

Making the Case for Teaching Construction Contract Changes and Claims as an Elective Course in Construction-Related Programs

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Abstract

The construction industry is a very risky industry due in part to various factors that negatively affect project outcomes. One of those factors relates to contract changes, claims, and disputes. Construction professionals know firsthand that projects don't always go as planned. Mistakes, errors, omissions, differing site conditions, weather, and so many other factors can affect project performance. Considering the risk associated with poor management of contract changes, it could be beneficial to expose students in construction-related programs to various aspects of contract changes and how to effectively manage those changes, claims, and disputes. In addition, as the landscape of project delivery methods keeps getting broader it might be time to teach the students about contract changes and claims in general and specific to each project delivery method. Considering poor contract management that has continuously plagued the construction industry, and the socioeconomic consequences of lack of knowledge and training in the area of contract changes and claims management, this paper calls for construction-related programs to consider adding contract changes and claims management as an elective course. Change is a part of construction irrespective of the project delivery methods – change happens and should be properly planned for. Knowledge of contract changes and claims brings together various areas of construction practices. From construction law to construction materials and methods, cost estimating, value engineering, planning and scheduling, risk management, and leadership. This paper makes the case for teaching contract changes and claims management to students in construction-related programs and the paper also presents a model syllabus for the implementation of the course. For the students taking the class, this should help them build awareness about how the industry works regarding contract changes. In addition, the project owners, designers, general contractors, and specialty contractors who employ these students will have students that are prepared from day one to effectively help those organizations manage contract changes and claims.

Introduction

The construction industry is notoriously very risky, and much of the contracting language is a formulation of risk allocation between the project owner, the contractor, the designer, and all the other parties in between. According to Kululanga et al. [1], the management of construction claims remains one of the greatest challenges to contractors. A lot can go wrong on a construction project, and practitioners or would-be practitioners must learn the tools and techniques to effectively manage construction projects and reduce the number of things that can go wrong. Several experts in the field of contract changes, claims, and dispute resolution offer courses to practitioners seeking to gain knowledge in this area. The benefit of teaching a similar course at the college level means that students who take the course will be ready from day one as different from learning on the job.

Literature review

This section makes the case for teaching students in construction-related programs about contract changes and claims management and getting them ready from day one. The argument is made on the basis that 1) contract changes and claims happen, and the industry is better when those changes and claims are properly managed, 2) most contracting parties in the construction industry have a poor level of preparedness and knowledge of the basic process to manage changes and claims, 3) knowledge resources on managing of contract changes and claims should help to alleviate the stressful nature of managing contract changes and claims, and 4) students who take the course in contract changes and claims management could bring value to the companies that the students will work for.

Contract change and claims happen

According to Ibbs and Allen [2], contract changes relate to any addition, deletion, or revision to the original scope of a work, contract time, cost, and quality of work. Change in the construction industry is unavoidable and happens on every construction project to some degree. However, what is lacking is knowledge of effective means to manage changes when they eventually occur. Contract changes happen and knowing how to effectively manage them may be key to the financial survival of contracting parties. Students in construction-related programs should be trained in the ways and means to effectively manage contract changes and claims, as the cost of not knowing how to, can be consequential. Molly in [3] states that there are six phases to resolving project changes in a more cost and time-efficient manner and they include:

1. Evaluate the contract.
2. Identify the change.
3. Notify parties of the change.
4. Document the change.
5. Prepare the change request, and
6. Resolve the change request.

Ibbs et al. in [4] note that contract changes are typically encountered on construction projects, and they pose a great challenge to contracting parties. Hanna et al., [5] state that changes result in schedule delays and cost overruns, which have a direct impact on project objectives. Finke [6] posits that changes can become a threat to project objectives and performance, resulting in claims, disputes, and disagreements.

Contract changes and claims are linked to overruns, mismanaged projects, litigations, unhappy project owners, loss of future jobs, and numerous adverse effects – you name it. This is why it is important to

effectively manage contract changes and claims, both from the part of the project owners and from the part of all the other contracting parties. Contract changes and claims management start where the contract leaves off, and where contract amendments are needed. Where changes cannot be managed through the design and preconstruction phases, then they must be effectively managed during the construction phase. Contract changes and claims management is risk management. While it is widely accepted that change happens, however, industry preparedness paints a different picture. Table 1 below shows that there are numerous sources or origins of contract changes.

Table 1. Contract issues identified as sources of contract changes by various authors

Research	Source	Cause of Contract Changes
Arcuri and Hildreth (2007) in [7]	Owner-Related	Disruption; additional quantity; differing site conditions.
	Contractor-Related	Poor workmanships that cause rework; failure to supply money, material, machinery, and manpower; failure to coordinate subcontractors; failure to perform job site investigation; poor management of crew; general work slowdown; over-estimation of crew production; lack of construction “know-how”; failure to account for “normal” weather; failure to follow contractual obligations.
	External Factor-Related	Act of God; act of government; fires; epidemics; strikes; quarantine restrictions; freight embargoes; unusual severe weather.
Marzouk and El-Rasas (2014) in [8]	Owner-Related	Slow decision making; suspension of work; late in releasing design documents; delay in releasing site to contractor; delay in payment of completed work; scope changes; unrealistic contract duration; owner interference.
	Contractor-Related	Difficulty in financing project; poor site management and supervision; ineffective planning and scheduling; rework; subcontract work delay; inadequate experience; delay in mobilizing to site; delay in preparing shop drawings and material samples.
	Consultant-Related	inadequate experience; delay in approving shop drawings and materials samples; errors/omissions in design; quality assurance/control issues. Material related: shortage; delivery delay; specification changes in material types.
	Labor and Equipment Related	Shortage of labor; unqualified workforce; low productivity; equipment availability and failure. Project related: subsurface conditions; traffic control and restriction at job site; unavailability or delay in providing utilities; project accidents.
	External-Related	Severe weather; environmental restrictions; change in government regulations; slow in obtaining permits; third party coordination; cost/currency fluctuation; force majeure.

Recent research on causes of contract changes and delays as captured in [9] and [10] is presented in Table 2 below.

Table 2. Recent research on factors that influence contract changes and delays in construction projects

Research	Sources	Factors
Fashina et al. (2021) in [9]	Owner-Related	Delay in honoring payment progressively
		Delay in the provision or delivery of project site
		Slow decision-making process
		Errors in design and specifications
		Lateness in the revision and approval of design documents
		Poor communication and coordination with contracting parties
		Difficulties in accessing credit facilities (E.g. Loan)
		Change orders during construction by owner
		Conflicts between project joint-owners
		Indefinite suspension of work by owner
		Lack of complete documentation before commencement of project
		Delay in the approval of sample materials
		Consultant-Related
	Poor communication and coordination	
	Lack of significant experience of consultant	
	Mistakes and discrepancies in contract documents	
	Delays in creating design documents	
	Inadequate site survey and data collection before design	
	Delay in instructions from consultants	
	Back report of the consultant	
	Contractor-Related	Difficulties in project financing
		Errors during construction
		Improper planning and preparation during construction project
		Poor site management and coordination
		Delays in sub-contractor's work
		Underestimation or overestimation of the project cost
		Conflicts between contractor and other parties
		Delays in the mobilization of workers
		Regular change of sub-contractor's technical staff
		Conflicts in sub-contractor's schedule in execution of project
	Underestimation of the project durations	
	Labor-Related	Lack/shortage of labors
		Labor strike
		Personal conflicts between labors
		Lack of sufficient skilled labors
	Material-Related	Materials procurement difficulties (Lateness)
		Shortage/lack of materials in the market place
		Increase/Fluctuation in the prices of materials
		Delay in the delivery of materials
		Changes in material types during construction
		Damage of sorted materials that are needed urgently
	Construction Equipment-Related	Shortage/lack of equipment
		Breakdown/Failure of equipment
Low level of equipment-operator's skills		
Challenges with the efficiency and effectiveness of equipment		
External Force-Related	Unfavorable site conditions	
	Change in weather condition	
	Delay in securing permits	
	Occurrence of accident during construction	
	Introduction of new government policies, regulations, and laws	
Delay in services provided by utility service providers		
Pamidimukkala and Kermanshachi, (2021) in [10]	External Force-Related	COVID-19 Pandemic - challenges related to organizational issues, economic issues, psychological issues, individual issues
Brown, (2022) in [11]	External Force-Related	COVID-19 Pandemic and its effects

Construction companies and level of preparedness to handle contract changes and claims

When contract issues related to contract changes and claims arise on a project, contracting parties need to act promptly to mitigate the impact of those contract issues. In the construction industry, a contract claim is a request made by a one-party usually asking to be compensated for time and/or money related to a particular change in the contract. Notifying the other party of the intent to file a claim and actual filing of a claim only happens when the other party does not acknowledge or accept being responsible. Usually, by the time a contract claim arises, the matter may have become contentious. Some contract issues related to contract changes and claims are simple and can be dealt with directly at a lower level, while others may be more complicated and require that the issue be escalated. It is important to note that some contract issues related to contract changes and claims that may arise during contract performance are characterized by disagreement leading to disputes between the contracting parties. Some contract issues related to contract changes and claims that arise during contract performance are difficult to resolve. A dispute is a disagreement over contract issues that are not resolved between the contracting parties. The reality is that most contracting parties aim to resolve all issues by mutual agreement without litigation, which is why there are set contract terms and conditions that are written in the contract to address what to do when a contract encounters contractual issues and disputes.

Effectively management of contract changes and claims must include knowledge of contract provisions and requirements, accurate and timely identification of contract changes and claims, timely notifications to the project owner, contemporaneous tracking and documentation, timely estimate for time and/or cost impact, effective presentation of the time and/or cost impacts to the project owner, fair negotiation for time and/or cost with the project owner, and escalation of disputed issues for dispute resolution. It is important to point out that notification provides the other party with the opportunity to act and/or to keep track of impacts/damages. In most contracts, failure to provide notice constitutes a waiver of claim.

Students interested in learning about contract changes and claims management should be exposed to the fundamentals and practices of effective management of contract changes and claims.

According to Kululanga et al. in [1], and as depicted in Figure 1 below, project claims management includes various practices.

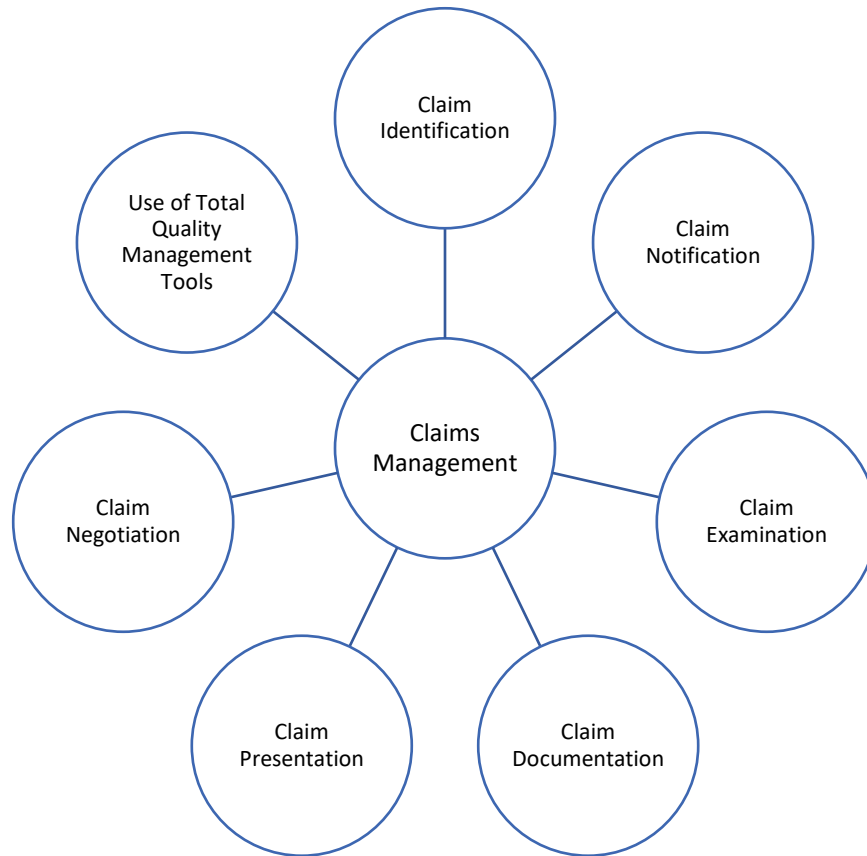


Figure 1. Claims management process – Adapted from Kululanga et al. In [1]

The research by Kululanga et al. in [1] evaluated construction contractors' knowledge in managing contract changes and the research found that the majority of contractors were not aware of and did not follow the basic processes in the effort to manage contract changes and claims. The issue of poor management of contract changes and claims is characterized using the table below as developed by Kululanga et al. [1]. Table 2 below paints a picture of the state of the industry and shows a range of preparedness and awareness of the construction company as it relates to the management of contract changes and claims. Preparing students in construction-related programs on effective methods for managing contract changes and claims should capture the range of steps outlined by Kululanga et al.

Table 2. A Measure of the typical range of preparedness and knowledge of contractors as it relates to change order and claims management. Adapted from Kululanga et al. in [1] on framework for construction contractors' claim process

CRITERIA	Scale 4	Scale 3	Scale 2	Scale 1	Scale 0
Construction claim identification	A contractor always accurately identifies construction claims.	A contractor once in a while accurately identifies construction claims.	Construction claim identification process is under consideration.	The importance of identifying construction claims is known but not done.	A contractor is completely unable to identify construction claims.
Construction claim notice	A contractor always gives timely notice of an identifiable construction claim.	A contractor once in a while gives a timely notice of an identifiable construction claim.	The culture of timely giving notice of a construction claim is under consideration.	The importance of giving a timely notice of an identified construction claim is known but not done.	A contractor gives notice of a construction claim very late.
Construction claim examination	A contractor always establishes the legal grounds on which the claim is based with an estimate of potential recovery.	A contractor once in a while establishes the legal grounds on which the claim is based with an estimate of potential recovery.	Construction claim examination process is under consideration.	The importance of establishing legal grounds for a construction claim is known but not done.	A contractor is unable to establish legal grounds on which a claim is based.
Construction claim documentation	A contractor elicits facts that record the actual history of the construction claim.	A contractor partially gives facts of the actual history of a construction claim.	Construction documentation that provides facts of the actual claim history is under consideration.	The importance of providing the facts of the actual history of a construction claim is known but not done.	A contractor is unable to give the facts that provide the actual history of a construction claim.
Construction claim presentation	A contractor always logically builds up a well organized and factual claim.	A contractor once in a while logically builds up, a well organized and factual claim.	Construction claim presentation that gives a logical, organized, and factual claim is under consideration.	The importance of giving a logically, well organized, and factual claim is known but not done.	A contractor has an illogical, disorganized, and nonfactual construction claim presentation.
Construction claim negotiations to avoid cost and time increase	A contractor is always committed to an organized claim negotiations process.	A contractor once in a while is committed to an organized claim negotiations process.	A contractor is considering developing construction claim negotiating skills.	The importance of having skills in claim negotiations is known but employees are untrained.	A contractor has no claim negotiations skills and often his claims consume excessive time and cost.
Use of TQM tools to prevent claims arising from management weaknesses	A contractor's use of TQM tools and techniques always comes out naturally to all employees.	A contractor's use of TQM tools and techniques sometimes comes out naturally to all employees.	TQM tools and techniques are used by employees when reminded.	The importance of TQM tools and techniques are recognized but not applied.	All employees are unaware of TQM tools and techniques.

Note: TQM = total quality management.

The stressful nature of managing contract changes and claims can be alleviated through knowledge

According to Jepson et al. in [12], stress is a major part of the construction management team's life. The research found that stress, as experienced by the construction management team, is a result of 1) a lack of resources 2) a lack of control, and 3) increasing accountability. Construction jobs are known as stressful jobs for not only the front-line workers but also for those who supervise and manage the projects. The responsibilities of those charged with managing contract changes and claims can be challenging. In addition to the extensive list of things that those charged with managing contract changes and claims are required to do, their role is made stressful because:

- He/she is expected to resolve and address all contract changes and claims
- He/she is like a person caught in the middle of a fight – between the contracting organization
- He/she is the bearer of bad news and sometimes good news
- He/she must be knowledgeable in all things contract clauses and must be an expert at interpreting contractual languages
- He/she must be an expert in developing cost estimates and analyzing time impacts resulting from contract changes and claims
- He/she gets blamed when a project is not able to recover the full cost of contract changes or claims
- He/she is expected to coordinate and manage conflicts related to contract changes and claims
- He/she must be a great negotiator and must be good at owner relations – and learn not to take things personal
- He/she gets subjected to scrutiny and reviews on the validity/accuracy of every contract change order or claim that they pursue
- He/she must work late and sometimes work on weekends to meet deadlines and manage contract changes and claims promptly

Another area of stress can be for the general contractor in their management of subcontractors and suppliers. As the contractors are contractually placed between the project owners and the subcontractors, this can add significant critical obligations for the contractors to properly represent and advocate for all parties in a change or dispute.

As the level of project complexity increases so is the type and number of contract changes and claims to be encountered. Those responsible for managing contract changes and claims need knowledge to prepare them and help them feel comfortable and confident in their abilities. Knowledge is a resource and having the right knowledge of how contract changes and claims are managed should reduce the stress of managing contract changes and claims and provide better control. It could be argued that the more practitioners know about the various aspects of their job and how to get things done, the less stress they feel about their job. In other words, when practitioners lack the tools necessary to do their job it may create unnecessary stress and frustration. Sauter et al. in [13], made seven recommendations for preventing work-related stress and they include 1) ensuring that the workload is in line with workers' capabilities and resources, 2) having a clearly defined work schedule, 3) clearly defining roles and responsibilities, 4) clear communication about job security and opportunities for career development, 5) allowing for social interaction, 6) design jobs to provide meaning, stimulation, and opportunities for workers to use their skills, and 7) participation in decisions and actions affecting their jobs. The recommendation on ensuring that the workload is in line with workers' capability and resources speaks to the fact that the more knowledge resource an individual has the more capable they are at doing their job and the less stress they will feel. The recommendation regarding clearly defining roles and responsibilities also ties back to knowing the various aspects of a job and being well-prepared to execute them. Table 3

below captures some of the key roles and responsibilities of someone responsible for managing contract changes and claims on a construction project.

Table 3. Roles and responsibilities of those charged with managing project changes and claims

Typical Roles and Responsibilities of Those Responsible for Managing Contract Changes and Claims
Read and understand the entire contract document better than anyone else on the project
Review and price out agreed contract change orders
Educate and work with the owner's representative on cases where the owner fails to accept that an item of work is a change
Maintain the various logs - issue log, change order log, potential change order (PCO) log, delay log, and others
Initiate and transmit the various notification letters
Follow-up correspondence related to change orders and claims
Work with the front-line superintendent and gather construction methods for the items of work that require pricing
Work with the project scheduler to prepare time impact analyses (TIA)
Attend numerous meetings
Present change order and claims package to the project manager and gain their approval.
Negotiate the Time extensions with the owner
Present and negotiate the price of agreed change orders with the owner
Prepare and present claims to the owner and get the owner to issue a change order instead
Prepare and defend claims that are directed for resolution using one of the many options of dispute resolution methods
Work with the subcontractors to get their portion of the estimate when the scope of work to be priced is for to the subcontractors
Work with material suppliers to get their portion of the estimate when a scope to be priced involves a material supplier
Track, document, and get owner sign-off on documents related to force account change orders.
Monitor and manage payments for contract change orders
Issue change orders to subcontractors for approved change order
Issue change order to material contractors for approved change order
Monitor and manage payments to subcontractors for change order
Monitor and manage payments to material suppliers
Execute contract adjustment by adding executed change orders to the control budget
Coordinate and add new cost code to track potential change order (PCO) and subsequent contract change order (CCO)
Report to management on the status of contract changes and claims
Create and maintain good owner relations
Initiate partnering efforts and activities
Setup and maintain the risk register and risk matrix
Train others on changes and claims management
Prepare and maintain changes, and claims-related flowcharts detailing contractual procedures
Setup, maintain, and oversee a system for effective and contemporaneous gathering of change and claims related documents

The value that students who have knowledge of contract changes and claims management bring

In general, knowledge gained in contract changes and claims management should help the students get ahead, and come prepared with the tools to help the industry solve the issue of managing contract changes and claims.

Specifically, the case can be made that students who take this course will gain contract administration knowledge in the areas listed below and should help to improve project experience and project outcome for all parties involved. Knowledge is an important tool when it comes to risk management.

- Knowledge of the pervasiveness of contract changes irrespective of the project delivery methods, resulting in better awareness and the need for effective practices.
- Knowing that contract changes pose the biggest threat to project objectives (time, cost, quality, safety, etc.) is vital in project risk management aimed at mitigating the impact of contract changes on project objectives.
- Knowing the importance of timely payments for contract changes and the need to avoid contract claims ending up in a lawsuit.
- Knowledge of effective resource planning for original contract work and contract change work, resulting in getting the right resources on board to manage contract changes promptly
- Knowledge of strategies to help reduce and mitigate contract changes at the preconstruction stages and at the construction phase.
- Knowing what to look for in contract terms and clauses and knowing the risks of getting into contracts without a proper understanding.
- Knowledge of the role of good owner relations, and effective contract administration practices that could help to build a fair, healthy, inclusive, and conducive work environment and avoid adversarial relationships between the parties.
- Knowing not to make false claims out of ignorance of not knowing what the contract says and what the extent of the scope of work is.
- Knowledge of how to track and manage productivity on original contract work and contract change order work, and knowing when contract change order work may affect productivity on original contract work.
- Knowing the importance of executing timely notifications, tracking and documenting contract changes contemporaneously, and making timely requests for changes and claims
- Knowledge of how to make effective presentations for contract changes and claims, negotiating in good faith, and resolving disputes amicably.
- Knowing that construction operations or activities are interrelated and interdependent, and solving any construction-related problem requires a grounded knowledge of the issue and all the touch points.
- Knowledge of the interplay between original contract work and contract changes and the basic practices to manage them will increase the odds of project success.
- Knowledge of contract changes and claims involves an in-depth knowledge of contract provisions, such knowledge helps contracting parties avoid being out of contract compliance because of not knowing what they are contracted to do.
- Knowledge of applicable change order cost estimating and time impact analysis (TIA) as an added tool in a toolbox.
- Knowing that construction knowledge areas are interrelated and there are several touch points. For example, evaluating the impact of contract changes requires knowledge of construction law, cost estimating, planning and scheduling, construction materials and methods, value engineering, and leadership and decision-making.

- Knowledge of conversational receptiveness and application to conflict resolution could help young engineers who will soon realize that managing contract changes can be very stressful, and effective strategies are needed to help contracting parties amicably resolve issues.

Proposed course design and development

Course Format - The course could be designed as a dual-level course that can be taken by both undergraduate and graduate students. The class meetings could be offered once a week or as needed. If designed as once a week evening class it may attract young construction professionals who may be interested in taking the class. The course delivery options are:

- Face-to-face method
- Synchronous online method
- Asynchronous online method

Course Description - Construction projects rarely go as contracted or as planned. Contract changes happen for various reasons. Contract changes may cause work disruptions, time delays, extra costs, disputes, legal battles, an adversarial environment, and loss of profit. Knowledge of how to mitigate changes, manage changes, and manage claims are important parts of effective construction project management. In this course, students will learn effective contract administration practices required to: identify when contract change has occurred, notify contracting parties that change has occurred, track and document contract changes, identify various types of claims, prepare accurate cost estimates and/or time impact analyses, present and negotiate claims, mitigate the impact of contract changes, proactively reduce or avoid contract changes, resolve disputes resulting from claims, and avoid making false claims.

Students' understanding of the topical areas will be evaluated using quizzes, homework, exams, and mini-research projects. The exams will focus on concepts covered in the course. The homework will include exercises on developing a cost estimate and work schedule for a retaining wall contract change order, creating flowcharts for mapping contract provisions, evaluation and assessment of project risks, and mapping documentation needs for various contract changes. The mini-research project will require the students to analyze the number and value of change orders from design-bid-build projects as compared to design-build projects.

No one textbook could synthesize all the topics covered in this course and none is recommended for this course. Researchers and educators are experts at synthesizing information from various sources, and it is hoped that the person teaching this course will be able to do the same without requiring the students to buy textbooks.

The proposed learning outcomes are as follows:

1. Identify and assess project risk factors
2. Determine contractual basis for evaluation of changes - conditions of the contract
3. Determine types of directed changes and claims and their root cause - change happens
4. Identify effective contract administration practices
5. Implement practices for identification, notification, and documentation of changes, and claims
6. Determine changes in the scope of work, differing site conditions, and methods for proving related claims
7. Conduct analysis for delays, acceleration, disruption, and methods for proving time impact and time extension

8. Estimate lost productivity and methods for proving related claims
9. Prepare accepted methods for analyzing and quantifying the cost impact of directed changes and claims
10. Implement effective steps to prepare and present claims
11. Implement practices for dispute avoidance, and resolution of claims
12. Conduct an investigative study to characterize contract changes and different project delivery methods

The following Tables 4A to 4L detail the topical areas covered to meet the course objectives listed above.

Table 4A. Proposed course content on project risk factors

Project Risk Factor Identification and Assessment
The Risky Business Called Construction
Why do Companies Decide to Engage in Risky Business Such as Construction?
Risk Defined
Risk Preference Theory
Risk Perception and Personal Attitudes (risk-averse or risk-taker?)
What Can Go Wrong?
Construction Industry Top 107 Project Risks
Typical Reactions, Positions, and Attitudes of Practitioners Toward Contract Changes
Project-Related Risks and Their Direct and Indirect Impacts on Owner, Architect/Designer, Contractor, Subcontractors, Material Contractors, Public
Risk Management Options
The Use of a Risk Register and Risk Matrix to Capture Project-Related Risks on Specific Items of Work

Table 4B. Proposed course content on contract conditions

Conditions of the Contract and Contractual Basis for Evaluation of Contract Changes
Contracting Parties Use of Contract to Control, Mitigate, and Transfer Risks
Order of Precedence of Construction Documents, Interpretation, and Requirements of Contract
Anatomy of Typical Forms of Construction Contract (Agreement, General Conditions, Supplementary Conditions, Specifications, and Drawings)
Conditions of the Contract - Contract Provisions and Conditions Precedent – rights, duties, roles, and responsibilities of contracting parties on Different Project Delivery Methods
Typical Contract Condition Clauses Related to Changes and Claims
Definition of Terms in Conditions of the Contract
12 Implied Obligations of the Project Owner During the Construction of a Project – the 12 Deadly Sins
Scope of Work as the Basis of Contract Change Analysis.
Agreed Contract Amount/Cost Estimate as the Basis of Contract Change Analysis
Agreed Project Duration/Schedule as the Basis of Contract Change Analysis
The Contract as the Basis of Contract Change Analysis
Contract Modification Mechanism – Understand that Nothing Can be Done to Add Time or Cost to a Signed Contract without Formal Contract Modification
Understand State DOTs' Different Methods of Payments for Contract Change Orders

Table 4C. Proposed course content on the root cause of contract changes

Change Happens - The Root Cause of Directed Changes and Constructive Changes
Introduction to Methods for Procuring/Obtaining Contracts, Project Delivery Methods, and Contract Payment Methods
Awareness and Consciousness Toward Change
Likelihood of Encountering Changes on a Project
Causes of Changes, Which Party is Responsible, and What are the Time and Cost Impacts that Result in Changes
Directed Changes vs Constructive Changes
Every Construction Claim Entails – Liability and Financial Damages
Knowledge of Specific Types of Claims and Reasons – The Warning Signs
Which Change is Related to Which Type of Claims?
Claimsmanship and Emotive Responses to the Word Claims
False Claims
Essential Elements of Successful Claims
Effective and Proactive Methods and Practices to Reduce Contract Changes and Their Impacts on Projects

Table 4D. Proposed course content on contract administration practices

Effective Contract Administration Practices for Contract Changes and Claims
Different Ways to Look at Construction Project Administration and Management
Contract Administration Defined – Administering All Aspects of the Contract
Understanding Contract Administration for Changes and Claims – Focus on Changes and Claims
The Elusive Goal of Meeting Contract Administration Objectives
Basic Know-How for Contract Change and Claims Administration
Contract Administration Flow Charts Depicting the Contractual Requirements in a Flow Chart Format
Basic Process in Identification, Notification, Documentation, and Negotiation of Change
Self-Audit of Contract Administration System
Factors that May Affect Effective Contract Administration Practices and Performance
Coordination and Relations Amongst Contracting Parties – Owner, Design/Engineer, Contractor, Subcontractors, Material Contractors
Key Elements to Include in a Manual for Effective Contract Administration of Changes and Claims
State DOTs’ Contract Administration Manuals Related to Changes and Claims

Table 4E. Proposed course content on contract change identification, notification, and documentation

Deep Dive into Contract Administration Practices Related to Identification, Notification, and Documentation
Identification of Change
Notification of Change
What Records to Keep and Document for Changes?
Use of Measles Chart to Show the Degree of Impacts Due to Changes

Table 4F. Proposed course content on claims related to the change in scope, and differing site conditions

Change in Scope of Work Claims and Differing Site Condition Claims
Recognizing Change in Scope of Work Claims
Contractor's or/and Subcontractor's Claim on Change in Scope of Work and Owner's Defense/Rejection Basis
Recognizing Differing Site Condition Claims
Contractor's or/and Subcontractor's Claim on Differing Site Conditions and Owner's Defense/Rejection Basis
Are there Likely to be Differing Site Conditions on Design-Build Projects?

Table 4G. Proposed course content on claims related delays, disruptions, and acceleration

Delay, Disruption, and Acceleration (<i>Compression of the Schedule</i>) Claims
Difference Between Delay and Disruption
Types of Delays
Schedule Impact Analysis Techniques and Application and Use of Project Schedule in Delay Analysis
Interpreting Project Planning and Scheduling Specifications
Aspects of Effective and Realistic Baseline Critical Path Method (CPM) Schedule and Progress Schedule to Avoid Defective and Deficient Project Schedule Design and Maintenance
Application of 4D Schedule in Depicting Impacts
Contractor's or/and Subcontractor's Delay Claims and Owner's Defense/Rejection Basis
Owner's Delay Claim Damages Against the Contractor is Generally Based on Certain Grounds
How Does Disruption Occur – When Workers are Prematurely Moved from One Assigned Task to Another Due to Changes?
Disruption on Changed and/or Unchanged Work Items
COVID-19 Related Delays and Disruptions
Methods for Analysis and Measurement of Disruption Claim as Evident in Productivity Loss
Contractor's or/and Subcontractor's Disruption Claims and Owner's Defense/Rejection Basis
How Does Acceleration (<i>Compression of the Schedule</i>) Claims Occur?
Types of Acceleration
Contractor's or/and Subcontractor's Acceleration Claims and Owner's Defense/Rejection Basis

Table 4H. Proposed course content on claims related to loss of productivity

Lost Productivity Claims – Identifying, Quantifying, and Proving Loss of Productivity
Environmental Factors and Productivity
Other Factors that Affect Labor Productivity
Understand what Productivity is and How it Should be Measured
Review Guidelines, Methods, and Tools Commonly Used to Measure Loss of Productivity
Determine when Loss of Productivity Claims can be Asserted
Understand what Types of Documentation Should be Gathered and Maintained to Support Loss of Productivity Claims
Contractor's or/and Subcontractor's Loss Productivity Claims and Owner's Defense/Rejection Basis

Table 4I. Proposed course content on pricing changes, and preparing time impact analysis

Prepare Cost Estimate and Job Schedule for Contract Changes and Claims
Control Budget Setup – Contract Items, Change Orders, and Potential Change Orders
Type of Claims and Types of Costs Claimed
Contract Conditions Detailing Change Order Pricing Requirements
Example of Typical Markups and What Is Included
Difference Between Forward Pricing and Post Pricing Methods
Changes and Claims Pricing Checklist
Cost Estimating Methods for Pricing Direct Costs for Changes
Changes and Claims Pricing Template
Estimating Delay Cost in Delay Claims
Estimating Disruption Cost in Disruption Claims
Estimating Acceleration Cost in Acceleration Claims
Home office overhead Time Related Overhead (TRO) – Eichleay Versus Home Office Overhead Payment (HOOP) Method
Project Schedule to Show Time Impact from Directed Change Orders

Table 4J. Proposed course content on how to prepare, present, and negotiate changes and claims

Prepare, Present, and Negotiate Contract Changes and Claims
Essential Elements of Successful Claims – Cause, Effect, Entitlement, Substantiation
A Clear and Logical Presentation of Claims
Preparing and Packaging Claims
A Case Study on Claims Presentation, Claim Response, and Determination
Owner’s Defense to Delay Claims – An Example of What to Expect
Effective Negotiation of Construction Claims

Table 4K. Proposed course content on conflicts, dispute avoidance, and resolution

Conflicts, Dispute Avoidance, and Resolution
Every Relationship Has Its Problems and None is Perfect
Disputes and Conflicts – In construction, there is a strong tendency to view disputes as: "us versus them", "good guys versus bad guys," or just "good versus evil."
Why Claims are Not Good for Contracting Parties
Principles of Proactive Claims Management - Reducing or Avoiding Disputes that Result in Contract Claims
Methods for Dispute Resolution
Adversarial Environment and the Stressful Work Characteristics of Contract Changes and Claims Manager on Projects with a Large Number of Changes and Claims
Partnering as a Tool to Lower the Temperature and Help Create Trust, Respect, and Cooperation Among all Contracting Parties

Table 4L. Proposed course content on project delivery methods and contract changes

Conducting an Investigative Study to Characterize Changes and Types of Claims in Project Delivery Methods
Analysis of the Number of Change Orders, the Types of Change Orders, and the Value of Change Orders Encountered on Design-Bid-Build Projects Versus Design-Build Projects

Conclusions and recommendations

Construction is a very risky business due in part to various factors that negatively affect project outcomes. One of those factors relates to contract changes, claims, and disputes. Construction professionals know firsthand that projects don't always go as planned. Mistakes, errors, omissions, weather, and so many other factors do affect project performance. Considering the risk associated with poor management of contract changes, it could be beneficial to expose students in construction-related programs to various aspects of contract changes and claims and how to effectively manage them. Research has shown that some construction contractors are unaware of and do not follow the basic processes to manage contract changes and claims. The state of the industry shows a poor level of preparedness and awareness as it relates to the management of contract changes and claims, and this strengthens the need for help. Such help could come from preparing students in construction-related programs on effective methods for managing contract changes and claims. The responsibilities of those responsible for managing contract changes and claims can be challenging, especially without the right knowledge and skill. Knowledge is a resource and having the right knowledge of how contract changes and claims are managed should reduce the stress of managing contract changes and claims and provide better control for the practitioners. The design of this course follows an in-depth understanding of the risk involved with poor management of contract changes and claims, as well as an understanding of the roles and responsibilities of those charged with managing contract changes and claims. A model syllabus is presented in this paper with student learning outcomes and detailed topical areas that follow industry practice. It is hoped that this course will help prepare students and in turn, help improve industry preparedness to effectively manage contract changes and claims.

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