

Worldwide Activities



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TUNNEL DESIGN

GEOTECHNICAL ENGINEERING

CONSTRUCTION MANAGEMENT

INSTRUMENTATION & MONITORING

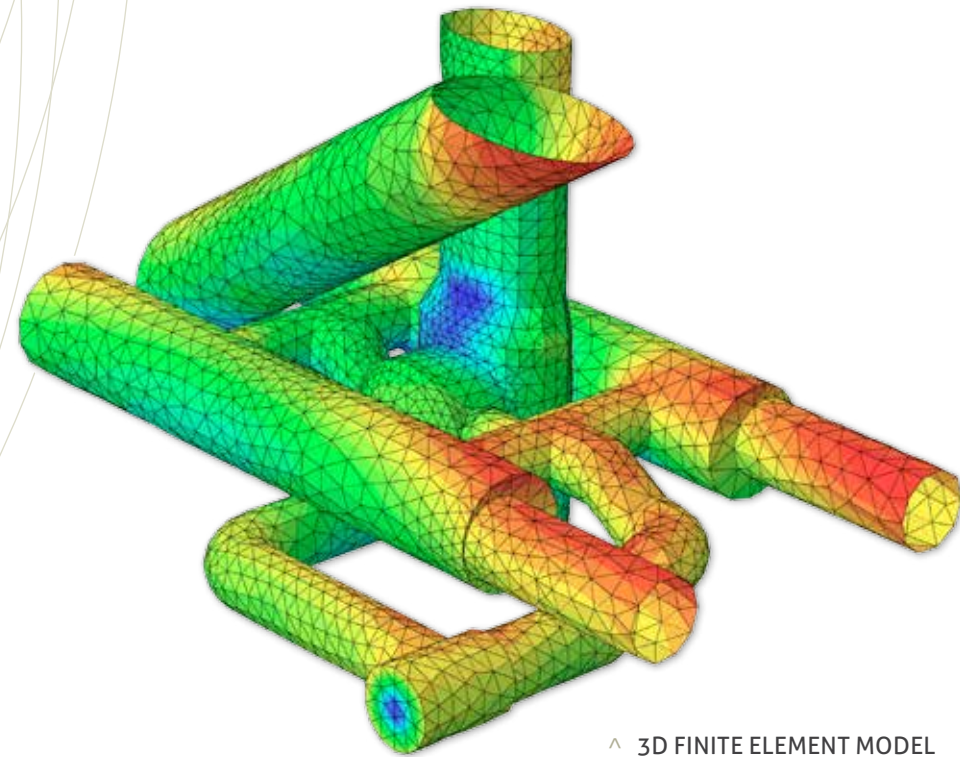
WATERPROOFING & WATER CONTROL

TUNNEL REHABILITATION



Based on worldwide experience and involvement in numerous tunneling projects since 1980, **Dr. Sauer & Partners (DSP)** can refer to an unmatched pool of case histories and successful projects for transit tunnels and underground stations, highway, railway and utility tunnels. **DSP** designs tunnels in urban and rural areas and any type of geology, including soft ground, mixed face and hard rock.

Our focus on underground works and mined structures enables us to stay on top of new developments and technologies. Implementing these developments into our designs translates into improvements of safety, schedule and cost.



^ 3D FINITE ELEMENT MODEL of Green Park Station, London, UK

DSP TUNNELING METHODS

- Mined tunneling methods (NATM / SEM / SCL)
- Mechanized tunneling methods and pressure-face TBMs
- Open cut methods (cut-and-cover, top-down)

DSP DESIGN SERVICES

- Feasibility and other technical studies
- Comparative studies: comparing mined / mechanized / cut-and-cover tunneling methods
- Conceptual and preliminary design
- Final design and bid support services
- Conceptual and detailed cost estimates
- Risk management
- Value engineering
- Design-build design services
- Construction support services during construction (e.g. value engineering proposals and shop drawings)
- Insurance support services
- Claim management
- Expert advice
- Waterproofing design
- Tunnel ventilation and emergency evacuation design

DSP SPECIALIZED TECHNOLOGY

DSP routinely uses sophisticated ground support and ground improvement techniques to address special conditions for tunneling, such as:

- Doorframe slab method: for tunnels with shallow overburden
- Barrel vault method: for tunnels in soft, loose ground
- Jet grouting: as pre-support and ground improvement
- Ground freezing: in soft, water bearing soils
- Compensation grouting: underneath sensitive structures

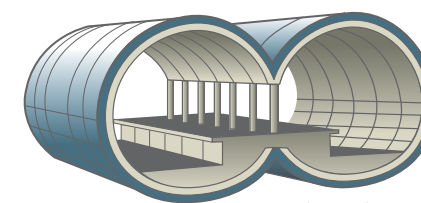


GREEN PARK STATION > London, UK

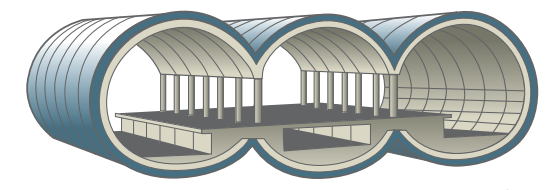


Green Park station is a London Underground station that serves as an interchange between the Piccadilly, Victoria and Jubilee lines.

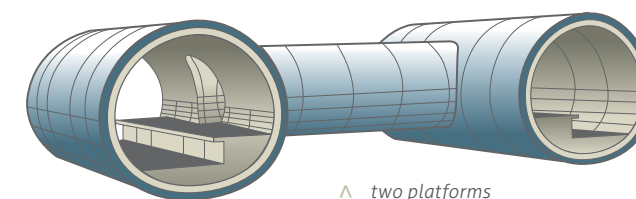
A new ticket hall extension, elevator shafts and access tunnels were constructed to increase capacity and enhance access. **DSP** was responsible for the detailed design. Extensive 3D Finite Element analysis was used for the structural lining design and to predict deformations, with an accuracy of +/- 2 mm.



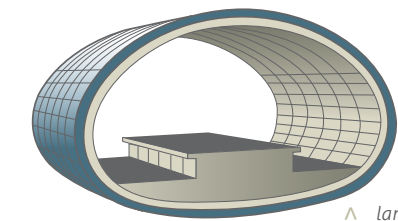
^ binocular



^ trinocular



^ two platforms



^ large span cavern

MINED UNDERGROUND STATIONS

As urban density increases, many cities opt for mined underground stations in lieu of traditional cut-and-cover stations to minimize surface disruption. This has significant benefits for community businesses and urban fabric as a whole. **DSP** has over thirty years of experience in this field and can custom-tailor the station layout, configuration and construction sequence to address space constraints and meet our customers' needs.