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WE’VE STOPPED TRUSTING INSTITUTIONS AND STARTED TRUSTING STRANGERS

CLICK to watch Rachel Botsman talk about “We’ve Stopped Trusting Institutions and Started Trusting Strangers” presented by TED.

Something profound is changing our concept of trust. While we used to place our trust in institutions like governments and banks, today we increasingly rely on others, often strangers, on platforms like Airbnb and Uber and through technologies like the blockchain. This new era of trust could bring with it a more transparent, inclusive and accountable society. Who do you trust?

Rachel Botsman is an author whose work focuses on how technology is enabling trust in ways that are changing the way we live, work, bank and consume. She defined the theory of “collaborative consumption” in her first book, What’s Mine Is Yours, which she co-authored with Roo Rogers.
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PRISM Connect 2017
A PRISM Conference & Networking Event
Manchester Grand Hyatt – San Diego, California, USA

Conference
October 30th-31st, 2017
Training
November 1st-3rd, 2017

Inspiring Keynotes – Valuable Connections – Educational Presentations
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PRESIDENT’S MESSAGE

REACHING ANOTHER MILESTONE

Charles E. Bolyard, Jr. CFCC PSP FAACE, President

Congratulations as we have reached another milestone in the history of AACE International, that of having successfully completed our 60th year, topping it off with an excellent Annual Meeting and conference.

It was great to see so many of you, more than 600, at the AACE International Annual Meeting in Orlando, Florida. Congratulations to all the awards recipients, who are very deserving of the recognition from their peers across AACE. Congratulations also to each of the Sections receiving awards for their activities over the past year.

Thank you to those members of the Board of Directors and Associate Boards who are moving on to other pursuits in support of our Association, and congratulations and thank you to the members of the Boards who will be supporting AACE throughout the coming program year.

AACE’s Annual Meeting is a year-long pursuit, the success of which is dependent upon those attending and, as well, the volunteers, speakers, committees, Associate Boards, Board of Directors and AACE Headquarters Staff whose tireless efforts drive all the activities in preparation for and execution of the Annual Meeting. Thank you so very much to all who contributed! The technical content was outstanding, the unveiling of AACE’s new logo was really exciting, the new Communities component of our website is a welcomed communications enhancement, and the Keynote presentations rank among the best ever.

The continuing growth of AACE International is exciting and energizing. The globalization of many industries and the evolving world economy encourages the expansion of our Regions and Sections. Individual memberships, along with COMP memberships, remain as the grass roots efforts through which our Sections and Regions are expanding. With this ongoing geographical expansion of our membership and activities, we are experiencing increasing demand for AACE’s technical products and programs, as well as our certifications. As we started the Annual Meeting, AACE has 4,383 active certificants world-wide, both members and non-members, and we are actively promoting AACE’s Professional Certifications to drive those numbers even higher. There are 998 computer-based testing centers worldwide, with 502 of those being located outside of North America.

Our initiative to provide on-line learning opportunities continues. The first module of this program was rolled out earlier this year and development of subsequent modules is underway. I was particularly impressed with the excitement and enthusiasm among the Rising (Young) Professionals Committee. These energetic AACE members are driving innovation in both our technical materials content and in the application of rapidly evolving technologies, and, as well, in the growth of our membership.

It is exciting and encouraging that the opportunities for growth of our membership is fueling the expansion of our Regions and Sections, as we are seeing increasing demand for AACE’s technical products, training programs and certifications. The drive to grow our membership is best accomplished at the Section level through our existing and emerging Sections. Membership growth and diversity will continue to prompt the initiation of regional meetings and symposiums. While there are so many influences that make it
impractical for every member to attend AACE’s Annual Meeting, the ability to reach our members and potential new members and connect with associates and friends through regional and local events is a key component in enhancing AACE’s outreach and strengthens our technical and certification programs. In addition to established Regions and Sections, we have four active Task Forces working to expand AACE’s outreach across China, India, Eastern Europe, and Latin America.

With all of the very exciting initiatives we have underway, and in planning, I encourage each AACE member to bring a new/potential member to a Section or regional event and the Annual Meeting, and to become actively involved as a volunteer in any of the many opportunities as Section leaders or as participants in the activities of our Committees, Special Interest Groups, the Associate Boards, and the Board of Directors. Please visit AACE’s new website and update or establish your AACE member profile and select a Section with which to be actively affiliated.

My objectives for this year are recapped below:

- To continue the growth of AACE’s membership at the individual member level as well as through our COMP member program for organizations. The grass-roots efforts for membership growth come from the Sections and Regions actively driving membership and active participation.
- To continue the expansion of AACE’s Certification Program across all Regions and Sections. Our professional Certifications are recognized globally and highly sought after.
- To continue the development and implementation of AACE’s On-line Learning Modules. This is a long-term strategic initiative that will continue to require significant volunteer contributions and provide lasting benefits to our members.

I am certainly looking forward to seeing you at local and regional events wherever possible in the year leading up to our next Annual Meeting in San Diego, CA, June 24 to 27, 2018.

If you would like to contact our current president with questions or comments about The President’s Message please address your email to president@aacei.org. To engage in other discussions, check out AACE International’s Online Forums at web.aacei.org.

Confidence Compounds: The Impact of Boldly Seizing Opportunities
Jill Johnson

One of the most significant leadership skills you need to develop is your confidence. It is an essential core leadership competency. Confidence allows you to have impact far beyond your title or level within your organization. Building your confidence requires a disciplined focus on seeking and accepting bold opportunities to help you reach for higher rungs of influence and impact. You don’t need to make huge leaps or take big risks, but each small effort or success will build your confidence over time. As your confidence compounds, you will find you can do vastly more than you ever dreamed was possible. There are three keys to build your confidence; practice, preparation and your presentation.

Confidence is a Skill You need to Practice
Just as with any new skill, you have to practice it over and over for it to become something you can do with ease. The key is to identify what skill you need to master next. Opportunities to practice new skills are all around you. You should plan to practice your new skills both inside and outside of work.

Preparation is Necessary - Do the Hard Work
Most people want to take shortcuts. The more detailed and thorough your preparation, the greater the likelihood you will have success. Preparation is especially essential to having confidence in yourself, especially when you are dealing with power players.

PROJECT CONTROLS CONFERENCE
SYDNEY 2017

Wednesday 20 – Friday 22 September 2017
International Convention Centre, Sydney
www.projectcontrols2017.com.au

Across Australia, the engineering profession is in the middle of an explosion in infrastructure spending with a circa $70 billion spend planned over the next 5 to 10 years. For example in Sydney, there are a range of complex infrastructure projects being planned and executed to reengineer the city’s transport system to a world class standard.

With this surge in investment, alongside significant opportunity, comes the well-known risk of cost and time overruns. Project Controls is a central part of the solution here, encompassing all the competencies for control of cost and time, estimating, budgeting, planning, scheduling, trend analysis, risk management, change control, forecasting and effective and transparent communication.

Project Controls 2017 conference will showcase developments across all industries and sectors and will appeal to Company Owners and Executives to understand how their businesses will benefit from improved efficiencies and productivity.
A

ACE International is excited to announce the launch of its new communities and engagement platform, AACE Communities. Designed exclusively for AACE members, the collaboration tool will give you the opportunity to engage, ask questions, join groups and find resources. You can begin by setting up your profile – you can even pull in your information from LinkedIn. So don’t wait—get started now!

Click http://communities.aacei.org/home to access AACE Communities. Please click the “Sign In” button in the upper right corner.

1. Log in using your AACE International website username and password. If you do not remember your username and password, please click “Forgot Password” and submit your email address. Your credentials will be emailed to you. If you do not have a username and password, please click “New User” and complete the form. Once you have created your username and password, repeat step 1 to access AACE Communities. (TIP: We recommend you click on the “remember me” box the next time you log in—then you won’t have to on future visits.)

2. Read the Community Rules and Etiquette as well as the Privacy Guidelines. Once you have completely read the information, choose to agree or disagree to continue. (TIP: Once you agree, then you will not be prompted for this anymore.)

3. Complete your profile. Now that you have successfully logged in to AACE Communities, click on the dropdown in the upper right hand corner and choose Profile. Share something new about yourself and upload your photo. (TIP: If you have a LinkedIn account, feel free to upload your info from LinkedIn.)

4. Participate in a community. Keep up with conversations on the topics of your choice. Go to Communities. If you are trying to join a community, please click Join a Community. You will then be taken to your Association Anywhere account menu. Select My Committees/Join Committees and add the specific committee(s) by clicking the + sign beside the desired committee(s). Be sure to hit the Save button after you have made your selections. Your AA profile page was opened in a new tab, so you can refer back to the AACE Communities tab that is already open. To instantly see the communities that you added, go to your profile and click “Refresh My Profile.” Next, go to My Communities to verify the committee(SIG was added. (TIP: You are now subscribed to receive a daily digest of conversations posted to the discussion group which you may elect to change to real time, or no emails. This allows you to join the conversation at your leisure.)

5. Post a message. Got a question? Your colleagues have the answer! Go to Discussion, then Post To This Discussion to send a note to your colleagues in your communities. (TIP: Some companies have very strict firewalls that may interfere with your ability to receive messages. Please be sure to ask your IT department to “white list” aacei.org.)

6. Share. Just like the “take a penny, leave a penny” model, if you find something useful on AACE Communities, we hope you will share something of your own! You might even ask colleagues for feedback on your shared resource. To share a document, click Create a Library Entry. ♦
SAVE THE DATE & CALL FOR PAPERS
AACE INTERNATIONAL’S
2018 ANNUAL MEETING
JUNE 24-27

2018 SAN
DIEGO

CALIFORNIA, USA
MANCHESTER GRAND HYATT

Abstracts for the 2018 Annual Meeting due July 1 to Aug. 31, 2017
web.aacei.org
Big news! For the first time since 1961, AACE International will have a completely new logo and font. The colors have changed a bit too. You’ll see this new look on our website, Facebook, Twitter, and on our official LinkedIn Group. Very soon you’ll begin seeing it reflected in all of our products as well.

Although AACE was founded in 1956, the first logo was revealed in 1961. Since that time, AACE has more or less retained the same font for the acronym – until now. The old look became extremely dated and although the colors which were initially green and gray transitioned to blues, they were not clearly defined. And our Association has grown and evolved over the last 61 years, so we wanted a logo to reflect who we are today and to symbolize our dynamic future.

AACE’s brand and logo are our organization’s identifying symbols of quality and professionalism and are protected under Intellectual Property Law. Our brand and logo carry significant meaning and value to those in the cost engineering community. Individuals and businesses using the brand/logo promote certification, education, quality assurance and affiliation for AACE. No organization, person, or entity should ever use AACE’s logo without express written consent of AACE International.

Logo Explained

An official style guide has been developed and provides in specific detail how the logo must be created and displayed. The style guide provides specifics on the logo, color palette, typography, and layout. Deviations from the official style guide are not permitted.

In order to maintain a consistent brand for our constituency, as well as the marketplace, AACE Sections should use the official logo that will be developed for them. Enhancement or creative artistry with the AACE logo or font is not permitted. The font is a service mark, as such, the service marked logo must not be compromised or changed.

For additional information on AACE’s logo and brand please visit web.aacei.org/home/terms-of-use. If you are interested in purchasing products, such as a shirt, with the new logo, please visit our Lands’ End Store: https://business.landsend.com/store/aace_international/.
The track record and current state of capital project delivery is poor. Statistics on project failure rates abound, including seminal work by Independent Project Analysis (IPA) President Edward Merrow. In *Industrial Megaprojects*, he writes that 65 percent of 300 global megaprojects failed to meet business objectives with a 75-percentage failure in some industrial sectors [1]. These statistics are hardly surprising to readers of this publication and capital project practitioners. Yet, despite these grim statistics there are projects that achieve their desired cost, schedule, and technical objectives. What trends and patterns can be gleaned and applied from these projects? Are there practices that can be leveraged to improve project planning and delivery? The answer is absolutely!

Admittedly, there are numerous project stakeholders, but the critical role of the owner organization, including its impact on project success, is worthy of grander attention. Capital project owners/sponsors may have the greatest opportunity to screen and select project opportunities that create a competitive, business advantage. Capital project owners are also in a unique position to align all stakeholders on objectives, strategies, and project execution philosophy early in the project life cycle. Research from numerous publications suggests that the period prior to sanction, often referred to as Front End Loading (FEL), offers the greatest opportunity to influence the project outcome.

This short essay introduces four key success factors that contribute to project success.

- Meaningful purpose
- Cohesive team
- Robust processes
- Rewarding culture

Specifically, we consider why capital project owners/sponsors should apply the following mutually reinforcing elements, as shown in Figure 1, to their projects:

---

**Meaningful purpose**

**Cohesive team**

**Robust processes**

**Rewarding culture**

These four success factors must be applied early in the project lifecycle, optimally starting in FEL-2 when alternatives analysis is being undertaken. They should be emphasized continu-
ously, and even amplified, as the project progresses through basic engineering, execution, and operations.

Through 25 years of consulting experience with capital project owners, Paragon Worldwide has identified and further defined key success factors. Interestingly, these four factors remain consistent regardless of project size, market segment, host country, culture, and team demographic. Let’s briefly review each of these four key success factors:

**Meaningful Purpose**—This is the project’s importance which engages team members. Projects are appropriated because the project outcome has been deemed valuable and important to the owner’s business objectives. Whatever the desired project outcome, it is essential that teams understand the significance of the project and its importance to the company, industry, or customers. It is this meaningful purpose that engages team members in the work and motivates them to strive for excellence. Owners who recognize this and connect team members with the project’s strategic objectives establish a tremendous foundation and launching pad. Too often, project teams execute project ‘just because.’ Connecting everyone with the business drivers will change the trajectory of the project success because team members will excel and understand that their purpose is grounded in a greater purpose. We encourage owners to share the context and goals with the broader team, including all contractors, suppliers, and contributors to ensure that their meaningful purpose is attained.

**Cohesive Team**—This is the alignment of team members which enables project success. Successful projects aren’t delivered through a few superstars. Quite the contrary, successful projects are produced by tapping into each team member’s potential. Contrary to common practice, the work of building a high-performance project team is not completed when the funds are appropriated. Rather that is when the true work of building the project team, in earnest, begins.

One crucial element for a cohesive project is role and accountability clarity of stakeholders as well as team members. Role and accountability clarity is woefully lacking on capital projects. This is not a new phenomenon, but rather a persistent issue. Owners, are in a unique position to ensure clarity of roles and accountabilities since they are predominately responsible for choosing and engaging key stakeholders. Lack of role and accountability clarity results in confusion, frustration, inefficiency, and unnecessary expenditure of project funds because of either the duplication of effort by multiple entities or, even worse, the inadvertent omission of essential project tasks and deliverables.

**Robust Processes**—This is the tools that ensure efficiency of project delivery. AACE International, the Association for the Advancement of Cost Engineering, has a wealth of technical materials including the Total Cost Management Framework, Skills & Knowledge of Cost Engineering, Recommended Practices, Professional Practice Guidelines, and more. These materials provide an excellent starting point for the application of sound cost engineering practices but must be tailored and applied to the specific capabilities of the owner organization and project/portfolio context. At least one major oil and gas operator discussed this process in a recent essay entitled, “Building Owner’s Cost Engineering Capability” [2]. Yet, too many owner organizations and project teams implement processes which are not right-sized or well understood by team members.

Robust processes must reinforce the concepts of role and accountability clarity of stakeholders and team members. This is especially true regarding the relationship between owners, contractors, suppliers, and other key members of the broader project team. Duplication of efforts should be minimized to enable lean project delivery. Processes should enrich complimentary and reinforcing mechanisms and allow each entity to leverage its respective competitive advantages resulting in successful project outcomes.

**Rewarding Culture**—This is the environment that facilitates successful project delivery. The collective attitudes and behavioral characteristics of the team determines a project’s culture. Every project has a culture, regardless of whether any intentional effort was invested in establishing it. Sadly, negative project cultures are the norm. These cultures are largely negative, adversarial and disrespectful toward stakeholders and team members. It is impossible for team members to perform well in a toxic environment. This type of project culture produces highly unfavorable project results in virtually every measure, including safety, schedule, cost and productivity.

The owner is uniquely positioned to set the capital project tone and, thus, establish the overriding culture. Members of the owner project team can establish rewarding cultures characterized by positive, trustful and respectful attitudes and behaviors toward stakeholders and team members. In doing so, an environment for innovation and optimization is created that allows team members to thrive and perform. A team working in a rewarding culture will overcome seemingly impossible challenges and far exceed desired project metrics in safety, schedule, cost and productivity. When it comes to project success, rewarding culture, that is underpinned by the other criterion, is paramount.

In conclusion, the consistent application of these four success factors, “sets the organization clearly apart from its competitors, which raises its attractiveness to new customers and potential team members. There is more focus and discipline. Fewer projects and initiatives are undertaken and those that are, are finished on time, within budget and with the desired results” [3]. We encourage all students and practitioners of capital projects to consider how these factors can be applied or enhanced within your projects and organizations. To help facilitate a more robust dialogue, the authors further developed this essay topic for the 2017 AACE Annual Meeting. We hope that you will read and contribute to the conversation in the coming weeks and months.

**REFERENCES**

ne of the methods of earning recertification points (CEUs) through individual, independent effort is to write questions for AACE’s certification exams. You can earn up to 4 of the 12 recertification points you need this way.

When sitting down to write questions, keep the following four fundamental points in mind:

- **First**, you can only write exam questions for which you hold the active certification(s).
- **Second**, the questions must be in the format used for computer based testing. (These requirements can be found by following the menus on the aacei.org website: main page/certification/volunteer opportunities, then following the link for “Writing and submitting new questions,” and the subsequent link, “Question Writing Presentation”).
- **Third**, simple definition questions taken directly from the reference texts, while fair game for the exams, are not needed at this time.
- **Fourth**, the subject matter and complexity in the question must be appropriate to be added to the exam.

The fourth requirement is what this Cert Corner is about.

Remember the candidate’s qualifications when writing questions. For example, in the case of the “Professional” level exams (CCP/PSP/EVP/CEP), these are individuals who have nominally 8 years of experience. While they may not yet be discipline or project leads, they are habitually expected to be able to perform independently or with minimal supervision. They encounter all kinds of situations that require analysis, engage in research for supporting information, identify appropriate method(s) of analysis, and present their results. The subject matter and complexity of any submitted questions should reflect the expected level of competence of the exam candidate.

One of the best approaches for developing realistic questions is to work from your own experience. Take a particular problem or challenge you had to solve on the job, suitably “sanitize” it for any company or proprietary data, make sure any company conventions used that are different than AACE standards are adjusted, then put the question into the format prescribed by the presentation on the website.

As you are writing your question, there are two other aspects you need to consider:

- This question, if accepted, is going into a limited time examination. Clear writing is essential to communicate the problem in all of its complexity so that candidates can make the best use of the limited time they have available to them.
- The “professional” level and DRMP exams are closed book; meaning there is no opportunity for research. Consequently, all the information to solve the problem needs to be somewhere in the problem statement. Ex-
traneous, related information may be included to test the candidate’s ability to extract only the needed information, but again, clarity in the language of the question is essential to be fair to the candidate.

Many “real life” analyses have the benefit of being multi-disciplinary, so there is the possibility of covering more than one area of the body of knowledge in a single question. If this is the case, when you submit your question via the automated form, identify all the references that apply and if there are additional competencies that apply, list them with the reference information. Use the drop down competency list for the main competency the question covers.

AACE International certifications are respected around the world. Part of that respect derives from the knowledge that professionals holding these certifications have not only educational and work experience, but have demonstrated their knowledge in a vigorous written examination. Help maintain that respect for your certification by adding to the realistic questions that candidates use to demonstrate their competency.
Jelena was born and raised in Belgrade, which is the capital of the southeast European country of Serbia. She currently lives in San Francisco working as a senior cost engineering consultant for Arup North America Ltd. Jelena graduated from Belgrade University, Faculty of Civil Engineering, with a major in structures with an emphasis on project/construction management.

Jelena has about 20 years of experience in engineering, project management, project controls, cost estimating and insurance. Jelena’s experience includes contract administration, cost control and project management for commercial, residential, and industrial developments.

Since moving to the United States in 2012, her focus has been more on infrastructure projects, including high speed rail, bridges, and high level transportation planning and redevelopment cost engineering. Recently, she has developed an interest in estimating operation and maintenance costs (OPEX), as well as lifecycle analysis for both building and infrastructure projects.

Early in her career, she chose to work at the construction site. She was working for Energo-projekt Visokogradnja, which is a major engineering and construction company in Belgrade. For the large residential developments, Jelena was an assistant to the construction manager, responsible for project controls, including but not limited to construction schedule, day to day resource schedule, procurement, subcontractors, change orders and budget.

Later on, Jelena decided to try something different and she spent four years working for an insurance company, an affiliate of Generali (an Italian insurance company). She was responsible for technical assessment and risk prevention for the insured properties. Jelena was also tasked with estimating loss in the event of damage to the assets.

Afterwards, Jelena spent two years working for the Dutch company, Tebodin. She worked mostly in the pre contract phase, developing RFPs, evaluating tenders and managing consultants and contractors on behalf of the client. At this time, she was first introduced to the role of technical advisor responsible for budget control and payment approvals on behalf of the bank. She found this experience to be very interesting as she had to take regular site visits, as well as to evaluate work in progress in order to provide

“Get involved. AACE is always looking for jubilant volunteers, for professional eager to learn and share knowledge. Every organization needs support from its roots. Each member counts.”

Source: August 2017

SPOTLIGHT ON
JELENA DJUROVIC

Sandra Mejia Villegas
decision makers with information that will eventually influence the project.

Jelena joined Arup in Belgrade’s office as a cost manager, responsible for budget and schedule management for a retail center development. With the organizational changes within Arup and after four years in Belgrade, Jelena was offered a transfer to Arup’s office in San Francisco. She found this offer very exciting and a challenging opportunity.

The work she does in the San Francisco’s office is definitely different from the work she did previously. Her current role includes mostly cost estimating and it is more focused on infrastructure, bridges, rail, transportation and highway projects, as well as science and industry. Her tasks include technical due diligence for financial institutions as well as for P3 projects.

Jelena considers that one of her biggest achievements includes an independent cost review for the City of Bellevue East Link Light Railway Project, because it has given her an opportunity to work closely with the city council and directly impact the decisions made. This is a very important project for the local community.

Currently, Jelena is working on a few projects, more specifically on one for the City of Napa. The project consist of a development of feasibility study for a Bay Bridge bike path. Each of the projects she currently has is unique and requires a different approach, each has its own excitement and challenges.

Jelena got into project controls very early in her professional career as she realized that engineering design was not something she wanted to spend her career on. Jelena wanted to experience the construction site and participate as close as possible in creating a “built environment.” Her first contact with project controls was way back in Serbia, while working for an international financial organization as a lender’s technical advisor for a major retail development.

Jelena chose to stay in project controls because she has always been good with numbers and she finds very exciting when budgets align with actuals spent.

Throughout her career, she has had a number of people that have provided her with advice and support. They have been very useful by just watching them influence clients and work with contractors on solving problems.

Jelena feels that AACE Annual Meetings offer a great experience when everybody shares their own experiences. The Annual Meeting is a great opportunity to meet with variety of people with similar interests, to share knowledge and accomplishments. It is truly a global event with a strong technical component. It is a good place to see old colleagues and meet new ones, she says.

Jelena has been very involved volunteering with AACE in the last few years. Her roles have been in the San Francisco Bay Area Section as a Secretary in 2014/15, Vice President in 2015/16 and her last role was the Section President 2016/17.

Jelena feels that AACE International provides a number of different resources, as well as opportunities. She says that AACE is a great community and getting to know people has been a tremendous asset. Jelena was closely involved in the event organization of the Western Winter Workshop the past couple of years. She found the experience to be a great professional challenge and a wonderful opportunity to work with an extraordinary group of people and professionals.

When thinking about AACE, Jelena wants to convey the following message to other professionals:

“Get involved. AACE is always looking for jubilant volunteers, for professional eager to learn and share knowledge. Every organization needs support from its roots. Each member counts.”

Jelena’s motto is: “Professional life (as life in general) is rarely a straight path. There are always unexpected crossroads and intersections, where we should stop and reevaluate our goals and opportunities, we should not be afraid of trying new experiences.” ◆
Sunny Goklani is a project controls professional, with a masters in civil engineering from Texas A&M University, and a student of business analytics from Wharton Business School.

His experience includes project planning, strategy, and controls; for projects across various industry sectors and around the world including residential, commercial, industrial, infrastructure and defense ranging from $0.4M-$2.7B with varying contract types and delivery methods. His work is a means to manifest his vision of integrating complimentary disciplines to generate positive impact. He particularly derives his passion from integrating an engineering mindset and project controls principles with business strategy, data analytics, market insights, and technological innovation.

Sunny was born and raised in Ahmedabad, India. He pursued his bachelors in civil-construction from CEPT University (Center for Environmental Planning and Technology), where in addition to receiving awards and scholarships for his academic performance, he also served as academic secretary in student council. His experience at CEPT, taught him a lot about what leadership, specifically on how to form a vision, build a team, and deliver on details. During project training, he worked with L&T (Larsen & Toubro) toward construction of world's third largest open-die forging plant, in Hazira, Gujarat.

He started supervising field execution and over time helped the the project manager with formulating execution strategies based on actual performance. This effort led to productivity enhancement initiatives, which delivered splendid results. Over a span of just three months, efficiency of RMC plant operations improved by 46 percent and productivity of driven cast-in-situ piling jumped 23 percent. He presented the results to the regional leadership at L&T and proposed integrating field-level data analyses into the practice of project delivery. This experience solidified his interest in the field of analyses and strategy, which in project based environments, is held dear by project controls.

The pursuit for higher academic standards in

Sunny Goklani’s advice to fellow professionals is that while its deemed safe to bank on experience, always have an open mind. He specifically highlights importance of embracing new technologies, young employees, and fresh ideas, as core essentials to be leaders of tomorrow.
project analyses led him to Texas A&M, College Station; where he got his Master’s in Civil Engineering, while also embracing courses from schools of business, technology, and public policy. Besides academics, he also served as Vice President of the Indian Graduate Student Association (IGSA), where his multiple achievements led to the organization receiving the highest honor of ‘best student organization on campus’ award from the university (competing with 800 organizations).

He applied various academic concepts in his internship with Jenkins Custom Homes, where he worked to establish and run an integrated project controls system with specifications, on a portfolio of 13 luxury custom homes in Austin. Upon graduation, he moved to Philadelphia to work with Amec Foster Wheeler, where he got an opportunity to lead project control efforts for an AFCEC project at Cape Canaveral.

He has now led planning and cost control efforts from concept-to-completion for two US Air Force (USAF) and National Park Services (NPS) projects; and completed both ahead of schedule and under budget, while also achieving exceptional client ratings. He has also led project control efforts for eight proposals worth $500M+ with a win rate significantly over industry average. He takes pride in having developed and introduced process improvement tools, for smarter schedule updates, cost trend analysis, visualization techniques for financial forecasts, etc.

He is currently working on a space technology project with Lockheed Martin, where he manages cost control efforts, and briefs senior management on program’s cost and schedule performance. As a part of the sophisticated program, he currently works with Primavera P6 (schedule), Deltek Cobra (EV), and Acumen Fuse (analytics), in addition to in-house cost control applications and cloud based project management solutions.

His manager, Jim Sobkowiak, EVP PSP, introduced him to AACE International, through a regional symposium in 2015, attending which opened the practice of project controls to him through a network of accomplished project controls professionals. Relevance of AACE’s technical resources and quality of network led to his increased participation, while he also volunteered to take up organizational responsibilities. He took an active role by supporting the Rising Professionals Committee (RPC) in 2016, and served as the program chair for the Region-2 TCM Symposium in 2017. He was recently appointed as the chair of the Rising Professionals Committee (RPC) in April 2017. He is very excited to welcome new members to the RPC team. He looks at RPC as a think tank that can mold the shape that practice of project controls will take tomorrow. With technology advancing at lightning pace, he thinks this is the most opportune time ever, in the timeline of the profession, to be involved in the committee.

Sunny was also very excited to be at the AACE Annual Meeting in Orlando from June 11-14. He particularly looked forward to the technical sessions showcasing application of new technologies in project controls, and the opportunity to discuss emerging themes with those who have implemented them first hand. His advice to fellow professionals is that while its deemed safe to bank on experience, always have an open mind. He specifically highlights importance of embracing new technologies, young employees, and fresh ideas, as core essentials to be leaders of tomorrow.

Specific to project controls, he looks at it being the means of using analytical skills to achieve strategic business goals. With the same data set, there are virtually unlimited ways to spot and analyze trends, and he believes the key to getting analytically creative in the process is to design implementation of passive learnings from various seemingly unrelated disciplines. In closing, therefore, he suggests to read different genres, acquire complimentary skills and sharpen your expertise on things you love to do outside work. They all come together, in the way you look at things, including project data. Outside work, he’s personally into public speaking, creative writing, photography, equity research, comedy, theatre, and poetry.
Significant effort and research has been expended understanding the cost behavior on large and mega-capital projects. These marque projects immutably change careers and corporations. While landmark projects create step-wise change for corporations, it is the small, sustaining capital and incremental productivity projects that underwrite a corporation’s long-term financial promises and prospects. While these large projects can easily justify the funds to develop and implement a detailed risk management and contingency assessment processes - the consequences of failure are simply too large - no small project individually can afford to spend the funds required to complete a comparable level of assessment. A simple range-estimate session can easily cost over $25,000 between consultants, engineers, contractors and the project team. While no single small project will likely change the course of a large corporation, their aggregate impact is unquestionable. Between 2013 and 2016, Suncor spent 45 to 55 percent of its annual capital program on sustaining capital ($3.2B to $4.5B respectively in absolute spending on sustaining capital) [14, 22, 30, 31].

With so many small projects, the natural solution is to develop a process. Many corporations do have an automated process for contingency on small projects: blindly apply 10 percent. Is this the correct amount? Is there a better way? These questions are seemingly exclusively saved for the marque projects. This article will demonstrate how a Canadian mid-sized midstream oil and gas company developed and implemented a parametric contingency method on small projects.

This article will provide background to the situation by: reviewing the root causes of cost over runs on large and mega-projects; describing and evaluating various contingency assessment methods; illustrate the differences between large and small projects; and, how these differences influence their cost outcomes. The article will then: develop a problem definition; detail the methodology used to resolve the problem at a mid-sized Canadian midstream oil and gas company and implemented a parametric contingency method on small projects.

This article will provide background to the situation by: reviewing the root causes of cost over runs on large and mega-projects; describing and evaluating various contingency assessment methods; illustrate the differences between large and small projects; and, how these differences influence their cost outcomes. The article will then: develop a problem definition; detail the methodology used to resolve the problem at a mid-sized Canadian midstream oil and gas company; and, describe the solution. Finally, the article will discuss the need for cultural change management, the impact of management policies and outline areas of future work.
Common Risk Root Causes
Beginning with the original RAND studies and subsequent demonstrate that there are seven primary drivers for cost variance on large projects. These root causes are systemic and common almost all large capital projects [1, 10, 20, 23, 24, 25, 27]. The seven factors and their relative importance are listed and illustrated in Figure 1:

- Project planning prior to project sanction
- Ownership structure
- New technology
- Plant complexity
- Regulatory regime
- Failure to forecast escalation
- Feedstock

As Figure 1 indicates, the single largest driver of large project cost outcomes is amount of effort prior to sanction. As project definition increases the lower the average cost overrun and the more narrowly distributed the cost overrun becomes as shown in Figure 2 [5].

This framework explaining root causes for cost variance has been qualitatively applied to 20 years of Alberta’s oil sands mega projects [2, 3, 4, 6, 16, 21]. As expected the massive cost overruns encountered are supported or even predicted by these methods. This study [3] of a petro-chemical plant in Alberta during this time frame also showed that geography is not destiny. The reference mega-project qualitatively avoided the common root causes and embraced industry best practices and came 15 percent under budget [6].

Contingency Methods
There are two main bases to assess how much contingency a capital project requires: opinion and empirical. Each of these two bases can be applied with either a simple or sophisticated methodology. These four methods, shown in Figure 3, can be used independently or in combination. The four methods are [7, 11, 13, 15, 17, 26, 28, 32, 33]:

1. Opinion
   a. expert
   b. range estimating

2. Empirical
   a. predetermined guidelines
   b. parametric

Each of the four methods offer different cost and benefit relationship. Risk and contingency management are a subset of project controls and, in many respects, project controls is the front line of risk mitigation methods. As such the “right” degree of project controls is wholly dependent on the scope of the project, the consequences of project failure and the risk tolerance of the organization [17].

Opinion Basis: Expert Opinion
The simplest, lowest cost and quickest method of risk assessment is expert opinion. To obtain the “expert” opinion contingency, one simply asks a subject matter expert(s) suitably familiar with the project [33]. While speedy and implicitly accounting for project risks, this approach has both agency issues and prone to heuristic bias – both
optimistic and pessimistic. As a result, expert opinion contingency assessments are not repeatable in time on a single project, nor comparable between different projects. A method to address some of the heuristic bias is to employ the Delphi technique, polling several experts independently. This may increase the accuracy of the estimate; it also increases the complexity of the process undermining its key strength.

**Opinion Basis: Range Estimating**

Range estimating is a Monte Carlo approach illustrated by AACE Recommended Practice 41R-08 [18]. In this approach, the Work Breakdown Structure (WBS) is reviewed in detail with ranges or distributions created for each line item's quantities and unit rates costs and durations. To these calculations project risks are added from the risk register with quantitatively defined probability and both cost and schedule impact ranges. A Monte Carlo simulation is then applied that provides an apparently very mathematical distribution curve. This appearance is misleading.

Ideally, the variables ranges in a Monte Carlo simulation are data-based. In practice this is almost never the case. Typically, variable ranges are ultimately drawn from the project team's tacit and expert opinions. This data source means the foundation of a typical range estimated contingency is identical to expert opinion: someone's best guess, albeit disguised with excessive math. Rather than asking subject matter experts' for a range or value for the total installed cost of a project, range estimating instead asks for a range on each line item’s quantities and unit rates but is strongly correlated to the price of structural steel, pipe and conduit. As the ease of the software has increased over time, the abundance of “amateur” individuals performing Monte Carlos has increased. Just as owning Microsoft® Project or Oracle® Primavera P6™ does not make one a scheduler, much less a planner, so too the use of Palisade @Risk® does not guarantee an accurate contingency assessment (Microsoft® Excel® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries). The key difference between an accurate range estimated contingency and an inaccurate estimate boasting pretty graphics is found in a detailed correlation matrix. Finally, without exclusive reliance on real data range estimating is has more iatrogenic risk (risk created by the process through faulty practices) than other three methods. All of these issues lead to simulation results that predict smaller cost outcomes than those that are actually incurred by real projects [9].

In the same vein of quantitative approaches to risk analysis are expected value, event modelling and fault tree analysis [33]. Like range estimating, these approaches are mathematical in approach but focus on explicit events, risks or competing scenarios. The resulting analysis may be static such as traditional expected value, or probabilistic as the result of a Monte Carlo simulation. These techniques are excellent for evaluating discrete events and those with mutually exclusive outcomes. Like range estimating, these approaches tend to do a poor job at evaluating systemic project risks that have been shown to drive the majority of large project’s cost variance.

**Empirical Basis: Predetermined Guidelines**

The second family of contingency methods eschews opinion and focuses on empirical data. The two siblings of data-based approaches are predetermined guidelines and parametric. At their heart both techniques correlate the project's level of definition with historical or typical cost outcomes.
Predetermined guidelines are the most common industry method of determining an estimate’s accuracy as described by AACE Cost Estimate Classification Systems 17R-97 [33, 34, 35]. Why these guidelines are accurate, or where the source data came from, maybe lost to time. The approach relies on the concept that the more defined a project is, the more accurate the cost and schedule estimates are. This correlation is both well documented and stands the test of time [1, 10, 20, 23, 24, 25, 27, 36]. A class III estimate typically has a cost accuracy range of +30 to -20 percent [32]. This tends to be true assuming and that the engineering and other deliverables have been created as a class III estimate requires completed P&IDs, single line diagrams, finalize plot plans, layouts and more. Herein lies this approach’s key failing in application. It is the method of creating the estimate - the level of effort and detail in project deliverables - that creates an accuracy range. Too often owners and engineers alike treat estimate accuracy as the first deliverable, rather than an outcome of deliverables. The class of estimate is determined by its estimating method, not its accuracy. For instance, one can use a class V estimating methodology (analogous or referential estimating using key parameters – number of bedrooms, bathrooms, size, property type and location) to provide +10 percent accuracy for purchasing a resale home simply by using Multiple Lister Service (MLS) [42]. The second main source of error in this approach is that a Class III estimate requires not only engineering deliverables, but also deliverables for environmental, regulatory, stakeholder engagement, procurement, operations, finance, marketing, human resources to name a few and typically these deliverables, if created and suitably detailed, are not integrated with engineering.

Empirical Basis: Parametric

Systemic contingency, or parametric modeling, as defined by AACE RP 43R-08 [8] compares the current project’s level of development with historical reference project’s cost and schedule outcomes. Grounded in the concept that projects are not unique in their behavior, cost or schedule outcomes, this approach assumes they all share the same main sources of systemic risk (as previously discussed in Common Risk Root Causes). Unsurprisingly, all projects suffer from systemic risks: weak project controls, staff turnover, incorrect or missing drawings, weather delays, late equipment as a partial listing. The parametric approach relies on a database of historic project results that includes their level of project definition prior to sanction, its final cost and schedule outcomes, and some accounting for realized project specific risks. The project in question is then compared to the database to give possible cost and schedule outcomes. To this range of outcomes project specific risks can be added. In the author’s experience on hundreds of projects totaling over $100B, less than 10 percent of identified risks are truly unique and can be considered project specific risks. Project-specific risks often are created by the project’s constraints and assumptions.

The parametric approach is faster, cheaper and more accurate than a typical Monte Carlo assessment [9, 39], however it does have some draw backs. First, parametric contingency estimates lose accuracy after the detailed design stage is complete and do not seem to be accurate for short-term schedule estimating. This could be addressed by larger databases that include project definition levels post sanction. Second, the development of a parametric process is reasonably complex, requires periodic calibration, and historical data that is hard to obtain or only available for large and mega-projects. Creating such a system for a single project would require more effort than possible benefit. Finally, the approach is rooted in the notion that projects are not unique, nor are we better at managing projects than our predecessors. While a project’s objective is unique, the processes that drive capital projects to conclusion are seemingly unchanging. Systemic contingency, when coupled with a detailed risk register detailing its project specific risks, provides a fast, risk-based, probabilistic contingency assessments.

Comparison of Contingency Methods

Figure 4 provides the author’s comparative opinion on the four main methods of contingency assessments [3, 39]. While range estimating and systemic provide the highest level of insight, the speed and improved accuracy of the systemic method makes it preferable. The author once had an unbelieving project manager who insisted on completing both the parametric and range estimating approaches at the same time on the same project. The results were exactly as literature would suggest: Range estimating took triple the amount of the team’s time, cost three times as much and provided similar mean contingency values as the parametric approach but a much narrower range of possible outcomes.
Contrast of Large and Small Capital Projects

Large and mega-projects capture the attention of media, executives, investors and academics. They provide step-wise change to an organization’s assets and performance. With project teams of over 100 staff, large projects have all the organizational complexity of a small to medium enterprise. Spending hundreds of millions, even billions of dollars, over several years, these herculean undertakings will have staff turnover, changes in direction, varying market and weather conditions. Contrasting this, are small capital projects. Often with a capital spend in the millions (or less), durations measured in months (if not weeks) and a project “team” consisting of a single person. While some attempts have been made at classifying projects and providing a distinction between large and small [40] a good general statement is:

- Large projects’ problems cascade causing secondary, tertiary or future hidden problems due to their complexity, whereas
- Small projects’ problems can be contained and isolated.

This definition supports empirical evidence when it comes to the cost outcomes of large and small projects illustrated in Figure 5 [9, 16].

The cascading issues of large projects are a possible explanation of their “fat” right hand (overrun) tail. When cost overruns occur, the can extend dramatically so that the median outcome (most likely P50) is lower than the mean outcome (arithmetic average). When large projects fail, they fail dramatically. In contrast, small projects have a “crashing wave” shape or a “fat” left hand (underrun) tail. The typical small projects tend to cost underrun (barring agency issues between project managers and management).

The magnitude of large projects easily justifies more extensive project controls and risk management. It is fairly easy for $200,000 of risk management effort to pay for itself many times over on a $100 MM project. On small projects, this is not the case. Even a scaled down parametric or range estimating exercise for a small project can cost over $10,000 making it hard to offset with possible savings on a $500,000 project. It is intuitive that these project management funds are better spent on some other form of project controls, or, not spent at all and simply “saved”. As a result, many organizations simply apply a 10 percent contingency to all of these small projects [35].

There are some negative consequences to the simple “10 percent” approach. First, it does not take into account the underlying risk of the specific project. Second, AACE guidelines for 10 percent contingency are associated with a class 3 or better project definition, whereas often small projects barely meet a class IV definition [35]. These factors can create the situation when a small project simply does not have enough contingency. Many organizations allow up to a 10 percent cost overrun on small projects without a supplemental or revised Authorization for Expenditure (AFE). In some organizations a project manager’s consequences for going over this amount can be significant. Agency theory would encourage project managers in this situation to “pad” or inflate their cost estimates so that they can be on the conservative side. This unintended behavior can be compounded by organizations that reward project managers for cost underruns. These two factors maybe one explanation of why small projects underrun. Conversely, some organizations penalize project managers for underruns. Agency theory would then incentivize them to allow scope creep and unnecessary spending [38].

Figure 5 – Cost Outcomes of Small and Large Projects
better solution is providing projects with contingency that is tailored to the risk of the project.

**Problem Definition**

Small projects tend to be either sustaining capital projects, required to comply with changing regulation and asset maintain, or to incrementally enhance production or efficiency. Taken in aggregate these small projects can equal or even eclipse the spending of any single large project at a company [14, 24, 30, 31]. Over allocation of capital on these projects can hurt a company’s bottom line by tying up constrained capital and precluding other worthwhile projects. Each project cannot afford a full risk-based contingency assessment. The sheer volume of these projects merits a process solution funded at the program level. This problem calls for a systemic answer: a parametric contingency assessment tool for small projects. The ideal solution is:

- data based
- simple to use
- does not require a risk register
- project specific

Given the limitations of the parametric approach for estimating schedule contingency coupled with small projects’ relatively short duration, schedule contingency is not required. If a small project has a sensitive schedule, such as a maintenance turnaround, a Monte Carlo of the schedule or other schedule risk solutions could be implemented.

**Methodology**

A mid-sized, Canadian midstream oil and gas company previously retained the author to develop a systemic contingency tool for large projects and has been successfully using the tool for almost three years. For small projects they were using a standard 10 percent contingency and were dissatisfied with the results. The company retained the author to develop a systemic contingency tool for their small projects using an in-house database of over 400 projects spanning over two years. While these projects varied in scope, geography, routine and special maintenance, they all had common traits:

- Under $10 MM Cdn
- Schedule less than one year
- Compact or simple scope

- More or less “routine” projects (none of them would attract executive, media or investor attention)

The methodology followed the following steps:

- data scrub
- statistical investigation
- key risk drivers
- project manager interviews
- tool creation
- calibration
- beta-test
- rollout

**Data Scrub**

The data was reviewed comparing the actual project cost divided by its AFE budget cost less approved contingency. This provided a cost index, shown in equation 1, so that a value less than 1 indicates underspending while a value above 1 was a project that required contingency or had possible over spending.

Many of the projects had supplemental/revised AFEs. Projects

![Figure 6 – Cost Index Before and After Data Scrub](image)

**Equation 1**

\[
Cost \text{ Index} = \frac{Actual \ Spent}{Approved \ AFE \ Budget - Approve \ Contingency}
\]
with amended AFEs were reviewed to determine if the extra spending was the result of a change in business scope or simply a cost overrun. Changes in business scope included increases to capacity/volume, different connectivity requirements etc [39]. Such changes were treated as “new” project definitions and not cost overruns. Unsurprisingly most AFE revisions were cleverly disguised excuses or realized risks that were beyond a project manager’s control – weather, quotes coming in higher etc – as few project managers would revise an AFE with reasoning “I was wrong”. By definition many of these risks are systemic and would occur regardless of a project manager’s skill. Projects with AFE revisions without changes in business scope were treated as cost overruns.

All projects with a cost index of 30 percent or less were removed from the data set with the assumption that they were likely undocumented reductions in business scope. All projects with a cost index below 50 percent and above 200 percent were individually reviewed for validity with project managers. This review supported later process steps and revealed over a half dozen data entry errors. Figure 6 shows the original data and the scrubbed data. Despite its lumpiness, Figure 6 follows the general crashing wave pattern expected from small projects [16].

### Statistical Investigation

The data was parsed by a variety of over 30 standard factors defined on the AFE forms including:

- project type
- asset class
- AFE originator business unit
- year
- start quarter
- location
- budget status
- regulatory regime
- program or standalone project
- ownership structure
- spend allocation on standard WBS
- project manager
- project manager experience
- project cost

Through this analysis it was possible to determine that some projects categories had statistically different cost indexes than others. In evaluating potential differentiating criteria, a bias was included to attempt to minimize the number of variables so that the final tool would be easier to use. This resulted in some project categories being merged with others, reducing the number of relevant project categories from over 20 down to six common project cost outcome distributions. Each project category was tested to determine the curve basic shape (normal, lognormal, uniform, triangular etc.). Interestingly each project category had the same common curve-type (within statistical tolerance) albeit with different variables. Results are shown in Figure 7.

![Figure 7](image1.png)

**Figure 7 – Project Categories Cost Index Probability Distributions**

![Figure 8](image2.png)

**Figure 8 – Sample of Statistical Difference Between Projects With Different Percent Mechanical Services**
Figure 7 indicates that several of these six project curves are very similar: two curves are almost identical while two others seem to differ by their means. The simplicity design objective drove consolidation of multiple curves into a single distribution indicating it may have been possible to further compress the number of categories. This was not done for two reasons. First, subsequent development steps defined category-specific risk-based questions that are irrelevant to various project categories (e.g., right of way access on a scrubber replacement project). Second, some of the project categories responded differently to data driven risks requiring multiple project categories and their associated curves as discussed later in this article.

Data Driven Major Risk Factors

Within these six project categories, individual AFE defined traits were evaluated to determine if they were statistically different from the rest of the data. As illustrated in Figure 8, projects with less than 10 percent AFE spending on mechanical services behaved differently than projects with greater than 10 percent. Interestingly, some of the pre-supposed risk factors had no statistical impact, or insufficient impact including: capital cost, year, location, and project manager experience. Conversely, some variables that could not be immediately explained were discovered such as: harsher regulatory regimes resulted in lower cost indexes; seasonality impacts other than winter; and, uncommon or “special” projects had lower cost indices. A second screen was used to determine if a given variable was shared across project categories or unique. The results of these screens reduced the number of possible risk factors from over 80 down to seven. These seven data-driven risk factors resulted in standard shifts to cost probability distribution (both mean and variance) for each project category. These seven data-driven risks are company/project specific and are not those discussed in Common Risk Root Causes. The seven common root causes by pure coincidence match the number data-driven risk factors.

Project Manager Interviews

Once the initial data was collected and analyzed, it was shared in one-on-one interviews with a subset of seasoned category-specific project managers. During these sessions the following was reviewed:

- Did the preliminary findings make sense?
  - Are the six project categories sufficient?
  - Are the seven major data driven risk factors real?

- Discuss the level of effort normally completed for an AFE.
  - How often was more or less effort completed?

- Discuss specific project outliers
  - On their projects that went over, what happened?
  - On their projects that went under, what happened?

From these questions several things were determined. First, the level of project definition prior to sanction was common within a project category and between project categories. This permitted the assumption that any variation within a project category was not due to project definition (like large projects in Figure 2), but due to some other risk factors. It also allowed for simplification of the final tool as rather than trying to assess the level of project definition, the tool only had to review relevant risk factors.

From outlier discussions common cause risks for cost over and underruns were identified. These traits became estimate-based category-specific risk factors as direct causality could not be proven due to limited data sample size. These “estimated” minor risk traits included items such as: known environmental sensitivities; spill history; site access; contracting strategy; operations confirmation of assumptions etc. As these minor risk factors were opinion based, they were given smaller impacts on the cost probability distribution (mean only) as a multiple of the base curves’ variance.

Tool Creation

In keeping with the objective for a simple tool, the tool was created in Excel®, with various pull down menus and error checking. A master list of 33 questions was created from the major data-driven risk factors and the minor estimated risk factors. Questions’ responses were “point and click” answers that best describe the response. Unlike large parametric tools, the answers were very specific and limited. Often “Yes,” “No,” or “Don’t know.” No project category required responses to each of the 33 master questions. The fewest number of questions in a category was 11 while the largest was 25. This question list acts as a “defacto” risk register. Reviewing all the major and minor common risk factors significantly reduces or eliminates the need for a project specific risk register. This allowed the tool to be used without a custom risk register, passing another requirement of the tool.

Beta-test

The trial tool was emailed out to the previously interviewed project managers who were asked to complete the tool for a “typical” project in their given project category. Other than a few lines in the body of the email no formal training was given. Only one of the project managers called for clarification (a phone call that lasted one minute) and all could finish the tool in under 10 minutes. Clearly the tool passed the ease-of-use and speed requirements. The project manager’s provided feedback on: ease of use; question and answer phrasing; tool layout; and, general reception. This feedback was incorporated back into the tool, or if not, a follow up call was given to explain its exclusion. These selected project managers would become advocates and ambassadors for the new process.

Calibration

The project managers’ “typical” responses were feed into the tool to determine if it tool would give cost index predictions in line with average actual cost outcomes. The tool was then run with the worst possible questions’ responses and the best possible questions’ responses to verify that the tool could provide cost outcome ranges that reflected reality. In an iterative process the weights of the various
questions for each project category were adjusted accordingly: mixture of science and art. Figure 9 shows a specific project category’s actual cost index results against the distribution for the best possible case (“min” or minimum contingency), the worst possible case (“max” or maximum contingency) and the typical response contingency curve. Curves for all project categories used comparable graphs to support calibration.

**Solution Description**

The final product for use by project managers is a two-tab Excel® file: one tab for inputs and question responses; and a second for results. Calculation and calibration tabs were locked and hidden within the tool to prevent damage or unintended use. The two-page approach make it more difficult for project managers to game the system. The input page has a header requiring basic project parameters project category, start date, estimated cost etc. that are pulled from the AFE submission supported by pull down menus. Question responses are all verbally anchored – typically “Yes,” “No,” “Don’t know” – and selected with a point-and-click interface. This front tab (page) will be included with AFE submissions as a high-level risk-based project review alleviating the requirement of a project specific risk register. The output tab provides a table showing the P10, P50, Mean and P90 costs along with a single recommended contingency and the prospect of a contingency value more in line with the project’s risks. Roll out sessions explaining what was done, the results, how to use the tool, and interaction to address specific concerns were conducted for all departments and users.

All trained users are able to complete the tool in under 10 minutes. This time requirement is an insignificant incremental burden on already too-busy project managers given the significant benefits. This project control tool clearly passes any project manager’s cost-benefit evaluation. The tool meets all the design criteria:

- data based
- simple to use
- does not require a risk register
- project specific

**Cultural Change**

From its inception this project required change management: cultural buy-in was critical to the tool’s success and integration. With that in mind experienced project managers were involved early and often. For the most part project managers were very excited to abandon the tyranny of 10 percent contingency and the prospect of a contingency value more in line with the project’s risks. Roll out sessions explaining what was done, the results, how to use the tool, and interaction to address specific concerns were conducted for all departments and users.

One of the consequences of the “crashing wave” small project curve is that it accurately predicts reality: small projects tend to underrun their cost estimate. In the data set just under half of the projects had a cost index below 100 percent and over 2/3rds did not use their full assigned contingency. Grounded in data, the tool predicts most projects will underrun and recommends a negative contingency. If blindly followed this could lead into a fear-fueled vicious cycle: fears of not enough contingency leads project managers to artificially inflate cost estimates and subsequent periodic recalibration then recommends even greater negative contingencies. Fear must be removed from the system for optimal performance [37] so a minimum contingency policy was created: all projects would receive at least 10 percent contingency. The tool still accurately indicates the likelihood of a cost underrun, but overrides the recommended mean contingency with 10 percent, while flagging the user that a minimum contingency has been assigned. As the tool is used and confidence more broadly established this minimum contingency can be reduced and the systemic reasons for cost over estimating can be addressed through other policies and practices.

Company policy allowed project cost overruns of up to 10 percent over their approved AFE (including assigned contingency) without an AFE revision. Project managers indicated that AFE revisions are considered “four letter words” by management and explicitly stated fears that this tool could result in an increased number of supplemental/revised AFEs. To address this a cumulative frequency diagram was created for each of the six project categories with the intent of educating management on the consequences of policy decisions. Figure 10 is for the most volatile project category and includes:

- Historical cumulative cost index.
- The tool’s typical contingency assignment (using the “typical” responses as defined by project managers in section Project Manager Interviews).
- A typical assessment with a policy allowing a 10 percent cost overrun.
- A typical assessment with a theoretical policy of allowing 20 percent overruns.
- The highest possible tool assigned contingency (“worst”).
Figure 10 – Tool Impact on AFE Revisions

In reading Figure 10 a typical project contingency would result in at most a little over half the projects having sufficient funds. The application of the 10 percent policy results in drop to a maximum of 45 percent AFE revisions while a 20 percent policy reduces this to a mere 25 percent. Using the logic that the projects most likely to encounter significant overruns are those with the highest risks, the tool identifies these risks and assigns the maximum contingency possible. As a result, management should expect between 17 and 45 percent of all projects in this category to require AFE revisions. For some project categories these policies result in a minimum AFE revision frequency of 1 percent or less. With this information management can make an informed business decision that balances financial oversight and fiscal authority with increased work effort and paper work.

Additional Work

Recalibration

Cost outcomes are directly related to project management practices and management policies. These are not always stable over time. While backwards application demonstrates the tool’s accuracy, it still has its vocal and silent doubters. In two years’ time recalibration will be completed using historic projects that used the tool. As each small project must complete the assessment it will allow the calibration of predicted with actual results. With recorded responses to all of the questions, some of the “estimated” minor risk traits can be transformed into “data driven” major risk traits. This will allow the removal or revision of some questions – further streamlining the process – or the addition of new “estimated” risk traits.

An example of this process was revealed during calibration with the “safety assessment” question. Every single project manager indicated they completed an informal safety assessment prior to AFE submission. None indicated that a safety assessment was skipped and all indicated a full assessment would be completed during the project. This is not a surprise in our safety-conscious environment: it is a bold project manager who admits that they were not concerned with safety on their project. Given the tool’s objective of speed, if project managers only have one answer to this question, why ask it at all? Here the policy of paramount safety trumped other objectives and data: the safety question stayed in the tool.

Fractal Patterns

In completing this work an extremely interesting phenomena was found: curves, within curves, within curves. While the overall data complied with the expected small project “crashing wave” probability distribution, within that master data were project categories that shared the same “crashing wave” probability distribution but with statistically different means and variations. Within each project category – without fail - there were multi-modal probability curves as shown in Figure 8. Given each project within a category has a common amount of project work prior to sanction (i.e., all were sanction from the same class of estimate, roughly a class IV) the variation within the project category could not be attributed the main root risk cause for large projects, “planning prior to sanction” as shown in Figure 1, but was due to some other variable(s). It is speculated that these underlying “crashing wave” curves arise from the interaction between “data-driven” risks and “estimated” risk traits discussed above. Going forward data will be collected on the “estimated” minor risk traits to tie them back to the lowest level of curve possibly showing a fourth level that further increases the tool’s precision.

Conclusion

This article demonstrated that an easy-to-use parametric contingency estimating tool can be developed and successfully implemented for small capital projects. The tool allows tailored contingencies for individual projects permitting project managers security knowing they will have sufficient contingency while avoiding tying up excess capital.

The parametric approach works as 60-90 percent of cost overruns are driven by seven root causes. Small projects carry limited budgets for project controls that preclude the cost of the more sophisticated contingency assessment methods, such as range estimating. Conversely, common parametric tools are driven off of large and mega-project databases with fat right-hand cost overruns tails unlike actually small projects crashing wave pattern and a tendency to cost underruns. The foundational knowledge from large project parametric processes can be applied to small projects. The large volume of small projects leads to a processes-based solution and the extent of in-house data precludes the need for external project databases.

The required solution had to be accurate, data-driven, easy-to-use, repeatable, project specific and most
importantly fast. While the tool meets all these criteria, it had to be deployed in a manner that acknowledges the change in a corporate culture. If the process is used as a method to reduce contingency it can increase the agency issues between management and project managers. The tool’s unintended benefit was the insight management gained on impact policies have on work effort and paperwork.

While the tool was backward tested, it remains to be seen if the predicted results match the actual results. A recalibration in two years will undoubtedly provide better insight and what learnings will need to be re-incorporated into the tool. In particular, the concept of fractal probability distribution curves within curves within curves is mesmerizing: rather than viewing cost outcomes area random point in a probability curve, do certain traits “load the dice” in favor of one end of the curve or another? While large and mega-projects capture the industries collective attention, small projects offer something enticing – potentially large databases and relatively fast feedback loops. Ongoing work on this tool may reveal why certain projects tend to cost overrun more than others. Knowing this the industry might better put resources in the correct places to consistently avoid the “fat” end of the cost index tail.

REFERENCES
2. AACE International Recommended Practice 17R-97, Cost Estimate Classification System.
3. AACE International Recommended Practice 40R-08, Contingency Estimating General Principles.
5. AACE International Recommended Practice 42R-08, Risk Analysis and Contingency Determination Using Parametric Estimating.
6. AACE International Recommended Practice 56R-08, Cost Estimate Classification System As Applied for the Building and General Construction Industries.


42. The Canadian Real Estate Association, [www.realtor.ca, 13 2016. [Online].

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Do an “advanced search” by “author name” for an abstract listing of all other technical articles this author has published with AACE. Or, search by any total cost management subject area and retrieve a listing of all available AACE articles on your area of interest. AACE also offers pre-recorded webinars, an Online Learning Center and other educational resources. Check out all of the available AACE resources.

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UPCOMING AACE ANNUAL MEETINGS

- 2018 Annual Meeting - June 24 - 27
  Manchester Grand Hyatt
  San Diego, California, USA

- 2019 Annual Meeting - June 16 - 19
  Sheraton
  New Orleans, Louisiana, USA

- 2020 Annual Meeting - June 28 - July 1
  Hilton Chicago
  Chicago, Illinois, USA
**Arizona Section**

The March Arizona Section technical meeting was on March 16, at the Kitchell Training Center in Phoenix, AZ. Attendees included Matt Chappell, Charlene Mendoza, Steve Vergara, Julian Anderson, Rodney Lee, Sunitha Jain, Peng Yue, Emma Garza, Jesse Zunke, Greg Cutler, Robin Kankerwal, Yudhvir Saharan and Marina Sominsky.

The presentation was given by Chris Perry from CADsoft, who provided the group with an overview of BIM and detailed model creation in Revit. He showed libraries, standard assemblies, and the relationships between objects in Revit. He went on to cover new BIM 360 tools and uses. The session was very interactive, and the group found it very engaging and informative. Thanks to CADsoft and Chris for coming and speaking to the group!

**Central Ohio Section**

The AACE Central Ohio Section is proud to recognize Matthew Burton as the well-deserving recipient of the inaugural local section scholarship; and, the section is excited to see him awarded a top scholarship by AACE International during the 2017 academic year. He resides in the central Ohio area and currently is a junior attending the University of Cincinnati majoring in Civil Engineering. He had an exemplary resume and application.

The Central Ohio Section conducted its May Section meeting at Barley’s Brewing Company in Columbus, Ohio. Our guest speaker was Michael Cairns, Principle at Aerial Image Solutions. Aerial Image Solutions is an aerial photograph company specializing in construction progress and marketing layouts for the construction industry using state-of-the-art drone and photography.
technology. Mr. Cairn’s topic was The “Eye in the Sky,” how the use of Unmanned Aerial Vehicles (UAV’s) offers the possibility of improving a number of project aspects for construction management. UAV’s can assist in traditional tasks, such as field inspection and aerial photography. They can provide important benefits in areas including productivity, safety improvement and schedule adherence / progress monitoring. The presentation also pointed out certain government restrictions from the FAA when using drones. It was a very informative presentation and enlightening discussion. AACE Central Ohio is committed to enriching the profession in our region through an enthusiasm to try new things increasing member value and strengthening the diversity of our section.

Find the section on LinkedIn at: www.linkedin.com/groups/8188672.

- **Houston Gulf Coast Section**

At the Houston Gulf Coast Section’s final dinner meeting of the 2016-2017 speaker program, Geoff Sherwood gave an entertaining presentation titled, “Turnaround Management”. In a low-price environment, the reliability and operability of assets becomes more challenging and essential to the profitability of the large IOC’s. He explored his top ten recommended practices for successfully delivering turnaround projects. One of his top ten was: “Don’t open the charge code too early!”, which drew a big laugh from the audience. Geoff is a retired project services manager and turnaround supervisor with Marathon Petroleum. He has over 35 years’ experience in planning and executing maintenance, hook up and turnaround projects in both upstream and downstream environments in UKCS, the Middle East, and the United States.

April was another busy month for the Houston Gulf Coast Section. For four consecutive weeks, HGCS BOD members volunteered to teach a Project Controls 101 Class. The classes included estimating, risk, cost, and planning and scheduling. The attendance was great with approximately 50 people attending each night. Turner & Townsend graciously allowed the section to use one of its training rooms. The attendees interacted with the instructors to get full value of the class. Another HGCS success! Special thanks to Yemi Ibiyemi for the photos.

- **India Section**

The India Section organized a national conference on, “Powering Capital Projects Through Enhanced Cost and Schedule Performance,” in association with IIT Madras, a technical institution in India. The conference was in Chennai, India, on May 3. The theme of the conference was highly relevant as studies by leading consultants, including a KPMG-PMI study initiated by the Ministry of Statistics and Program Implementation of the Government of India, came up with a very high percentage for the number of mega projects running into time and/or cost overruns. As a good part of the infrastructure development projects in any country fall in the “Mega Capital Projects” category, effective monitoring and control of these projects are of paramount importance. India is quickly marching to join the league of developed countries of the world, so the systems and practices in this area need to be enhanced to the level of global best practices.

The conference was attended by invited delegates at the decision making level from the industry, commerce, policy making and academia. Attending were experts from different sectors in India, Europe, the Middle East and North America, apart from
Sankar Subramaniam, Chair of the AACE India Taskforce, is shown above left presenting a speaker’s gift to D.K. Ojha upon delivering his lecture at the May 3 India Section conference.

D.K. Ojha, Director IPMD, Ministry of Statistics and Program Implementation, is shown inaugurating the May 3 India Section conference by lighting the lamp.

The May 3 India Section conference was well attended by delegates from industry, commerce, policy making and academia, as well as attendees from India, Europe, the Middle East and North America. Some of the attendees are shown above.

The May 3 India Section conference included a panel discussion. Shown above from Panel discussion. From left to right are: Mr. Sankara Narayanan (GM Strategy and Planning, Larsen & Toubro Limited), Mr. Devi Prasad (Indian Economic Services – Retired, Founding Director Fiscal Policy Institute), Mr. Madhu Pillai (Director Kentz/SNC Lavalin - moderator), Mr. Varadarajan (Chief Growth Officer, VA Tech WABAG), and Dr. Ashwin Mahalingam (Associate Professor, IIT Madras) and Mohamad Raifuddin, VP International Regions with AACE International.

D.K. Ojha, Director from the Ministry of Statistics and Program Implementation, made the inaugural address and shared a video message from the Honorable Minister Sadanda Gowda. In his address, Mr. Ojha highlighted the scale of infrastructure projects being monitored by the ministry along with the tools and mechanisms in for effective monitoring of projects. He emphasized the need for coordinated efforts by industry, academia, and government to benchmark Indian systems with global practices. He called for enhancing these as required with necessary customization to an Indian context in some areas. He welcomed regional and association level leadership of AACE. Professionals from KBR, Engineers India Limited, Petrofac, AMEC Foster Wheeler, Saipem, Central Public Works Department, IRCON, Pricewaterhouse Coopers, Larsen & Toubro, ITC Limited, Karle Infra, Coca Cola, Mcdormat, scholars from IIT Madras, Anna University, Fitchner, etc., attended the conference.

Sankar Subramaniam, Chair of the AACE India Task Force and chief organizer of the conference, welcomed all the speakers and participants. He thanked Karle Infra, the sponsors for the event, IIT-Madras for joining hands with AACE and the Ministry of Statistics & Program Implementation for their support and active involvement in the event.

The conference was inaugurated with the traditional South Indian style by lighting the lamp by D.K. Ojha, Director, Ministry of Statistics and Program Implementation, Dr. Koshy Varghese, Professor and Dean IIT Madras, Dr. Nick Lavangia, a project management consultant, Dhruva Karle, Director of the Karle Group,
and encouraged global professional bodies, like AACE, in supporting educating and certifying the professionals in the area of project management and project controls.

Dr. Koshy Varghese, Dean of IIT-Chennai, shared the initiatives, programs, and research of IIT in the area of construction management and connected it to the project controls area in mega project investments of various governments in India and to nation building efforts.

Dr. Nick Lavingia, a renowned project management consultant and ex advisor to the global oil & gas giant Chevron at its US headquarters, shared his vast experience on mega projects to the size of 50 billion USD, plus single projects and how the Recommended Practices of AACE and other professional bodies are successfully engaged by Chevron and other international companies in the control and management of these projects across the globe covering developed, developing, and under-developed countries.

Mr. Subramanian Sarma, CEO and MD of L&T Hydrocarbon Engineering Ltd, briefed the best practices L&T is using in project controls, for hydrocarbon and/or infrastructure sectors across the globe. He emphasized the need to enhance systems to a higher level of maturity. He also touched on the need for easier project financing options to support contractors in overcoming cashflow constraints.

Mr. James Perry, a renowned contract management guru, arbitrator, and consultant/trainer to the Asian Development Bank, from France, shared the best practices and commonly faced challenges in mega project contract administration in different continents around the world. His experience in training senior management professionals on mega projects supported by the World Bank/ADB, helped him to connect the best global practices into an Indian context.

Mr. Philips Tharakan, Vice President International Regions with AACE International, briefed the delegates on various professional certifications offered by AACE and their global acceptance along with the eligibility and preparations required for these programs.

The conference also had a panel discussion by eminent panelists from India and the Middle East. Discussion covered industry, academia and policy making. It was moderated by Dr. Madhu P. Pillai, past Vice President International Regions with AACE and a project management specialist associated with leading MNCs globally. The panel included Mr. Devi Prasad (Ex. Indian Economic Services officer, advisor to the World Bank, and policy expert), Mr. Sankar Narayanay (General Manager and Head of Strategy, L&T Construction), Dr. Aswin Mahalingam (Associate Professor, IIT-Madras) and Mr. Varadarajan (Chief Growth Officer, VA Tech Wabag).

The discussion touched key risk elements leading to time and cost overruns of the capital projects, rigorous ways of arriving at the cost quantification, possible legislation to implement sound program management practices like in many developed countries, involvement of leading global consulting firms on control of capital projects and possible partnership between Indian and foreign organizations to enhance the efficiency and effectiveness of the implementation of these mega capital projects and programs. The panel recommended the government and industry to encourage globally accredited professional certifications for their key professionals engaged in the execution of these projects. Also the panel identified the need and opportunity for industry to set up project management consulting organisations delivering global standards. All the speakers connected the infrastructure projects to strategically important areas, like delivery of public services, and connecting citizens and organizations to economic opportunities; thereby strengthening GDP and providing new economic opportunities for millions of citizens.

Mr. V. Sivakumar, VP Corporate Relations and Outreach – South India Section, AACE International, in his valedictory speech thanked MoSPI, the government of India, IIT Madras, speakers from various parts of the world, participants and Karle Infra for their support to make the program successful. He also mentioned that the team from Karle Infra—consisting of Karthik Murthy, Suresh Chavan, Kavitha Kumar, Kalpana, Fathima, Swetha, Manjunath, Nambiappan and Sushma of IIT Madras whose tireless effort from behind the scenes made the program very successful. The program concluded with the Indian National Anthem.

The conference was covered by the Indian Print and Electronic Media.

On the second day, Laurie Bowman, Director Region 8, conducted one day orientation for 15 selected participants on TCM Framework and AACE certification. He introduced Total Cost Management to participants, understanding CCP, EVP, and PSP certifications along with the role of the modern cost engineer. The program was well received by the participants and the participants provided good feedback.

Qatar Section

On April 28, Feras Al Roumani, a Hill International Delay Analyst and Mohamad Daaboul, Vice President of AACE International Qatar Section and Founder and Managing Director of Analyzer Consulting, hosted a joint training session: ‘Practical Training in Delay Analysis Part 02 – Time Impact Analyst (TIA)’ at the Marriot Marquis, Doha.

Time Impact Analysis is a method used to determine the potential impact of delays on the construction process and is one of the preferred methods to promote negotiation and later agreements on delay claims. During the eight hours of the workshop, the 15 attendees had the chance to practice this specific type of delay analysis on their own computers and to start to understand the way to produce a time impact analysis.

The presenters guided them through each step, using exercises on their computers. The workshop’s good atmosphere was helped by a delicious lunch and light refreshments prepared by the Marriot team. The section thanks everyone that helped organize this event and trusts that all the attendees will benefit from this workshop in the near future.

Projects in Qatar are generally in delay for many reasons. If a project is delayed because of employer delay events and an extension of time is awarded, very often the contractor will not receive any prolongation costs because of his alleged “concurrency.” AACE Qatar Section organized a brief exploration into what Contractor Concurrent Delay is, how employers will call all delays concurrent, and what a contractor can do about it.

Andrew Woodward, Executive Director of QGS, a Chartered Civil Engineer, with more than 25 years’ experience in the construction industry delivering complex civil engineering and in-
fracture projects, helped to guide section members through this controversial topic during a Saturday evening meeting on April 8.

The one hour technical section was at the Radisson Blue in Doha. Some 40 attendees had the chance to question Andrew on this topic and the section hopes they enjoyed this evening as much as the dinner buffet which followed this technical session.

The Vice President of the Qatar Section, Mohamad Daaboul, held a three hour workshop on ‘Basic Concepts of Project Planning for Effective Project Management’ on March 3, at the Radisson Blue, Doha.

Mohamad is a specialist in planning and scheduling and has over eight years’ experience in project management, project control, scheduling, and forensic delay analysis. The aim of the workshop was to develop a basic level understanding of planning concepts for the project management team, to have common terms of reference with regard to the concepts, terms and methodology of planning.

The workshop was for young professionals who wanted to continue with their professional carrier as planners, project control professionals or other positions in construction project management.

The Qatar Section organized a New Year technical session on the technique of fast tracking that changes network logic to overlap phases in a project which would normally be carried out in sequence. Ahmed Fouad Sedky introduced attendees to strategies for identifying and eliminating the risks associated with fast tracking in the section’s first technical session of 2017.

Ahmed is a specialist in planning and scheduling and has over 15 years’ experience in project management, project control, scheduling, and in the preparation of delay analyses. He has worked in Qatar, UAE, and Canada.

Around 40 members and friends of the Qatar Section enjoyed Ahmed’s presentation on January 21, followed by a delicious dinner buffet prepared by the Radisson Blue hotel.

Southern California Section

On May 23, the Southern California Section had AACE’s incoming President-Elect for 2017-2018, Dr. Alexia Nalewaik, CCC FAACE, Principal Consultant/Owner of QS Requin Corporation, discuss Project Performance Review—Capturing the Value of Audit, Oversight, and Compliance for Project Success. Alexia gave insight to the profession, project and career horror stories, and an introduction to her recently published book on Project Performance Review. She has 25 years of experience in capital project consulting, with a focus on project performance, stakeholder satisfaction, and cost management. There were 18 who attended including two students.

Keys to Shed Fear and Take Smart Professional Risks

Lei Wang

Like all the knowledge and skills that people learn, fear of failure is also learned. And as you age, you gain more and more mental constraints. Those mental constraints remove creativity and replace it with yet more fear.

Fear is perceived risk; it is learned, and it can be unlearned through practice. The ability to overcome fear—to combat fear—is like a muscle. It can be trained and can get stronger through exercise. Through deliberate practice, you can become courageous, and harness your fear to take informed, intelligent, and potentially lucrative professional risks.

Harness Fear’s Positive Power

Fear is an extremely powerful emotion—and thus, an extremely powerful motivational tool. When facing fear, the normal response is fight-or-flight. Flight is to let the fear and the worry take control of your mind. Fight is turning fear into a positive risk management response, forcing you to focus and actively do the best to overcome the present situation.

When you take a leap of faith to confront a new career challenge, instead of worrying “What if I fail?” imagine you have no opportunity to back out.

Act Early, Act Decisively

Rather than waiting until your industry or department becomes dispensable, proactively manage your career growth; learn new skills and think ahead of the curve continually to prevent a career crisis from happening.

Anticipate problems and dangers before they occur. Once danger does arrive, it is often too late to do much in response. Act early and act decisively, because waiting diminishes the chances for success.

Practice facing fear by taking chances. Even if you fail the first time, you should try again. Start with a small task, such as a new project, something you have never done. The more you try, the easier it will become to overcome fear.

Separate Probability from Consequences

Many working professionals are afraid of taking risks because the probability of success appears low and the consequences of failure are frightening. When you think about the consequences of a failure, it is important to recognize the difference between the immediate consequences and the ultimate consequences.

Yes, the probability that a new startup will succeed is low, and the immediate consequence could be losing investment money. For any new product launch or new job, there is a chance of failure, and losing your current position. But that is only temporary. Not taking the risk means that the ultimate consequence is failure. Be more mindful of the ultimate consequence of not taking that chance.
When Will Your Section News Submission Be Published?

The digital Source magazine includes all “Section News” submissions. Source has a submission deadline of two months in advance of the issue date. Please review the following production schedule. It lists the submission periods for the six bi-monthly issues of Source magazine in 2017.

2017-2018 Source Section News Submission Schedule

February 2017
- Items submitted from Oct. 16 - Dec. 15, 2016

April 2017
- Items submitted from Dec. 16 - Feb. 15, 2017

June 2017
- Items submitted from Feb. 16 - April 15, 2017

August 2017
- Items submitted April 16 - June 15, 2017

October 2017
- Items submitted June 16 - Aug. 15, 2017

December 2017
- Items submitted Aug. 16 - Oct. 15, 2017

February 2018
- Items submitted from Oct. 16 - Dec. 15, 2017

April 2018
- Items submitted from Dec. 16 - Feb. 15, 2018

June 2018
- Items submitted from Feb. 17 - April 15, 2018

This production schedule is based upon production schedules at AACE headquarters, as well as our printer having two to three weeks production time to take our in-house files and convert them to the Nxtbook software for posting. Enhanced features like audio, video, website links, and more will be a part of each issue of the Source. Some technology features will require additional production time and earlier deadlines. The magazine is to be ready for posting by the first of the month.

Within 2 to 3 business days of submitting a “Section News” items, you should receive a return confirmation e-mail that your submission was received at AACE headquarters.

How to Submit Text and Photos

Please submit any and all text as a part of the e-mail or as a Microsoft Word file attachment. Please submit any photo or photos as individual attachments in tiff or jpg formats. Do not embed photos in Microsoft Word files.

For photos to be used, we require either large original files or print size photos at 300 dpi (dots per inch). We can convert large 72 dpi submissions into the required 300 dpi. This process shrinks the size of the original submission. We cannot use photos taken on cell phones. For photos to be published, they must be in focus, of print quality, and wide enough to fill the width of the column layout.

Please include the names and titles of each person shown in any photos. Please list names from left to right or refer to those shown as being above left or right. For group photos please list names from left to right, beginning with the front row and working to the back. Do not list the Section officer first unless he or she is photographed on the left with guest speakers on the right.

All submissions should be e-mailed to editor@aacei.org. Please use the official name of the Section as approved by the AACE Board when the Section’s charter was approved. Never refer to the Section as a chapter.

Contact AACE Concerning Missing Submissions

Generally, all submissions received in the above scheduled times will be published in the listed issue. Items are not held because of space restrictions. There is no waiting list and no preference is given to one Section over another. Questions about incomplete submissions or failure to follow these submission guidelines could delay publication. Text will be published without submitted photos if the photo does not meet the listed quality requirements.

If a submission is not included in the designated issue, please e-mail or call the Managing Editor to ensure that it has not been lost or misplaced. Call or e-mail if you do not receive a confirmation e-mail within 3 business days of submission.

AACE reserves the right to edit all submissions and/or to refuse to publish any submissions determined by the Managing Editor or the Art Director to not meet the standards of the journal. Any appeals of these decisions will have a final decision determined by the Executive Director.

Any Section representative with questions is advised to e-mail editor@aacei.org or call the Managing Editor during regular business hours (9 a.m. to 5 p.m. Eastern Standard Time, Monday-Friday, except holidays and special closings.)
THE TOP 10 REASONS TO JOIN AACE INTERNATIONAL

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Increase your knowledge and expertise by joining one of AACE International’s many technical subcommittees, subcommittees, and Special Interest Groups (SIG’s) at no additional cost to members. Discuss industry problems with your peers or help experts develop new and improved techniques and practices for the profession.

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By attending a local section or our Annual Meeting for interesting speakers, informational tours, social dinners and much more. The online Membership Directory is an excellent source for a list of contact information on thousands of members. Join one of our many technical subcommittees and participate in the AACE Forums - a great way to tap into the collective wisdom and experience of our world-wide membership.

EXCELLENCE
Our certification programs are independently accredited by the Council of Engineering & Scientific Specialty Boards. AACE certifications are a recognized credible standard in the cost management field. A recent study shows that individuals with an AACE Certification earn 17.4% more than their counterpart without a certificate.

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We are your professional partner bringing you information and support you can trust. Join and become part of a unique network of individuals who are dedicated to improving the cost and management profession.
**COMING EVENTS**

### AUGUST 2017

2. **CMAA Breakfast of Champions: Bruce Rainey on Capital Program for Seismic Compliance by 2030,**
The Southern California Chapter of the Construction Management Association of America (CMAA),
The LA Hotel,
Los Angeles, CA
Contact: www.cmaasc.org

3. **CMAA Breakfast of Champions: UC Capital Programs Updates,**
The Southern California Chapter of the Construction Management Association of America (CMAA),
Long Beach Airport Marriott
Long Beach, CA
Contact: www.cmaasc.org

10. **CMAA SCC Breakfast of Champions: Queen Mary Island Entertainment Complex,**
The LA Hotel,
Los Angeles, CA
Contact: www.cmaasc.org

17. **Disaster Conference,**
Minneapolis, MN,
Long Beach, CA
Contact: www.diasterconferences.org

### SEPTEMBER 2017

7. **CMAA Seminar: Construction Manager’s Role in Project Schedule Management,**
The Southern California Chapter of the Construction Management Association of America (CMAA),
Long Beach Airport Marriott
Long Beach, CA
Contact: www.cmaasc.org

13. **CMAA Breakfast of Champions: California High Speed Rail Authority,**
The Southern California Chapter of the Construction Management Association of America (CMAA),
City Club, City National Tower,
Los Angeles, CA
Contact: www.cmaasc.org

19. **SEAOI Central Chapter Trade Show**
Bloomington, Illinois
Long Beach, CA
Contact: www.seaoi.org/event/central-chapter-trade-show-symposium-2017

20-22. **Project Controls Conference,**
International Convention Centre,
Darling Harbor
Sydney, Australia
Contact: projectcontrols2017.com.au

28. **CMAA Seminar: Change Requests, Change Orders, Claims,**
Long Beach Airport Marriott
Long Beach, CA
Contact: www.cmaasc.org

### JUNE 2018

11-14. **AACE International’s 2018 Annual Meeting,**
AACE International
Manchester Grand Hyatt,
San Diego, CA
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