

COLLABORATIVE RISK MITIGATION THROUGH CONSTRUCTION PLANNING AND SCHEDULING

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COLLABORATIVE RISK MITIGATION THROUGH CONSTRUCTION PLANNING AND SCHEDULING: RISK DOESN'T HAVE TO BE A FOUR-LETTER WORD

BY

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Synopsis from Industry Professionals

Owners

“Whether you’re new to the industry or a seasoned professional; architect, project manager, contractor, or owner; and regardless the size of the project, this is a must read for all in the industry on how to ‘plan your work and work your plan’ for more successful outcomes.”

Mark Webb

Principal at Vizient

“With the construction industry challenged with a limited labor market, lack of skilled trades, competitive landscape, and reduced margins, it is imperative that owners mitigate their risk in all facets of the capital project delivery process. With Lana Coble’s thirty plus years of experience in the construction industry, serving as a general contractor, owners representative, faculty member, and architect, she brings unique and proven experiences, and perspectives in this book through case studies that predict risks, with proven solutions.”

Spencer Moore, Vice President of Facilities Management and Operations
University of Texas M. D. Anderson Cancer Center

“Embarking on a large capital project is a challenging undertaking, even for a seasoned project leader. There is so much at stake — tens to hundreds of millions of dollars, the ability for an Institution to continue its mission and Institutional reputation, to name a just a few of the larger risks. It is not for the faint of heart or the inexperienced. Lana is neither of those, to say the least.

Lana has written a book, based on her long and extensive experience, to help both industry professionals as well as inexperienced owners to anticipate those risks and challenges. By doing so, they can better plan for and ultimately manage the risks that come from designing and constructing buildings.

Lana’s depth of experience makes her extremely qualified to walk the reader through these challenges. She brings case-study experience to illuminate her concepts and assist the reader to better comprehend the ideas she wishes to share.”

Sidney J Sanders, Senior Vice President

Construction, Facilities Design and Real Estate, Houston Methodist

Program Manager

“Set aside those ‘how-to’ project management books written by self-proclaimed authorities who’ve never managed a successful project. Make way for Lana Coble who in *Risk Doesn’t Have to Be a Four-Letter Word* provides highly useful approaches, specific tools, and sage advice on reducing risks to greatly improve the chances for project success. As one of the most experienced, knowledgeable, and owner-oriented project leaders I’ve ever known, you can be assured her recommended techniques and scheduling practices have been tested in her ‘laboratory’ of real world projects. For me, she led very large, complex projects in Houston’s dense and cramped Texas Medical Center and achieved outstanding results while gaining the respect of all who worked with her. Finally, a book has been written by a proven project authority based on doing, not on philosophy.”

James A. Broadus, PhD, P.E.

President, The Broadus Companies

Architect

“This book will be a great resource for anyone who wants to understand the importance of integrating project planning (managing risks) with scheduling.

To most designers/architects’ project planning and schedule creation are two separate and distinct exercises. Dr. Coble’s book explains the difference between the two and how integral they are to a project’s success. Congratulations on an informative and timely read!!”

Gus Blanco, AIA, ACHA

Studio Leader, Healthcare, Senior Principal

EYP Architecture & Engineering

Construction Agency

“While the commercial construction has made great strides in utilizing the latest technology and advancing less contentious procurement practices, delivering a high-quality construction project on time and within budget remains a complex proposition. In *Risk Doesn’t Have to Be a Four-Letter Word* Dr. Coble presents in a very systematic way, strategies and implementation measures that go a long way in enhancing the likelihood of a successful project for all involved.”

Jerry Nevlud, President/CEO

Associated General Contractors of America | Houston Chapter

General Contractors

“Risk Doesn’t Have to Be a Four-Letter Word” Dr. Coble’s passion for effective, team-oriented planning and scheduling shines through. The manuscript lays

out a great roadmap for those unfamiliar with effective project schedule management and provides a well-stocked tool box to build upon. Great Read!”

Thomas Kulick

General Superintendent Hensel Phelps

“I have worked with Lana Coble for 20 years and from Day 1 it was obvious that she possessed that innate ability to get things DONE! It has led to an association (and friendship) that benefits our clients and the construction community. Well done, Dr. Coble, I am looking forward to our collaboration on your next literary effort, ‘The Art of Pre-Construction’.”

Guy Cooke

Preconstruction Manager Tellepsen

“From personal experience, I know Dr. Cobles’ energy, enthusiasm, and commitment to collaborative and effective project schedule management. For someone new to the industry, or a seasoned professional, this book is a must read for anyone eager to achieve positive project outcomes and relationships.

Dr. Cobles’ unique qualifications and experience from the vantage point of Owners, Program Managers, Contractors, Architects, and Engineers alike provides credibility to the tools and processes outlined in this book. If you want your project to succeed, this is a must read.”

Michael Dwight

Director of Operations Hensel Phelps

Subcontractor

“In a time when our industry is challenged with more complex projects being built ever faster, it is critical that we understand the risk. Lana has been one of our best thought-leaders for decades on better ways and methods to build the most complicated construction projects. In this book, she does an exceptional job of combining her experience and research to help us identify and minimize the risks that affect all members of the design and construction team.”

Graham Moore

President TD Industries

Project Delivery Consultant

“Risk mitigation [...] engaging stakeholders [...] project planning vs. project scheduling [...] creating a culture of curiosity; all of these concepts are easily said but difficult to embrace both the art and science of their successful implementation for ultimate project success. Lana Coble is one of those rare technical talents who can explain those concepts but also specifically mentor folks in how to pull them off successfully [...] and in Lana’s case, in an emotionally intelligent manner. Read this book several times. It’s like a good novel, you will learn something new each time.”

Wayne O’Neill

CEO RESET

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About the Author

Dr. Lana Kay Coble CPC has dedicated her career to the advancement of construction methods, education of future and existing professionals, and promotion of diversity within the industry workforce. She has over 38 years of construction management experience, including positions as an owner's representative, executive manager in construction companies, and a professor in a major university construction management program. She has also published research in the American Institute of Constructors national journal. Her portfolio of construction projects includes healthcare, higher education, K-12 schools, commercial development, corporate campuses, mission critical data and energy facilities, athletic venues, zoo facilities, and major infrastructure systems. Her expertise includes the introduction of advanced technology to more efficiently engage all stakeholders in the construction process from concept to completion. Technologies and methods include implementation of software systems, development of document management systems, complex program management, planning/scheduling, and conflict mitigation on major high-profile construction projects. Ms. Coble's experience as an academician includes teaching at both the university level as well as in professional organizations and construction firms. Long a champion for diversity in the construction profession, Ms. Coble is an advocate for the development of women in construction and the advancement of historically underutilized businesses (HUB) through targeted affirmative action programs. Her passion for scheduling and mitigation is based upon academic fundamentals and construction experience. Within the span of her 38-year career, she has completed every project within the scheduled due date, with exception of one very complex project. Her most recent teaching endeavor was serving as the lead author of scheduling mitigation training to construction project managers and superintendents.

Dr. Coble holds a Bachelor of Arts in Construction & Design from Trinity University, a Master of Science in Architecture from Texas A&M University, and a Doctoral degree in Education from the University of Houston.

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Purpose of This Book

To determine if this book has value for you, first and foremost it's important to understand what is not included in the pages to come. Specifically excluded are:

- instructions on how to utilize scheduling software,
- basic fundamentals and definitions of project scheduling, and
- historical reference to the development of critical path scheduling.

There are a multitude of publications which explain the techniques of schedule creation inclusive of logic, activity parameters, and critical path calculations. While it is beneficial to the reader to understand the fundamentals of project scheduling, this knowledge is not required to enhance schedule management. This book does not address how to implement software for schedule documentation, as Primavera and Microsoft Project primers are commonly available. While it is important to understand the origination of any process to be learned in that field, there are many textbooks which illuminate critical path scheduling. With that said, students, schedulers, and academicians may assume that this book holds little value, however the author believes the case is to the contrary. Concepts and practices listed below will demonstrate the value of this work for a breadth of construction management members ranging from students, schedulers, owners, architects, engineers, and contractors.

Content included in this manuscript is focused on real-world strategy and implementation measures to proactively avoid risk in the project schedule. Specifically included are:

- Understanding the difference between project planning vs. scheduling.
- Identifying processes which allow all key stakeholders to collaborate in the project planning phase by identifying potential risk.
- Defining a new conceptual perspective during schedule preparation that focuses on mitigating the potential risk elements before they occur.
- Forecasting the greatest areas of risk that can cause project failure and providing tangible tools to include preventive measures in the schedule.
- Providing practical application of risk mitigation strategies for commercial construction projects based upon case-study lessons learned from actual projects.
- Demonstrating periodic communication tools which allow understanding of the schedule status and risk identification in non-technical scheduling terms.
- Identifying the greatest areas of risk in actual production reporting to the scheduler which typically create late project completions, and

- Reframing the way that construction professionals and project team members think about the purpose of a schedule and its purpose during project implementation.

During the authors teaching tenure in both the higher education and practitioners classroom, the most common lack of understanding by students is the difference between planning and scheduling. Knowledge of the differentiators between both concepts is critically important when identifying who can participate in schedule preparation. Planning is for any stakeholder who can identify risk associated with execution of the project. The act of scheduling is reserved for those persons who are trained in software and understand each individual activity and the sequencing logic required to complete the scope of work. Observation has revealed that typically more time is spent on scheduling which is performed by the fewest number of persons. Common sense would suggest that greater benefit could occur by spending more time with a larger group of stakeholders in identifying which high risk activities should be tracked during project production. Suffice to say, both planning and scheduling are integral to project success, but planning is often overlooked by scheduling professionals. Hopefully, this text will bridge the communication gap between the members of the team which are not focused on production and those who are. Additionally, production personnel, that is, schedulers, and field supervisors, are not the decision-makers which emphasizes the importance that owners and key stakeholders understand the impact of risk and decisions on timely project completion. The framework presented in this book should also shape a new “way of thinking” by the construction practitioners during the development of a project schedule. By examining risk areas associated with the project, tasks can be assembled which would minimize these risks and placed in time appropriate slots of the schedule to allow anticipatory mitigation. This approach is not only proactive, but also communicates project aspects that the technical construction professional may not have been privy to prior to this risk identification process. A practical tool developed by the author, the “Risk Identification Matrix”, can be used to facilitate this communication process by all stakeholders to enhance the development of the project schedule. Additional reporting tools are also included for the ongoing identification of risk as the project is constructed. After all, processes are dynamic and outside influences are always a risk during the production period. Schedules are “not wallpaper” and will continue to evolve as circumstances change relative to project conditions. This strategic shift in perspective on how to prepare and manage project scheduling should facilitate a more collaborative environment. Owners, program managers, architects, engineers, and construction professionals do not have to understand the technicalities of scheduling, rather they can learn how to transmit their concerns, so they can be included in the overall project schedule. Technical schedulers can benefit from learning how to discern key risk concerns by other team members and then translate those risks into schedule activities. While this book does not address the basic understanding of scheduling provided by academicians, it does provide

the application framework for the content creation phase of development. Lastly, higher education students who do not have real project experience, will be provided a conceptual starting point for analyzing the project schedule based upon projected risk factors. The common beneficial thread for all team members will be a process intended to forecast risk factors for the purpose of inclusive planning for successful schedule management.

In writing this book, the author has taken into consideration that all the readers will be practitioners at some point in their careers, so the text contain summarized strategic points for quick reference. Being a construction practitioner for the last 38 years, the author understands how limited time is when executing a project and felt it is essential to provide key concepts which are easily identified. These tips have been time tested and are important to consider when building your team and providing direction for its members.

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Acknowledgments

First and foremost, I want to thank all the industry practitioners who participated in the case studies for this manuscript. Your commitment to furthering the advancement of the building industry and the professionalism with which we practice is vitally important.

This book would not be possible without the tutelage of the academicians I had the privilege of working with during the pursuit of my doctorate degree. Profound appreciation to Dr. Lee Mountain whose belief in my message propelled me to pursue this project. I am eternally grateful for Dr. Cheryl Craig's ability to awaken the writing muse within me.

I would be remiss without acknowledging the many professionals who have contributed to my career as a building professional. Notably, Jay Tribble, who gave me my start as a construction project manager during a time when women project managers were an anomaly to the profession. A special thanks to the subcontractors who supported me and my projects for the last 38 years. To Donald Bonham and Jim Broaddus, thank you for the opportunities to experience project delivery from the perspective of an owner and program manager, respectively. And to Howard Tellepsen, my appreciation for providing me the opportunity to hone my skills as a general contractor. Profound appreciation to Brendan Jefferies and Guy Cooke who have been my building partners for the last 18 years of my career and for making construction fun!

Last and most especially not least, is my beloved Guusje who waited patiently for the last seven years while I sequentially completed my doctoral studies and wrote this manuscript. Your patience and support while I pursued my passion for education and giving back to the industry was truly a gift.

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Introduction

The approach of this text is to present “real-world” construction schedule experience with a focus on systematic application of risk management techniques. One aspect of risk management is creating a culture of curiosity on how to improve installation operations so that time is collected early in the project, much like contingency budget funding. The premise that unforeseen and uncontrollable events will impact the delivery schedule is the driver of this approach. The most effective means to counter impacts of failure are to forecast potential events which create the greatest risk in project delivery, engage in pre-planning of the risk activities, and track progress against the schedule so that adjustments can be made before time expires. A culture

THE “R” Word is Risk Create a culture which asks what is at RISK during all phases of the project

of curiosity is not complete until lessons learned have been discussed with the team and formalized for future reference which can benefit non-team members within the practitioner’s organizations.

The perspective of “time” as a commodity must be equally important as budget/cost considerations. In the case of large projects, time can literally be significantly monetized based upon the cost of general conditions by the contractor. One of the projects included in the case studies of this text incurred contractor’s general conditions cost of \$300,000 per month or \$15,000 per working day. Mitigation of time can result in savings to the owner at a quick rate based upon the metrics described above, and conversely, increased cost. In this example, these costs only reflect that of the contractor. Other team members, (architects, engineers, and owners) also have personnel that are impacted by delays which result in increased cost. These potential cost overruns are typically internalized against production profits, unless a scope change occurs and there is a condition to charge the owner for additional services. The point is that all team members are fiscally affected by time management and should be included in risk identification and minimization.

Time & Money are the Foundation of Successful Construction

Typically, time impacts are beyond the contractors’ control, therefore it becomes equally important to communicate schedule risks with the entire team of practitioners (architect, owner, engineer, subcontractors) to facilitate engagement of as many resources as possible during the problem-solving process. Mutual trust between practitioners becomes a “cornerstone” to facilitate this process. Periodic communication, in the form of schedule reporting, serves as the “brick-and-mortar” to build this trust so that transparent discussion can be exercised concerning the project time risks and requirements. Beyond risk forecast, this reporting process also includes successful mitigation efforts which aids

TIME TRUST is created by transparent and consistent communication between project team members.

in building trust between all parties by demonstrating engagement in the project efforts to create success. In the event that the time lost is within the contractor's control, this form of reporting is an effective means of

training the team to perform at a higher level, since repetition facilitates learning. This communication report has been implemented by the author for 15 years and will be discussed in depth in further chapters.

The content in the following chapters will provide a framework to better identify schedule risk, strategic concepts on improving time delivery, and how to engage all team members in the process.

Chapter 1

Has It Ever Gone As Planned?

After 38 years of direct and indirect scheduling practice, the author has yet to see a project completed exactly as the originally prescribed plan. One observed common fallacy between all project practitioners is clinging to the premise that they have a perfect plan and further adjustments are not required. This

**The perfect plan is an illusion,
Change is inevitable.**

perspective is an illusion that will slow the process in recognizing risk factors and changing circumstances, which ultimately minimizes the team's ability to respond effectively. A real-life example of this mentality is demonstrated when the schedule becomes "wallpaper." How many times have you walked into a construction trailer, seen the schedule attached to the wall, and peeled the corner of the schedule back to find the wall faded behind it? This condition is almost always an indicator of the practitioners viewing the schedule as static and non-responsive to changing conditions.

1.1. Change Is the Only Constant

As in life, change is inevitable and will occur during the life of a project. Success is measured by how the team adapts to the dynamic environment and the sched-

**Project Success is Hinged on the
Teams Ability to Adapt**

ule reflects the time changes associated with change response. The organic nature of the schedule, whereby it consistently evolves due to changing conditions, is essential for project practitioners to accept. Change can appear in many forms: staff turnover, owner-driven scope change, local regulation requirements, environmental impacts, and end user's inability to conceptualize two-dimensional drawings. Actual experienced examples of these types of conditions are as follows:

- Staff turnover and owner-driven changes: The week prior to scheduled construction groundbreaking, a key leadership position of the owner's team was changed (Director of Facilities and Construction) which resulted in re-evaluation of the projects program to meet the end user's needs. The design and construction team were placed on hold for three months during this evaluation period. Upon completion of the program review, the decision was made to commence construction immediately and add additional floors to the project. This change in direction impacted the entire team of architects,

4 Collaborative Risk Mitigation

engineers, and contractor. Actual details of this schedule impact are discussed in the chapter for case study 1.

- Local regulation requirements: During the final week of inspections on a five-story high school, the mechanical inspector determines that a potential fall risk could occur when a heating, ventilation, and air conditioning (HVAC) unit will be serviced on the roof. With one week left to go in the project, that inspector decides that a final certificate of occupancy will not be granted until permanent handrails are installed. In this particular case, the team had built contingency time into the schedule so there was no impact to the school's opening day.
- Environmental impacts: A school of nursing building, located in the Texas Medical Center on a highly congested intersection, was in the construction process when an optic fiber cable was discovered inside the building line of the foundation. The cabling wasn't identified on the plans nor was it labeled as to whom it belonged to. Since the impact of critical care services could be at risk, by cutting the line, a 2-week delay occurred to the foundation while the project team determined which institution owned the line. As this was early in the project, there were multiple opportunities to mitigate the delay and finish the project on time.
- End user's ability to understand two-dimensional drawings resulting in nonalignment of expectations: This type of nonalignment event probably occurs most often across all types of projects because end users are typically not well-versed in construction application. To illustrate this situation, a recently constructed five-story high school was designed with structural concrete frame and floors. The architect designed the floors to be polished concrete and the final appearance of the floor wasn't communicated clearly enough to the end user. When the building was almost ready to open, the end user didn't like the fact that there were natural cracks in the polished concrete, a condition created by the nature of elevated structural concrete. This late discovery was the result of not clearly aligning expectations of the finishes, which could have been avoided early in the project. As construction practitioners, it is critical that this type of knowledge is not taken for granted, and the end product is visualized through the end user's perspective.

As change is a given, it is equally important to understand that the impact of change is less when incurred earlier in the project. [Figure 1](#) illustrates the impact on cost relative to the effectiveness of change during the lifecycle of a commercial construction project. Most practitioners are familiar with this illustration; however, the aspect of time is seldom addressed.

In reality, time follows the "Effectiveness of Change" path. The "less-more" axis becomes effort. When greater effort is applied earlier in the project (Predesign and Schematic Design), probability increases for the creation of time contingencies and minimizing risk. The primary lesson learned with regard to change is anticipate as much as you can, as early as you can, so you have reserve time to utilize for those unanticipated changes.

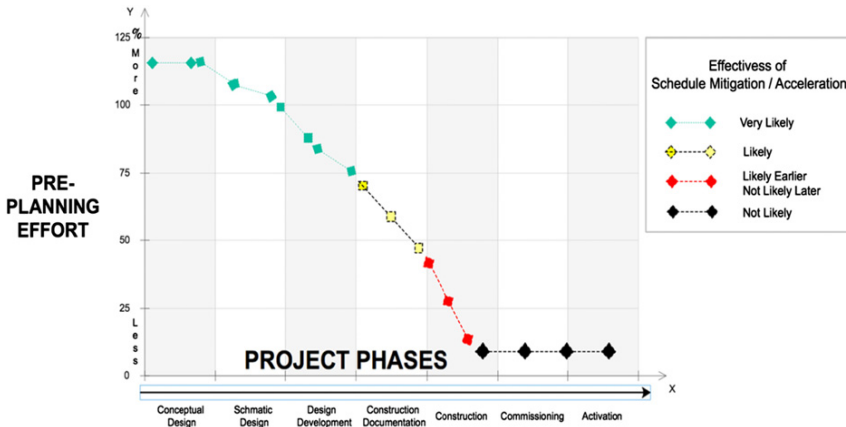


Figure 1: Effectiveness of Change in the Form of Schedule Mitigation or Acceleration during the Life of a Project.

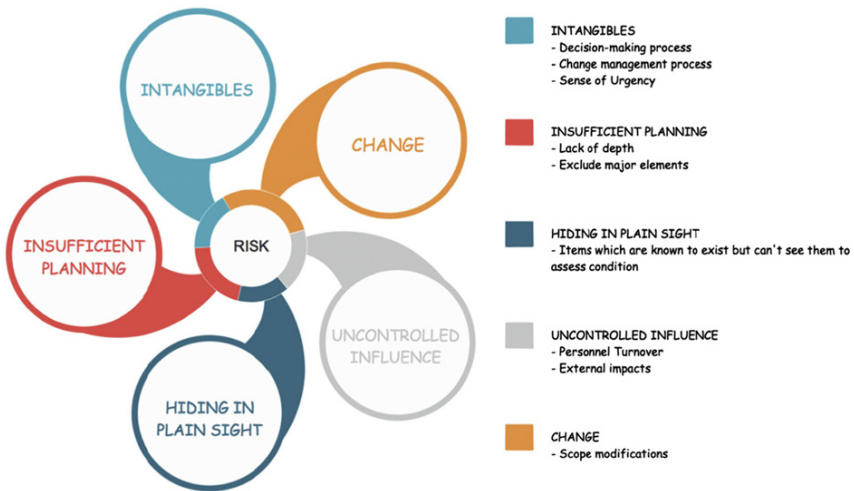


Figure 2: Forms of Project Risk.

1.2. Forms of Risk

While change is considered the most common bearer of RISK, other aspects of project management can impact a schedule such as intangible elements, insufficient planning, uncontrolled project influence, and elements that are hiding in plain sight (Figure 2).

The illustration in Figure 2 above, represents high-risk aspects which can impact a project timetable and share the trait of potential change. Intangibles

are nonphysical states or processes which can impact time such as an attitude lacking in a sense of urgency or inefficient decision-making processes. The experienced practitioner knows that change management and decision-making processes can vary greatly from institution to institution. Practitioner firms are not excluded from consideration when evaluating the effectiveness of these processes. As an example, some owners may take longer to finalize change orders due to increased number of levels of approval in the process. Another intangible risk can be represented by a practitioner team which is deflated due to excessive changes or obstacles encountered in the project's execution. Sustained frustration can lead to lack of productivity which can erode time from the schedule. Intangibles can be characterized as subtle time-killers and as such can be difficult to identify and correct. Oftentimes, the intangible elements are those that can be the most destructive to time contingencies or activity durations because of the nonphysical nature. In preparing a schedule, these items are difficult to quantify on a time scale and oftentimes ignored or underestimated. Insufficient planning is a tough risk factor to evaluate by most execution teams since practitioners tend to plan based upon past experience. While the approach of utilizing past experience and lessons learned is considered as a positive, it can be limited in not providing enough depth. A good rule of thumb for the level of depth to apply in the planning effort is to equal the perceived element of risk with the construction component or activity, i.e., the more risk, the greater the planning. An example of matching risk with the level of planning was the construction of a steel crown, aka "tiara," on the top of a 25-story hospital, where the structure was elevated 40 feet above the roof and 25 feet beyond the face of the building. The unusual nonrectilinear shape of the tiara in conjunction with the size and location of the steel members made the building element uniquely difficult to construct. As a result, the designers, fabricators, and installers dedicated approximately 4–5 months of collaborative planning in an effort to ensure an efficient schedule and safe installation.

Uncontrolled influence can appear in many forms and can originate either externally or internally. One of the most common manifestations of uncontrollable impact to construction is catastrophic weather events. Tornadoes and hurricanes can occur with relatively short notice,

Effort of Planning should be equivalent to the level of Risk

preventing preparations to protect the construction site from damage, unless of course your project consists of interior scope only.

The key word in identifying this type of risks is "uncontrollable," which can manifest from employee turnover or as contractual language defines the term *Force Majeure*. The Latin derivation of the term is superior force beyond the control of all parties and instances including crime, war, weather, and labor strikes. The last and sneakiest construction risk element are those issues that are hiding in plain sight. These risks are known to exist, but their condition cannot be assessed due to their lack of accessibility. Two conditions of the most common construction examples are in the form of inaccurate "as built" drawings for a remodeling project or incorrect depiction of underground utilities. In both conditions, the practitioners believe they know

what exists, but in reality, the final determination cannot be achieved until the existing conditions are uncovered. One of the most common mistakes on construction projects is failure to uncover existing utilities early enough in the schedule to allow for potential correction of existing conditions. One such condition occurred with an existing sanitary sewer line in a congested urban setting, where two independent agencies had modified the lines flow. Upon investigation, it was determined that the last agency (“B”) who modified the line had failed to notify the other agency (“A”) of the change. The civil design professionals utilized agency A’s as-built drawings, which was typical practice. In this instance, the existing sewage system was stagnant with the manholes holding 6’ depth of waste. The contractor had field verified the existing utilities early in the project and there was adequate time to redesign the utility lines to accommodate sufficient flow for the sanitary sewer system. This situation occurs more frequently than expected and has shaped the risk approach of “what you cannot see, will hurt you.” The purpose of this phrase is to accentuate the importance of exposing nonvisible conditions earlier in the schedule to allow for time contingencies.

With all the forms of change illustrated above, it could be considered common sense to focus construction planning on elements of risk. Statistically speaking, however, the higher risk elements have the highest probability for change, therefore time spent on contingency plans may yield the best schedule results. The conservation of time, especially in the early stages of a project, is critical to schedule management. In technical terms, this time contingency is referred to as float. In practical terms, it is best to think of float as a time contingency, which can be applied for mitigation of the risk factors in [Figure 2](#). Team success is differentiated by how we manage risk and solve problems. How we respond to change defines us as practitioners. And regardless of the practitioners technical scheduling prowess, everyone relates to risk. Just as it takes multiple perspectives to create a more complete understanding, it is key to realize involving all team members in the quest to identify and assess project risk will contribute to a better execution plan. This collective, risk-focused approach shifts away from the old school paradigm of scheduling as only a technical exercise in illustrating construction activities. The technical aspect of scheduling is still important but the focus on risk allows for expansion of content. Acceptance of this method facilitates understanding high-risk activities from all members of the project team during all phases of the project (i.e., predesign, design, budgeting, procurement, permitting, construction, commissioning, and end user activation) and creates a comprehensive plan. These are the reasons why this book focuses on the art of managing risk in construction.

Responsiveness to changing conditions after the creation of the baseline schedule is a key characteristic of optimized schedules. With all of the potential for change, as identified earlier in this chapter, thought should be given to how the baseline schedule is organized. This approach is often neglected by practitioners during the development of the original schedule due to a myopic focus on content. Those who do consider the organizational impact generally limit their layout to a work breakdown structure (WBS). Specifically, the schedule should be created where activity adaptations can be easily implemented during

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the life of the project to reflect change. This planning should consider the constructability sequencing of the project. An example of this approach was implemented on a university classroom and administration building which required all exterior walls to be replaced due to leaks. The situation was compounded as the building was in the shape of a “piano” and had approximately 12 different elevations. Other constraints on the building process was the building had to remain operational during construction. Early in the planning, it was apparent that the glazing subcontractor may have worker staffing issues which could result in fluctuations of productivity. Based upon these high-risk levels, each elevation was planned as an independent work sequence. Once the activities have been developed, the schedule was organized in a similar fashion, by elevation. Within two weeks of starting actual construction, the subcontractor confirmed that worker availability had changed and required re-sequencing of the elevations. Due to the anticipation of this potential change, the team was able to adapt the schedule within a short period of time and still met the overall delivery mandate. There were additional changes invoked by the university to accommodate off-cycle occupancy needs. The approach of anticipating change as it reflects to the organizational structure of the schedule facilitated a “win-win” scenario for the entire team.

The last critical aspect of schedule risk management involves understanding the difference between contingency and mitigation planning. Merriam-Webster dictionary (2017) defines a contingency plan as “a plan that can be followed if an original plan is not possible.” Mitigation (Merriam-Webster, 2017) is defined as lessening the severity of damage or loss. In the context of time, contingency implies that it is prepared prior to actual impact to the baseline schedule, where mitigation seems to apply an ad hoc approach to minimize delay impacts. In terms of the final outcome, mitigation assesses the results of the contingency plan. This distinction is important as the higher risk implementation processes should have contingency planning prepared prior to actual execution. Mitigation becomes more of an immediate adjustment approach to managing time delays.

In summary, with every project, there is always RISK. The sources of risk can vary from internal to external, forces of nature, labor, economics, politics, project leadership, delivery method, and so on. The constant in project execution is change. Risk planning is necessary once the baseline schedule is prepared to increase the percentage of successful deadline delivery. While many of the concepts described can be correlated to common sense thinking, the point is that practitioners can increase success by adopting a risk assessment approach. In order to apply this paradigm, collaboration and risk assessment should be at the forefront of all planning efforts.