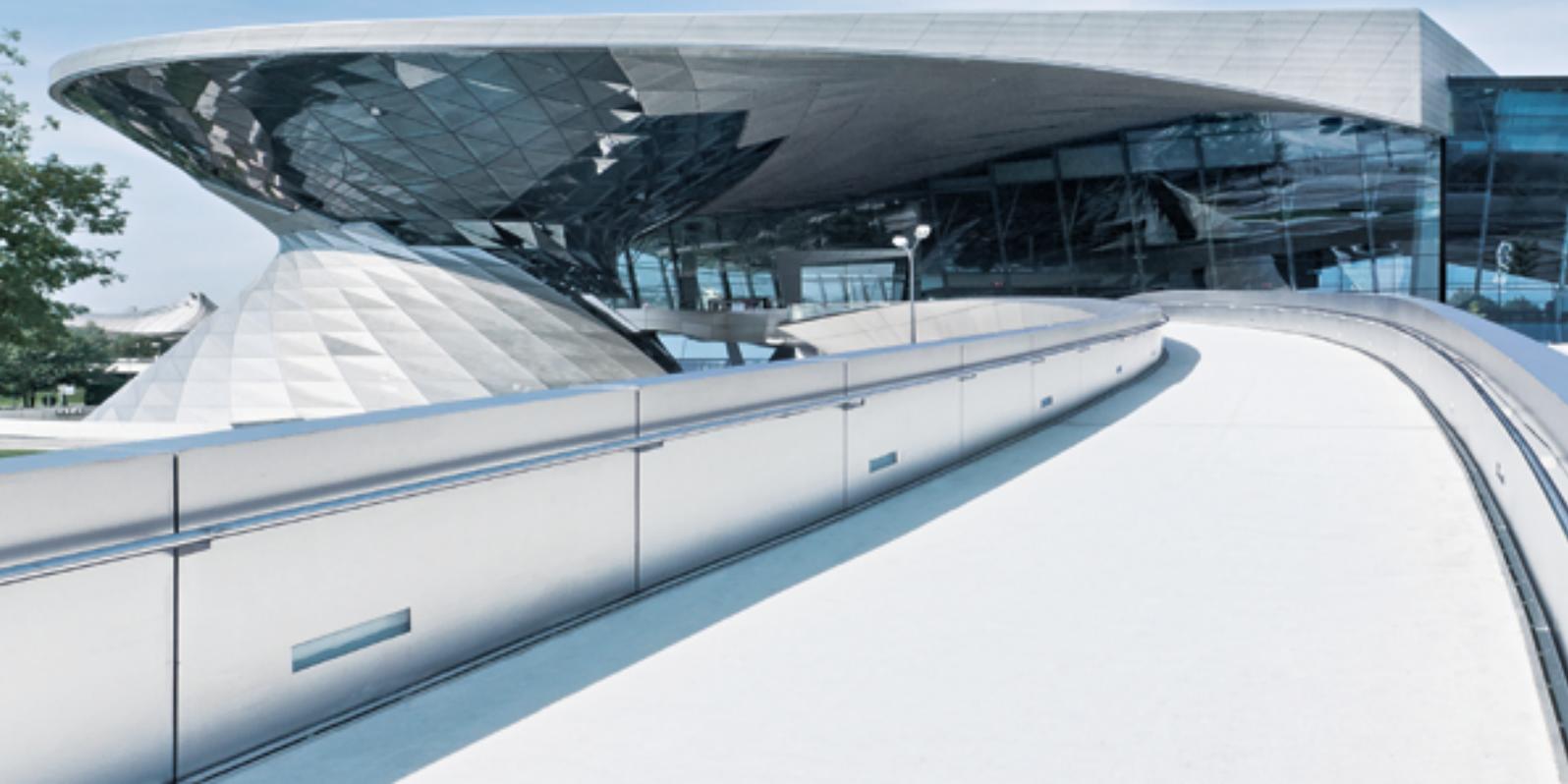
**Usable space:** 67,400 m<sup>2</sup>

**Gross floor area:** 73,000 m<sup>2</sup>

**Gross volume:** 531,000 m<sup>3</sup>

**SSF:** final design structures and object, overall  
construction management and supervision

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# SSF Ingenieure

## First choice for realising your projects

SSF Ingenieure AG is one of Germany's leading engineering companies, offering its clients an interdisciplinary network of high-quality solutions in all fields of civil engineering, foundation engineering as well as within the topics environmental engineering and sustainability. We apply materials of the present and the future in an economic, ecological and creative manner – with highest competency and more than 50 years of experience.

Transparent and light structures, clear and modest constructions as well as thorough design of structural details correspond with our effort to achieve high efficiency, functionality and beauty.

We realise the projects entrusted to us by focusing tightly on our customers' individual needs. Whether you are planning small-scale building projects or large-scale and complex infrastructure projects: With SSF Ingenieure you will have the support of a competent and reliable partner on your side. We implement your project with maximum quality, reliability and integrity.

Together with our innovative partners from the construction industry, academia and the software sector, we develop methods that enable us to control all processes, from the planning to the fabrication of individual components, and even entire structures, directly from the computer. This technology enables all parties involved in the construction process to work on and monitor a digital model of the project. This saves time and money. Using this technology, the virtual structure becomes a "five-dimensional" project that can be controlled efficiently.



## Milestones

- 
- 1971** Foundation of Schmitt & Stumpf GbR
- 
- 1988** Wolfgang Frühauf joins as the third partner
- 
- 1990** Foundation of Schmitt Stumpf Frühauf and Partner GmbH
- 
- 1991** Establishment of offices in Berlin and Halle
- 
- 1998** Stake in the engineering firm Wagner + Partner, Munich
- 
- 1999** Stake in the company Europroject Gdańsk S.A., Poland
- 
- 2004** Stake in the company PEC + S Planning, Engineering, Consulting + Services GmbH, Munich
- 
- 2004** Stake in the company PEC + S Beijing Planning, Engineering, Consulting + Services Ltd., Beijing, China
- 
- 2005** Stake in the company Baugeologisches Büro Bauer GmbH, Munich
- 
- 2006** Stake in the company S.C. SSF – RO s.r.l., Timisoara, Romania
- 
- 2008** Company renamed SSF Ingenieure GmbH, Management Board Expanded
- 
- 2009** Renaming of Wagner + Partner to Wagner Ingenieure GmbH, Munich Management board expanded
- 
- 2009** Stake in the company Prof. Schaller UmweltConsult GmbH, Munich
- 
- 2010** Transformation of the company into SSF Ingenieure AG
- 
- 2015** Stake in the company Buba Ingenieure GmbH
- 
- 2016** Establishment of office in Düsseldorf
- 
- 2017** Stake in the company fair CM<sup>2</sup> GmbH
- 
- 2017** Establishment of office in Regensburg
- 
- 2022** Foundation of SSF Azerbaijan LLC
- 
- 2022** Establishment of office in Hamburg
- 

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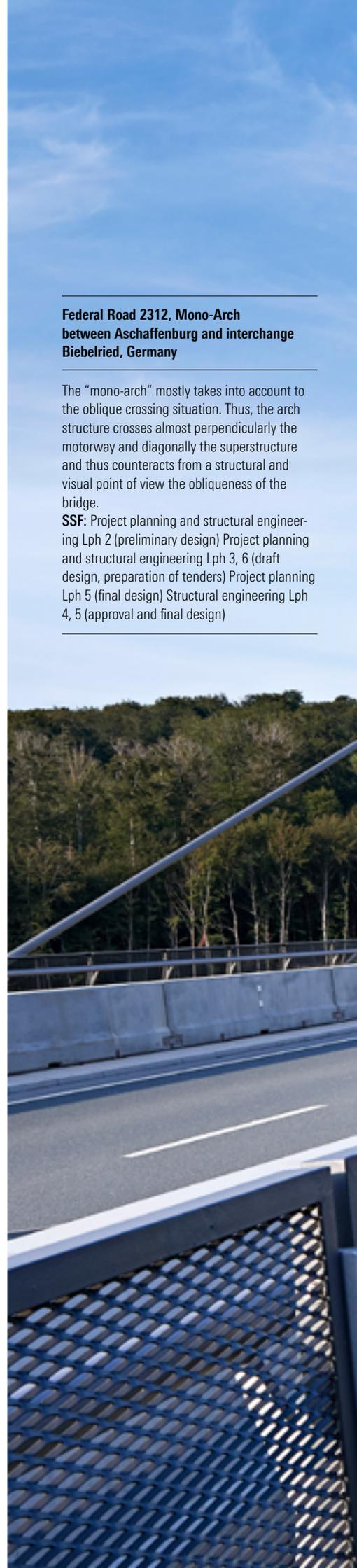
### Federal Road 2312, Mono-Arch between Aschaffenburg and interchange Biebelried, Germany

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The “mono-arch” mostly takes into account to the oblique crossing situation. Thus, the arch structure crosses almost perpendicularly the motorway and diagonally the superstructure and thus counteracts from a structural and visual point of view the obliqueness of the bridge.

**SSF:** Project planning and structural engineering Lph 2 (preliminary design) Project planning and structural engineering Lph 3, 6 (draft design, preparation of tenders) Project planning Lph 5 (final design) Structural engineering Lph 4, 5 (approval and final design)

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# History

## From bridge specialist to structural generalist

In 1971, graduate engineers Victor Schmitt and Dieter Stumpf founded the consulting firm Ingenieurbüro Schmitt&Stumpf, the “core” of today’s enterprise. In 1988 Wolfgang Frühauf, another engineer, joined the company as a partner, and the firm became Schmitt Stumpf Frühauf and Partner. Before joining SSF, Wolfgang Frühauf had been managing director of the Munich office of a large German civil engineering company.

Since then, our company has steadily expanded on the basis of our successful activities and competences in structural civil engineering. Following German reunification, new regional offices were opened, and additional services were included in the performance spectrum. Today the SSF Group\*, together with its cooperating partners, can provide every planning and consulting service associated with building. In 2008 the management board was expanded to include the engineers Christian Schmitt and Helmut Wolf. At the same time, the legal name changed to SSF Ingenieure GmbH.

In 2010, SSF Ingenieure GmbH transformed into SSF Ingenieure AG. At the same time Victor Schmitt, Dieter Stumpf and Wolfgang Frühauf withdrew from the management and changed to the supervisory board. Christian Schmitt and Helmut Wolf will henceforth assume the management of SSF Ingenieure AG. In January 2011 Dipl. Ing. Anton Braun was appointed to the management.

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**Bridge over the Ziegelgraben  
Second bridge over Strelasund,  
B 96n slip road Stralsund / Rügen, Germany**

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Cable stay bridge across the Ziegelgraben as part of the 2,8 km-long bridge span.

**Overall length:** 583 m

**Main opening:** 198 m

**Pylon height:** 46 m

**Height of pylon over roadway:** 87 m

**SSF:** final design structures

Construction award Mecklenburg-Western Pomerania 2008 (Special Award)

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\* SSF Group members and affiliations see page 54 and 55 of this brochure.



# Holistic design and consulting

## Design our built-up environment in a future-efficient way

“Sustainable development aims at the improvement of well-being, which, by contrast to the model of unlimited growth, respects the preservation of viability of natural bases of life.” (Objectives for sustainable development, Munich 2005)

“Sustainability” has become a key word in the political discussions – out of realisation that the current way of life and economy cannot guarantee the well-being of humans on a long-term basis and even influences it significantly in a negative way.

To design a society, a city, a region or the fabrication of a product or construction “sustainably”, a holistic consideration is needed in line with private sector and economy aspects as well as ethical, socio-cultural and ecological values.

We as architects and engineers understand it as our social task to implement the projects our clients entrust to us with much confidence as long-term functioning structures not only under aspects of design, technology, function and economy. Moreover, we want them to fulfil – with regard to future repercussions – demands of ecological restrictions and of socio-cultural evaluation criteria. We take the challenge on to ensure and design a viable and liveable environment for present and future generations.

As sustainable and socially responsible companies of the SSF Group, we identify ourselves with the principles of corporate responsibility and orientate ourselves voluntarily to the new ISO standard 26000 of Social Responsibility.





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**ZAE – Energy Efficiency Centre, Würzburg, Germany**

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The research building “Energy Efficiency Centre” of the Centre for Applied Energy Research (ZAE) uses innovative, prototypical and efficient construction materials, systems and technologies in order to verify by means of example their application in the sense of resource-friendly construction methods within the building stock as well as for new buildings, to demonstrate them and to subject them to monitoring.

**Architect:** Lang Hugger Rampp GmbH Architekten (LHR)

**SSF:** Project management and final design structures together with architects LHR

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## Designing with BIM

### More than 3D Construction

Nowadays, design and construction stages overlap in many ways. Several processes run in parallel and many sequences influence each other. Moreover, the choice of materials influences the construction process. Different trades have to be synchronised and coordinated.

It is SSF Ingenieure's aspiration to design a technologically high-quality structure for our clients, which corresponds to their wishes in terms of style as well as structural design. Optimisations of the future structure, the used materials or of the projects time schedule are our quality features.

#### Advantages generated by BIM design

- high quality
- increased design reliability
- quantity reliability

#### BIM is more than 3D construction

It represents the digital imaging of all structural, technological, physical and functional characteristics of a structure in one central data model. The continuous data entry and processing allows to collect, update and document the information of all design processes – from the first idea to the design and construction or conversion/reutilisation and operation.

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#### Metro Doha, Qatar

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In the context of the complete new construction of the metro network in Doha, SSF Ingenieure has been commissioned to develop the draft and final design of 6 stations, 2 crossing structures, 1 track-switching system, 1 trough structure and 6 emergency exits.

The design is entirely implemented by BIM planning and is based on the BIM Implementation Plan of the metro construction project "Green Line".

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**SSF:** Optimisation of draft and final design

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## People at SSF

**With expertise, responsibility and enthusiasm**

### Staff

We employ around 300 experts who not only master your specific topic to the last detail, but never lose sight of the superordinate project goals. They design in a future-oriented way, examine carefully, evaluate precisely and implement interdisciplinarily. They are amongst the best of their discipline and our most important and precious good.

*“Our employs are among the best in their particular discipline, and are our most important and valuable asset.”*

### Our mission

We strive to offer our customers efficient, tailor-made to the individual needs and sustainable solutions that meet the demands for ever more sophisticated and complex infrastructure systems. Our aim is to continually improve our work and contribute alternative, more refined or entirely new ideas. In this way, we create real added value for our customers.

**300**  
Employees





## Board

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### Christian Schmitt

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Management Board Chairman  
Project planning and buildings Munich

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cschmitt@ssf-ing.de

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### Helmut Wolf

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Management Board  
Construction and project management, international projects and tunnel construction  
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### Anton Braun

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Management Board  
Final design Munich

T +49 89 / 3 60 40 - 411  
abraun@ssf-ing.de

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**Maintenance hangar 1, Munich Airport  
for Deutsche Lufthansa AG, Germany**

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**Length:** 85 m

**Width:** 305 m

**Height:** 33 m

**Gross volume:** 840,000 m<sup>3</sup>

**Overall height (pylon):** 55 m

**SSF:** general planning

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## 50 years SSF

### Civil engineering in figures

<b>Projects handled</b>	<b>17,500</b>
Roads	10,700
Railways	5,325
Bridges	11,000
Buildings	1,025

<b>Road kilometres</b>	<b>3,350</b>
Motorway	1,475
Motorway interchanges	110
Services / parking and toilet areas	60

# International Markets

## Design and Construction in a global Network

Foreign countries, different (construction) cultures, different traditions and certain standards always present a new challenge for the international project management at SSF Ingenieure. Our successful international projects clearly show that good and sustainable planning is only possible in close dialogue with the client based on widespread competencies in project management and the application of multiple engineering disciplines. Many years of experience and high expertise from SSF Ingenieure's core business contribute directly to the productivity and success of our foreign activities.

Export success of SSF Ingenieure abroad is inner-urban special civil engineering for traffic tunnels and metro lines, railway infrastructure for local public transport, long distance and high-speed railway lines, highly specialized civil engineering for bridge construction and industrial buildings or the overall design of event locations, arenas and exhibition buildings. Based on the experience from SSF's core business, the client abroad can count on a complete and integral solution through our especially skilled engineers who manage the international business.



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**Baku Crystal Hall**  
**Eurovision Song Contest 2012,**  
**Baku, Azerbaijan**

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The multi-functional hall was erected in the capital of Azerbaijan Baku at National Flag Square and is one of the new landmarks in the dynamically growing city. In May 2012, more than 100 million people all around the world experienced the Eurovision Song Contest in front of their television.

**Remarkable:** design and implementation took place within only 8 months.

**Architects:** GMP – von Gerkan, Marg und Partner

**General contractor:** Alpine Bau Germany

**General designer and design coordinator:** NÜSSL International AG

**SSF:** structural engineering of stands and stadium roof, foundation, steel structure, interface coordination, examination of workshop drawings

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## Quality assurance

### Our guarantee for the achievement of your goals

The projects we develop are characterised by optimum characteristics and usability. One major component here is assuring the quality of the planning and development process. Our quality management system (QMS) is certified according to DIN EN ISO 9001:2015.

Our QMS helps us to continuously improve our performance and supports us in achieving the objectives defined at the start of a project. Planning and management processes, inspection and approval procedures, scheduling and cost tracking, recording and documentation of data, assessments, analyses and processes for determining customer satisfaction are defined precisely in the form of detailed processes.

We also enhance the quality of our work through our high level of team skills and the exceptional sense of responsibility of each individual. Regular discussions about our works' results in the team, constant application of the four-eye principle and verification of important design phases (6-eye principle) guarantee the high quality demands of our clients.



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### Arnulfpark footbridge, Munich, Germany

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The pedestrian and cycle bridge Arnulfpark crosses 37 tracks in front of Central Station Munich and links the city quarters Nymphenburg-Neuhausen and Westend-Schwanthalerhöhe.

**Span widths:** 90,80 m + 87,60 m + 61,90 m

**Total Length:** 240,30 m

**Total area:** 1,365 m

**SSF:** Engineering structures: basic evaluation, preliminary, draft and final design (joint venture with Lang Hugger Rampp), preparation of tenders (§ 43 Lph 1–3, 5, 6); Structural engineering: preliminary, draft, approval and final design, preparation of tenders (§ 51 Lph 2–6); On-site construction supervision, supervision of railway constructions; Railway close-off requests; Authorized to submit building documents with DB AG

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*“Living, mobility, profession and recreation – there’s hardly one moment in everyday life that isn’t in some way connected to civil engineering achievements.”*





Services

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*“The concepts and plans we execute generate a high level of satisfaction on the part of clients, users and operators. This acceptance is the basis for commercially successful investments.”*



# Structural engineering

## The basis for sustainable investment

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### **Filstal Viaduct, Newly Built Railway Line between Stuttgart and Ulm Mühlhausen im Täle, Germany**

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The around 485 m long, double-tracked and semi-integrally designed structure crosses on two separate superstructure and up to 80 m high Y-supports the Filstal valley. It has a main span width of around 150 m and is on both sides connected to tunnels.

**Span widths:** 44,00 m + 95,00 m + 150,00 m + 93,00 m + 58,00 m + 45,00 m = 485,00 m

**Total Area:** 8.000 m<sup>2</sup>

**SSF:** Approval and final design in joint venture with Schneider & Partner Ingenieur-Consult

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Structural engineering is the science, one might even say art, of designing buildings, bridges, tunnels and similar structures in a cost-effective and elegant manner, so that they safely withstand all the forces they might be exposed to.

We not only design load-bearing structures but develop user-oriented structural systems with efficient foundation, floor and pillar load bearing structures, optimized in terms of material and components. They are ideally attuned to maximum flexibility of utilisation in order to do justice to future uses and expansions. In the structuring of supporting members, SSF places great emphasis on transparency and clarity.

Decisive for continuous energetic construction are the coordination of load-bearing structure and thermally effective component layers and the intelligent design of structural details. This is an important criterion to achieve investments that are durably economically successful.

*“When creating a project, you’re not looking for hard and fast or archetypal thinking, but rather for active, intellectual capital that can be transformed in a continuous dialogue with the client.”*

*"Letting a project break down into illogical details and egoistic single interests is the most counter-productive thing you can do."*

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New construction of German Pavilion for Expo 2010 in Shanghai, China

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Site area: 6,700 m<sup>2</sup>

Usable space: 4,000 m<sup>2</sup>

SSF: surveys, supervision and consulting for soil, foundation and environmental protection

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# Geotechnical engineering

## Perfect interaction with a capable partner

As an engineering consultancy, we possess a great deal of experience in specialised civil and geotechnical engineering. Our core competencies include planning, construction management and monitoring of all types of foundation projects and underground construction (basement levels, parking structures, tunnels, caverns, underground stations, building underpinning).

As a result of our merger with Baugeologisches Büro Bauer, the SSF Group has an experienced partner on board that can offer a wide selection of geotechnical, geological and hydro-geological services.

One of the major activities of our partner in the areas of soil/subsoil consulting, geotechnology and hydrogeology are the planning and assessment of preliminary

exploration concepts to obtain dependable and comprehensive forecasts, plus detailed geological-geotechnical consulting on the foundation and creation of structures. Naturally there is always due emphasis on optimally minimising soil/subsoil risks and the costs involved, i.e. best practice and best build ability. The services of Baugeologisches Büro Bauer also include geotechnical project management in the actual construction phase plus documentation and evaluation of collected data for consistent quality assurance.

Comprehensive knowledge of, and experience in geotechnical sciences, soil and rock mechanisms, scarp stability and special-purpose excavation, petrography, sedimentology and regional soil history all guarantee the best results.



## Building construction

### Structures for individual needs

In building construction the portfolio of SSF Ingenieure ranges from wide-span halls and hangars through large railway stations and complex industrial facilities, to challenging commercial projects and representative corporate offices and administration buildings.

Enormous flexibility, attractive architecture, efficient costing, optimal completion time without exceeding cost targets, and especially high sustainability in energetic construction and use are all high priorities in our conception and implementation of projects and the resulting buildings.

Our consideration of the economy of your project does not end with the first use, but extends over the entire life cycle of the structure. The simple and economical option to convert the building at a later stage is considered in the development of the very first draft.

To solve and master complex requirements and conditions and for the precise handling of building projects, SSF Ingenieure supports its clients with a highly accomplished team of engineers and architects.

#### Our range of services

- Needs analysis and site assessment
- Conceptual design, further development and optimisation of buildings and load-bearing structures
- Area utilisation and user logistics
- Generation of complete draft, submission and working plans as expert or general planner
- Project management as well as comprehensive construction management
- Energetically optimised structural engineering
- Sustainability assessments (DGNB, LEED)

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#### Münchner Volkstheater, Munich, Germany

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New construction of the theatre venue of Münchner Volkstheater on the area of the former Munich stockyard.

**Total Gross floor area:** 30.000 m<sup>2</sup>,

**Total Gross building volume:** 202.000 m<sup>3</sup>

**SSF:** Structural engineering Lph 1 – 6, (basic evaluation, preliminary, draft, approval and final design, preparation of tenders); Engineering control; verification of structural fire protection incl. temperature assessment; design of construction pit and foundation of central rotating tower crane; BIM shell structure model

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1,025  
Building  
constructions



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**Bridge over the IJssel, Hanzelijn,  
Netherlands**

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The new IJssel Bridge is part of the 50 km long new railway line Hanzelijn from Zwolle to Lelystad. The structure spans the IJssel with a length of 900 m and a width of 15 m, connecting the province capital Zwolle to the community of Hattem. In autumn 2010 the bridge has been completed.

**Construction type:** 2-tracked steel composite superstructure with a truss arch above the river and laterally attached sidewalk.

**Spans in m:**  
 $33,34 + 4 \times 40,0 + 75,0 + 150,0 + 75,0 + 10 \times 40,0 + 33,13 = 926,47$  m

**Particularities:** winning design in a Design & Build awarding procedure, 927 m long structure without expansion joints, composite superstructure connected to abutments at the side of Hattem, ballast superstructure

**SSF:** draft and structural design

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11,000  
Bridges



# Bridges

## Aesthetic harmony of form and function

In the conception, planning and design of bridges and engineering structures, SSF Ingenieure plays a leading role. Since the foundation of the company, it has designed, planned the construction or supervised the actual building of over 8,300 bridges and engineering structures. The company's many years of experience and accumulated expertise include the construction of a wide range of bridges, such as: large-scale viaducts and suspension bridges, cable-stayed and arch bridges, extremely inclined portal frame bridges, the complex refurbishment of railway bridges while still in use, bridge repairs, footbridges and counterpoise bridges. Holistic thinking and responsible design result in well-engineered bridges, which are designed using appropriate materials and boast an enormous variety of load-bearing structures and forms.

### Cost-effectiveness

First and foremost, bridges always have a technical function: they join two or more different points. In a developed and intensively used environment, this requires comprehensive planning. Our passion for complex problems leads us to develop plans together with clients and construction companies. Bridges must also meet high aesthetic standards. We devote great attention to the elegance of a structure and the care in the structural details. We harmonise form and aesthetics with the structural requirements – and make sure that both aspects are economically balanced.

We aim to optimise durability and sturdiness with minimum maintenance and service costs, while at the same time creating formally attractive and ambitious structures. SSF consequently attaches the greatest importance to designing and implementing integral structures without joints and bearings as well as to efficient load-bearing structures and construction methods that, with regard to sustainability, leave a small "carbon footprint" over the course of their life cycle.



# Tunnels

## The hidden art of construction

SSF Ingenieure specialises in engineering services for underground projects, especially tunnels and complex underground load-bearing structures. Together with the specialists from Baugelogisches Büro Bauer, we assemble teams of experienced engineers from the fields of applied geology, geotechnical sciences, rock mechanics, structural engineering, underground construction, and project and construction management for every conceivable task.

### Designing and planning

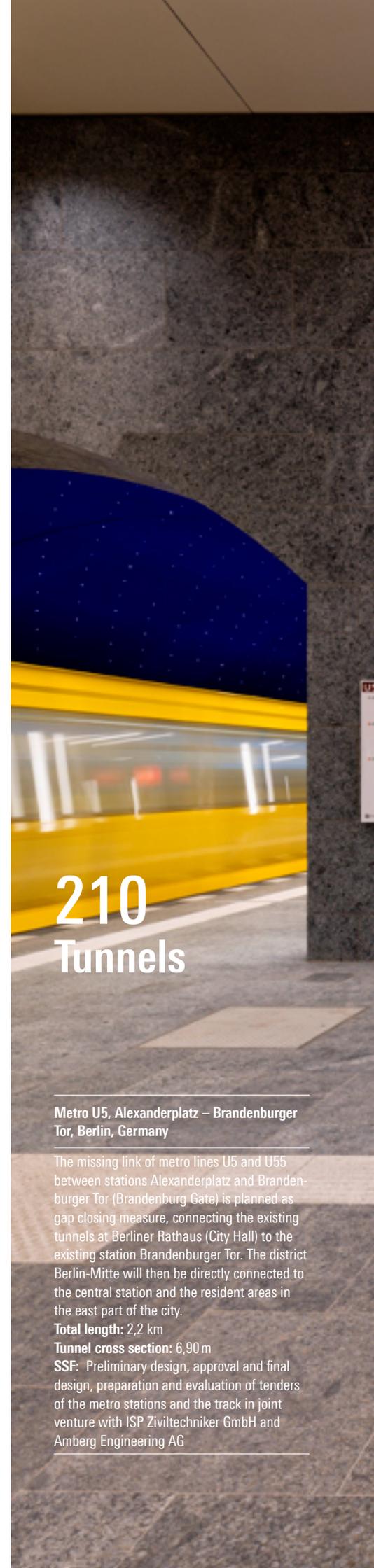
SSF planning considers numerous construction methods (NATM and hard-rock tunnel drilling machines, shielded rock drilling machines, earth pressure balance and slurry shields for soft soil). Our specialists possess extensive expert knowledge in the calculation of tunnels and portals, deep shafts and building pits. We develop economical concepts for advancing tunnels under compressed air or by soil freezing.

### Analysis

SSF conducts non linear geotechnical FEM analysis of complex substructure measures under consideration of primary stresses, load history and soil/structure interaction, and assesses the stability of scarps and rock overhangs including analysis of rock slide hazards. Simulation of tunnelling using the mining technique on three-dimensional and two-dimensional models, using the stiffness reaction ( $\alpha$ -method), is a speciality of SSF Ingenieure.

### Inspection

Our experts inspect existing tunnels to assess structural and building defects, evaluate the situation, and define measures for reinforcement or repair. SSF provides preliminary cost and schedule analyses, designs and plans and supervises measures for the renovation or enlargement of tunnel tubes, caverns and underground rail installations.



# 210 Tunnels

### Metro U5, Alexanderplatz – Brandenburger Tor, Berlin, Germany

The missing link of metro lines U5 and U55 between stations Alexanderplatz and Brandenburger Tor (Brandenburg Gate) is planned as gap closing measure, connecting the existing tunnels at Berliner Rathaus (City Hall) to the existing station Brandenburger Tor. The district Berlin-Mitte will then be directly connected to the central station and the resident areas in the east part of the city.

**Total length:** 2,2 km

**Tunnel cross section:** 6,90 m

**SSF:** Preliminary design, approval and final design, preparation and evaluation of tenders of the metro stations and the track in joint venture with ISP Ziviltechniker GmbH and Amberg Engineering AG

← **U5** Hönow

Hauptbahnhof **U5** →

Information board with the U5 logo and text, likely a station map or schedule.

MUSEUMSSEL



# Construction management

## Our experts on-site

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**New railway line  
Erfurt – Halle/Leipzig,  
Standard analysis Unstruttal  
viaduct, Germany**

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**Construction supervision new  
railway line Erfurt – Halle/Leipzig:**  
lots 2 + 3: joint venture management  
Saale-Elster viaduct in joint venture,  
main structure within FFH area  
Saale-Elster viaduct: L = 6,465 m  
branch-off bridge: L = 2,423 m  
Scherkondetal viaduct total span  
width approx. 576 m  
Saubachtal viaduct total span width  
approx. 248 m

**Services rendered by SSF in con-  
struction management:**

- Construction surveys / monitoring
- Project planning and renovation design
- Construction supervision
- Supervision of railway constructions including provision of authorised technician at the interface of construction and railway operation, person charged with overhead cable on and off switch and if necessary grounding, fulfillment of administrative construction prescriptions and authorizations conferred by the German railway company DB AG for individual projects
- Construction management
- Project management and documentation
- Security and health protection on construction sites

SSF Ingenieure is prequalified with DB AG for the area of construction supervision under the application number 7 00 00 148 and has been assessed as "L1" supplier in constant evaluations.

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To implement complex civil engineering projects not only comprehensive designs and quality-conscious partners are necessary; an important link between the multiple participants is a proficient construction management team that in addition to technical tasks takes on all organisational and commercial activities.

SSF Ingenieure disposes of skilled specialists that, with their supplementary qualifications, ensure a flawless execution on-site and that the client's satisfaction is fulfilled. We have confident experience in dealing with the German contracting rules for the award of public works contracts (VOB), with the relevant technical prescriptions, with railway regulations, precision in organising and structuring of construction stages and competence in contract and contract addendum management which are part of our daily routine. The construction management team has excellent knowledge and long-time experience in construction supervision and supervision on site for bridges and complex building projects involving multiple trades.

So in addition to accompanying new construction projects, they are positioned with the most modern technological equipment to examine existing construction components and entire constructions and to establish surveys of existing situations and renovation designs for civil engineering structures.

Consulting the client about all questions regarding construction operation, contractual questions and contract alterations complementing the supervising and managing construction services is at the center of our management activities that are always orientated on our leading principles "quality-deadlines-costs".

# Noise protection

## Serving health and the environment

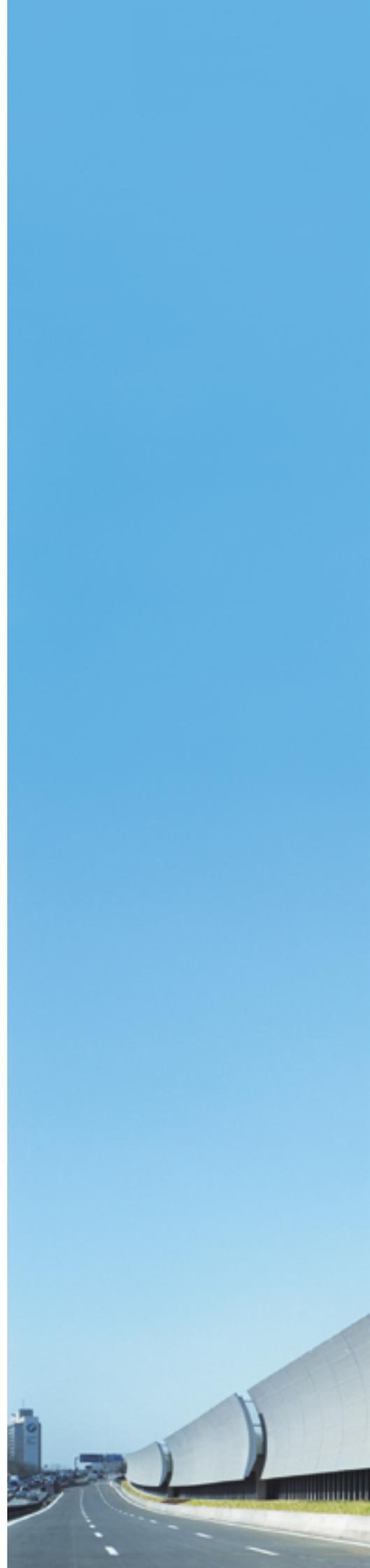
Noise is an extremely serious form of environmental pollution. Directly and indirectly it can very much impair the wellbeing and health of the individual. Consequently, combating noise has become an important facet of environmental protection.

### Situation

In addition to the building of new traffic routes, the expansion of existing ones is becoming increasingly important – especially in densely populated suburbs and conurbations. A frequent problem is that, because of the space restrictions, multi-lane expansion is rarely possible. As a result, the route must be based on the current layout, which means action must be taken to densify or compensate for the existing construction. As the width of the roadway increases, the noise screening walls become higher as well.

### Consequences

With noise protection, there are significant cost and authorisation issues. Structural changes to existing traffic routes or the building of new ones both involve the right of citizens to noise reducing measures. Careful and precise implementation of the conditions defined by a whole number of rules and regulations in the planning phase is decisive for obtaining a building permit. We have been working on the creation and implementation of effective noise protection measures for many years now, in close, constructive dialogue with planners and experts. The emphasis here is on devising individual noise engineering solutions for traffic routes in densely areas, and on developing technically improved and cost-optimised alternatives.



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**Noise protection structure Freimann,  
Munich, Germany**

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Constructed as part of the six lane expansion of the A 9 motorway in the inner city area curved, shell-shaped prefabricated concrete parts with highly absorbing aluminium cladding on steel posts, torsion beams and augur piles

**Length overall:** 2,600 m

**Total area:** 22,000 m<sup>2</sup>

**Height:** up to 9 m above top edge of road and 14 m above ground

**SSF:** object planning and structural engineering design

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**Marshland south-east of Andechs,  
Germany**

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Concept for landscape development in the  
Munich region services partner company Prof.  
Schaller UmweltConsult GmbH  
(SSF Group):

- landscape planning
  - ecological reports
  - ecological supervision of constructions
  - ecological monitoring
  - environmental planning
- 



# Landscape and environment planning

## The ecologic basis

The preservation of a liveable environment is considered as a matter of course by responsible engineers. SSF Ingenieure conscientious of that has already years ago decided to offer environment and landscape planning and design as integral constituent of its array of services. Together with Prof. Schaller UmweltConsult GmbH, we solve proficiently all environment related questions within the SSF Group.

Especially infrastructure and large-scale construction projects require complex studies on environment tolerance as well as considerations of species protection so as to be approvable. Prof. Schaller Umweltconsult disposes of extensive national and international experience and contacts to relevant partners in this area. The company supports private and public clients in all stages of administrative approval procedures as well as during project management. In addition to traditional landscape planning services such as establishing of landscape and green area plans, renaturalisation and recultivation plans, conservation and development plans, it provides services of landscape architecture such as object, design and execution planning. Biologists are part of the team, too, and give their expert advice on environment protection planning and cartography. Furthermore, ecologic expert reports are established.

To deal with all environment related questions, a highly efficient geographical information system (ESRI-GIS) is in use to support the collection, processing and evaluation of environmental data as well their presentation.



## Railroad construction

### Optimal performance all along the line

The basis of every rail system is its civil engineering and structural traffic infrastructure. Well-thought-out concepts and quality-oriented construction of railway infrastructure ensure at long-term the performance and availability of both high-speed trains and lines with mixed traffic, as well as underground networks or urban rail systems.

Intelligent route and station infrastructures, easy access and long-term ride quality are decisive factors for sustained passenger volume, sufficient passenger comfort and efficient and economical operations. With its extensive knowledge and understanding of how the numerous elements of railway networks and their interfaces interact, SSF is able to optimally support clients in all phases of a project.

SSF Ingenieure performs a wide range of services in the area of construction and geotechnical engineering for rail infrastructure – from routing through tunnels and bridges to stations and halts. We draw on a wide range of experience in the planning and development of railway infrastructure and the development of construction methods tailored to the needs of railway operations (e.g. lateral shifting of bridges, cut and cover bridge erection, VFT®, VFT-WIB®, VFT-Rail®). We design slab track for high-speed networks, develop mass suspension systems, perform noise and acoustic calculations as well as vibration and shock calculations.

In cooperation with our partners, we cover all rail-relevant issues – such as traffic forecasting, equipment and railway technology, organisation and operation, and maintenance.

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#### **NBS high speed line Nuremberg-Ingolstadt, North lot, Germany**

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New ICE rail link as an extension of VDE project No. 8 from Berlin and Erfurt to Nuremberg, as well as part of axis No. 1 (Berlin – Verona – Palermo) of the trans-European networks.

**Overall length:** around 35 km

**SSF:** general planning of all works (particularly route, structures, tunnel, slab track, rail technical finishing works, railway right of way)

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5,325  
Railway  
projects



# Roads

## The foundation of our mobility

SSF Ingenieure is a single source for planning and engineering services, and project and construction management services for all kinds of traffic projects.

Together with the affiliated firm Wagner Ingenieure GmbH and the business units for building and structure planning and geotechnical engineering, we offer engineering consultancy services throughout all phases of infrastructure projects. Our experience and broad-based expertise create planning approaches with efficient and innovative solutions in the conceptual planning, new construction and expansion of roads and motorways, motorway services, and the infrastructural links to airports, railway stations and industrial and commercial parks.

The demand for ever more complex and high-performance infrastructure systems with concurrent consid-

eration of environmental protection has resulted in a major change in how traffic and road planning is approached and implemented.

- Traffic forecasting
- Traffic progression effects
- Environmental impact and compatibility
- Multiple benefit / cost analyses
- Regional / supra-regional scale
- Regional structure and regional sensitivity analysis

The above aspects are important criteria for the buildability of infrastructure projects and require a high level of interdisciplinary knowledge in the design phase. Together with its proven cooperating partners, the SSF Group offers a virtually comprehensive selection of consulting and planning services.



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**Motorway A9 Expansion of interchange  
Neufahrn – flyover, Germany**

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The conversion aimed at adapting interchange Munch North to higher traffic frequency. Coming from Munich Airport, from direction Deggendorf, a direct ramp onto A9 in direction Munich was built. In the course of this project, the four mentioned new bridge constructions and adaptations of existing structures became necessary whilst maintaining traffic at the same time.

**SSF:** project planning and structural engineering

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*“Transparent and light structures, clear and modest constructions as well as conscientious designs of structural details correlate with our striving for efficiency, functionality and beauty.”*





# Application development

## Linking steps to reach creativity

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### VFT-WIB® construction method developed by SSF Ingenieure

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Girder system for superstructures with a high level of prefabrication and external reinforcement.

Girders for an integral road bridge near Vienna / Austria: 3 x 26.15 m span width, prefabricated rolled girders, composite dowels in fin-cut design ½ HEM 600 x 399, grade S 460

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Research and development are at the basis of the continuous optimisation of buildings and infrastructure constructions in the view of their efficiency, security and sustainability and progressive design. The technical opportunities resulting from the combination of new construction materials, calculation methods and changing construction procedures are enormous.

To fulfil the clients' as well as the construction companies' individual wishes and to satisfy the presented requirements in an optimized way, it is important to know and master not only the current construction methods and procedures but also to continuously improve and develop them. At SSF Ingenieure we have established our own department for application development which dedicates its work to subjects and questions concerning further and new development of construction methods and procedures independently from the daily constraints. One of the outstanding examples for the development of a new construction method at our company is the VFT® construction method showing consequent implementation of an idea to make it ready for the market. Moreover, development and constant improvement of certain techniques and procedures take place in our operative departments in various means.

The first patent for bridge launching 25 years ago – meanwhile state-of-the-art –, top-down construction for railway bridges and under compressed air for tunnel construction, several German and European patents for maglev tracks or patent applications for mass-spring-systems and numerous utility model registrations (e.g. VFT-WIB®, VTR®, light noise protection installations), all these innovations show that we keep our fingers on the pulse and do not stop to improve existing technologies and to achieve innovations by constant modifications. Linking sometimes small but sustainable steps leads to creativity.

## Remedial engineering

### Analysis comes first

The preservation, conversion and expansion of existing structures are a further focus of our activity. SSF examines and documents the condition of structures, buildings and load-bearing structures. We seek to understand and respect them in order to properly modernise them, convert or expand them, and if necessary repair or renovate them.

When it comes to preserving existing building fabric, expanding a structure, or integrating it in a new building, plus enhancing its durability and usability through foundation repair, it is vital to examine a structure, identify damage, and report deficiencies.

For many years, we have been conducting structural examinations, and major inspections on buildings, bridges, tunnels and other engineering structures.

Developing a specific repair or maintenance programme and calculating with a precise budget means determining the nature, scope and sequence of the necessary measures. The basis for such a catalogue of measures is assessment of the structure and its exact condition, including appropriate calculations of the load-bearing structures and cost-effectiveness.

Our team possesses in-depth knowledge and experience in the area of structural inspection and appraisal and is equipped with the necessary specialised testing and inspection equipment. This enables careful, thorough inspection of structures and components.

#### SSF can prepare

- Expert opinions, assessments and recommendations for existing load-bearing structures of bridges, tunnels and other constructions, building structures and industrial installations
- Load-bearing structural analyses for planned conversions and additions
- Repair plans, tenders
- Project and construction management

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#### Dresden Central Station, Germany

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Major restoration and alteration of platform halls. The design of Sir Norman Foster was characterised by the covering of all platform halls with a teflon-coated fibreglass skin (membrane roof).

**Footprint:** 25,500 m<sup>2</sup>

**Overall length / width:** approx. 240 / 122 m

**Height:** approx. 35 m, Roof area: 30,000 m<sup>2</sup>

**SSF:** general planning of all works construction and object planning and structural engineering design

Structural Award for Infrastructure 2007,  
Deutscher Stahlbaupreis 2008 (Award)

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# Structural analysis

## Optimum optimisation

### Stadsbrug Nijmegen, Netherlands

The road bridge in Nijmegen crosses the river Waal as tied arch bridge with a span width of 285 m. The lengths of the foreland bridges amount with single spans of 42,5 m to a length of 294 m on the south side and on the north side to a total length of 679 m. The filigree middle arch that spans the river and dissolves into portals towards the abutments is around 60 m high. It supports the 27 m wide bridge deck by crossed hangers. The deck's cross section consists of a wide hollow steel box with concreted composite slab made of reinforced concrete.

**SSF:** assembly design of tied-arch bridge

In addition to the "conventional" preparation of static calculations as part of structural engineering, structural mechanics studies are becoming increasingly required for special component-design tasks. This applies in particular to the required simulation of failure processes with respect to inconsistencies of static and dynamic analyses due to non-linear material characteristics.

SSF has extensive knowledge and experience in performing structural analysis using the finite element method. We exclusively use latest-generation software to analyse load-bearing structures and components with the broadest possible range of dimensions, material properties and loads.

### Our analytical service range includes

- Structural analyses and component dimensioning, optimising of components
- Analyses of the linear elastic stress of load-bearing structures and components (under static load) to optimise materials
- Non-linear material and geometric analyses
- Stability analyses of load-bearing structures and components
- Vibration analyses including resonant frequencies, harmonic frequency domain analyses and time domain spectral analyses
- Fully dynamic analyses including shock, impact and drop tests
- Fracture-mechanical analyses
- Fatigue calculation of single components and local load transferring regions, calculation of structural tension
- Non-linear geotechnical FEM analysis of complex foundation constructions taking into account primary stresses, load history and soil / structure interaction
- Simulation of tunnelling using the mining technique on three-dimensional and two-dimensional models, using the stiffness reaction or  $\alpha$ -method
- Thermal effects: temperature distribution, heat conduction, heat stresses

## PPP / BOT projects

### Reliably assessing opportunities and risks

On top of its classic engineering activities, SSF offers extensive consulting and support in PPP (public-private partnership) and BOT (build operate transfer) or comparable projects. These range from management consulting, project development and project controlling, the generation of technical risk analyses as a supporting decision-making criterion for project financing, to participation in the development of financing models.

As the public sector is neither able to provide sufficient financial resources for all the many tasks nor implement these within a suitable time frame, the number of PPP / BOT projects will increase significantly in the medium term.

Sound expertise and experience plus innovative ideas are indispensable for reliably estimating and assessing potential projects in the developmental or bidding phase as regards their technical and financial opportunities and risks. By their nature, large-scale construction projects in the infrastructure segment entail a full range of planning, operational and strategic risks and a wide variety of conflicts. These must be identified, assessed and classified preventively to ensure interruption-free processes and costing reliability.

In the tender phase, we give consortia, banks and insurers that finance or provide security for PPP projects, the necessary and secure background – either in association with its affiliated companies or for joint ventures with national / international consulting companies.

As an independent engineer focused on value engineering, SSF supports you with its expertise and long-standing experience in all aspects of risk analysis, technical feasibility evaluation and investment costs.



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**A8 west motorway, Ulm – Munich, Augsburg  
– Munich section, Germany**

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Pilot project for the construction, maintenance and operation of a motorway in Germany under the operator model as part of a public-private partnership (A-model). Expansion of motorway to six lanes over 37 km from Augsburg to Munich with optimisation of gradients. 52 km operating section (concession area). Average daily volume up to 100,000 vehicles / day.

**SSF:** object planning as well as structural engineering design for the licensee by Wagner Ingenieure GmbH (SSF Group).

A number of bridging structures on this section were realised using VFT® construction, developed by SSF Ingenieure.

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Contact

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*“Our goal is to design and realise high-quality, cost secure and sustainable buildings and infrastructure projects in close cooperation with our customers on the basis of mutual trust.”*

## Offices

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### SSF Munich

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muenchen@ssf-ing.de

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### SSF Halle

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### SSF Munich

Head office of SSF Ingenieure AG  
at Domagkstrasse in Munich

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### Headquarters SSF Group, Munich

Baugeologisches Büro Bauer GmbH  
Prof. Schaller UmweltConsult GmbH  
Wagner Ingenieure GmbH, Buba Ingenieure  
GmbH, fair CM² GmbH, PEC + S Planning,  
Engineering, Consulting + Services GmbH

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Headquarter  
Lang Hugger Rampp GmbH Architekten

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## SSF Group

SSF offers you a comprehensive and client-oriented service, with integral solutions that exactly match your requirements. For this purpose, the following companies have joined SSF Ingenieure AG:

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### Baugeologisches Büro Bauer GmbH

geology | hydrology | subsoil

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T + 49 (0)89 / 3 60 40 - 465 | F + 49 (0)89 / 3 60 40 - 54 65  
markus.bauer@baugeologie.de | www.baugeologie.de

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### Prof. Schaller UmweltConsult GmbH

environmental planning | landscape planning | ecological reports

Domagkstrasse 1a | 80807 Munich / Germany  
T + 49 (0)89 / 3 60 40 - 320 | F + 49 (0)89 / 3 60 40 - 53 20  
info@psu-schaller.de | www.psu-schaller.de

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### Wagner Ingenieure GmbH

traffic installation planning

Domagkstrasse 1a | 80807 Munich / Germany  
T + 49 (0)89 / 68 08 96 - 3 | F + 49 (0)89 / 68 08 96 - 59  
kontakt@wagner-ingenieure.com | www.wagner-ingenieure.com

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### fair CM<sup>2</sup> GmbH

Ingenieurgesellschaft für Baubetrieb

Freie-Vogel-Straße 393 | 44269 Dortmund  
T +49 231 / 98 949 84 - 0  
info@fcm2.de | fcm2.de

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### Buba Ingenieure GmbH

Prüfung bautechnischer Nachweise im Eisenbahnbau

Domagkstraße 1a | 80807 München  
T +49 89 / 36040 - 409  
rbuba@buba-ing.de

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## **Europrojekt Gdańsk S.A.**

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traffic installation planning | structural engineering

ul. Nadwislanska 55 | 80-680 Gdansk / Poland  
T + 48 (0)58 / 3 23 99-99 | F + 48 (0)58 / 3 23 99-98  
europrojekt@europrojekt.pl | www.europrojekt.pl

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## **S.C. SSF – RO s.r.l.**

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structural engineering

Str. Splai Tudor Vladimirescu Nr. 12, Ap. 6 | 300.195 Timisoara / Romania  
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office@ssf.ro | www.ssf.ro

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## **PEC+S Planning, Engineering, Consulting + Services GmbH**

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consulting und supervision for the Chinese market

Domagkstraße 1a | 80807 München  
T + 49 89 / 3 60 40-0 | F + 49 89 / 3 60 40-100  
muenchen@ssf-ing.de

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## **PEC+S Beijing Planning, Engineering, Consulting + Services Ltd.**

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representation for PEC + S in China

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## **SSF Azerbaijan LLC**

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(fully owned subsidiary company)

AZ1025 | Baku | Republic of Azerbaijan | Khatai District  
Suleman Vezirov street | House 22  
jfruehauf@ssf-ing.de

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## **SSF Ingenieure AG – Tansania**

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(registered branch office)

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Dar es Salaam | Tanzania  
jfruehauf@ssf-ing.de



**BMW Welt, Munich, Germany**

BMW AG promotional and distribution centre

**Architects:** COOP HIMMELB(L)AU Wolf D.Prix/W. Dreiholz & Partner ZT GmbH

**SSF:** final design structures and object, overall construction management and supervision



## Fast Facts

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e-Mail	muenchen@ssf-ing.de
Internet	www.ssf-ing.de
Number of offices in Germany	6
Locations	Munich, Berlin, Halle, Düsseldorf, Hamburg, Regensburg
Offices abroad	China, Poland, Romania, Azerbaijan, Tanzania
Employees	approx. 300
Year established	1971 (Schmitt & Stumpf GbR)
Supervisory board / Management board	V. Schmitt, D. Stumpf, W. Frühauf / C. Schmitt, A. Braun, H. Wolf
Services	Complete management and planning ser- vices in civil, structural and geotechnical engineering and environmental planning
Legal form	AG (non-stock corporation)
Registered	Munich district court, HRB 189.061
VAT registration	DE 129 472 191
Quality management system	certified to DIN EN ISO 9001:2015
Insurance	VHV Versicherungen; Hannover, personal and property insurance



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[www.ssf-ing.de](http://www.ssf-ing.de)

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Subject to change without notice

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For reasons of readability, in this brochure only the masculine form has been used to describe persons. The use of the masculine includes also the feminine.

## SSF GROUP



**SSF Ingenieure AG**  
Beratende Ingenieure im Bauwesen  
[ssf-ing.de](http://ssf-ing.de)



**Baugeologisches Büro Bauer GmbH**  
Beratende Geologen und Ingenieure  
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**Wagner Ingenieure GmbH**  
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**Prof. Schaller UmweltConsult GmbH**  
Landschaftsplanung, Landschaftsarchitektur  
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**Buba Ingenieure GmbH**  
Erfahrung beim Planen – Kompetenz beim Prüfen  
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**fairCM² GmbH**  
Professionelles Nachtragsmanagement für  
Auftraggeber und Auftragnehmer  
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