

A PROFILE



FACT Engineering & Design Organisation

A Division of

The Fertilisers And Chemicals Travancore Ltd.

(A Government of India Enterprise)

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1 OUR BACKGROUND

- 1.1 FACT Engineering & Design Organisation (FEDO), is a premier engineering consultancy organisation of India, engaged in design, engineering and implementation of projects in process, oil & gas and allied industries. We form part of a multi-divisional company, the Fertilisers And Chemicals Travancore Ltd (FACT), a Schedule-'A' category Government of India Enterprise, under the administrative control of the Department of Fertilisers in the Ministry of Chemicals & Fertilisers.
- 1.2 FEDO's symbiotic relationship with FACT endows us with certain unique strengths that most other Indian consultants do not possess. These include access to FACT's rich database on building and managing of plants, based on different generations of process technology, availability of experienced personnel, support of sister divisions like FACT Engineering Works (engaged in equipment fabrication), Computer Services Centre, R & D Centre, Management Development Centre etc. The financial backing of FACT, with an annual turnover in excess of Rs.17450 million (US \$275 million) adds to our credibility with clients, while awarding high value LSTK (Lump sum Turnkey) contracts to FEDO.
- 1.3 In May 1995, FEDO became the first project engineering Consultant in India to be awarded the prestigious international quality certification ISO 9001 (1994 revision) for our quality systems and procedures. Presently, it has been upgraded to the ISO 9001:2008 version, and getting ready for revision to ISO 9001:2015, due in 2018.

2. SERVICES OFFERED

- 2.1 In the fifty eight years of its existence, FEDO has served an impressive array of clients in diverse fields of operation. Indian blue chip companies operating in the petroleum, refining and fertilizer sectors have utilized our services for their prestigious projects during this period. FEDO's operations have been extended in big way to Infrastructure sector also, catering its services to major Educational Institutions of the country.
- 2.2 Besides taking up projects on a concept-to-commissioning basis, FEDO also undertakes pure consultancy jobs for owners who are capable of managing the fine intricacies of project implementation - technology sourcing, procurement and construction - themselves.
- 2.3 Our consultancy services package comprises:
 - >> Pre-project activities like preparation of Techno-Economic Feasibility Reports, Detailed Project Reports, Hazop studies, selection and transfer of technology and assisting owner in liaising with statutory bodies and project financing agencies;
 - >> Supply of know-how and basic engineering packages for processes developed in-house and preparation of basic engineering package for commercial sized plants based on pilot plant data;

- >> Providing detailed engineering, procurement assistance, construction supervision and commissioning assistance during project execution stage;
- >> Inspection, including third party inspection and expediting services;
- >> Project management services comprising of planning, cost control and associated MIS;
- >> Trouble-shooting and maintenance services for running plants;
- >> Undertaking revamp and retrofit of ailing plants;
- >> Electrical System/Power System Analysis using ETAP Software and
- >> Conducting safety, energy and environmental audits, HAZOP and HAZAN studies, disaster management studies, lightning protection adequacy studies etc. of existing plants;
- >> Fire & Safety Engineering including adequacy study of existing Fire Protection Systems, Fire Fighting facilities and Safety systems;
- >> Health Study and Weak Area Analysis of Process Plants.

3. FIELDS OF OPERATION

- 3.1 Over the years, FEDO has actively participated in the industrialisation process by helping both private promoters and Government agencies in setting up viable units. Our clients include:
- >> Oil & Natural Gas Corporation Ltd, Gas Authority of India Ltd, Indian Oil Corporation Ltd, Hindustan Petroleum Corporation Ltd, Bharat Petroleum Corporation Ltd, IBP Co Ltd, Chennai Petroleum Corporation Ltd, BPCL-Kochi Refineries, etc. in the oil, gas and refining sector.
 - >> Krishak Bharati Co-operative Ltd, Indian Farmers' Fertiliser Cooperative Ltd, Madras Fertilizers Ltd, Fertiliser Corporation of India Ltd, Hindustan Fertilisers Corporation Ltd, Southern Petrochemical Industries Corporation Ltd, Tuticorin Alkali Chemicals & Fertilisers Ltd, Paradeep Phosphates Ltd, Pyrites, Phosphates & Chemicals Ltd, Indo Gulf Fertilisers & Chemicals Corporation Ltd, Oswal chemicals & Fertilizers Ltd, Gujarat State Fertilizer Corporation, Gujarat Narmada Valley Fertilizer Corporation Ltd, Mangalore Chemicals & Fertilizers Ltd. in the fertilizer sector.
 - >> Hindustan Organic Chemicals Ltd, Hindustan Zinc Ltd, Hindustan Copper Ltd, Kerala Chemicals & Proteins Ltd, Travancore Titanium Products Ltd, Binani Zinc Ltd, Hindustan Lever Ltd, Gujarat Narmada Valley Fertiliser Company Ltd, Hindustan Insecticides Ltd, Indo German Carbons Ltd, etc from the other sectors of process industry.

- >> Kerala Infrastructural Development Corporation (KINFRA), KINFRA Export Promotion Industrial Parks (KEPIP), Kerala State Industrial Development Corporation (KSIDC), Roads & Bridges Development Corporation of Kerala Ltd. (RBDCK) etc. in the infrastructure sector.
- >> For the ongoing projects in the Infrastructure sector, the client list includes National Institute of Technology, Nagaland and Kendriya Vidyalaya Sangathan, New Delhi.

3.2 For these clients, we have executed projects in fields like:

Fertilisers	Ammonium Chloride, Ammonium Sulphate, Mono and Di Ammonium Phosphate, Urea, Complex Fertilisers etc
Petrochemicals	Caprolactam, Phenol, Methanol, Mono Chloro Benzene etc
Refining & distribution	Unit revamps, tank farms, oil depots, LPG bottling plants, floating roof tankage – Crude and Product tankages, natural gas distribution system etc
Pesticides	DDT, Dicofol, Benzene Hexa Chloride, Bio-pesticides, Mancozeb. etc
Intermediates	Acids (organic and inorganic), Ammonia, Hydrogen etc
Industrial chemicals	Ammonium Chloride, Ossein and Di Calcium Phosphate, Gelatin, Sodium Bi Carbonate etc
Antibiotics	Streptomycin, Penicillin etc
Environmental	Physico-chemical and biological engineering effluent treatment plants, gas scrubbing system, stacks etc.
Infrastructure	National Highways, Industrial parks, Textile parks, Video Park, IT Park, Industrial Infrastructure Development Centres (IIDCs)., Crude Receipt Facilities etc.

3.3 Apart from engineering and building main plants, FEDO also undertakes offsite facilities such as utility systems, raw material/product storage and handling

systems, fire fighting facilities, EHV power receiving stations, captive power generation plants, non-plant buildings and industrial townships.

4. SYSTEM STRENGTHS

4.1 Organisational Structure

Our parent company, FACT Ltd. is a multi-divisional company. Besides FEDO, it has

- Two fertiliser manufacturing Divisions - Udyogamandal Division and Cochin Division - located at Udyogamandal and Ambalamedu respectively, producing Urea, Ammonium Sulphate, DAP, Complex fertilisers etc;
- Petrochemical Division at Udyogamandal producing Cyclohexanone and Caprolactam;
- Equipment fabricating Division - FACT Engineering Works (FEW) - at Palluruthy; and
- Central Marketing Division for Fertilisers and Chemicals, headquartered at Udyogamandal.

(Udyogamandal, Ambalamedu and Palluruthy are industrial locales situated just outside the city limits of Kochi in Kerala, one of the southern states of India).

M/s. FACT is managed by a Board of Directors. The Chairman of the Board is also the Managing Director. We also have a full-time Finance Director, a Technical Director and a Marketing Director. There are also several part-time Directors on the Board, who are nominees of the Central and State Governments.

FEDO, like other Divisions of FACT, is headed by a General Manager/Chief Operating Officer. The operations are streamlined by the coordinated work of various Groups, viz. Process Technology, Engineering, Projects, Construction, Materials, Finance, Commercial, Personnel etc. The Groups are usually headed by General Managers. The various Departments in each Group are headed by Deputy General Managers.

4.2 Human resources

FACT has employee strength of around 2500 spread across its various Divisions. FEDO is a professional - dominated division with majority staff members with technical qualifications and engineers, many with post-graduate qualifications in engineering and management subjects, distributed across the various specialized disciplines.

FACT lends its personnel from the production and fabricating Divisions to FEDO, whenever FEDO has to take up operations & maintenance assignments or when plant commissioning / site fabrication expertise is required.

FEDO designs are tempered with the plant experience gathered by our personnel during the periodic job rotations. Our designers also gain invaluable insights into the latest international developments in the practice of design,

engineering, project and construction management through their association with various process licensors and engineering contractors in different projects, participation in technical seminars, training programmes etc. Our Material Procurement group is also acquainted with international competitive bidding procedures and procurement practices through their involvement in projects funded by bi-lateral and multi-lateral funding agencies like the World Bank, Overseas Economic Cooperation Fund etc.

4.3 Computer facilities

FACT was one of the first Indian companies to computerize its operations, way back in 1965. This head start is maintained even today with computers finding applications in integrated maintenance and materials management systems, vendor information systems, HRD database, plant optimization projects, product distribution monitoring etc besides routine accounting and MIS functions. A vast array of hardware, ranging from mainframe and super minis to PCs, Plotters, Printers, Scanners are used for this purpose and distributed on a network, FACTNET, which provides connectivity and resource sharing.

Advanced engineering and design software is utilized to develop optimum designs for plant and machinery.

Major packages procured include:

SOFTWARE	APPLICATION
Engineering Software	
Autocad 2017	Drafting
Process Engineering	
1. Design – II	Process Simulation Software
2. Hydronet	Network Analysis of Water/Fire Hydrant Network System.
3. Aspen - EDR	Thermal Design of Shell & Tube Heat Exchangers
4. Cameo Aloha	Dispersion Analysis
5. Delta P	Pressure Drop Calculation (In House software)
6. R Orifice	Orifice Sizing (In house software)
7. Orimet	Orifice Sizing (in house software)
8. SAPHED	Design of Heat exchangers for Sulphuric Acid Plant (in-house software).
9.SAPHER	Rating of Heat exchangers for Sulphuric Acid Plant (in-house software).
10. Conv.	Process Simulation of Sulphuric Acid Plant (SO ₂ Converter) (in-house software)
Piping Engineering	
1. Caesar II	Stress Analysis of Piping
2. PipeNet	Surge Analysis
3. CADWORX	3 D Modelling

Process & Combustion Equipment Engineering	
“TANK” Design Software	1. Design of Storage Tanks as per API 650, 11Ed. 2. Verification of In-service Storage Tanks as per API 653.
P V Elite	1. Design of Pressure Vessels as per ASME Sec. VIII Div.1, 2007 2. Design of Pressure Vessels as per ASME Sec. VIII Div.2, 2007. 3. Design of Pressure Vessels as per British Standard PD 5500 4. Design of Pressure Vessels as per EN 13445. 5. Component Analysis to the above codes.
Aspen - EDR V8.4	Mechanical Design of Shell & Tube Heat Exchangers as per TEMA – Latest Edition.
Civil Engineering	
STAAD Pro V8i	Structural Analysis using 3D Models and Design.
ETABS	Structural Analysis using 3D Models and Design
Autocad	Building design suite
Staad foundation advanced	Foundation Design
Staad RCDC	Reinforcement Design
Projects Management	
PRIMAVERA P6	Project scheduling & monitoring
MS PROJECT 2007	Project scheduling & monitoring
Electrical Engineering	
ETAP Software Version 7.0.1	Power System Analysis
Instrumentation Engineering	
SMART PLANT INSTRUMENTATION	Instrumentation Engineering and Design Software.

Besides running advanced design and engineering software, computers are also used for communications. Internet connectivity and e-mail communication facility make decision taking and implementation faster and more client-friendly.

4.4 **Geographical Network**

FEDO carries out most of the engineering and procurement activities from the home office at Udyogamandal, near the city of Kochi in the Kerala State.

FEDO has an office in Mumbai, mainly for liaison work related to various projects. Depending on vendor distribution pattern, expediting canters are opened for short duration at other locations as required.

FEDO has an office also at New Delhi for business development and liaison with Government, financing agencies and clients located in that area.

FACT Marketing offices in places like Chennai, Hyderabad, Bangalore and Trivandrum act as communication links for FEDO.

4.5 **Technological Capabilities**

FEDO has own process know-how for the production of Hydrogen (low capacity plants), Sulphuric acid and Effluent Treatment Plants for fertilizer, petroleum and petrochemical plants.

FEDO concludes tie-ups with globally reputed technology licensors for sourcing know-how for projects in other areas, on a case to case basis.

We also provide detailed engineering and allied services for technologies identified and sourced by clients themselves for their projects. In this way, we have worked in association with reputed international firms like MW Kellogg, Haldor Topsoe, Stamicarbon, Chiyoda, Toyo Engineering, United Oil Products, BASF etc.

4.6 **Recognitions**

FEDO has been awarded ISO 9001 quality certification for our systems and procedure for activities connected with project execution such as engineering, procurement, construction etc. The certification was given in May 1995 by Det Norske Veritas Quality Assurance Ltd, the UK based accredited quality auditors. In May 1998, a re-certification audit was conducted by Det Norske Veritas Quality Assurance Ltd, The Netherlands and the certification was extended for a further period of three years. A second re-certification audit was conducted in July 2001 by Det Norske Veritas Quality Assurance Ltd, The Netherlands, and the certification extended for another three years. FEDO has been awarded ISO 9001:2008 in November 2009 (Recertification).

FEDO has been recognized by the Electrical Inspectorate of the Government of Kerala for undertaking the statutory Electrical Energy Audit of Industrial undertakings.

FEDO personnel have served on important policy-making bodies like the Bureau of Indian Standards etc.

5 PROJECT MANAGEMENT STYLE

5.1 General Manager (Projects) at senior level heads a multi-disciplinary Task Force comprising specialists from the following streams:

- * Process Technology & Systems design.
- * Engineering - Civil & Structural, Mechanical, Electrical and Instrumentation.
- * Planning, cost control and Management Information System.
- * Procurement, Purchase, Inspection & Expediting.

- * Vendor Coordination
- * Traffic & Stores Management
- * Site Management

5.2 The site organisation will be headed by a Resident Chief Construction Manager who will be assisted by specialists in erection / construction.

5.3 This Task Force will be totally responsible for the project from start to finish. It will ensure completion of the project on schedule, within defined costs and achievement of the guaranteed performance.

6 MAJOR PROJECTS HANDLED BY FEDO

6.1 Since inception FEDO has executed a number of projects, either using its own process know-how or know-how obtained from other process owners. A representative list would read like this:

- * 4 Petrochemical plants (Phenol, Caprolactam, Methanol & Mono Chloro Benzene)
- * 13 Ammonia/Hydrogen plants based on steam reforming of hydrocarbons
- * 1 Urea Plant revamp project
- * 19 Sulphuric acid plants
- * 5 Phosphoric acid plants
- * 2 Formic acid plants
- * 2 Nitric acid plants
- * 10 Fertiliser salt plants (N, NP & NPK fertilisers like DAP, SSP, Urea, Ammonium Sulphate, Ammonium Chloride etc)
- * 7 Pesticide Plants, (DDT, Endosulphan, Malathion, Gamma Benzene Hexa Chloride, Dicofol, Bio-pesticides and Mancozeb)
- * 3 Mini Cement plants
- * 3 Antibiotics plants (Streptomycin, Penicillin, Ampicillin)
- * 3 Non-ferrous metallurgical plants (for mercury & silver recovery)
- * 7 Effluent treatment plants
- * 5 Captive power plants
- * 3 LPG Bottling plants.
- * 5 Bulk Oil Terminals
- * 2 Large diameter Floating roof tankage projects
- * 8 Oil Depots
- * 4 fine chemical plants (Ossein, Di Calcium Phosphate, Gelatin, Sodium bi Carbonate).
- * 12 Refinery related projects
- * 8 Cross-country oil product pipelines
- * 3 Natural Gas related projects
- * 6 Cross country water pipelines
- * Single Point Mooring (SPM) Project for BPCL-KR
- * 12 Infrastructure projects
- * 2 Adequacy Study of Fire Water Network
- * 3 Revamp / Extension of Electrical Systems

- 6.2 A number of Utility plants and off-site facilities including solid and liquid raw material storage and handling, power receiving and distribution, Rock Phosphate storage handling and grinding, sulphur storage and handling, raw water pumping, cooling towers, in-plant buildings, off-site buildings and peripheral facilities have also been executed by us as part of various projects.
- 6.3 FEDO has also been involved in Indian Space and Defence Research through the execution of a few vital projects.
- 6.4 FEDO has considerable experience in carrying out of Techno-Economic Feasibility studies, Detailed Project Reports, End-to-end surveys, Safety Audits and Energy Audits.

7 SPECIFIC PROJECT PROFILES

Though FEDO has successfully executed a number of turnkey projects, most of our projects have been executed on a consultancy basis. Our experience in rendering consultancy services for certain large Indian projects in the recent past, is given in detail in the ensuing pages.

7.1 Ammonia Project of FACT

Client	:	FACT Ltd
Capacity	:	Ammonia : 297,000 TPA Addl. Syn. gas: 29,700 TPA
Location	:	Udyogamandal, Kerala
Process Licensor	:	Haldor Topsoe, Denmark.
FEDO's scope	:	Detailed engineering, Procurement and Construction
Zero date	:	May 1993
Commissioning date	:	March 1998
Project Cost	:	₹6,500 million
Feed stock	:	Naphtha
Process route	:	Naptha desulphurisation Steam/naphtha reforming High & low temp shift conversion CO2 removal (MDEA process) Methanation Syn. gas compression & Ammonia synthesis Refrigeration & ammonia storage.
Off sites	:	2 x 60 TPD steam generation plant DM water plant Nitrogen Plant Cooling towers (Process plant & auxiliary) Instrument air system 5000 MT ammonia storage system.

Engineering

P & I diagrams	:	56 Nos.
Civil & Structural drawings	:	500 Nos.

Piping

Planning drawings	:	120 Nos.
Key plans	:	120 Nos.
Isometrics	:	2260 Nos.

Electrical drawings	:	350 Nos.
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Instrumentation drawings	:	500 Nos.
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Procurement

Equipment details	:	100 Nos.
Static	:	160 Nos.
Site fabricated tanks	:	16 Nos.
No. of purchase orders (Major)	:	393 Nos.

Construction

RCC	:	18,000 M3
Structural steel/plates	:	3,600 MT
Reinforcement	:	2,900 MT
No. of pile (for ammonia Storage tank)	:	170 Nos.

Equipment erection

Heavy equipment (ODC)	:	1,400 MT
Light equipment	:	2,500 MT

<u>Piping fabrication</u>	:	130,000inch dia
<u>Insulation</u>	:	20,000Running M

7.2 Ammonia Plant Revamp Project of MFL

Client	:	Madras Fertilisers Ltd
Objective	:	Enhance capacity from 750 TPD to 1050 TPD. Extend economic life of plant by fifteen years.
Location	:	Manali, Chennai
Process Licensor	:	Haldor Topsoe, Denmark.
Date of completion	:	September 1997
Project cost	:	₹3,500 million

Feed stock	:	Naphtha
Process route	:	Naphtha desulphurisation Steam/naphtha reforming High & low temp shift conversion CO2 removal (MDEA process) Methanation Syn gas compression Ammonia synthesis Refrigeration & ammonia storage

Engineering

P & I diagrams	:	69 Nos.
Civil & Structural drgs	:	221 Nos.
Piping:		
Planning drawings	:	107 Nos.
Key plans	:	97 Nos.
Isometrics	:	1160 Nos.
Electrical drawings	:	165 Nos.
Instrument drawings	:	1075 Nos.

Procurement/Equipment details

Rotating	:	55 Nos.
Static	:	84 Nos.
Major turnkey packages	:	10 Nos.
Sub-contract packages	:	9 Nos.
Major purchase orders	:	230 Nos.

7.3 Methanol Project of GNFC

Client	:	Gujarat Narmada Valley Fertiliser Company Ltd
Project	:	100,000 TPA Methanol plant
Location	:	Bharuch, Gujarat
Project cost	:	₹820 Million
Technology Licensor	:	Toyo Engineering Corporation Japan.
P & I Diagrams	:	20 Nos.
Civil & Structural diagrams	:	110 Nos.
Electrical & Instn. Diagrams	:	440 Nos.
Piping isometrics	:	1200 Nos.
Purchase Orders	:	300 Nos.
RCC	:	5400 M3
Structural steel	:	450 MT
Equipment erection	:	900 MT

7.4 Caprolactam Project of FACT

Client	:	FACT Ltd.
Project	:	50000 TPA Caprolactam & 225,000 TPA Ammonium Sulphate
Location	:	Udyogamandal, Kerala
Project cost	:	₹3,500 Million
Technology Licenser	:	Stamicarbon, The Netherlands & Chiyoda, Japan.
P & I Diagram	:	126 Nos.
Civil & Structural diagrams	:	600 Nos.
Electrical & instn Diagrams	:	1,400 Nos.
Piping isometrics	:	4,500 Nos.
No of purchase orders	:	900 Nos.
Equipment procurement	:	1,099 Nos.
RCC	:	32,000 M3
Structural steel	:	3,600 MT
Equipment erection	:	3,800 MT

7.5 Phenol/Acetone complex of HOC

Client	:	Hindustan Organic Chemicals Ltd.
Project	:	40,000 TPA Phenol & 24,000 TPA Acetone
Location	:	Ambalamedu, Kerala
Project cost	:	₹900 Million
Technology Licenser	:	UOP Incorporated, USA
Completed	:	1987
P & I Diagram	:	80 Nos.
Civil & Structural diagrams	:	220 Nos.
Electrical & Instn Diagrams	:	269 Nos.
Piping isometrics	:	1,050 Nos.
No of purchase orders	:	250 Nos.
Equipment procurement	:	393 Nos.
RCC	:	12,000 M3
Structural steel	:	680 MT
Equipment erection	:	1,200 MT

7.6 Ammonia Project of KRIBHCO

Client	:	Krishak Bharati Cooperative Ltd.
Project	:	2 x 1350 TPD Ammonia plants
Location	:	Hazira, Gujarat
Project cost	:	₹4,000 Million

Technology Licensor	:	MW Kellogg, USA
Completed	:	1985
P & I Diagram	:	31 Nos.
Civil & structural diagrams	:	155 Nos.
Elec. & Instn. diagrams	:	519 Nos.
Piping isometrics	:	2,400 Nos.
No of purchase orders	:	313 Nos.
Equipment procurement	:	280 Nos.
RCC	:	35,000 M3
Structural steel	:	2,450 MT
Equipment erection	:	5,000 MT

7.7 Revamp of Urea Plant of NFL, Nangal

Client	:	National Fertilisers Ltd., Nangal.
Project Description	:	Revamp of Urea Plant at Nangal.
Location	:	Nangal, Punjab.
Project cost	:	₹120 crores.(₹1200 million)
FEDO's fee	:	₹22.87 crores (₹228.7 million)
Technology Licensor	:	UREA CASALE, SWITZERLAND.
Zero Date	:	Aug 1999
Completion date	:	Feb. 2001.
P&I Diagram	:	20 Nos.
Civil & Structural diagram	:	150 Nos.
Elect. & Instn.diagrams	:	150 Nos.
Piping Isometric	:	Approx: 150 Nos.
No. of purchase order	:	Approx: 80 Nos.
Equipment	:	CO2 compressor, Ammonia Pump, Carbamate pump, Urea reactor, carbamate condenser, heat exchangers, conveyors, pumps, piping, pritting.
Structural steel	:	Tower equipments
Equipment erection	:	150 Tonne

7.8 Transducer Positioning System for NPOL

Client	:	Naval Physical & Oceanographic Laboratory (NPOL), Ministry of Defence, Govt. of India.
Project description	:	Installation of facility for under water testing & Calibration of ultrasonic transducer on LSTK basis . Capable of testing 5 Tonne transducers accuracy #10mm in all three directions. Movement controlled through PLC system.
Location	:	Thrikkakara, Kochi.

Project Cost	: ₹364.98 lakhs (₹36.5 million)
FEDO's fee	: ₹364.98 lakhs (₹36.5 million)
Technology Licensor	: Nil
Zero Date	: 28-10-2002.
Completion date	: 31-3-2004.
General arrangement drgs	: 10
Elec. & Instn. Diagrams	: 10
No. of purchase orders	: 10
Equipment	: 2 Platforms for Transducer Positioning systems PLC, Azimuth Positioner (5 Nos.), Under water lumineries, low noise cable Laser vibrometer.

7.9 Consultancy services for Cochin Airport-Seaport Highway

Client	: Roads & Bridges Development of Kerala Ltd.
Project description	: Consultancy services for Kochi Airport-Seaport Highway.
Location	: Kochi.
FEDO's scope of and services	: Detailed engineering, construction supervision Project Management for four-lane highway from Kochi International Airport, Nedumbassery to NH-49 Bye-pass, connecting to Cochin Seaport.
Total Length of Road:	: 31 Km.
Total Estimated cost:	: ₹240 crore, excluding cost of land acquisition.
Work description	: The total work was divided into three phases, as follows: Phase-I – Strengthening & widening the existing two lane 13 Km road from HMT junction, Kalamassery to Karingachira, Construction of 2 lane road from HMT Junction, Kalamassery to Kochi International Airport, Nedumbassery (16 Km) & from Karingachira to NH 49 Bye-pass (2 Km). This includes a bridge of about 400m span across the River Periyar, and a 50m bridge over Thuruthu, as well as a Rail Over Bridge (ROB) at Neduvannur. Phase-II - Four Laning of the whole stretch, of approximately 31Km length. This involves bridges across River Periyar, Thruthu and Chitrapuzha, ROB's will be required at Neduvannur, Irimpanam and Tripunithura.

Details of Services provided:

- a) Reconnaissance survey and Alignment Finalisation
- b) Topographical Survey
- c) Soil Investigation
- d) Detailed Engineering and estimation
- e) Tendering, prequalification of bidders, techno-commercial recommendation and Contract Finalisation.
- f) Construction Management including construction supervision & quality assurance and control.
- g) Project Management including Planning and monitoring.

Topographical survey: Executed through sub-contractors M/s. Bhageeratha Engineering, Kochi and M/s. Geo Foundations, Kochi. The survey was conducted using Total Station and Global Positioning System.
Soil Investigation - Executed through sub-contractors M/s. Geo Foundations, Kochi.

Value of Contract (Total Project cost excluding land cost)

Phase I : ₹124 crore.
Phase II : ₹120 crore (estimated)

7.10 Crude Oil Receipt Facilities Project of M/s. BPCL, Kochi Refinery

Better known as the Single Point Mooring Project (SPM) for unloading of VLCCs off the coast of Kochi, the first of its kind in Asia, FEDO was the PMC for setting up the on-shore tank farm, pumping facilities, cross-country crude and product pipelines, fire installations and associated facilities for this prestigious project. The project cost for the on-shore part was to the tune of ₹300 crore, while FEDO received a fee of ₹3.72 crore for successfully rendering its consultancy services. The tank farm was commissioned in December 2007.

7.11 PMC Services for Crude Oil Pipeline project of M/s. BPCL, Kochi Refinery including study of adequacy of existing electrical system.

The job involves Review of Design Basis, Preparation of Major Packages, Process Design Services, Detailed Engineering Services, Construction Supervision and Quality Assurance, HAZOP study, Project Management, Commissioning assistance, Performance Guarantee run. FEDO's fee was ₹5.9 crore. The job was completed in 2012.

7.12 Health Assessment & RLA Study for Ammonia/Urea Plants

The client was M/s. KRIBHCO, Surat and FEDO's fee was ₹2.21 crore. The study was completed and final report submitted by FEDO in March 2010 well ahead of the scheduled date of submission.

7.13 Detailed Health Study of Ammonia/Urea Plants

The client was National Fertilisers Limited and the work was for its plants located at Panipat, Bathinda & Nangal. FEDO's fee was ₹1.08 crore. The final report was submitted in November 2008.

7.14 Feasibility Study for Installation of New Back Pressure Turbine

The client was M/s. BPCL, Kochi Refinery and FEDO's fee was ₹44.75 lakh. The final report was submitted by FEDO in September 2011.

7.15 PMC Services for Electrical Distribution System Revamp-Phase III

The client was M/s. BPCL, Kochi Refinery and FEDO's fee was ₹45.25 lakh. The work was completed in August 2011.

7.16 Revamp of 900TPD Ammonia Plant for Feed Stock Flexibility for M/s. FACT Ltd., Udyogamandal

The scope of services includes Preparation of DPR, Project Management and engineering services up to commissioning and test run. The work was completed in March 2013.

- Conversion of fuel and feed from Naphtha to fuel and feed mode of LNG and Naptha
- Revamp of plant to increase the energy levels and increase the capacity increase possible.
- Preparation of TPS for the Captive Power Plant for the above facility

7.17 PMC Services for implementation of Crude and Product Tankages for Paradip Refinery Project at Paradip, Orissa (India) on Built-Own-Operate-Transfer (BOOT) Basis for M/s Indian Oil Corporation, New Delhi

The initial phase of the project including consultancy services for preparation of PQ docs, floating of bid, PQ of bidders, preparation of tender docs, tendering, evaluation up to appointment of the BOOT contractor was entrusted to FEDO for a fee of ₹1.78 crore. This is a mega tankage project of M/s. IOCL, Refinery Division being set up in conjunction with the Greenfield refinery coming up at Paradeep, Odisha state. The work under FEDO's scope was completed in August 2010.

After completion of the initial phase of the project up to appointment of the BOOT contractor the implementation was also entrusted to FEDO by M/s IOCL for a fee of ₹15.0028 crore. The work under FEDO's scope of Consultancy Services for Project Management, Review of Detailed Engineering, Construction Management & Supervision, and Procurement Services of the tankage project was completed in July 2013. It was part of a major refinery expansion for enhancement of capacity by Indian Oil Corporation and was dedicated to nation in January 2016.

8 PROJECTS IN HAND

Our current major Indian assignments include:

(Major Ongoing Jobs)

Sl. No	Client	Description of the Job

1	Ministry of Chemicals & Fertilisers	Technical Audit of SSP Manufacturing units
2	BPCL-KR, Kochi	PMC Services for setting up of facilities for Residential township in Ernakulam
3	IOCL, Mumbai	Consultancy services for Project Management and facilities for setting up LPG import facility at Kochi
4	NIT, Nagaland	Construction and Expansion of Infrastructure facilities of National Institute of Technology, Nagaland
5	IOCL, TamilNadu State Office	PMC for terminal automation system, CCTV surveillance system and inspection services at Tamil Nadu State Office
6	BPCL-KR, Kochi	PMC for Crude Tank construction at STF, Puthu vypeen, Kochi
7	ONGC, Hazira	PMC for laying New Fire Water Network at Hazira plant
8	Kendriya Vidyalaya Sangathan , New Delhi	Empanelment of FEDO as construction agency of KVS for Constuction of School Building, Staff Quarters, Boundary Wall, etc. for Kendriya Vidyalaya, Kaduthuruthy (Kottayam), Haveri (Karnataka) and Harda (Madhya Pradesh)
9	KMML, Chavara, Kollam	Preparation of DPR for the capacity expansion of TiO2 pigment production from 40000TPA TO 60000TPA
10	BPCL-KR, Kochi	PMC for the job "Providing additional pile supports for the crude lines and related structures at STF, Puthuvypeen"
11	HPCL, Mumbai	EPMC services for LPG Augmentation Projects including Engineering & Design consultancy at HPCL, Indore

9 OVERSEAS PROJECTS

- FEDO has been active in the exports sector also. Some of the jobs are listed here:
- >> Providing engineering services for Sahi Rawl Water disposal project of Petroleum Development Oman, sub-contracted from the EPC contractor, Al-Hassan Trading & Contracting Co, Muscat, Oman.
 - >> Providing maintenance services for rotating equipment of Petrochemical Industries Company, Kuwait, contracted through Abdul Aziz Yousuf Al-Essa, Kuwait.

- >> Providing technical assistance for procurement of rotating equipment to ABB Global Engineering, Qatar.
- >> Providing inspection services to Kuwait Oil Company, Kuwait sub-contracted from the maintenance contractor, El Dabhous, Kuwait.
- >> Providing engineering services for Ahmadi and Sabhan Oil depot projects in Kuwait for Kuwait National Petroleum Company, sub-contracted from the EPC contractor, Abdul Aziz Yousef Al-Essa, Kuwait.
- >> Providing detailed engineering services for the 2.5 km long Inter Refinery Transfer pipeline connecting the Shauiba and Mina Ahmadi refineries of Kuwait National Petroleum Company, sub-contracted from the EPC contractor, Abdul Aziz Yousef Al Essa, Kuwait. Overall project management consultancy for this project was provided by Flour International, USA.
- >> Providing plant operation services for DM Water plant contracted through Abdul Aziz Yousef Al Essa, Kuwait.
- >> Providing engineering services for the revamp of steam system (involving utility boilers and associated piping) of Kuwait National Petroleum Company, Kuwait, sub-contracted from the EPC contractor, Abdul Aziz Yousef Al Essa, Kuwait. Overall Project Management Consultancy was provided by Stork Ketels, The Netherlands.
- >> Developing detailed process design for Gas separators (for separating associated gas and free water from crude oil) for the gathering station of Kuwait Oil Company, Kuwait sub-contracted from the equipment supplier, KREMENCO, Kuwait.
- >> Providing design and engineering services for the Acid Washing system in the Salt & Chlorine plant of Petrochemical Industries Company, Kuwait, sub-contracted from the EPC contractor, Abdul Aziz Yousuf Al-Essa, Kuwait.
- >> Providing design and engineering services for the 'Replacement of Water and Gas Networks at Ahmadi" for Kuwait Oil Company (KSC) together with Jaseem Qubazard Engineering Consultants under the subcontract of United Gulf Construction Company (UGCC), Kuwait.
- >> Design & Engineering of Tanks for M/s Al Bucheeri Engg. Services, UAE.

10 ADDRESSES & KEY PERSONNEL

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