
DISCUSSION QUESTION:

How do we address project cost data that we have collected over the past 5 years?

Over the past several years we have gone from a time period of average project activity to one of excessive activity to then one of relatively no activity. We are now seeing signs of increased movement and possibly getting back to the level of 2006/2007/2008. Labor, materials and equipment pricing have been on a rollercoaster ride throughout this 5 year period. As we develop cost estimates for our future projects, how do we address the cost data that we have collected over the past 5 years? Many are saying that we need to throw out this data and just extrapolate cost information from pre 2007 and use normal escalation. Others say cost will be more in line with 2007/2008 so this is the data we should use. What are you seeing?

Online (LinkedIn) Feedback

- Ignore 2006 & 2007 data and linearize the trend
- Costs were not consistently impacted across all commodities. Some increased and some decreased. Need to be careful with an all-encompassing statement. Likely that different factors are required for different aspects
- All estimates need to establish the basis of estimate in a memorandum that accompanies the estimate
- Estimates need to consider volatility of currencies
- Consider and address Lessons Learned. Should be considered in the estimate or identified as addressed in the Project Execution Plan
- To avoid misleading projections, develop more complete EPC Packages and institute a “No change” mentality for the project
- Standardize designs, where feasible, to maximize use of modularization and minimize cost/scope growth

Feedback from Workshop

- Base of Estimate should well defined and communicated back to the Business.
- Owner input in cost estimate based on actuals from past projects.
- Historical Data
 - o Productivity Factors
 - o Cost of metal
 - o Currency variation
- Necessary adequate engineering for that stage cost estimate (level of energy)
- Challenge of meeting pre-conceived cost estimate decided by Business when too little Engineering is completed (FEL1)
- Retain '06 –'08 data to mitigate risks
- Make proper use of commercially available data normalized and analyzed
- Cannot limit data to last 5 years – must go back much further (eg. 25 years)
- Look at long term trends
- Look for opportunities – forecasted recessionary periods
- Must consider the global marketplace
- Fails to account for the lack of training & transfer of project knowledge and expertise
- Must maintain contact with potential sources of supply of project resources – keep up to date
- Offshore supply has its own cost adders and challenges (will influence cost estimates)
- CII Cost Database available (“anonymous” data)
- IPA Database available (worldwide but expensive)
- “Factors” – other industries (ie – insurance) have systems
- Solid “Base of estimate” important
 - o Define assumptions, sources, etc.
- Make sure to manage contingency and allowances, build into estimate, define them specifically in the Basis of Estimate doc

DISCUSSION QUESTION:

Field Supervision

During the last aggressive capital project execution period (3 years ago), one of the lessons learned regarding escalating field cost and excessive time delays was the ineffectiveness of field supervision. With this next surge of construction work upon us, how are companies (owners and contractors) dealing with the limited supply of experienced field labor supervisors and is this a learnable skill through training?

Online (LinkedIn) Feedback

- Project Execution Plans that effectively plan the work to set Filed Construction up for Success through efforts like Workface Planning
- Supplement field construction staff with field engineering support and where appropriate Shift responsibilities from field to office support
- A field office rotation of personnel to alleviate “burnout” and foster teamwork between the two environments
- Incentivize construction success with appropriate rewards
- Prompt support from offsite engineering staff with clear lines of communication ensuring fast turnaround of RFIs
- Effective Purchasing/Expediting programs to ensure meeting schedule needs
- Defined Project Controls rules for effective progress measurement. Rules of Credit understood by Field Supervisors so they can accurately assess real progress.
- Properly designed contracts and contracting strategies to ensure proper focus on project completion and quality
- Proper and timely staffing levels
- More effective use of technologies – such as video conferencing or video of problem areas

Feedback from Workshop

- Modularization – offsite construction
- Raise profile of field engineering, more desirable profession
- Construction college/corporate mentoring
- Incentives and retention programs
- Improve communications and relationship with home office
- Engagement with University and College programs early
- Corporate training rotations through the field for all new project employees so that people understand how designs get built in the field
- Government should facilitate, retention of graduates
- Efficient allocation of field support personnel
- Training/mentoring ongoing
- Selection of supervision from Trades. Get people who like to supervise from trades and grow their expertise.
- Financial incentives for productivity
- Partnering with Institutes (technical) and companies
- Centralizing some project services (utilities – steam- air – power...)
- Start induction and training very early in career path
- Broad based and multifaceted training (not specialized) that exposes Field Supervisors to all the trades. More cross training – less specialized – multi ticketed trade
- Facilitate accreditation for foreign workers under the TFW program
- Need good engineering support
 - o Need Owner buy-in (\$) to send engineers to site
 - o Provides excellent (necessary) training
 - o Provide good incentives to encourage engineering support

DISCUSSION QUESTION:

Quality of Engineering Deliverables

What can we do to improve the quality and completeness of Engineering Deliverables? Many large industrial projects have experienced schedule delays and comprises in field quality due to Construction Work Packages (CWPs) issued to contractors that are lacking. As one example, some Issued for Construction (IFC) drawings may be issued with insufficient or inconsistent detail. Any ambiguity in the scope of construction as defined in the drawings/specs often leads to confusion in the field. The system we rely on in which Requests for Information (RFIs) are submitted to the Owner/Engineer for clarification helps, but is it a reaction to the root cause of deficient Engineering Deliverables. How can Owners, Engineering, and Construction Companies work together to ensure that our Drawings and Specs are clear, complete, and free of error? How can we better set up the construction process for success?

Online (LinkedIn) Feedback

- Decrease the overlap of engineering, procurement and construction schedules. Quality over Speed of delivery.
- Realistic schedules allowing proper time for reviews, approvals, procurement & execution
- Resource availability – need to promote maintaining adequately trained & experienced resources
- Empower field for resolution of issues
- Communicate problems/impacts created by low quality documents to the EPC companies producing them and the Owners reviewing them. Many of these people have never seen a construction site. Training to ensure company cultures stress the need for quality
- Create contracts that incentivize quality and penalize a lack of quality
- Involve the Construction Contractor in the design phase and have them resident in the design office for constructability reviews
- Make Design and Construction a unified effort, not separate efforts – joint responsibility for project success
- Alignment of design and construction teams (team building) to ensure open communication and problem solving
- Do not permit subsequent activities to progress prior to finalization of quality documents
- Incorporate quality principles (such as Six Sigma and Lean) into the design process
- Minimize changes after drawing AFC
- Develop effective quality plan that is actively used and includes appropriate checklists/ monitor quality through RFIs and NCRs, formal audit requirements and other quality methods

Feedback from Workshop

- Timely decisions from Owners
- Realistic schedule
- Clarity of scope
- Involvement of key stakeholders
- Reduce overlapping
- Plan ahead for challenges (i.e. – brownfield issues)
- Adequate/timely communication
- Avoid scope creeps during the execution phase that creates change during detailed design.
- Have clear idea of Owner's expectation vis-à-vis quality
- Quality guidelines should be in place
- Necessary QA/QC processes, procedures/training should be in place
- Involve construction in design upfront
- Involve Operations personnel in design (esp. brownfield projects)
- Continuity of resources on a project makes projects more successful
- Conduct constructability review assessment of IFC SOW package
- Have necessary technical input in time (e.g. geo-tech information) so that changes do not occur late in design cycle
- OWNER
 - o Early input of Engineering & Construction & Operations

- Formal constructability reviews
- Design reviews with qualified people
- Process safety reviews
- Involved document review & approval from Owner
- “One Owner” – Alliance – Co-Location
- Strong focus on project execution & scope development
- Owner technical staff involvement
- Responsibility & accountability for project & TIS deliverables
- **ENGINEERING**
 - Incentive to retain consistent project team throughout project
 - Owner part of team that approves project deliverables
 - Design/Build contracts will improve the constructability of the engineering deliverables.
 - Quality discipline review of engineering deliverables
 - Consistent PM
 - Scope definition in full prior to engineering documents. Importance of defining scope in FEL
 - Early involvement of Operations. Then adopt a “no change” policy during detailed design.
- **CONSTRUCTION**
 - Follow the COAA model
 - Workface planning
 - Change management
 - Involvement in design
 - Not mobilize on unsatisfactory documents. Insist on complete quality documents before deploying people to field.
- Make proper investment in planning & engineering
- Use well experienced project team and engineers
- Need greater “feedback” from construction and operations on design quality and cost details
- Comprehensive & fully collaborative project “post mortem” involving all main participants
- Need clear expectations PEPs and DBMs (client sign-off)
- Take advantage of Lessons Learned
 - Update the specs
 - Update the process
- Good QA – Do QC too (Cold Eyes Reviews)
- Use automation in design process (CAD systems & databases)
 - Need the same technology in the field
- Sufficient time (planning)
 - Crashing the schedule costs quality or money
- Team approach effective
 - Owner/Engineer/Construction start – finish
 - Goof training opportunities again
- Invest in having and maintaining engineering standards
- Educate/Disseminate the risks of poor quality