

None of the groups, however, critically examined the weakest link in their predictions, namely the correlation for the heat transfer coefficient. None of the groups went to the primary literature to examine the limitations and potential errors of the heat transfer coefficient correlations they used. To address this, the problem statement could be improved by explicitly requiring each group to estimate potential sources of error in their analysis.

The students' responses to this problem were generally quite favorable. Several students commented that they enjoyed the challenge of designing and conducting an experiment. This problem also provided a change of pace from the standard lecture format and problems that require solving a partial differential equation—typically the mainstay of graduate transport classes. The open-ended and nonspecific nature of the problem statement was of some concern in developing this problem, but a survey given to the students at the end of the semester indicated that the problem statement was not too vague and that the level of difficulty was appropriate. Also, all students indicated they found that working in groups was helpful for this problem.

SUMMARY

We have presented a simple experimental and analytical problem concerning the drying rate of the typical bath towel. This problem can be incorporated into a graduate-level transport phenomena class with no cost and relatively little effort on the part of the students. The problem uses common items to demonstrate an important concept in coupled mass and heat transfer. Students must reconcile differences between experiments and the heat transfer or mass transfer coefficient obtained from correlations found in standard textbooks.

The problem also provides an excellent opportunity for critical thinking. We will modify the problem statement to include an explicit statement requiring students to critically examine both their experimental design and their analytical solution.

REFERENCES

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Dear Sir:

Safety in the chemical industry has moved to center stage since the Bhopal tragedy of 1984. It is usually achieved by add-on equipment such as controls, alarms, and trips after the plant has been designed. A concept, called Inherently Safer Design (ISD) by Professor Trevor Kletz, has captured global attention and is gaining support from industry as well as researchers. It parallels "Pollution Prevention" and "Waste Minimization" concepts in pollution control and is in tune with similar other concepts such as "Green Chemistry," "Sustainable Plant Design," and "Life-Time Cost Analysis," etc. Basically, it builds safety into the process development and early design stages so that the add-on safety measures are not needed or are minimized. Further, the remaining risks are more easily controlled. The leading professional bodies, such as the Institution of Chemical Engineers (U.K.) and the American Institute of Chemical Engineers (U.S.A.) are actively supporting it, as are the regulators, such as the Health & Safety Executive (U.K.).

Realizing the significant potential of ISD to provide a quantum leap in process safety, the U.K. Engineering and Physical Sciences Research Council has funded a project on making its use more widespread and user friendly. As a step in that direction, we wish to determine the current status of ISD use by way of a brief questionnaire. It can be obtained from our web site as follows:

For responders from industry and consulting organizations

http://www.lboro.ac.uk/departments/cg/isd/isd_ind/htm

while those from academia, research and development organizations, and regulatory bodies should download from

http://www.lboro.ac.uk/departments/cg/isd/isd_acd/htm

The questionnaire takes less than ten minutes to complete. We would be grateful if your readers will spare the time to do so at the earliest time possible and return it by e-mail, fax, or post. After all, all chemical engineers have a stake in making our industry safer so its public image, as well as its profitability, improves.

The responders to our questionnaire will be kept posted on future developments in this project if they indicate on the questionnaire that they want updates.

Thank you,

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