



**Korea's SK E&C Reduces Engineering
Estimating Man-Hours by 50% With
Aspen Capital Cost Estimator™**

“The owner-operator was facing a decision to build a major refinery facility in Thailand. Aspen Capital Cost Estimator delivered a verifiable and confident budgetary estimate to the owner-operator, while providing SK with an easier, more flexible way to estimate the project.”

– Jaeyong Kim,

Plant Project Senior Estimator, SK E&C

50%

reduction in engineering and functional man-hours

CHALLENGE

Global competition in bidding and estimating capital construction projects is fierce, and SK E&C needed a technology and workflow process that allowed them to compete against low-labor-cost competitors. Specifically, the firm faced three main challenges:

- Target accuracy needed improvement.
- Existing estimating practices did not maintain sufficient data to execute a Class IV estimate.
- Bids could not be optimized, as time was spent developing the estimates rather than refining them.

SOLUTION

Aspen Capital Cost Estimator (ACCE) was chosen as the integrated estimating tool. SK E&C defined a path for deployment that was methodical and produced bids in a systematic manner.

- Bid accuracy improved through the calibration of the unit-rate estimate with SK historical data.
- Modular construction (digital twin) became an option because the unit-rate estimate format could be leveraged.

BENEFITS

After implementing ACCE, SK E&C was able to:

- Easily optimize the capital cost by selecting the best options and making the right decision
- Reduce wasted engineering and functional man-hours
- Start a bid with minimal scope definition
- Increase accuracy as well as consistency

Company Overview

Since its establishment in 1977, SK E&C has worked to transform itself from a well-known global EPC to a global Total Solution Supplier. The firm is renowned for services and solutions that span feasibility studies of design, procurement, construction and all cycles of facility planning and construction, expanding outside of its core upstream, midstream and refining business.

SK E&C was the first company to enter the LNG business in the United States and the oil sands business in Canada. It has used its unique abilities to continuously expand into the global market in Asia and the Middle East with projects such as Turkey's Eurasia Underwater Tunnel and the Laos hydroelectric power project. SK E&C has a corporate culture of innovation and excellence, and they apply this to their projects and business model.

SK E&C brings a unique perspective, as it recognizes exactly what the owner-operator seeks to obtain from a bid:

- Scenario analysis
- Understanding of financial planning (including budgeting after FEED)
- A cooperative engagement with EPC contractors
- A thorough cost comparison leveraging alternative designs

This perspective has helped SK E&C become the successful global company that it is today.



SK E&C reduced waste in engineering and functional man-hours to shorten estimate preparation time by 50%, while also improving accuracy by 50%.

Focusing on a Better Way

Since the fall of crude oil prices, capital investment in new facilities or revamp projects has dropped precipitously. The few projects that are currently being offered by owner-operators have inspired fierce competition among the E&Cs.

Many would assume that regions that enjoy low-cost labor would have an advantage over other regions like Korea, Japan, Western Europe and the United States for bid development and cost; but that is not always the case.

Many E&Cs in these low-cost-labor regions do leverage their cost advantage in developing bids, but that benefit is squandered or lost

because their estimating methods rely upon manual entry into Microsoft Excel-based spreadsheets.

- This limits flexibility, as design changes are not cascaded into all aspects of the bid, thereby consuming time and effort when seeking design changes or optimizing design alternatives
- It is also not an effective use of time, as the bid is founded on factor-based work, and factors need to be created and verified for equipment, capacity, Lang, installation, scaling and cost. Maintaining these consumes time that could be used to optimize the bid.

- In addition, manual entry limits the visibility of costs because the reporting structures cannot break down the sources of cost into meaningful reporting segments (COA, process type, process unit, material type, etc.).

SK E&C knew they needed to counter global threats to their business with technology that would enhance efficiency and develop bids that were more accurate, as well as providing flexibility to the business process when changing scope or work breakdown structure, along with the ability to reflect historical cost data.



The Low-Cost Approach Does not Always Win

SK E&C had global experience with Aspen Capital Cost Estimator at their Houston office, having leveraged its benefits for several years. In broadening its business beyond energy to other markets, the firm felt it made sense to bring this tool to its Korea office.

Before doing so, SK set internal targets for efficiency and accuracy, so that it could measure the benefits of the tool. The efficiency goal was set at **three to five times fewer man-hours**, and ACCE had already been shown to offer **50 percent better accuracy when measured against factor-based estimates**.

A six-step workflow was established for conceptual estimates using ACCE. The workflow reviewed the data (plant digital twin), prepared an estimate, executed the estimate, and then benchmarked and indexed against prior historical estimates to sharpen and adjust cost, thereby improving accuracy.

Putting Best Practices to Trial

The six-step workflow was applied to a major integrated petrochemical company in Thailand, specifically for a refinery revamp Class IV estimate. The results met the set goals with engineering man-hours being reduced 50 percent.

SK found ACCE to provide the following benefits:

- Easier optimization of the capital cost by selecting the best options and making the right decision
- Fewer wasted engineering and functional man-hours

- Less scope definition needed to start a bid
- Greater accuracy and consistency

The success of the trial and the entire deployment of ACCE to all projects will allow SK E&C to be more competitive in bidding capital projects or revamps. The flexibility, accuracy and consistency that Aspen Capital Cost Estimator delivers will allow SK to continue their global efforts to become the total solutions supplier that their customers value.

SK E&C Workflow to Prepare a Conceptual Estimate Using ACCE





Technology That Loves Complexity

About Aspen Technology

Aspen Technology (AspenTech) is a leading software supplier for optimizing asset performance. Our products thrive in complex, industrial environments where it is critical to optimize the asset design, operation and maintenance lifecycle. AspenTech uniquely combines decades of process modeling expertise with machine learning. Our purpose-built software platform automates knowledge work and builds sustainable competitive advantage by delivering high returns over the entire asset lifecycle. As a result, companies in capital-intensive industries can maximize uptime and push the limits of performance, running their assets faster, safer, longer and greener.

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