

## DYNAMIC ROLE OF COMPANY STANDARDS FOR EXECUTING PROJECTS IN PETROCHEMICAL INDUSTRIES

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**Abstract:** *The economic growth of a country depends on large projects. The schedules and budgets are considered as important factors in completing large projects. Standards team in Oil Companies are developing in-house standards and Recommended Practices (RP) for the use of Engineering, Major Projects and other Groups throughout the Company, consisting of Civil, Mechanical, Piping, Electrical/Instrumentation, Heating, Ventilation and Air Conditioning (HVAC) specifications. There are two major tasks involved in the present study. The first is to review at a high level the entire engineering, procurement, and construction process for executing large projects in Petrochemical Industries. The purpose of this review is to gain an understanding of how the engineering/procurement/construction (EPC) processes function, which will help identify the current issues in executing the projects. Upon identifying the issues, the second objective is to propose a prototype for effective project management for executing projects. Since large project execution involves Cost, Schedule, technology, execution strategy and stakeholders, the case study method is more suitable. The study of various cases will help to find the following,*

- *Communication between and within EPC teams*
- *Knowledge/experience of management processes to execute large projects*
- *Control Management of engineering deliverables*
- *Have clearly defined and frozen scope by the end of the Engineering Design Specifications (EDS) phase*
- *Project Control Management during completion stage.*

**Key Words:** *Project Control Management, Process, Standards and Design*

### I. INTRODUCTION

The characteristics associated with the oil and gas sector include high capital investment, high level of uncertainty/risk due to its exploratory nature, high technology/heavy engineering, large scale/magnitude, large number of engineering disciplines and specialists from exploration to first oil and from production to decommission and tight delivery/supply and installation schedule

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(Wright, 1996). The infrastructure business has witnessed several forms of contracting. Globally, Engineering, Procurement and Construction (EPC) has become an accepted form of contract by the construction industry and the EPC contractors have adopted a modern variation called Engineering, Procurement and Construction Management (EPCM). Leading companies gather technical inputs early, incorporating into the project's framework to make sure it aligns with the organizations larger goals. They also engage stakeholders throughout the life of project, for architecture and design through execution. To move from one stage to the next, Managers, coordinating with stakeholders, have to decide if they are ready to move on. To keep these stage relevant. Leading oil and gas companies and the contractors who work with them continuously revise their stage frameworks to align them with evolving market conditions.

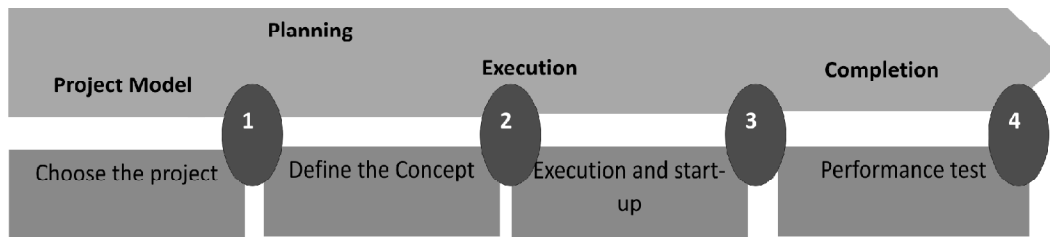


Figure 1: Typical phases of major Petrochemical infrastructure projects.  
(Source: Bain & Company)

## II. PROJECT CYCLE

In common practice that projects are progressed in consecutive phases. One important advantage of these staged phases is the flexibility of using contracting approaches for each different stage (Phil Loots and Nick Henchie, 2007).

For Petrochemical projects there are two main phases:

1. The Development Phase in which the output is the Basic Engineering of the project.
2. The Implementation Phase which includes (Detailed Engineering, Procurement and Construction). (Berends, 2007)

## III. STANDARDS

International Standards are prepared by International Standards Development Organization (SDO). The two such SDOs that have produced standards related to the petrochemical industries are the International Organization for Standardization (ISO) and the International Electro technical Commission (IEC). The objective of standards document is to provide a tool for making potential users aware of Standards available in the Petrochemical Companies. As a result, the costs

associated with the procurement of industry materials, equipment, and structures will be reduced, and greater efficiency will be realized in the use of resources that would otherwise be required to develop and maintain local standards and specifications. The standards documents undergo a rigorous process of review by subject matter experts. The standards are periodically reviewed and revised. The EPC contractors have to fully comply with the set standards of Oil Companies for the execution of large projects. In general the standards of Petrochemical Industries are divided into civil, electrical, Engineering and General. General Specification/standards for workmanship and some material and to provide documentary guidance for personnel engaged in the execution of typical Civil Engineering building works carried out for Company. Well documented standards are available to provide consistent and practical guidelines for the design of general civil engineering works including foundations, buildings, and structures made of concrete and structural steel as well as other associated works, which complies with international standards. Apart for the civil engineering general specification, individual detailed specifications are available for the all the subcomponents of civil works.

Electrical Engineering, being a prime energy source to the Company with its extensive systems of control and distribution for providing power, lighting, heating, air-conditioning and power supplies for instrumentation, communications, alarms and other apparatus; and being potentially a great danger to both persons and plant, unless under complete control. The electrical standards are standard applies to all Company owned electrical systems within industrial plant, all types of industrial and commercial buildings, housing, temporary equipment, mobile plant and offshore installations. This Standard related to design, selection, erection inspection, testing and maintenance; and is in the interests of safety, performance, reliability, appearance, durability, ease of maintenance, modification and/or extension and the use of standardized equipment as far as practicable and subject to economic purchasing.

The spare parts standard describes requirements for provision of spare parts and maintenance data for Lump Sum TurnKey (LSTK) and In-House controlled projects. This Standard describes the minimum requirements for provision of precommissioning and commissioning spares and the data requirements for operational spare parts and maintenance schedules. It ensures adequate spares are available for project pre-commissioning and commissioning phases and also identifies the information required by Company to enable realistic Operational Spares, Specialist Equipment and Maintenance scheduling to be selected, organized and integrated into Company's systems. The Standard for Security Systems is intended to describe the conceptual model of integrated security systems to be established at the Company Facilities with a view to optimizing the security concerns with practical effectiveness, upon which the detail engineering will be

developed to install the system in place as required. The Standards describes conceptually the current requirements of security systems at all Sites and Facilities, on the basis of Security Vulnerability Assessment (SVA) study of the ongoing security scenarios. The Standard covers Security Fences, Gates, Crash Blockers, Vehicle Barriers, New Buildings and Guard Houses; various electronic surveillance and recording systems through Perimeter Intruder Detection Systems (PIDS), Closed Circuit Television (CCTV), Building Intruder Alarm System (BIAS), Intercommunication Systems such as Voice Over Internet Protocol (VOIP), Electronic Access Control Systems (EACS), Security Management System (SMS) and Digital Recording.

To have consistent and safe methodology for shutdown of Plants / Facilities standards team has document the requirements under Procedure for Plant Shutdown - Gathering Centers. All shutdown procedures in the facilities will be carried out to meet the relevant Health and Environment (H&E) Guidelines to protect all personnel and surrounding environment. Incidents and disasters keep happening at various plants and business work areas all over the world. Chemical, petrochemical and oil & gas industries are the main industrial sectors where major incidents occur frequently. Incident Management and Emergency Preparedness are therefore essential to any operating facility in those sectors. To perform detailed Damage Assessment of a plant or facility, which have been subjected to major damage(s) from explosions, fires, spillages, disaster, etc. Procedure for Damage Assessment is evolved and followed.

#### IV. CONCLUSION

Continuous updates of the company standards by standards team of subject expects and Higher Management based on international standards organizations for smooth flow of Projects.

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