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# Exploring the Construction Project Closing Effects on Project Success

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**ABSTRACT:** The general assumption in a construction project success, often seems to be based on the first four phases of initiation, planning, executing, monitoring and controlling. If these phases are well done, then the project is considered successful. However, unless the last phase of administrative and documentation adjustments and completion are satisfactorily done, the project is not complete and successful. This last part of a project; *Closing Phases* is as significant for the project success as any other phase. This paper is focusing on the closing process of construction projects and investigates the effects of a well performed, closing phase in the success of future projects by literature reviews of scholarly research papers and professional experts' report.

**KEYWORDS:** Closing Process, Lifecycle, Project Success, Project Management, Construction

## I. INTRODUCTION

Any contractor can start a project but not all can finish them properly. Throughout the duration of a project, many things can take place that alter the course of how the project will end but at the end of the day, all the documentation required in the specifications are still to be submitted. Large or small, all construction projects have a closeout phase and inside of the specifications are typically a list of requirements that the contractor must meet in order properly closeout the project. These requirements are always found inside of the Division 01 Specs of the project manual and should be reviewed at the beginning of each project by the entire team to get a good understanding of what is expected and to get everyone on the same page collectively. The project team should typically divide up the project responsibilities at the beginning of the project to alleviate any sort of confusion there may be over the priority of certain closeout documents. Closeout of a project should always start day one of the job. For example, submittals at the beginning of the project are part of the closeout documentation at the end of the project. All submittals should be saved in an accessible location for access during and post construction. The closeout phase starts with starting and adjusting systems and ends with contractor accepting final payment from the Owner. Typically, the contractor will set up a meeting with the Owner and the Architect to discuss the closeout process near the end of the project and what is expected depending on the type of delivery process the contract is.

## II. RELATED WORK

For further clarification and understanding of this phase, we first explain some definitions regarding project close-out. Generally, a construction project has four phases in its lifecycle. The last phase of construction projects is closing phase. In fact, it is this phase that all the documents that have been produced are assembled and it is the last chance to go over them and prepare the final document for the client. The substantial completion of projects is the completion of the first three phases but until you do not complete the last phase and the general contractor gets the final payment, the project does not end. At this phase, often the project group face a lot of pressure specially if the general contractor has multiple projects in the pipeline to be closed simultaneously.

Collecting documentation from the different parties in a construction project setting is the issue here. Although, it seems like not a big deal, but actually it is. Once initial request for document are sent, the subcontractors already completed their job and they may well be on their next project and providing documentations for the past project may not be their first priority. So, it may take a longer time to collect from them. For the project manager is not easy to schedule a definite closing time for the project. Collecting document can take weeks or months and the average time for closing is three to five months. However there has been close-out time over six months (Gonzalez 2021)



Gulland discussed the potential issues which may come up during closing phase of projects. Without an effective management from the beginning of the project you may end up with some problems which will eventually appear on your punch-list. Knowing that a punch-list is a list of incomplete items that need to be changed and or completed before the project being considered complete. If the completion of the check-list delays it would affect project completion timeline. Like many other construction professionals, he suggests communication with all stake holders from the initial phase is essential (Gulland 2021).

Gonzales, in an article titled "Successful Project closeout" wrote that the project closeout is nobody's favored phase in construction. Rather it is a phase that usually left to the last minutes. That is when project participant suddenly found out there was a problem and then they pressure the sub-contractors to follow-up and organize their files (Gonzales 2021)

### III. METHODOLOGY

The methodology of this paper is based on the articles, scholarly publications and books by experienced professional contractors. This topic is rather a managerial and experimental subject and it depends on what is happening on daily bases of the field and contractors' offices to organize the flow of information for more efficient collaboration with all project participants. The construction industry is changing due to advances of technology which demands more and more information and documentation. Project closing deals with organizing documents and complying with legal responsibilities each project stake-holders have. The construction project at the end depends on fulfilling these responsibilities and satisfying the clients.

### IV. POTENTIAL ISSUES IN CLOSEOUT PROCESS

#### *Documentation*

Closeout documentation could include a variety of things depending on the project and the design team that wrote the specifications. Documentation that is always in the closeout docs are the warranties and the operation and maintenance manuals. These items will always be in the closeout documents regardless of what the project is. The reason is because with the legal responsibilities both are vitally important to the longevity of the building or structure. The general contractor will typically provide a warranty and a guaranty provision in the contract of their own with the subcontractors providing special warranties for the products and services that they have installed. "In a typical construction contract warranty provision, the contractor "warrants" or "represents," or covenants, that its work will be performed in accordance with certain standards stated in the contract (e.g., in "a good and workmanlike manner") and otherwise be free of defects and in conformity with the design documents.

While the term "warranty" or "warrants" is often used in connection with this concept, it really pertains to any provision in the contract, whether a representation or a covenant, which prescribes a standard of performance governing the contractor's work. The remedy for breach of the "warranty" is the recovery of monetary damages incurred by the other party (e.g., the project owner or general contractor) by reason of the breach. So, for example, if defective materials need to be repaired or replaced by the owner, the owner is entitled to recover from the contractor the cost of the repairs or replacement made by the owner. The duration of the warranty will sometimes be designated in the contract (or design specifications), but if not, the statute of limitations period for contract breaches will constitute the time frame for enforcement (in New York, for example, the period is six (6) years from the accrual of the cause of action)" (Scheffler 2015).

There is a difference between a warranty and a guaranty, or guarantee. Confusion surrounding the different concepts of a warranty and a guaranty can create problems in drafting or enforcing the construction contract. "A typical guaranty (or guarantee) provision becomes operative after completion of the contractor's work and requires replacement of defective or non-conforming materials or equipment, or remedy improper workmanship, at its own cost and expense. The contract, or design specification, containing this obligation generally provides for an expiration date or period beyond which the guaranty is no longer enforceable. The design specifications may contain certain guaranty time periods that are longer than the time period provided for in the contract, so it is important to state in the contract that the longer period prevails.





The term "guaranty" may not be used to characterize this obligation, and often the word "warranty" is used, which can generate confusion because of the different remedies available under a true "guaranty" and a true "warranty" (Scheffler 2015).

### *Enforcing the Warranties and Guaranties in Closeout*

Closeout doesn't just end after the project is completed. After Substantial Completion and Final Completion as the project is warranted for a period of time that the general contractor must maintain. "The other party to the construction contract is entitled to enforce the contractor's guaranty or warranty, as well as any other party who is named as a beneficiary of the guaranty or warranty provisions (e.g., the owner, if the contract is with a subcontractor) or to whom the contract (or separate guaranty or warranty document) has been assigned. When assessing the contractor's responsibilities, the enforcing party should make sure it reviews any warranties or guaranties contained in the design specifications, in addition to those set forth in the contract" (Scheffler 2015).

### *System Start-Up/ Commissioning*

Project commissioning is the process of assuring that all systems and components of a building or industrial plant are designed, installed, tested, operated, and maintained according to the operational requirements of the owner or final client. A commissioning process may be applied not only to new projects but also to existing units and systems subject to expansion, renovation or revamping. In practice, the commissioning process is the integrated application of a set of engineering techniques and procedures to check, inspect and test every operational component of the project: from individual functions (such as instruments and equipment) up to complex amalgamations. "HVAC commissioning is usually a testing and reporting process that takes place at the end of an HVAC system installation. It documents the system was installed according to designer's and manufacturer's requirements (Puryear 2014)." In the closeout manual, criteria are listed as to how each system should function at the end of the project for turnover to the Owner. Typically, at the end of the project, a third-party commissioning agent or engineer will be brought onto the project to test all areas of the mechanical equipment for final completion. "Most companies have different levels of design methods based on the quality of the job. Low-cost design methods begin with the installers designing the system during the installation. Unfortunately, this design method often ends up producing poorly performing systems (Puryear 2014)." Owners may often spend higher dollar on the mechanical systems and commissioning costs in order to ensure an efficient system and a correctly installed system. The general contractor should develop a commissioning log to track issues found during commissioning and have them corrected within 14 days in order to complete the closeout phase.

### *Punch list & Work to Complete*

When a project is nearing its completion, the Architect, Engineer, or Owner will typically make a final inspection of all of the work that has been completed and compare it to the contract documents. If anything deviates from the documents, it must be corrected in order to be considered complete. The list of deviations that is developed may be titled as a "punch list" or "work to complete list". "Creating and completing an accurate punch list is essential in delivering a successful project. This step in the construction project is performed last so that all work can be reviewed and double checked. To ensure the best review process, the contractor, subcontractor, owner, and architect should all walk through the project together. Each has a specific role in providing that the punch list is completed successfully. Also, having multiple sets of eyes will help catch all remaining issues and flaws (Novotny 2018)." This is crucial because the final punch list needs to be signed off and submitted as part of the closeout documents at the end of the construction project. If the final punch list is not submitted, retainage will not be paid by the Owner to the contractor. Retainage is the percentage of the contract that is withheld by the Owner until all criteria of the contract documents are met.

### *Operation & Maintenance Manuals*

Arguably the most critical part of the closeout documents are the Operation and Maintenance Manuals, or the O&M's. These manuals provided by the subcontractor to the contractor are vital to the building staff in maintaining the life of the building. "The building owner's manual is prepared by the contractor or the sub-contractor with additional information from the designers (in particular, the services engineer) and suppliers. It is a requirement that is generally defined in the preliminaries section of the tender documentation where its contents will be described, although there may be additional requirements regarding mechanical and electrical services in the mechanical and electrical specification.



A draft version of the document should be provided for the client as part of the handover procedure prior to certifying practical completion. The final document is not usually available in full form until several months after practical completion, as commissioning information often needs to include summer and winter readings taken in the fully occupied building. The preliminaries may require several copies of the building owner's manual and might require an electronic version (March 2020).” The O&M’s provide the owner with clarity on what steps to take in the event something fails after the warranty stage is over. Not all building maintenance staff is fully trained around the country and a properly put together operation and maintenance manual can assist the maintenance staff troubleshoot any issues that may arise.

### *As-Built Drawings*

Along with the Operation and Maintenance manuals that are submitted, up to date as-built drawings must be submitted as well for final closeout. As-built drawings are drawings that are submitted to the Architect and the Owner and details the exact work that was completed. This work is work that deviated from the working contract documents and shows where everything is installed. Usually this is done in red lines. “As-built drawings are an essential part of every construction project. The main purpose an as-built drawing serves is to replicate how the contractor built the project and identify what changes were made throughout the course of constructing the project. The final sets of as-built drawings hold important information, such as shop drawing changes, design changes, field changes, approved and disapproved changes during construction, and any minor or major modification to the final resulting project (Riddell 2017).” The importance of these are so that if any issue may arise in the future of the structure, the maintenance staff can easily locate where it is on the drawings. As-builts are also important for future renovations to be used as existing drawings. These drawings must be submitted and approved before closeout.

## V. CONCLUSION

Closeout of the project is arguably the most crucial to the general contractor because it sets the standard to the owner of how exactly the company works and treats their clients. In fact, it is a learning and experimental phase that strengthen management skills. Closeout is the last thing that the owner remembers as it is the most recent on their minds. A bad closeout job could leave a nasty taste in the owner’s mouth and spurn them away from using that contractor again on future projects, regardless of how successful the overall project was. A good closeout process with the owner could leave a lasting impression on them for years to come and help open the doors to new opportunities with the same clients in the future. The lessons one can learn during a successful closing will include but not limited to an effective communication with all project participants, transferring all deliverables to customer, completing project documentations, re-evaluating resources and reviewing the project at each phases and value in a good closeout process is unmeasurable; it is up to contractors, to leave that impression.

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