Power System Study/ Engineering Services

الدار الدولية للهندسة
DAR ENGINEERING
www.dar-engineering.com

DAR Engineering offers full range of power systems studies and engineering services to utilities, IPP's & Industries - both for new installations and to improve the efficiency and performance of existing Electrical Network.

DAR understands utility/industrial Power System Study requirements with respect to International practices/standards and use state-of-the-art software to analyze the system problems in detail to provide techno-economic solutions.

Our success is based on our well proficient and dedicated design team, high-tech design software tools and close interaction with site team during execution and utility engineers for real time feedback.

Expertise in conducting:

- Power Flow Studies.
- Short Circuit Studies.
- Contingency Studies.
- Reactive Power Optimization.
- Capacitor Locations and Sizing.
- Voltage Stability Analysis.
- Transient Stability Analysis.
- Protection System Studies (Overcurrent phase and earth fault, High set, Differential, Distance, Frequency, Voltage relays).
- Equipment Protection Applications (Transformers, Transmission lines, Motors, Generators, Bus Protection).
- Harmonic Measurements, Analysis and Filter Design.
- Voltage flicker studies.
- Switching Transient Studies.
- Insulation Coordination.
- Motor Starting Studies.
- Arc Flash Hazard analysis.
- Line Constants & Parameter Evaluation.
- Induced voltages on buried pipe lines running under the transmission line corridor.

Our Services include:

- Network planning and system design
- Grid interconnection studies for IPP's and Industrial plants
- Impact studies for new projects or extension
- Equipment Failure investigation studies
- Line reactor/Neutral Grounding reactor design studies
- Single pole auto-reclose studies
- Power evacuation studies
- Insulation co-ordination/Ferro resonance studies
- Industrial MV network performance assessment studies
- Protection co-ordination and setting calculation studies for generating stations, Transmission & Distribution Networks and Industrial plants
- Power quality measurements & assessment studies

Important Reference Projects

*** Please visit our website for complete project list.*

Power Plant Interconnection and Impact analysis, Plant MV network design validation

Industry : **Power Generation and Water treatment**
Client : **Saline Water Conversion Corporation (SWCC)**
Location : **Ras-Al Khair, Saudi Arabia**

Requirement :

- Assessment of the impact of 2400 MW power plant operation along with Ma'aden aluminium smelter in Grid Islanded mode by conducting Potline startup and Potline re-start studies.
- Studies to assess the response of power plant with variation in smelter load and water production (Load shedding and generation rejection).
- Assessment of response of power plant to grid disturbances.
- Equipment Validation for 380kV substation and 13.8kV MV network of Power plant, desalination plant and pumping station.
- Motor starting and automatic bus transfer studies.

Studies performed:

Load flow, short circuit, dynamic stability, motor starting studies, bus change-over studies, Insulation co-ordination, Ferro-resonance, transfer surge analysis and circuit breaker TRV studies.

Transmission system switching study for 380kV network of EOA

Industry : **Electricity utility**
Client : **Saudi Electricity Company**
Location : **Dammam, Saudi Arabia**

Requirement :

- Modeling EHV network of SEC EOA.
- Performing reactive power compensation and line switching studies to assess the need for line reactors.
- Performing network frequency scan studies.
- Detailed design and specification development for line reactors.

Studies performed:

Temporary over voltage study, Switching over voltage study, Ferro-Resonance study, Resonance study during circuit breaker stuck pole and Circuit breaker transient recovery voltage study.

Investigations for Ferroresonance occurrence during energization of new 69kV substation of a hydrocarbon plant

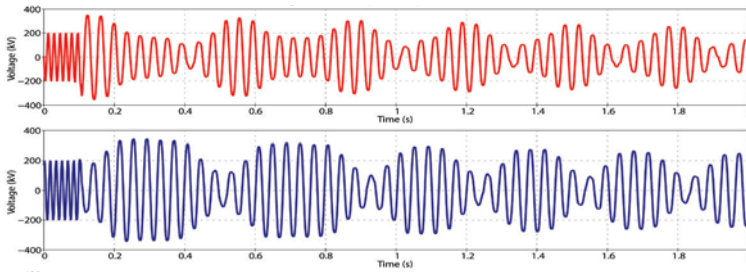
Industry : **Oil & Gas**
Client : **Saudi Aramco**
Location : **Dammam, Saudi Arabia**

Requirement :

- Field investigations and collection of design Data, Operating Parameters, test/event Records.
- To analyze the possibility of occurrence of Ferro-resonance for different operating scenarios
- To provide mitigation measures to overcome Ferro-resonance in the 115/69kV network.

Studies performed:

Switching over voltage study, Ferro-Resonance study, Resonancestudy during circuit breaker stuck pole.



Defining protection settings for 380kV interconnection between SOA, WOA & COA transmission systems (Complete SEC Transmission network)

Industry : **Electricity utility**
Client : **Saudi Electricity Company**
Location : **Riyadh, Saudi Arabia**

Requirement :

- Loss of synchronism study between interconnected power system for power system contingencies (Power system faults, Loss of Generation & Line switching).
- Loss of synchronism study between generators and rest of the utility system for power system contingencies (Power system faults, Loss of Generation & Line switching).
- Provide Relay setting for Out-of-step situation.
- Power system dynamic performance validation after out-of-step operation and system spilt.

Studies performed:

Load flow, short circuit, dynamic stability and protection setting calculations.

Transmission system up-gradation for Abqaiq Area

Industry : **Oil & Gas**
Client : **Saudi Aramco**
Location : **Abqaiq, Saudi Arabia**

Requirement :

- Review of existing network of Saudi Aramco in Abqaiq area.
- Identification of network constraints.
- Perform simulation studies and develop suitable proposals for system reinforcement and strengthening of Abqaiq Area network.
- Development of load shedding and grid islanding schemes.

Studies performed:

Load flow, short circuit, motor starting studies, transient stability, relay setting co-ordination, Arc flash hazard studies, Insulation co-ordination and Ferro resonance.

Power quality assessment and grid interconnection studies

Industry : **Steel plant**
Client : **Arab Steel**
Location : **Dammam, Saudi Arabia**

Requirement :

- Power Quality and Harmonic measurements at grid interface points
- DC EAF modeling and AC LF modeling
- Studies to assess the harmonic and voltage flicker levels at PCC.
- Proposals for mitigation measures to suppress the harmonics and voltage flicker problems.
- Validation of STATCOM design and specifications.
- Review of steel plant MV network configuration.
- Motor starting impact analysis
- Preparation of scheme.

Studies performed:

Load flow, short circuit, motor starting studies, Harmonic studies and Voltage flicker studies

Investigation of Electrical problems in Arar, Rafha, Qurrayat, Tabarjal and Al-jouf Power plants

Industry : **Electricity utility**
Client : **Saudi Electricity Company**
Location : **Riyadh, Saudi Arabia**

Requirement :

- Field investigations, measurements and collection of design Data, Operating Parameters, Maintenance and Test Records & Future Expansion Data.
- Route cause analysis for the existing Electrical problems in the power plants.
- Developing techno-Economic proposals to mitigate the problems.

Studies performed:

Load flow, short circuit, dynamic stability and protection setting calculations.

Power System performance assessment for 380kV MYAS network

Industry : **Electricity utility**
Client : **Marafiq**
Location : **Yanbu, Saudi Arabia**

Requirement :

- Modeling complete 380kV MYAS network along with SEC WOA network
- Assessment of existing network constraints by simulation studies

Studies performed:

Load flow, short circuit, dynamic stability and insulation coordination studies.

Offering **Power System Solutions** tailored to fit the needs of:

- Transmission utilities
- Distribution utilities
- Power generation companies
- EPC contracting and construction companies
- Oil & Gas industry
- Metals & mining industry
- Chemicals, cement and fertilizers industry

Simulation Tools:

To address more complex networks for sophisticated electrical studies with precise and optimum design, highly specialized reputed design software with right expertise is required. DAR Engineering uses the following well reputed software for conducting the system studies as per customer needs

PSCAD: Electro Magnetic Transient analysis package for performing Insulation coordination, NGR design, special protection relay (like distance relay) behavior analysis and over current relay protection coordination and Power quality assessment study.

EMTP: Electro Magnetic Transient analysis package for performing Insulation coordination, NGR design.

ETAP: Load flow, short circuit, motor starting, transient stability studies, relay setting calculation/coordination study, load shedding analysis, Arc Flash Hazard Analysis, Harmonic Analysis and Automatic Bus Transfer studies.

PSS/E: Load flow, short circuit, protection review and dynamic studies for utility networks.

CDEGS: Substation Grounding

SES-ROW PRO: Induced voltage and magnetic interference studies.

Our other **Core Fields**

- Power Generation
- Substations (EHV / HV / MV)
- Transmission lines (EHV / HV / MV)
- Industrial and building electro mechanical
- Project / Construction Management
- Healthcare & Education
- Oil & Gas
- Architectural, Civil and Structural
- Electrical Engineering
- Mechanical and Piping Engineering
- Power System Studies
- Industrial Electrical Studies

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