

# INTEGRATION OF QUALITY, HEALTH AND SAFETY AND ENVIRONMENT MANAGEMENT SYSTEMS IN CONTRACTOR ORGANISATIONS

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Organisations of all types are increasingly implementing management systems for quality, health and safety and environment for many reasons including the fulfilment of legal obligations, a better image for stakeholders and the wider demonstration of concern for society. In the majority of cases, these management systems are being developed around the certification and accreditation requirements of quality standard: ISO 9000, environmental standard: ISO 14001 and also the health and safety standard: BSI-OHSAS 18001. These standards have developed individually, independently and at different times fulfilling unique demands. However, the structural similarities in the standards have led to the evolution of integrated management systems (IMS). UK construction contracting organisations have implemented such management systems and are international pioneers in IMS development. Research also finds links between sustainable construction themes and the integration of management systems. This paper investigates the application of IMS in UK contracting organisations. Research critically analyses the various different concepts, approaches and models being developed for IMS.

Keywords: environment, integrated management systems (IMS), quality, safety, systems.

## INTRODUCTION

Management of quality, health and safety and environment are important aspects to any organisation in today's competitive, stringently regulated and environmentally-friendly, image conscious business environment. These aspects also coincide with the UK Government's sustainable development "triple bottom line" social, economic and environmental objectives. However, the list of management initiatives and standard based management systems is set to increase. Dealing with separate systems and ensuring their alignment with any organisation's business strategy is a problematic management issue. This has given rise to search for integrated management systems (IMS) to reconfigure the organisation to a more holistic approach and business focus.

The construction industry plays a vital role in the economy. However, the industry performance on quality, health and safety and environment issues is far from impressive. In the industry, contracting organisations occupy a pivotal role. They are the public face of the industry and their performance on quality, health and safety and environment issues has a huge impact on the industry as a whole. This paper, supported by an extensive literature review and the ongoing case studies being

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conducted in some major UK contractor organisations, investigates the implementation of standard based quality, health and safety and environment management systems. The paper looks into the issue of integration of management systems in contracting organisations in detail and analyses the state of the implementation of integrated management systems (IMS) and different approaches being adopted for achieving the IMS.

## **QUALITY, HEALTH & SAFETY, ENVIRONMENT SYSTEMS**

Organisations of all types are implementing a number of management systems in addition to their core business management systems. QMS (quality management systems) in a formal and certified shape (e.g. ISO 9000 series) are the most common type to be found in organisations. The UK Government measures, customer and competition pressures, use as a marketing tool and globalisation of businesses are a few factors among many to credit. Clearly, in the post modern-era, social and environmental considerations are gaining growing importance. The shift in focus has resulted in the emergence of management systems to deal with these concerns. A common mix of management systems includes quality management systems (e.g. ISO 9000:2000), health and safety management systems (e.g. BS 8800:1996/OHSAS 18001:1999), and environmental management systems (e.g. ISO 14001:1996). The mix may contain other management initiatives such as IIP (Investors in People) etc. Where the tendency of having all these systems shows the business concern for social, environmental and sustainability issues, it also raises a management issue for an efficient and effective structure and performance of the management systems.

## **MANAGEMENT SYSTEMS IN UK CONSTRUCTION**

Construction is one of the important industrial sectors for any economy. The industry makes a huge contribution in the UK and also world-wide in terms of employment and the share in the gross domestic production. This business volume naturally results in industry's impact on the economy and on others spheres of our society. The industry provides the delivery mechanism for provision and moderation of a nation's built environment. However, in the public eye, construction is an untidy, strident and time-consuming process disturbing everyday life. Egan (1998) also pointed to client dissatisfaction with construction contractors. The industry is also famous for its cowboy culture. In terms of health and safety the industry has the highest rate of fatal accidents in the UK and across Europe (Eurosat 2001, 2002, HSS 2001, 2003). Industry is also one of the main contributors to the depletion of natural resources and a major cause of unwanted side effects (Augenbroe and Pearce 1998, DETR 2000). Hence, quality, health and safety and environment management, especially in the contracting organisations, need greater improvement. Growing competition, customer and stakeholder focus, stringent legal requirements and an urge for a community responsible image also vitalises the quality, health and safety and environmental management.

Moreover, over the years, and especially in the recent past the construction industry has undergone radical changes, changes which have had major effects on the nature of the construction business. Clients' demand for value for money and customers emphasising the delivery of a "quality" product in a "safe" and "environmentally friendly" way are all as important as delivery on time and at the right price (CIRIA 2000). Hall (1998) agrees and points to the construction design and management regulations (CDM Regulations 1995) which are one of the several pieces of legislation

giving legal status to this type of customer requirement. Generally, today there is an enhanced focus and concern for quality, health and safety and environment and their management is too important to be ignored. As Griffith (1999a) identifies, quality, health and safety and environment issues are aspects of construction, utilizing corporate and project management systems. All are subject to increasingly stringent regulations, legal requirement, monitoring and assessment. For many organisations, regulatory or other external pressures have been a major factor in the development of management systems for quality, health and safety and environment (CIRIA 2000). Nevertheless, the impact of the systems is wider than merely providing a response to any standard or regulation. They can have a positive effect upon the development of the business as a whole (Griffith 1999b).

Across the various industrial sectors, implementation of the formal standard based management systems is found as a convenient and structured arrangement for the management of quality, health and safety and environment. In that respect, the construction industry has adopted ISO 9000 to a certain extent. After the introduction of CDM regulations particularly, industry has also seen the adoption of health and safety designed around BS 8800, whereas, the environmental management systems, like ISO 14000, are also gradually consolidating in the construction industry.

As Griffith (2000) points out, quality, health and safety and environment are standards-based (project) functions that need to be managed in a systematic way. However, the traditional method of designing a management system to comply with a particular regulatory or conformity requirement is based on the structure of the requirement itself, rather than the way the company actually operates (CIRIA 2000). Organisations develop management systems clause by clause as suggested in standards i.e. ISO 9000, the CDM regulations and the environmental management ISO 14001.

## **INTEGRATION OF MANAGEMENT SYSTEMS**

Similarities are apparent in the structure of the systems, when analysing the management standards for quality, health and safety and environment (ISO 9000, BS 8800/OHSAS 18001 and ISO 14000) respectively. Organisations having all these systems in place or planning to implement, would be expected at some stage to question the logic of keeping the systems separate. The integrated management systems (IMS) in that respect offer a holistic approach for quality, health and safety and environment management. The IMS is gathering increasing support from academics and more importantly practitioners (Jonker and Klaver 1998, Renfrew and Moore 1998, Hoyle 1998, Millidge and Smith 1999, Wilkinson and Dale 1999a, 1999b, 2000, Griffith 2000, Smith 2001 and others).

It is evident from this research that no matter how logical it may appear, achieving IMS is not easy. Resolution and understanding is required even when considering the meaning of IMS and ways to accomplish it (Wilkinson and Dale 1999b). Alignment, compatibility, co-ordination, deployment and combination are some of the terms being used to define IMS (Dessler 1992, McGregor 1996, IQA 2001, ISO 2004). If integration is just merging the documents then it is falling short of its potential advantages. True integration will be nearer to the framework advocated by Smith (2001), where a single management system is established and all the bits and pieces for quality, health and safety and environment and other current and future

management systems fit fully into that framework. In practice, this entails a huge organisational change which is an uphill task and with questionable viability.

The current approaches to integration mainly depend on what is really meant by the IMS. Integration through the links suggested by standards has the strongest support and is attracting most attention (Beechner and Koch 1997, Karapetrovic and Wilborn 1998, Millidge and Smith 1999, Wilkinson and Dale 1999b, Douglas and Glen 2000, Griffith 2000, IQA 2001). Although it is simple and easy to follow, Byrnes (1996), Hoyle (1996), Powley (1996) and Wilkinson and Dale (1999b) consider it as a narrow approach that ignores the differences in the systems. The main objectives are only to achieve reduction in the documentation and auditing fees related to certification.

## **CONTRACTOR ORGANISATIONS**

Construction is a multifarious process involving many organisations on a single project; however, the contractor's role is pivotal for the success of any project. Contractors work as the interface between the public and the industry and they demonstrate the real performance of the industry. They are the public face of the construction industry. Their performance, focuses, policies, processes and methods have a direct impact on all stakeholders in the industry. The Egan Report (1998) also focuses on contractors. Any process that makes the performance of the contractors efficient and effective will have a positive impact on the whole industry. In terms of management systems, the majority of contractors are certified to ISO 9000 standard. Most of them have some type of health and safety management system in place, mainly because of the CDM regulations. In addition, there is now a desire for certification of environmental management systems. The aftermath of any negligence in quality, health and safety and environmental management can be catastrophic owing to the often high risk nature of construction projects. Given the importance and sensitivity of these management areas, a contractor occupies a key position in the construction industry and can offer a public demonstration of the compliance with the legal and regulatory requirements and with the management system standards. The efficiency and effectiveness in processes brought by the configuration of the management systems will have great positive effects on all stakeholders of the business.

## **IMS IN CONTRACTOR ORGANISATIONS**

As discussed earlier, the majority of construction contractors have quality systems in place with some semblance of health and safety management systems. Growing emphasis on sustainable construction is driving the adoption of environmental management systems also. The project-oriented nature of the business means that staff on-site have to deal with different sets of documents and manuals to comply with each management system, not forgetting that the compliance with the systems is also essential to the benefit of all stakeholders in the project. Systems, in addition to compliance, also help in business process improvement. Integration in this scenario seems to be a viable option to streamline the documentation, leaving room for more focus on the process improvements, resulting in more efficient, effective, productive, sustainable and safe construction.

Leading contractor organisations have shown considerable interest in integrating quality, health and safety, and environment management systems following the examples in manufacturing and the chemicals industry. It can be argued however, that

models and approaches adopted in the manufacturing and the chemicals industry cannot be easily replicated in the construction industry owing to the different nature of the sectors.

The total construction process relies heavily on functional specialisation. For quality, health and safety and now the environment, departmentalisation is the easiest option. However, as Griffith (1999a) comments, developments in the communication media and information technology will reduce the need for functional specialists to be present at each production or process site. There is still a need for traditional roles (of quality and safety managers) but their understanding of other functions is broadening (Moore 1998). Griffith (2000) advocates that conventional separate or segmentalized systems generally meet the requirements of construction, however, as additional management functions need to be accommodated, an integrated system can be advantageous. A report from CIRIA (2000) also identifies the potential of integrating the management systems for quality, health and safety and environment in the construction organisations.

Moore (1998) found from a case study of a leading construction company that separation of its quality, safety and environmental functions compounded the difficulties employees already faced in their daily roles. The company was too close to its main problem to actually see that complying with individual systems was how other people thought the business should be run rather than how it actually was run. A CIRIA (2000) study also strengthens the same view that separate systems for certification reasons and for clients serve no purpose. At project level, policies, procedures and plans (quality, safety, and now environmental) are produced for external consumption, rather than used as tools to improve the effectiveness of the business. Exercises have shown that all these documents aim to describe how the project is being managed, whilst retaining a slant to the particular area of interest that triggers the document production. The use and effectiveness of these several plans may be limited by the sheer effort required to decide on the systems and controls needed for a particular activity.

The separate management functions need to be integrated in line with the business objectives of the organisations. The people doing work need one set of instructions not a hotchpotch of potentially contradictory guidance. Griffith (1999a) points out that as more systems are introduced the boundaries between systems can become indistinct and control procedures can become vague, particularly at the project level during the production phase.

It is perceived that a tendency to address the environmental management of construction by creating parallel yet separate management systems operating alongside existing quality and health and safety systems, will overload the site management resources and will not allow the benefits of such management to be delivered. There is an opportunity to take advantage of the need to introduce some form of environmental management to reconsider the management structure and processes for the disciplines of quality and health and safety (CIRIA 2000).

Structurally, Griffith (2000) reminds that established systems used by contractors to manage quality and environment serve both the corporate and project organisation, and an IMS should be consistent in this respect. The corporate organisation for IMS must have strong linkage with and not merely have a joint to the project organisation. Only in this way can the system provide a holistic service to the core business and

then IMS can extend and work across professional boundaries and become an important element within an integrated management process (Griffith 1999b).

### **IMS Implementation**

In the view of Griffith (2000), early approaches to IMS will likely bring together existing quality, health and safety and environment procedures into a vertical framework of co-ordinated parallel systems for company and project application. Over time, these may be merged into a single cross-functional horizontal management system. For this, he regards the understanding the boundaries between specialist disciplines as essential as this may point the way forward to restructuring the various inputs to create the IMS.

The cross-functional management system would be a major step forward but as Griffith (2000) anticipates, such change will not be easy. His research shows that PMPs (Project Management Plans) were seen as vital in driving the management ethos as project implementation would be the true test of company policy and instilling culture. Achieving the benefits of IMS also requires the contractor to devise and to implement revised methods of working, focusing explicitly on the role of IMS within the corporate and project organisations. It is seen as essential that contracting organisations have well conceived and structured management procedures to give clarity and purpose, reduce effort and duplication but without the traditional hindrance of over-management and bureaucracy. With careful consideration and configuration IMS would be a feasible way forward.

## **CURRENT IMS APPLICATION BY CONTRACTOR ORGANISATIONS**

It is reported that both large and small contractors in the UK have implemented integrated management systems (Moore 1998, CIRIA 2000, Griffith 2000 and Smith 2002). Moore (1998) explains in detail the process for IMS implementation in Tarmac Civil Engineering, TCE (now Carillon).

On the drivers for IMS in construction, Griffith (2000) observes the introduction of IMSA (Integrated Management Systems Assessment) by BSI and the lead by a small number of prominent contractors to seek dual and triple certification for their management systems. The construction industry in the UK is perhaps at the leading edge of IMS development and a small number of UK contracting organisations are currently pioneers within the construction industry.

In TCE's case, (Moore 1998) the approach resulted in the development of a single project management plan on all its contracts. This document, which is effectively a method statement for how it manages the job, is the basis for all systems, roles and responsibilities that in the past were spread over a variety of documents. Griffith (2000) also advocates a single project management mechanism, perhaps on the SHE (Safety, Health and Environment) approach. This mechanism is set within a framework of quality approach, enabling the development of a combined management to safety and environment of construction projects.

However, as suggested in the literature, there is yet no concerted drive among contractors to implement integrated systems, although many are adopting environmental management systems (CIRIA 2000). Griffith (2000) also found a lack of in-depth awareness of the emergence of the IMS.

CIRIA Report (2000) concludes that the development of integrated management systems is an organisation-specific decision and different circumstances will lead to different decisions as to the degree of integration that is desirable or achievable.

Moreover, as Moore (1998) maintains, only when people realize that systems are tools to help and not hinder them, can an integrated approach be fully adopted.

Evidence in the literature and from case studies suggests the tendency of clause-wise implementation of systems for compliance and certification resulting in the frustration and dissatisfaction with the management systems. The need is to understand the nature of systems and mould them around the business needs, to take advantage of implementation. Moore (1998) catches the essence of IMS by suggesting the systems be imbued in the core processes, as part of culture rather than superimposed separate functions.

## ANALYSIS OF CASE STUDIES

The previous sections of this paper mainly referred to the analysis of an extensive literature review conducted as part of the research project. The research also includes ongoing case studies being conducted with five major UK contractor organisations. These contractor organisations are the representative sample of top the 100 UK contractor organisations. Table 1, presents the profile of case organisations. The status of integration of management systems and approach being adopted to achieve the integration in each case organisation is presented as follows.

**Table 1:** Profile of case organisations

Main Activity	Turnover £000*	Management Systems in Place		
		Quality	Health and Safety	Environment
1 Principal Contractor	350,000	ISO 9001:2000	No Certification	ISO 14001:1996
2 Principal Contractor	450,000	ISO 9001:2000	No Certification	ISO 14001:1996
3 Principal Contractor	225,000	ISO 9001:2000	No Certification	ISO 14001: 1996
4 Principal Contractor	460,000	ISO 9001:2000	OHSAS 18001:1999	ISO 14001:1996
5 Principal Contractor	2,000,000	ISO 9001:2000	OHSAS 18001:1999	ISO 14001:1996

\* Industry Rankings, Building 20 July 2001

### Case Organisation One

The organisation is at a basic stage in terms of the integration. The Quality and Environment Managers are working to develop an integrated quality and environmental project plan. The proactive quality department is keen on the integration initiative. However, the divisional Health and Safety Representative is not very supportive of the integration. At the moment, the organisation is focussing on integration of quality and environment management systems. The approach adopted is based on the clause wise compatibility suggested by the standards. The organisation is struggling in understanding the scope of the IMS. The integration effort underway is very narrow and limited and mainly aimed at reducing the paperwork. The broader issues associated with integration are not being considered.

### **Case Organisation Two**

The organisation is at a comparatively higher level than organisation one. The Quality and Environment Manager (joint position) is the key person in pushing the integration forward. He has developed an eight stage process model for integrated quality and environmental management systems. It is claimed that the registration organisation is satisfied with the model. The health and safety management system is not part of the integration. However, health and safety is included as a main element in the process model. The Health and Safety Manager is open to integration, however, he wants to see it succeed first with quality and environmental management systems.

### **Case Organisation Three**

The organisation claims to have integrated management systems since 1996, with the introduction of ISO 14001: 1996, environmental management system. However, the integration is limited to quality and environment management systems. The health and safety management system is not included. The organisation maintains an integrated management system manual. Quality and environment audits are integrated. The Quality Manager is the key person looking after the integrated management systems. As with the two previous organisations, the health and safety is not part of the integrated management systems. The integration approach mainly reflects the merging of documentation of standard based quality and environment management systems.

### **Case Organisation Four**

The organisation is one of the few early organisations to achieve the triple certification for quality, health and safety and environment management systems from BSI. The organisation is quite proactive in its approach towards the integration of management systems. Integrated management systems manual is established covering the integrated quality, health and safety and environment management systems. A Business Improvement Department is established to facilitate the integrated management systems. The organisation is currently rolling out the integrated systems based on a process model. Nevertheless, the staff on site still considers the systems overly documented and difficult to follow sometimes.

### **Case Organisation Five**

The organisation is one of the highly advanced UK construction contractor organisations in the integrated management systems. It operates a fully computerised process based integrated systems easily accessible on the organisational wide intranet. The systems include quality, health and safety and environment management systems which are certified against the latest relevant standards. The position and management structure for Integrated Management Systems Managers has been introduced to facilitate the implementation of integrated management systems.

## **DISCUSSION AND CONCLUSION**

The implementation of integrated management systems in contractor organisations is limited at present. Contractors are still in the process of having all the management systems in place. From the examples quoted in the literature and analysis of the case organisations it is evident that the majority of the contractor organisations, having quality, health and safety and environment systems in place are not very advanced from simple document merging in terms of systems integration. The approaches being adopted for IMS at the moment can be categorised as follows:

1. Integration of quality and environmental management systems
2. Integration of environment and safety management systems
3. Integration of quality, health and safety and environment management systems
4. Process based model for total integrated management systems

Only a few contractor organisations have reached to a level where they can claim to have adopted approach three and four. The majority of the organisations are focussing on the links suggested in the standards of quality, health and safety and environment to merge the documentation. This approach, as discussed above is narrow in focus and does not let organisation reap the real benefits from truly integrated systems. One of the reasons as suggested in the literature given above (Griffith 2000) and also evident in the case studies, is the lack of basic understanding of integration. As suggested by CIRIA (2000) and also apparent from case studies, development of integrated management systems is an organisation-specific decision and different circumstances will lead to different decisions as to the degree of integration that is desirable or achievable. Nevertheless, the contractor organisations are open and willing to embrace the integrated management systems application in order to make the management systems for quality, health and safety and environment more efficient, effective, user-friendly, streamlined and more acceptable on sites. However, this research finds a critical lack of industry specific guidance for the application of integrated management systems. A dearth of best practice industry models is hampering the integration drive forcing the contractor organisations to start from the beginning.

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