

STUCKY LTD

SPECIALIST  
FOR  
WATER  
AND  
ENERGY



# WATER AND ENERGY – INSEPARABLE RESOURCES



Deriner Dam and Hydropower Plant, Turkey

**Stucky Ltd** is a leading engineering and design company specialized in the dam and hydropower engineering and energy sectors since its foundation in 1926. To date, Stucky's engineers and specialists have successfully completed well over 100 major schemes for the construction, extension and rehabilitation of dams and hydropower plants in Switzerland and abroad. Our hydraulic and environmental engineering experts also design state-of-the-art water supply systems, river renaturalization schemes and flood control infrastructure and measures.



## Our services

We offer a wide range of engineering, consulting and project management services for public- and private-sector clients. These cover all project stages, from inception and preliminary studies to works supervision and commissioning. We also cover projects of all sizes from Run-of-River to storage-type hydropower projects of 1 MW to several thousand MW. We have comprehensive experience of all the Engineering roles and thus can act as Owner's Engineer, EPC Engineer or indeed as Lender's Engineer. Our expertise in dam and hydropower engineering is highly regarded and sought after both inside and outside Switzerland.

- > Masterplans & project development
- > Preliminary and feasibility studies
- > Concession and construction permit design
- > Tender design and tender documents (FIDIC and other construction contracts, etc...)
- > Procurement assistance

- > Execution design
- > Works supervision
- > Special studies, technical assistance

- > Due diligence
- > Independent expert advice
- > Safety assessment and risk analysis

## Our competencies

Stucky has extensive engineering design expertise in the fields of dams, hydrology, geotechnics, hydraulics, hydraulic steel structures, power plants, energy transmission, river and water basin management, water supply and water transfer schemes and flood control. Our highly qualified team of engineers provides you, the Client, with all necessary support both in Switzerland and abroad.

## Our presence

Stucky Ltd is headquartered in Renens, Switzerland. Through our branches and project offices, we are represented in many countries across the world.

## Our network

As a member of the Gruner Group, we can draw on the knowledge and experience of over 1,000 experts and specialists with backgrounds in some 50 different professions.



Heightening of Vieux Emosson Arch Dam, Switzerland

## DAMS

# FOCUS ON SAFETY

**We offer a full range of engineering services for the construction of all types of dams. These services cover everything from the identification and preliminary studies to design and construction stages, including operation, commissioning support, monitoring and rehabilitation.**



Hightening of Cambambe arch dam, Angola



Muttsee gravity dam, Switzerland



Shahid Rajaei arch dam, Iran

Over 20 large dams higher than 150m, in Switzerland and abroad are a testimony to Stucky's expertise. Our company is a global leader in the field of structural and numerical analysis with extensive experience in dam heightening and dam rehabilitation projects.

- > Embankment dams including earthfill, rockfill and CFRD (concrete-face rockfill) dams
- > Arch dams, gravity dams, roller-compact-ed-concrete (RCC) dams, buttress dams
- > Foundations, strengthening and grout curtains
- > Appurtenant structures, spillways, intakes and waterways
- > Dam monitoring and instrumentation
- > Concrete technology

### Optimization and rehabilitation

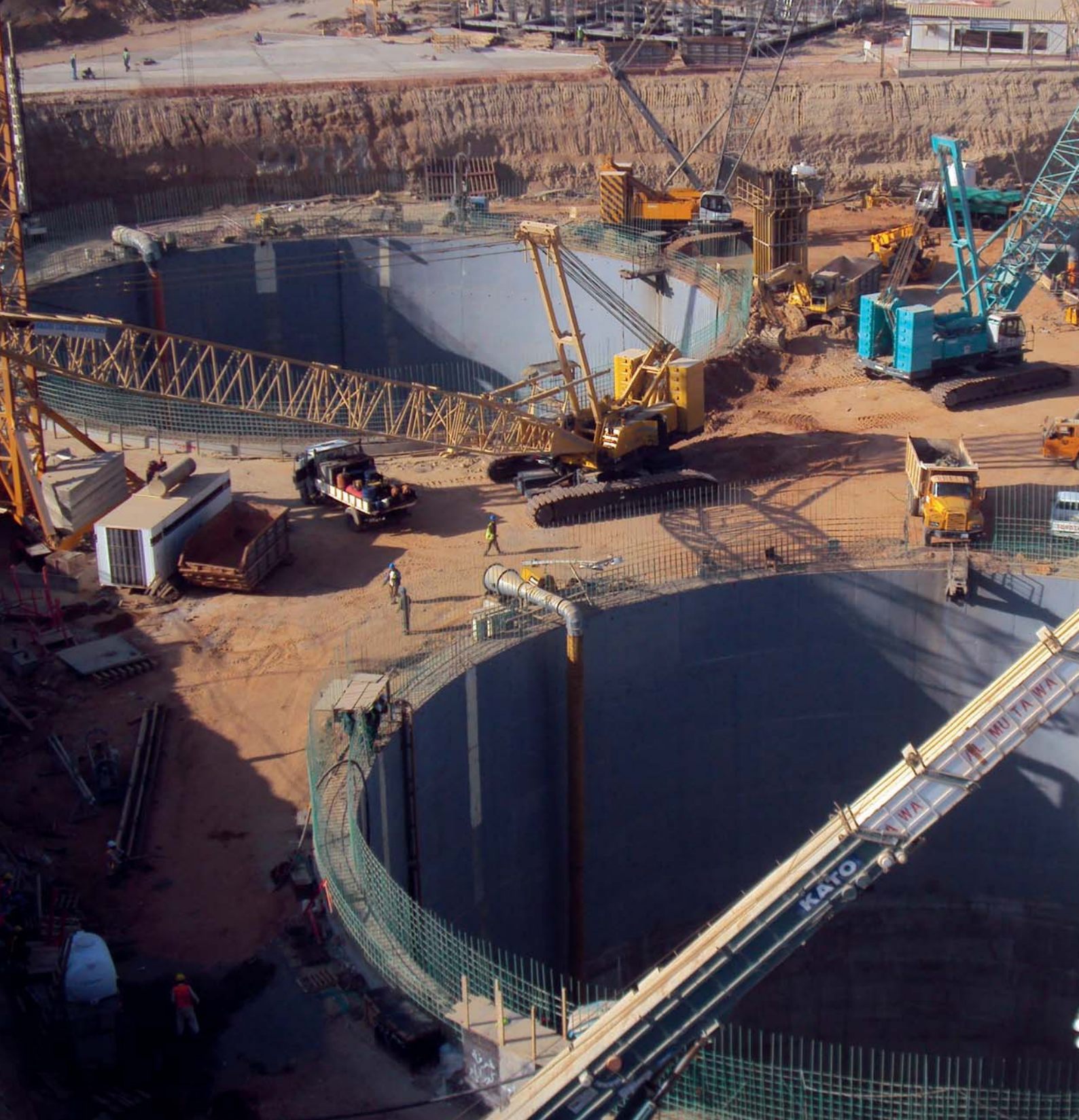
Thanks to the application of state-of-the-art computational methods, projects that optimize and heighten existing dams have now become a viable alternative to new-build structures. Projects involving the rehabilitation and extension of existing facilities present highly complex engineering challenges while placing rigorous demands on the project planning and construction. Assessing load-bearing capacity and deformation behaviour is extremely complicated, especially in older structures. In parallel, the works often have to be performed while maintaining energy production. With an outstanding track record in projects involving rehabilitation under operating conditions, Stucky is in an excellent position to master these challenges, minimizing disruption to power production.

- > Rehabilitation
- > Dam heightening
- > Dam strengthening
- > Analysis and mitigation of alkali-aggregate reaction

### Better safe than sorry

Stucky's dam monitoring expertise is highly valued both inside and outside Switzerland. Our services include the precise appraisal of dam behaviour as well as detailed investigations to guarantee dam safety. Seismic safety certification for existing structures and assessment of the associated strengthening measures are key activities in this area. Our dam safety know-how has evolved over many years from experience gained from our involvement in hundreds of international projects with both small and major dams in Switzerland and abroad, many over 100 years old.

- > Computation and numerical analysis of dam behaviour
- > Expert reports on potential dam failure
- > Dam safety assessment and certification
- > Seismic analysis
- > Verification of flood and spillway capacity
- > Contaminant management (presence of asbestos etc...)



Sewer Shafts Jeddah, Kingdom of Saudi Arabia

# UNDERGROUND AND GEOTECHNICAL ENGINEERING

# A DEEP WELL

# OF EXPERTISE



**Our underground engineering service portfolio covers structures such as tunnels, galleries, caverns, shafts and foundations in all project phases, along with the planning and supervision of geotechnical field investigations.**

Our extensive knowledge gathered during many years of hands-on experience paves the way for the successful design and construction of even the most complex underground works and foundations.

Our core competencies also include the repair and rehabilitation of existing tunnels and galleries for hydropower and water transfer schemes.

- > Concept development, design and works supervision for underground construction
- > Analysis of material properties and behaviour of rock and soft ground excavations
- > Analysis and computations of the stability of dam foundations
- > Appraisal, monitoring, maintenance and rehabilitation of underground structures
- > Design and the supervision of the construction of grout curtains and dewatering systems
- > Planning and supervision of geotechnical field investigations
- > Evaluation of tunnelling methods (TBM, blasting, raise boring etc.)



Powerhouse Cavern, Hongrin-Léman Pumped Storage Scheme, Switzerland



Lausanne Train station, Installation of the Tunnelling Boring Machine for the creation of Cable Gallery under the station, Switzerland

## HYDRAULIC STEEL STRUCTURES AND PENSTOCK ENGINEERING

# GROUND BREAKING TECHNOLOGY

**Stucky will provide you with expert support in the planning design and construction supervision of hydraulic structures, including penstocks, pressure shafts, valves, gates and stoplogs as well as with complex hydraulic transient computations.**

Akköy II Penstock, Turkey





Our references for penstocks and pressure shafts include new-build and rehabilitation projects with hydraulic head up to 1,800m and flow rate of up to 320m<sup>3</sup> per second. State-of-the-art analysis paves the way for long-term project success.

Stucky's portfolio also includes water transfer schemes of several hundred kilometers, and associated pumping stations.

- > Design and work supervision for steel-lined pressure shafts and penstock made from concrete/steel/GRP/cast iron
- > Hydraulic steel structures
- > Design and analysis of hydraulic model tests
- > Hydraulic and transient computations
- > Expert reports on performance of existing facilities and steel structures
- > Assessment of residual safety, damage surveys, rehabilitation concept



Drinking Water Transfer Tamanrasset, Algeria



Replacement of the Penstock, Cleuson-Dixence hydropower plant, Switzerland



Penstock manifold (Hongrin-Léman Pumped Storage Scheme), Switzerland



Ilisu Powerhouse, Turkey

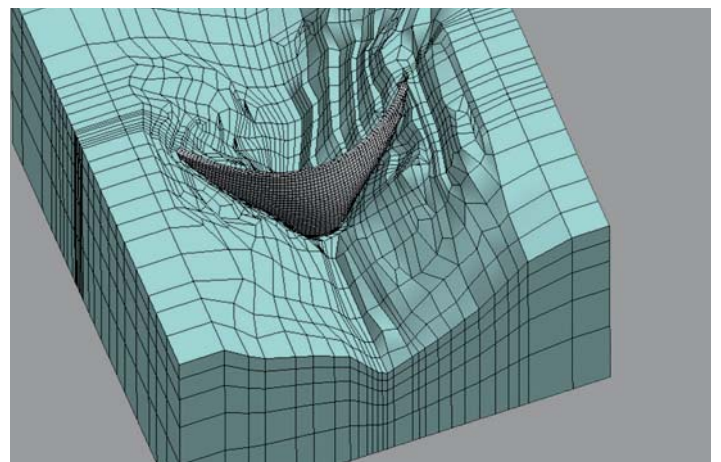
## **STRUCTURAL DESIGN**

# PRECISION FOR HIGHEST PERFORMANCE

**Stucky develops tailored structural design solutions for challenging projects. These include powerhouses, hydraulic structures, buildings, bridges and infrastructure facilities.**



Deriner Arch Dam, Turkey



3D FE-Numerical Model of Deriner Dam, Turkey

In designing all types of complex structures, Stucky capitalizes on its proven track record in numerical modelling for linear, non-linear, static and dynamic computations. We also have considerable experience in the field of concrete technology with a particular focus on the long-term behaviour and the resulting effects of Alkali-Aggregate Reaction (AAR).

This is backed up by comprehensive consulting services covering all technical, social, environmental, economic and financial issues.

- > Powerhouses
- > Reservoir impounding
- > Dams and weirs
- > Valve chambers
- > Static and dynamic computations
- > Analysis and computations on structural stability
- > Finite Element modeling
- > Seismic safety certification for structures
- > Alkali-aggregate reaction



Substation Hauterive, Switzerland

## HIGH-VOLTAGE NETWORKS AND POWER PLANTS

# GUARANTEED RELIABILITY

**The need for operational flexibility and reliability of high-voltage electricity networks, switchgear and power plants is steadily growing. This is a result of the electricity market liberalization and the development of generation and intermittent energies. We innovate and design the electro-mechanical equipment and energy feed-in for run-of-river or regulated, small and large hydropower plants.**



Energising Kamoia, Aerial view of the substation, Democratic Republic of Congo



Karun IV powerhouse, Iran



NIPP Transmission lines and substations 330-132 kV, Nigeria

In the field of energy transmission, we conduct network analysis and other investigations into the grid connection of power plants. We also specialize in the design of high-voltage power lines and air- or gas-insulated switchgear.

Our core competence covers all types of power plants ranging from small to large power plants, up to and beyond 3,600 MW.

- > Works supervision and commissioning of
  - Power plants
  - Substations from 72.5 to 400kV
  - Gas-insulated and outdoor switchgear from 33 to 400kV
- > Factory acceptance tests
- > High-voltage power lines up to 400kV
- > Substations up to 400kV
- > Design of energy supply and electrical protection cables for railway systems

- > Cable routes, cable tunnels, cable trenches
- > Small and large power plants
- > Local and national dispatch centres
- > Pumped-storage hydropower plants
- > Pumping stations
- > Rehabilitation of hydropower plants
- > Control systems
- > Analysis of energy potential and assessment of hydropower potential

## RIVER AND ENVIRONMENTAL ENGINEERING

# UNDERSTANDING NATURE

**Natural systems tend to be highly complex. Understanding them requires broad-based, interdisciplinary expertise covering all the associated technical, scientific, social, environmental, economical and financial aspects.**

Third Correction of the Rhône, Switzerland



Stucky's specialists provide the knowledge and experience needed to analyze natural processes and develop tailored solutions. The company's service portfolio ranges from risk assessment studies on specific issues and projects to mitigate natural hazards to the re-naturalization of watercourses.

- > Irrigation and drainage schemes
- > Hazard maps
- > Hydrological and hydraulic studies
- > Water resource management
- > River structures, water retaining structures, transverse structures, bedload and drift wood retention basins
- > River training

- > Renaturalization of watercourses
  - Uncovering, revitalization, bio-engineering
  - Fish passes and ladders
  - Bedload analysis and computations
  - Hydropeaking
- > Minimization of flood risks
  - Planning and maintenance of water courses
  - Measures to protect property
  - High-water alarm systems (early warning systems)
- > Dam break studies
- > Studies on environmental impact of river engineering works

### Specific activities

- > Numerical modelling
  - Hydrological models of catchments
  - Hydraulic models
  - Coupled models for bed-load transportation
- > Development and supervision of physical model tests
- > Cartography and GIS analysis



Fish Ladder Aubonne, Switzerland



Debris Rake on the Marivue River, Switzerland

# WE VOUCH FOR QUALITY

## Certification

- > Quality management system:  
ISO 9001:2008
- > Environmental management system:  
ISO 14001:2004
- > Occupational health and safety management system:  
OHSAS 18001:2007

All of our contracts have to comply with the directives of our quality management system (QMS) and are supervised by a Project Supervision Committee.

This allows us to guarantee the required quality standards, identify and mitigate risks in advance, develop interdisciplinary solutions, and finally to promote ideas and experience sharing between our Engineers and our Clients.

Our code of ethics obliges us to enforce the following principles:

- > **Integrity**
- > **Provision of first-class services and quality**
- > **Sustainability, social and environmental responsibility**
- > **Personal responsibility and accountability**
- > **Compliance with laws and international standards**

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