Troubleshooting guide system in refinery

Junghwan Kim, Que-Cheol Lee and Il Moon

Abstract

Over one thousand of troubleshooting cases in a refinery company have been collected, classified and stored in a knowledge based system. A troubleshooting problem is one where something occurs that in unexpected to such an extent that it is perceived that some corrective action may be needed. The troubleshooting is defined here as: 1) to initiate emergency shutdown procedures; 2) to forget the situation; it will eventually correct itself; 3) to return the situation to "safe-park" and identify and correct the cause and try to prevent a reoccurrence; 4) to identify and correct the cause while the process continues to operate under current conditions. The trouble occurs somewhere in a system that consists of various pieces of interacting equipment run by people. Engineers often have trouble with equipments and have to quickly and successfully solve problems that occur. The TSR database system provides systematic lessons and know-how to solve the troubleshooting cases. This system is very important and useful in refinery companies. Using this system, it is capable of trouble-free operation to prevent trouble before it occurs. When the troubles previously occurred and recorded, the system also minimizes trouble impact.

In order for the TSR database system to be useful, comfortable and compatible with other related software, this system is divided into four windows; an input window, a search window and two output windows. Each window has its own contents. Some contents are general such as a report’s number, name and team of members, a trouble occurring date, the trouble name, the contents of trouble and the amount of loss, others are special such as type of process, involved equipments, a period of operation, the causes of trouble, improvements, attached files and so on. Several contents have additional sub contents. 1) The involved equipment has the rotating equipment (pimples, compressors, mixers, etc.), the stationary equipment (boilers, heaters, etc), the instrument, the electric equipment. 2) The period of operation has normal operation, normal shutdown, emergency shutdown, startup and turnaround. 3) The contents of trouble has shutdown, slopping, feed down, the influence of product’s quality, hunting, sweet accident, noise, etc. 4) The causes of trouble has erosion, coke plugging, human error, sealing, catalyst, design, vibration, etc.

To develop this system, we collected troubleshooting cases first. In this step, human cooperation including engineers and operators is a very important factor. Many troubleshooting cases are classified in a knowledge based system. Classification is sophisticated and systematic. Therefore, this systematic classification developed in this paper helps engineers to search and use the TSR easily. Additionally, we use this system in vocational training (education). Finally, a knowledge database system is organized with a user-friendly interface. The TSR database system is useful and comfortable. This system prevents the troubles that make the amount of loss. It also raises the efficiency of production in refinery.

Practical uses of this system will be introduced in the presentation.