# TURNOVER PACKAGES (TOPS) FOR INDUSTRIAL CONSTRUCTION PROJECTS

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*A CAI E-Publication*

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Directors and Project Managers need to manage many project elements to complete operational readiness successfully. Take time to sit down and facilitate communication with your design and construction teams to coordinate how documents will be delivered and how they will be stored. As a result of this constant team communication, a Construction Turnover Plan (CTP) is developed and maintained throughout the project's execution.

Construction turnover planning begins at the outset of the project with planning for a startup, and a multi-discipline and multi-functional team accomplishes this. The Owner's TOP Manager is responsible for establishing the overall turnover vision and program that supports project goals and critical milestones. Also, this team leads the development of CTP and Turnover Packages (TOPs) and ensures the documentation is prepared, turnover, and stored per the established plan and Owner's procedures. The completion of CTP and TOP played a vital role in completing the CQV process and Operational Readiness.

# INTRODUCTION

A key element in completing an industrial construction project is planning to transfer jurisdictional control of a system from Construction through CQV and into operations. This planning starts at an early stage of the project and is managed throughout the project's entire life.

The best way to formalize all this planning is by completing a Construction Turnover Plan (CTP) and managing the Turnover Packages (TOPs). The Owner's TOP Manager is responsible for managing and completing the CTPs and TOPs.

This insight focuses on the general scope of executing construction TOPs of industrial plants to the Owner. Also, this insight should be viewed as a starting point for efficient and effective construction turnover of Systems and System Elements. This insight is written from the perspective of industrial facilities, especially those with major mechanical and electrical components.

# BACKGROUND/PROBLEM STATEMENT

During Construction, many contractors are primarily focused on creating a building and not necessarily on managing documents for an upcoming transition of information. In the back and forth, it's easy for critical documentation to get lost or missed placed. Owner's Project Managers (OPMs) must think ahead and plan for the successful transfer of documentation during construction turnover.

OPM's first step is to establish the Owner's TOP Manager to generate and maintain a Construction Turnover Plan (CTP) that provides the instructions on how to manage the information and documentation of different Systems and System Elements from the beginning to the end of the Construction (electronically or hard copies). This plan helps guarantee that construction information is complete, well-organized, and easy to access. It also ensures that Owner's CQV team, operations, and facilities/maintenance personnel have the information they need to operate systems within their buildings.

To ensure that Construction provides the required deliverables for each System, the Owner's Subject Matter Experts (SMEs) will complete the construction Turnover Package Indexes (TOPIs) for each System and Element of Systems, and this TOPIs are included in the construction bid package before award the construction contract/PO. The Contractor's QC team is responsible for preparing, maintaining, and handover the construction TOPs (electronically or hard copies) by following the CTP and TOPs requirements. Before the handover, a system TOP to the Owner, the CQV team, and the Owner's Subject Matter Experts (SMEs) of the System need to review, approve, and sign off the TOP that confirms the content complies with the verification/qualification and others operational requirements.

Project System List, CTP, and TOPs are live documents, and changes can occur due to scope or design changes. Therefore, it is critical to keep these documents updated to ensure the successful turnover of TOPs.

To avoid cost and schedule impacts on industrial construction projects, most OPMs preferred formally control the execution of TOPs. To do so, the OPM needs to be aware that the content and structure of how TOPs will vary depending on the project. This insight provides a guideline for formally managing and executing industrial construction TOPs to complete operational readiness successfully.

## SOLUTION

The construction Turnover Package (TOP) is the culmination of an industrial construction project, and all TOPs will be handed over at the system level. Construction TOP identifies what documents are to be handed from Construction to the Owner's CQV team and CQV team to Operations and facilities/maintenance. The starting point of planning starts when OPM assigns and delegates the responsibility to the Owner's TOP Manager before a preliminary design is completed. TOP Manager is responsible for assessing initial and detailed design packages (drawings and technical specifications) and Owner's Computerized Maintenance Management System (CMMS) to generate the Project System List (PSL) that includes the impacted Systems and System Elements. The PSL shall consist of the systems numbers, descriptions, and Owner's SMEs. The Owner's TOP Manager is also responsible for maintaining and updating the PSL from generation to final handover of construction TOPs. Review and approval of OPM, document manager, and SMEs are required after the age and updates of PSL. TOP Manager shall submit and coordinate all PSL updates to design PM. System Elements occur when more than one System is in one P&ID, and different boundaries define these System Elements in a P&ID or drawing. Non-process System Elements such as civil, structural, and available systems can be determined, with limits like process systems, for turnover purposes.

Next, the Construction Turnover Plan (CTP) is completed by the Owner's TOP Manager and approved by the Owner's CQV team, SMEs, EH&S, document manager, operations, facilities/maintenance, and OPM. The CTP reflects all activities to transition the handover of construction documents from Construction to the Owner's CQV team and the CQV team to Operations and facilities/maintenance. These activities include not only those associated with physical completion of the work but testing, inspection, and walk-downs to confirm compliance with drawings and technical specifications.

Then, the PSL and CTP are used to reference the process equipment, and Construction TOP Indexes (TOPIs) for each System and system element is completed. Process equipment TOPIs are generated and approved by the Owner's SMEs with the support of the CQV team and design PM. Construction TOPIs are developed and backed by the Owners' SMEs' backing of the CQV team. This TOPIs will provide the required document deliverables for each System and System Element. Industrial projects' long lead process equipment is typically purchased after preliminary design, and the long lead equipment budget is approved (after Gate 2 of the FEED process). Therefore, process equipment TOPIs are completed during the preliminary design execution and included in the Request for Proposals (RFPs) of long lead process equipment. Construction TOPIs are met during the performance of detail design and included in the construction bid packages to ensure the Contractor consists of all applicable costs in proposals. The Owner's TOP Manager is responsible for managing and coordinating the execution of CTP and TOPIs throughout the completion of construction documents turnover.

After the construction bid is awarded, the Owner's TOP Manager shall contact the Contractor to coordinate first and subsequence training of the Owner's Good Documentation Practice (GDP) and procedures to ensure the Contractor's and Subcontractor's QC Teams are trained to comply with Owner's requirements and avoid discrepancies and rework. Next Owner's TOP Manager, with the support of the CQV team, document manager, scheduler, and Contractor's QC team, will complete and maintain a Construction Documents Tracking Log (CDTL) through the completion of Construction. Constant communication and coordination between these teams must ensure the proper execution of CDTL. Coordination of CDLT includes establishing and updating priorities and completion dates of Systems and Systems Elements. Owners' CQV team will be responsible for updating periodically (weekly) the progress of the following activities in CDTL: GXP assessments, URLs, verifications or commissions, qualifications, validations, and Release for Use. The Contractor's QC team will be responsible for updating the startup's progress, MCC, VR, MCC, CCC, and TOPI for each System. The Owner's TOP Manager is accountable for updating: FAT, SAT, and systems numbers and descriptions of each System and Systems element. Also will ensure coordination and updates of the Owner's CQV team and Contractor's QC team are completed. Owners Document Manager will use this information to coordinate the proper storage of Construction TOPs after they are turnover to the Owner. The scheduler will maintain an update of systems in the project integrated schedule using updated information (dates) from CDTL.

After CDTL is generated and construction work is awarded to the Contractor, the contractor Quality Control (QC) team starts to build the construction TOPs binders or electronic folders in BlueBeam or other software application that allows users to markup, takeoff, organize, and collaborate with PDF files. Construction TOPs binders shall be stored in a secure/locked area. The contractor QC team will be responsible for maintaining updated and controlling the access of these TOPs. It is essential that all documents are legible, organized, secure, and filed correctly.

Building and turnover of a construction TOP involve two key steps: physical completion of the System and transfer of knowledge in the documentation. Physical realization of a system is achieved when Mechanical Completion (MCC), Verification Ready (VR), and Care Custody Control (CCC) certifications are completed by the Contractor and reviewed/approved/signoff by the System Owner, SME, EH&S, and CQV team. Facility managers should receive and take charge of construction TOPs by ensuring that information and data are protected and preserved.

The designer Team is responsible for coordinating with his team the completion of process equipment TOPs (electronically and/or hard copies) and submitting to the Contractor to complete the construction TOPs of those systems. Therefore, these construction TOPs will include the documentation received from designer Team plus all documents generated during the receiving, installation, and startup of the process equipment.

When closing out a project, pulling together documentation should be simple, but often items can get missed. A complete compilation of all documents shall be included in a construction TOP after constructing a System. Full system completion means the documentation (including drawings, startup procedures, log sheets, settings, operation and maintenance manuals, Certificates of Occupancy, and other items) in content is submitted by the Contractor and reviewed, approved/signoff by the Owner's CQV team and SME. Owners' approval/signoff demonstrates that the facility's systems have been completed following the drawings, technical specifications, changes, and contract and can be operated safely for their intended purposes.

## CONCLUSION

Owners Project Managers (OPM) who do not plan early in industrial construction projects for management and handover of documentation will negatively impact the budget and schedule.

Construction turnover planning begins at the outset of the project. During the scope definition and concept phase, the OPM and Owners TOP manager develop a high-level project execution schedule and confirm the scope of critical milestones and activities (such as mechanical completion, turnover or CCC, startup, verification, qualification, and validation). The TOP Manager develops initial turnover system definitions and limits during preliminary engineering and construction planning, including the scope and associated documents. This is when the initial draft of the Construction Turnover Plan (CTP) is prepared, and coordination with construction and quality teams begins. During detailed engineering, system boundaries for turnover are defined and fixed, and the final CTP is ready. The CTP is updated as needed during the construction phase, and TOPs are generated and turn over to the Owner.

If you think a construction TOP plan in industrial projects is optional or just a recommendation, think again…

## ADDITIONAL RESOURCES/REFERENCES

Project Management ToolBox: Tools and Techniques for the Practicing Project Manager by Russ J. Martinelli and Dragan Z. Milosevic | Feb 1, 2016

Successful Construction Project Management: The Practical Guide by Paul Netscher | Apr 14, 2014 Rajkumar, S. (2010).

Mechanical and Electrical Systems for Construction Managers by ATP Staff | May 5, 2013

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Victor Torres has over 32 years of success in the engineering construction sector, running company-wide operational functions and leading large-scale projects from inception to successful completion while making and executing sound strategic decisions. He is an Associate Director in Program and Project Management with CAI, which is influential in shaping and directing business strategy, and a recognized leader within the engineering and construction industries. He has experience in heavy industrial planning, permitting, engineering/design, construction, and validation, including years in API, parenteral, bio-science, pharmaceutical, medical device, mining, petrochemical, and industrial process projects in Canada, the USA, the Caribbean, and Central America.

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