

THE INFLUENCE OF LEGISLATION UPON ONSITE CONSTRUCTION ENVIRONMENTAL MANAGEMENT OPERATIONS: A QUALITATIVE ANALYSIS

K. Maund¹, T. Gajendran², G. Brewer³

University of Newcastle, Australia

Kim.Maund@newcastle.edu.au

ABSTRACT

A sustainable built environment begins during the design and construction phase as potential environmental damage from such operations may impact negatively upon ecosystems. With the introduction of ecologically sustainable development (ESD) principles, effective onsite environmental management operations should be a realisation. However, in reality construction operations continue to have negative environmental impacts. Within New South Wales, the government pledge to ESD has created a complex legislative system and its ability to achieve objectives associated with environmental protection remain in question. Application of the legislation in different contexts results in inconsistent levels of environmental protection. Inconsistency may occur at the confluence of interpretation and implementation of regulations, in conjunction with monitoring and enforcement. There remains ambiguity, informality, and interconnectedness inherent in interactions considered highly complex and unique to each construction project and a lack of knowledge about the impacts of external non-contractual influences upon project operations. Using a systems theory approach, this research investigates on-site construction operations and environmental management against the effectiveness of regulation, monitoring and information flow. This paper reports preliminary findings based on twelve (12) semi-structured interviews conducted during the initial phase of a qualitative study. Interviews targeted the following professional stakeholder groups: government regulatory officers; non-government regulatory certifiers; planners; and construction managers. Preliminary analysis through a coding approach identified themes that impact upon effective onsite environmental operations, *inter alia*, processes of environmental assessment compliance, organisational processes of environmental compliance, information transfer, learning and development, environmental management systems and accreditation and regulatory processes of environmental management.

Keywords: construction, ecologically sustainable development, regulation, qualitative analysis, systems theory.

INTRODUCTION

At the United Nations Conference on Environment and Development (UNCED) in 1992, there was international acknowledgement that human activities significantly contribute to environment degradation. Subsequently, Agenda 21, a plan of action on how to mitigate the impact of human activities upon the environment, was ratified establishing the principles of sustainable development: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (United Nations World Commission on Environment and Development, 1992).

Australia was a signatory country to Agenda 21 which has been considered 'the most significant event influencing environmental policy for the development and construction industry' (Maund and London, 2009). Subsequently, an array of regulatory policy was introduced across all government tiers in an attempt to achieve ecologically sustainable development (ESD).

With the introduction of ESD principles, effective onsite environmental management operations should be a realisation. However, construction operations continue to have negative environmental impacts. Within New South Wales (NSW), the introduction of policy has created what may be considered an extremely complex legislative system and its capacity to achieve ESD principles is questionable. The NSW Coalition government, elected in 2011, conducted an examination of the *Environmental Planning and Assessment Act* (EP&A Act), 1979, the primary Act governing development with a central focus on ESD. Their Issues Paper identified that the Act still used 'overly legalistic language...', '...overly complicated processes...' and was so complex that interpretation and practical application was difficult (Moore and Dyer, 2011).

It appears the application of regulatory policy in different contexts results in inconsistent levels of environmental protection. Inconsistency may occur at the confluence of interpretation and implementation of regulations, in conjunction with monitoring and enforcement. There remains ambiguity and informality inherent in interactions considered highly complex and unique to each construction project. This research investigates on-site construction activities and environmental management against the effectiveness of regulation, monitoring and information flow using qualitative analysis techniques.

RESEARCH CONTEXT

Within the literature, negative environmental impacts associated with construction operations are widely acknowledged (see for example, Ding, 2008, Shen and Tam, 2002, Tam et al., 2006). Shen and Tam (2002) quite aptly state that 'construction is not by nature an environmentally

friendly activity' (p.535). The copious adverse impacts that result from industry operations primarily lead to environmental degradation (e.g. toxic air emissions, hazardous waste production, land contamination); and the exhaustion of natural resources (e.g. excessive consumption of water and energy) (Ding, 2008, Hendrickson and Horvath, 2000, Shen and Tam, 2002, Tam et al., 2006).

Theoretically, these detrimental environmental impacts may be a result of deficiencies within regulatory policy. Although responsible for meeting ESD principles, policy does not operate in isolation. There may be inadequate information flows and a disconnect between variables in the environmental preservation system (see Figure 1) with the subsequent result being destructive onsite operations. Hence, there is a need to explore and understand the stakeholders and relationships within the system to identify barriers to effective onsite environmental management operations.

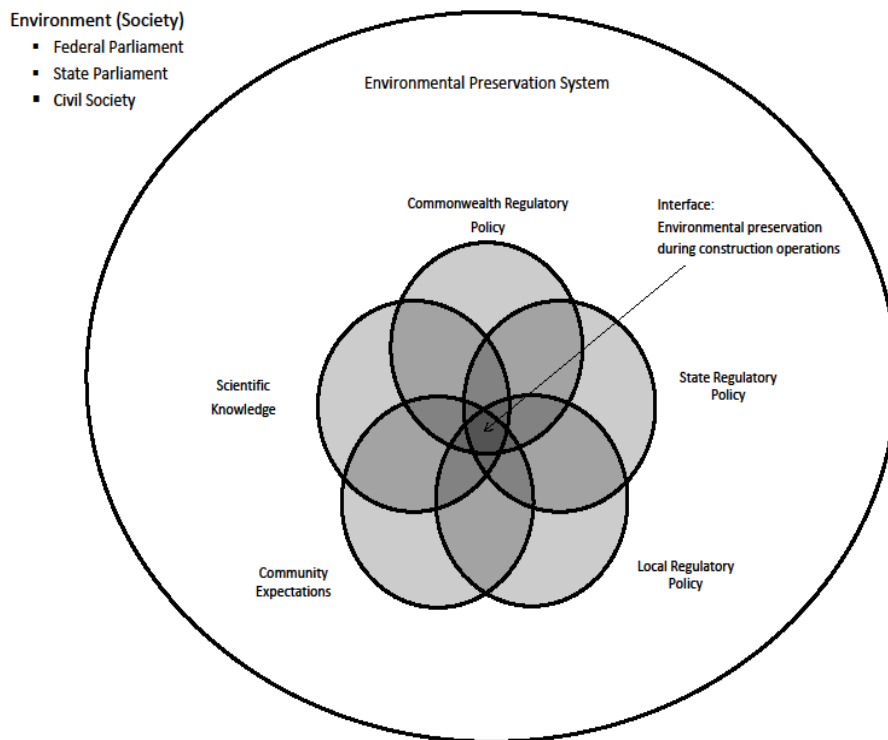


Figure 1 The Environmental Preservation System
(Maund and Brewer, 2012).

In general, regulatory policy has had a controversial history. Even in the 1970's, Kneese, an environmental advocate, expressed concern over policy stating 'it is inconsistent, often outdated, and grossly over dependent on direct regulation...' (Kneese, 1976). In later years Gunningham and Sinclair highlighted the continued inefficiencies of policy: '...most existing approaches to regulation, are seriously sub-optimal...they are not effective in delivering their purported policy goals, or efficient, in

doing so at least cost, nor do they perform well in terms of other criteria such as equity or political acceptability' (Gunningham and Sinclair, 1998). Internationally, forums such as the Organization for Economic Co-operation and Development (OECD) continue to identify 'evidence of serious regulatory failures' given current economic and environmental climates (Organization for Economic Co-operation and Development, 2011).

Within NSW effectiveness of policy also remains questionable. During 2005, the State government identified the need to '...eliminate unnecessary and complicated red tape' (NSW Government Department of Planning and Infrastructure, 2005a), describing it as '...a confusing web of conflicting plans and instruments' (NSW Government Department of Planning and Infrastructure, 2005b). This pattern continued during 2007 as it was highlighted policy '...remains lengthy, complex and confusing...' (NSW Government Department of Planning and Infrastructure, 2007). The NSW Coalition, brought to government in 2011, undertook a further EP&A Act Planning System Review. Their Issues Paper acknowledged the Act continued to retain its complexity and impacting negatively upon system effectiveness (Moore and Dyer, 2011).

SYSTEMS THEORY

There are many reasons behind policy failure, many of which relate to system processes. A system may be defined as a set of interactions amongst entities or elements that have a direct result of achieving a set objective: both tangible and intangible (FitzGerald et al., 1981, Smith, 1982). Within systems theory the stakeholder as an element can be recognised along with their significant influence upon anticipated outcomes.

Referencing the environmental preservation system, stakeholders include developers, builders, subcontractors and other technical professionals related to construction processes. However, within the assemblage of stakeholders, systems theory enables regulatory entities: policy-makers, assessors and enforcers to be acknowledged as part of the system and their impacts upon operations measured, particularly as regulatory entities have potential to significantly impact upon project outcomes. As Stewart and Ayres (2001, p.80) explain that 'they are themselves within and subject to the very system they seek to understand and influence'. Therefore, communication linkages of stakeholder relationships contribute to effectiveness of policy (Stewart and Ayres, 2001). Inappropriate information flow may contribute to ambiguity and misinterpretation at the interpretation and assessment phases and subsequently on-site operations. They contribute to fragmentation from structures and process, including inappropriate consideration of causes and consequences.

Understanding systems and their stakeholders, provides the theoretical framework by which effectiveness of any regulatory system can be explored (Mbiti et al., 2011). Application of systems theory to the research would allow examination of key aspects of policy against stakeholder interactions: intent versus actuality. It would identify barriers to effective policy to enable a shift to target those areas in a way that would enhance systems functioning that equates to improved environmental performance.

METHODS

A qualitative exploratory approach using interviews was adopted to enable an exploration of perspectives and understandings in relation to regulatory policy and its impact upon on-site construction operations. Recruitment was conducted through third party organisations. The following criteria was applied to select organisations:

- Councils who approved the most number of development applications from the 2010-2011 period as identified in the NSW Department of Planning and Infrastructure 'Local Development Performance Monitoring 2010-2011' report.
- Private firms that employ Category A1 accredited certifiers, as they have no restrictions on their accreditation and can certify a range of buildings and structures, including small scale residential to large complex industrial and commercial projects.
- Building firms, associated with the Australian Institute of Building Board or its committees as the institute is a peak industry body.

Creswell and Plano Clark (2011) discuss how it is important to interview small numbers of people, as this ensures issues will emerge so patterns can be identified. They further explain 'the larger the number of people, the less detail that typically emerge from any one individual' (Creswell and Plano Clark, 2011). A total of twelve (12) interviews were conducted with key stakeholder professions:

- building surveyors (certifiers) and town planners from local government organisations involved with assessment, certification and regulation of development;
- building surveyors (private certifiers) responsible for building certification works; and
- industry developers and construction managers responsible for on-site construction operations.

Participants were selected due to their knowledge and experience of development assessment processes (either lodgement or assessment of applications) and/or construction operations (either on-site operations or certification). They required an in-depth understanding of the EP&A Act.

Each participant was required to participate in one (1) interview of approximately one (1) hour duration. The interview script was structured with questions: (a) concerning the demographic data (including participants title, role descriptions and duration in the role); and (b) concerning specific environmental onsite issues including environmental performance, design and approval processes, site operations, monitoring and compliance, information sources and advice.

Interview recordings were transcribed and analysed using qualitative methods. Analysis involved a thematic exploration of data using a three (3) step coding process (Morse and Richards, 2002) to enable full use of the richness of data and increase robustness of the analysis.

RESULTS AND DISCUSSION

Data analysis exposed six (6) predominant themes. The following provides a summary of factors impacting upon onsite construction environmental operations.

Processes of environmental assessment compliance

- Interpretation of 'environmental management' primarily related to design and post-construction operations: minimal consideration of onsite operations. Regulation mandates environmental protection and this has been interpreted as good design to achieve post construction compliance: areas regulated such as energy efficiency. Use of natural resources, atmospheric emissions and the like were not considered to be salient to environmental protection.
- An overreliance upon local government development control plans (DCPs) and checklists for assessing compliance was evident. There was a belief that these documents covered all possible environmental impacts that regulators needed to consider. During subjective regulatory interpretation and subsequent DCP and checklist formulation it appears that the focus was upon areas of community or political concern rather than all potential impacts.

Organisational processes of environmental compliance

- Occupational health and safety along with quality assurance were given priority over environmental management due to ramifications associated with non-compliance. This questions whether existing environmental planning regulations: (a) have limited enforcement mechanisms; or (b) are being administered to their full potential.

- Internal local government development application assessment processes were controversial. Many regulatory officers highlighted a need to be involved with the development process and from an early phase (pre-DA meetings to application assessments) due to their professional expertise. In general, town planners controlled assessments and dictated when internal specialist project referrals were necessary. The professional qualifications and experience of town planners to make environmental determinations highlights a deficiency in the operational process of regulation.

Information Transfer

- Fragmentation was consistent throughout the sector causing information transfer blockages. There appeared to be minimal interaction between policy makers, regulators and private specialists against those responsible for onsite operations including implementation and monitoring. Similarly, private sector avoidance of local government advice was evident due to involvement of many regulatory officers presenting different subjective opinions at various stages. Questioning development consent conditions or onsite issues may result in the introduction of new conditions or requirements not previously identified. Local government rarely sought state government advice. Assistance was not forthcoming due to potential legal ramifications associated with incorrect advice. These factors impact upon policy formulation, interpretation, implementation, monitoring/auditing programmes and feedback mechanisms

Regulatory processes of environmental management

- Minimal onsite regulatory inspections were undertaken. These were often left to the building regulator during mandatory construction inspections. Regulatory environmental inspections occurred where there was a major environmental incident. Essentially minimal monitoring processes occur creating an information barrier from regulatory assessment to onsite compliance.
- The complexity of the planning system introduced a practice whereby meeting conditions of consent is the priority to ensure regulatory certification is forthcoming. Again, this highlighted a 'faith' that development consents were comprehensive in their environmental coverage.

Environmental management systems and accreditation

- Accreditation with national/international bodies identified a belief that once attained environmental preservation was achieved. The focus was upon accreditation attainment over implementation. Similarly, Federal and state government tender requirements regarding environmental accreditation introduced false security. From a policy perspective this provides an artificial sense of

compliance with ESD principles and potentially no follow through to site operations.

Learning and development

- Government training initiatives were typically reactive processes. Changing legislation or operational procedures induced training. Across private and public sectors no training programmes were identified that related to onsite environmental management. Assessment, interpretation and implementation operations may be negatively affected without training.
- Knowledge and experience of local government regulatory officers was highlighted. Major determinations by officers without appropriate qualifications and experience resulted in flawed assessment processes that continue to onsite operations rendering them inappropriate or inadequate.

A significant theme that heavily influenced environmental management operations was private certification. Regulatory building certification enables a developer to use private or public authorities to certify projects. It was evident that local government directed system faults upon private certifiers. Monitoring these professionals was common; yet, some local government officers stated that they had insufficient time or resources to attend to environmental management responsibilities. There appeared more focus upon private certifiers, almost a power struggle, with less upon environmental management.

CONCLUSION

Construction operations continue to have negative environmental impacts. Regulatory policy provides the context for ensuring effective environmental management yet its ability to achieve objectives associated with environmental protection remain in question. There is a dearth of literature regarding the impact of complex legislative systems upon onsite operations.

This research provides the context for development of a theoretical framework within which examination of the onsite construction domain can be gauged against existing regulatory controls. Bridging the knowledge gap and learning about these processes can ultimately assist in achieving the objectives of ESD during construction operations.

The research highlighted the following issues as relevant to policy and the effectiveness of onsite environmental management operations: processes of environmental assessment compliance, organisational processes of environmental compliance, information transfer, learning and development, environmental management systems and accreditation and regulatory processes of environmental management. The next phase of

this research involves exploration of actual construction projects: an investigation of the practical application and whether consideration was given to environmental onsite impacts at the design/consent stage of the project and if so, whether they were monitored and implemented in accordance with the consent.

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