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Environmental Management Systems: Issues of development and implementation.

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Abstract
The construction and operation of buildings in Australia is responsible for some 30% of the raw materials manufactured, 42% of the energy consumed and 40% of air emissions (Industry Science Resources, 1999). This research investigated how proactive Australian construction contractors are in protecting the environment through the development and implementation of an appropriate environmental management system (EMS). The study utilised a qualitative methodology and was limited to large non-residential construction contractors, which account for seventy-five (75) percent of the output of that sector.

The research found that there are many factors that determine whether an EMS is adopted. These are; organisational experience in the civil engineering sector, company involvement in international operations, desire for competitive advantage including good corporate citizenship, the role and responsibilities assigned to the environmental manager, and the perceived benefits and barriers encountered. The level of support and commitment was found to be vital to the development and implementation from top management to personnel on site level. The key factors determining implementation successes were found to be; the development of an environmental organisational philosophy, the establishment within the organisational structure for an environmental manager, effective training for all staff and incentives for subcontractors. The benchmark of success was found to be accreditation. It is recommended that governments legislate for the mandatory inclusion of environmental management systems and strategic procurement methods be adopted, were possible, to achieve the implementation of EMS over the total design and construction process.

Keywords
Environmental Management, Construction Companies.

1. Introduction

As one of the major sectors of economic output in Australia, contributing 14.4 percent towards the Gross Domestic Product (Industry Science Resources, 1999), the building and construction industry has a vital role to play. Compared to other industries, it is seen to have a myriad of predominant and equivocal direct and indirect effects upon the environment (Griffith, 1997b). With the growth of consciousness of environmental issues, the pressure is increasing on the industry from many sectors to improve its record regarding environmental consideration.

For this reason the building and construction industry must understand the nature and impact of the environmental damage it creates, and adopt tangible measures to address it (Ofori et al, 2000). However as Griffith et al (2000) highlight, the building and construction industry lags behind other industry sectors in the adoption of environmental management concepts being perceived as 'profit motivated', destroying rather than protecting the environment (Hall, 1990). Griffith et al (2000) also point out that a likely reason for this is that currently organizations do not, or cannot, perceive the cost-effectiveness of environmental management systems (EMS), which provide both 'soft' and 'hard' benefits. Ofori (1998, p.143) highlights the need for radical change by stating "to achieve sustainable development, there should be changes in thinking, behaving, producing and consuming".

This research investigated how proactive construction contractors are in protecting the environment through the development and implementation of an appropriate environmental management system. The research found that there are many factors that influence adoption of an EMS as well as various issues, which determine implementation success. The study utilised a qualitative methodology and was limited to large construction contractors. These contractors account for seventy-five (75) percent of the output in the non-residential sector. The paper concludes with some recommendations, which include the mandatory adoption of EMSs through appropriate legislation as well as the use of strategic procurement methods to achieve the implementation of EMS over the total design and construction process. Recommendations for further research are also made.

2. Environmental Concerns and The Construction Industry

The building and construction industry is considered one of the largest industries in terms of investment, employment and contribution to the Gross Domestic Product (cited in Zhang et al, 2000). It promotes investment through its own activities and generates further investment in the broader economy. However, the building and construction industry poses many different and significant threats to the environment, which all authors agree has an irreversible impact on the environment (Morledge & Jackson 2001; Zhang et al, 2000; Ofori et al, 2000). The effect construction activities can have upon its environment can be classified as direct and indirect (Zhang et al, 2000). Direct effects include land use, land deterioration, deforestation and various forms of pollution and noise. Indirect effects include, but are not limited to, production processes involved in those materials and products that the construction industry consumes, for example natural resources, many of which are non-renewable and leave their mark on the environment (Griffith et al, 2000). In Australia, the construction and operation of buildings are responsible for some 30 percent of the raw materials utilised, 42 percent of the energy and 40 percent of air emissions (Industry Science Resources, 1999). In addition Yip (2000) states that 50 percent of the world's atmospheric carbon dioxide output is generated by fossil fuel used to service buildings. This equates to 25 percent of the total gases that are present in the atmosphere producing what is known as the green house effect (Yip, 2000). The drawback is there are no plausible technological substitutes for the loss of materials, ecosystems and the build up of greenhouse gases in the atmosphere from these irreversible environmental impacts (Kibert et al, 2000).

Many authors highlight that while construction activities continue to exist and have such a propensity to adversely affect the environment and human life, the industry must take appropriate action to improve its environmental performance (Zhang et al, 2000; Kein et al, 1999; Ofori et al, 2000; Griffith et al, 2000). These authors agree that environmental management must be a fundamental consideration for every construction organisation. There has been increasing pressure on the building and construction industry from many sectors to improve its record regarding environmental considerations (Hall, 1990). Griffith et al (2000) and Zhang et al, (2000) identify that these pressures originate from shareholders, lenders, clients, employees, suppliers, regulatory bodies and the public who are affected by construction activities. For instance Griffith et al, (2000) found, that the public is becoming increasingly intolerant of environmentally unsound business practices by organisations they perceive to threaten the environment. This has increased the pressure on all commercial sectors, including the building and construction industry to expand their environmental awareness, improve their environmental performance and provide tangible measures of environmental safeguarding (Griffith et al, 2000). Furthermore, Griffith et al, (2000) assert that it is likely that the main pressures on construction consultants and contractors to support environmental management will come from public sector and major private sector clients

procuring large projects, in particular those projects with significant environmental significance. Environmental management is considered by some to exist in any construction organization that seeks to actively recognise the growing concern of environmental issues, and to develop projects in a manner that adds value to the community (Griffith et al, 2000; Walker, 2000).

3. Environmental Management Systems in Construction.

An Environmental Management System (EMS) can be defined as "the organisation's formal structure that implements environmental management" (Griffith et al., 2000, p. 261). In 1996 the codification of environmental management (ISO 14000) occurred (Affisco et al, 1997). These standards emerged from British and European standards that were initiated as a result of the Uruguay round of the General Agreement on Tariffs and Trade (GATT) negotiations and the 1992 Rio de Janeiro summit on the environment (Kein et al, 1999). The ISO 14000 series creates a market driven framework for balancing environmental protection and social economic needs, which will improve environmental performance of construction organizations (Zhang et al, 2000). It is a non-prescriptive system of processes and procedures that examines and manages their practices that impact the environment (Environment Australia, 2002). It ensures that organizations focus on environmental management and place themselves in a proactive role when addressing environmental consequence in respect of their business.

At this stage legislative measures with respect to organisational management of environmental issues have not been introduced here in Australia, or Victoria; so the framework is voluntary for most Australian contractors. However, in response to community concern about pollution the Victorian Parliament under the Environmental Protection Act has established a statutory body, the Environmental Protection Authority (EPA, 2002). The Environmental Protection Act has placed a voluntary responsibility for sound environmental management on all Victorians, but the Environmental Protection Authority maintains a standard of environmental quality through works approval, licences, inspections, pollution abatement notices and land use-planning referrals (EPA, 2002). In addition the State Road Authority - VicRoads has mandatory environmental requirements for contractors tendering and undertaking the works. Contractors must have an established EMS, with third party certification to AS/NZ ISO 14001.

Yip (2000) emphasises that few construction contractors give serious consideration to the environmental impact of their construction activities because traditionally, management success in construction has been measured by three criteria namely; cost, time and quality. These criteria are micro-factors that influence the development of economy at the firm level in the short term, whereas, the environment is a macro-factor that affects the economy and its development in the long-term globally. Furthermore, Yip (2000) considers traditional management, which has little concern for the environment, will be given less value in determining project success in the future as environmental issues are given greater concern by all sectors in society. In addition, increasing competition between organizations in the global and domestic market place will led to a focus on environmental protection as a source of competitive advantage.

4. Research Methodology

The objectives of this research were met by a qualitative study involving interviews with key personnel responsible for environmental management in large construction companies in Victoria. The study was limited to all large construction firms, which undertook work in the non-residential sector in Victoria, Australia. In Australia, the large construction contractors account for seventy-five percent of the output of the non-residential sector (AEGIS, 1999). Of the ten companies approached seven consented to be part of the study, representing a 70% response rate. These large contractors were selected for several reasons. Firstly, the magnitude of the projects they undertake and therefore their subsequent environmental impact. Secondly, more so than smaller firms, they have the resources to implement environmental management within their organization. Finally, large construction organizations are said to be more influential, than their smaller counterparts, in pressuring industry change due to their dominance upon the sector (Industry Science Resources, 1999).

5. Research Results

All seven companies were national organisations with offices in most Australian states. Four of the seven were multinational companies. Four companies, two national and two multinational have a civil engineering arm to their business operations. Four of the seven managers interviewed had a dual or multiple roles, responsible for environmental management and other areas, such as quality assurance and occupational, health and safety. One interviewee was a project manager, and other a business development executive. One was a project engineer whose role had changed from a previous project where he acted on site as the environmental management representative. Six interviewees highlighted that their primary responsibility towards their respective EMS is to ensure that it is implemented on all jobs. The seventh interviewee currently had no responsibility to implement their EMS on any project.

5.1 Key Findings

5.1.1 Current Environmental Management Practices

All seven organisations had developed and implemented an EMS. Six of the seven organisations have an integrated management system for which environment management was one element. One EMS stands on its own, not integrated with either quality assurance or occupational, health and safety. Four of the six organisations that have an integrated management system hold certification for international standard organisations AS/NZS ISO 14001, three of which could identify the period for which their organisation had certification. One organisation has held certification for six years, another for three years and the other for one year. The remaining two organisations were looking for certification of their EMS within the next year.

5.1.2 Factors Influencing The Implementation Of An Environmental Management System

There were many factors found that significantly influenced the implementation of an EMS within the construction company. One could conclude that building construction companies perceive themselves as ‘good’ corporate citizens, but are still ‘profit motivated’ focused on environmental protection as a source of competitive advantage. The study revealed that those organizations that operate in the civil sector and internationally are aware of the benefits gained as the results of implementing an EMS. It is obvious that they have used their experience in the civil sector to successfully implement a system for their building construction operations, prior to many of their competitors to attain a competitive advantage. In addition, those companies in the international market demonstrated a greater understanding of drivers of change and had a specific environmental manager role. It is envisaged that the primary reason that the building construction industry lags behind other industry sectors in accreditation of EMSs is because environmental management has not generally been a compulsory requirement of the public or private client.

5.1.3 Benefits Gained From Environmental Management Systems.

The literature stated that there were many benefits to be gained to effectively drive the successful development and implementation of an EMS within an organization. Griffith et al (2000) summarise the benefits to be gained by a better corporate focus, improvements in efficiency, enhanced marketability, reduced liability and improved commercial competitive advantage. However, the study concluded that on the whole, the EMSs were immature unable to measure, specify or quantify the benefits to progress to the next level of continual improvement. A reason revealed in the study for the lack of tangible benefits was because of the integrated nature of the EMSs with quality assurance and/or occupational health and safety. Although AS/NZS ISO 14001 has procedures to measure the performance of the systems, it is clear that this may need to be further developed to benchmark to increase the level of commitment to effectively drive implementation.

5.1.4 Barriers To Environmental Management System Implementation.

Conversely, there were several barriers identified in the literature review and the study that undermined successful implementation of EMSs such as time and cost. These primary barriers were addressed in the study. It was established that these factors did not appear to undermine implementation efforts. However, this study did find that a lack of cooperation from consultants, project managers, foremen/supervisors and subcontractors were barriers. In addition, the physical

barrier on central business district sites common to large contractors working in the non-residential sector to place the many waste separation bins required for recycling. The study also discovered that it was the organizations without an accredited system that undermined their own implementation efforts due to the lack of effective training provided to their project managers and foremen/supervisors.

5.1.5 Extent Of EMS Implementation

The literature established that the application of environmental management should be implemented to the total construction process, from project evaluation, through design, procurement and contract administration, into use and maintenance. However, the literature was found to be 'idealistic' with the organizations in the study revealing that their respective EMSs were implemented *"where they can"*. Upon further clarification it was learnt that most of the organizations implement their system at tender stage. It addition, it was discovered that as an EMS evolves, organizations could be successful in implementing their system in the design phase of a BOOT or design construct projects. One could conclude that the inherent fragmented nature of the building construction industry, and the segregation of the design and construction functions in the majority of projects impose impediments to the achievement of environmental management implementation success. Procurement routes that provide a more 'comprehensive' approach, such as strategic alliancing, may be one answer to improve the extent of environmental management implementation.

5.1.6 Level Of Commitment And Support.

The level of commitment and support for the system identified in the literature review and study was found to be directly correlated to the success of achieving accreditation of an EMS. The study concluded that the commitment towards the EMS from an organization must derive from top management and filter down. It was discovered in those organizations that had achieved accreditation, senior commitment had promoted some cultural change and in doing so attained a high level of knowledge towards their EMS. However, it was apparent that the majority of those organizations that did not have an accredited system that commitment from top management was ineffective to change the organisational culture, provided inadequate or no training to attain a high level of knowledge, and therefore were effectively a barrier to the development of the EMS.

5.2. Key Factors For Successful Implementation.

Of particular importance, to ensure successful development and implementation for any construction organization, it was established that an organization should develop its EMS to a stage where it can be accredited to AS/NZS ISO 14001. However, unless all participants in the construction process actively seek to improve their individual performance of a construction project, the impetus for environmental management will be lost (Griffith et al, 2000). The following key factors should be considered for an organization aspiring to achieve cultural change and accreditation.

1. A 'whole organisational' environmental philosophy must be developed, which embodies those aspects of corporate policy, strategy and procedure (Griffith, 1997b).
2. For a system to evolve and improve performance of an organization a manager should be allocated with the specific role and responsibility to plan, implement, monitor, control and review (Griffith, 1997a) the EMS.
3. Effective training of all staff, ensuring that there are adequate resources provided to support the effort whether it be financial or organisational (Daily and Huang, 2001).
4. Incentives must be created for subcontractors to ensure support for the head contractor's EMS is created at site level, because subcontractors carry out the majority of the work.

6. Conclusions

The majority of large construction contractors in Australia have been proactive in developing and implementing an EMS within their organizations. The increasing competition in the industry and greater awareness and concern for environmental issues has led organizations to strategically focus on environmental protection as a source of competitive advantage. Most of the organizations can perceive the cost-effectiveness of an EMS from the experience gained fulfilling civil construction projects and the international market, and as a result have ensured that their systems are accredited for building

construction projects. Currently, there is no legislation in place to enforce the implementation of environmental management in businesses, and this is not assisted by the fact that the majority of construction clients, both private and public, are not insisting on it. To ensure that industry remains competitive and is environmentally accountable to society, the government must consider legislating environmental management and setting a benchmark for all organizations.

One could conclude that the literature is too idealistic not fully understanding the many difficulties to overcome to have a system that is 'truly' successful. Due to its integrated nature with other support services, environmental management benefits are hard to measure. Efforts need to be made to develop benchmarks that organizations can achieve, and in turn, compare themselves with their competitors to strive for that competitive edge. However, this competitive behaviour is short term driven by price. To ensure best value is achieved for society, not only for the client, an EMS should be an integral part in any project. We need to strive to change the industry to exhibit long-term competitiveness via strategic procurement methods such as partnering and alliancing to improve the industry's adversarial culture, increase profit margins of organizations, and mend the inherent fragmented nature of the industry and its processes (Kenley and London, 2002). Only once is this accomplished, construction contractors from the development and implementation of an EMS can achieve tangible benefits and true success. Until legislation and industry change occurs, organizations can attain accreditation by ensuring that commitment and understanding is effectively filtered down from top management to the workers at site level by creating an organisational culture. This can be achieved by delegation of roles and responsibilities and ensuring adequate resources are placed into training, as one interviewee surmised, "*you can have the greatest system in the world, but if people don't understand it, it's not going to work*".

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