

Introduction

Engineering Procurement Construction Solutions (EPC Solution) is a wholly owned Thailand Company that was registered in Thailand in July 2000 to address the dynamic growth in the Wire Line and Wireless Environment, in Thailand, in addition to the existing Broadband growth and the requirement for maintenance of existing Wire line Networks as Thailand enters the 21st Century.

EPC Solution has a permanent Staff of Qualified Project Managers, Civil Engineers, Procurement Specialists and Construction Supervisors who are fully versed in Engineering and Construction of Wireless Projects as well as Projects involving Outside Plant, Fibre Optic Cables or Copper Cables normally associate with a fixed line and a backbone Network. Our “in place” resources number 40 people and we have the capability to grow our Staff as the need arrises.

We utilize state of the art Project Management tools and two of our Project Managers are hold Masters Certificates in Project Management from George Washington University in the United States.

EPC Solution Co., Ltd. represents a significant technical and management resource to a customer.

EPC can implement telecommunications programs by providing design, construction, installation, test individually or on turnkey basis.

EPC is a very flexible company that can perform all aspects of a Project (Turnkey) or any portion thereof. Our in depth knowledge of, and relationships with the Major Communications Companies In Thailand make EPC a strategic choice for your businesses.

EPC Capabilities

EPC was formed to support telecommunication construction projects and has since grown into a fully capable telecommunications engineering and construction Company that can provide design, engineering applications and construction management for all types of telecommunications systems.

EPC's is staffed with experienced telecommunication engineers, draftsman (CAD Capable), procurement specialists, project control and Project Managers.

Engineering and Design

EPC's staffs of technical specialist have been trained in the technologies of the telecommunications industry and are seasoned veterans. These personnel are available, to provide engineering in their fields of expertise, and to perform project management.

EPC's capabilities in Engineering and Design include but are not limited to the following:

- **Copper Cable Network**

- Demand Investigation
- Penetration Factor Calculations
- Wire Centre Design
- Fundamental Plan Design
- Detail Design

- **Optical Fibre Optic Network**

- Fibre Optic Cable Network Design
- Fundamental Plan Design
- Core Assignment
- Detail Design

- **Civil Structure Design**

- Conduit route
 - Manhole and Handhole
 - Pipe Jacking
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- **Wireless Network**

- Site Acquisition
- Tower Installation Design
- Antenna System
- Civil Engineering
- Power System

Construction and Installation

EPC executes the following construction and installation tasks in support of any project.

- Reviews engineering designs for practicality and low-cost constructability
- Advises the customer on the maximum practical use of common design to achieve economies of scale
- Performs daily site management routines
- Coordinates individual subcontractor activities
- Inspects in-progress and completed work to ensure quality in accordance with quality assurance standards and design specifications
- Identifies the bases for, and verifies the validity of, change order requests and claims
- Performs subcontract administration

All site work is carried out under the supervision of experienced EPC representatives. For large projects requiring extensive supervision, EPC will adopt an “Area Manager” concept to ensure total Project visibility, resulting in “on time performance”

EPC’s scope of Construction and Installation includes

- **Copper Cable Network**

- Underground and Aerial Cable Installation
 - Civil Construction
 - Splicing and Termination
 - Commissioning Test
 - Final Construction Drawing
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- **Fibre Optic Cable Network**

- Underground and Aerial Cable Installation
- Civil Construction
- Splicing and Termination
- Commissioning Test
- Final Construction Drawing

- **Wireless Network**

- Site Preparation
- Tower Erection
- Antenna and Feeder Cable Installation & Test
- BTS installation
- Room Refurbishment
- Power System Installation
- Commissioning Test
- Final Construction Drawing

- **In Building Wireless**

- Power Installation
- In Building Conduit
- BTS Installation
- Feeder cable and its accessories (internal cabling)
- Antenna
- Commissioning Test
- Final Construction Drawing

Subcontractor Management

EPC procurement specialists conduct competitive solicitations using definitive work scopes, specifications, and terms and conditions when qualifying subcontractors.

EPC identifies and competitively awards subcontracts to contractors who offer the optimum combination of quality, and ability to meet schedule. Award is also based on a firm's existing capabilities, past experience, and financial solvency.

When design drawings from contractors are required, EPC will conduct formal design reviews with the appropriate approvals to ensure conformity with approved design criteria as set by International or Customer Standards.

EPC Performs the following Subcontractor Management functions:

- Prepares engineering estimates for the work(s) to be subcontracted
- Identifies and qualifies contractors
- Incorporates Work Statement and prepares Invitations for Bid
- Evaluates and selects subcontractors
- Assists in change order negotiations as requested
- Manages subcontract closeouts, including the release of liens

Project Control

The objectives of Project Controls are:

- Provide accurate and timely information for management decision making.
- Develop and monitor a detailed schedule which will identify key milestone dates that will provide visibility to the entire project team in order to remove potential roadblocks that will result in the Project to be completed on or ahead of schedule, at the lowest possible cost, and in compliance with the system turn over schedule.
- Establish budgets and control systems which provide accountability for all supervision from the Project Manager to Discipline Supervisor / Subcontractor.
- Provide basis for identifying, tracking, estimating and approving scope changes.
- Minimize the cost for monitoring and maximize the effort of control.

The Project Controls philosophy is based on early and thorough planning, followed by timely execution of the work utilizing appropriate tools to monitor the results and measure progress.

The controls used will be as simple as possible, effective and flexible. During the execution of the work, the controls instituted will be reviewed for effectiveness.

Project Controls exists for the purpose of budgeting and scheduling the project, identifying deviations from budgets and schedules and recommending corrective

actions when deviations occur. In order to identify deviations early and accurately, the project will be organized by an appropriate Work Breakdown Structure (WBS). This will allow the Project Team to analysis problems at a manageable level.

Testing

EPC will conduct pre-operational tests of installed work to ensure compliance with Quality standards and design criteria.

EPC can perform pre-operational and/or acceptance testing solely, or in conjunction with customer personnel. Performance and acceptance tests are executed from a coordinated test form.

EPC utilizes only certified and calibrated testing equipment. This equipment is Industry standard and periodically upgraded or replaced as may be required due to technological changes.

Permission

EPC will assist the client in obtaining permissions from Government Authorities which may include, but not be limited to,

- Bangkok Metropolitan Authority (BMA)
- Metropolitan Electric Authority (MEA)
- Provincial Electric Authority (PEA)
- Highway Department
- Private Enterprises

Turnkey Project

The turnkey approach is the most effective method for achieving cost and scheduling goals on a project. Portions of the normally separate design, engineering, and construction phase can be performed in parallel if one contractor is responsible for all of these functions. Eliminating multiple project management teams significantly reduces the time and cost requirements to implement a project. Using one contractor for design, engineering, procurement and construction also reduces the risk of claims. This approach frequently is the best means of using EPC to its fullest potential.

Specific Services

In some cases, the turnkey approach may not be applicable. EPC can also provide its full complement of engineering, procurement, construction, and program management services individually, or in a group tailored to fit a

specific assignment. These services encompass all phases of engineering such as design, design verification, detailed engineering, quality control, construction, installation, implementation, and test. They also include all phase of administrative, support such as scheduling and document control.

Resources

EPC's staff is composed of personnel with years of experience in the telecommunication industry and project management. We are a very flexible Company that is capable to grow according to your needs.

Our most senior consultant has over 31 years experience in telecommunication industries worldwide and we also have consultants who are very experienced in working with the state owned telecommunication enterprise.

Financial Strength

EPC receives financial support from DBS Thai Danu Bank for its projects, when required. The bank reference is available upon request.

Management System

EPC applies management systems to ensure clients receive services delivery on time, within budget and to the client's satisfaction.

Quality - EPC focuses on quality management in all Project activities in order to deliver all of the project's requirements to all regulatory bodies and to satisfy all contractual obligations.

Safety - We are committed to safety for all employees and subcontractors. We are also committed to Occupational Health and Safety Regulations.

Experience

Copper Network

- 3 M Thailand Limited - TelecomAsia Fixed Line Network
 - Fault Analysis of underground copper network
 - Resplice and repair low insulation, short and reversed pairs at splicing closure
 - Commissioning Test

Fibre Optic Cable Network

- Thai Furukawa Unicomm Engineering Co., Ltd. – Advance Info Services (AIS), SDH Fibre Transmission Project (Phase 7 and 7.5)
 - Engineering Design
 - Installation of over 600 KM of Fibre Optic Cable for 52 links
 - Commissioning of all installed network
 - Final as-built drawing
- Thai Furukawa Unicomm Engineering Co., Ltd. – Advance Info Services (AIS), SDH Optical Fibre Transmission Project (Phase 8A)
 - Routing Survey
 - Engineering Design
 - Installation of 250 KM of Optical Fibre Cable for 26
 - Commissioning of all installed network
- Thai Furukawa Unicomm Engineering Co., Ltd. – Advance Info Services (AIS), SDH Optical Fibre Transmission Project (Phase 8.2)
 - Routing Survey
 - Engineering Design
 - Installation of over 1000 KM of Optical Fibre Cable for 85 links
 - Commissioning of all installed network

In Building Wireless

- TAC
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- Central Future Park Rangsit 14 Antenna
 - Sukhothai Hotel 16 Antenna

 - Sakhunthai Surawong Tower 55 Antenna
 - Charter Square Tower 75 Antenna
 - World Trade Center 90 Antenna

 - AIS
 - Maboonklong 16 Antenna
 - SCB Park 22 Antenna
 - The Imporium 42 Antenna
 - Zeer Rangsit 18 Antenna
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