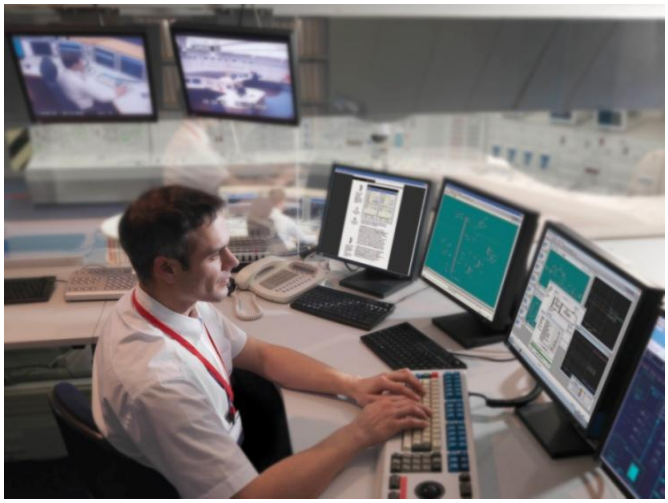
Product Information Note

UniSim® Design Link to Cleopatra Enterprise

Improving CAPEX and OPEX process engineering design by quickly estimating project cost



The Challenges

The oil and gas production, gas processing, petroleum refining and chemicals industries need to optimize their process designs to achieve more reliable and stable operations. For these companies, optimum designs must be quickly identified with minimum risk of rework to remain competitive and maximize business performance. Process engineers are challenged with making timely decisions to meet the business objectives of designing and operating efficient, safe and profitable plants.

During Conceptual and Front-End Engineering and Design (FEED) project stages, process engineers are required to quickly and effectively screen different process alternatives and to select the best configuration to produce on-spec, minimizing energy consumption and with minimum environmental impact. Of course, these design decisions will have an impact on the project budget. Applying a consistent and structured approach to design by estimating the cost implication of process configurations as early as possible in the project lifecycle will help customers save engineering time, improve project quality and optimize Capital Expenditure (CAPEX) and Operational Expenditure (OPEX) investments while maintaining the highest safety standards.

Today's market requirements can be summarized by the following challenges:

Project Cost Savings and Risk Mitigation: Assessing the effect of the different process alternatives early in the project lifecycle will have significant impact in the project economics.

Engineering Time Savings: Allowing engineers to quickly and easily determine the cost implications of their process design choices will reduce the number of man hours spent on evaluating expensive process configurations and validating data to support decision trade-offs.

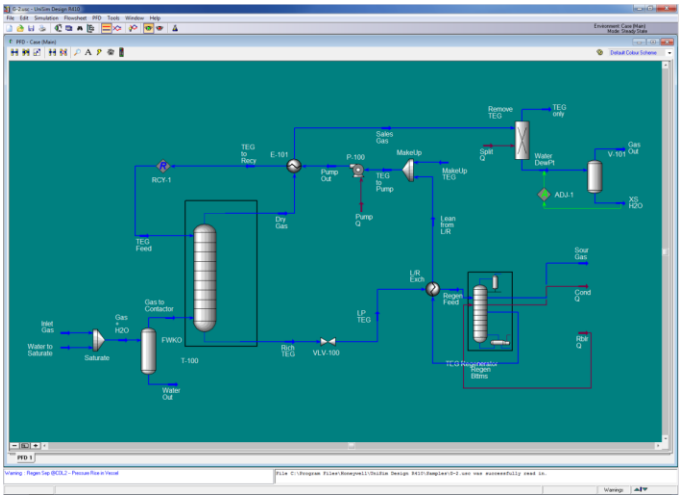
Reducing Re-Engineering: It is not uncommon that during projects, process design scope determined during the conceptual phase needs to be reviewed during the FEED and/or detailed engineering phase. Having a clear understanding of the potential cost implications associated with these scope changes will optimize the entire design workflow.

The Solution: *UniSim Design Link to Cleopatra Enterprise*

UniSim® Design Suite helps process industries improve productivity and profitability throughout the plant lifecycle. Its powerful simulation and analysis tools, real-time applications and the integrated approach to engineering solutions enables companies to improve designs, optimize production and enhance decision-making.

Simulating with UniSim Design reduces engineering costs by creating models that can be leveraged throughout the plant lifecycle, from conceptual design to detailed design, rating, training and optimization, providing a work environment that ensures work is completed quickly, effectively and consistently. This avoids the time-consuming and error-prone manual process

of transferring, formatting and analyzing production and process data that can account for up to 30% of engineering time.



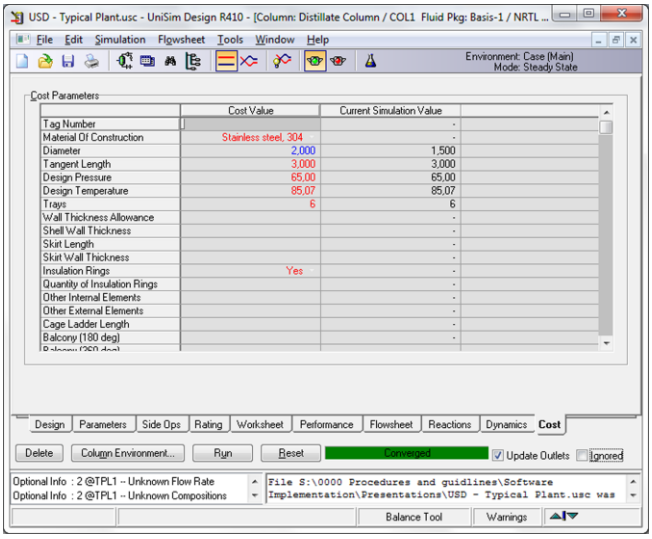
PFD (Process Flowsheet Diagram) Modeling Environment

Cost Engineering Consultancy (www.costengineering.eu) provides cost engineering services and software for capital projects of all types to owners and contractors and have engineered Cleopatra Enterprise, cost estimating software "developed by and for cost engineers".

Since 1996, Cost Engineering has helped over 250 companies by providing solutions for a wide range of industries. By using Cleopatra Enterprise users can improve their competitiveness in the market and increase their productivity by enabling them to:

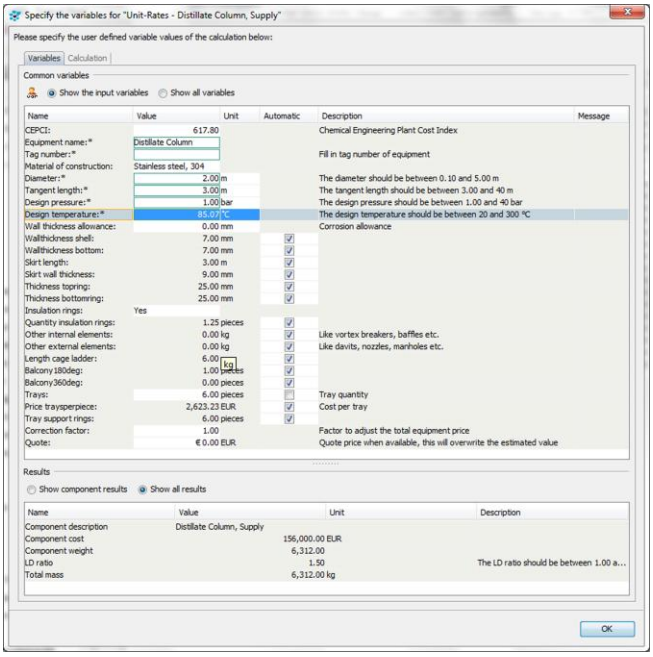
- Estimate, request bids, analyze and keep track of costs and resources
- Acquire real time detail estimating of MTOs derived from engineering systems
- Create conceptual estimates based on historical data and industry sources
- Adhere to standards: developed based on recommended practices from organizations like AACE
- Capture cost estimate relationship in advanced cost models

Cleopatra Enterprise can now be linked to UniSim Design in order to get the required process data to provide engineers with a cost estimation of the project. Since the release of UniSim Design R410, a Cost tab has been added to select unit operations in UniSim Design.



Cost Tab in UniSim Design - Process Data to Export

The Cost tab provides a summary of all the process data required by Cleopatra Enterprise to produce a cost estimation. Data is organized in two columns, displaying the data to be exported to Cleopatra Enterprise (Cost Value column) and the current Simulation Value. The advantage of this approach is that the user can directly export the raw data from their simulation or can override the proposed values if required. Once the process data has been imported into Cleopatra Enterprise, the UniSim Design process data will be automatically mapped with Cleopatra Enterprise's unit operation cost models to produce a cost estimation for the simulated project scope.



Imported Equipment Parameters into Cleopatra Enterprise

Benefits

Some of the benefits of the UniSim Design – Cleopatra Enterprise link are:

Cost Savings of Improved Process Design

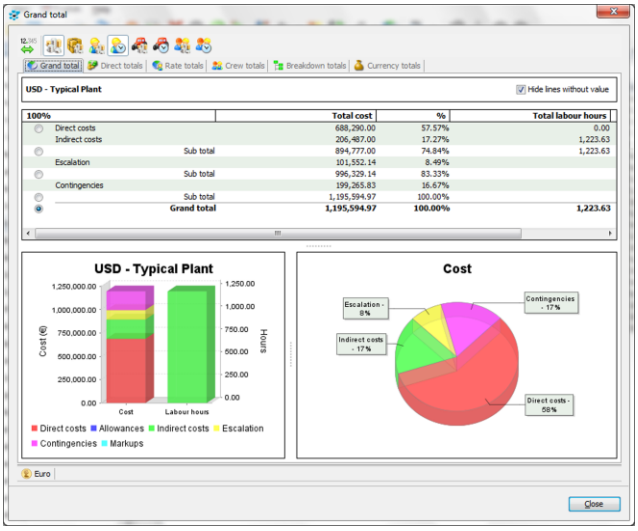
Understanding the correlation between process variables and cost helps engineers to design improved facilities with reduced energy consumption and less environmental impact. These improved designs can generate significant CAPEX and OPEX savings by identifying the potential cost consequences that under-performance will have in terms of shutdown, production loss, replacement of existing internals, etc.

Engineering Time Savings

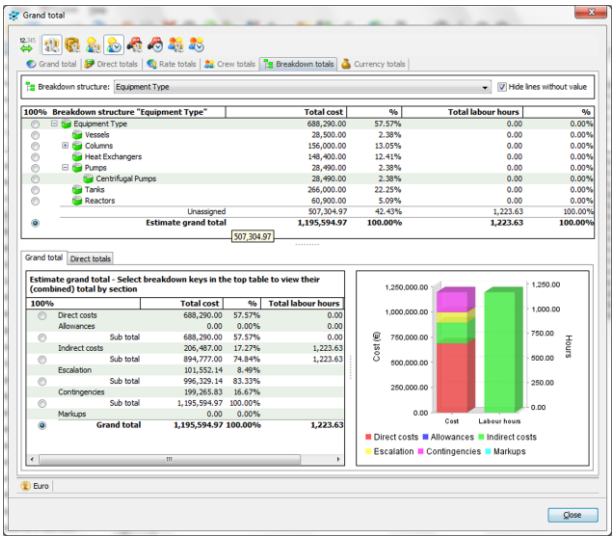
A process engineer taking advantage of the UniSim Design – Cleopatra Enterprise link will significantly reduce the man-hours invested on costing different process configurations. The link will also improve overall project quality as it smoothes and facilitates data transfer between the two applications.

Flexibility

Process engineers using this powerful tool will be able to optimize overall process design by having the ability to explore project cost implications beyond the process simulation scope.



Cost Estimation: Grand Total Overview



Cost Estimation: Breakdown of Grand Total

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