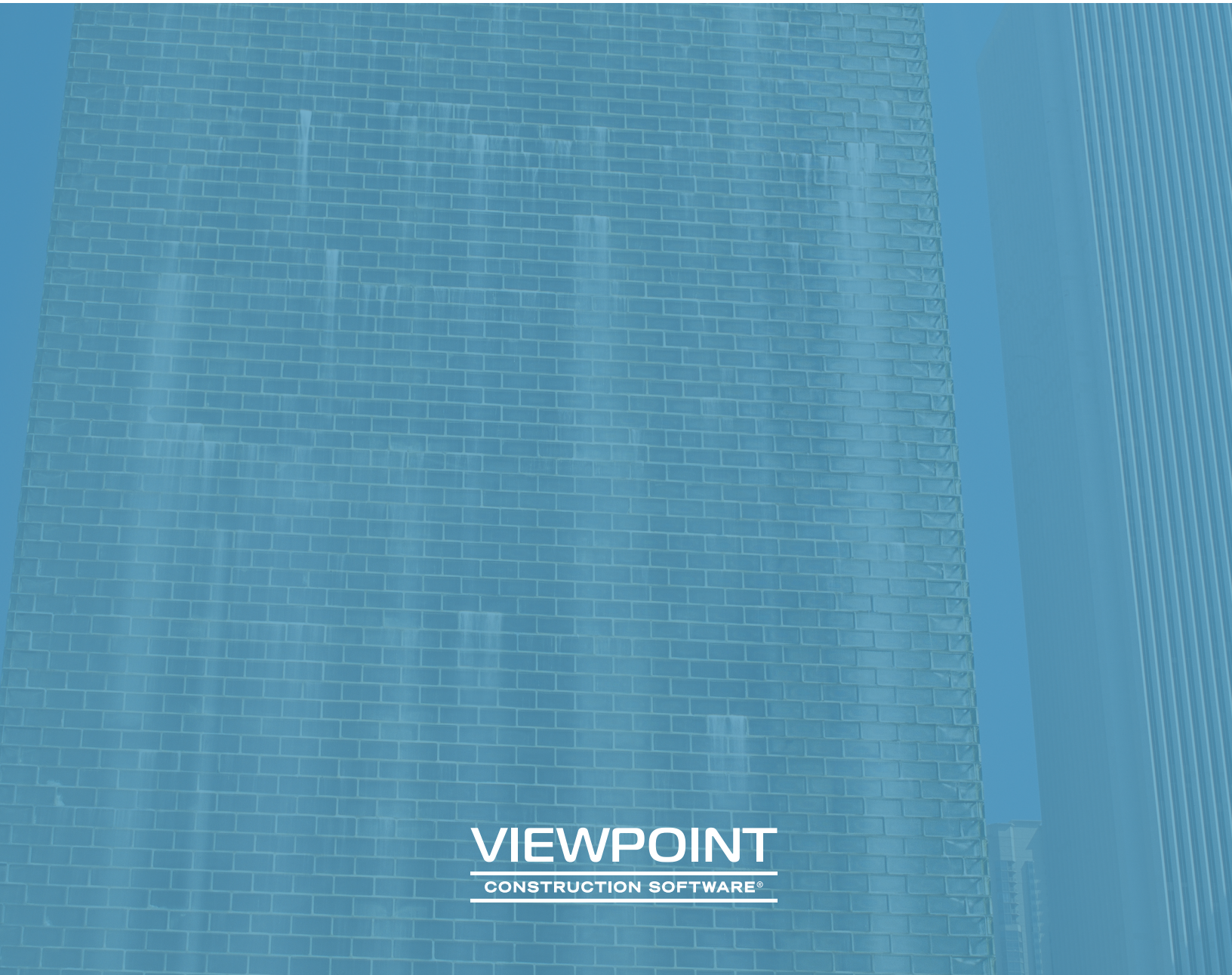
BEST PRACTICES GUIDE

To Live and Die by Change Order Management

Developing a Proactive Change Order Management Strategy to Manage Risk and Avoid the Paradox



VIEWPOINT
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No work shall commence without a signed change order; the mantra of almost every contractor in the United States. Stern words used to embody the average construction firm's policy regarding additional or extra work resulting from any number of factors including but not limited to unforeseen conditions, designer error or omission, uncoordinated scope, etc. With such a strict policy that appears universal in its application, why do so many firms struggle with the liability of unapproved, uncollected or even litigious change orders? What are the drivers of this management dilemma and how have these nine words become a paradoxical farce in the construction community?

Most industry experts would agree that change orders no longer represent untapped margin potential. Contractors agree that with few exceptions, change orders are productivity killers and often become the focal point for schedule disruptions and project controversy. Customers believe contractor seek out change orders when in fact, most contractors would relish a project with few or no changes, additive or deductive. Many studies have shown that as the frequency of change orders increase, labor productivity decreases. Coupled with other uncontrollable project issues (i.e. climate, spatial constraints, etc.), project margins begin to suffer. The deleterious effect of change orders becomes compounded on projects with multiple trade contractors and suppliers. General contractors and trade contractors alike suffer from the effects of poor change management. With the exception of collaborative delivery systems such as design-build, many contractors would agree that construction documents are declining in quality and presenting greater ambiguity in their interpretation. All signs are indicating the problem related to construction changes will continue to get worse before it gets better.

What are project managers to do? Project managers walk a tenuous line when charged with managing not only the project but also preserving and maintaining the relationship with the customer. Even on hard-bid, lump sum projects where maintaining strong customer ties for the next project are less important, there is no discounting the project harmony that is lost with a heated and controversial change order battle. Here in lies the conundrum. Proceed with the work and maintain the schedule and relationship, or stop, haggle and argue disrupting the wheels of progress and shake the project's momentum. However, proceeding blinding without authorization is never without risk. While maintaining the project's progression and continuity,

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change order liability is increased by negotiating values at the very end of the project that are rarely collected at full value. Projects write-downs occur, disrupting the anticipated margins as well as the overall financial health of the organization. In addition to the sacrificed direct costs, the project teams also fail to capture to some of the hidden or indirect costs. The impact of increased or expended general conditions and additional overhead

exacerbates the damage. Developing a proactive change order management strategy will not only minimize the firm's risk but also provide a mechanism to better manage customer expectations and relationships.

Managing Change Early

Why do change orders exist? The answer is hardly some existential pontification. Changes are breakdowns in communication. Some change orders are simply the result of a customer making an innocuous business decision that they feel will better the finished product.

How can contractors in this environment have any control when they are merely operational pawns reacting to their customer's poor planning and coordination?

Add an office, add and outlet, or change a color may be simple and non-controversial discussions. The vast majority of change orders arise from a mismanagement of expectations. Flaws in the design and constructability such as errors and omissions in contract documents, unforeseen site conditions and misaligned interpretations of scope, comprise the foundation of many change orders. Many contractors believe architects and engineers are single-handedly responsible for all change orders. In the contentious world of hard bid, plan and specification contracting, it is easy to take the perspective of the victimized contractor. How can contractors in this environment have any control when they are merely operational pawns reacting to their customer's poor planning and coordination?

Whether speaking of hard bid or design build projects, so many contractors subscribe to a victim mentality rather than approach projects seeking early and steadfast resolution to change orders. Proactive management begins with handling change before there is change. During the preconstruction meeting with the customer, whether it is an end-user or general contractor, it is imperative to discuss the change order process. In addition to discussing the generic project specifications, the process should include the following items:

- **Lines of Authority —** Who can approve what and for how much? If a customer hesitates to sign a change order for fear of retribution, they probably do not have the necessary authority. Find the decision maker.
- **Deadlines —** What timeframes are established for resolving change order issues? Avoid the never-ending change order cycle and have mechanisms in place to quell contentious items early.
- **Escalation —** If change orders cannot be resolved at the jobsite, what are the levels at which issues are escalated. Within the timeframes allotted, when should issues be raised to the next level?

Many contractors view this methodology of addressing the potential of change orders early in the project relationship as adversarial and worry customers will view this manner of questioning as primer for the change order floodgate. Quite the contrary, when the change order process is discussed proactively within the context of other standard operating procedures such as invoicing, quality control and schedule management, it becomes less controversial and more about finding solutions. Educating the customer on the process not only details the hazards for them but also helps to uncover the hidden and nebulous contract terms often only discovered after the project climate has become hostile. Historically, contracts become the "go-to" device in times of crisis rather than tools to manage unforeseen conditions, schedule delays, schedule acceleration and damages.

Educating customers mitigates the risk associated with ignorance about how to handle change.

The next step in the process is to begin to identify change. Most likely, crews identify changes as the crews and trades judiciously toil in the field, thus halting progress and negatively affecting productivity. Careful scrutiny of the plans and specifications during the Pre-Job Planning phase is one mechanism. It is important to avoid this from becoming an Easter Egg Hunt for potential change orders. More importantly, the project manager and superintendent should examine the plans, specifications, subcontracts, purchase orders, permits and site, carefully utilizing the following list for potential "Job Progress Hazards":

- **Trade Coordination —** Review the scope of each trade contractor and/or supplier to identify scope holes or scope duplication. **TABLE 1** illustrates the use of matrices to coordinate scopes.
- **Detail Review —** Each member of the team should scrutinize connection details, grade changes, cross sections, panel summaries, room details, etc. It is often here that small details are missed or omitted. These small details can compound and complicate already arduous schedules.
- **Staging —** Jobsites continue to shrink and site utilization during construction resembles claim staking from the Gold Rush. Developing site plans and logistical coordination plans will help manage expectations on storage, deliveries and exit strategies. Simply laminate a site plan and use scale models to represent material bundles, access roads, critical utility ties-ins, trailers, crane swing radii, etc. Map on paper the utilization of before it costs money to relocate materials and labor. This best practice not only protects against presumptive change orders relating to logistics and handling but also guides the project team to strategically managing the site. **FIGURE 1** is a depiction of how this process works:
- **Schedule Review —** Review all assumptions regarding schedule milestones and ensure both production schedules and procurement schedules support the overarching project goals. **TABLE 2** can be used in the development of master schedules and expose disconnects or interpretational differences early rather than later.

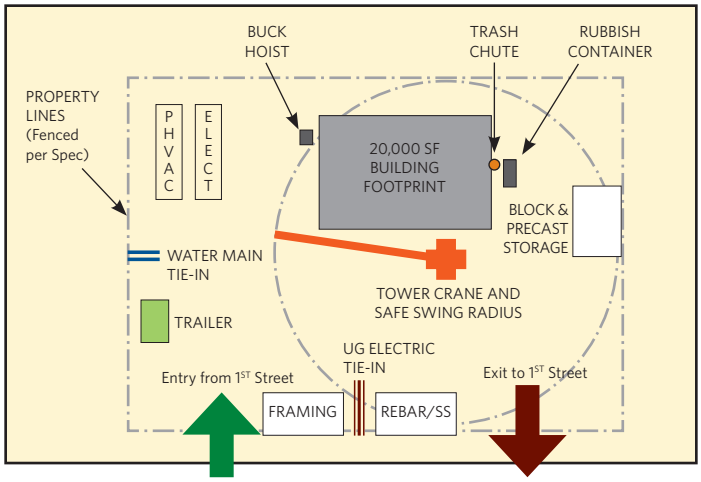

FIGURE 1 Site Plan Coordination

TABLE 1 Trade Contractor Scope Coordination

DIVISION 15 Coordination Matrix

TRADE	DOMESTIC AND SANITARY	ROOF TOP UNIT CONNECTION	CONDENSATE LINES	ROOF DRAINS	CONNECTION TO CENTRAL PLANT
EZ Plumbing, Inc.	✓		✓	✓	?
ICE Cold HVAC Company		✓	✓		?

Duplication of Scope?

Scope Hole?

TABLE 2 Master Schedule Development Matrix

TASK	TRADE/ SUPPLIER	ANTICIPATED DURATION	ACTUAL DURATION (Input from Contractor or Supplier)	Δ (Disconnect)	RESOLUTION
FOUNDATIONS	Grey Concrete, Inc.	10 days	10 days	0	0
SLAB ON GRADE	Grey Concrete, Inc.	7 days	7 days	0	0
DOORFRAME INSTALLATION	Internal (Supplier: ABC Frames, Inc.)	3 days	6 days	3 weeks	Quick ship (10% price increase)
ELEVATORS	United States Hydralics	5 week install, 15 week procure	7 week install, 20 week procures	7 weeks total	Meet with USH on Tuesday to coordinate production and review bid documents.
CARPET INSTALLATION	Fuzzy Side Up, Inc.	4 days	3 days	-1	Allow for special staging. Use day to load individual floors.

Each piece of this Pre-Job Planning exercise must be carefully mapped and developed to match the firm's core business. For example, the level of detail will vary greatly between a mechanical contractor engaged in medical gas piping installation within a hospital and a painting and coatings contractor responsible for tilt-up warehouse finishes. Consistency, standardization and a customized application of historical lessons learned will help manage any firm's process and root out potential conflicts of scope. Early identification of errors, conflicts and omissions will not only mitigate the risk of uncollected change orders, but it will aid in the management of the overall project scope by reducing production killers and simple reactionary tactics.

Change Order Process and Strategy

Changes are inevitable, even with the greatest preparation and planning. The Request for Information (RFI) remains the device that originates the vast majority of work in process change orders. Many problems lie in the verbiage of the question. More often than not, the contractor knows the right answer but poses the question in some convoluted and tortuous fashion. RFI's become documents seemingly proving designer incompetence and offer one-upmanship for contractors with an axe to grind. Identification of changes, errors and omissions as part of Pre-Job Planning leads to asking the question in a professional and goal oriented manner. Any well-crafted

RFI should include the following in order to facilitate an expeditious and well-crafted response:

- **Location —** Where on the site does this occur? Where on the plans does this occur? Including a sketch, cut sheet and photographs makes it easier to visualize the problem and potential solution.
- **Potential Solutions —** What are the options available? By no means are contractors assuming the risk, but by posing options, precious time investigating solutions can be saved.
- **Magnitude —** Does this change have an impact? How is the cost quantified? Receiving clarification on wall colors has minimal impact. Resolving plenum conflicts with trade contractors may have some impact on schedule and project cost. Finding a satisfactory answer requires knowing all of the factors.

This same strategy is employed in drafting change orders. Timely approval of change orders can often be traced to the presentation of the change order. Consider the two examples below in **FIGURE 2**.

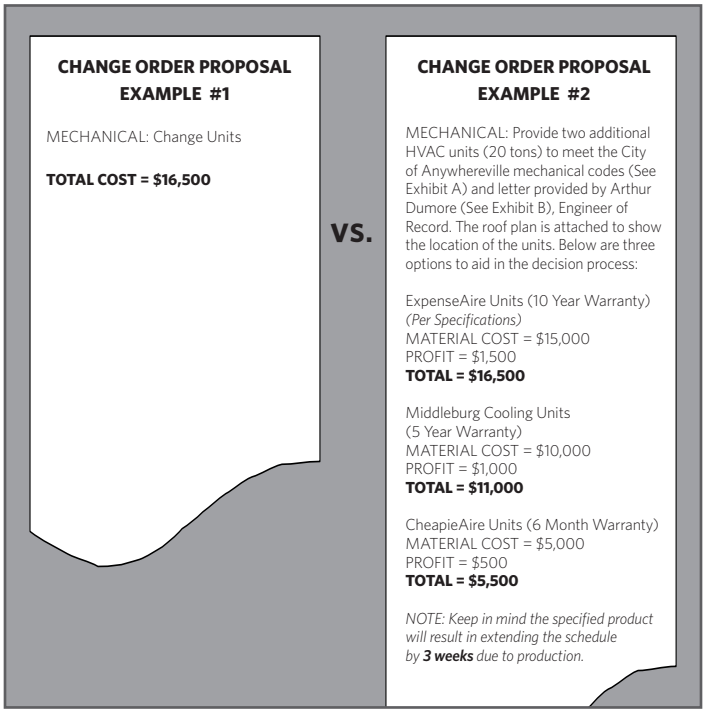

FIGURE 2 Change Order Comparison

There are many items to consider when developing strategic change orders. First, consider the audience. While a field director may authorize a change order and understand the background illustrated in Example#1, decision makers further upstream may not be privy to important supporting details. Assume the audience is ignorant of the change order particulars. This ensures project managers develop each change order as if they were educating their customer for the first time.

Gone are the days assigning change order margins of 40–50% and having a customer fail to question at the exorbitant costs.

"Sticker shock" is another important consideration of delays in change order approvals. Customer confidence in a product or system can often be shaken or dissuaded after seeing the price tag. With only one option presented, the automatic reaction is to ask for other options. Carefully selected options or shopping lists eliminate a costly and unproductive step in change order resolution.

The final price and its constituent components become another contentious issue. Contractors guard against sharing their margins believing it to be proprietary corporate information. Gone are the days assigning change order margins of 40-50% and having a customer fail to question at the exorbitant costs. General contracts and subcontracts now often stipulate change order terms and quantify allowable margins and overhead. Provide the breakdown early! A schedule of values or line item account becomes the next step in this tedious process. The customer begins to wonder what the contractor is hiding when a breakdown is conveniently absent.

While change orders may lack the enormous profit potential of yesteryear, contractors should have a measure to capture all of the hidden but real costs of

change orders. As a change order is estimated and priced, project managers should review their firm's checklist of potential costs including, but not limited to, some of the items below:

- Additional supervision
- Additional project management (if direct costed)
- Clean-up
- Additional storage and trailer rentals
- Transportation costs
- Misc. tool and equipment rental
- Bonds
- Builder's risk policies
- Safety management and supplies

Many of these items are easily justified and imperative to completing additional scopes of work. Historically, high margins simply covered these various costs but contractors failed in providing the appropriate justification. Once again, preparing the change and providing sufficient explanation makes this more palatable for the customer, thus increasing the rate of approval.

Change order discussions would be remiss without discussing schedule. One of the greatest frustrations in change order management comes after the costs are agreed upon. "Well, glad we got that approved. By the way, the materials you chose will take an extra three weeks to produce. Sorry." Schedule can rival cost when evaluating alternatives and making final decisions. Blinded by dollars, contractors fail to provide critical schedule information. The failure to quantify the impact of procurement is not the only misgiving of schedules and change orders. With the addition or modification of scope, resources must be adjusted and reallocated. The options to handle change include adding labor and equipment to accomplish new tasks or extending the schedule. Many contracts have clauses precluding the addition of time to schedules. Hard and fast deadlines mean the adjustments are addressed during the pricing. Proposing change orders at standard rates when clearly additional time is necessary becomes a recipe for margin fade.

Utilization of time and materials tracking is another traditional mechanism used in change order value disputes. Customers often feel this method ensures the contractor's honesty and avoids the padding of final prices with excess contingencies. This is true until the issuance of the final invoice. Weeks of work tickets, time cards and receipts are dismissed because "there was no way it could have taken that much time or that much money to do that work." Who is at fault — the customer who had the option of taking the lump sum change order value but chose not to or the contractor who perceivably duped the system and used this time and material change order as a vehicle for capturing lost margin? In this instance, better communication during the process prevents the remorse customers feel when presented with the bill. One tool to help prevent this form of sticker shock is the use of running time and material change order updates. This continually

"Well, glad we got that approved. By the way, the materials you chose will take an extra three weeks to produce. Sorry."

provides the customer breakdowns of change order costs during the work in process. Frequency is dependent on the project specifics. Some change orders will require only weekly maintenance, while others may require daily updates. The complexity of the work and potential costs are the most likely determinants. The customer can continually compare the progress to their baseline or expectations. Ultimately, the contractor has a running tabulation of the project's progress and a narrative establishing precedence to the customer. **FIGURE 3** below illustrates a running time and material change order log:

Time and Material Change Order – Over Excavation of Lot 13
Projected Value (Proposed Change Order 7) = $25,000

UPDATE	CURRENT LABOR SPENT TO DATE	CURRENT EQUIPMENT SPENT TO DATE	TOTAL COSTS TO DATE	ANTICIPATED COSTS TO COMPLETION	PROJECTED OVERRUN	DISCUSSION
12/5	$2,500	$2,000	$4,500	$25,000	$0	
12/12	$5,000	$5,000	$10,000	$27,000	$2,000	Lot 14 included per John Smith direction
12/19	$12,000	$7,000	$19,000	$30,000	$5,000	Rock formation at station

FIGURE 3 Running Time and Materials Change Order Logs

In addition to capturing the various costs and presenting in a fashion that provides a chronological history, customers can quickly review reasons for projected cost overruns. In many cases, this log resembles an abbreviated work in progress report for the customer. This also becomes a central mechanism for communicating the work to the entire project team regardless of their involvement. It cannot be overstated that this log assumes field managers receive the appropriate daily approvals and gain consensus on quantities and work tickets. Discounting and abandoning this first step in the field implodes the entire process.

The resolution of many change orders occurs at the end of projects. Project managers delay the awkward conversations until the end of the project as if settling a bar tab. Facts surrounding the changes becoming fleeting memories and the project staff barely resembles that of the one that began the project. In the spirit of expedient closure, change orders settlement occurs at fractions of their original value. These same change orders were bullet points in every project progress meeting for the prior six months, five hundred pound gorillas the project team danced around during general discussion. Higher powers muddle through these sticky and complicated issues at the end of projects with little or no documentation of fact on which to base a sound decision. Establish escalation steps to avoid the never-ending change order discussion that plagues so many projects. If an issue remains open for seven days, what is the next step toward resolution?

It cannot be overstated that this log assumes field managers receive the appropriate daily approvals and gain consensus on quantities and work tickets. Discounting and abandoning this first step in the field implodes the entire process.

How and when should it be routed to a higher level to render a judgment? **FIGURE 4** (next page) illustrates typical steps of escalation:

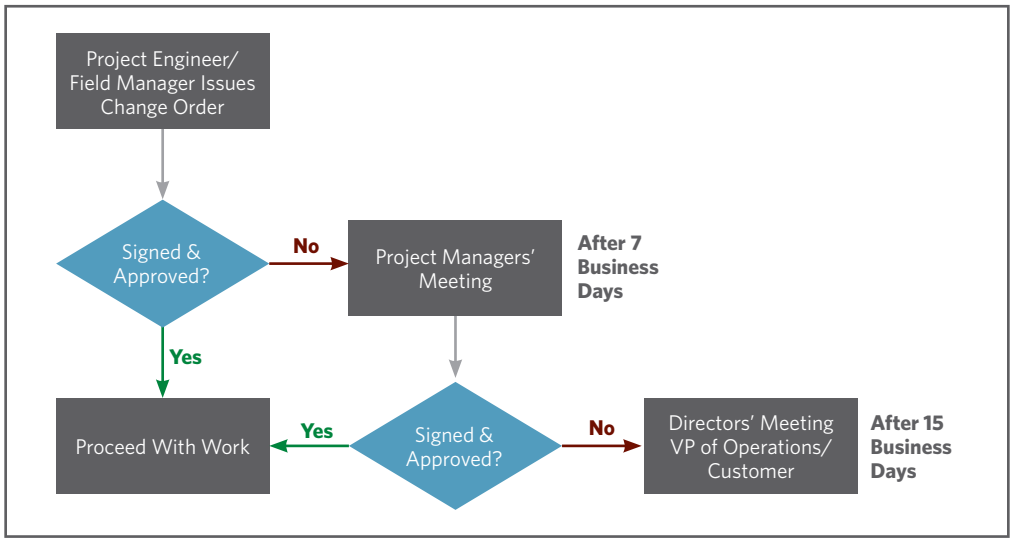

FIGURE 4
Change Order Escalation with Time Limits

Change Order Log

SUMMARY SHEET			
Project	ABC Hospital, P-1234	Total Number Of CO's to Date	5
Customer	ABC Health	Current CO Outstanding Duration	10.67
Architect	XYZ Designers	Average CO Closure Rate	7.5
Engineer	123 Engineering	Average Dollars Attributed to CO's	$7550
Drawing Version	2	Current Potential Exposure of CO's Related to Unresolved CO's	$37,750
Report Run Date	20-Dec-06		

CO CRITICAL INFORMATION								
CO NO.	CO TITLE	ORIGINATION DATE	DATE FINALIZED	CLOSED?	DAYS OUTSTANDING	FINALIZATION DATE	TIED TO RFI? (#)	COST / (CREDIT)
1	Error in Duct Size	1-Dec-06	7-Dec-06	Yes	Closed	5	#2	$2,000
2	Conflict with joist	2-Dec-06	15-Dec-06	Yes	Closed	10	n/a	
3	New Equipment: Carrier vs. Trane	1-Dec-06		Pending	14	n/a	#10	$50,000
4	Cut Refrigerant Lines	6-Dec-06		Pending	11	n/a	#11	$750
5	Deletion of West Wing HVAC	12-Dec-06		Pending	7	n/a	#13	$(15,000)

FIGURE 5 Change Order Log and Summary

Proactive Measurement

Accurate record keeping helps provide a level of accountability as well as a measure of a firm's risk as it relates to change orders. Numerous project management software packages contain tools to capture not only changes orders and requests for information, but also important metrics about a project or individual's performance within said categories. The first mechanism is a project specific change order log. **FIGURE 5** depicts a typical change order log:

Establishing a change order closure rate provides a benchmark for monitoring the status of unapproved change orders.

In addition to capturing the fundamentals such as number and title, each project contains a series of metrics to provide feedback on project performance. Establishing a change order closure rate provides a benchmark for monitoring the status of unapproved change orders. In the scenario above, change orders typically close within 7.5 days. The unapproved change orders are averaging a rate of almost 11 days outstanding. Are these change orders disputed or is it simply an administrative hiccup? Ticklers or metrics such as these serve as reminders for the management team. **FIGURE 6** below is another example of comparing the closure rate from a project (left gauge) and firm (right gauge) perspective:

Dashboards such as these provide a visual depiction of performance better than many tabular representation or spreadsheets. Managers, superintendents, executives and foremen and technicians alike can quickly process and assimilate the information presented on these pictorials. Firms are also able to capture benchmark data and use this comparative information to measure historical performance. In the **FIGURE 6** example, the firm is experiencing a 33-day closure rate. What are the drivers of this increase? How have the customers' behaviors changed during this time? What are project managers doing or not doing to gain the necessary approvals? The information gathered from provides fodder for such introspective questions.

Closure and approval rates are one mechanism to mitigate the risk. Financial exposure is another key metric that easily

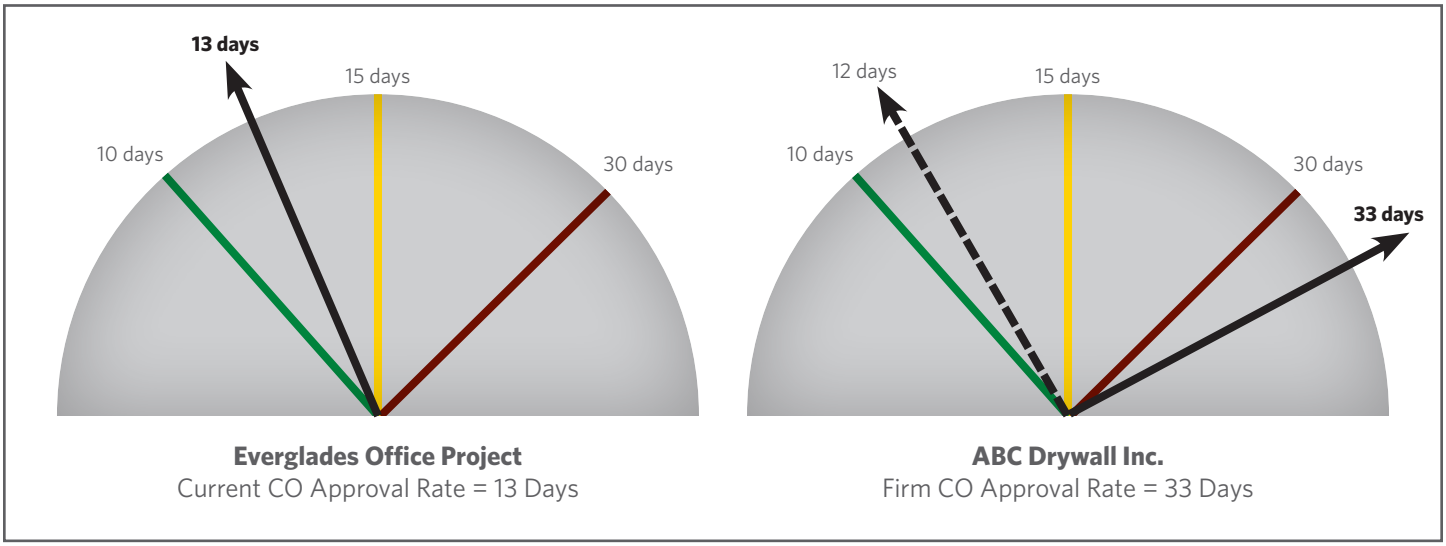

FIGURE 6 Change Order Dashboards with Approval Metrics

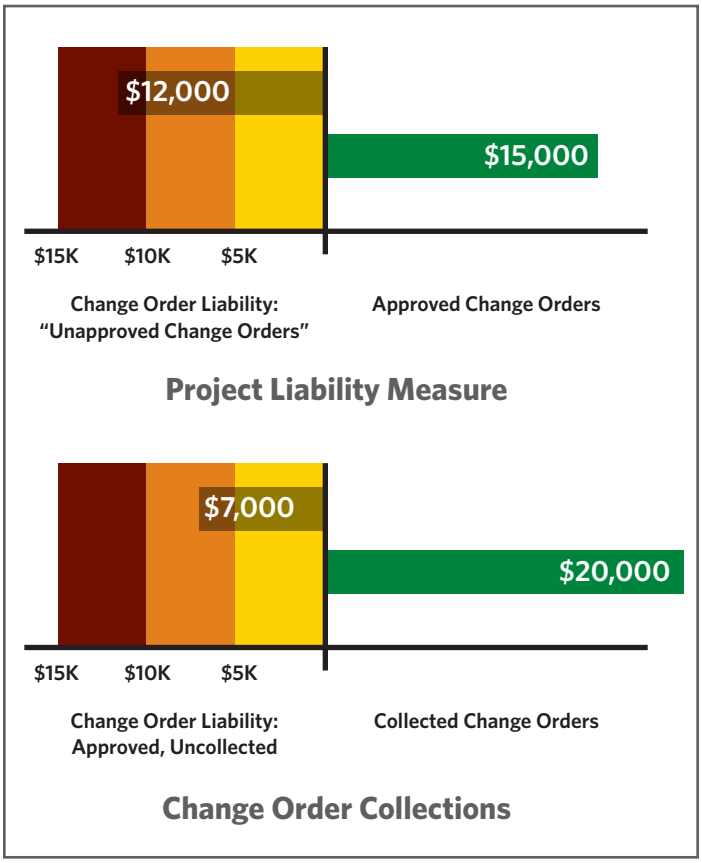

FIGURE 7 Financial Dashboard of Change Orders

quantifies exposure and risk. It is always important to review approved change as well as those whose dollars have yet to be collected. Even with a fully executed change order, there always remains the risk of customers failing to pay. The illustrations in **FIGURE 7** show two perspectives of examining change orders:

From a managerial perspective, it is important to understand how change orders are affecting the business in order to make effective decisions. While remaining above the minutia of project details, executives can quickly scan an inter-company change order dashboard. Identification of high-risk areas focuses the effort on specific problem areas. Furthermore, change orders can be evaluated in the context of their project size. Operations managers, vice presidents and controllers alike can use this dashboard information when evaluating new projects to be estimated, existing customer risk and individual associate performance. No conclusions can be drawn from this single metric, but with a comprehensive investigation or audit, managers and executives can make better business decisions. **FIGURE 8** (next page) compares individual projects with the appropriate measure of change order liability on each:

Sabotaging Change Order Management

Monthly job cost review meetings often become the bane of any project manager's monthly schedule. This monthly torture for some project managers often resembles the Spanish Inquisition. Project managers squirm and routinely rationalize poor project performance. Ultimately, there are always the change orders "that are in the mail" and will be signed in a week's time. The week passes with no signature and compounding project costs. However, strong project leaders abound in firms whose commitment to change order policies is exemplary. Unfortunately, the risk lies not in the project manager's behavior but with the senior executive's flimsy adherence to policy. Change order sabotage is another frequent cause of change order mismanagement.

Executives can quickly scan an inter-company change order dashboard. Identification of high-risk areas focuses the effort on specific problem areas.

The ruthless change order saboteur thwarts even the greatest project managers in their efforts to effectively manage this delicate process. For example, consider a project manager who has informed a customer that no work will be completed without a signed change order in a professional and non-confrontational manner.

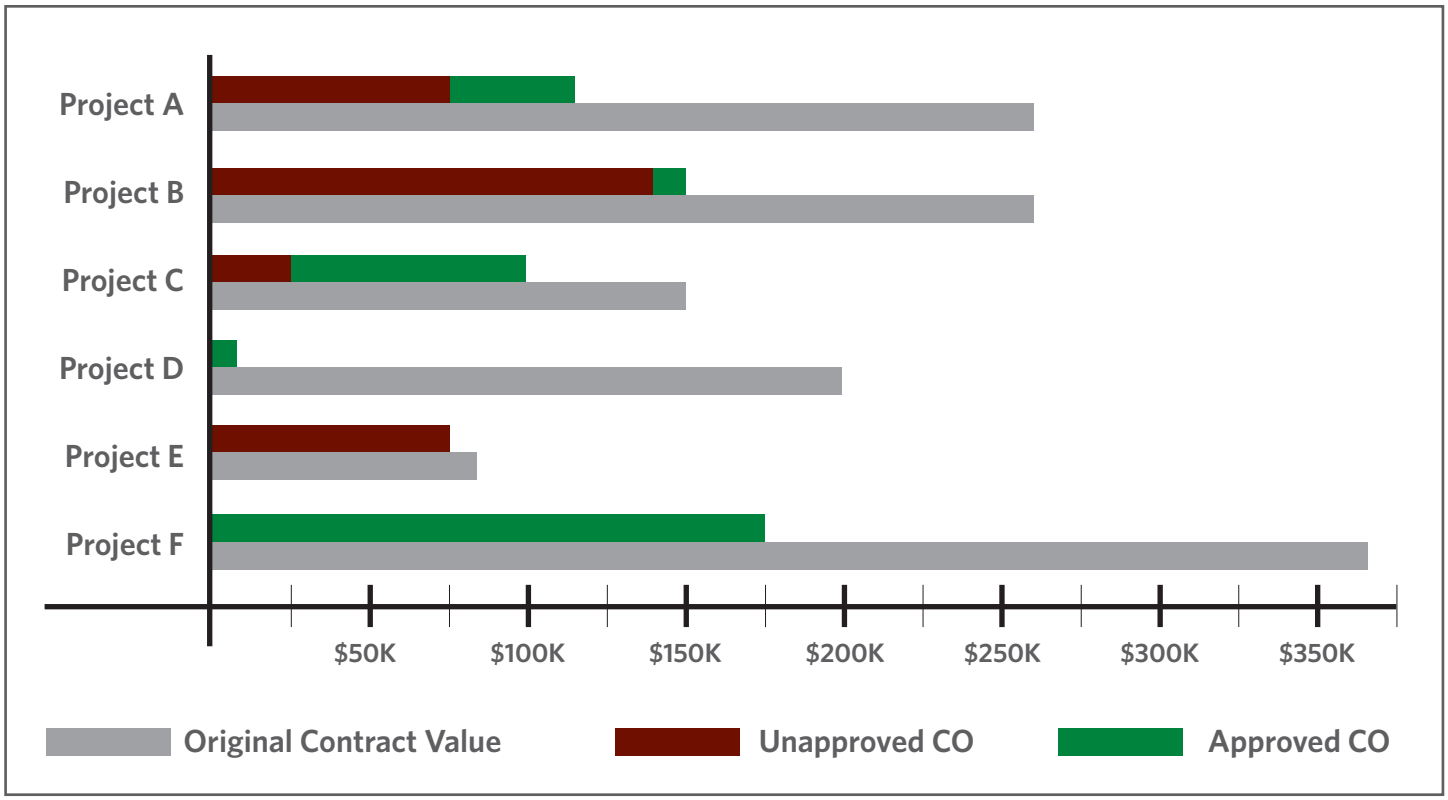

FIGURE 8 Company Change Order Performance

Upon hearing this perceived insubordination, the customer dials the project manager's superior instantaneously with the fury of an active volcano. The construction executive only has to hear a customer complain once to completely abandon the firm's change order policy and countermand the project manager. "No problem, Mr./Mrs. Customer, I'll tell my project manager to get to work immediately. Sorry for the confusion." Exceptions are made for this "one customer" in the effort of expedited schedules and satisfied customers. Many business decisions are made in the spirit of maintaining customer relations. Negotiation is an art practiced daily on construction jobsites. Every day, contractors take risks in managing their businesses. In many cases, this scenario becomes the rule rather than the exception. What message has this sent to the project manager? In order to keep the customer satisfied, do work without signed change orders. At the first sign of resistance, abandon the process and rationalize away good judgment. The correct behaviors are easily forgotten when the project manager is chastised for doing the right thing. Senior management should use this opportunity to reflect on the reasons for the customer's reaction. Was it because they did not have all of the information, a potential breakdown in the firm's process? Alternatively, did the customer not intend to pay in the first place and used this strong-arm tactic to gain the upper hand?

The construction executive only has to hear a customer complain once to completely abandon the firm's change order policy and countermand the project manager.

When developing a change order strategy, it is important to tie this to the firm's strategy. A hard and aggressive change order process will not suit a contractor that prides itself on being "customer-centric." This does not mean signatures become optional. Rather, the process developers should be conscious of their business drivers. Focus on the upstream processes to minimize change and the potential impacts. Determine the root causes of these changes. Does this customer routinely utilize poorly defined scopes and weak designers to develop the projects plans and specifications? Do the schedules continually compress or elongate? Is this customer "high maintenance"? The customer-centric contractor's process revolves less around change orders and more on educating the customer early in the construction process.

Process, procedure, proactive management and measurement will mitigate many of the risks that surround this extremely controversial topic. However, it is important to note that while there are many good contractors and customers, there is a select group of dastardly individuals with the most evil of intentions. These people are truly the lowest common denominator on the ethical scale and will never pay no matter how well they are managed. Bad customers seem immune to the most foolproof management system. A firm's change order process will not root out these denizens of the construction industry. Careful customer selection provides the greatest safeguard against unethical customers.

Educating customers early in the process is the greatest preventative medicine to ensure a good customer does not go sour.

In litigious situations, project managers at the very least will have detailed records and well-documented job files to support their case. However, many customers, contractors and end-users alike, become branded as unethical and obstinate because they simply lack the knowledge to help themselves. Educating customers early in the process is the greatest preventative medicine to ensure a good customer does not go sour. Adherence to policy and procedure will educate the vast majority on the correct way of handling change. Understanding how to prevent change, communicate change and manage change will not only serve to deliver a higher quality finished product but create more knowledgeable project teams in this business of construction.

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