



Story Link: <https://pacetoday.com.au/engineer-inside-system/>

The engineer inside the system

🕒 September 30, 2016 📁 Features 👤 AspenTech Australia

The changing engineering and procurement landscape

Now is not the time for engineering companies in Australia to be 'retiring' experienced design engineers, project engineers, and estimators. It has not been common practice in the past to electronically harness the decades of knowledge stored in the minds of these engineers, and when they leave the workplace, all this intellectual bounty goes with them.

According to a recent Australian Bureau of Statistics report, "Engineering construction activity is weaker and the pipeline of work yet to be done is diminishing, although there appear to be some positives, particularly in road infrastructure. After peaking in September 2012, the value of work done in engineering construction has steadily fallen, down by 32.6 per cent between the peak and March 2016. ABS figures show that employment of engineering professionals (across all industries) declined by 13.0 per cent over the year to May 2016."

As a consequence, many engineering companies are being forced to 'right-size', which means losing people and knowledge. However, before farewelling the engineers and estimators, there is an opportunity to implement the latest software tools to 'download' as much of the experience as possible. A downturn reversal is imminent so this knowledge and experience will be vital for future success.

Investment in mining development has slumped whilst further LNG projects have stagnated. The consequence of this is that engineering, procurement and construction companies (EPCs or E&Cs) have been forced to consolidate, merge, or simply close down, resulting in today's generation of estimators and engineers working under pressure to do more with less resources and adapt quickly to change. Additionally, many mergers and closures have resulted in the 'early retirement' of skilled estimators and engineers, and, with that, all their experience and knowledge. It is vital that EPCs embrace methodologies to meet customer requirements, cope with new tight economic conditions, and retain the intellectual capital.

Integrated economic evaluation software with built-in engineering and costing produces comprehensive, accurate conceptual estimates. Empowering estimators with cutting-edge technology enables them to rapidly and confidently evaluate capital investment projects early in the design process, understand all the economic implications of engineering decisions and manage projects more effectively. Further, the knowledge is stored by the software for future use – downloading the 'engineer into the system'.



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Engineers inside the system

The adoption of scalable, intelligent 'engineering-in-the-box' estimating and (Front End Engineering and Design) FEED software captures knowledge during each phase of the project lifecycle.

The software tool is like having an 'engineer inside the computer' that is as good as a team of disciplined engineers and estimators within the company. For example, it can instruct how to develop single line diagrams, teach how to organise and put together an electrical system. Alternatively, it is like a structural engineer that will show best practices for the design of structures and similarly in piping. Therefore, all the engineering knowledge is embedded within the software tool and helps the estimator to engineer, design, cost and validate information provided by engineering disciplines. The years of embedded knowledge within the tool help E&Cs to accurately and quickly reduce estimating uncertainty in bidding costs for design/build of a mine, LNG plant, chemical plant, and infrastructure projects.

Once the estimate is set up properly inside the model-based software, the estimator can make changes very effectively. For example, this could involve tank farms for a client, where the size of the tank's size, location and geometry layout and any other aspects of the configuration are altered. Using integrated software, the estimator can make changes within minutes for every option instructed by the client. This would not be possible using traditional spreadsheets.

Empowering the next generation

Attracting qualified employees is a major challenge to the industry today. There is a large population of employees close to retirement and there are not enough qualified engineers to fill the gap. Companies hiring and training their own estimators need to rapidly get less experienced staff up the estimating learning curve. This is achieved much faster by empowering users with a recognised engineering and estimating tool, as opposed to adopting a more traditional system of spreadsheets.

A real engineer in the system

The US operation of one of the leading global engineering companies, Linde Engineering, who have supplied their proprietary coil wound heat exchangers (CWHE) to most of the older and recent LNG plants in Australia (Kwinana, North West Shelf), has recently standardised on AspenTech's Aspen Capital Cost Estimator, ACCE, and extended its use throughout the organisation due to the ability of the software to keep projects on schedule and within budget, improve safety performance, and achieve the highest standards of operational excellence.



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According to Jason Stevens, Head of Cost Estimating, Linde Engineering North America Inc., "Today's generation of estimators and engineers are under pressure to do more with less and adapt quickly to change. With ACCE, and the long-term AspenTech partnership, Linde Engineering North America, can successfully work with owner-operators hand-in-hand to manage risk more effectively and improve overall operational conditions for our clients."

Built-in knowledge delivers enormous benefits. AspenTech's economic evaluation system empowers estimators to do more and achieve more timely and accurate estimates in collaboration with process engineering design. The templates and databases that are generated from using ACCE give the next generation of estimators a tremendous platform to add immediate value due to the inherent capability within the software product. For many E&Cs today, ACCE is an excellent tool for passing on the knowledge and skills from one generation to the next.
