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# OIL SPILL RESPONSE AND PREPAREDNESS SYSTEM BASED ON CASE - BASED REASONING - DEMONSTRATED USING A HYPOTHETICAL CASE

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## Abstract

For the purpose of coping with oil spills successfully, it is important to establish effective response and preparedness plans. In previous study, we proposed the use of Case-Based Reasoning (CBR) technology to develop environmental emergency response and preparedness plans. In this paper, we present how to develop a CBR-Oil Spill Response and Preparedness System (CBR-OSRPS). In particular, the Frame method is employed to do case representation, the modified Heterogeneous Euclidean-Overlap Metric method is used to define the similarity function, and the Attribute Hierarchical Model method is applied to assign relative weights to attributes. 228 cases are designed and stored into the developed CBR-OSRPS in Shanghai, and the steps of application of the system is demonstrated through a scenario analysis of a hypothetical oil spill accident, including case retrieval, solution show, solution adaptation, and map function. The results show that the total process is quick and these solutions are created reasonably and can be applied in practice. Because the methodology adopts relative weights for relevant attributes, it can be used even with speculative or incomplete accident information. Its ability to record historical knowledge in a database should be helpful for on-site reference by decision makers and experts. The method of establishment of a rule library to adjust solutions is presented in this paper, but it remains relegated to suggest qualitative adjustments. We propose integrating the CBR system with other technologies, such as Genetic Algorithm (GA) and Back-Propagation Artificial Neural Networks (BP-ANN), to solve this issue in the future.

*Key words:* case-based reasoning, environmental emergency, emergency preparedness, oil spill

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