化工学报 2008 59 (1): 111-117 ISSN: 0438-1157 CN: 11-1946/TQ

过程系统工程

基于案例推理的HAZOP分析自动化框架

赵劲松, 赵利华, 崔林，陈明亮，邱彤，陈丙珍

北京化工大学信息科学与技术学院;清华大学化工系

收稿日期 2007-1-23 修回日期 2007-8-10 网络版发布日期 2008-1-14 接受日期

摘要

危险与可操作性（HAZOP）分析是一种广泛应用于化学流程工业的危险分析方法。为克服现有的HAZOP分析专家系统在“非常规”分析方面的局限性，提出了基于案例推理（CBR）的HAZOP分析自动化方法，描述了案例库及案例结构，给出了案例搜索策略。为便于案例库的知识管理，开发了案例构造器。工业实例应用结果表明，基于CBR的HAZOP专家系统突破了现有HAZOP专家系统没有学习能力和不能进行“非常规”分析的技术瓶颈。

关键词

危险和可操作性 案例推理 化工过程安全

分类号

Case based reasoning framework for automating HAZOP analysis

ZHAO Jinsong, ZHAO Lihua, CUI Lin, CHEN Mingliang, QIU Tong, CHEN Bingzhen

Abstract

Hazard and operability (HAZOP) analysis is a widely recognized process hazards analysis (PHA) technique used for hazard identification in the chemical process industry in the world.To overcome the shortage of the existing HAZOP expert systems with regard to “non-routine” analysis, a case based reasoning framework is proposed in this paper.The case base and the structure of cases are briefly described and the case search and matching strategies are presented.To facilitate the management of the knowledge base, a case constructor is developed.The industrial case study demonstrates that the CBR-based HAZOP expert system has overcome the technical bottleneck of the existing HAZOP expert systems in machine learning and “non-routine” HAZOP analysis.

Key words

HAZOP case based reasoning chemical process safety

DOI:

通讯作者 赵劲松 zhaojs@mail.buct.edu.cn