Solar PV Projects – The Case for Independent Construction Monitoring

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EXECUTIVE SUMMARY

A solar PV project is divided into various essential aspects of infrastructure such as: electrical engineering, civil engineering, module mounting structures, weather monitoring stations, and supervisory controls. In order for a solar power plant to achieve the desired generation values, it is vital that the design conceptualization translates into implementation on the ground. This means that every aspect of engineering and construction needs to be properly validated, documented, and easily accessible during the project cycle.

Th article provides a high-level overview on the importance of independent monitoring during the construction phases and its implementation techniques with the help of site quality assurance documentation. The presence of independent engineers during various project phases such as initiation, planning, and execution will help solar power plant developers and engineering, procurement, and construction (EPC) companies achieve acceptable solar power plant quality standards.

INTRODUCTION

Solar PV power plants are often considered to be simple construction projects, but the reality is that essential methodology and implementation techniques are often ignored because of delays starting the project or the need to meet the commercial operational date (COD) deadline in the power purchase agreement (PPA).

Basic health, safety and environment (HSE) site quality documentation such as the field quality plan (FQP), installation checklist, pre-commissioning checklist, and testing checklist are frequently treated as being unimportant. Even imperative guidelines that detail project construction activities such as the method of statements (MOS) or technical work procedures (TWP) are regularly ignored or neglected by the EPC. These plans and procedures can be implemented and adhered to as a project progresses with the help of independent engineers.

NEED OF CONSTRUCTION MONITORING

These actual images from project sites illustrate low quality civil engineering work that was executed in the absence of supervision or construction monitors.

Figure (A)

Figure (B)

Lack of supervision and underutilization of implementation quality checklists has resulted in structural post pile cap erosion after heavy rains in Figure (A). Improper grouting and insufficient finish to the foundation bolts of the structural pole can be observed in Figure (B).

Figure (C)

Figure (D)

Figure (C) shows deformed structural bracing members for the installation of module mounting structures that is the result of implementation quality checklists not being used along with no independent oversight. Deformed bracing can be replaced, but in Figure (D) the support post has been installed at an incline, which will result in instability to modules. These low quality mistakes are repairable, but at a high cost and the rework will consume precious time towards meeting project completion deadlines. Such issues have been observed to be accepted by developers as defects. Quality lapses are commonly observed and noted in the electrical infrastructure as well. Modules can be damaged or even broken beyond acceptable limits, leading to higher costs for project installations. Compromised quality can lower energy generation, causing a project to fall short of the target output for which it was selected.

To mitigate the above concerns, solar PV project construction should typically progress through the following stages: planning, conceptualization, schematic design, construction design and drawings, and most importantly construction administration to ensure that quality control and assurance is implemented throughout the project lifecycle illustrated in **Figure (E).**

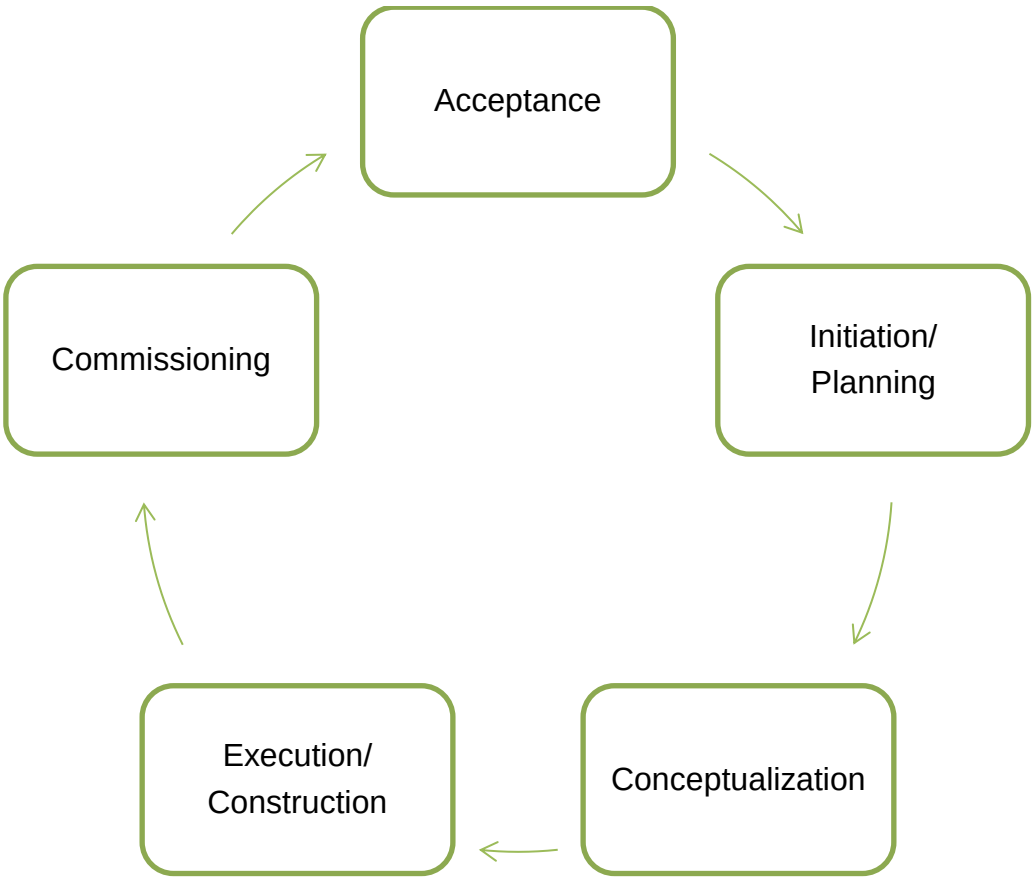

Figure (E): Project Life Cycle

Appointing a designated team of engineers for construction monitoring during the project phases to confirm the implementation of quality control and assurance systems would achieve acceptable quality plant standards at delivery. These engineers would principally help contractors follow consultant, developer, and manufacturer recommendations during installation, testing, and commissioning for all the project components. They would compile records of all the installation and testing results in the form of checklists, which will in turn make the project documentation stronger and more useful for future O&M.

Construction monitoring of solar PV plants needs to be performed in the interest of quality control and to resolve issues that arise due to non-conformance to standard industry practices. In this model, every task is completed in a sequential manner and the steps include resolving common problem or lapses as shown in Figure (F).

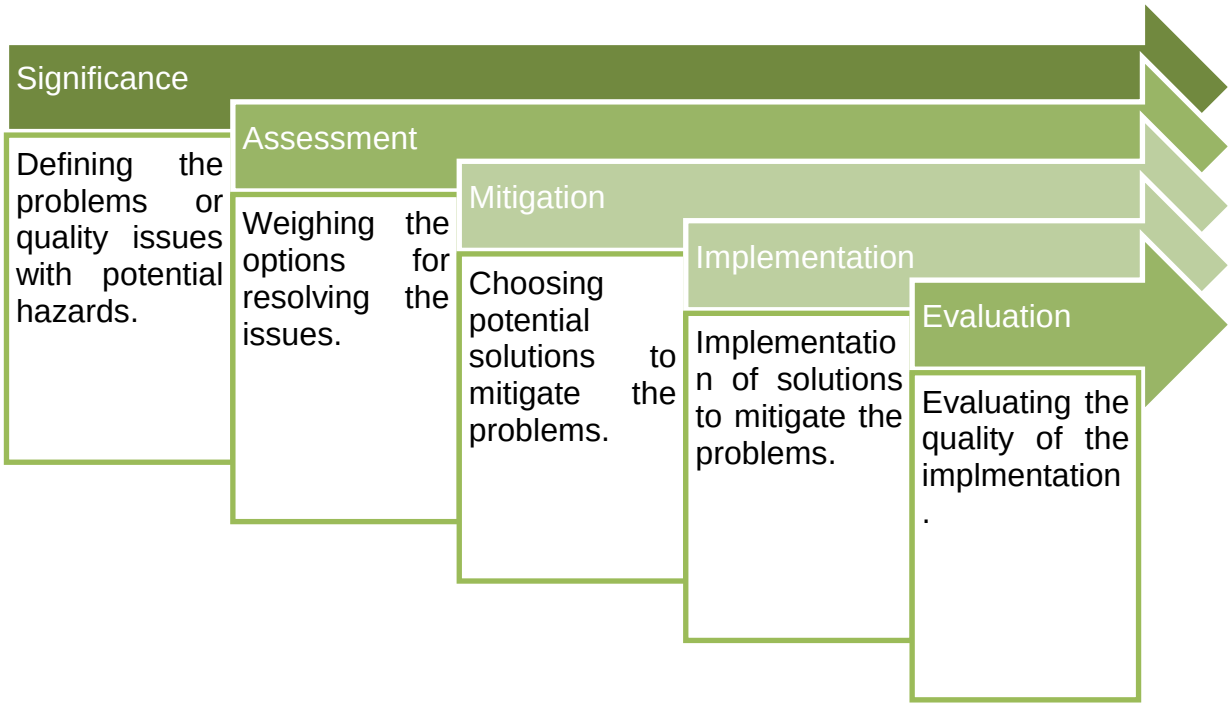

Figure (F): Quality Control Steps

CONCLUSION

Project construction monitoring teams would apply their knowledge, skills, tools, and techniques to project activities to assure they meet established project safety and quality requirements. They would also be proficient at helping EPCs in implementation aspects such as following quality plans, utilizing check lists, completing compliance reports, resource management, etc. It is essential for the solar industry in India to appoint construction monitoring teams so that a standard level of project construction can be achieved and maintained.