CLEARWATERBAY TECHNOLOGY, INC.
The Process Development Company

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HOW TO COMBINE PROCESS SIMULATION WITH PINCH TECHNOLOGY

HELPFUL TIPS

INSIDE THIS ISSUE:

SPECIAL POINTS OF INTEREST:

- **TECH TIP: "How to combine process simulation with Pinch Technology "**
- **Upcoming 4 Training courses in diverse fields of Process Development**
- **New course on Energy Issues**

In keeping with our new tradition, here is our latest *Tech Tip*. This segment is the second part of our cover story on Pinch Technology from the last issue: *Good Results Require Good Data Extraction—best practices and how to avoid common mistakes*. You can read it at http://cwbtech.com/downloads/Newsletter_November_2007.pdf

Process simulation and Pinch technology are powerful tools for optimizing processes and finding process alternatives, especially when they are used together. However there are also many pitfalls and mistakes that can be made which may provide misleading or incorrect answers. Here is a collection of helpful tips that can help minimize errors when implementing pinch technology for process simulations.

- Stream mixing can reduce heat quality. Best heat recovery is when hot streams are not degraded in quality by mixing with cold streams. Isothermal mixing is best, but feasibility depends on thermodynamic properties of the streams.
- Watch for changes in stream heat capacity, especially phase changes. See Figure 1 for an example of inappropriate linearization. The stream is cooled as a gas, which has a low heat capacity initially, then condensation begins to occur. Thus a lesser proportion of the heat is available at the higher temperature.

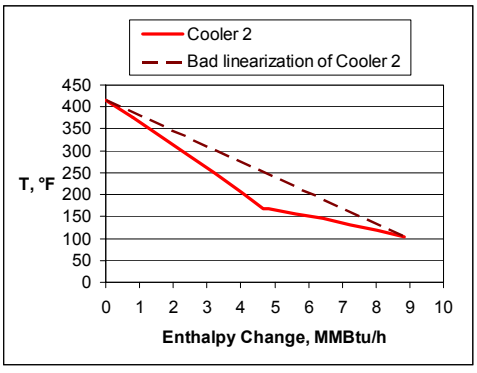

Figure 1

- Make sure that streams in the pinch program are feasibly available for heat exchange matching and utility matching.
- Many simulators can easily give you temperature-enthalpy printed out in small increments for each heat exchanger (e.g. called H-curves in Aspen plus). Good idea to use this before you are familiar with the process and know which regions to select for linearization.
- Be mindful the rather harsh reality of being +/- on one side of a utility temperature. 0.1 °C or less can mean the difference between chilling out with cooling water or freezing by expensive mechanical refrigeration in the numerical world. Watch for practical utility assignments—you may have to modify the simulation or massage the data or stream DTmin slightly to get the realistic answer.
- In some pinch programs, small roundoff errors can cause the program to go bonkers. Sometimes a number like 39.9998 changed to 40.0 ° C can fix the situation.
- Reactors can be a source of input error. For example a multi-tubular reactor with cooling medium can have a temperature rise AND reject heat if the reaction is exothermic. Make sure the difference in temperature of the source and destinations of the streams is consistent with the direction that heat is flowing.

You can email us with suggestions for a featured article. Contact us today for your process development needs!

UPCOMING TRAINING COURSES

1-Day AIChE Course
Title: Reaction Process Development: From Bench Chemistry to Reactor Scale-up
Venue: New Orleans Convention Center, New Orleans, Louisiana
Date: April 6
Registration: http://www.aiche.org/Conferences/SpringMeeting/ShortCourses/index.aspx
Course Code: S7

2-Day ASME Course
Title: Multi-disciplinary Process Development from Lab to Plant
Venue: Houston, Texas
Date: June 23-24
Registration: www.asme/org/education
Course Code: CH757
Credits: 1.5 CEUs, 15PDHs

2-Day Public Course
Title: Practical Strategies for Energy Issues of Chemical Plant Complexes: Design, Management and Planning
Venue: Hilton University of Houston, Houston, Texas
Date: June 26-27
Registration: www.cwbtech.com/short_courses.html

2-Day Public Course
Title: Crystallization Process Development – from Lab to Plant
Venue: Regus Philadelphia Center, Philadelphia, Pennsylvania
Date: August 21-22
Registration: www.cwbtech.com/short_courses.html

天然ガスからのLPG

Recently CWB has completed its report to Japan Gas Synthesis Co. for last year's work. The report, which was delivered in Japanese, is titled "天然ガスからのLPGの生産, リアクター設計研究, " or in English, "Production of LPG from Natural Gas, A Reactor Design Study." Many thanks to Hideo Iketani and his computer for translation help! Last year's work focused on initial screening and cost estimation of the reactor. The report advised on the best reactor selection among fixed bed, fluidized bed, and slurry reactors that were considered. The process itself, a novel gas to liquids (GTL) process that converts syngas to liquefied petroleum gas, LPG, was evaluated in a prior year's study. The process is a promising method to increase LPG supply and has the advantage of only needing one reactor for the entire conversion, compared to 2 or more for the methanol or Fischer Tropsch based synthesis routes. Japan Gas Synthesis Co. is now seeking funding avenues for commercialization of this process.

HAPPY NEW YEAR 2008

2007 brought several new opportunities for CWB Tech. We moved to our new office in Pomona, CA and also opened a new branch in Hong Kong. In 2008 we continue to offer our expert services in the form of consulting projects and new training courses. We value the support of our customers and will continue to offer our process development expertise.

Here are a few pictures from our annual dinner and CWB Tech's 6th birthday party. CWB Tech members had a blast with kite flying, tennis competitions and a stylish dinner.

For detailed information on our upcoming training courses, contact us at shortcourse@cwbtech.com, or Hideo Iketani of I.T. Solutions at iketani@its-ykh.co.jp

NEW COURSE

Practical Strategies for Energy Issues in Chemical Complexes: Design, Management and Planning

This course is designed to give an overview of several modes of energy study , designed to improve your thinking to identify meaningful energy reductions that may help your company's overall performance. Fundamentals and new tools will be taught in detail, with a chance for interaction by means of hands-on workshops Register today by emailing us at short-course@cwbtech.com

CWB Tech President Dr. Lionel O'Young receiving the prestigious Computing Practice Award for 2007 from the CAST division of the American Institute of Chemical Engineers. The award was handed at the 2007 annual AIChE meeting in Salt Lake City, Utah.

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