PRESIDENT’S MESSAGE
SUMMER VACATION IS OVER

CERTIFICATION CORNER
DECISION AND RISK MANAGEMENT PROFESSIONAL CERTIFICATION

TECHNICAL BOARD NEWS
TECHNICAL BOARD FEATURES

BONUS CONTENT - TECHNICAL ARTICLE
USING THEORETICAL S-CURVE TO FORECAST PROJECT DURATION CONSIDERING PAST PERFORMANCE
BOOST YOUR VISIBILITY. ASTRONOMICALLY.

From a high vantage point, you gain insights into the big picture. In the same way, EcoSys EPC delivers a strategic set of tools to gain visibility into your project portfolios, to improve capital planning, and to achieve the flexibility to adapt as long-term plans meet the world’s constant state of change. Then in the very same software, drill down to make sure your project performance has…the right stuff.

Learn more about EcoSys EPC, the industry standard for enterprise project controls software. ecosys.net/therightstuff
CLICK to watch Martin Reeves talk about “How to Build a Business that Lasts 100 Years” presented by TED.

If you want to build a business that lasts, there may be no better place to look for inspiration than your own immune system. Join strategist Martin Reeves as he shares startling statistics about shrinking corporate life spans and explains how executives can apply six principles from living organisms to build resilient businesses that flourish in the face of change.

Martin Reeves is the Director of the BCG Henderson Institute, BCG’s think tank for new ideas in strategy and management, and a Senior Partner based in New York City. Reeves has been with the firm for 26 years and focuses on strategy, dividing his time between the Institute and client strategy work across sectors. He is author of a new book on strategy, Your Strategy Needs a Strategy, which deals with choosing and executing the right approach in today’s complex and dynamic business environment.
President’s Message
Summer Vacation is Over

Technical Board News
Technical Board Features

Certification Corner
Decision and Risk Management Professional Certification

Bonus Content - Technical Article
Using Theoretical S-Curve to Forecast Project Duration Considering Past Performance
1 Outside the Box
How to Build a Business that Lasts 100 Years

14 Women in Project Controls
Spotlight on Kim Forbes

16 Young Professionals in Cost Engineering
Spotlight on Marcus Love, PSP

27 COMP Program Members
30 The AACE International Bulletin
36 In Memoriam
37 Coming Events
38 AACE International Contacts
39 Professional Services Directory
39 Index to Advertisers
40 Next Month in the Cost Engineering Journal
Seeing half is not enough.

Trust ARES PRISM to give you the complete picture.

Relying solely upon a CPM schedule puts your project at risk. You need integrated cost management. PRISM G2 is the industry’s best integrated cost management software that simplifies projects controls by delivering dependable forecasts and accurate views of project performance so you can make informed decisions.

- Seamlessly aligns your schedule with project budget
- Streamlines changes from request to work authorization
- Utilizes a flexible coding structure to simplify performance management
- Delivers real-time analysis and data validation through precision reporting

www.aresprism.com/completopicture
I am so glad that summer vacation is over. I, like many of you, had the opportunity to kick-back and find some time to relax away from the frantic pace of business. That did not mean I did not take my cell phone and computer so the emails would not pile up, but having even a few days where the press of business, whether my day job or AACE’s events, receded was great. But with summer over, there is much to do and now it’s time to get started.

For example, all our Associate Boards with their new Chairs are meeting and setting their plans for the year—each has a full agenda. The Technical Board seems to work quietly in the background, but produces a prodigious number of technical documents that form the core of our intellectual property. That content is the basis of our existing and expanding educational programs, which is delivered to our membership under the guidance of the Education Board. As you may recall, we are in the process of rolling out the first of our new online learning modules, which are essential to AACE staying relevant in the 21st century. Our Certification Board, perhaps the most visible of our boards due to the range of certifications we offer, continues to develop and refine our certification program. One of the major current objectives of the Certification Board is to develop more depth in our question pool. As with all organizations that certify, we are under constant threat of exam theft. In addition to the rigorous security we have associated with the test preparation, storage and administration, we are developing large sets of comprehensive questions with lots of redundancy, so if there is a security breach, the thieves only get a small percentage of the question pool.

And even the Board of Directors is getting back to work. We are developing our budget for 2017 and commencing some of our initiatives including developing a translation strategy, creating policies for our burgeoning and very successful Section-run regional symposiums, and developing a plan to get our AACE Fellows more involved in everything we do.

As exciting as the activities of the Associate Boards and our various initiatives may be, there are two special AACE initiatives underway that you need to know about because they could have a big impact on you and your membership. Coming in a very short time, AACE will have a new website and a new association management system. This will immediately translate (hopefully with few glitches) into a better member or potential member experience. Members will be able to find the materials they need more quickly, buy services or products more easily, and find AACE information more efficiently. If you are reading this, you may have already come through our new portal. I invite you to tell me what you think by sending an email to president@aacei.org.

The other exciting activity is the continuing work of Vision 20/20. This task force, formed almost a year ago, has been charged with plotting AACE’s future with an eye for marketing our association. Why is marketing important? Our world is much faster than even a decade ago. We have noticed that more and more members bypass traditional forms of meetings and classes to partake in online education. We are becoming more of an association with an online presence. Even the ubiquitous webinar is under marketing pressure. Therefore, our marketing is essential to expand our membership base so we
have more capacity to develop the needed educational and training materials. We need more members so we can afford to provide all our membership with the tools they need to compete in our modern society globally. As I indicated above, this has started to happen with the roll-out of the first module for online learning from the Education Board, but we must do more. Our Strategic Plan identified this as a major goal.

As part of Vision 20/20’s activities, we are examining if we should change our name. I am under no illusion and know that even discussing this creates tension. In the next few weeks you will see several pieces about this possibility and Vision 20/20 will roll out our second survey to clarify the rather mixed results from the first survey last spring on a potential name change. You will have the opportunity to express your opinion again as to if we should change our name, and assuming we do, what should it be changed to. Our AACE home page has had a detailed discussion of the first survey results, but the bottom line is that the membership is pretty evenly divided about a name change.

Much of our marketing starts at a grass roots level, where we can each identify a colleague or friend who would benefit from belonging to AACE. In that context, I am sometimes asked why a person joins AACE or becomes a cost engineer, estimator, or a project controls specialist. The first is easy – AACE has great products and great people. We have first rate educational opportunities and our certifications will document your skill and perhaps increase your pay.

As to why become a cost engineer, estimator, or project controls specialist, we all want to say that it is because of the great public perception of our jobs and the widespread envy that our chosen professions demand—right up there next to professional athletes and movie stars. Then I wake-up.

I realize that even though our spouses sometimes can’t describe what we do, we love our work because it is fun and rewarding. It is fun and rewarding to be involved with the management and control of aspects of the largest industry in the world – construction. Though not all our members are involved in actual construction, we are all involved with the development and progress of major human activities. Engineering News Record (ENR) ran a small piece on construction pay on 11-Jul-16. Their studies concluded that the various job titles of “Cost Engineer Manager,” “Scheduling Manager,” and “Chief Estimator” are three of the four highest paid construction and construction management jobs. These are of course the job titles members of AACE are likely to hold. When coupled with AACE’s own statistics that AACE certification holders make up to 25 percent more than non-certified, we can see that our chosen professions are not only well paid, but among the best-paid.

This study also reinforces several of our ongoing AACE initiatives. We can point to these statistics when discussing the advantages of joining AACE. Better trained individuals tend to rise into these leadership positions, and where better to get the know-how than from AACE. It can help you decide that getting the CCP, PSP, or any of our other Certifications can generate benefits that are quantifiable. Finally, you can explain tangible benefits, other than fun, to a young professional as to why to go into a career path in cost engineering, project controls, or estimating. This conversation naturally leads to why they should join (or remain) in AACE.

Now that summer is over, let’s get working on making AACE a better organization by using its services, attending Section meetings, meeting friends at these meetings, introducing colleagues to AACE, using AACE’s great resources, and if you choose, volunteering to work on AACE activities.

If you would like to contact our current president with questions or comments about The President’s Message please address your e-mail to president@aacei.org. To engage in other discussions, check out AACE International’s Online Forums at www.aacei.org/forums.
THE TOP 10 REASONS TO JOIN AACE INTERNATIONAL

TIME
Gain access to a wealth of resources that will save you time and money! You’ll stay informed about the complexities of the cost and management profession -- plus you’ll have access to discounts on educational programs, publications, and more!

INFORMATION
Locate thousands of technical papers and publications in the Virtual Library. AACE’s database is keyword searchable for quickly locating appropriate reference articles.

CAREER
Members can post resumes at no additional cost in our Career Center and keep your career on track through information sources such as our annual Salary and Demographic Survey of Project and Cost Professionals.

LEARNING
We offer numerous online learning courses on estimating and project management. The Approved Educational Provider program helps maintain high quality development courses and providers. AACE also holds many seminars throughout the year.

RESOURCES
Starting with the TCM Framework and Recommended Practices that are available for free only to members to our bi-monthly publication Cost Engineering featuring articles for cost professionals around the world. Through the mail or via the AACE International website, the Cost Engineering journal is a great current resource for members and as a member, you gain access to an archive of past issues.

TECHNICAL DEVELOPMENT
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.

NETWORKING
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.

DISCOUNTS
On products and services ranging from Annual Meeting registration fees, archived webinars and presentations, certification examination registrations, and more!

YOU!
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.

JOINING US IS JUST THE BEGINNING
www.aacei.org
Successfully managing a project within the budgeted cost depends upon having a solid cost estimate that is based on a well-defined scope. Two important components of a cost estimate are contingency and escalation.

Contingency and escalation funds are considered risk funds. This means they are intended to be used to cover costs that are associated with the uncertainty that is inherent in the cost estimating process. Although these funds are alike in that they are associated with project cost uncertainty (risk), the types of risk they cover are very different.

Let’s take a look at contingency. AACE defines contingency as “An amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs” [1]. Items that are typically not included in contingency funds are major scope changes, events that are out of the ordinary (labor strikes, natural disasters, etc.), and management reserve and escalation funds. The basic principles of contingency estimating are discussed in Recommended Practice (RP) 40R-08.

It should be understood that every estimate is associated with a range of potential cost values due to the uncertainty associated with the estimating process. Contingency is the amount of money that is included in a cost estimate to align the final cost estimate value with an acceptable probability that the final estimate value will not be exceeded. Therefore, contingency determination is dependent upon an effective evaluation of the various elements of uncertainty within a cost estimate. This evaluation of uncertainty (i.e. risk, including both threats and opportunities) is typically tied to the risk management process for a given project.

The amount of contingency included in an estimate depends on the project team’s capacity to accept risk. The less risk the team is willing to accept that the final estimate value may be exceeded, the higher the amount of contingency that will need to be included in the estimate.

Some companies have policies for applying standard contingency funds (for example: 10 percent contingency for all Class 3 estimates); however many studies indicate that this practice results in poor project outcomes. Contingency is best determined by utilizing proven analytical methods and risk analysis tools. Without the use of well-founded techniques, methods, and tools for developing realistic contingency, a project has the potential to significantly under or overrun the estimated cost. AACE RPs 41R-08 through 44R-08 describe various methodologies that can be used to determine contingency.

After the appropriate contingency has been determined, typically a separate control account...
is created in the project budget to hold the contingency funds. Control of contingency occurs through the use of a project’s change management process. When a change is approved that includes a significant cost impact, contingency may be distributed as necessary to readjust the appropriate control account(s).

In today’s world where mega-projects (or programs) are quite common, it is not unusual for contingency to be managed through the use of a contingency portfolio fund. This would allow the program to maintain less aggregate funds than would be necessary if each individual component of the program held separate contingency funds.

Now, let’s examine escalation. AACE RP 58R-10 describes escalation as, “A provision in costs or prices for uncertain changes in technical, economic, and market conditions over time [2]. Inflation (or deflation) is a component of escalation.” Escalation does not include the impacts of currency exchange; nor does it cover substantial technology changes that may occur during the lifetime of the project. These costs should be covered by contingency or management reserve.

Estimates are generally prepared in current-day costs (costs valid at the point in time that the estimate is prepared); however the project is intended to be executed at some point in the future. If the project cost estimate is intended to account for the final as-spent costs (the actual costs spent at completion of the project), then the cost estimate needs to include costs for escalation – the changes in pricing due to inflation and market conditions between the time the estimate is prepared and the costs at completion. Escalation is considered another risk fund due to the uncertainties in estimating their cost.

Some companies will pre-define the amount of escalation added to a project in their annual operating plan (for example: two percent of all project costs compounded annually for the project lifespan). However, similar to contingency, escalation is best determined using proven analytical tools and methods. AACE RPs 58R-10 and 68R-10 describe two methodologies that can be used to determine the amount to be included in a cost estimate to account for escalation.

Escalation is a substantial risk and has the potential to significantly impact a project. For mega-projects being executed over several years, it is possible for escalation to be one of the largest cost accounts in an estimate. This is due to the fact that it is tied to economic factors and can easily be impacted by events that are beyond control of the project team. In addition, escalation often varies between geographic regions and economic areas, making it even more difficult to predict.

Unlike contingency, there may not be a separate control account to hold escalation funds. Using projected cash flow spend profiles by discipline, escalation funds are distributed to the various control accounts based on the expected schedule of spending. However, other companies may hold escalation funds in a separate control account and manage escalation similar to contingency through a change management process.

While these are general rules of thumb, each company should identify what is specifically included (or excluded) from contingency and escalation (as well as other project related allowances); and document their determination methods and resulting values in the basis of estimate. ◆

REFERENCES
1. AACE Recommended Practice 10S-90, Terms and Definitions.

Build With Strength: Safety Must Come First in Second City

Build With Strength, a coalition of the National Ready Mixed Concrete Association (NRMCA), continues to stress the importance of safety when it comes to new and existing construction projects. As the coalition focuses on the City of Chicago, surrounding suburbs, and the Midwest in general, they are stressing the durability and resilience of concrete when it comes to fire, wind, and rot. Their efforts are part of a national campaign to inform the design/build and construction communities about the advantages of concrete construction in the low- to mid-rise residential sector, and in general.

“No building is any stronger than the degree of safety it provides for its occupants, and no degree of safety should ever be overlooked on account of cost or speed of construction,” said Kevin Lawlor of the Build With Strength Coalition. “Chicago stands out for both its architectural aesthetic and its pragmatism by allowing builders and developers to showcase unique designs, but insisting that high density dwellings be built with concrete and steel, and not wood.”

Build With Strength is asking Chicago developers, investors, builders, architects and consumers to watch their new video on the safety benefits associated with concrete construction and the limitations of buildings built with wood and wood products. The video features Jon Narva of the National Association of State Fire Marshalls, who notes, “It’s just not worth a firefighter’s life to go into a building that might collapse on them.” The Great Chicago Fire of 1871 looms large in current day Chicago zoning and construction codes that prevents multi-family dwellings in high density parts of the city from being built with cheap wooden frames.

“As a city, Chicago understands that safety and durability have to be the first priority when it comes to the construction of new and existing buildings,” said Lawlor. “If a city as architecturally stunning as Chicago can put safety first without sacrificing aesthetics or speed of construction, then other cities and small towns all over America should be taking note. Learn more at www.buildwithstrength.com. ◆
We welcome John Livengood, President AACE International and over 20 speakers from Region 5 (Texas, Colorado, Arizona, New Mexico, Utah, Montana, and Wyoming) already lined up, representing Owner Contractors, and consultancies. Keynote is by Karl Sturm, Chevron’s Cost Engineering Manager.

This year's Symposium showcases the very latest in project controls knowledge, tools and methodologies, as well as to provide a unique opportunity to network with key decision makers for major capital project delivery organizations, owners, executives, managers, engineers, and many other industry professionals.

The 2016 Region 5 Symposium features:

- Technical program - Presentations by industry experts on cost engineering, project management, project controls, scheduling, claims and other relevant topics.
- Networking reception - Evening networking reception with opportunities to meet experts and advance your career.
- Certification credit hours - Attendees will receive credit hours towards their certifications.
- Training in the fundamentals of project controls - Individual sessions on estimating, planning & scheduling, risk management, and cost control.

Kiewit Platinum Sponsor

NOVEMBER 4-5, 2016
WOODLANDS, TEXAS

Visit www.Region5Symposium.com for more information
Risks are inherent in capital construction projects. It is the nature of the business. Findings from one of the most comprehensive studies ever undertaken that analyzed 258 transportation infrastructure projects worth US$90 billion showed that 9 out of 10 projects had cost overruns and that over the past 70 years for which data were available, the rate of cost overruns had not changed [1]. While the project stakeholders have always looked for ways to manage risks in their projects, there have been a number of technological advancements over the past 10 to 15 years that has changed the way we view, identify, analyze, manage and mitigate risks in capital construction projects [2].

Accordingly, the niche of professionals who serve the field of project risk management has also steadily grown over the past decade. This is evident from the increase in the number of technical presentations being given on risk management at various conferences hosted by organizations such as AACE International, Construction Management Association of America (CMAA), and Construction Owners Associations of America (COAA), to name a few. This is a great development for the field of project risk management.

However, just like any other area of professional practice, the risk management field includes an array of risk analysis and practitioners

Risk management is an integral part of overall project management in all industries, including construction. I was very happy to learn about the DRMP certification offered by AACE International as it seemed to cover the key areas of competencies and body of knowledge expected in a certification related to decision and risk management.

- Baabak Ashuri, Ph.D., DBIA CCP DRMP
who just started yesterday to veteran risk management experts who have been serving the industry for a while and who bring experience and expertise to the table. How is one to tell the difference? This is a particularly challenging question for owners or stakeholders when they want to select and retain the services of a risk management professional. What can they rely on to draw the distinction between the amateurs and professionals?

**DRMP Certification**

To address this need, AACE commissioned a task force in 2008 to develop a certification program, now known as the Decision and Risk Management Professional (DRMP) certification. The DRMP task force was comprised of the risk management experts that represented wide spectrum of industries, who worked tirelessly over the next several years developing examination questions and the recommended practices. The beta test of DRMP certification was offered in December 2012. After the successful administration of the beta exam, the certification was formally offered starting in early 2013.

The purpose of any professional certification or licensing program is to provide a mechanism to formally and objectively evaluate and publicly recognize the capabilities of an individual in a defined skill area. Certification as a Decision and Risk Management Professional (DRMP) recognizes certificate holders who have demonstrated their expertise in Decision and Risk Management (DRM), which includes the following:

- Decision and Risk Management (DRM) supporting skills and knowledge;
- Risk management (RM) skills and knowledge;
- Decision-making skills and knowledge; and,
- Other functional skills and knowledge.

**Potential DRMP Candidates**

DRMP candidates are those desiring to be recognized for their strong skills and knowledge in decision and risk management as it relates to their broad business and technical perspectives and senior-level experience in life cycle asset and project management. Skills and knowledge range from analytical (e.g., statistics and modeling); to socio/psychological (e.g., risk elicitation and communication); to management (e.g., risk response planning and management). Candidates may include, but are not limited to, risk managers, decision and risk management consultants, capital program managers or planners, project managers, value engineers and any cost engineering professionals focusing on asset and project decision and risk management.

It is expected that candidates will be experienced risk subject matter experts and well-read in the general industry literature on recognized decision and risk management principles and practices. The eligibility requirements described below show the depth and breadth of experience expected of the DRMP candidates.

**Eligibility Criteria**

A four-year college or university degree plus eight-years of industry related experience, of which four-years must be directly related to the field of decision and risk management, demonstrated by providing any combination of the following:

- Three (3) letters of recommendation from the clients (past or present) describing the complexity of the project, type of risk management implemented on the project, and the candidate’s role in the implementing or providing such risk management services, or
- Three (3) work products personally produced by the candidate that demonstrates having performed any aspect of the risk management work (decision analysis, schedule and cost risk analyses, implementation of risk management programs, risk workshops, etc.) on his or her projects.
- Applicant may substitute a four-year of college degree with an additional four-years of industry related experience or one of the following professional certifications: AACE’s CCP, CEP, EVP, or PSP; Certified Construction Manager (CCM); Certified Professional Constructor (CPC); Professional Engineer (PE); Registered Architect (RA); or Chartered Surveyor.

**Recommended Study Materials**

There are a number of reference and recommended study materials to prepare for the DRMP test, including:

- **AACE’s DRMP Study Guide.**
- **AACE’s Recommended Practice 72R-12:** “Skills and Knowledge of a Decision and Risk Management Professional,” describing the DRMP Body of Knowledge (Bok).
- **AACE’s Total Cost Management Framework** (with emphasis on sections 3.3 and 7.6).
- **AACE’s Recommended Practices (RPs)** (with emphasis on RPs: 105-90, 15R-81, 16R-90, 39R-06, 40R-08, 41R-08, 42R-08, 43R-08, 44R-08, 57R-09, and 58R-10).
- **AACE’s Professional Practice Guide #02: Risk.**
- **AACE’s Professional Practice Guide #08: Contingency.**

To learn more about DRMP certification, or if you have any questions please contact certification staff at AACE HQ: certification@aacei.org or 304-296-8444, ext. 1104.

**In their Own Words: What do the industry experts say about the DRMP certification?**

For this article, we reached out to a prominent scholar Dr. Baabak Ashuri, and here is what he had to say about the DRMP certification:

“Risk management is an integral part of overall project management in all industries, including construction. I was very happy to learn about the DRMP certification offered by AACE International as it seemed to cover the key areas of competencies and body of knowledge expected in a certification related to decision and risk management. I took the test in 2014. It was a tough exam and I had to study for it, but it was all worth it. I applaud AACE for putting together a program that is sorely needed in the industry.”

Baabak Ashuri, Ph.D., DBIA CCP DRMP

Dr. Ashuri is an associate professor at Brook Byers Institute
for Sustainable Systems (BBISS), and a fellow of the School of Building Construction/School of Civil & Environmental Engineering. He is also the director of the Economics of the Sustainable Built Environment (ESBE) Lab and the chair of the Integrated Project Delivery Systems Masters Track at the Georgia Institute of Technology. He may be contacted at baabak@gatech.edu or by visiting www.gtesbe.wix.com/home.

REFERENCES
2. AACE International Recommended Practice (RP) 57R-09, Integrated Cost and Schedule Risk Analysis Using Monte Carlo Simulation of a CPM Model, June 2011 (as an example of how risks are being identified and analyzed).

Shapiro & Duncan, Inc. Wins Big With Associated Builders and Contractors, Inc.

Shapiro & Duncan, Inc., one of the D.C metro area’s leading mechanical solutions provider of choice, announces that it has been recognized by Associated Builders and Contractors, Metro Washington and Virginia Chapters (ABC) for the INOVA Women’s & Children’s Hospital in Falls Church, VA.

Shapiro & Duncan was honored at the ceremony held on September 14, 2016 at The Ritz Carlton, Tysons Corner. In addition, for the second year in a row, Shapiro & Duncan was voted Subcontractor of the Year for the Mechanical Trade and this year was voted Subcontractor of the Year for the Plumbing Trade as well. This is a tribute to their people and their steadfast commitment to live by their corporate values every day.

“This project award is special to us because this marks a major milestone at our company. INOVA Women’s and Children’s Hospital is our largest mechanical project to-date,” Shapiro & Duncan’s CEO, Sheldon Shapiro stated. “In a building of this size, it could have been disastrous if coordination issues had not been handled correctly. Our Virtual Design and Field teams truly excel at their craft and continue to develop effective ways in which we communicate and provide exceptional customer service for our clients no matter the size. We work to resolve conflicts in the digital world where cost and time are minimized.”

INOVA Hospital is an award-winning hospital and has been named one of “America’s 50 Best Hospitals” for two consecutive years. They are the only hospital in the Greater Washington D.C. area to be given this distinction.

The challenge with this project was that it required a complex addition and a new central plant to be constructed on a 24/7/365 hospital complex. Everything had to be coordinated and completed with the utmost detail and timing to maintain the level of patient care INOVA is known for.

The final project outcome resulted in a new 12 story 665,000 square foot structure. The new hospital includes 192 patient rooms, a 108 bed neonatal intensive care unit, 33 labor and delivery rooms, 6 C-section rooms and 116 pediatric rooms.

Due to a great team effort the project was completed months ahead of schedule providing the Hospital with an early opening and the community with added capacity for medical services earlier than anticipated.
Kim Forbes, did not set out for a career in project controls. From the grade school memory books, you would have gleamed that she wanted to be a nurse, teacher, or veterinarian. Born in Hampton, Virginia, within the United States, she spent most of her days with her brother along the Chesapeake Bays’ rivers crabbing and fishing.

She set off after high school to attend Virginia Tech in the beautiful Blue Ridge Mountains of Virginia. This is where she earned a degree in Public and Urban Affairs, Concentration in Urbanization: Planning and Policy. Initially, she thought, thinking she would play SimCity for a local municipality after multiple internships, during college, around the state of Virginia. But as luck would have it, she moved to Washington, D.C., to work with some of the best people at Charron Consulting, which was a small construction project management firm with a broad spectrum of projects including office, retail, industrial, civic, and various government facilities.

Her professional work experience has stretched 16 years from project management to cost estimating for a contractor in areas of heavy civil. She has currently landed in project controls because the overall nature of the industry is exciting and ever changing. She has extended her academic knowledge through numerous certifications and continued eagerness for knowledge.

She first joined AACE in 2011, after passing the PSP certification. She currently helps to grade the memo sections for the PSP certification. She wants to see the ever evolving process grow within all of the AACE certifications. AACE has an abundant amount of technical information within its forum boards and sharing within the membership. There is never a lack of knowledge that people are more than happy to share and educate with. She has found that she can gleam from all the organizations she is involved in and comingle these positions with her construction background. She holds the AACE PSP certification, and also CCM and LEED AP certifications through other organizations.

Kim knows that she could not have a fulfilling career without continual support throughout her life. She is forever grateful to her parents who first instilled hard work and caring and a belief that these will land you in the right place.
Now that she is a parent herself, she has found that this life takes more than just an ‘I’ it takes an astounding amount of support that is far reaching. Kim leans heavily on her husband, Carlton, who pulls strengths out of Kim that she never knew she had. With his success within one of the US Fortune 500 companies and work done abroad, he helps Kim to guide the family and both of their careers.

Kim’s success does come without a number of mentors as well. She has been fortunate enough to work alongside AACE leaders Chris Carson and Patrick Kelly. Their passion and hard work with AACE and with project controls provided energy not only for the organization, but for helping Kim to think harder, do better, and look further. She believes that AACE has great growth potential not only internationally, but also with capitalizing on the younger association members and their drive and the momentum that they can create.

She looks forward to what AACE has in store for her. She also looks forward to her new role as RP Coordinator within the AACE Planning & Scheduling subcommittee and continuing to lead the Central Virginia Section in AACE Region 2 as President for a second year. She will forever hold true to her alma mater motto of Ut Prosim, English translation of, “That I May Serve.”

Karen believes that AACE has great growth potential not only internationally, but also with capitalizing on the younger association members and their drive and the momentum that they can create.

Arcadis Report: U.S. Construction Industry Buoyed by Reduced Dispute Time, Costs for Construction Disputes

The 2016 Arcadis Global Construction Disputes report shows that while the cost and time involved solving construction disputes is rising in some parts of the world, the costs have decreased for the third year in a row in North America – the only global region where it’s also taking less time to resolve disputes.

“The North American industry has become more sophisticated in recent years, realizing what we have said for a long time—focusing on managing risk and early intervention will help reduce the number and cost of disputes,” said John Jastrem, CEO of Arcadis North America.

The construction disputes report provides insight into the main causes of disputes and how best to avoid, mitigate, and resolve disputes quickly and cost effectively. Further, the report predicts that the decline in duration and value of construction disputes in North America will continue into 2016. These trends represent a positive signal for the U.S., reducing the financial drag on construction overall.

Global Construction Disputes—Summary of Results

<table>
<thead>
<tr>
<th>Region</th>
<th>Dispute values US$ millions</th>
<th>Length of dispute (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2014</td>
<td>2015</td>
</tr>
<tr>
<td>Middle East</td>
<td>76.7</td>
<td>82</td>
</tr>
<tr>
<td>Asia</td>
<td>85.6</td>
<td>67</td>
</tr>
<tr>
<td>North America</td>
<td>29.6</td>
<td>25</td>
</tr>
<tr>
<td>UK</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>Continental Europe</td>
<td>38.3</td>
<td>25</td>
</tr>
<tr>
<td>Global average</td>
<td>51</td>
<td>46</td>
</tr>
</tbody>
</table>

Source: Arcadis Global Construction Disputes 2016
Marcus Love, PSP, is originally from Germany and graduated with a bachelor’s degree in industrial engineering. During the last part of Marcus’s college term, he was given the opportunity to do a project engineering internship in Calgary, Alberta Canada, where he worked for a subsidiary of a German EPC contractor (Krupp Canada, part of today’s ThyssenKrupp Industrial Solutions.) Krupp Canada was involved in supplying the upstream equipment and components (i.e., crusher, conveyor belts, and slurry plants) to Canadian Natural Resources Limited and Shell. This assignment is where Marcus was exposed to project planning for the first time.

Working as a planner sparked his interest and he decided from then onwards that he wanted to work in project controls. He was interested in heavy industrial projects that were not too common in Germany where car manufacturing dominated the economy. He was fascinated by organizing and planning projects and managing details to illustrate to management where the project was headed.

After graduating from his university, his job prospects where slim because of the global financial crisis. He was able to make an entry into the work force as a project management and Oracle Primavera consultant. After helping a small consultancy to gain exposure to international clients, he moved on to work as a planner for a different business unit within ThyssenKrupp Industrial Solutions.

He was working mainly on engineering and procurement projects during his tenure with ThyssenKrupp and with the help of his first mentor he learned the trade of planning. This is when he first came across AACE International by picking up one of the *Cost Engineering* journals that were around the office. He enjoyed browsing through the journal(s) and picking up the tricks of the trade.

After almost two years, Marcus was very keen to get involved in construction projects to gain valuable experience working on site. He was offered a position as a site planner with Fluor in Australia. The role was part of an $18.5 bn Gladstone LNG (GLNG) coal-seam-gas project. It was a great experience for him because he was responsible to look after a part of the project that had big procurement and quality issues.

He started planning the installation and upgrade of wells and the associated water network, and the water treatment plant connected to the network. After completing this assignment, he was given more responsibilities to plan major equipment including the main compressor and generator installation, as well as the Triethylene...
Marcus has been promoting AACE International to his colleagues because he believes there's something for everybody with AACE International. He says, 'It is not only learning about new things, but also getting in touch, networking and sharing ideas and experience.'

Marcus then obtained a new opportunity to work for Queensland Gas Company, QGC, in Brisbane Australia. QGC is the Australian branch of the BG-Group, a major UK oil and gas owner. BG was bought by Shell in 2015, and QGC will be integrated into Shell throughout 2016. The project was also a CSG project (coal seam gas) project and scoped for a total of $20.5bn. Marcus says his new role, ‘feels like stepping on an accelerator because his knowledge expanded a lot through access to his mentor.’ He learned skills that helped him become a better planner and took an acting lead planner role. He is also getting involved in the cost, estimating, and earned value aspects of project controls. He has also learned to work closely with managers and with contractors alike, and appreciates that effective communication and efficient resolution of issues can make a difference, especially in this challenging environment with oil prices hitting an all-time low.

Marcus has been following AACE International for a few years and he decided to formalize his experience by taking the Planning and Scheduling Professional (PSP) certification exam last year. He has greatly benefited from the resources that AACE provides, for example, he helped his contractors establish a baseline that both met the project requirements, and complied with industry standards, simply looking up the respective documentation in AACE’s library. This achievement has helped his project manager and team to gain confidence in the delivery of the contractor’s scope of work.

Marcus intents to gain his EVM and CCP over the course of the next year(s). He believes that companies will be looking more and more for skilled project controls professionals to predict more reliable project outcomes, as companies and shareholders all alike will have to tighten the belt over the course of the next year(s).

Marcus has been promoting AACE International to his colleagues because he believes there’s something for everybody with AACE International. He says, ‘It is not only learning about new things, but also getting in touch, networking and sharing ideas and experience.’

Marcus offers this advice for other young professionals. He says, ‘Project controls is a great field of work, but you must watch out for the cowboys.’ The greatest thing that happened to me was finding AACE, becoming a member, and having a mentor. He also advises, ‘Don’t wait for a mentor to approach you. If you believe that you can learn something from someone, all you need to do is ask. If you don’t ask, you don’t get.’

**Hill International Project Wins ENR Global Best Projects Award**

Hill International, a global leader in managing construction risk, announced that one of the company’s projects has been recognized by *Engineering News-Record* (ENR) as one of the magazine’s 2016 Global Best Projects. The award will be presented to Hill on October 11, 2016 during ENR’s 2016 Global Construction Summit at the New York Hilton Midtown in New York City.

Industry veterans selected 23 projects hailing from 15 different countries and five continents as outstanding examples of the risks and rewards of designing and building internationally. The judges looked at projects in many markets and examined safety performance, innovations, challenges, and design and construction quality—with a special emphasis on the diversity of global project teams and their collaboration. They also considered how the projects benefit the local community and/or the construction industry.

Hill’s award-winning project was the Nile Ritz Carlton rehabilitation project in Cairo, Egypt, which received an Award of Merit in the category of “Renovation/Restoration.” The hotel, formerly operated as the Nile Hilton Hotel since 1959, is an iconic landmark of the Cairo skyline. The 13-story hotel was renovated to modernize the facility and to meet the modified design and specifications of the Ritz Carlton brand.

“We congratulate our client and our entire project team for this prestigious recognition,” said Waleed Abdel-Fattah, Senior Vice President and Managing Director (Africa) for Hill’s Project Management Group.
Using Theoretical S-Curve to Forecast Project Duration Considering Past Performance
Rafael Gonçalves Monteiro and Vinicius Oliveira Daher

Abstract: Project controls tools are considered keystones to project managers regarding costs, schedule, and risk management. Project environments are really challenging and unsettled. Therefore, procedures and standards for estimating, planning, controlling and forecasting are truly welcome. Notwithstanding these procedures being crucial, it is common that owners fail to have contemporaneous and consistent data from contractors. Aiming to help owners (and even contractors) to forecast the total duration of a project, this article explores how to use a mathematical equation of a general S-curve to predict project duration at completion. This article differs from previous works because the past performance (physical progress) is used to fit a theoretical S-curve using the method of (weighted) least squares. Also, it is neither mandatory to know the remaining quantities to be executed nor the original planned curve (or value), since no scope change had happened and the actual physical progress reflected reality. Finally, some examples will be presented showing how to use this procedure and how easy it is to implement using electronic spreadsheets, in spite of the mathematics behind it.

Project success criteria have been evolving from the well-known project triple constraint (cost, schedule, and scope) to a wider approach like PRINCE2® project diamond (cost, schedule, scope, quality, risks and benefits) or PMBOK® six key indicators of project performance (cost, schedule, scope, quality, risks and resources). Despite the fact that these indicators must be measurable; cost, schedule, and scope are easier to measure than other indicators. A project manager is responsible to monitor progress according to the plans. Undoubtedly, a frequent question that a project manager listens to is: When will the project be finished?

In order to answer this question, it is necessary to have a well-defined and leveled schedule, and a Work Breakdown Structure (WBS), which reflects accurately what is intended to be accomplished. Schedule techniques help achieve these goals. The most common techniques are:

- Gantt charts
- Milestone charts
- Networks diagrams, such as:
  - Program Evaluation and Review Technique (PERT)
  - Critical Path Method (CPM)
  - Precedence Diagram Method (PDM)
  - Graphical Evaluation and Review Technique (GERT)

These techniques are truly helpful when planning and reviewing schedules. However, when the project is already under construction, other techniques to monitor and forecast schedules are necessary. One of these techniques is Earned Value Management (EVM), which is widely used to monitor cost and schedule performance, although there are some well-known deficiencies with SPI (Schedule Performance Index). For instance, if the project is still ongoing, but its planned finish date has passed, SPI by definition is one, which, erroneously, means that schedule is on track. This inconsistency occurs because SPI is based on value, not on time, although there is some correlation between cost and time. Thus, using EVM demands both good knowledge of its limitations and how meaningful those indicators are.

Because of these restrictions, D. Khamooshi and H. Golafshani have developed an alternative method based on duration in order to monitor and forecast schedule, called Earned Duration Management (EDM) [1]. However, quite often owners (the client)
do not have detailed information about schedule, activities, and duration. Therefore, an alternative simplified technique could be valuable to demonstrate to executives the actual performance of a project. This could be accomplished using indexes or other concise indicators that summarize the status of a project in furtherance of facilitating understanding of the current situation and trends.

One possible way to monitor physical progress is analyzing the project S-curve, both planned and actual. As defined by AACE, in the context of project control, S-curve is a graphic display of cumulative costs, labor hours, progress, or other quantities plotted against time [2]. Aldo Mattos has presented a theoretical S-curve aiming to predict the expected progress, especially when a detailed baseline schedule is not yet available or the planner wants to compare his or her output with a standard one [3]. From Mattos’ study, this article will explore a way to use the theoretical S-curve to forecast future work based on past performance, thus supporting decision makers. Some examples will be presented, displaying benefits of the model, its limitations, and the feasibility in implementing it into electronic spreadsheets.

**Theoretical S-Curve**
According to Mattos, a theoretical S-curve can be described as (adapted) [3]:

\[
C_p = 1 - \left[1 - \left(\frac{n}{N}\right)^I\right]^S \quad \text{Equation 1}
\]

where:
- \(C_p\) = cumulative progress (in percentage) up to period \(n\)
- \(n\) = number of period up to some time
- \(N\) = project total duration
- \(I\) = right shape parameter
- \(S\) = left shape parameter

High numbers of the right shape parameter, \(I\), implies the mean is greater than the median. On the other hand, high numbers of \(S\), the left shape parameter, means the mean is less than the median. In his article, Mattos stated that \(I\) is the inflection point of the curve, so it must be between \(\log(1)\) and \(\log(100)\). Despite the theoretical S-curve was constructed to \(I\) being related with the inflection point, the mathematical adaptation for this article does not impose such a restriction.

As a result, the S-curve has three parameters; two acting as shape parameter and one related with monthly effort and consequently total duration. It is important to understand how an S-curve behaves. Higher orders of \(I\) and low orders of \(S\) implies the curve will be left (negative) skewed. On the contrary, i.e., a low order of \(I\) and high order of \(S\) means a right (positive) skewed curve, as depicted in Figure 1. When \(S = \log_{10}(0.5)\), for \(I > 0\), the curve has the inflection point at 50 percent of total duration, and it will be approximately symmetric.

**Method Implementation and Cases Studies**
In order to fit a best curve using Equation 1 to a sample database, the usage of a nonlinear regression technique is necessary. Although the mathematics behind it is not so difficult, it is common that no simple straightforward solutions exist.
Therefore, iterative methods must be used to find the values of the unknown parameters, e.g., I, S and N. To further complicate the problem, while forecasting some projects’ durations, sometimes there are multiple solutions to the problem. That is, there are more than one minimum, called local minimum. Then, one needs to search for the global minimum.

Equal to the example showed in Figure 2 (c), it is most likely to occur in real world local(s) minimum(a). An algorithm that will search for a global minimum is preferred over one that just looks for a local minimum, even though the time of resolution will be greater [4].

Plenty of statistical software has algorithms already implemented in the program to solve these kind of problems. A free and powerful software is R and its packages. Nevertheless, Microsoft® Excel® has the Solver tool that, despite not being so fast and powerful, might be helpful solving iterative nonlinear problems. In fact, all cases presented in this article were solved using Excel, although some problems took too long to be resolved. Microsoft® and Excel® are registered trademarks or trademarks of the Microsoft Corporation in the United States and/or other countries. To solve Equation 1, it is mandatory to calculate and minimize the sum of squared differences between $C_p$ (actual) and $C_p$ (estimated). Using Excel, the GRG Nonlinear Solving Method with multi-initialization was used, as this increases the chances of finding a global optimal.

In order to have a reasonably well-scaled problem, all boundary conditions must be both clear and defined. Consequently, it is necessary to establish how a S-curve behaves at the final plateau. Usually for big construction projects, the last 10 percent of physical progress will consume around 20 percent to 25 percent of the total time, i.e., for a project planned to be built in 40 months, it is expected that by month 30 to 32, there will be 90 percent of the physical progress of the project accomplished. This assumption is quite reasonable and is supported by a historical database. When establishing this boundary, the planner can either impose this as a restriction, or implement it into the problem without being a restriction that must be satisfied, but at least it should be approximate. It is the last case that was used to solve all the problems presented within the case section of this article.

Furthermore, three cases will be presented. The first one is a projection of an entire project, from early civil works to final electromechanical assembly, including commissioning.

The second case is a projection for one unit of a project, which also contains all steps of construction, but not the interfaces linking the units, such as piping. Lastly, the third case will represent a projection for an isolated discipline inside a project, namely civil works.
Case Study 1 – Petrochemical Plant

The first case is from a full petrochemical plant construction. The plant consists of an ISBL (Inside Battery Limit), an OSBL (Outside Battery Limit), utilities and infrastructure.

At the time of analysis, the project had accomplished 37.6 percent of physical progress within 23 months; practically two seasonal periods were incorporated in the model. To address all boundary conditions, the final behavior of an S-curve for this kind of service and project is that the last 10 percent of physical progress will consume something around 20 percent to 25 percent of the total duration of the project. In accordance with a historical database and expertise, 20 percent was used for the calculations. A good practice to better understand the final behavior of an S-curve, despite the purpose of this article being to forecast total duration considering past performance, is to look at the planned curve of the project. At least have an idea how, originally, the contractor was intending to perform the last 10 percent of physical progress. In this case, the original plan was to perform the last 10 percent of physical progress at around 23 percent of total planned duration.

After fitting the best curve, see Figure 3, the parameters are $I = 2.58$, $S = 2.68$ and $N = 46$, with $R^2$ adjusted equal to 99.83 percent. The original plan was to finish the project within 37 months, however, because of change orders and inefficiencies, the contractor estimated a new project duration equal to 40 months. Using the theoretical curve adjusted to the past performance, the total duration was projected to be 46 months.

After the projection, it was known that at the 31st month the project had accomplished 70.5 percent of physical progress. According to the replanned baseline, they should be at 81.0 percent, a difference of 10.5 percent in nominal terms. According to the original plan, they should be at 96.0 percent, a difference of 25.5 percent in nominal terms. The projection indicated that they should be at 67.4 percent on the 31st month, a difference of 3.1 percent. In fact, according to the projection, they should achieve 70.5 percent at about 25 days later than they truly did, i.e., an error of only 25 days in, up to that moment, 930 days.

A forecast is better used to prepare for the future and develop a coherent action plan to recover the project. In this example, it seems that, even with six months of delay forecasted, no further and significant directive was implemented up to month 31, since the difference between what was predicted and what was accomplished is small. If any disruptive moment had been introduced into the project, such as additional work shifts, changes on constructability methodologies, etc., the
project would be adherent to a replanned baseline, i.e., with 81 percent of physical progress. Therefore, without any disruptive moment, past performance was sufficient and reliable enough to prepare for the future.

According to Figure 4, residuals appear to follow a normal distribution, with a possible case of heteroskedasticity at the final data, however not sufficient to invalidate the model. Heteroskedasticity refers to the circumstance in which the variability of a variable is unequal across the range of values of a second variable that predicts it. Here “variability” could be quantified by the variance of the sample. In addition, it is important to notice that these are nonlinear regressions. Unusual behavior of residuals, like waves shapes, is expected. Moreover, since residuals seem to follow a normal distribution, the assumption of maximizing the maximum likelihood function, i.e., minimizing the sum of squared error to find a solution, remains valid.

**Case Study 2 – Oil and Gas Unit**

For the second case, a whole unit process plant (ISBL) from the oil and gas sector will be referenced. Works were from early earthworks to commissioning.

The original plan established that all work, including demobilization, should be done in 92 months, however with a peculiar plateau at the end. Available data was up to 97 percent of physical progress, at month 83. The original plan was to accomplish 97 percent of the project between months 65 and 66. In order to test the model, three forecasts were performed, as described as follows.

The first assessment used 36 months of actual work, which summed up to 13.4 percent of the work. However, since this project was a long-term construction, by month 36, just 13.8 percent of the project was accomplished. Additionally, as reported above, boundary limits to final curve behavior is that the last 10 percent of progress should be done around 20 percent of the total project duration.

A good practice when forecasting projects is that available information should not be inferior to 30 percent of physical progress, since at the beginning it is expected that works would be done at a slower pace, as a result of the learning curve. Nevertheless, willing to demonstrate results, a projection was made, as depicted in Figure 5.

Projection indicates that work completion would have been accomplished within 115 months. Clearly, the accomplished works, light blue curve, deviates significantly in comparison with the projection. It is important to note that doing projections too early is worthless, because the
project is still ascending on its learning curve. According to Figure 5, monthly progress was rising from month 28 on, indicating that projected was deviating from actual. An alternative way that could be used to improve forecast is to give higher weights to the error calculated from 28th month.

A good practice is to use sufficient data that corresponds, at least to 30 percent of the physical progress. Therefore, the next prediction was performed at month 53, with a 43.8 percent completion rate.

As depicted in Figure 6, the forecast performed at that time was indicating the project would be finished within 94 months, the hashed green line. In addition, the accomplished work from month 54th to 83rd month is plotted with the light blue line. \( R^2 \) adjusted is equal to 99.85 percent, with \( I = 3.31, S = 3.56 \) and \( N = 94 \).

Noticeably, this second forecast is much better than the previous one, since enough data was used and the project was already at its “cruising speed.” From approximately month 70, the projection deviates a little in comparison with the accomplished work, however results are still very good. According to the projection, at month 83, physical progress would be 97.9 percent, whereas actual work was 97.1 percent, just 0.8 percent of deviation, remembering the projection was made at 43.8 percent of progress.

According to Figure 7, residuals appear to follow a normal distribution, with severe heteroskedasticity, indicating the regression is not linear.

Finally, a last forecast was calculated at month 74, see Figure 8, where physical progress was 85.3 percent. Projection indicated that project would be finished within 95 months, one month more than the previous forecast.

Equally, the accomplished work from 75th month to 83rd month is plotted with the light blue line. \( R^2 \) adjusted is equal to 99.96%, with \( I = 3.21, S = 3.54 \) and \( N = 95 \).

At month 83, forecasted physical progress is 96.9 percent, whereas actual is 97.1 percent, an error of 0.2 percent, remembering that the forecast was made nine months before, demonstrating that results are quite reasonable.

Residual analysis is plotted in Figure 9. Residuals do not follow a normal distribution, thus further investigation is necessary. Notwithstanding, for the purpose of this article, the model is trustworthy enough.

Despite not being reported, the project was expected to finish within 94 months. The original plan was to complete the project within 92 months; however, as depicted in Figures 5, 6 and 8, there is a strange plateau at the end.
Discarding this unusual behavior, and considering a baseline up to 98 percent, the S-curve assumes a typical shape. The 98 percent was planned to be accomplished at the 71st month. For the second forecast, it was predicted that 98 percent would have been accomplished at the 83rd month, and for the last forecast, at between months 84 and 85. As a result, the projection indicates that 98 percent would be achieved 12 to 13.5 months later in comparison to the original plan. The actual last data available was 97.1 percent at month 83, i.e., at the best scenario the project would achieve 98 percent by the 84th month, equal to 13 months of delay, in accordance with projections.

Case Study 3 – Civil Works
For the last case, it is demonstrated that even at a discipline level, forecasting an S-curve is reasonable. The case was from a mining project and the scope of services was, but not limited to: (i) execution of earthworks, including vegetation suppression, pavement, drainage, urbanization and landscaping; (ii) execution of civil works, including
The second, and last, forecast was made at month 26, with physical progress equal to 91.9 percent, maintaining the final behavior of 10 percent to be accomplished at the last 25 percent of N. The results are shown in Figure 12. The forecast indicates that the project would finish within 34 months of total duration, the hashed green line, one month more than the previous forecast. In addition, the accomplished work from month 27 th on is plotted with the light blue line. R² adjusted is equal to 99.72 percent, with I = 2.24, S = 2.64 and N = 34. Even though the last forecast is supposedly to be more accurate, tendency indicates 34 months of duration, not a significant difference in comparison to the actual duration, i.e., 33 months.

According to Figure 13, residuals appear to follow a normal distribution, with a possible case of heteroskedasticity at the end of data, however not sufficient to invalidate the model. In addition, it is important to notice that these are nonlinear regressions; hence, unusual behavior of residuals, like waves’ shapes, is expected.

Moreover, a regular regression was performed, so, in order to diminish erratic behavior at the end, a weighted regression could be used instead, i.e., given more weight to the most recent data, for instance the last five points.

**Conclusion**

Cost and schedule are practically the two most important constraints in a project. For cost controlling and monitoring there are plenty of good tools to estimate cost at completion, such as EVM, probabilistic analysis, bottom-up estimates, so on and so forth. Regarding schedule, there are lesser tools and with some restrictions. For instance, when calculating SPI, because of its definition at the end of a project, trends approximate to one, even though the project is highly delayed. For that reason, a modern approach has been developed to calculate SPI in terms of time duration, as defined by Khamooshi and Golafshani [1]. Notwithstanding EDM development, it is common that owners do not have access to full data of a schedule, or even do not have schedule specialists on their staffs. For this reason, a simplified approach to estimate project total duration is welcome.

This article had the intention to present a new methodology that could be used easily and with contemporaneous data. Aiming to demonstrate how the method works, three cases were presented exhibiting the results and its limitations. In order to improve results, it is recommended that actual data is from a period more than a year, and at least 30 percent of physical progress has been accomplished. Additionally, the user must establish the shape of the final plateau of an S-curve, in all cases of this article it was considered that the last 10 percent would consume, around, 20 percent to 25 percent of total duration. Despite working as a “rule of thumb,” this assumption must be adapted depending on the situation of the current project being studied. For large construction projects, this might work satisfactorily.

Finally, it must be reinforced that all kinds of predictions should be used as additional information to decision-making.
makers wisely make their changes on a project. Predictions have no intention to truly predict the future; instead, they have the purpose to design scenarios, bad or good, in order that current decisions might make a different and better future.

REFERENCES

ABOUT THE AUTHORS
Rafael Gonçalves Monteiro is with Deloitte Touche Tohmatsu Consulting. He can be contacted by sending e-mail to: rafmonteiro@deloitte.com.

Vinicius Oliveira Daher is with Deloitte Touche Tohmatsu Consulting. He can be contacted by sending e-mail to: vdaher@deloitte.com.

Two Ways to Fix Failure – Or Prevent It!
Chuck Gallagher, chuck@chuckgallagher.com

Why is it that we cheer SUCCESS and yet most people expect failure? A friend of mine shared two ideas with me, neither of which I liked, but both of which seemed to be true over time. First, he said that people are motivated more by the fear of loss than the desire for gain. Second, and the one that irritated me most, was his statement: “No good deed goes unpunished.” If you want to find success then adopt these two ways to fix failure.

Having worked with thousands of people over my career, the truth is – FEAR – is likely the most powerful motivating emotional force that humans experience. So…I decided to look at the idea of what motivates FAILURE and address how to fix that. Let’s take a look at Two Ways to Fix Failure (or prevent it).

1. Understand the power of Rationalization
People who have faced failure have two choices – accept responsibility for what you did that contributed to the failure or rationalize that you had no control and that you were a victim. People with a victim mentality are generally experts at rationalizing why something happened that, of course, could not be their fault. Winners understand that failure is a natural part of the process of winning and seek to understand what they did or had control of that could have created a positive outcome. From that analysis they create opportunities to win. Key – when you hear yourself rationalizing personal behavior you should look in the mirror and ask yourself if you want to be a victim or a victor. Analyze don’t rationalize.

2. Learn from past Mistakes
The old statement – “If at first you don’t succeed, try try again” is a simple yet powerful statement of wisdom. Failure is the catalyst to discover what does work and what does work leads to success. Seek to discover from failure what happened? Why didn’t the action or activity work? What could have been done different to achieve a better result? The truth is a careful analysis of what went wrong, why and what can be done different is a powerful process that we all do quite naturally in seeking success in our lives – either personally or professionally. Of course, it’s been said over and over (and I have no idea who to give credit to since I’ve heard it said everywhere), but the definition of insanity is doing the same thing over and over and expecting a different result.

Learning from past mistakes is the first major step to achieving success.
COMP is a comprehensive package of benefits designed to encourage companies to develop the skills of their total cost management employees through AACE membership.

Acciona Infraestructuras
www.accionainfraestructuras.es

Administrative Controls Management, Inc
www.acmpm.com

AMEC Foster Wheeler Oakville Mining & Metals
www.amec.com

ARCADIS
www.arcadis-us.com

ARES Project Management LLC
www.aresprism.com

Ball Aerospace & Technologies
www.ballaerospace.com

Belstar Inc
www.belstar.com

Benchmark Estimating
www.benchmarkestimating.co.uk

BHP Billiton Petroleum
www.bhpbilliton.com

Black & Veatch
www.bv.com

Brasfield & Gorrie LLC
www.brasfieldgorrie.com

Burns & McDonnell
www.burnsmcd.com

Caixa Economica Federal
www.caixa.gov.br.sinapi

Canadian Natural Resources Ltd
www.cnrl.com

Cargill, Inc.
www.cargill.com

CB&I
www.cbi.com

CB&I Project Services Group (CPSG)
www.cbi.com

CH2M Hill Inc
www.ch2m.com

Chevron Corporation
www.chevron.com

China Petroleum Engineering Co. Ltd.
Beijing Company
www.cpebj.com

CNS, LLC
www.y12doe.gov

ConocoPhillips
www.conocophillips.com

Crawford Consulting Services
www.crawfordconsultingservices.com

Delta Consulting Group, Inc
www.delta-cgi.com

Department of Energy/National Nuclear Security Administration
www.energy.gov

Department of Energy/Idaho Operations Office
www.id.energy.gov

DR McNatty & Associates
www.drmcnatty.com

EnergySolutions
www.energysolutions.com

Faithful+Gould
www.fgould.com

Fluor Corporation
www.fluor.com
Want your company to be an AACE COMP Member?
Contact Sharon Hardman at shardman@aacei.org, by calling 304-296-8444 or go online to www.aacei.org/mbr/comp/

UPCOMING AACE ANNUAL MEETINGS

• 2017 Annual Meeting - June 11 - 14
  Hyatt Regency       Orlando, Florida, USA

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

• 2019 Annual Meeting - June 16 - 19
  Sheraton       New Orleans, Louisiana, USA
Aurora Edmonton Section

The annual BBQ for the Aurora-Edmonton Section was in June and it was a great success. The Section’s dinner meeting program wrapped up with the annual BBQ in Edmonton. It was a beautiful day and section attendees had a lot of fun. The annual BBQ was a great opportunity to reconnect in a friendly atmosphere. It was a great team building event; a great way to build rapport, to network, and to have fun.

Dr. Donald Kennedy, P.Eng., an experienced project controls practitioner who has worked on many large industrial projects, was the presenter at the Aurora Edmonton Section’s April dinner meeting. Dr. Kennedy has taught courses at several universities and private companies. He has written many articles in a variety of management journals, magazines, textbooks, and has written two books on management.

Dr. Kennedy said, “a critical factor in building competitiveness is sound financial management. The cost engineer who possesses quick rules of thumb involving ratio analysis can assist management in recognizing where and when limited resources may best be employed. This presentation involved an in-depth look at a real case where a quick decision by management to drastically change the scope of a major project resulted in a missed opportunity to optimize the design.”

He added that, “having a solid understanding of the factors critical to your specific industry will help to identify when investments may be getting off track. When a quick calculation yields a result that is outside the expected value, a red flag should go up and prompt a closer look at the proposal on the table. A cost engineer who can highlight a big savings will be invaluable to his or her firm.” The dinner meeting was on April 20, and it was a great opportunity for everyone to network,
The East Tennessee Section joined the East Tennessee Chapter of PMI (ETPMI) for an annual joint meeting on June 23. The meeting venue was Buddy’s Banquet Hall in the Bearden area of Knoxville, Tennessee. A total of 50 persons from the two organizations enjoyed an evening of education, good food, networking and camaraderie.

This year was ETPMI’s turn to serve as the host and meeting program coordinator. The guest speaker for the evening was Terry Burkhalter, of Willis Towers Watson. Mr. Burkhalter holds a master’s degree in industrial safety and a B.A. degree in industrial management from Middle Tennessee State University. He has over 33 years of experience in the safety field, with over 29 years in the insurance industry. Terry is a professional member of the American Society of Safety Engineers and former board member of the National Safety Council for Tennessee and The Associated Builders and Contractors of East Tennessee. He serves as chairman for the Safety Risk Management Committees for the Associated Builders & Contractors, and is active with the Associated General Contractors.

When we typically consider risks to a project, it is in the framework of uncertain events or conditions that, should they occur, have a positive or negative effect on one or more project objectives such as scope, schedule, cost and quality.

Mr. Burkhalter’s presentation, “Break the Hazard Chain,” explained a program that creates a simple and logical framework for accident prevention—to break the chain of hazardous events that can lead to an accident.

Unfortunately, some of us have witnessed a project suffer substantial setbacks in cost and schedule as a result of a workplace injury, only to realize that the risk of injury in the context of project management is easy to overlook.

Terry shared communication tools that can eliminate hazards before accidents happen. The program illustrated how to break down parts of a job using previous incidents, show how to get to root causes, and increase employee’s hazard awareness of incidents before they happen. “Break the Hazard Chain” teaches that safety means taking action before an accident occurs rather than handling the aftermath.

Montreal Section

The Montreal Section of AACE International closed out the 2015/2016 technical season in high style in May 2016 with over 60 in attendance at a special presentation entitled, “Principles of Project Management and Analytics: the Key to Efficiently Managing Construction Disputes.” The guest speaker was Maged Abdelsayed, a professional engineer and partner at Deloitte with more than 30 years’ experience in the construction industry. He is well known for his claims expertise, Canadian and international construction project management services and services as an expert witness. Maged has also served on the Montreal Section Board.

The presentation showed how managing the resolution of a construction dispute is similar to managing a construction project. The management process needs to be implemented at the outset, requires good scope definition, a proper plan, a budget, and an adequate control system. The process often requires an important amount of data analysis, for which the use of construction analytics can be beneficial. The presentation focused on the application of selected principles of project man-
agement to the dispute resolution process in the construction industry, and how embedding construction analytics can improve the process.

Key points included risks during dispute resolution, applying the project management process, data analysis and embedding analytics and successful outcome. The session concluded with active audience participation and discussion. Thanks to Deloitte for graciously providing meeting facilities in the most recent office tower on the Montreal skyline.

On April 5, the Montreal Section enjoyed a double header on the theme of project management, featuring two excellent presentations. The first was given in English and the second in French.

The first was entitled, “Decision Quality: Tools and Techniques” and was presented by Fadi Najdi, MBA, CPA, CMA, project manager at ABB Canada in charge of Capital Projects. The presentation discussed the six main elements considered in decision making, along with an overview of the related tools and techniques. The Decision Quality approach described provides insight and clarity that leads to alignment and high quality decisions and has been adopted by some of the leading organizations in the industry.

Mr. Najdi has experience in manufacturing and management consulting. He told attendees that, “It has been proven that humans are not wired to make consistently rational decisions. Biases and a lack of methodical approaches sometimes hinder optimal decisions. Practical tools and a systemic approach can be used toward an improved decision quality. This approach has been adopted in many large companies like Chevron, Conoco and Worley Parsons.”

The second presentation on Program Management featured two presenters from Hydro Quebec Equipment (HQE) including Richard Jaeger, MBA, program manager in HQE and team leader of the innovation committee and Dr. Noureddine Mouncef.
Mouncef. She holds a PHD in business administration and is from the project controls team with more than 20 years of experience in management, project controls and contract administration. Mr. Jaeger is an architect. He is program manager control buildings of TransEnergie in HQE and team leader, divisional innovation committee. He has many years of experience as an architect and in project management in different industries.

Their employer, HQESP-SEBJ, manages its projects through a combination of project and program management, with each project having their specific structure, targets and responsibilities, under the supervision of a common functional management.

Program management is defined as a group of projects managed in coordination to obtain certain synergies and benefits which would otherwise not be possible to achieve. The speakers presented the rationale, justifications and benefits of adopting the program management approach and shared some experiences of program management in HQE. The Q&A segment of the evening was bilingual. The facilities used were provide courtesy of Hydro-Quebec.

This past winter, the Montreal Section sponsored a panel discussion on planning and scheduling entitled “Planning and Scheduling: an Owner, Consultant and Contractor Viewpoint” attended by 60 members and other guests. Michel Guerremont, PE, M.Sc., PSP, PMP and scheduling advisor at Hydro-Quebec served as the facilitator and moderator for the event. The panel consisted of Marc Imbeau, PE, Project Controls Manager at Hydro-Quebec Equipment, Beatrice Nasui, PE, M.Sc., Lead Scheduler at Hatch in Montreal and Patrick Habib, PE, VP and Associate at LCO construction and management consultants. Respectively they represented the owner, consultant and construction contractor views.

The panel started with a technical introduction by Michel, sharing common scheduling challenges and referring the audience to available scheduling documents available from AACE International (guides, books, RP’s). A series of questions were addressed to the panel on topics such as: scheduling software, scheduling process, scheduling market trends, critical path scheduling, schedule levels of details, baselines, schedule updates, schedules integration, schedule flaws, resource allocation, as-built schedules, 4d scheduling and schedule reviews.

A lively discussion ensued with the panelists engaged in dialogue between themselves and the audience. The panel discussion has become an annual event at the technical meetings. SNC-Lavalin provided the meeting facilities.

Qatar Section

On June 23, the Qatar Section organized a one hour technical session, “Practical Approach on Integration of Planning and Cost Control.” The session was presented by Shanmuga pandian Thangavelu, a planning and cost control manager with a leading contractor working in Doha, Qatar.

Approximately 80 people enjoyed dinner at the Gokulam Park Hotel. It was enjoyable to meet a lot of enthusiastic people ready to share their knowledge and have a nice dinner all together. The Qatar Section is proud to have received many positive comments about this event and will always try to offer better services to all its members and future members.

Mr. Shanmuga has over 24 years of professional experience in the field of project planning and cost control across various sectors/projects. These range from towers, malls and infrastructure projects. His fields of expertise include developing processes and implementing planning and cost control, developing strategies for baseline programs, reviewing baselines and subcontractor programs, preparation of EOT’s, preparation of risk analyses in Oracle Primavera Risk Analyzer, cost estimating and baseline budgeting.

The technical session objectives were to understand projects, project planning, project scheduling, Work Breakdown Structure, cost breakdown structure and resource breakdown structure. To get a feeling for a practical approach to cost coding structures and the cost control process, to be able to identify gaps and to map actual cost compared to budgeted cost, to have an overview of earned value analysis, mitigation and how to re-
duce risk (preventive measures and corrective actions) and cost control reporting.

On May 14, the Qatar Section conducted a technical session on, “Contractor Cash Flow for an EPC Simple Cycle Power Generation Project.” Due to increased market competition, as well as tight cash requirements in the construction industry, especially during this recent recession, the importance of cash flow has increased and become an essential part of construction projects’ life cycle. The presenter was Amir Attia who is a cost control manager working currently in Doha, Qatar. He is a certified CCP – PSP, MCIOB, PMP, SP, RMP, PMI and holds a project management diploma certificate from the American University in Cairo. With 25 years’ experience in project control on construction projects, he has worked for the contractor and in consultancy in Egypt, India, Kuwait, Germany, and Qatar, on a wide variety of projects ranging from main sectors, power stations, oil and gas, and infrastructure. This presentation discussed the process of preparing a contractor’s cash flow from tender stage to project hand over, for an Engineering, Procurement, Construction (EPC) project, which depends on how much information is available, and to what level of detail, in each phase of the project. This topic was attended by approximately 60 members and nonmembers who enjoyed two hours of this technical section.

On Saturday April 23, the Qatar Section organized a one hour technical session, “Design by the Backdoor – Contractor’s Design Responsibility Under Some Qatar Forms.” The presenter was Sean Vernon who is a commercial and contractual consultant working in Doha, Qatar. He is a qualified quantity surveyor and has worked for the employer, contractor, sub-contractor and in consultancy. He has worked in the UK, France, Germany, Poland, Slovakia, South Africa, UAE, and Qatar, on a wide variety of projects ranging from concrete repairs to high-rise housing to a multi-billion Euro nuclear power station. Currently he is associated with preparing extension of time and other claims for contractors in the Gulf area. Many forms of construction contract are in use in Qatar with many of them being home grown versions of the International Standard Forms, such as FIDIC. The contractor has certain design responsibilities under these forms that are often not fully understood or applied correctly. The aim of the presentation was to look at some Qatar construction contracts and explore the limits of the contractor’s design responsibilities under these forms. The presentation was attended by approximately 40 professionals who can benefit from it in their working situations.

**Southern California Section**

On June 16, Steven C. Hanna, Senior Vice President of Construction for developer CentralCal Properties, and John Thornton, Executive Vice President for Layton Construction made a great presentation of its 300 million planned redevelopment of the Redondo Beach waterfront. The 35 acre site will include a 20-foot wide boardwalk, parks, a 120-room boutique hotel facing the pier, and an upscale movie theater overlooking Seaside Lagoon, which would be opened to the ocean and transformed into a shallow beach with artificial reefs. Business owners in Redondo Beach have long called for revitalization of the aging and neglected waterfront. Two students joined the Southern California AACE members for the monthly meeting.

Some of the approximately 80 Qatar Section attendees are shown enjoying the section’s June event. The technical session was titled, “Practical Approach on Integration of Planning and Cost Control.”

Qatar Section presenter Amir Attiyah gives his presentation at the Section’s May meeting. Attia is a cost control manager from Doha, Qatar.

Qatar Section presenter Sean Vernon delivers remarks at the Section’s April meeting. Mr. Vernon is a commercial and contractual consultant from Doha, Qatar.
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 2016.

2016-2017 Source Section News Submission Schedule

February 2016
• Items submitted from Oct. 15 - Dec. 15, 2015

April 2016
• Items submitted from Dec. 15 - Feb. 15, 2016

June 2016
• Items submitted from Feb. 16 - April 15, 2016

August 2016
• Items submitted April 16 - June 15, 2016

October 2016
• Items submitted June 16 - Aug. 15, 2016

December 2016
• Items submitted Aug. 16 - Oct. 15, 2016

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. 17 - April 15, 2017

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.)
Robert Lee Kimmons
1926 - 2016

Robert Lee Kimmons, 90, passed away peacefully at his home with his wife and daughter by his side the morning of Sunday, August 14, 2016.

The son of Robert and Harriet Kimmons, Bob was born in Longmont, Colorado, on June 23, 1926. He grew up in Brush, Colorado, where he graduated high school. He later enrolled in the U.S. Navy while attending the University of Illinois Champaign Urbana. He graduated and obtained an engineering position with Creole Petroleum Corporation, which took him to Maracaibo, Venezuela, where he met his first wife, Evelyn. From that union he had four children: Ann, Simone, Robert, and Anthony. Life took him around the world and eventually led him to Florence, his wife of 42 years, who stood faithfully by his side.

Bob led a full life, and all that were close to him knew him for his enormous heart, intellect, determination, and his quick wit and amazing sense of humor. He was passionate about his work; not only managing countless projects, but authoring and publishing project management books, as well as industry related articles in professional publications.

Bob was an active member of AACE International and the Houston Gulf Coast Section (HGCS) for 29 years, from 1985 to 2014. Always in attendance at the monthly HGCS technical meetings, Bob encouraged us all. He always had a kind word for everyone and we enjoyed his stories and lessons learned from projects gone by. He was a member of AACE’s Claims & Disputes Resolution Committee starting in 2002, and passionately donated to the Scholarship Fund to further opportunities to the upcoming Young Professionals.

Bob’s obituary referred to his “countless friends”; yes, we at Houston Gulf Coast Section of AACE International definitely consider ourselves as part of Bob’s “countless friends.” He will be missed.

AACE International’s new website is almost ready. The forums area is not available at this time, but please bear with us as we are working on the transition.

If you need immediate assistance, please email info@aacei.org.
OCTOBER 2016

5-6 The 5th Annual Urban Renewal Conference, Trueventus, Goodman Park Hotel, Singapore
Contact: www.trueventus.com

5-7 IFMA’s World Workplace, The Singapore Chapter of the International Facility Management Association (IFMA), San Diego Convention Center, San Diego, CA
Contact: wgs1.net/ifma-sg/

9-11 The CMAA National Conference and Trade Show, The Southern California Chapter of the Construction Management Association of America (CMAA), San Diego, CA
Contact: www.cmaasc.org

12-13 Cloud Expo Asia, CloserStill Technology Events, Marina Bay Sands Expo and Convention Center, Singapore
http://www.cloudexpoasia.com/

12-13 The Facilities Management Summit Asia, Trueventus, Pullman Bangkok Grande Sukhumvit, Bangkok, Thailand
Contact: www.trueventus.com

2016 Mobility 21
Southern California Transportation Summit: Empowering California, Mobility 21, Disneyland Hotel Anaheim, CA
Contact: www.mobility21.com

Contact: www.registration.offshore-energy.biz

NOVEMBER 2016

9-12 The National Academies Keck Futures Initiative (NAKFI) Conference, Keck Futures Initiative, Arnold and Mabel Beckman Center, Irvine, CA
Contact: www.keckfutures.org

JUNE 2017

11-14 AACE International’s 2017 Annual Meeting, AACE International, Hyatt Regency Orlando, FL
Contact: phone 1-800-858-COST fax (304) 291-5728 info@aacei.org www.aacei.org

Please submit items for future calendar listings at least 60 days in advance of desired publication.

AACE International, 1265 Suncrest Towne Centre Dr, Morgantown, WV 26505-1876 USA
phone: 304-296-8444 fax: 304-291-5728 e-mail: editor@aacei.org website: www.aacei.org

SOURCE OCTOBER 2016 37
AACE INTERNATIONAL CONTACTS

PRESIDENT-ELECT
Charles E. Bolyard, Jr. CFCC PSP FAACE
703.641.9088 / preselect@aacei.org

PAST PRESIDENT
Julie K. Owen, CCP PSP
213.922.7131 / pastpres@aacei.org

VICE PRESIDENT-ADMINISTRATION
James “Jim” E. Krebs, PE CCP FAACE
734.207.1457 / vpadmin@aacei.org

VICE PRESIDENT-FINANCE
Christopher W. Carson, CEP DRMP PSP FAACE
757.342.5524 / vpfinance@aacei.org

VICE PRESIDENT-TECHNICAL BOARD
Larry R. Dysert, CCP CEAP FAACE Hon. Life
971.221.2101 / vptechboard@aacei.org

VICE PRESIDENT-EDUCATION BOARD
Martin R. Darley, FRICS CCP
713.892.0747 / vpedboard@aacei.org

DIRECTOR-NORTH AMERICAN REGIONS
Jacqueline T. Doyle, PE PSP
410.654.3790 / vpregions-na@aacei.org

DIRECTOR-INTERNATIONAL REGIONS
Philips Tharakan Mulackal, CCP EVP
971.50.631.4830 / vpregions-intl@aacei.org

EXECUTIVE DIRECTOR
Charity A. Quick, MBA CIA CCT
+1.304.296.8444 x1102
cqquick@aacei.org

DIRECTOR, GOVERNANCE,
MARKETING, AND MEETINGS
Jennie Amos
+1.304.296.8444 x1106
jamos@aacei.org

MANAGER, CERTIFICATION
AND MEMBERSHIP
Penny Whooley
+1.304.296.8444 x1104
pwhooley@aacei.org

COORDINATOR,
MEMBER SERVICES
Sharon Hardman
+1.304.296.8444 x1105
shardman@aacei.org

MEMBERSHIP ADMINISTRATOR
Emily Nigh
+1.304.296.8444 x1115
tbolyard@aacei.org

MANAGER, ACCOUNTING
AND ADMINISTRATION
Janice L. Johnson, CPA
+1.304.296.8444 x1107
jjohnson@aacei.org

ACCOUNTING ASSISTANT,
ACCOUNTS RECEIVABLE
Donna Williford
+1.304.296.8444 x1101
dwilliford@aacei.org

ACCOUNTING ASSISTANT,
ACCOUNTS PAYABLE
Molly Burrow
+1.304.296.8444 x1118
mburrow@aacei.org

www.aacei.org
1265 Suncrest Towne Centre Dr
Morgantown, WV 26505-1876
304.296.8444
fax - 304.291.5728
INDEX TO ADVERTISERS

ARES Corporation                   page 4
D.R. McNatty and Associates       this page
Ecosys                             Inside Cover
Infinitrac                         this page
Management Technologies            this page
Ron Winter Consulting              page 13

For additional information about the listed advertisers or about advertising with us, please contact Cassie LoPiccolo at: +1.304.2968444 ext 122, or e-mail clopiccolo@aacei.org
• NEXT MONTH IN THE
COST ENGINEERING JOURNAL •

Articles announced for publication in the
Cost Engineering journal are subject to change.

Technical Article
Project Cost Management
Prior to Conceptual Design

Technical Article
What is so Important about a
Project Controls Plan

Technical Article
Managing a Large Mill Tailings
Cleanup Project

Subscriptions to the COST ENGINEERING journal are included
with AACE International membership. For full membership
benefits and discounts, become an AACE International mem-
ber today, by visiting:
www.aacei.org/mbr/how2join.shtml