عنوان مقاله:

An Integrated Approach to Process Safety based on Equipment Analysis

محل انتشار:

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خلاصه مقاله:

Today's technological systems, such as chemical plants, nuclear power and petroleum are characterized by a high level of complexity such that the requirements for the reliability and safety of such systems are very high. In fact, most of companies who is planning or have significant investment in assets can not risk malfunction causing a hazardous situation, let a lone down time, of system due to safety problems. This paper presents a framework for analyzing and improving the total performance of machinery and equipment in a system from the view point of efficiency and safety. The main idea is to employ Artificial Intelligence technique (AI) and multi-variate analysis to provide insight on impact of safety policy on the system availability. The integrated approach discussed in this paper is based on Total Performance Measures (TPMs) and Probabilistic Safety Analysis (PSA). At first Data Envelopment Analysis (DEA) is utilized to recognize the critical hardware, which could have most impact on the total performance. Then, Probabilistic Safety Analysis (PSA) is performed to classify its components based on their importance measures to improve total reliability. Finally, Radial Basis Function (RBF) network is used for safety impact assessment. To achieve the objectives of this study, a comprehensive study was conducted to locate the economic and technical indicators which have great influence on machinery and equipment performance. These indicators are related to machine maintainability, efficiency. Standard factors such as down time, time to repair, mean time between failures, operating time were considered as shaping factors. The results of this approach not only show the weak and strong points of system in regard to machinery and equipment but also facilitate senior management with the expert advice to make better strategies in safety and production management.

کلمات کلیدی:

Safety Analysis, Efficiency, Risk Analysis, Radial Basis Function Network