ACES NSW QUARTERLY NEWSLETTER

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ACES NSW

In this issue:

Message from the National Chair

Dear ACES colleagues,
ACES continue to provide a voice through branch and national level CPD and advocacy, and a summary of recent and upcoming events are listed in this newsletter.

Our Technical event titled "Using algorithms to create Faster, Accurate and more Reliable Schedules" delivered by Pieter Rautenbach on 4th May went very well with over 120 participants attending the session. The recorded version is also available on EA for Demand.

Moving ahead, we look forward to hearing our ACES colleague Ish Ahuja deliver a session on "Earned Value Management" as part of the PMI events and our NSW/ACT Vice Chair Ali Nami with a presentation on "Fast track delivery of Infrastructure Mega Projects". ACES will place a keen interest in assisting and engaging with students interested in the cost sector. I wish to encourage ACES members to reach out to the future generations of professionals interested in cost and to embrace collaboration with partners and universities in 2021.

As a final note, while we are now in the middle of receiving COVID vaccinations while getting on with our lives, we must not forget the many who have succumbed to COVID.

Leonardo Ferro
National Chair, ACES

Message from the NSW Chair

We all know that it's an interesting time for Australia's construction and the infrastructure industry. We have probably made through the initial set back from COVID 19 but it's not over yet. With major infrastructure and construction projects planned, we are trying to answer what our future cities and infrastructure should look like. The use of technology is part of the construction and infrastructure story. We are exploring some of these ideas in this issue of the newsletter. If you would like to get some more insights and information, please feel free to get in touch.

Abhi Datta
NSW Chair, ACES

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Upcoming Event

Earned Value Management

On behalf of ACES, you are cordially invited to attend a session on Earned Value Management which is being delivered by our ACES committee member Ish Ahuja on 10th June 2021.

Please find the details below:

PMI Sydney Chapter

PMI Sydney Chapter Evening Event: 10 June 2021 - Earned Value Management

Event Properties

Event Date	10-06-2021 6:30 pm
Event End Date	10-06-2021 8:30 pm
Registration Start Date	10-05-2021
Cut Off Date	10-06-2021 6:00 pm
Individual Price	$35.00
Location	Castlereagh Boutique Hotel

We look forward to learning in detail about how Earned Value Management brings cost and time, two diverse yet critical factors on an amalgamated scale and lets you compare the execution against planned. It brings you closer to precision in project planning and accuracy in performance for unmatched process delivery and empowers you to define responsibilities without burning out your team members and, at the same time, provide stakeholders the clarity in terms of the progress.

Join ACES

Get involved and make a difference!!

The Australian Cost Engineering Society (ACES) is both a technical society of Engineers Australia and a member of International Cost Engineering Council. ACES membership offers great value.

ACES is a member of International Cost Engineering Council

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Infrastructure Pipeline and Project Controls

We are all aware of the Infrastructure Priority list in Australia which is a pipeline for the evaluation and prioritisation of nationally significant infrastructure projects. The main areas of investment opportunities identified by the **2021 Infrastructure Priority List** that are of national significance include:

Export gateways – investment in ports and freight; in line with the existing proposals there are new investments identified to improve both the capacity and the efficiency of ports across the country. Some of the projects to aid this initiative are:

- Western Sydney Freight Line and Intermodal Terminal (NSW)
- Raill access to Webb Dock (VIC)
- Port of Burnie capacity (TAS)
- Australian Marine Complex Infrastructure Capacity (WA)
- Hobart Port precinct capacity improvements (TAS)
- Common user infrastructure at the Middle Arm Precinct (NT)

Renewable Energy - Globally we are seeing a transition to renewable energy sources. The priority list recommends investing in energy sources which can address the peak energy demands. Thus, the priority list recommends identifying a program of works to provide renewable energy to communities in remote NT.

Water Security is also a key priority for national investment. There is a greater Sydney Water security initiative, while priority initiatives include South East Melbourne recycled water supply infrastructure upgrades (VIC); Bowen Basin production water supply (QLD); Northern South Australia productive water security (SA) and Barossa Valley Region water supply (SA).

Development in regional and remote communities – including increasing digital connectivity and digital health services.

Social infrastructure – Investing in the social infrastructure is also critical in supporting the quality of life for all Australians.

All of this investment means efficient management of capital project and programs. With so many resources tied up in such initiatives, management of such projects effective has never been more important. These projects are risky because of certain factors highlighted below:

- These projects have long planning horizons and complex interfaces (Flyvberg 2006; Chapter 21, Davies);
- Often these projects are led by planners and managers without deep domain experience who keep changing throughout the long project cycles that apply to the projects;
- Decision making, planning and management are typically multi stakeholder dependent with competing priorities

- Technology and designs are often non-standard, leading to "uniqueness bias" which impedes learning from other projects There is a lack of modularization and standardisation in infrastructure projects.
- Frequently there is an overcommitment to a certain procurement concept at an early stage resulting in 'lock-in' leaving alternatives analysis weak or absent;
- Because of large sums of money involved, principal agent problems are inherent (conflict of interest needs to be managed closely);
- Statistical evidence shows that such complexity and unplanned events are often unaccounted for leaving budget and time contingencies for projects inadequate; and
- Misinformation about contingency, cost, schedule is almost a norm without a single source of truth.

It may be terrifying but good for awareness that performance data for mega projects show that 70-90% have cost overruns (*The Oxford Handbook of Megaproject Management*) , depending on project type. With all the above there has been no better time for us **Project Controllers** to come together with an intent to solve and an **intent to Lead**. Let our focus shift to outcomes and look at innovative ways to govern these projects. This may be individuals with accreditation and necessary competencies for applying / implementing 'fit for purpose' project organisations. ***Let's shape the future together.***

By Abhi Datta
Source: Infrastructure Australia Priority List

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Project Cost Tips: 3 Dos and Don'ts of Creating Estimates

As a contractor, finding the balance between profit and positive customer relationships can be tricky at times. Of course, there are many factors that go into creating an estimate, and that no two jobs are the same. Fortunately, there are plenty of ways to strike a balance by giving your clients an accurate and fair price without compromising on costs. Here are top dos and don'ts for creating estimates.

Be Accurate

Estimates are essential tools for contractors, and not only because they outline the specific costs of a project for potential clients. These figures are also useful for your records because they help shape your future estimates. That's why it's so important to include everything that you view as a cost for each project. Some of the most common costs include:

- Materials
- Labor
- Miscellaneous costs, including:
- Building permits
- Administrative and other fees
- Rental vehicles and equipment

Methodically listing and pricing each individual cost or stick estimating, as it's called in the industry is a common way of accurately estimating a building project. However, it can be very time consuming. Some contractors now prefer to estimate by using unit costs instead, while others make use of construction estimating software to make the job even quicker and easier.

Whichever estimation method you choose, remember that accuracy is key. Ballpark figures aren't good enough here; although it is just an estimate at the end of the day, your past projects will provide enough information to help you produce an estimate that is right on the money (so to speak!).

Be Honest

If there is one thing more important to your customers than a good price, it's honesty. This applies to the entire process of a building project, of course, but is particularly useful to remember when producing estimates for potential clients. If, for whatever reason, you decide to quote a price that is much lower than you actually anticipate, know that your decision will become evident sooner or later.

While under-estimating may secure a new lead and boost your clientele initially, rising costs throughout the course of the building project will soon become apparent. Once your client knows that the price you quoted isn't exactly accurate, you will lose their trust and, most likely, their business. A positive client-professional relationship is more important than a high profit margin at the end of the day, because happy clients will be more likely to become repeat customers who give you great reviews and more business.

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Be Professional

In any business, professionalism goes a long way towards creating a brand that is both reputable and successful. For contractors, staying professional during the estimation process means:

• Being honest – By following the recommendations outlined above, you will be able to provide your clients with an accurate and honest estimate for their works.
• Keeping a paper trail – Always provide written estimates for your clients to look over (it's also a good idea to keep a copy on file for future reference).
• Communicating your costs – Arrange a meeting to discuss a breakdown of your estimate with your clients, taking time to answer any questions or concerns they may have about the itemized prices.

If, after costing a project for a potential client, you feel like you can't commit to the expenditure, service, or time scale required, let them know as soon as possible. Part of your job as a contracting professional is making sure you are the right person for the job, so if it turns out you aren't, your clients will understand and appreciate your honesty.

Producing an estimate for every construction job you undertake may sound time-consuming and monotonous, but the benefits far outweigh the drawbacks. If your estimates are accurate, truthful, and clear, you will establish a positive relationship with new customers from the very beginning. This transparency will be appreciated by your leads and stand you and your business in good stead for a financially viable and successful future.

By Craig Pierce – Craig is the CEO at Construction Monkey based out of Denver Colorado, US

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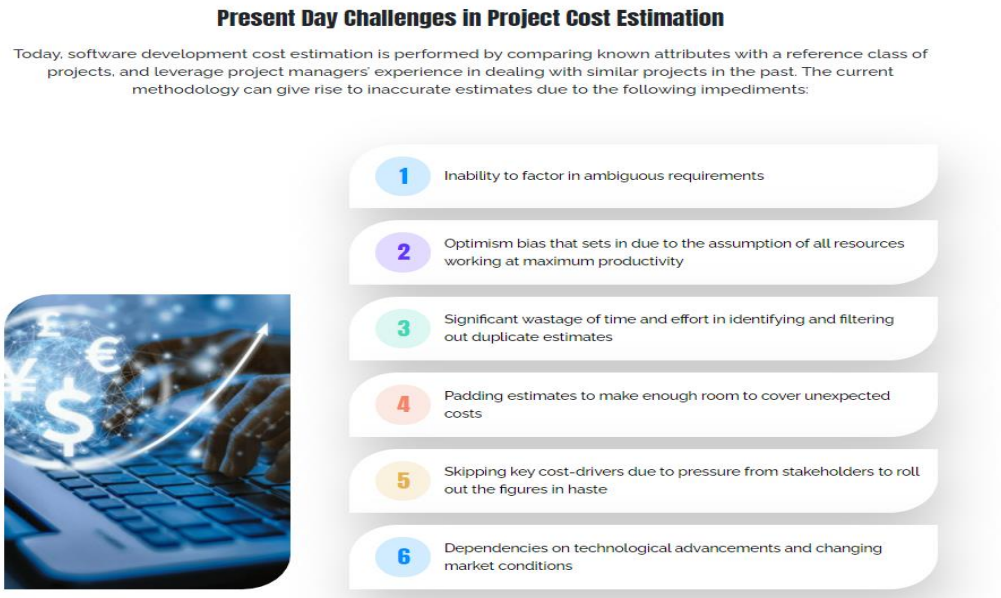
Can AI Transform the way we Estimate Construction Projects?

The construction industry faces an ongoing challenge of controlling construction costs and avoiding cost overruns. Various studies have documented that as an industry we deliver projects that are often delayed and cost more than estimated at the time of project inception.

While the construction industry is trying to engage new technologies like blockchain and use of drones at construction site, we need to make sure that we don't lose vision of the basic responsibilities of meeting the key project requirements of time and cost.

For nearly seven decades our industry have found the consideration of the Project Management Triangle quite useful as it has helped us gain insight of the complete Project Management lifecycle from concept, definition and development up to the handover and closure stage and has been used as a practice for measuring Project Management success. Under this practice, industry professionals have considered time, cost, and scope to constrain project outcomes and over the years, other constraints such as safety, sustainability, and risk have been added to the list.



How can AI help?

With increasing public scrutiny, the importance of managing project cost has again come into the forefront. Given this emphasis, we need to find out ways and means of how our industry can address the issue of cost overruns. Is there any way, we can make use of technology to improve the processes of estimating and budgeting in order to reduce cost overruns? More precisely can Artificial Intelligence (AI) improve the estimation of construction projects costs?

While the debate whether data is the new oil or not rages, it is clear to us that large volumes of data that are available due to the prevalent nature of digitization can help improve project estimates. Data analytics supported by AI techniques can help the industry professionals develop accurate estimates using organization-wide and industry-wide historical data.

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Broadly, AI can assist in the development of company-specific and industry-wide benchmarks that can reduce optimism bias and strategic misrepresentation. Specifically, AI can help the estimating process in the following ways:

- Classify and categorize unclassified cost data
- Develop statistical models for parametric estimating
- Identify reference class projects

Classify and categorize unclassified cost data

Unclassified cost data is generally available in a variety of electronic formats. AI tools that perform natural language processing can be used to classify this type of data into a predefined cost classification system. A natural language classifier can be first trained and tested using historical cost data. Once the system is trained, it can process large volumes of cost data from historical projects and classify it into cost categories and cost groups. After the data is classified, several important analyses including cost benchmarking can be performed.

Alan Muse, global director of built environment standards at RICS, commented: "Broadly, AI can assist in the development of company-specific and industry-wide benchmarks that can reduce optimism bias and strategic misrepresentation."

Develop statistical models for parametric estimating

Artificial neural networks (ANN) are a form of artificial intelligence that is inspired by the human nervous system; more precisely the neurons. It is one of the main tools used in machine learning. An ANN consists of an input layer, an output layer, and one or more hidden layers. All these layers consist of neurons that are connected by adjustable weights. The input layer receives inputs, and the output layer provides an answer to the problem that is being solved using the ANN. It is a good tool for parametric estimation where a statistical model between historical data and other variables is used to estimate the cost of a project.

For example, if we have historical cost data of 100 similar buildings that consist of key project attributes such as height of the building, constructed area, type of construction, class of building, building use, etc. along with the actual cost of the building we can design an ANN to predict the cost of a new building. Out of the sample data, we will use most of the data to train the ANN so that it 'learns' (by repeatedly comparing predicted output with the known output of the training data set and constantly adjusting the connection weights until predictions become accurate) to predict cost and then use the remaining sample data to test and validate the ANN.

After this process of supervised learning and testing, we can use input for a new building project to predict the cost by using the trained ANN.

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Identify reference class projects

For analogous estimating it is vital to identify a comparable historical project that can be used to estimate the cost of a new` project. Identifying and recalling the comparator project can be enhanced by using case-based reasoning (CBR) which is another form of AI.

In CBR a historical database of projects is used to 'retrieve' a similar project by matching a set of project attributes using a metric called similarity index. The project estimation information and knowledge from the retrieved project are 'reused' to arrive at a preliminary estimate. The data from the retrieved data is called the 'suggested' cost data, and the resulting solution is called the suggested solution. This solution is further improved via the 'revise' process which leads to the confirmed data for the cost estimate. The new project itself is 'retained' in the historical project database as a learned case or project for future use.

By Alan Muse and A. Sawhney
Alan is Global Director of Built Environment at RICS
Anil is a Construction tech enthusiast

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The Chartered Credential

What is Chartered status?

A mark of trust, skill and expertise, Chartered status is your competitive edge. Chartered status demonstrates that you are globally recognised and recognised by the community, industry and Government as professional.

Why is Chartered status important for Cost/Project Controls Engineers?

Until now in Australia, a standard and independent way to recognise and evidence cost engineering skills and expertise has been lacking. In response to this, Engineers Australia has introduced the Cost Engineering area of practice. Chartered status as an independently practicing engineer is required to join the National Engineering Register (NER). Registration as a Professional Cost Engineer, Associate, or Technologist is an independently certified way for you to demonstrate your skills, capabilities and expertise to Clients.

How to Become Chartered Cost Engineer? A Six Step Process:

You can manage the entire chartered process online, starting with the Self-Assessment.

Learn about Chartered Area of Practice

An Area of Practice is a subgroup of the engineering profession that practitioners align their skills and work activities with. Formal education, informal education and work experience will influence how an engineering practitioner identifies with an Area of Practice. Members can seek to become Chartered in one or more Area of Practice. An Area of Practice is the 'purpose' of your work not activities that are incidental to your work.

If you are already Chartered and want to add another Area of Practice, click here.

Upcoming Events / Webinars / Presentations

JUNE - Technical Event on Earned Value Management
JUNE/JULY – Webinar – Mega Project Governance and Controls setup
JULY/AUGUST - Technical Event on Fast track delivery of Infrastructure Mega Projects
JULY - Planning, Coordinating and Lookaheads in Mega Projects (TBC)
JULY - Design and Commissioning Management on Mega Projects (TBC)

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ACES NSW Committee

Here we come!

Leonardo Ferro	National Chair
Abhi Datta	NSW/ACT Chair
Ali Nami	NSW/ACT Vice Chair
Juan Vega	Committee Member
Yan Nang	Committee Member
Mano Manoharan	Committee Member
Ish Ahuja	Committee Member
Vipul Kumar	Committee Member
Henrique Heimfarth	Committee Member

Note: *Fellow ACES Committee Members - Pull up your socks & enter for your chance to win giveaway prizes by contributing interesting articles for the Q3 Newsletter!!*