



دهمین کنفرانس بین المللی مهندسی صنایع

Tenth International Industrial Engineering Conference

۷ و ۸ بهمن ماه ۱۳۹۲

27-28 January, 2014



A Fuzzy Linear Programming for Improvement of Accident Investigation in Industrial Processes

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Abstract— Accident models and analysis its methods involves how an accident happens and organizing which causal factors helps the accident and which recommendations are issued. Industries such as air traffic control, nuclear power plants, space missions, chemical and petroleum industry, healthcare and patient safety is leading to potentially disastrous failure modes and new kinds of safety issues as well. These industries are facing with numerous models developed for accident investigation; however, little effort has been devoted in order to develop methodology in accident investigation. The main purpose of this study is to develop a model for screening and ranking of the appropriate accident investigation models in different application fields. So first of all the appropriate factors describing advantages and disadvantages of the accident models are determined through a literature review. After that some of accident investigations that uses more in industries listed to rank with the most important criterion of industries and accident investigation models. Then a fuzzy data envelopment analysis (FDEA) is presented to find the most appropriate accident model according to its pros and cons. The application of the proposed model is illustrated through subjective analysis of accident models accessible in nuclear power, aviation, and chemical industries.

Keywords-component; Accident Investigation; Fuzzy DEA; Industries; Safety system

I. INTRODUCTION

Safety Systems are commonly tries to provide a system that prevents injury to or loss of human life and damage of explosions. Highly technological systems such

as maritime, air traffic control, telecommunications, nuclear power plants, space missions, chemical and petroleum industry, healthcare and patient safety are becoming more complex nowadays and we can see the increasing of notable disasters and accidents such as the Bhopal toxic gas release disaster, the NASA Challenger shuttle explosion, and critical aviation accidents such as the 1993 Warsaw accident are some examples of system failures in complex systems that lead to serious loss of material and human life. Large complex systems like the Bhopal chemical plant and the Operation Provide Comfort Command and Control System are semantically complex. Accident models provide a conceptualization of the characteristics of the accident, which typically show the relation between causes and effects. They explain why an accidents occurred, and are used as techniques for: risk assessment during system development, and *post hoc* accident analysis to study the causes of the occurrence of an accident, to dominate the prevention of an accident this is important to use the proper accident investigation for the relevant industry because we can't expect a company to correct use a system who don't use it in appropriate system size. This paper is a good reference for industries to choose their appropriate accident model for evaluating their system because there is not a good reference to allocate industries to appropriate accident models that we can see it in literature review. Actually we try to collect information about advantages and disadvantages of accident models, this problem includes lots of variables, so we have used the DEA method to solve choosing problem.