



FEATURE REPORTS

Draining Process Vessels

Summary: This article develops the equations that a process engineer can use to easily estimate the time required for draining a vertical cylindrical process vessel with a flat bottom, cone bottom or an ASME F&D (dish) bottom. Unlike other articles, the effect of the connected drain line is included in the analysis.

Related equipment and services: Tanks and vessels, pumps, piping

Dynamic Modeling for Developing Steam-System Control Strategies

Summary: One of the most energy-intensive utilities for many chemical process industries (CPI) facilities is the steam system. Traditionally, steam-use optimization has centered on efficient heat transfer and eliminating waste. Further optimization can involve a broader look at how steam supply and consumption interact dynamically throughout a large complex. This type of optimization often results in increased interconnectivity and interdependency, and a control strategy that is stable and appropriate for a particular complex is needed. Steady-state modeling and steam balances only show the endpoints of system behavior. Dynamic modeling fills in the space between these endpoints, providing a more complete analysis. With potentially billions of dollars in capital investment depending on a reliable supply of steam, employing dynamic modeling during the design and development of integrated systems is worth the extra effort. This article breaks down the task of setting up a control strategy into four basic steps.

Related equipment and services: Steam systems, industrial control systems, modeling software

NEWSFRONT

Chemical Engineering Education

Summary: This news feature will explore some of the recent developments in the effort to prepare new and experienced chemical engineers for the requirements of the modern workplace.

Related equipment and services: Chemical engineering books, textbooks, websites, training courses, continuing education classes

Explosion Protection

Summary: This equipment news synopsis will discuss trends in products that prevent or suppress explosions, as well as explosion-proof equipment.

CHE.COM

Related equipment and services: Equipment designed for potentially explosive environments, equipment designed for preventing or containing explosions in flammable gases and dusts

Send editorial material for consideration to contributing editor, Joy LePree (jlepree@che.com)

FRACTIONATION COLUMN

Summary: This monthly column in *CE* is written by the technical director at Fractionation Research Inc., a consortium of end-users, engineering companies and distillation equipment providers that pool budgets on distillation research.

Related equipment and services: Distillation towers, trays and packings, tower-scanning equipment and services

FACTS AT YOUR FINGERTIPS

Drying and Evaporation

Summary: This one-page reference will outline several considerations for optimizing spray-drying operations.

Related equipment and services: Spray-drying systems and equipment, nozzles, cyclones, bag filters

FOCUS

Software

Summary: The June issue will feature a focus on computer software for the CPI. The Focus will present the latest versions of software for modeling, simulation, design and calculating mathematical equations.

Related equipment and services: All types of software

Send editorial material for consideration to senior editor Gerald Ondrey (gondrey@che.com)

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The Achema Daily closes on May 25th. Don't miss out on this great opportunity to increase company exposure at the world's largest trade show for the chemical process industries!



ENGINEERING PRACTICE

CFD Analysis to Study the Impact of Heat Transfer from Flares on Structures

Summary: Though modern flare systems are specifically designed to reduce the thermal radiation, pollution and acoustic impact of a flare, a considerable amount of radiation is emitted by an operational flare as a result of burning of large quantity of combustible gases. The emitted radiation increases the temperature of the flare support structure and the nearby structures. It is essential to correctly estimate the heat transfer from the flares to the structures for designing of the structures, selection of the materials of construction (MoC) for structural items, selection of protective paints and so on. Flare vendors sometimes provide temperature data on structures vis-à-vis distance from the flare tip based on prediction of their proprietary software, experimental data or correlations. In most of the cases, these predictions are on 2D planes and detailed temperature data on 3D geometries of the structures are not available. In reality, temperature of flare support structure and the surrounding structures depend on several factors such as ambient air velocity and direction, geometry of the flare tip, composition of the combustible gases etc. and hence correct estimation of the predicted temperature is very difficult unless a detailed mathematical modeling of the entire system is carried out. This paper deals with CFD analysis for prediction of temperature on neighboring structures of flares. In the current study, comprehensive CFD analysis combining the effect of fluid flow, combustion and heat transfer inclusive of radiation has been carried out for an offshore oil & gas process complex.

Related equipment and services: Software (computational fluid dynamics, thermal analysis), flare systems and supporting equipment

Modeling Green Projects to Evaluate Economic Impact

Summary: Modeling a process or proposed process to see if it meets project requirements is an economically viable way to enhance the conceptual demand. In terms of assessing the potential environmental impact of a process, modeling efforts provide engineers with a convenient means of identifying the most promising green processes, in terms of capital investment and return. This article provides a detailed example of such a modeling exercise, which provides an assessment of the potential impact of switching to a synthetic fuel produced from municipal waste.

Related equipment and services: Modeling software, consulting services related to modeling, process control systems, combustion systems, furnaces

Avoiding Problems During Distillation Tower Startup

Summary: This article provides practical tips and tools for both efficient startup and effective problem analysis for a distillation tower (depropanizer unit) that was experiencing loss of the downcomer seal. The symptoms observed and sequence of events that were involved to rectify the problem are discussed in detail.

Related equipment and services: Distillation towers, tower internals (trays and packings), liquid-level instrumentation, flowmeters, distillation-related modeling software, condensers, strippers, chilling systems

A Novel Isothermal Pipeflow Equation for Ideal Gases

Summary: Compressible flow in pipes is common, and is typically associated with gases in which the density changes when subjected to pressure variation. The simple isothermal model is applicable to uninsulated long pipelines. It has been noted that the flow equation results in somewhat higher mass flux than would be expected. A newly derived isothermal flow equation for ideal gases yields more conservative mass flux predictions.

Related equipment and services: Piping, modeling software for piping, pipeline equipment for gases

SHOW PREVIEW

Achema 2012 Preview II

Summary: The June issue will continue last month's presentation of new products and services being exhibited at Achema 2012, the 30th World Exhibition Congress (Frankfurt am Main, Germany; June 18–22).

Related equipment and services: All types of CPI equipment

Send editorial material for consideration to senior editor Gerald Ondrey (gondrey@che.com)

LOOK FOR THESE ARTICLES COMING IN THE JULY ISSUE:

Feature Reports

Corrosion

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Equipment Focus

High Purity Processing

Equipment Newsfront

Catalysts

Facts at your Fingertips

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