

# RISK ASSESSMENT OF CONTAMINATED SITE REDEVELOPMENT WITH FMEA

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**Abstract:** Failure Mode and Effects Analysis (FMEA), put the contaminated sites redevelopment as a complete system. Various kinds of actual or potential risk factors considered to be the failure mode of the system. Application of FMEA conducted redevelopment and risk assessment of contaminated site, is a new perspective and scientific exploration, has a great theoretical innovation significance and practical value.

**Key words:** FMEA contaminated sites redevelopment risk assessment

## I. INTRODUCTION

Contaminated sites is the result of accumulation, storage, processing, disposal or other means (such as metastasis) carrying hazardous substances on human health and the environment, or a region with potential hazard or risk. Nearly three decades, as China's rapid urbanization and industrial restructuring, not only in the city center area left behind a large number of contaminated sites, in the suburbs also has become a serious venue pollution problem, and a great spread of rural trend. Contaminated sites redevelopment has a high risk. The major research topic of scientific management of risk, control risk, reduce risk, are highly concerned by the domestic and foreign scholars.

## II. REVIEW OF FOREIGN LITERATURE

Foreign scholars on the risk assessment of contaminated sites focused on the environment and public health fields, mostly used environmental protection and health care theory to study the risks. Pizzol(2011), for example, indicate that environmental risk analysis of chemical pollutants is an important factor in the evaluation of contaminated sites. It needs to consider the relationship between source and recipient of spatial position, carrying out in cooperation with the environmental resources experts and policy makers. Senese (2010) investigate quantitative evaluation of ecological risk is a complex field, based on the individual characteristics of site-specific work, due to a lack of physical, chemical and toxicological pollutants quantitative data makes it difficult to complete. Swartjes(2013), through the analysis of the cadmium content in vegetable, puts forward a hierarchical, the public health risk assessment model for contaminated sites.

## III. DOMESTIC REVIEW LITERATURE

Domestic scholars study mainly concentrated in two aspects. One side, focused on environmental and health risks of contaminated sites. Li Guanghe (2010) select MMSOILS model, set different parameters for risk evaluation, supplemented for uncertainty analysis by Monte Carlo simulation model, study the environmental risk of contaminated sites from the perspective of a more comprehensive. The other side is to focus on the repair or redevelopment management of contaminated sites. World Bank research report that China should learn from

international experience in contaminated site management. Guo Peng and Zhu Yuming study the evaluation index system of contaminated sites redevelopment, using the structural equation model of evaluation index system to optimized verification and correction, proposed risk management framework based on stakeholders.

At this stage have more scientific research achievements in the field of health risks. However, the risks facing the study of contaminated sites redevelopment, still in its initial stages, but based on the failure mode and effects analysis risk assessment of contaminated sites redevelopment, first of its kind in academic circles.

## IV. MAIN CONTENT

This paper intends to four different regions: North America (USA, Canada), Europe (UK, Germany, Netherlands), Asia (Japan, Taiwan), Latin America (Brazil and Mexico). Compare and comb their redevelopment of contaminated sites risk management framework, as a basis for China's national conditions and the concept of sustainable development, in a parallel manner, from the political, social, economic, financial, environmental, health and other dimensions of departure, follow these steps study:

- 1) Establish contaminated sites redevelopment Risk Index;
- 2) Design criteria risk weights;
- 3) Evaluation of the "risk severity" (S), "Risk frequency" (O), "Risk detectability" (D);
- 4) Clear "Risk Key Features" (CRIT) and "Risk Priority Number" (RPN);
- 5) Forming system and complete path based on FMEA contaminated sites redevelopment of risk assessment.

## V. METHODS

This topic mainly adopts the scientific method of theory with practice, combined with field survey and case study analysis. Risk assessment on failure mode and effects analysis theory problems, adopt the combination of inductive and deductive logic reasoning and the method of literature research; In the screening of risk evaluation index, the issue of risk management framework, adopt the method of theory with practice and comparison research. In the establishment of evaluation index system of risk, path problem such as the formation of the risk assessment, adopt the expert interviews, questionnaires and case study approach, and use the triangular integrated strategy to be revised.

## VI. CONCLUSION

In this paper, the contaminated sites redevelopment are deemed as a system of production process, review its actual and potential risk factors with the scientific development perspective, not only study the ecological environment and

health risks, but also comprehensive research about the social, economic, many risk policy through the redevelopment process. Application of FMEA conducted redevelopment and risk assessment of contaminated site, is a new perspective and scientific exploration, has a great theoretical innovation significance and practical value.

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