

# An Application of an Expert System to a Distillation Column

吳明鋒、涂瑞澤

E-mail: 8515655@mail.dyu.edu.tw

## ABSTRACT

Distillation is one of the most important and frequently used unit operations. Accidents may take place during an operation of a distillation column due to operator's mistakes. Some of the accidents may be severe and could cause a big loss to the plant. More often than not, a new operator needs instructions from senior operators or engineers to solve some problems. It is almost impossible to have an experienced engineer to accompany to an operator all the time. It would be great to have an expert system to store all the operation and maintenance experience owned by those senior operators and engineers into a database. Whenever an abnormal situation occurs, the inference machine in the expert system can figure out the possible problem and then activate an alarm to warn operators at an appropriate moment. Furthermore, the expert system may be able to propose some more problem solving sequences for operator's reference. In some occasions, the system may even act as an operator to correct the problem. Doing so, it will be able to reduce heavily the loss in personnel and materials. In this study, a computer simulation program for multi-component distillation has been developed. A 3-component mixture consisting of acetone, n-hexane and ethanol is used as a feed. The simulation model is then verified with a real distillation tower. Under the same operating conditions, we compare the composition of distillate and bottoms of the real distillation column with those obtained from the simulation. Comparison results are satisfactory. Finally, an expert system is super-positioned onto the simulation model to become a powerful control system. In order to reduce the difference between this system and a real distillation column, this system efficiently uses the multi-tasking function provided by the Windows software to build a simulation program. We believe that the expert system can make the operation of a distillation column safer and more smooth.

Keywords : Expert System ; Distillation ; Artificial Intelligence ; LEVEL5 OBJECT

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## REFERENCES

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