Presented at the 2018 ICEAA Professional Development & Training Workshop

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Your Schedule Is in Shambles and This is Why – A Systematic Approach to Why So Many Projects Fail

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INTRODUCTION

An alarming 2017 PMI survey showed only 51% of projects are completed on time[1], while a similar 2016 report revealed that $122 million of every $1 Billion was wasted due to poor project performance[2]. Despite these statistics, new projects, some with staggering price figures, are started every day. It is doubtful that anyone would tolerate a 49% failure rate in their day-to-day activities, so shouldn't we hold our projects to the same high standards? Let's look at an industry where failure cannot be tolerated, where failures are measured in deaths, not just in days or dollars. The airline industry had 0.08 accidents per 1 million flights in 2017[3]. While there is an enormous difference between a plane accident and a project failure, the high price associated with loss of life and property has resulted in meticulous, prevention-focused analysis of factors that cause accidents.

When an airplane accident occurs, the Federal Aviation Administration conducts a "root cause analysis." This analysis breaks down the accident to answer the following questions: why did the accident happen, what was the root cause(s), how can the precipitant(s) of the accident be avoided? What corrective actions need to be taken to ensure it does not happen again? This systematic approach for identifying and understanding the root cause of failure, and identifying corrective actions is both effective and applicable to the field of project management. The main difference – an airplane accident analysis is conducted after something bad has occurred (reactive), while in project management, we can understand the warning signs both before the project starts or while in execution to make immediate changes to prevent failure before it occurs (proactive). Despite the existence of applicable models to work from, many projects fail in developing a rigorous approach to understand why their project fell behind schedule or overran cost.

ROOT CAUSE

The authors have observed multiple root causes that prevent programs from achieving their schedule and cost targets, as shown below in Figure 1. These include: requirements, contracts, program management approaches (or lack thereof), scope creep, unrealistic estimates, and neglecting to take a data-driven approach to decision making. To understand them further, let's take a more in-depth look at the root causes contributing to project failure. Then, we'll discuss some techniques to apply to your project to help avoid / mitigate the occurrence and impact of these root causes.

The below issues are not rank ordered, nor does any-one issue carry more weight than another. Each can cause serious issues depending on the project phase and severity to where each root cause impact's planning, monitoring or execution of the project.

1. https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/thought-leadership/pulse/pulse-of-the-profession-2017.pdf
2. https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/thought-leadership/pulse/pulse-of-the-profession-2016.pdf
3. http://to70.com/to70s-civil-aviation-safety-review-2017/

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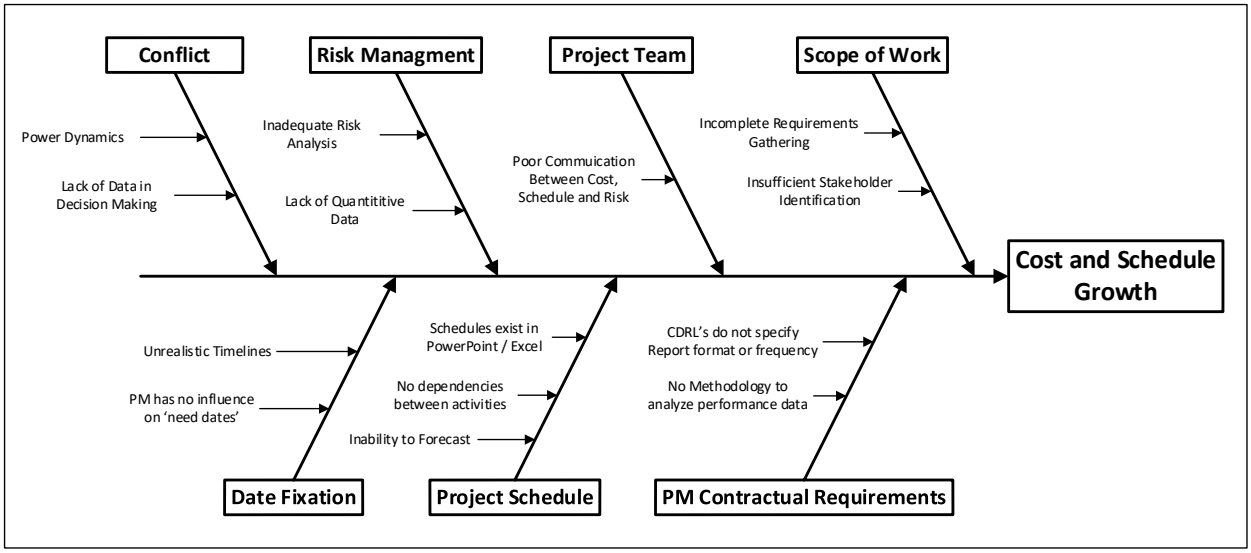

Figure 1: Root Cause Analysis of Cost and Schedule Growth

SCOPE OF WORK

A clear scope of work, or at least a clear understanding of the desired end result by all project team members and stakeholders is critical to all project success. Defining early on what needs to be completed, by whom, and how it will to be completed is critical to any project to avoid scope creep. However, this can be a challenge, especially on large scale defense programs and design build construction projects, where scope creep can run wild as stakeholders bring new requirements to the project. A notable example of incomplete requirements leading to scope creep is the VH-71 Presidential Helicopter Program. The number of requirements added to the program caused the scope of the project to grow in both cost and schedule to a point where the first helicopter would cost more and take longer to deliver than the first Air Force One.

CONTRACTUAL REQUIREMENTS

Contractual requirements determine the type of contract (FFP, CP, CPFF, T&M, etc.), the period of performance (or length of time the project will last), the who, what, when, and how the work will be performed, the deliverables required as a part of that contract (for government contracts these are known as Contract Data Requirements List (CDRL), for commercial contracts they are usually known as Terms and Conditions), as well as anything else the owner may levee as a requirement. Establishing the contract type and the expected period of performance for most projects is straight forward, however as the old expression goes: "the devil is in the details." Many projects fail to define and clearly state requirements for the management of contractor deliverables (i.e. schedules, cost data, risk information, program reviews frequency, etc.). These contract details determine (1) the frequency that performance data is received from the contractor and (2) the owners' methodology to understand how well work is progressing (how their money is being spent). Failure to include these contract details can end up costing projects huge sums of time and money (especially on cost plus contracts). Contractors who are not be required to regularly supply performance information to owners can hold the information hostage during project execution (after substantial amounts of money have already been spent) and propose additional cost penalties for contract modifications to obtain this information.

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PROJECT TEAM

Project management is not a checklist and projects do not always follow "the plan." Having a team that is adaptable and diverse in knowledge / skillset is necessary to adequately manage a project. In recent years, a lot of focus has been placed on the importance of project management certifications; to address that bluntly: *Project Management certifications do not make staff automatically experienced to manage a project, period*. Certifications provide a demonstrated understanding of key concepts and can help add or enhance the necessary knowledge to manage projects, but they are not a replacement for experience. Along with an experienced project manager, a team that is skilled in cost and resource management, schedule development and management (specifically Critical Path Method or Agile depending on the project), scope, risk, and quality management are critical to project success. Each discipline, as shown in Figure 2, has its own specifics and each project will require various levels of experience depending on project complexity, dollar value or other factors. These disciplines, however, do not exist in a vacuum; cost, schedule, and risk performance are all related. To address these interrelated disciplines, constant communication among project team members is necessary. The ability to share and discuss accomplishments, risks, issues, problems, challenges, etc. among the team without repercussions enhances the flow of information and allows for items that may impact the project (good or bad) to be managed quickly and efficiently.

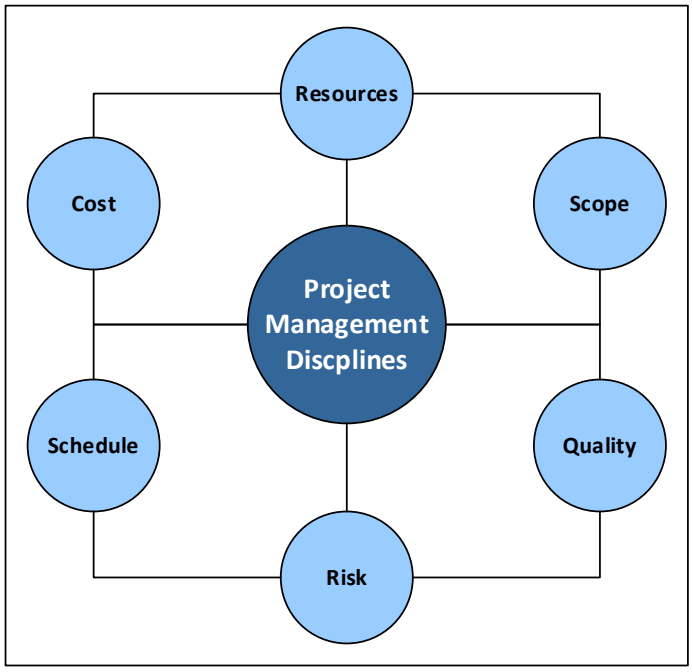

Figure 2: Project Management Disciplines

PROJECT SCHEDULE

The schedule on any project contains the entire scope of work that the program team must complete, along with the appropriate sequence for which those tasks must be completed in. Unfortunately, many programs fail to create anything more than a picture (AKA the "taco chart," "chip dip chart," PowerPoint/Excel schedule), or worse they don't use anything at all. Without a plan that contains a complete list of activities and connections (logical dependencies), creating the project network diagram and driving path (critical path) to the end date, the project is unable to track changes to the plan and forecast downstream impact of changes as the project is being executed. Without a plan that can

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change dynamically as the project executes, often represented in a Gantt Chart as shown in Figure 3, the team is unable to identify delayed activities that may impact other activities, contributing to schedule growth.

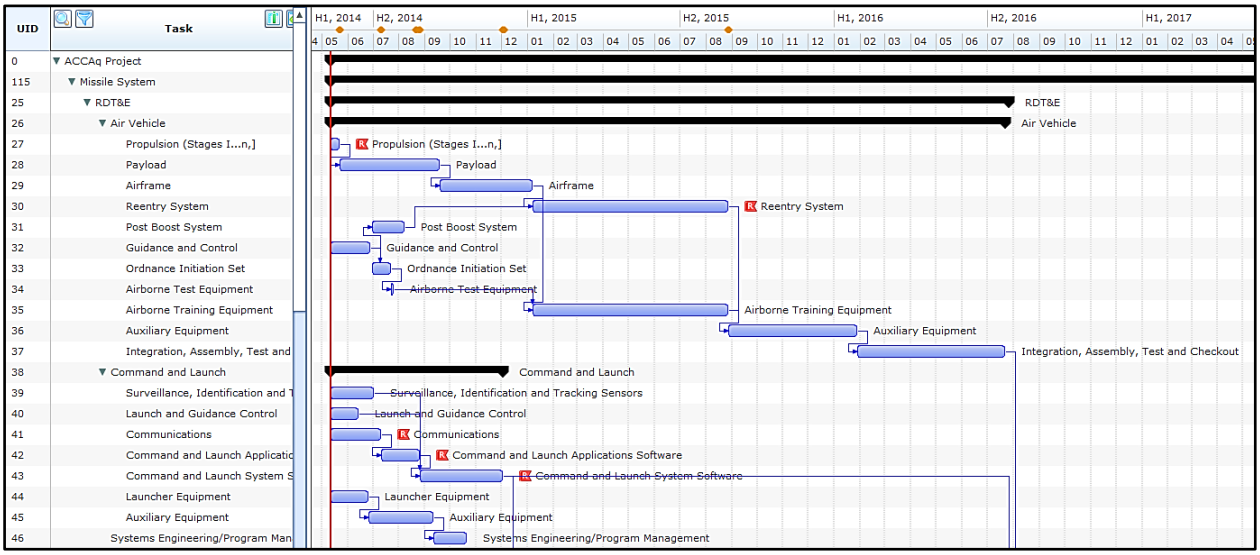

Figure 3: Gantt Chart

RISK MANAGEMENT

Risk can be a broad discussion topic; however, the risk management process is very straight forward: identify risks, assess and analyze risks, plan risk response and control risks. Within risk management, there are many types of risk that require different methods for management / analysis, but it is an *iterative* process throughout the project, as shown in Figure 4.

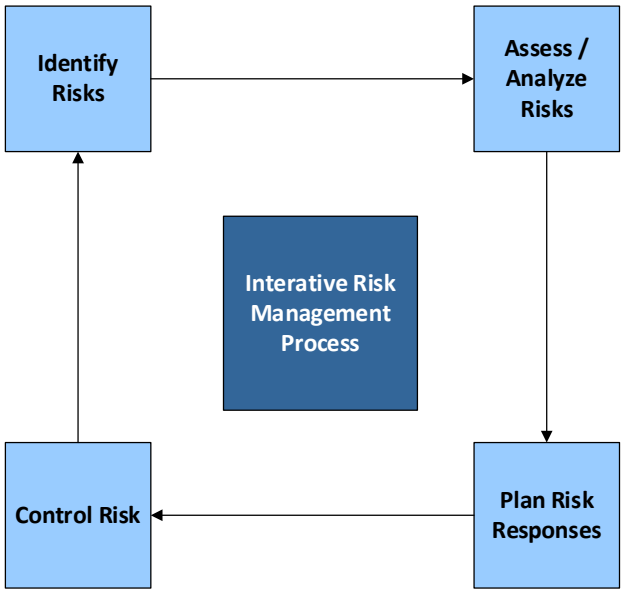

Figure 4: Iterative Risk Management

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For many projects, risk management involves nothing more than creating a list of broad statements about events that may occur and quickly discussing them during project meetings. The problem with this approach is that risk impacts on cost and schedule are not quantitatively assessed. This list of broad statements is a good starting point to develop specific IF-THEN statements about each event (note the word "specific," meaning a precise, detailed statement on each risk event). These statements form the foundation for risk assessment, quantification, analysis, management and either mitigation (negative risk) or enhancement (positive risk). Performing risk analysis is a crucial step in truly understanding how risks impact project cost and schedule targets and identifying what actions can most effectively mitigate or enhance impacts. There are several types of analysis that can be performed to assess risk impact (Monte Carlo, decision tree, schedule modeling, etc.) but the most important factor of any analysis is that it is driven by quantitative, not qualitative, data.

OVERLY OPTIMISTIC PLANNING & 'NEED DATES'

Believe it or not, people are optimists; think about almost any projects' planned completion date and compare to the actual completion date – in most cases the planned completion date is significantly earlier than the actual completion date. This is said slightly in jest, but at least one of two issues are present on every project, (1) overly optimistic planning by the project team (2) an external stakeholder imposing a completion date on the project (and in many cases the latter leads to former). Overly optimistic planning is straightforward, the project team plans to complete work by a certain date, but their basis of estimate for the end date includes a myriad of different assumptions (usually without using data, a schedule, or considering risks). The main driver as to why teams plan to a certain date is because a 'need date' (often unachievable) is imposed by a client, stakeholder, 3rd party, and/or business office (usually the person/organization paying for the work). There may be multiple reasons for fixating on a specific need date for the completion of work, but the project team should never chisel that date in stone or skip a due diligence assessment to determine if the externally imposed 'need date' is truly achievable. The project team should build out a low-level list of activities, determine connections, consider available resources, determine durations, identify the critical path and then compare the calculated completion date (based on the critical path) and compare to the 'need date'.

CONFLICT

Human beings are social creatures each with their own experience, opinions, and ideas and when brought together can do amazing things, but not without some level of conflict. The Tuckman Ladder Model describes the stages of a project as: Forming, Storming, Norming, Performing, and Adjourning – note *storming* is towards the beginning as most projects start with some conflict. Conflict among the team isn't bad – in many cases, conflict between two parties about a method to complete work, respond to an issue, or mitigate a risk can spar debate, which leads to discussions, which leads to different ideas / options on what to do next. Once all options are identified, the team can collaborate to assess each impact on all project constraints and determine to best way forward. Regrettably many project teams miss out on healthy debate due to the following: power dynamics between team members, not wanting to hurt feelings, fear of repercussions, or inability to communicate their idea in a meaningful way that will resonate with other team members.

DISCUSSION

The authors have noted that any one of the root causes can be the origin of cost and schedule growth on a project. However, it is typically a combination of the above factors that lead to a perfect storm of issues that impact the program and lead to cost and schedule growth or worse project failure. By identifying root causes, it is easier for project teams to identify issues as they are happening and either;

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plan for their occurrence or mitigate them from happening. The stage of the project will drive where and how planning or mitigation actions are conducted, performance improvement efforts to a project in planning or executing will make the largest impact. Identifying, assessing, and planning for the root causes of failure *prior* to project start will save the greatest amount time and money. However, just because the project is underway does not mean the direction cannot (or should not) be changed to improve performance.

So how do we effect positive change on a project?

(1) Understanding root cause(s) of project failure
(2) Identify what process stage in which the project falls (initiating, planning, executing, controlling, or closing)
(3) Plan accordingly how to avoid root cause(s)
    - If root causes have already occurred, develop a corrective action to bring performance back in line with baselines

ROOT CAUSE PREVENTION

The project team cannot control everything on a project. For example: the requirements, scope and deliverables may be determined by another organization; the project manager may not have authority to choose the project team (meaning varied skill sets); stakeholder requirements and expectations may not be achievable. This is not an all-inclusive list – there are other factors that cannot be controlled – so the first item to focus on are the project elements we can control and work to try and change or at least understand and plan for the items that cannot be controlled. The themes below start to outline processes that project teams can use to avoid the root causes of failure (if early in the project lifecycle) or to create corrective actions (if the project is well underway).

DATA DRIVEN PROJECT MANAGEMENT

In one word, critical, this should be near the top of the list on every project or program. Decision making needs to follow data driven techniques. This includes:

(1) Schedules – Integrated Master Schedule (IMS), logically linked network of activities
    - Use of Critical Path Method to calculate project completion date and communicate the timeline with stakeholders with 'need dates'
    - Regular schedule updates with the team to understand current status and project completion dates
    - Comparison of schedule estimates to cost estimates to ensure the two reinforce each other
(2) Cost Data – Cost Estimates with valid basis of estimate, Budget Management, Contingency and Reserve analysis
    - The stage of the project will determine the best methodology to use. A project early in planning or execution will use analogous or parametric techniques, whereas projects later in execution or controlling may use an engineering or actuals technique
(3) Qualitative and Quantitative Analysis – First identifying risk, opportunities, and uncertainty, and ranking them. This is followed by conducting a quantitative (numerical) analysis by attaching values to the risks, opportunities, uncertainties and their impacts
    - Qualitative risk analysis is the first step to identifying and ranking risks on project, this is commonly done as a risk cube or matrix with qualitative rankings (high, medium, low)
    - Quantitively risk analysis is the next step, this attaches numerical values to the risks and assigns the impacts to specific tasks in the schedule or costs in the cost estimate

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- These values are: likelihood in percentages, impacts in days, dollars or a factor based (percentage or multiplicative) approach

SCHEDULE RISK/COST RISK/INTEGRATED COST AND SCHEDULE RISK ANALYSIS

Using the data from above and coordinating with Risk Owners and Stakeholders to determine the specific activities and work packages that risk realization will impact is critical to informed decision making. Conducting schedule, cost or integrated risk analyses will allow the project to understand how cost and schedule growth are correlated, what risks are on or impact the critical path, budgets vs risk adjusted costs, schedule criticality, mitigation and what-if analysis. These analyses further reinforce making data driven decisions and will allow the team to model potential future actions. For example, an output of this analysis might show a risk that has a large schedule or cost impact, but it impacts tasks that are not on (and will not be on) the critical path, so from a scheduling standpoint, contingency reserves could be more effectively allocated elsewhere.

STAFFING ANALYSIS

Understanding the project team's existing skill set, determining the required skill sets, and performing a gap analysis will aid in deciding the types of training or additional support necessary for project team to reach its costs and scheduled targets. This is something a project manager should do as soon as possible to ensure that either needed training can be conducted or additional support can be added to the project either as needed or immediately depending on the situation. If additional support is needed this is something the project owner or stakeholders may need to help with (as its in their best interests) and the project team should communicate this as soon as possible.

PROJECT MANAGEMENT CDRL's/TERMS AND CONDITIONS

Read the contract. Then re-read the contract. Understanding the Terms and Conditions or contract requirements is the first step to recognizing if there is an issue and if corrective action needs to be taken. If the contract's language is not understood or open to interpretation, find someone who can help discern exactly what the intent is and provide information on what is to be provided per the contract (usually a contracts manager or contracts attorney). Most contracts tend to cover the work that needs to be completed, but not the data that is needed to show performance. Work with the contracts professionals to ensure contractors are obligated to provide cost and schedule performance reports, risk data, and other specific data metrics as required on the project with the correct level of detail, format, and frequency. If this information is not included on the contract, add it. If the project is already underway, modify the contract and add performance data. This will likely incur cost (modifying contracts usually does), however continuing to execute a project without the proper data on performance metrics will likely cost more than a contract modification.

For government contracts, refer to the Refer to appropriate guidelines for creating the Contract Data Requirements List, Integrated Program Management Report (IPMR) Data Item Description (DID), number DI-MGMT-81861A. For commercial contracts work with contracting staff to follow best practices or corporate guidance on creating or amending contracts.

CONFLICT RESOLUTION

Given the complex nature of projects conflict will always exist, differing of opinions and disagreements between project team members will continue to happen until the project is complete. It is how these conflicts are handled that will determine how successful the project is at completion. If a team member or stakeholder fears repercussion or conveys their thoughts in such a way that others may not receive them (by directive or forceful means usually) their ideas will not be communicated. This could be the

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difference in receiving information that could prevent something from happening which is a major impact to the project. There are many methods of conflict resolution, honestly a full paper could be written on just that subject, but the most important thing is to recognize the signs of conflict (disagreements, forceful or strong language, anger, personnel shutting down or not sharing information, to name few) and work to resolve these issues head on. An open-door policy among team members tends to work best and allows for free-flowing lines of communication that help suppress conflicts, this requires trust, another critical component among any team.

Personalities are not something easily changed, however all team members and stakeholders should conduct themselves in a professional manor throughout the project. This isn't as simple as stating "treat others how you would like to be treated" but there is a lot of truth in that statement. Viewpoints should be supported by data, and decisions should be made using data. Communication of viewpoints should be conducted in a rational manor and time should be taken to listen and receive different viewpoints from team members and stakeholders. It is critical that all project team members regardless of rank feel comfortable to share information with others to ensure successful navigation of issues.

CONCLUSION

Albert Einstein defined insanity as "doing the same thing over and over expecting a different result." Regrettably many organizations tend to manage projects the same way over and over, ignoring most items noted in this paper, but still expecting success. At the outset a project team's success should begin with an active decision to rise above 49% of projects that fail. The next step is to ensure a data driven approach is utilized, the team is identifying root causes for failure, and creating plans to combat them. Although this systematic approach is not elaborate, the goal of this paper is to serve as a road map of potential pitfalls to avoid while managing the project. As reviewed in the discussion, each area noted have numerous mitigating resources and alternate approaches. A Google search on any one area or problem can provide the project team with the data on the approach and/or resources needed for their project. In summary, project performance improvement can be boosted by following the simple steps of identifying and understanding root causes, selecting a mitigation or management strategy to address these causes, and effectively implementing that strategy. Here lies the exception to Einstein's definition; If you follow these steps iteratively, different results are guaranteed.