

# Application of Standard Project Management Processes in Fiber Optic Cable Plant Project Management

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## Introduction

The Project Management Institute (PMI) is the world's leading not-for-profit professional association for the project, program, and portfolio management profession. PMI delivers value to nearly 3 million professionals worldwide through advocacy, collaboration, education, and research. PMI strives to mature the profession of project management through its globally recognized standards, certifications, resources, tools, academic research, publications, professional development courses, and networking opportunities.

PMI develops the *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* to promote project management standards and guidelines recommended by project practitioners around the globe. The PMBOK® Guide – Fourth Edition defines the project lifecycle as a combination of the following three (3) main phases: **Project Initiation, Project Execution, and Project Closing**. Every phase of the project lifecycle encompasses a set of integrated processes designed to allow the completion of the work required to complete the phase.

The PMBOK® Guide – 4<sup>th</sup> Edition categorizes project management processes into the following five (5) categories known as Project Management Process Groups:

- Initiating Process Group
- Planning Process Group
- Executing Process Group
- Monitoring and Controlling Process Group
- Closing Process Group

Those Project Management Process Groups fit into the three (3) main phases of the project lifecycle.

This paper discusses how standard project management processes apply to fiber optic cable plant project management. The paper relies on the Fiber Optic Association (FOA)'s processes, procedures, standards, and best practices to illustrate how fiber optic project management processes fit into the PMI's standard project management framework described in the PMBOK® Guide – Fourth Edition.

The FOA is an international not-for-profit educational organization that promotes professionalism in fiber optics through education, certification, and standards. Founded in 1995, the FOA has been active participating in the development of standards in the communications industry and promoting fiber optic

applications and education. According to the FOA's best practices, the fiber optic cable plant project management lifecycle's phases include the Design, Installation, and Testing.

## • Project Initiation

According to the PMBOK<sup>®</sup> Guide – 4<sup>th</sup> Edition, the project initiation includes all the processes necessary to define a new project and obtain the authorization to start the project. During the Project Initiation phase, the initial scope of work is defined and initial financial resources are committed. The project manager, assigned to the project, develops the project charter, which upon approval, the project becomes officially authorized.

The Project Initiation phase is based on the following main process: **Develop Project Charter**

### **Develop Project Charter**

According to the PMBOK<sup>®</sup> Guide – 4<sup>th</sup> Edition, the Project Charter formally authorizes the project and documents the stakeholder's needs and expectations. A Project Manager is identified and assigned preferably while the charter is being developed and always before the project planning phase. The project charter provides the Project Manager with the authority to allocate resources to the project activities.

The Project Charter is approved by a person external to the project and is referred to as the Project Sponsor. The Sponsor is the one providing fund for the project and whose approval of the Project Charter formally initiates the project.

### **Project Charter Inputs:**

The project charter is developed based on the following elements.

**Project Statement of Work (SOW):** description of products or services to be delivered by the project

The SOW includes the business need, product scope description, strategic plan, etc.

**Business case:** description of business need and cost-benefit analysis to justify the project

The business case includes the market demand, organizational need, customer request, technological advance, legal requirements, etc.

**Contract:** legally binding document in case the project is done for an external customer

**Enterprise environmental factor:** including Government of industry standard, organization structure, marketplace condition, etc.

**Organizational process assets:** including Organizational standard processes and policies, templates, historical information, and lesson learned knowledge base.

**Project Charter outputs (Project Charter Outline):**

A standard Project Charter highlights the business needs, current understanding of the customer’s needs, and the product or service that is intended to satisfy. The Project Charter includes, but is not limited, to the following:

- Project purpose or justification
- Measureable project objectives and justification criteria
- High-level requirements
- High-level project description
- High-level risks
- Summary milestones schedule
- Summary budget
- Project approval requirements (What constitutes project success, who decides the project is successful, who signs off on the project)
- Assignment of project manager, responsibility, and authority level
- Name and authority of the sponsor or the person authorizing the project

The project initiation phase also includes the process referred to as **Identify Stakeholders**, which consists of identifying all people and organizations impacted by the project and documenting all relevant details regarding their interests, involvement, and impact on project success.

**FOA Fiber Optic Cable Plant Project Initiation Processes**

The fiber optic cable plant project initiation is centered on the following key processes:

**Initiation Process Group**

- Choose project manager
- Develop project charter

**• Project Planning**

According to the PMBOK® Guide – 4<sup>th</sup> Edition, the project planning consists of developing the project management plan and all relevant project documents to establish the project scope of work necessary

to achieve the project objectives. The project planning integrates all aspects necessary to execute the work required throughout the project lifecycle, including scope, time, costs, communication, quality, risk, and procurement.

The project planning phase include the following processes:

**Develop Project Management Plan:**

The Develop Project Management Plan process consists of documenting the necessary actions to define, prepare, integrate, and coordinate all subsidiary plans. The project management plan determines how the project will be planned, executed, monitored and controlled, and closed.

**Collect Requirement:** collect requirement consists of defining and documenting the stakeholders' needs to meet the project objectives

**Define Scope:** Develop a detailed description of the project and product

**Create Work Breakdown Structure (WBS):** Subdivide the project deliverables and project work into more smaller and more manageable components

**Define Activities:** Identify specific actions to be performed to produce project deliverables

**Sequence Activities:** Identify and document relationships between the project activities

**Estimate Activity Resource:** Estimate the type and quantity of material, people, equipment, or supply required to perform each activity

**Estimate Activity Durations:** Approximate the number of work periods needed to complete individual identified activities

**Develop Schedule:** Analyze activity sequences, durations, resource requirements, and schedule constraints to create project schedule

**Estimate Costs:** Develop and approximate the monetary resources needed to complete project activities

**Determine Budget:** Aggregate the estimated cost of individual activities or work packages to establish and authorize cost baseline

**Plan Quality:** Identify quality requirement and/or standard for the project and product and documenting how the project will develop compliance

**Develop Human Resource Plan:** Identify and document project roles, responsibilities, and required skills, reporting relationships, and creating a staffing management plan

**Plan Communication:** Determine the project stakeholders' information needs and define a communication approach

**Plan Risk Management:** Define how to conduct risk management activities for a project

**Plan Procurements:** Document project purchasing decisions, specify the approach, and identify potential sellers

### **FOA Fiber Optic Cable Plant Project Planning Processes**

The major activity during the fiber optic cable plan project planning is based on the Design. The following processes are included in the fiber optic cable plant Design Process Group.

#### **Design Process Group**

- Develop link communication requirements
- Develop equipment and component requirements
- Choose link route and obtain permits
- Develop cable plant component requirements
- Determine coordination with facilities and electrical personnel
- Develop installation documentation
- Develop guidelines to inspect workmanship at every step
- Develop test plan
- Develop restoration plan
- Develop installation schedule
- Develop fiber optic installation contract including project requirements

## **• Project Execution**

According to the PMBOK® Guide – 4<sup>th</sup> Edition, the project execution includes all the processes necessary to complete the work defined in the project management plan. The project execution consists of coordinating people and resources, as well as integrating and performing project activities as specified in the project management plan.

The project execution includes the following processes:

**Direct and Manage Project Execution:** Perform the work defined on the project management plan to achieve the project objectives

**Perform Quality Assurance:** Audit quality requirements and results from control measurements to ensure quality operations are used and standards are met

**Acquire Project Team:** Confirm human resource availability and obtain the team necessary to complete project assignments

**Develop Project Team:** Improve competencies, team interaction, and the overall team environment to enhance project performance

**Manage Project Team:** Track team member performance, provide feedback, resolve issues, and manage change to optimize project performance

**Distribute Information:** Make relevant information available to project stakeholders as planned

**Manage Stakeholder Expectations:** Communicate and work with stakeholders to meet their needs and address issues as they occur

**Conduct Procurements:** Obtain seller responses, select sellers, and award contract

### **Project Monitoring and Control**

According to the PMBOK® Guide – 4<sup>th</sup> Edition, the Project Monitoring & Control phase includes processes necessary to track, review, and regulate the progress and performance of the project, and also identify necessary changes to perform and ultimately implement those changes.

**The Project Monitoring and Control includes the following processes:**

**Monitor and Control Project Work:** Track, review, and regulate the progress to meet the performance objectives defined in the project management plan. Monitoring includes status reporting, progress measurement and forecasting. Performance report provides the project performance status in regards to scope, schedule, cost, resource, quality, and risk.

**Perform Integrated change Control:** Review change request, approve changes, and manage changes to the deliverables, organizational asset, project documents, and the project management plan

**Verify Scope:** formalize acceptance of the complete project deliverables

**Control Scope:** Monitor the status and the project and product scope and manage changes to the scope baseline

**Control Schedule:** Monitor the status and the project to update project progress and manage changes to the schedule baseline

**Control Costs:** Monitor the status and the project to update project budget and manage changes to the cost baseline

**Perform Quality Control:** Monitor and record results of executing the quality activities to assess performance and recommend necessary changes

**Report Performance:** Collect and distribute performance information, including status reports, performance measurements, and forecast

**Monitor and Control Risks:** Implement risk response plan, track identified risks, and evaluate risk process effectiveness throughout the project

**Administer Procurements:** manage procurement relationships, monitor contract performance, and make changes and corrections as necessary

### **FOA Fiber Optic Cable Plant Project Execution Processes**

The fiber optic cable plant project execution phase is centered on the communication infrastructure installation activities. The installation phase can be subdivided into the pre-installation, installation, and post-installation phases.

The following paragraphs describe the breakdown of the processes involving each phase.

#### **Pre-Installation Process Group:**

- Choose contractor (s)/ installer
- Discuss/sign contract with the contractor (s) and hand sets of plans to contractor (s)
- Review components with contractor (s)
- Conduct procurement to choose equipment, components, and cable plant vendor (s)
- Order components, schedule delivery time and place
- Stock, inspect, and secure material
- Tour link route with contractor (s) and make note of special requirements
- Review contract with contractor (s)
- Review schedule with contractor (s)
- Review safety rules with contractor (s) and post rules on the jobsite
- Review restoration plan with contractor (s)
- Review test plan with contractor (s)
- Train installers on any new component installation or new equipment operation
- Prepare installation site and make power available
- Notify contractor(s) and all stakeholders of installation start date

#### **Installation Process Group:**

- Control workmanship compliance with specifications at every step
- Conduct daily review of process, progress, and test data
- Report issues and solutions and shortages to relevant stakeholders

#### **Post-installation Process Group:**

- Conduct final inspection of workmanship
- Review test data on cable plant
- Set up and test communications system

## • Project Closing

According to the PMBOK® Guide – 4<sup>th</sup> Edition, the Project Closing consists of executing the processes necessary to finalize all activities and formally complete the project or contractual obligations. The Project Closing may include the following:

- Obtain acceptance by the customer or sponsor
- Conduct post-project review
- Record impact of tailoring to any process
- Document lessons learned
- Archive all relevant project documents in the Project Management Information System (PMIS)
- Close out procurements

The Project Closing includes the following processes:

**Close Project:** finalize all project activities to formally complete the project

**Close Procurements:** Complete each project procurement

### **FOA Fiber Optic Cable Plant Project Closing Processes**

The fiber optic cable plant project closing focuses on updating the restoration plan and project documentation with test results, modifications occurred during the execution, etc.

The following represents the main processes that are executed during the fiber optic cable plant project closing phase:

#### **Closing Process Group:**

- Update and complete documentation
- Update and complete restoration plan
- Store restoration plan, documentation, and components, etc.
- Document lessons learned
- Archive all relevant project documents in the Project Management Information System (PMIS)
- Close out procurements

## **Conclusion**



This paper was an attempt to demonstrate that fiber optic cable plant project management can be conducted following the PMI's project management framework described in the PMBOK® Guide – 4<sup>th</sup> Edition. The fiber optic cable plant project Design, Installation, and Testing phases can be broken down to fit with the PMBOK® Guide's project lifecycle, which includes the project Initiation, Planning, Execution, and Closing.

The paper also found that fiber optic cable plant project management could be enhanced by implementing PMI's project risk management processes in order to contribute to increase fiber optic project success rate.

## **Summary of Fiber Optic Cable Plant Project Management Processes**

### **Project Initiation**

#### **Initiation Process Group**

- Choose project manager
- Develop project charter

### **Project Planning**

#### **Design Process Group**

- Develop link communication requirements
- Develop equipment and component requirements
- Choose link route and obtain permits
- Develop cable plant component requirements
- Determine coordination with facilities and electrical personnel
- Develop installation documentation
- Develop guidelines to inspect workmanship at every step
- Develop test plan
- Develop restoration plan
- Develop installation schedule
- Develop fiber optic installation contract including project requirements

### **Project Execution**

- Choose contractor (s)/ installer
- Discuss/sign contract with the contractor (s) and hand sets of plans to contractor (s)
- Review components with contractor (s)
- Conduct procurement to choose equipment, components, and cable plant vendor (s)
- Order components, schedule delivery time and place

- Stock, inspect, and secure material
- Tour link route with contractor (s) and make note of special requirements
- Review contract with contractor (s)
- Review schedule with contractor (s)
- Review safety rules with contractor (s) and post rules on the jobsite
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- Train installers on any new component installation or new equipment operation
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#### **Installation Process Group:**

- Control workmanship compliance with specifications at every step
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- Report issues and solutions and shortages to relevant stakeholders

#### **Post-installation Process Group:**

- Conduct final inspection of workmanship
- Review test data on cable plant
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## **Project Closing**

#### **Closing Process Group:**

- Update and complete documentation
- Update and complete restoration plan
- Store restoration plan, documentation, and components, etc.
- Document lessons learned
- Archive all relevant project documents in the Project Management Information System (PMIS)
- Close out procurements

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Alfred is a telecommunications specialist who has been active in the planning, deployment, and operations of telecommunications infrastructure since 1999.

In the United States and Africa, Alfred has been involved in the execution of various telecommunications projects, including plans and specifications development, fiber optic network deployment (FTTH, SONET, DWDM, Carrier Ethernet, and OTN) and wireless network implementation (WiMAX, Wi-Fi, UMTS, and LTE).

Alfred co-founded DigiBridge TelCo to contribute to reduce the digital divide in emerging countries by assisting governmental entities to deploy state-of-the-art telecommunications infrastructure.