



Assessing concerns of interested parties when predicting the significance of environmental impacts related to the construction process of residential buildings

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ABSTRACT

The most common challenges and obstacles encountered by construction organizations during the process of implementing and using environmental management systems are related to the inherent peculiarities of the construction sector. Several studies have shown that one of the issues involving the greatest level of uncertainty is the identification and assessment of environmental impacts. In order to improve the identification of the significance of environmental impacts of construction projects and sites, which will lead to greater efficiency and robustness in environmental management systems, this paper extends the systematic approach for identifying and assessing potential adverse environmental impacts at the pre-construction stage presented in Gangolells et al. (2009) by introducing the assessment of the concerns of interested parties. By considering concerns amongst internal and external interested parties, one can assess the significance of environmental impacts taking into account not only the severity of the impacts but also local perceptions and international challenges, thereby ensuring that the determination of the impacts' significance is appropriate to the particular socioeconomic and biophysical environments surrounding construction sites. In order to quantitatively measure concerns among internal and external interested parties for each of the 37 environmental impacts related to a construction project, we developed corresponding indicators and assessment scales with the help of a panel of experts. A series of χ^2 tests conducted over 76 new-start construction projects clearly revealed that the severity of environmental impacts is not correlated with the concerns of interested parties. The development of a formal quantitative method and the subsequent definition of a threshold make it possible to obtain advance knowledge of the significance – and, therefore, the acceptability – of each potential environmental impact for a particular construction project. A total score for each construction project alternative is also obtained, so the improved methodology provides a consistent basis for comparing construction companies and construction sites. Finally, two case studies are presented in order to demonstrate the benefits of the improved methodology.

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1. Introduction

According to Griffith and Bhutto [1], quality management systems have successfully been implemented by contractors over the last 25 years, formerly as BS 5750:1978 [2] and in recent years by ISO 9001:2000 [3] and ISO 9001:2008 [4]. The construction industry has the third highest number of ISO 9000 certificates among all industrial sectors worldwide [5]. Construction-related firms accounted for 7% of all certified companies in all industrial

sectors worldwide in 2000 [6], with approximately 28,600 construction-related companies having a quality certificate. In the construction industry, environmental certification ISO 14001: 1996 [7] or ISO 14001:2004 [8] is relatively infrequent compared with ISO 9001 [5], for which 9095 certificates were awarded in 2006 [9]. According to official data provided by the European Commission in February 2009, an Eco-Management and Audit Scheme (EMAS) had been adopted and implemented by 216 construction organizations [10].

Environmental management systems are most common among manufacturing facilities, which are relatively stable over time and have a longer and more extensive history of environmental regulation [11]. The low environmental certification rates in the

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