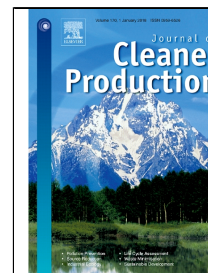


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## A holistic framework for environment conscious based product risk modeling and assessment using multi criteria decision making

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### ABSTRACT

This article presents a holistic framework for environment conscious based product risk modeling and assessment. The attributes of product risk assessment are identified. The degree of interrelationships of the identified attributes is also established. A linked structure called product risk assessment digraph is developed to show various interrelationships among the identified attributes. For analysis of this linked structure, the concept of matrix is used. This facilitates the development of an environment conscious based product risk assessment index. Various product design alternatives are analyzed from risk perspective. The proposed methodology will facilitate product designers, manufacturing engineers, environmental analysts and risk experts in design and development of environment conscious based product. Two examples have been shown here in the present work to support the proposed methodology. Example one is to illustrate the proposed framework and second example is for validation purpose.

**Keywords:** Environment conscious design; Risk; Product development; Energy conservation; Disposability; Multi criteria decision making

### 1. Introduction

The design of engineering systems is generally carried out using complex analytical and mathematical models which are integrated and operated under inescapable risk environment in a system development process (Haimes, 2008). This complexity is often expected to encounter

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