

## **An Analysis of Contract Modifications: USACE Jacksonville District, Jacksonville, Florida**

Scott Kramer<sup>1</sup> and James McRae<sup>2</sup>

<sup>1</sup> Auburn University, Auburn, AL 36849

<sup>2</sup> USACE – Jacksonville District, Jacksonville, FL, 32207

[kramesw@auburn.edu](mailto:kramesw@auburn.edu)

### **Abstract**

Construction projects generally solve someone’s problem or situation whether it be new construction, renovation or operations and maintenance projects. During the process of solving these problems, various issues arise along the way and must be addressed. These issues lead to changes and result in modifications to the contract called change orders. From 2003 to 2019, U. S. Army Corps of Engineers, Jacksonville District awarded four hundred fifty-seven (457) construction contracts and executed a total of four thousand six hundred seventy-seven (4677) contract modifications on these contracts. This research seeks to identify the causes of these change orders and determine if actions could be taken on future contracts to reduce the number of change orders. The results of this study indicate that additional design phase and pre-award activities such as additional scrutiny, review and vetting have a definite possibility to reduce the number of these types of change orders. This study is relevant to USACE project managers, construction contract administrators, and other Construction Management Professionals.

### **Keywords**

Change Orders, Government Contracts, U. S. Army Corps of Engineers, Jacksonville District, Contract Administration

### **1. Introduction**

Construction is a problem driven industry. Construction projects generally solve someone’s problem or situation whether it be new construction, renovation or operations and maintenance projects. During the process of solving these problems, other problems arise along the way and must be addressed. These new and potentially different problems may result in changes to the way the contract is executed. Potentially, these changes result in an increase or a decrease in the cost to execute the contract and potentially affect the time it takes to complete the work. These potential changes result in modifications to the contract called change orders.

The American Bar Association defines a “change order” as an industry term for an amendment to a construction contract that changes the contractor’s scope of work. Most change orders modify the work required by contract documents (which, in turn, usually increases the contract price) or adjust the amount of time the contractor has to complete the work, or both. For there to be a valid change order, the owner and contractor must both agree on all terms. (*Construction 101: The Basics of Change Orders*, n.d., p. 101). Change orders affect the construction process in many ways depending on the contract type. Projects that are hit by change orders are usually prone to delays, cost increases, and reduced labor productivity (Günhan et al., 2007). A contractor does not perform work in a vacuum; rather he must properly allocate his limited resources within projects and between actual and potential projects. Consequently, whenever a change, suspension or delay occurs, a contractor must make adjustments to work under the contract and reallocate time, material and labor resources. (Dunn III, 1999).

While change orders are sometimes unavoidable, it’s difficult for teams to accurately estimate their impact. On average, change orders result in a 30% loss of productivity. Understanding the true cost –direct, indirect and

consequential – can help construction teams to minimize the effects. (*What Does A Change Order Actually Cost You?*, 2019) Minimizing the number of contract change orders on a project is in the best interest of all parties involved in the contract the owner, the Government and the contractor to avoid additional time, costs and potentially litigation.

## 2. Background

It seems that disputes over change orders are inevitable for all construction projects (Cox, 1997). These disputes range from the scope of the change, cost associated with the work required under the change, any changes to contract time associated with the change to the contract, who caused the change and ultimately who bears legal and financial responsibility for the impacts of the change. It is important for each party to understand their role in the project and the change management process. The owner should strive to structure the acquisition strategy and contract structure that manages and allocate risk as well as provide a means to prevent and resolve disputes in a timely manner. The contractor’s role is to recognize the risk assumed by entering onto the contract, be cognizant of any changes clause in the contract, and be prepared to provide cost for all added and changed work. Cox indicated that successful management of change orders and claims beginning construction and continue through the close out of the contract.

In GAO’s, Report to Congressional Requesters GAO-19-500, FEDERAL CONSTRUCTION, Army Corps of Engineers and GSA Need to Improve Data on Contract Changes, in fiscal year 2018, federal agencies spent more than \$36 billion on construction contracts. 45 percent of these contract went to small business. Typically, construction projects involve some degree of change as the project progresses. Some federal construction contractors have raised concerns that delays in processing contract changes and making payments creates challenges, particularly for small businesses (Office U.S. Government Accountability, 2019). For this report GAO was tasked to review federal construction contract change processes and timeframes for two agencies with large amounts of obligations on construction, GSA’s Public Buildings Service and USACE. Completing the study, GAO reviewed relevant regulations, agency policies, analyzed available data, and interviewed officials from the two agencies. The review identified factors that affect the time it takes to finalize contract changes, and it assessed the extent to which selected agencies monitor time frames for finalizing contract changes. The report found that GSA nor USACE routinely monitors the length time it requires to finalize construction contract changes, which limits their respective management’s ability to identify and respond to problems. GAO stated that a variety of factors affect how long it takes to process a contract change. The factors include the time needed for making a change determination, creating a cost estimate, identifying funds, negotiating with the contractor, completing reviews, and processing the change. (Office U.S. Government Accountability, 2019). According to agency officials, some of these steps play a role in protecting the government’s best interests. For example, creating robust cost estimates helps provide the government with information to inform negotiations with the contractor.

The Associated General Contractor of America (AGC) echoed the GAO’s finding “As AGC has known, GAO confirmed that one of the main issues that delayed change orders causes an interruption in cash flow to a contractor (*Change Orders | Associated General Contractors of America*, n.d.). They articulated, that the longer it takes an agency to identify and process a change order, the longer it will take for contractors to get paid for the additional work and it impacts. These impacts include project schedule disruption that can limit the ability of contractors to successfully execute the contract. AGC also articulated that any delay in processing change orders not only costs contractors valuable time and money, it cost the Government as well.

The Jacksonville District of the United States Army Corps of Engineers administers approximately \$500 million placement on construction contracts each year. The Construction Division is tasked with administration/execution of these construction contracts. The Construction Division is divided up into regional Areas of Responsibilities (AOR), called Areas. The Areas are further subdivided into office call Resident Offices. A summary outline of the Jacksonville District’s current construction contract administration structure is provided in Table 1.

**Table 1.** Jacksonville District Construction Contract Administration Structure

AOR	Area Office	Resident Office	Work Type
	Antilles	North Puerto Rico	Major and Minor Civil Works Construction

Puerto Rico, Cuba and Lesser Antilles		Rio Puerto Nuevo	Contracts with Minor Military Construction Contracts
South Florida	South Florida	West Palm Beach Resident Office Miami Resident Office Hebert Hoover Dike	Major and Minor Civil Works Construction Contracts with Minor Military Construction Contracts
North Florida	North Florida	Jacksonville Melbourne/IIS Tampa/Sebring	Major and Minor Civil Works Construction Contracts with Minor Military Construction Contracts

The USACE process for processes change orders is out lined in the SADDM 1110-1-1 Contract Administration manual. The process is summarized below

1. Identify and scope the work required under the change
2. Prepare and send a properly executed Request for Proposal to the contractor requesting proposal in within a set amount of time
3. Once proposal is received analyze the proposal against the Independent Government Estimate (IGE) prepared while the contractor is preparing his proposal
4. Prepare a Pre-negotiation Objective Memo (POM) documenting the Government pre-negotiation position for approval by the Contracting Officer prior to entering negotiations
5. Conduct negotiations with the contractor
6. Prepare a Price Negotiation Memorandum (PNM) documenting the negotiation with the contractor that emphasizes the reason why a contractor's price was accepted and clearly articulating deviations from the original Government position documented in the POM for legal review and Contracting Officers approval.
7. Prepare Special Form (SF) 30 (contract modification document) and send to the contractor for execution
8. Receive contractor executed SF 30 and obtain Contracting Officers signature to finalize modification.

The process outline above can have a lengthy time frame to complete depending on the complexity of the modification.

USACE utilizes the Resident Management System (RMS) to administer all aspect of a construction contract. It is a USCAE developed system that is congressionally mandated to be used on all USACE construction contracts over one million dollars. The contract administration functions in RMS utilized by USACE include but are not limited to contract correspondence, submittal and shop drawing submission and approval tracking, quality control and assurance reporting, and contract financials such as progress payment and change order.

Once a modification is identified and entered into RMS, the database tracks each contract modification with an assigned code. Each code is classified as either controllable or uncontrollable. In layman's terms a controllable change is a change that could have reasonable foreseen or prevented with proper due diligence and an uncontrollable change is due to conditions or circumstances that could not have been reasonably foreseen or prevent proper due diligence. To better track the changes and their causes USACE further classifies controllable/uncontrollable changes into causal description codes. Modification Code Description as outline in USACE Engineering and Construction Bulletin 2002-27 and defined in RMS are as shown in Table 2.

**Table 2.** RMS Modification Reason Codes

RMS Code	Modification Reason	Description
1	Engineering Changes	Changes, accountable to the U.S. Army Corps of Engineers, which are necessary to remedy deficiencies in the contract plans and specifications. This could be an AE Responsibility issue. (Controllable)

4	User Changes	Changes resulting from conditions differing from the original design, e.g. new federal regulation, code, criteria, mission changes, or enhancement. These changes must be directed or requested by a government agency, using/programming command/service or customer and generally relate to ease of maintainability, operability, or an enhancement of quality of life for the user (soldier). (Uncontrollable)
5	Contract Option Exercised	Exercised with construction funds after award of the basic contract. The option must be specifically identified in the original Bid Documents. (Uncontrollable and Controllable)
6	Miscellaneous Changes	Changes resulting from various reasons such as changes in tax as a result of tax law changes, decrease in inspections, decreases because of inaccurate price or description furnished by the contractor etc. (Uncontrollable)
7	Differing Site Conditions	Subsurface or latent physical conditions at the site which differ materially from those identified in the contract or unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract and not identified through a normal engineering site investigation. (Uncontrollable)
8	Value Engineering Change	Change those results in reducing the contract price or estimated cost without impairing essential functions or characteristics. (Controllable)
9	Administrative	Change that does not affect the substantive rights of the parties (e.g., a change in the paying office, appropriation data, contractor address change, funding change such as continuing authority civil contracts, etc.). The change MUST be for no cost to the contract price and no time extension. (Not recorded as Controllable or Uncontrollable)
E	Excusable Delay for No Fault	Change in contract period for weather (including floods), strikes, fires, epidemics, freight embargoes, material or supply shortages, delays of subcontractors or suppliers, and other events which are determined to be beyond the control and without fault or negligence of both the contractor and the subcontractors or suppliers. Change involves time only, no contract cost. (Uncontrollable)
G	Government-Furnished Property (GFP)	Corrections in deficiencies in equipment or property supplied by the Government including delays by the Government in providing the GFP. (Controllable)
Q	Variations in Estimated Quantities	Overruns and underruns of quantities included in the contract. The quantities MUST be listed as Contract Line Items and entered as such in RMS.(Uncontrollable)
S	Suspensions or Termination of Work	Temporary work stoppage on all or part of a contract with the intent of restarting work at a later date (Suspensions). (Controllable)
T	Termination of Work	Permanent work stoppage on all or part of a contract by deleting a portion of the scope from the contract requirements. (Controllable)
V	Construction Change	Changes not falling into one of the other reason codes. The reason for selecting this code MUST be provided in the Necessity for Change block of the BCD. (Controllable)
A	Adverse Security Conditions	Modification required for construction destroyed, damaged or delayed by hostile/friendly actions. (Uncontrollable) (Is in RMS but not ECB)
R	Revaluation	Foreign Currency

### 3. Results

To identify primary causes for of construction contract change orders, the following 2 research methods were utilized: (1) A survey of the District’s ten construction contract administration personnel to identify their perceptions about change orders in the AOR and (2) an extensive review and analysis of charge order data from the District construction contract administration database, RMS.

The USACE business model put the responsibility for identification, quantification negotiations, and administration of change orders on personnel with delegated contract authority called an Administrative Contracting Officer (ACO). How those engaged in the solution of a problem perceive the problem is often paramount in solving the problem. To gauge personnel perception of change orders a survey was provided to the District’s 10 Administrative Contracting Officers with the following Questions:

1. Are most of the contract changes in your AOR Controllable or Uncontrollable?
2. What is the most common form of Controllable Change your office experiences?
3. What is the most common form of Uncontrollable Change your office experiences?
4. Are there any measures pre-award that could reduce the number and magnitude of Controllable Changes?
5. Are there any measures pre-award that could reduce the number and magnitude of Uncontrollable Changes?

Nine (9) of the ten (10) responded. There responses are summarized in Table 3 below.

**Table 3.** Contract Administration Personnel Perception

Question	Questionnaire Response	Positive Response	Negative Response	ACO Perception
Are most of the contract changes in your AOR Controllable or Uncontrollable?	Controllable	4	5	
	Uncontrollable	5	4	Uncontrollable
What is the most common form of Controllable Change your office experiences?	Engineering Changes	8	1	
	Contract Options	1	8	
	Value Engineering Change	0	0	
	Government Furnished Property	0	0	Engineering Changes
	Suspensions or Termination of Work	0	0	
	Termination of Work	0	0	
What is the most common form of Uncontrollable Change your office experiences?	Construction Change	0	0	
	User Changes	0	0	
	Miscellaneous Changes	1	8	
	Variation in Estimated Quantities	3	6	Variation in Estimated Quantities & Differing Site Conditions
	Differing Site Conditions	3	6	
	Excusable Delay for No Fault	1	8	
Are there any measures pre-award that could reduce the number and magnitude of Controllable Changes?	Adverse Security Conditions	0	0	
	More thorough/better Plan Reviews	1	8	
	Different Contract Acquisition Strategy (RFP vs IFB)	0	0	
	Increased/Better site investigation/surveys	1	8	
	More experienced Design team	1	8	Early Construction Staff Involvement
	Increased/better Design Team Coordination	2	7	
	Early Construction Staff Involvement	4	5	
Other (Please Describe Below)	0	0		

Are there any measures pre-award that could reduce the number and magnitude of Uncontrollable Changes?	More thorough/better Plan Reviews	1	8	
	Greater upfront coordination with end user	0	0	
	Different Contract Acquisition Strategy (RFP vs IFB)	0	0	
	Increased/Better site investigation/surveys	4	5	Increased/Better site investigation/surveys
	More experienced Design team	0	0	
	Increased/better Design Team Coordination	1	8	
	Early Construction Staff Involvement	1	8	
	Other (Please Describe Below)	2	7	

Data Summary: Due to the differences in work load and primary work type conducted by each office some variation in response was anticipated. Based on analysis of the responses to the questionnaires, most ACOs viewed perceived that the majority of changes in their AORs were uncontrollable. The data indicates that additional design phase and pre-award activities such as early involvement of construction management personnel, additional security, review and vetting have a definite possibility to reduce the number of these types of change orders.

### 3.1 RMS Database Information Analysis

Jacksonville District maintains data on change orders in the District's RMS database. The data base contains information from contracts dating back to 2003. While the database may not contain all construction contracts executed by the District because the district executes contracts within its boundaries for construction programs owned and executed by some of its sister Districts, it is reasonable representation of scope and magnitude of contracts the District executes as regular basis. A review of the District's RMS database yielded four hundred fifty-seven (457) contracts of vary size, scope and complexity with a total value of approximately \$4,1 billion dollars. On these four hundred fifty-seven (457) contracts at total of four thousand six hundred seventy-seven (4677) contract modifications were issued for various reasons adding approximately \$736 million dollars and a cumulative total of 69,603 days to contract durations. Or a cost growth of 17.8% and a time growth factor of 49%. As detailed below, of the four thousandsix hundred seventy-seven (4677) contract modifications, one thousand six hundred ninety-five (1695) or 36.3% of those modification were controllable change orders (Table 4) and two thousand nine hundred eight-two (2982) or 63.7% were attributable to uncontrollable change orders (Table 5). The analysis validated the ACO perception of controllable versus uncontrollable changes.

**Table 4.** Controllable Modifications

RMS Code	Modification Type	Number of Modifications	Percent of Controllable	Percent of Total Modifications
1	Engineering Changes	953	56.19%	20.38%
5	Contract Options	132	7.78%	2.82%
8	Value Engineering Change	33	1.95%	0.71%
G	Government Furnished Property	12	0.71%	0.26%
S	Suspension of Work	57	3.36%	1.22%
T	Termination of Work	14	0.83%	0.30%
V	Construction Changes	494	29.14%	10.56%
Total Number Controllable Modifications		1695	100%	36.2%

Data Summary: Based on analysis of the data the three most prevalent controllable changes are Engineering Changes, Construction Changes and Contract Options. Again the analysis validated the ACO perception of the controllable changes. Contract Options are not a relevant comparison as they are priced at the time of bid and do not factor into time and cost growth statistic for USACE. Engineering Changes are changes due to remedy deficiencies in the contract plans and specifications. Construction changes do not fall into one of the other reason codes and are a bit ambiguous. However, there are code controllable and in terms of this study should be treated like Engineering changes. The data indicates that the ACOs perceive that additional design phase and pre-award activities such as additional security, review and vetting have a definite possibility to reduce the number of these types of change orders.

**Table 5.** Uncontrollable Modifications

RMS Code	Modification Type	Number of Modifications	Percent of Uncontrollable	Percent of Total Modifications
4	User Changes, Discretionary	555	18.61%	11.87%
6	Miscellaneous Changes	614	20.59%	13.13%
7	Differing Site Conditions	409	13.72%	8.74%
9	Administrative Change	458	15.36%	9.79%
A	Adverse Security Conditions	4	0.13%	0.09%
E	Excusable Delay for No Fault	228	7.65%	4.87%
I	Incremental Definitization of Work	2	0.07%	0.04%
Q	Variations in Estimated Quantities	711	23.84%	15.20%
R	Revaluation - Foreign Currency	0	0.00%	0.00%
Z	COVID-19	1	0.03%	0.02%
Total Number Uncontrollable Modifications		2982	100%	63.8%

Based on analysis of the data the three most prevalent controllable changes are Variation in Estimated Quantity, Miscellaneous Changes, and User Changes. The analysis validated the ACO perception of the controllable changes. Variations in Estimated Quantities changes stem from overruns and underruns of quantities of unit price items included in the contract. Miscellaneous Changes result from various reasons such as changes in tax as a result of tax law changes, decrease in inspections, decreases because of inaccurate price or description furnished by the contractor etc. User Changes result from conditions differing from the original design, such as new federal regulation, code, criteria, mission changes, or enhancement. It is important to note that these changes must be directed or requested by a government agency, using/programming command/service or customer and generally relate to ease of maintainability, operability, or an enhancement of quality of life for the user. The data indicates that additional design phase and pre-award activities such as additional scrutiny, review and vetting have a definite possibility to reduce the number of these types of change orders.

#### 4. Conclusions

“Management of change orders is management of risk” (Cox, 1997 p.24). Review of the data indicates that there is opportunity to reduce the number of change orders on construction contracts within the Jacksonville District. While there are some contract changes that cannot be reasonably anticipated, such as adverse weather, acts of God, etc., many other causes for contract changes can be potentially identified prior to formulation of the contract and incorporated prior to contract award. The data supports this position for different classifications of both controllable and uncontrollable change orders. Additional design phase and pre-award activities have the potential to reduce change orders. These activities add to project costs and schedule in different ways as well. The question must be asked, “Is the risk worth the reward?” Is the additional time and monies required up front less than what might be required later? Additional study is required to answer these questions. Future research is recommended to build upon this dataset to seek to determine the magnitude of saving that may be possible if additional design phase and pre-award activities are considered and implemented.

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