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The disclosure of costs and income on incomplete contracts in the financial statements of contractors

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Abstract

The standard and generally accepted guideline for the accounting treatment of revenue and costs associated with construction contracts is *AC109/IAS11: Construction Contracts*, which recognises that contract start and end dates usually fall into different accounting periods. This causes the problem that forms the primary focus of this article, namely: the allocation of contract revenue and costs to the accounting periods in which construction work is performed.

Critical to the above allocation is the ability to determine percentage of completion of contract and cost to completion at the balance sheet date (reporting date). The important activities in this regard according to *AC109/IAS11* are to "measure" and "estimate" reliably.

AC109/IAS11 contains detailed guidelines on how these aspects should be dealt with. However, questions arise as to who the relevant role players are and how these actions should be performed. It seems obvious that the guidelines used for determining the stage of completion should correspond with the guidelines for on site cost control. *AC109/IAS11* gives guidance by stating clearly that the provisions of the statement should be read in conjunction with *AC000/Framework: Framework for the preparation and presentation of financial statements*.

South African literature on the subject is limited to textbooks with detailed guidelines to assist accounting students and qualified accountants. No other discussions or guidelines could be found that are directed at the built environment professionals in general, or the contractor in particular, regarding the topic of recognition of cost according to formal accounting guidelines.

The research on which the article is based, attempted to obtain clarification on key aspects from the experts on the subject, namely the registered auditors and accountants of contractors. The results of the survey indicated that they interpret *AC109/IAS11* to require no other skills than general accounting abilities. It also showed that certain important terms and activities described in *AC109/IAS11* are interpreted in ways that differ from how built environment professionals would interpret the same terms.

From the study it became apparent that problems in construction accounting and reporting could arise due to the fact that certain guidelines and terms in *AC109/IAS11* are not consistently interpreted by all involved. These apparent ambiguities will influence the recognition of costs in different phases of completion of a construction contract.

Keywords: *AC109/IAS11*, construction contracts, percentage-of-completion method, costs

Note: For clarity on referencing of accounting and auditing guidelines see reference section.

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Abstrak

Die standaard en algemeen aanvaarde riglyn vir die rekeningkundige verantwoording van inkomste en koste wat met konstruksiekontrakte verband hou, is *RE109/IAS11: Konstruksiekontrakte*, wat erkenning gee aan die feit dat kontrakbedrywighede begin en afgehandel word in verskillende rekenpligtige tydperke. Dit gee aanleiding tot die primêre fokus van hierdie artikel: die toedeling van konstruksieinkomste en konstruksiekoste aan die rekenpligtige tydperke waarin die konstruksiewerk verrig word.

'n Kritiese aspek tot bogemelde toedeling is die vermoë om die persentasie van voltooiing van die kontrak en koste tot voltooiing daarop te bepaal op die balansstaatdatum (verslagdoeningsdatum). Die belangrike aktiwiteite in die geval, volgens *RE109/IAS11*, is om betroubaar te "meet" en te "beraam".

RE109/IAS11 bevat gedetailleerde riglyne vir die hantering van bogemelde aspekte. Die vraag wat egter ontstaan het is wie moet wat doen en hoe dit gedoen moet word. Dit het geblyk ooglopend te wees dat die riglyne vir die bepaling van die stadium van voltooiing sou ooreenstem met riglyne wat sou geld vir die beheer van kostes op terrein. *RE109/IAS11* verskaf riglyne deur dit onomwonde te stel dat die bepalings van die standpunt saam gelees moet word met *RE000/Raamwerk: Raamwerk vir die Opstel en Aanbieding van Finansiële State*.

Suid-Afrikaanse literatuur oor die onderwerp is beperk tot handboeke wat gedetailleerde riglyne bevat om hulp te verleen aan rekeningkunde studente en gekwalifiseerde rekenmeesters, maar geen ander besprekings of riglyne kon opgespoor word wat gerig is op professionele persone in die bouomgewing in die algemeen, of spesifiek op die kontrakteur, ten opsigte van die onderwerp van erkenning van kostes ingevolge formele rekeningkundige riglyne, nie.

Die navorsing waarop die artikel gebaseer is, poog om duidelikheid te bekom rondom sleutelaspekte vanaf die kenners op die gebied, naamlik die geregistreerde ouditeure en rekenmeesters van kontrakteurs. Die resultate van die opname toon dat hulle *RE109/IAS11* interpreteer dat daar niks meer as algemene rekenmeesters vermoëns van hulle vereis word nie. Dit het ook aangetoon dat hulle sekere belangrike terme en aktiwiteite verduidelik in *RE109/IAS11* verskillend geïnterpreteer as wat professionele persone in die bou omgewing dit sou doen.

Dit blyk daarom vanuit die navorsing dat probleme in konstruksierekeningkunde en -verslagdoening mag ontstaan weens die feit dat sekere riglyne en terme in *RE109/IAS11* nie konsekwent geïnterpreteer word deur die betrokke rolspelers. Die ooglopende onsekerhede beïnvloed die erkenning van koste in die verskillende fases van voltooiing van 'n konstruksiekontrak.

Sleutelwoorde: *RE109/IAS11*, konstruksiekontrakte, persentasie-van-voltooiings metode, koste

Nota: Vir meer duidelikheid rondom verwysings na rekeningkundige en ouditriglyne raadpleeg die bronverwysings.

1. Introduction

Adrian, J.J. & Adrian, D.J. (1999: 3) stated that the success of a construction firm is closely aligned to and determined by its ability to forecast and control costs. Both these functions have accounting as their base.

Although no other industry needs sound accounting practice more than construction firms, the construction industry has a history of neglecting to perform the accounting function properly. Construction firms in the United States of America fail annually and many of the reasons can be traced to inadequate accounting practices (Adrian, J.J. & Adrian, D.J., 1999: 3).

Literature, however, indicates that the many unique characteristics of construction accounting render generic financial management teachings almost useless. The problem is either related to the nature of construction accounting itself or to the way financial reporting in the construction industry is done.

Abraham Briloff, as cited by Adrian, J.J. & Adrian, D.J. (1999: 3), in his book *Unaccountable Accounting* poses the question as to whether one plus one always equals two in the accounting profession, and draws attention to the fact that alternative accounting methods available to the profession often result in financial statements that are misleading or open to interpretation.

Adrian, J.J. & Adrian, D.J. (1999: 121) indicated that these alternative accounting methods and means of expressing financial data in the financial statements are especially troublesome to the construction industry and often result in lenders and sureties falling victim to misleading financial statements. The contractor's ability to continue as a going concern often depends on his accountant's ability to present financial statements in the most favourable light. These type of statements (and allegations) led to the question whether accounting in construction should be considered differently from accounting in other fields.

In a construction entity one would expect to find a variety of built environment professionals involved in planning, production, on site cost control, etc. They could be internal personnel or external consultants. Furthermore, accounting professionals are expected to be involved in preparing financial records, once again as internal personnel or external consultants. It would be logical to assume and expect that these professionals use methods and systems that are mutually compatible to ensure effective and accurate information

sharing. Enquiries into the validity of these perceptions, however, resulted in a different perspective.

According to Peterson (2005: preface v), business schools teach the fundamental principles of financial management to their students but the many unique characteristics of the construction industry, however, render the usefulness of these teachings almost meaningless. This is apparently more evident in the construction industry than any other industry.

Why does the construction industry experience accounting problems? The answer could be all or some of the following:

- The accounting education of built environment professionals is not up to standard or the standard required has not yet been established or is misdirected.
- The accounting education of built environment professionals is passed on to the accounting departments of those institutions where they encounter the problems as pointed out by Peterson. Is it assumed that built environment professionals will do the financial adaptations and applications to construction, on their own, as years go by?
- Contractors do not spend as much time, energy and resources on the financial planning of their businesses as they do on the operational planning of their businesses. The financial plan and the execution of that plan need to be in place before the contractor starts with construction on site.
- According to Shinn (2002: 3) the design of the accounting system for a construction entity can never be left to the accountant. The construction manager knows what information is necessary to successfully manage a project and therefore the accounting system should rather be management orientated and directed. Utilising more than one reliable system is costly and could lead to time wasted on lengthy reconciliations or clarifying possible contradictions.
- The situation might exist where accountants and contractors do not communicate with sufficient clarity to avoid ambiguity and costly mistakes. Contractors cannot qualify as accountants, or accountants as built environment professionals, just to comply with guidelines such as the South African Institute of Chartered Accountants' (SAICA) *AC109/IAS11: Construction contracts* (reporting principles for contractors). *AC109/IAS11* should be clear to all parties

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involved in the preparation and presentation of the financial statements of a contractor. Are statements such as AC109/IAS11 written for qualified accountants only? Will any user of the statement be able to interpret it correctly? Will financial statements compiled by accountants and non-accountants show the same results if applied to the results of the same construction contracts?

2. The current situation or the current perception of the situation

2.1 The type of accounting problems encountered by contractors in practice

The ability of a contractor to estimate as well as to manage the cash flow, distinguishes him from his competition in the industry. Contractors seem to accept and even prefer a situation where their cost control on projects is done with the aid of systems other than their formal accounting system. Numerous reasons are given for this. Although it is apparent that the list below is not exhaustive, some consequential problems are discussed to determine its relevance to the recognition of costs in different accounting periods. The following seem to be general guidelines:

2.1.1 Timeliness and affordability of accounting reports

An accounting system is normally two to three months behind the current date unless a major effort is made in recruiting accounting personnel and purchasing expensive computer software and updates. The situation is worse for the smaller contractor than for the larger contractor and affordability of an adequate infrastructure is the main obstacle. Reports are of no use unless received in time to implement changes to rectify emerging problems.

2.1.2 The perceived reliability of accounting reports

An accounting clerk can verify that an expense is legitimate in terms of description, value, quantity and cost code, but he will not be able to verify it in terms of its sequence in the construction procedure. Manipulations and errors are not easily spotted. This leads to a loss of confidence by managers (non-accountants) in reports that are technically correct but comply with principles unfamiliar and unclear to them.

2.1.3 Possible reconcilability of various financial reports

It is difficult to persuade individuals, who spend long hours to ensure that their control systems are reliable, to sit down and reconcile it with another system that produces different answers, especially if they do not have experience in each other's field of expertise. This could be avoided with simultaneous input by various professionals on the same system. Everybody concerned needs to be able to interpret and understand the underlying accounting principles in a consistent fashion.

2.1.4 Non-availability of reports containing estimated, budgeted and actual amounts

Very few accounting systems are capable of reporting on estimations, budgeted and actual amounts. Most contractors settle for a hybrid spreadsheet solution that runs separately from the accounting system. These systems are usually maintained by built environment professionals rather than accountants.

2.1.5 Comprehension difficulties with financial reports in general

Contractors generally seem to struggle with understanding accounting concepts. Could this be attributed to unclear guidelines or merely lack of training opportunities?

2.1.6 Summary

Construction entities operate mainly as public companies, private companies, close corporations, partnerships and sole traders. Apart from a few exceptions these business forms are usually a reliable indication of the physical size and contracting abilities of the construction entity. The same applies to contracts awarded to them and the duration and extent thereof. The number of personnel making up the accounting department, their qualifications, expertise and experience, are almost always directly related to the entities' size. A contractor that cannot afford the luxury of a qualified internal accountant will revert to the engagement of external auditors and/or accountants.

In the case of a company, the directors are responsible for the financial statements. Private companies may, under certain circumstances and conditions, transfer this duty to their external auditors and accountants. Usually when close corporations and other

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types of businesses appoint registered auditors and accountants for their accounting and tax responsibilities, they would automatically request them to compile their financial statements. There is, however, no obligation to do so. The entity may compile its own statements.

The question therefore is: Will statements compiled by external auditors and statements compiled by internal accountants always be similar in principle and specifics?

2.2 General deductions and resulting questions:

- Where external auditors and accountants draw up the financial statements of a contracting entity, do they accomplish this on their own without any assistance from built environment professionals?
- If built environment professionals know, at best, little or nothing about accounting principles and guidelines and the impact thereof on their financial statements, are they in a position to give any assistance in compiling financial statements?
- Built environment professionals are of the opinion that a person must first be able to measure before he can estimate. Do accountants share this opinion?
- If the built environment professionals do not assist the external auditors and accountants or their own internal accountants with the compilation of financial statements and verification of balance sheet items such as work-in-progress, where do accountants acquire the skills needed to measure and estimate to be able to audit items such as 'cost to complete' on a construction contract?
- Are registered auditors and accountants allowed to rely on the work of an expert when needed? According to SAAS620/ISA620 they can use the expert's work but not accept it as final verification. In discussions between the AICPA and International Accounting and Auditing Standards Board (IAASB), the same concerns are being raised. Whether this will result in feasible solutions remains to be seen.
- The solution might be that registered auditors and accountants may make use of a built environment professional as a member of their audit team, or rely on internal controls designed to authenticate accounting procedures. The biggest shortcoming of internal auditors, however, is the

fact that they are usually accounting-orientated personnel. Designers of controls (and systems) need to be experienced in accounting, auditing and construction related activities. Such persons appear not to exist.

2.3. The unavailability of literature and guidelines on the topic of construction accounting

Useful publications on cost accounting are numerous but useful publications on construction accounting are scarce. The literature on construction accounting can be grouped as follows:

- Accounting literature that contains prescriptions, guidelines, statements, sections in acts and other statutory documentation. Text books for accounting students (mostly textbooks on GAAP for prospective Chartered Accountants) which are mostly theoretical of nature and contain little reference to practice. *AC109/IAS11: Construction contracts*, is such an example.
- Accounting material from the United States of America containing their alternative/equivalent of *AC109/IAS11*. This includes the *Accounting Research Bulletin 45*, (1955) and the 1981 *Statement of Position 81-1*. The American Institute of Certified Public Accountant's (AICPA) *Professional Issues Task Force Practice Alert (2000-3)* for construction companies proves to be a valuable guideline.

3. AC109/IAS11 and recognition of contract costs and revenue and recognition of proportionate profit based on the determination of percentage of completion on the date of the financial statements

The standard guideline for accounting for construction firms is *AC109/IAS11: Construction Contracts*, which recognises that with large contracts the start and end dates usually fall into different accounting periods. This creates a problem that forms the primary focus of this article namely the allocation of contract revenue and costs to the accounting periods in which construction work is performed. According to Everingham *et al.* (2004: 22:1) the major accounting problem facing a contractor is the determination of "an equitable method of revenue and costs allocation" and failure to do so adequately can lead to profit manipulation. The longer the duration of the contract the greater the problems surrounding

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profit recognition. Critical to the above allocation is the ability to determine the percentage-of-completion of the contract and the cost-to-complete at the balance sheet date (reporting date). The important activities in recognition in this regard are to 'measure', 'estimate' and 'identify' reliably the revenue and costs associated with the contract.

AC109.03/IAS11.03 provides definitions for a construction contract, a fixed price contract and a cost plus contract. AC109.22/IAS11.22 states that when the outcome of a construction contract can be estimated reliably, contract revenue and contract costs associated with the construction contract should be recognised as revenue and expenses respectively with reference to the state of completion of the contract at the balance sheet date. The stage of completion should be based on the work completed on the contract at the balance sheet date. An expected loss on the construction contract should immediately be recognised as an expense in accordance with AC109.36/IAS11.36.

AC109.23/IAS11.23 refers to a fixed price contract and states that in the case of a fixed price contract, the outcome of a construction contract can be estimated reliably when all of the following conditions are met:

- Total contract revenue can be measured reliably.
- It is probable that the economic benefits associated with the contract will flow to the enterprise.
- Both the contract costs to complete the contract and the stage of contract completion at the balance sheet date can be measured reliably.
- The contract costs attributable to the contract can be clearly identified and measured reliably so that actual contract costs incurred can be compared with prior estimates.

AC109.24/IAS11.24 furthermore states that in the case of a cost plus contract, the outcome of a construction contract can be estimated reliably when both of the following conditions are met:

- It is probable that the economic benefits associated with the contract will flow to the enterprise.
- The contract costs attributable to the contract, whether or not specifically reimbursable, can be clearly identified and measured reliably.

In the Introduction Paragraph to AC109/IAS11 it is stated that the provisions of the statement should be read in conjunction with AC000/*Framework: Framework for the Preparation and Presentation of Financial Statements*. The reference is repeated in the Index part of AC109/IAS11. The Objective Paragraph in AC109/IAS11 places it beyond argument with the wording: the objective of this statement (AC109.01/IAS11.01) is to prescribe the accounting treatment of revenue and costs associated with construction contracts. It is also stated that AC109/IAS11 uses the recognition criteria established in the above framework and that AC000/*Framework* provides practical guidance on the application of these criteria.

4. Reliable measurement and estimates: the cornerstones of costs

4.1 Definitions

This article does not include the July 2006 Discussion Papers by the IASB (International Accounting Standards Board) issued in conjunction with the FASB (Financial Accounting Standards Board of the Financial Accounting Foundation). It is the opinion (of the authors) that the discussion papers would not have influenced the principles of research and deductions made from the results to the survey. AC000/*Framework's* definitions do not differ from the discussion documents to a degree that would affect the interpretations to AC109/IAS11 references.

The IASB document is titled *Preliminary Views on an improved Conceptual Framework for Financial Reporting: The Objective of Financial Reporting and Qualitative Characteristics of Decision-useful Financial Reporting Information*. The FASB document No.1260-001/ July 6, 2006 is titled *The Preliminary Views* and is issued by the Financial Accounting Standards Board for public comments as a step preceding the Development of an Exposure Draft of the Initial Parts of an Improved Conceptual Framework for Financial Reporting.

According to Everingham *et al.* (2004: 2:13 & 3:14) 'reliability', 'measurement' and 'reliability of measurement' are all defined in AC000/*Framework: Framework for the Preparation and Presentation of Financial Statements* that states:

- Reliability of measurement:

The criterion for the recognition of an item is that it possesses a cost or value and that it can be measured with reliability. When, however, a reasonable estimate cannot be made, the item

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is not recognised in the balance sheet or income statement. The disclosure in the notes is appropriate when knowledge of the item is considered to be relevant to the evaluation of the financial position, performance and changes in financial position of an enterprise, by the users of financial statements.

- Measurement:

Measurement is the process of determining the monetary amounts at which the elements of the financial statements are to be recognised. This involves the selection of a particular base of measurement that is employed to different degrees and in varying combinations in the financial statements. Historical cost, current cost, realisable (settlement) value and present value are the bases mentioned. Historical cost is the measurement base most commonly used by enterprises.

- Reliability:

To be useful, information must also be reliable and thus free from material error and bias and dependable to users. Information can be relevant but unreliable and potentially misleading but must at least lead to Faithful Representation (information must represent faithfully the transactions and events it purports to represent although subject to some risk of being less than faithful), Substance over Form (information must be accounted for and presented in accordance with their substance and economic reality and not merely their legal form), Neutrality (information contained in financial statements must be neutral and free from bias to be reliable), Prudence (preparers of financial statements have to contend with the uncertainties that surround many events and circumstances) and Completeness (information must be complete within the bounds of materiality and cost).

The question whether the accounting definitions contained in AC000/Framework actually define measurements, as needed to calculate the stage of completion of a construction contract, is left to the accountants. The definitions contained in AC000/Framework definitely do not define 'reliable measurement' in the same way that the built environment professionals' literature and guidelines do. If the literature on 'measurement' and 'accuracy' of the built environment professionals are consulted, it is clear why misconceptions exist.

The following reference by one of the authoritative textbooks prescribed to accounting students in South Africa, illustrates the general approach to estimation, measurement and recognition of costs and revenue displayed by accountants. According to Vorster et al. (2003: 237) the outcome of a construction contract can be estimated reliably only if it is probable that economic benefits will flow to the entity. Other aspects to be considered are the predictability

of the costs, the accuracy of cost allocations to the contract, the accuracy with which the cost to complete is established and the duration of the contract.

The American Institute of Certified Public Accountants (AICPA) states in a document called *SOP 81-1 (Statement of Position 81 - 1)* in paragraph 24 that the presumption can be made that construction companies (contractors) have the ability to produce estimates that are sufficiently dependable to justify the use of the percentage-of-completion method of accounting, and that persuasive evidence to the contrary is necessary to overcome that presumption. They further consent that the ability to produce reasonably dependable estimates is an essential element of the contracting business. The above assumptions contradict results of a survey done in the USA, *Duns Review (1976)*, as cited by Adrian, J.J. & Adrian, D.J. (1999: 3), which indicated that the second most frequent reason for business failure in construction firms is inadequate project estimating and/or cost control systems.

Epstein & Mirza (2005: 187) indicate that *AC109/IAS11* does not specifically provide instructions for estimating costs to complete. This has to be deduced from other statements such as *SAAS540.03/ISA540.03* which states that an accounting estimate means an approximation of the value of an item in the absence of a precise means of measurement, one of the examples given includes losses on construction contracts in progress.

According to *AC109.23/IAS11.23* sub-paragraph 3, when both the contract costs to complete the contract and the stage of contract completion at the balance sheet date can be measured reliably are read in the context of the definitions supplied by *AC000/Framework*, it becomes even more debatable whether 'cost to complete' forms the focus of 'reliable measurement' as contained in *AC000/Framework*.

5. Reliable estimates and reliable measurement in the determination of 'the stage of contract completion' and 'cost to complete'

According to Adrian, J.J. & Adrian, D.J. (1999: 282) both the percentage of completion and the cost to complete can present problems. Lack of good accounting records can prevent the establishment of costs to date. Even more troublesome is determining a project's cost to complete. Like determining incurred costs to date, it can have a major impact on calculating the percentage of completion.

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Many construction firms cannot give an accurate estimate of such costs which is evidenced in part by the high failure rate in the industry. Defliese *et al.* (1975: 265-266) stated that the estimate of cost to complete is the most critical element in accounting for revenue and unbilled receivables under long-term contracts and evaluating the need to provide for estimated losses. Everingham *et al.* (2004: 22:6 & 22:9) state that the provision for expected losses on one contract may not be set off against unrealised gains of another contract. The need to do estimates undermines the quality of the profit reported. In the *Practice Alert* (2000-3) issued by the AICPA concerning construction auditing and accounting, the difficulty of construction audits are highlighted by the following statements:

- Construction companies using the percentage of completion method of accounting is one of the more challenging audits.
- Auditing construction contractors or entities using contract accounting is complex.
- Such businesses rely on accurate and reliable estimates to operate their business as well as to prepare financial statements in accordance with generally accepted accounting principles.
- It is critical that the auditor gains an understanding of the contractor's significant estimates and assumptions in operating his business.

According to Grosskopf (2005: 1) more than 50 percent of new contractors fail in the first five years of operation, most of these in the first two. Despite good field knowledge they had little knowledge of the business and financial environment. A similar situation prevails in South Africa. The *CIDB Report* (2004: 16) stated that the perception of the banking sector is that the construction industry is a high-risk industry and that almost all construction companies have been faced with serious financial problems at one time or another.

6. Measurement and estimate as defined by AC109/IAS11: Is it based on arithmetic or judgement by the accountant or the built environment professional?

The definitions in *AC000/Framework* require arithmetical accuracy and judgement from accountants. Other professionals are not referred to. The definitions 'reliable measurement' and 'reliable estimates' as used in *AC109/IAS11* do not seem to imply more than arithmetical accurateness.

Build environment professionals would generally agree to the rough definitions of:

- Measure:
The physical activity of taking off quantities from architect's of engineer's drawings or the physical measuring of dimensions on site
- Estimating:
Applying current construction cost rates to measurements (rough or accurate – depending on the quality of the information) in order to estimate the future construction cost.

Palmer *et al.* (1995: 400-401) stressed that in order to be fully effective in doing the internal auditing in a construction company the auditor should be able to review the plans, observe the physical progress of the job, know what the accounting records 'should' show, reconcile the records with what he has observed and know the normal sequence of physical work.

7. What is the best base and method to determine the percentage of completion of a construction contract on any given date?

AC109/IAS11 leaves the choice of the base and method to be used in determining the stage of completion, and therefore the recognition of profit on incomplete construction contracts, to the professional opinion of the accountants involved. The percentage-of-completion method of accounting can be applied if the stage of completion can be determined which is, according to Everingham *et al.* (2004: 22:6) "frequently difficult". No restrictions are placed and no mention is made by AC109/IAS11 of prohibiting the switching from one method to another.

Although AC109/IAS11 seems clear on this point, ambiguities are found in other areas. The wording of AC109/IAS11 contributes to this in that the question arises whether everyone interprets the wording in similar fashion. The guideline is such that more than one method could be applicable. This renders the choice of 'the best method' difficult for the accountant (or the non-built environment professional).

Adrian, J.J. & Adrian, D.J. (1999: 282) cautions that, in spite of any auditing technique used the percentage-of-completion remains somewhat of an uncertain variable to the construction firm and

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auditor and is therefore probably the most challenging area of construction firm auditing.

According to *SOP 81-1* paragraph 44, some of the key aspects on the percentage-of-completion method in practice are that a number of methods are used to measure progress against completion. Included are the cost-to-cost method, variations of the cost-to-cost method, efforts-expended method, the units-of-delivery method and the units-of-work-performed method. Some of the measures are sometimes done and certified by engineers or architects. Management should review and understand the procedures used by those professionals.

Palmer *et al.* (1995: 271-272) states that the cost-to-cost method is the most prevalent method of arriving at a percentage of completion for the purpose of recognising profit and losses on contracts in progress. Many contractors use some form of labour base for determining percentage of completion, but perhaps the best method of computing percentage of completion is the physical observation method.

Palmer *et al.* (1995: 273) states on measuring the extent of progress towards completion that the results obtained should be evaluated periodically through physical observation by qualified personnel, in the same way that the results of perpetual inventory records are evaluated and adjusted by taking a physical inventory in a manufacturing enterprise.

8. The built environment professionals as experts in construction

Determining the percentage of completion on a construction contract using *AC109/IAS11 Principles* will include some of the following procedures:

- Determine whether it is a construction contract as defined;
- Determine whether a loss can be expected or not;
- Determine whether any changes in estimates occurred;
- Reliably estimate the outcome of the contract;
- Reliably measure costs to complete;
- Reliably measure cost attributable (costs to date);
- Reliably measure the stage of completion (the work executed);

- Reliably measure income (revenue);
- Clearly identify cost attributable (costs to date);
- Compare actual costs with estimates;
- Agree on:
 - the parties' enforceable rights;
 - the consideration to be exchanged; and
 - the manner and terms of settlement.
- Determine whether the contract is sufficiently completed to warrant the application of the percentage of completion method;
- Determine whether the economic benefits will flow to the entity;
- Determine whether the contract(s) is to be combined or segmented;
- Verify existence of an effective internal financial budgeting and reporting system;
- Determine whether costs were incurred on:
 - future activity on the contract; and
 - advance payments to subcontractors.
- Determine whether costs were incurred:
 - after date of securing contract; and
 - before date of final completion.
- Costs incurred before the date of securing the contract, must be possible to:
 - separately identify the items;
 - reliably measure the items; and
 - determine whether it is probable that the contract will be obtained.
- Determine whether costs that were incurred are qualifying costs, i.e.:
 - directly related to the contract;
 - attributable to the contract activity; and
 - specifically chargeable to the customer.
- Determine whether costs exclude:

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- general administration costs;
- selling costs;
- research and development costs; and
- depreciation on idle plant and equipment.

Not all of the above will appear to the built environment professionals to be 'accountant friendly' activities but there is no alternative and feasible practice for adopting the work of independent, objective, qualified and experienced built environment professionals by registered external auditors and accountants of construction contractors.

SAAS620.06/ISA620.06 states with reference to *Using the work of an Expert* that in obtaining an understanding of the entity and performing further procedures in response to assessed risks, the auditor may need to obtain, in conjunction with the entity or independently, audit evidence in the form of statements by an expert. The examples given include "the measurement of work completed and to be completed on contracts in progress".

The competence and objectivity of the expert must be determined by the auditor. According to SAAS620.08/ISA620.08, when planning to use the work of an expert, the auditor should evaluate the professional competence of the expert. This will involve considering the expert's professional certification or licensing by, or membership of, an appropriate professional body and his experience and reputation in the field in which the auditor is seeking audit evidence.

Judging from an article by Shanteau *et al.* (2002), the auditor will encounter problems in identifying what exactly constitutes an expert.

8.1 The nine traditional approaches

Although the traditional approaches have merit, the question of what constitutes an expert is not easily answered, for example:

- Experience — many professionals gain considerable experience but never become experts.
- Certification — this is more often tied to years on the job than to professional performance.
- Social acclamation — when there is some agreement about the identification of such an individual, that person is then labelled an expert by 'social acclamation' and not technical expertise.

- Consistency (within) reliability — intra-person (within) reliability is a necessary quality for expertise, i.e. an expert's judgments should be internally consistent.
- Consensus (between) reliability — agreement between individuals is a necessary condition for expertise.
- Discrimination ability — the ability to make fine distinction between similar, but not equivalent, cases is a defining skill of experts.
- Behavioural characteristic — expert auditors share many common behavioural characteristics. Some examples are self-confidence, creativity, perceptiveness, communication skills and stress tolerance.
- Knowledge tests — knowledge of relevant facts is clearly a prerequisite for experts. Yet, knowledge alone is not sufficient to establish that someone is an expert. The problem is that it takes more than knowledge of facts to acquire expertise.
- Creation of an expert — in certain contexts, it is possible for experts to be 'created' through extensive training.

The conclusion on the above is that the characteristics of 'consistency (within) reliability' and 'discrimination ability' are considered to be the trademarks of an expert. Within those two characteristics are contained various degrees of accuracy effecting the identification of a person that belongs to an expert group or a novice group.

According to the IAASB (2004: 2004-2009) the ASB (American Standards Board) requested the IAASB (International Auditing and Accounting Standards Board) to reconsider the matter of using specialists or experts in certain audits. It is possible that under certain circumstances the contracting of experts could and should become mandatory and that non-contracting of experts by management could and should be considered scope limitation by the auditors.

The question of 'whether the auditor should obtain a description of the assumptions, methods, test data and findings of the 'expert' was also asked. According to Cheney (2005: 15) the indication of what to expect, regarding the above, might be contained in the statement by Landes, namely: "that what they want to do is take away what they think may be a practice problem in some situations – the over-reliance on the use of specialists' work without the auditor doing sufficient due diligence and applying appropriate professional scepticism."

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In the *Practice Alert* by the PIF (2000-3) of the AICPA, it was emphasised that it is challenging auditing entities that use contract accounting. They stated that the main element of the contractor's financial statements is based on estimates of cost. Prior to auditing contractors, their auditors should ensure that they have the appropriate expertise to conduct such audits. It is crucial that the auditor gains an understanding of the contractor's significant estimates and assumptions in operating its business.

Palmer *et al.* (1995: 457) stated that it is difficult and challenging for an auditor and/or accountant seeing that not many public accountants or internal accountants for that matter have enough knowledge or experience of the operational end of construction, to evaluate some of the important relationships between job progress as it exists in the field and what the job records show or should show.

Seeing that construction accounting and reporting is an arduous task, it was decided to focus on possible ambiguities in construction contract reporting guidelines, namely: *AC109/IAS11: Construction contracts*.

9. Methodology

A survey of the relevant laws, guidelines and practices concerning the disclosure and recognition of revenue and expenses on construction contracts in the financial statements of contractors, has been undertaken to attempt to define the content of the guidelines contained in *AC109/IAS11*.

A questionnaire was sent to the registered auditors and accountants of participating large general contractors registered in 2005 with the Gauteng Master Builders' Association. Small contractors are generally excluded from the definition of *AC109/IAS11*'s construction contractors because of their size, duration of contracts, internal control and internal accounting knowledge and expertise. In determining the accountant's interpretation of certain paragraphs in *AC109/IAS11*, the registered external auditors and accountants proved to be the most knowledgeable group to consult. As far as could be established, registered auditors and accountants as a group of professionals, are the only accounting orientated professionals qualified to guarantee knowledge, correctness and consistency in applying the requirements of *AC109/IAS11*. Their consistent application of guidelines and knowledge of accounting principles in general, proved to be valuable.

The questionnaire was sent out after obtaining the contractor's permission to contact their auditors as the questionnaire was expected to address some sensitive issues with the contractors. The contractors selected included the listed companies and/or their group companies and larger unlisted companies. All the construction companies listed as the top construction companies in 2005, according to Brummer (2006), took part in the survey.

The construction companies' registered external auditors and accountants included the 'big four' internationally registered audit and accounting firms (referred to as 'international firms' in the results section) as well as the other larger registered auditing and accounting firms in South Africa (referred to as 'other firms' in the results section). All but one of the registered external auditors and accounting firms of the construction companies listed as the top companies in 2005, took active part in the survey.

Built Environment professionals include construction managers, construction project managers, quantity surveyors, town and regional planners, urban designers, architects, landscape architects, interior architects, property valuers, civil engineers, structural engineers, electrical engineers, mechanical engineers, electronic engineers, geotechnical engineers and land surveyors.

In the questionnaire the questions were structured around the basic principles raised by issues such as:

- Does *AC109/IAS11: Construction Contracts* provide clear and feasible guidelines for the determination of the stage of completion on a construction contract for disclosure in the financial statements of contractors and are 'reliable measurement' and 'reliable estimates', as contained in *AC109/IAS11*, clearly identified as the most fundamental concepts and are they clearly defined?
- Do the terms 'reliable measurement' and 'reliable estimates' refer to the mathematical correctness of calculations, or do they refer to the use of special skills and experience of specific professionals and can each of the alternative methods of calculating the stage of completion provided for in *AC109/IAS11*, only be used in a specific set of circumstances, or in any given set of circumstances?
- Do the prescriptions and guidelines in *SAAS620/ISA620: Using of the work of an Expert*, provide an adequate alternative for gaining audit evidence in verifying calculations and estimates of work in progress and the stage of completion of a construction contract?

The focus is on determining the reasons for misunderstanding of *AC109/IAS11* by the build environment professionals, other than due to lack of knowledge of accounting and reporting.

10. Discussion of the results

10.1 The questionnaire

The questionnaire contained sixty-six questions. It included sub-questions and amounted to 142 questions with 365 possible answers. 60 Questions and 133 answers were directly related to *AC109/IAS11* principles and procedures. The questions were divided into categories that required all of the following qualities from the respondents; knowledge (of *AC109/IAS11* and other Statements of GAAP and GAAS, such as *AC000/Framework*), experience (of construction auditing, accounting and reporting) and an opinion (on the application of these accounting, auditing and reporting procedures and requirements).

The respondents showed a 100% agreement on only 6 of the questions asked. The 6 questions ranged from whether they had any formal training on built environment skills to whether they recognise and employ built environment professionals to assist them on auditing procedures. The question "do you compare cost to completion with estimated costs on all contracts where profit is calculated based on percentage of completion?" can be considered the only question directly related to *AC109/IAS11* where all the respondents answered yes unanimously. The question is an example of the ease with which confusion is created where accountants work with phrases that are also common to members of other professions. 'Cost to completion' or 'cost to complete' is 'estimated costs'. It is difficult to envisage why one would want to compare an amount with itself. It sounds like the correct procedure to follow. *AC109/IAS11* is not clear on the topic.

Subsequently the one question on *AC109/IAS11* that was asked with the objective of determining whether accountants experience certain phrases in construction accounting to be ambiguous, (whether they acknowledge it or not) is in fact the question that the respondents agreed on unanimously.

10.2 The respondents

The respondents were all qualified chartered auditors and accountants in private practice with construction contractors as clients. All but one of the 'big four' international audit firms responded. The 'missing link' forwarded a written declination to respond, stating that he had been transferred to another department before he could discuss the remaining questions with his colleagues.

A different choice of or number of respondents would not have resulted in a different conclusion. The fact that in only 0.75% of the AC109/IAS11 related answers respondents were unanimous in their interpretation, verified the fact that contractors, and their accountants, would have difficulty with the interpretations of important aspects of AC109/IAS11.

10.3 The most important concepts contained in AC109/IAS11

The respondents are in agreement that the most important concepts contained in AC109/IAS11 are contract revenue, contract costs and the recognition of revenue and expense.

Recognition of revenue and expense is considered by the respondents to be the most important concept contained in AC109/IAS11. To a large extent that is correct. However, included in the recognition of revenue and expense are the principles of 'reliable measurement' and 'reliable estimates'. Together with 'clearly identify' they form the cornerstones of the actions to be taken when recognition is being considered. The concept 'to be able to clearly identify costs' was not included in the questionnaire because it is considered to form part of the skills of an auditor and accountant. The other two concepts were tested as they might be considered to be built environment professionals' skills. To a certain degree it is a chicken and egg situation, but everyone should agree that if you can measure, identify and estimate, then you can recognise, according to AC109/IAS11, and not the other way around.

Table 1: The six most important concepts as identified by respondents

| No. | Concept | Considered 'most important' by respondents (percentage) |
|-----|-------------------------------------|---|
| 1 | Recognition of revenue and expenses | 84.6 |
| 2 | Contract revenue | 76.9 |

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| | | |
|---|----------------------|------|
| 3 | Contract costs | 69.2 |
| 4 | To measure reliably | 61.5 |
| 5 | To estimate reliably | 53.8 |
| 6 | Changes in estimates | 53.8 |

One of the following possible reasons may apply to the outcome, namely:

- The respondents do not realise that measure and estimate form part of recognition and/or cannot really see how measurement and estimation can be of more importance than recognition.
- The respondents are not of the opinion that recognition means to measure and to estimate and do not share the opinion that you have to be able to measure and estimate before you can recognise.
- The respondents are of the opinion that 'to estimate' and 'changes in estimates' are similar and are of the opinion that measurement is 'to establish the amount of'.
- The respondents do not recognise that to determine the construction cost of a design by one professional, will require the expertise of another professional and do not feel that they are required to verify something that they are or might not be qualified to do. They do not feel confident discussing construction auditing and accounting without consulting a textbook or AC109/IAS11.
- The respondents encounter difficulty with the interpretation of some of AC109/IAS11's wording and might be aware of it and might or might not have a solution, but decided not to share that knowledge in answering the questionnaire.

10.4 Reliable measurement and reliable estimates

The possible reasons for the non-recognition of two of the more important and prominent aspects contained in AC109/IAS11, namely reliable measurement and reliable estimates, might be that:

- it is not defined in the document and is therefore not described and placed in context,

- it is not clearly linked to a specific action and is therefore not evident by whom exactly it 'can' or 'should' be performed and it is therefore not clear what skills are required.

It is logical that users of *AC109/IAS11* assume that reliable measurement and reliable estimates are performed by an accounting person. When asked to define 'reliable measurement' and 'reliable estimates' some of the answers were: "Defined in framework" and "For audit purpose I need to obtain an indication of a fair measurement of cost and revenue. This is done by means of what is accounted for in the accounting records compared with third party inputs". These answers are contradictory.

More so is the answer to the question: "the wording 'measure reliably' (and other synonyms) are used throughout the guideline but is never defined. Do you agree with this statement?" The 'international' auditors and accountants were quite sure and gave a 100% 'yes' answer. The 'other' auditors and accountants were divided on the issue and 37.5% answered 'yes', 37.5% answered that they were 'unsure' and 25% answered 'no'. (A definition of reliable measurement is contained in *AC000/Framework*.)

Table 2: Response to the question whether concepts are defined adequately

| No. | Topic | Yes % | Unsure % | No % | 'International' auditors as part of "yes" answers | 'Other' auditors as part of "yes" answers |
|-----|----------------------------|-------|----------|------|---|---|
| 1 | Measuring reliably | 61.5 | 23.1 | 15.4 | 100% | 37.5% |
| 2 | Estimating reliably | 46.2 | 23.1 | 30.8 | 100% | 12.5% |
| 3 | Attributable costs | 53.8 | 30.8 | 15.4 | 60% | 50% |
| 4 | Overheads | 76.9 | 7.7 | 15.4 | 80% | 75% |
| 5 | Non-attributable costs | 15.4 | 46.2 | 38.5 | 0% | 25% |
| 6 | Cost allocation in general | 53.8 | 30.8 | 15.4 | 60% | 50% |
| 7 | Early stage of a contract | 15.4 | 30.8 | 5.8 | 0% | 25% |

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The uncertainty amongst the 'other' auditors, as illustrated by the table below in the answer to the question: Do 'estimate reliably' and 'measure reliably' require the same skills?

Table 3: Response to the question whether 'estimate reliably' and 'measure reliably' require the same skills?

| Topic | Yes | No | <i>'International' auditors as part of the "yes" answer</i> | <i>'Other' auditors as part of the "yes" answer</i> |
|------------------|-------|-------|---|---|
| Measure reliably | 84.6% | 15.4% | 100% | 75% |

10.5 Auditing the work of built environment professionals

This section discussed the measurement and arithmetic nature of various calculations required to produce the estimates of:

- cost to complete
- cost to date
- stage of completion
- costs attributable and
- revenue due

Respondents answered several questions that were intended to determine the extent of their measurement and estimating skills. They did not seem to have any doubts that they do not possess the skills needed to perform the required task as would a built environment professional, but it did not seem to matter. Respondents were of the opinion that the verification of the measurement, normally done by the built environment professionals, can be performed by accounting orientated personnel, but they were of the opinion that only senior accounting personnel would be able to perform this task.

The following question was then asked: Do you regard the calculations done in verifying the estimates made by the contractor as arithmetical in nature which can be checked by a clerk with the necessary experience?

Table 4: Response to the question whether estimates are arithmetical in nature

| Topic | Yes | No | <i>'International' auditors as part of the "yes" answer</i> | <i>'Other' auditors as part of the "yes" answer</i> |
|---|-------|-------|---|---|
| Estimates by contractor is arithmetical in nature | 84.6% | 15.4% | 80% | 87.5% |

The respondents are of the opinion that they possess the skills and are able to perform the necessary verification of estimates done by contractors.

10.6 Determining stage of completion

The respondents are unsure whether this very important calculation can be done with accuracy and indicated as much.

Table 5: Response to question on accuracy of stage of completion calculations

| Topic | Yes | Unsure | No | <i>'International' auditors as part of the "yes" answer</i> | <i>'Other auditors as part of the "yes" answer</i> |
|---|-------|--------|-------|---|--|
| Stage of completion calculated accurately | 61.5% | 23.1% | 15.4% | 60% | 62.5% |

In determining which of the methods for calculating the stage of completion are the most popular in practice, indication was that the preferred method is 'costs to date' compared with 'total expected costs'.

Whether the method for calculation was a free choice affair or whether any specific prescriptions were applicable according to AC109/IAS11, proved to be inconclusive. AC109/IAS11, however, states that: "The enterprise uses the method that measures reliably the work performed." The built environment professionals would expect that this will result in the "surveys of work performed" method.

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Table 6: Response to the question on acceptable alternatives of methods of calculation

| Topic | Yes | Unsure | No | 'International' auditors as part of the "no" answer | 'Other' auditors as part of the "yes" answer |
|--|-------|--------|-------|---|--|
| Acceptable alternatives for any set of circumstances | 61.5% | 7.7% | 30.8% | 60% | 75% |

In determining how final the choice of a calculation method is for future years, respondents indicated that it was a permanent situation, although no evidence could be found in AC109/IAS11 to substantiate that opinion.

Questions about the extent of 'accidental' manipulation that could occur in determining the stage of completion on construction contracts, again led to confusion among the respondents.

AC109/IAS11 indicates that certain costs must not be allocated to contract costs or else allocated in a consistent manner. Rework, for instance, would be excluded from contract costs in determining the stage of completion. Direct costs do not seem to pose a problem but 'indirect costs' do.

When asked whether 'attributable costs' and 'overhead costs' can be regarded as synonyms the respondents did not think so. According to AC109/IAS11, however, 'attributable costs' include 'overhead costs'.

When respondents were asked whether the *Bill of Quantities* and 'direct costs' were to be regarded as synonyms they responded overwhelmingly with a 'no' answer.

Respondents' view on whether they are of the opinion that AC109/IAS11 could be manipulated in any way, resulted in candid answers. The fact that both groups of respondents were of the opinion that it can be done, is significant.

Table 7: Response to the question whether manipulations are possible

| Topic | Yes | Unsure | No | <i>'International' auditors as part of the "yes" answer</i> | <i>'Other' auditors as part of the "unsure" answer</i> |
|-----------------------|-------|--------|----|---|--|
| Manipulation possible | 46.2% | 53.8% | 0% | 100% | 87.5% |

Although auditors indicated that they do their best to verify the accounting and other evidence according to GAAS, they did not agree on the interpretation of certain vague phrases contained in *ACT109/IAS11*.

The construction progress on a contract that would lead to their being comfortable that the client can start recognising profits and/or losses on the contracts is one such example. It seems that they might need the built environment professional in more respects than one.

10.7 Using the work of an expert

This question was asked to determine whether experience gained in construction contracts enable auditors to conduct an audit of construction contracts on their own or whether they will need outside assistance. The objective was to establish their need for built environment skills versus accounting skills. They did not indicate any need for assistance.

When questioned on their knowledge of built environment professionals and their contact with them in the conduct of their audits, it appeared that they do have contact with certain of the built environment professionals, namely those involved in calculations.

The one profession that does not seem to be consulted by auditors of construction contracts, is the construction manager or project manager. The construction managers will in most cases also be the project manager and could be very helpful to auditors in the auditing of construction contracts. The auditors did not appear to be knowledgeable on current professions and evolving professions in the built industry. Built environment professionals being employed or otherwise engaged in conducting audits, is not currently general practice.

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The above practice of non-employment and non-engagement continues even though an important role player such as the AICPA in their *PITF Report* (PITF, 2000-3:2) stated that the auditor should visit construction contract sites and meet with project managers to identify and understand the extent of significant assumptions and magnitude of uncertainties on the contract. The *PITF* consider this procedure as fundamental to performing an effective audit of an entity, using contract accounting. Not performing this function, according to the *PITF*, will result in an audit that does not comply with GAAS.

The respondents answered "no" to all the following questions in which they were asked:

- whether they employ a specialist to visit the construction sites of the client and conduct interviews with the construction project managers of these sites
- whether they employ built environment professionals to assist them in identifying and understanding the significant assumptions and uncertainties on the contract
- whether they employ professional assistance in studying significant and unique contractual agreements
- whether they have any formal training in Construction Contract Law
- whether they possess any expertise expected from built environment professionals.

The respondents indicated that they do regard built environment professionals as a source of audit evidence and that they do indeed use built environment professional to help in measuring activities.

Though they declared that they do make "use of the work of an expert" in construction auditing, it appears that this refers to existing payment certificates issued by architects and quantity surveyors. They further indicated that they do not employ any of the built environment professionals on construction audits but do employ attorneys on those audits.

The respondents are of the opinion that they can obtain all audit evidence needed without the built environment professionals' assistance. The 'international' auditors expressed the opinion that they cannot conduct the audit without the assistance from the built environment professionals, which was directly in contrast with the opinion of the 'other' auditors.

Table 8: Response to the question on audits of construction contracts without assistance from the built environment professionals

| Topic | Yes | No | 'International' auditors as part of the "no" answer | 'Other' auditors as part of the "yes" answer |
|---|-------|-------|---|--|
| The possibility of an audit without built environment professionals' assistance | 53.8% | 46.2% | 80% | 75% |

The fact whether the built environment professionals are independent from the contractor, is not important to the respondents. Respondents do not employ built environment professionals on a permanent basis.

The respondents indicated that they do encounter all of the built environment professionals during routine construction contract audits and although answers were vague it is assumed that these professionals are mostly employees of the construction companies.

11. Conclusion

In order to apply the percentage-of-completion method of recognising revenue and costs to construction contracts, the outcome of the contract must be estimated reliably.

11.1 The built environment perspective

To be able to estimate reliably it must be possible to measure reliably. Built environment professionals would deem it logical that AC109/IAS11 starts with measuring, then estimating and ending in cost recognition.

11.2 An AC109/IAS11 perspective

AC109/IAS11 refers accountants to AC000/Framework for the explanations to key aspects such as measurement and estimating. It bears no resemblance to the interpretations of similar words and phrases in the built environment.

It is uncertain whether the wording of AC109/IAS11 was meant to include built environment interpretations. No literature exists on this topic in the South-African context.

11.3 The respondents' perspective

On the question whether AC109/IAS11 does provide clear and feasible guidelines for the determination of the stage of completion on a construction contract for disclosure in the financial statements of contractors, the respondents were:

- adamant that no unclear wording and statements existed in AC109/IAS11, but
- unanimous in only 0.75% of the answers to AC109/IAS11 related questions contained in the survey questionnaire.

11.4 Comments

At present the above appears to be irreconcilable differences. Unless AC109/IAS11 recognises this fact and addresses it properly, the uncertainty and ambiguity will persist. The respondents' answers merely reflect the practical situation, although they seem unsure about the nature and cause of these uncertainties.

Informal discussions with respondents indicated that they do encounter problems in the auditing of construction companies, but have ways and means to overcome these problems.

Ambiguities exist as a result of choice of words, principles and actions originating from AC109/IAS11. It might be more of a problem for the contractor and his internal accountant than they realise. In AC109/IAS11 they are confronted with seemingly familiar phrases which actually have different meanings and expect different outcomes. AC109/IAS11 refers to the accountants' interpretation and definition of words common to both professional groups.

The contractor and his internal accountant should be made aware of this possible ambiguity to ensure that they comply with AC109/IAS11 and *Generally Accepted Accounting Practice*. If professionals with similar training and background differ, the possibility that contractors and their accountants would experience much more difficulty with interpreting AC109/IAS11 seems likely.

The mere fact that certain respondents differed or were unsure on certain AC109/IAS11 issues, verifies the assumption that some confusion does indeed exist.

It appears from the survey that problems in construction accounting and reporting could arise due to the fact that certain guidelines and terms in AC109/IAS11 are not consistently interpreted by all involved.

13. Recommendations

The results of the research and questionnaires substantiate recommendations in three problem areas, namely:

- Clear definitions and explanations to key concepts in *AC109/IAS1* that will result in consistent interpretation thereof.
- Built environment perspectives incorporated in *AC109/IAS11* to assist in the understanding of construction contract accounting.
- Guidance on the possible role of built environment professionals in determining aspects, such as cost to date and cost to complete, in reporting profit or expected losses on construction contracts based on the stage / (percentage) of contract completion on the date of the report.

ACCOUNTING AND AUDITING GUIDELINES REFERRED TO IN TEXT

Standards and statements by the South African Institute of Chartered Accountants (SAICA), International Accounting Standards Board (IASB) and International Auditing and Assurance Standards Board (IAASB):

Accounting (AC) / International Accounting Standards (IAS)

AC000/Framework: Framework for the Preparation and Presentation of Financial Statements

AC109/IAS11: Construction Contracts.

South African Auditing Standards (SAAS) / International Standards on Auditing (ISA)

SAAS540/ISA540: Auditing of Accounting Estimates

SAAS620/ISA620: Using the Work of an Expert

Statements and publications by The American Institute of Certified Public Accountant's (AICPA) and Financial Accounting Standards Board (FASB):

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Affordable housing on contaminated land in Johannesburg

Peer reviewed

Abstract

The intention of this article is to look at radon contamination; the various housing design solutions that may be implemented to overcome the problem; as well as the possibility that private developers will buy into this form of development. It is not sufficient to have designs and a population willing to live on this land if private developers are not willing to take a risk and develop these sites (Simons *et al.*, 2006). By addressing these issues, three questions shall be answered:

1. What are the potential complications in building housing on mining dumps?
2. What are the practical solutions for dealing with housing in such areas?
3. Are private developers willing to develop contaminated land?

The actual cost of construction on the sites although important to the overall feasibility of development shall not be discussed. This component certainly needs further research in order to sufficiently grasp the willingness to develop on behalf of the developers. From the onset of this research, the developers showed some ignorance towards the issues of radon contamination. They did show willingness to develop certain types of designs, but the recommendation of the research is the need for education to facilitate the use of this contaminated sites.

Keywords: Johannesburg, contaminated land, radon, building with radon

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Abstrak

Die bedoeling van hierdie artikel is om na radon besmette terreine te kyk; die verskillende huis ontwerp oplossings wat geïmplimenteer kan word om die probleem te oorkom; asook die moontlikheid van privaat ontwikkelaars wat in hierdie tipe ontwikkeling sal wil belê. Dit is nie genoeg om ontwerpe en 'n populasie gewillig om op hierdie grond te bly te hê indien privaat ontwikkelaars nie bereid is om 'n risiko te neem en in hierdie terreine belê nie (Simons *et al.*, 2006). Deur hierdie sake aan te spreek sal drie vrae beantwoord word:

1. Wat is die potensiele komplikasies om huise op ou mynhope te bou?
2. Wat is die praktiese oplossings wanneer met huise in hierdie areas gewerk word?
3. Is privaat ontwikkelaars gewillig om hierdie besmette terreine te ontwikkel?

Die werklike konstruksiekoste van hierdie terreine alhoewel belangrik tot die oorhoofse lewensvatbaarheid van ontwikkeling sal nie bespreek word nie. Hierdie komponent vereis verdere navorsing om die bereidheid van ontwikkeling namens die ontwikkelaars genoegsaam aan te spreek. Uit die navorsing blyk dit dat ontwikkelaars die sake oor radon besmette terreine grootliks ignoreer. Ontwikkelaars het wel bereidwilligheid getoon om sekere tipes ontwerpe te ontwikkel. Die aanbeveling is dat daar 'n behoefte bestaan vir inligting rondom hoe om die gebruik van besmette land te fasiliteer.

Sleutelwoorde: Johannesburg, besmette bou-terreine, radon, bou met radon

1. Introduction

The history of housing developments for the majority of the population in Johannesburg and indeed the rest of South Africa have predominantly been lacking in tangible physical, social and economic success (Bond & Tait, 1997). The reasons unfortunately cannot be attributed to, or rather restricted to one cause. There is a multiplicity of factors that include poorly constructed top structures, insufficient quantity, as well as the lack of surrounding amenities and services. However the prevailing problem, and most significant, in many cases with these developments has been their location (Bond & Tait, 1997; Behrens & Wilkinson, 2003). The peripheral location of most new housing developments compounds the inherent problems associated with apartheid planning and its intention of racial

segregation. The *Gauteng Housing Annual Report* for 2001/2002 supports this assertion and states that "The location of the majority of new housing projects since 1994 has not had a positive impact on changing the apartheid structure of the cities – in most instances; the poorest communities of Gauteng remain increasingly marginalized" (Gauteng Housing Department, 2000). However, there are solutions that are able to rectify the current situation provided they are not overlooked.

Housing does offer the opportunity to integrate cityscapes as it constitutes a large percentage of the land use in the urban area. This coupled with Johannesburg's insatiable requirement for affordable and moderate priced housing will make it one of the integration tools as the city continues to develop and the need for housing continues to grow. However, there are limitations to the ability of this mechanism to integrate, namely its location. This calls for the pursuit of alternative ideas for well located underutilised land in order to create viable communities from both a social and economic standpoint.

The former mine dumps in the South and South western areas of Johannesburg (see figure -1) provide a partial solution (Sihlongonyane & Karam, 2003). The land is largely owned by iPROP, which is a private company, holding land previously owned by the Rand mines in Johannesburg and Ekurhleni. This land remains to a large degree underutilized despite its good location in terms of proximity to job opportunities and bulk infrastructure. The land forms part of the mining belt that extends about 80 km east-west and 3 or 4 km north-south, as such it is a large parcel of land. Some of the dumps are currently undergoing re-cycling and some of the dumps are being cleared (figure – 2). A majority of this land is locationally suitable for development. The research identified this area for the research as it is close to several existing developments and is a natural extension for ties with the city centre and several southern neighbourhoods. The dumps in these areas are earmarked for clearing in the near future and development is contemplated by the owners of the land.

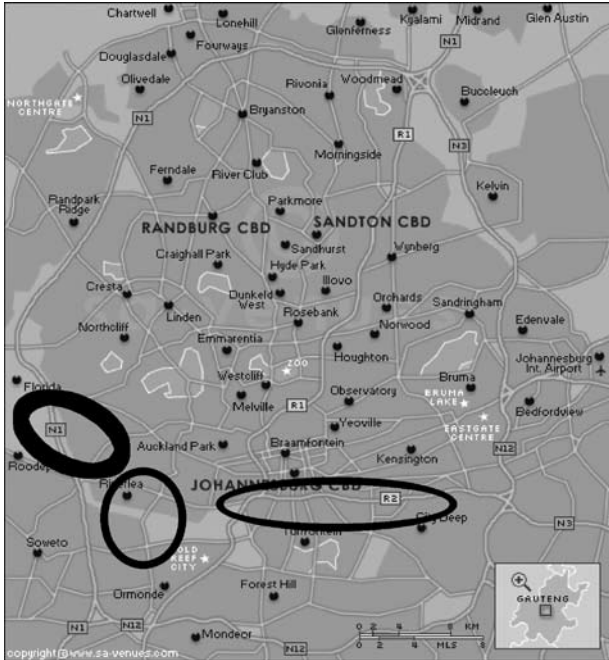


Figure 1: Location of mining lands in relation to Johannesburg CBD and Soweto. Source: South Africa explored, 2007: online



Figure 2: Part of reclaiming mining dumps in south of Fortsburg, Johannesburg, for use as storage area. Source: Karam, 2007: own picture

However, there are prevalent complications with the land as a result of the previous gold mining activity. These complications do not prevent development but rather pose difficulties and limitations to developing the land. In most gold mining areas, the land is contaminated with a radioactive gas known as radon (CCOHS, 2005: online). Radon is an odourless, tasteless and naturally occurring radioactive gas. It occurs as a result of the decay of Uranium; a heavy metal that accompanies gold in some mining areas (CCOHS, 2005: online). However, under certain conditions radon can prove to be hazardous to human health (CCOHS, 2005: online). Therefore, it is important to plan and design in accordance with radon gas as this contaminant cannot be entirely removed. Despite this, development should not be prevented from occurring. There are several developments around the world that have utilised radon contaminated sites for the purpose of housing.

Due to contamination, the design aspects of development are fundamentally important to the long term success, future and indeed health of the communities that shall occupy the sites. If carelessness is shown with regard to the conception of design solutions, one may find that the radon gas accumulates and aids in the development cancer, more especially lung cancer, within the population.

Currently there are several developments that although inhabited by people display levels of radon contamination that are detrimental to the health of its occupants (Colgan & Gutiérrez, 1996). In addition, the building materials used have acted as a catalyst in increasing the levels of radon within the houses. (Rydock *et al.*, 2001). These two circumstances may not prevail if the afore mentioned objective of sustainable human settlements is to be realised. This in turn makes the design component exponentially more important to the overall success of the future development of the former mine tailings.

The need and demand for the development of affordable housing in Johannesburg is growing and the complications with the land have been identified. On the housing side, between 2001 and 2004 the households living in formal housing increased by 0.01 percent while the annual growth in population during the same period was 2.5 percent (Cities Network, 2006: online). This leads to an increase in the households living in informal housing by 16.21 percent during the period 2001 and 2004 (Cities Network, 2006: online). Simons *et al.* (2006) studied the benefit-cost of such a project with the expenses of the land remediation and some of the discounted rates on the housing. Simons *et al.* (2006) concluded also that people are willing

to live in such location given a certain discount to the price of the units. One party that has not been consulted on whether they would be willing to take the risk of building in such land, are the developers. This article deals only with the developers' perspective but acknowledges that the city has developed some parcels for commercial use and could involve itself in residential developments on the sites discussed. Another reason for concentrating on private developers is the fact that the land is in private ownership.

In this article the concentration is on the review of some appropriate designs for radon contaminated land and survey seven developers in the Johannesburg area involved in producing different types of housing. The basic question was whether they would be willing to produce one or more of these types of housing in these locations. This study should be treated as exploratory as there are no other studies on types of designs likeability in Johannesburg to assist in determining from a developer's perspective the suitable type.

The intention of this article is to look at radon contamination; the various housing design solutions that may be implemented to overcome the problem; as well as the possibility that private developers will buy into this form of development. The latter will give an opinion regarding whether private developers are willing to actually develop these sites. It is not sufficient to have designs and a population willing to live on this land (Simons *et al.*, 2006) if private developers are not willing to take a risk and develop these sites. By addressing these issues three questions shall be answered namely:

1. What are the potential complications in building housing on mining dumps?
2. What are the practical solutions for dealing with housing in such areas?
3. Are private developers willing to develop contaminated land?

The actual cost of construction on the sites although important to the overall feasibility of development shall not be discussed. This component certainly needs further research in order to sufficiently grasp the willingness to develop on behalf of the developers; neither will the moral nor ethical issues arising from health problems related to living in previously contaminated land. Therefore the recommendation is to utilise this article as a platform from which further studies and research can be launched.

The United Nations Stockholm Declaration on the Human Environment in 1972 declared that protection of human health is the most important aspect when building in sites with potential hazards to human health. Accordingly, this research acknowledges the importance of this issue, but does not discuss the ethical or moral issues associated with building on hazardous sites. The research concentrates mainly on technical aspects rather than the important for mentioned issues. Having mentioned these issues, it is important to note that there have been several developments in other countries around the world on Radon contaminated sites, mainly in Norway and the United Kingdom (Denman *et al.*, 2000).

2. Radon: the contaminant

Uranium, the source element of Radon gas is associated with gold mining in Johannesburg. This radioactive gas arises as a result of the natural decay of Uranium-238 and radium-222 which can be found in soil, rocks, and water as well as gold deposits in many parts of the world (Denman, *et al.*, 2000). It is an odorless, tasteless radioactive gas that does have the potential to cause cancer (Kreswki *et al.*, 2005). Despite this however it remains harmless when outdoors due to its rapid dissipation.

The acceptable level for radon exposure according to the National Nuclear Regulator is around 0.4pCi/L (Strydom *et al.*, 2002). However when confined to smaller areas and allowed to accumulate and inhaled continuously for over 20 years, the risk of contracting cancer is increased substantially. It is important to keep in mind that radon levels, whether outdoors or indoors are subject to seasonal and daily fluctuations, which have been known to increase in the evenings and decrease during the day (Rydock *et.al.*, 2001; Strydom *et al.*, 2002). It is interesting to notice that the World Health Organization (2005) acceptable safety threshold are at levels between 2 – 4 pCi/L putting the possibility deaths from lifetime exposure at between 2 – 7 deaths per thousand population, which is significantly higher than the National Nuclear Regulator. Naturally, deaths will be less if exposure is less than a lifetime. Due to lack of information on the health implications of radon in South Africa, American research shall be utilised in order to grasp some understanding of the link between radon exposure and cancer as well as relating it to other situations (table – 1).

It is important to move toward discussing the relationship that exists between radon and mining practices in Johannesburg. The city has a long history of gold mining south of the CBD and north of the southern suburbs and as a result a by-product, as well as their various

implications, namely radon contamination occupy valuable space that is in close proximity to bulk infrastructure, work opportunities, recreation and shopping. This contamination may be attributed to the alluvial heavy minerals, namely gold and uranium, which are found together in some mine areas in the city. These areas, particularly those that have heavy metal mining, have naturally high levels of radon (Simons *et al.*, 2006).

The implication of this higher rate of contamination and subsequent exposure to those living there requires an intervention to make the areas safe for human occupation. Therefore the design of housing projects constructed on the mine dumps becomes exponentially more important and relevant.

Table 1: Radon risk if a person has never smoked

| Radon Level | <i>If 1,000 people who never smoked were exposed to this level over a lifetime*...</i> | <i>The risk of cancer from radon exposure compares to**...</i> | WHAT TO DO: |
|---|--|--|---------------------------------------|
| 20 pCi/L | About 36 people could get lung cancer | 35 times the risk of drowning | Fix your home |
| 10 pCi/L | About 18 people could get lung cancer | 20 times the risk of dying in a home fire | Fix your home |
| 8 pCi/L | About 15 people could get lung cancer | 4 times the risk of dying in a fall | Fix your home |
| 4 pCi/L | About 7 people could get lung cancer | The risk of dying in a car crash | Fix your home |
| 2 pCi/L | About 4 persons could get lung cancer | The risk of dying from poison | Consider fixing between 2 and 4 pCi/L |
| 1.3 pCi/L | About 2 people could get lung cancer | (Average indoor radon level) | |
| 0.4 pCi/L | | (Average outdoor radon level) | |
| <p>Note: If you are a former smoker, your risk may be higher. * Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003). USA data ** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.</p> | | | |

Source: Environmental Protection Agency, 2006: online.

According to Ellis (2005), the National Nuclear Regulatory allows workers in mines to be exposed to the internationally accepted levels of Radon of 20mSv/a. The NNR still uses the old measurement of the dose but it is equivalent to the internationally acceptable standards.

3. Housing designs for contaminated sites

The introduction illustrated a need to develop good quality, well located and affordable housing, therefore this section uncovers the resistance techniques and design elements that will enable this form of residential property to be constructed on the contaminated sites. The list below indicates the ways in which radon enters the house and will subsequently aid in the explanation of the resistance techniques implemented (Environmental Protection Agency, 2006):

1. Cracks in solid floors;
2. Construction joints;
3. Cracks in walls;
4. Gaps in suspended floors;
5. Gaps around service pipes;
6. Cavities inside walls; and
7. The water supply

It is important to keep in mind that radon dissipates in the air and if the ground floor is kept ventilated, it will decrease, almost to nothing, the radon infiltrating to the first floor over the ground floor which as will be discuss could be used for parking or commercial. Figure 3 shows the list.

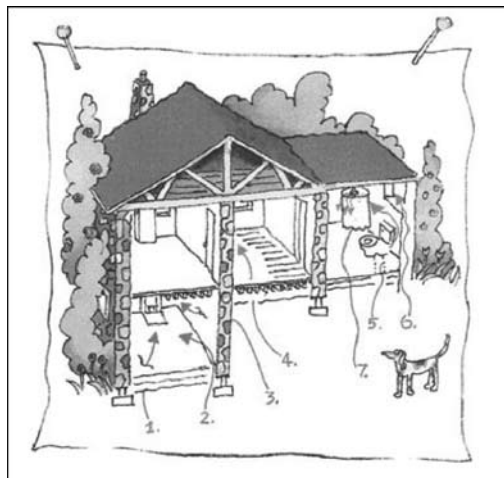


Figure 3: Ways in Which Radon can enter the House
Source: Environmental Protection Agency, 2005: online

3.1 Resistance techniques to aid in the dissipation of the gas

In order to stop radon from entering into a dwelling unit, there are resistance techniques that may be utilised. The first is a gas permeable layer which allows the free flow of the gas beneath the home. It comprises of a ten centimetre layer of clean gravel and is utilised in basement or ground level homes. (Office of Air and Radiation, 2003: online). Plastic sheeting is then placed on top of the gas permeable layer on ground floor units and acts as a blanket preventing the gas in the soil from entering the house.

The second technique is sealing the cracks and other openings in the slab or foundation. Sealing these cracks limits the flow of radon gas into the house thereby lowering the possibility of cancer development (Office of Air and Radiation, 2005: online). However this technique should not be used in isolation and must incorporate other reduction and resistance techniques such as active or passive sub-slab suction. Sealing has the advantage of allowing more cost efficiency as well as effective dissipation of radon.

Natural ventilation exists in all homes through windows, doors and vents. This forms the third technique, although not the most effective, of alleviating the build up of radon (Office of Air and Radiation, 2005: online). This technique should be regarded as a temporary solution because once these openings have been closed the radon levels will return to normal within 12 hours. Accordingly, it is important to monitor the levels of radon in the units to ensure it does not rise to dangerous levels and stays within the required approved limits.

Preventing the build up of the gas is important in new and existing homes and allows for people to live far healthier lifestyles. However, this only forms a component of the construction of the housing. The designs proposed, with the exception of ground level housing, all have elements that are there to dissipate the gas without the need to solely rely on preventative and reductionist techniques. The following is a list of the proposed designs. Each shall be investigated individually and explored in detail:

- Normal single-stand ground floor house;
- Normal single stand house with a crawl space;
- Commercial use on the ground floor with housing above it;
- Cluster developments with parking on the ground floor;
- Town houses with parking on the ground floor; and
- Single stand development with parking on the ground floor

3.2 A normal single floor house with or without a crawl space

Both of these design typologies pose considerable challenges in terms of development on contaminated land because of their inability to dissipate the radon gas. Consequently, they require the greatest number of mechanisms to make the houses safe for occupation. The first of these, which is the least effective, is using normal ventilation through open doors and windows. This method may help only if employed with other techniques.

The second of these is utilising Active Sub-slab Suction under the structure. This entails placing a suction pipe beneath the floor slab into a bed of crushed rock or alternatively the pipe is inserted under the slab from outside the dwelling. More than one pipe may be employed depending on the extent of radon gas build up and the size of the building. Once this has occurred a suction fan is placed on the pipe and subsequently draws the gas from below the slab and dissipates it into the air.

The other mechanism is using Passive Sub-slab Suction which is similar to active suction however it does not employ a fan and rather relies on the natural air pressure differentials and air currents that exist to dissipate the gas. This technique although simpler and easier to maintain is not as effective as the more mechanical option. A mechanism specific to crawlspace developments in conjunction with the resistance techniques discussed previously is making use of active or passive crawlspace ventilation. Firstly active ventilation relies on a fan to blow the gas from below the structure. This is the most effective but not necessarily the most cost efficient because of the need to maintain the fan. Secondly is passive ventilation which, rather than a fan, exploits the natural circulation of air within the crawlspace.

Preceding any implementation of a particular technique or mechanism is the need to know the level of radon in the area. Failure to do so may result in either the technique being superfluous or ineffective in coping with the gas. It is important to add that single story dwellings are the least cost-effective in terms of building cost and land cost, so this type of building might not be as effective when considering affordable housing options.

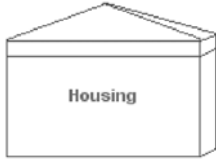


Figure 1: Single stand construction on the ground floor without crawlspace

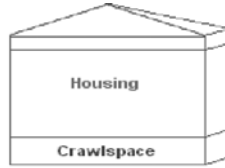


Figure 2: Single stand construction on the ground floor with crawlspace

3.3 Commercial or parking use on the ground floor with residential above

Commercial use on contaminated land is not new in Johannesburg. It has been developed successfully on several sites south of the CBD, such as City Deep. It is an economically attractive form of development because the cost of development may be recovered through rent and other commercial activity.

This form of development does not require the mechanisms implemented in the previous two design typologies, unless the levels are high. The reasons for this is with commercial use people are not constantly inhaling the gas as they would be with residential use (figure 3). The addition of the residential component is not only advantageous in terms providing affordable housing it also creates a vibrancy that is lacking in so much of Johannesburg's and indeed South Africa's housing developments. Therefore by ensuring a good land use and density mix, the prevention of inward looking, mono focused and private car oriented neighborhoods may be achieved.



Figure 3: Three storey residential construction with commercial or parking on the ground floor

3.4 Parking on the ground floor with residential above

The fourth design typology utilises the ground floor as parking and the floors above it as residential. The proposal is that the building go no higher than the third floor or that it be mixed density however these are subject to the requirements of the private developers as well as what the market is able to bare. This design may take various forms as is illustrated in the following figures however it still retains the basic design elements.

This fourth design is effective in dissipating the gas because it does not implement a use on the ground floor. This in turn aids in preventing a gas build up and therefore allows it to disperse. Research conducted by Simons *et al.* (2006) indicates that about 87 percent of their respondents indicated willingness to live in apartments. Due to the contamination and the simplicity of this form (requires no prevention techniques or mechanical dissipation measures) of construction this would be a good alternative.



Figure 4: Ground floor as parking and the floors above it as residential

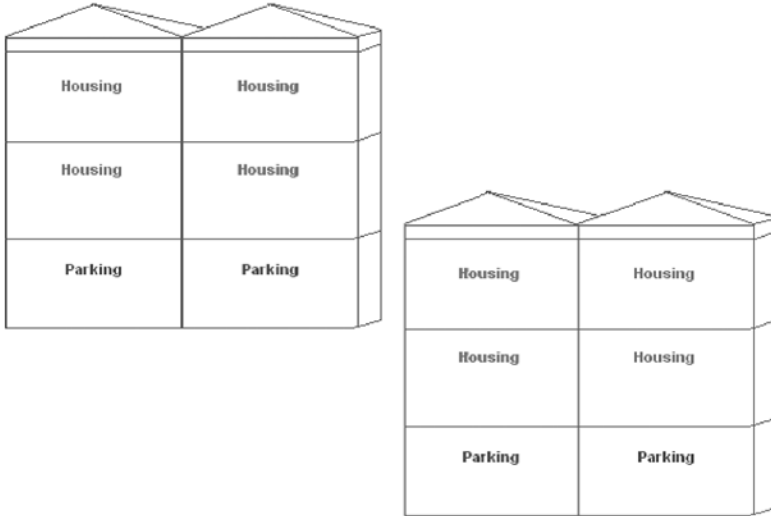


Figure 5: Three storey cluster developments with parking bay on the ground floor
This design will have island developments in the sense that the two structures will share a common wall.

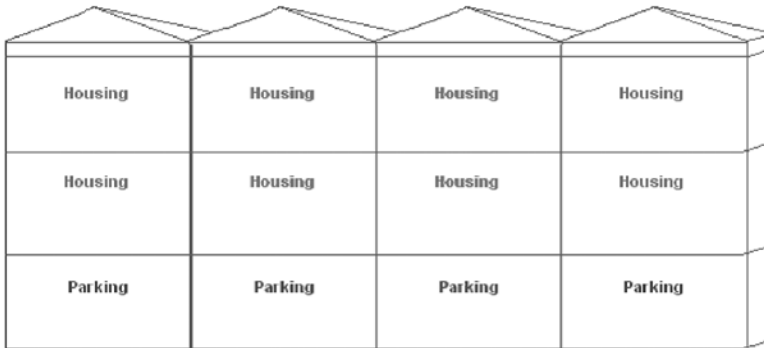


Figure 6: Three storey town house development that shares a common wall and has parking bay on the ground floor

This type might be the most economical in terms of cost and land usage but it then depends on the market whether this type would be acceptable. Having open parking underneath helps in dissipates radon and protects the above housing.

It is clear that houses remain fundamentally porous to radon infiltration, if resistance techniques are not employed. However if these

techniques are incorporated into the design typologies discussed previously it becomes apparent that contamination levels may be significantly reduced and controlled.

The intention of this section was to highlight the various resistance techniques as well and design typologies necessary in order to allow for the development of the former mine tailings into successful and sustainable human settlements that would not endanger human life.

4. The opinions of private developers

The following section is from seven interviews conducted with a range of private developers and one banking institution from Johannesburg. The interviewees' involvement in residential development was a key motivating factor for the purpose of this research as too was the size of the operations and projects undertaken. Therefore, smaller lesser known developers and large better known developers were also pursued. These were important elements that allowed the collection of the differing opinions on developing the sites as well as the different design proposals that would best suit their needs.

The interviews were conducted in person on a one on one basis in order to obtain more specific information as well as to provide an excellent platform from which the opinions of the developers could be collected. The questions regarding the most desirable design typologies were closed questions. However questions around the perceptions of the effects of contamination and overcoming these perception as well as Radon were left open to allow free conversation.

4.1 Awareness of radon

The responses to the surveys by private property developers in Johannesburg showed some interesting results with regard to radon as well as its subsequent health implications associated with exposure. Firstly of those surveyed only 28 % were aware of radon. The reason for the lack of awareness can be attributed to a shortfall of availability of information with regard to this type of contaminant especially within the housing developers. Accordingly, all those surveyed were unaware of the health implications of prolonged exposure to the gas. This can be attributed to the fact that all except one of the developers surveyed have ever worked on contaminated land. In that case the developer was not responsible for clearing the contaminated land; rather he received the land ready for development. Knowledge of the land is important if it is going to be developing it.

4.2 Responses to the different design typologies

In the survey, developers were asked to give their opinion on the design typology they found to be most attractive for the contaminated sites. A rating system was utilised in order to gauge their responses with 1 being the most attractive, 3 being middle attractiveness and 5 being the least attractive. The following results were obtained.

The **first and second** design typologies (with one story residential, figures 1 and 2) proved to be the most unpopular with the developers, scoring a four (not attractive) and three (middle attractiveness) respectively, despite the technology that exists to allow construction. This may be ascribed to the number of techniques required to enable development such as active and passive sub-slab suction as well as the gas permeable layer and in the case of the crawlspace design, active or passive ventilation. The perception is that these measures will inflate construction costs, drive down profit margins and create a barrier to development.

Another significant weakness is the low density of this form of housing. Amongst those surveyed there was unanimity in the need for the highest allowable density. The motivation behind this response is that construction costs will be lowered and greater number of people will be housed on a smaller area therefore reducing the acquisition of land.

The **third design** (two story residential above commercial, figure 3) obtained a three rating (middle attractiveness). This design requires no specific techniques to dissipate the gas unless the levels are high, in which case active or passive sub-slab suction could be utilised. This design got varied responses from the developers and therefore showed the greatest inconsistency. Despite the average rating being three, it is not an accurate representation of the overall opinions of the developers.

The range of responses is surprising considering the opportunity to place commercial features on the ground floor without having to implement any specific design techniques. This typology affords developers the opportunity to recover costs by renting to tenants and thus allowing a constant flow of income. This design requires greater more in depth studies in order to ascertain the reason for the discrepancies and be looked at on an individual basis.

The fourth, fifth and sixth design possibilities are part of the third design, they all utilise similar characteristics in that they have parking on the ground floor with housing above it and do not have to


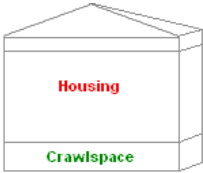
employ any specific techniques to dissipate the gas. The air differentials that exist allow the gas to be dispersed naturally.



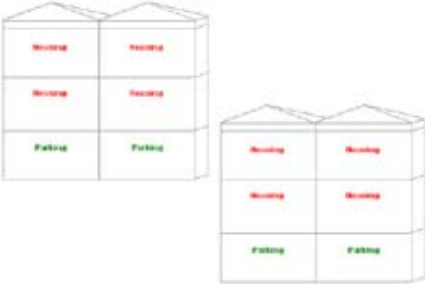

The **fourth design** (residential with parking underneath, figure 4) that proposed detached cluster units received an average rating of 2.4. There was only one developer that gave it a rating of five otherwise the rest were constant. It does not receive high ratings but better than middle attractiveness.

The **fifth design** (three story cluster with parking underneath, figure 5) proved to be the most popular for the developers. It received an average rating of 1.7. This design advocated town house developments, which shared a common wall. The ratings given by the developers were very consistent which illustrates the attractiveness of this form of development.

The **sixth design** (three storey town house development that shares a common wall and parking underneath, figure 6) was the second most popular for the developers. The design is a semi detached housing development. The scope of responses was very narrow, its average rating was 2.1, indicating great reliability in the opinions of the developers.

Table 2: Summary of the designs and the ratings

| <i>Design</i> | | <i>Rating</i> |
|---|----------|---------------|
|  | Design 1 | 4.0 |
|  | Design 2 | 3.0 |

| Design | | Rating |
|---|----------|--------|
|  | Design 3 | 3.0 |
|  | Design 4 | 2.4 |
|  | Design 5 | 1.7 |
|  | Design 6 | 2.1 |

The popularity of the basic components of these designs answers the research question conclusively. Although there were discrepancies between the three proposals within this design in terms of their popularity with the developers, they were still the best received. The fifth design that utilises a common wall proved to be the most popular of the designs and therefore by logical deduction would most likely be constructed.

A mixed density development utilising any one of the last three designs was suggested by one developer which seems to be the most appropriate for the site. It will break the monotony of a single height development and allow a range of different housing styles and sizes. For example bachelor flats, loft apartments, 2 bedroom flats or 1 bedroom flats. This creates greater flexibility for the consumer as well as the developer.

4.3 Findings from developers

First, the lack of awareness of both radon and the resulting health implications can be attributed to a shortage of available information and more importantly a lack of a drive to develop this land. Once there is a drive to utilise the land, developers will have to improve their knowledge regarding the radon gas and its remediation techniques. However, the general consensus amongst the developers was that the land could be developed, and more significantly for residential purposes.

Second, and most importantly, negative perception is a factor that may determine whether or not private developers are willing to develop the sites under investigation. Despite the land being safe for occupation, provided the appropriate measures are taken, the mere notion of contamination is enough to create enough bad sentiment amongst potential tenants that they will not occupy the property. This makes it necessary for greater marketing of the land in order to educate the public on the possible health risks but more importantly to make them aware that occupation of the sites is both safe and indeed possible.

Finally, the design typology that fulfils the requirements for overcoming contamination and makes the sites viable for development was the fourth design. This design utilises a vacant ground floor that will be used for parking and shares a common wall with the other townhouses. The reason for its popularity can be attributed to three things:

- The simplicity of construction, because it requires no specific dissipation techniques unlike the first and second design;
- It fulfils the goal of achieving a healthy environment for the tenants that shall live there; and
- The density requirement of developers is fulfilled with this typology because it supports multi storey construction.

Coincidentally the developers' preference is compatible with the design typology that is easiest to maintain, in respect to resistance techniques, and subsequently consistently maintains the lowest levels of Radon contamination.

5. Recommendations

From the previous research the following are recommendations for a shared responsibility between government, developers, in some cases banks, and possibly the NNR. As mentioned earlier the benefits from locating residential use on such land is far reaching and could not be overlooked, but naturally the risk on human life is also very important and cannot be underestimated.

- There is a need to educate the public as well as developers on the risks of developing and living on contaminated land. This education has to be in simple non-technical terms and widely available. The demand for development of the sites is currently, not high but as the city expands it is likely to become increasingly attractive. Therefore the education process can begin so that a gradual shift of perceptions is achievable.
- The negative perception associated with contamination may prevent any form of development occurring. However with the improved education, advocated in the above point, as well as the promotion and marketing of the former mine dumps as an investment, this can be overcome.
- It is important that the sites are developed for residential purposes and not solely for commercial or industrial applications. At present the city has a tremendous population living on the periphery, which makes it difficult for them to access jobs and basic amenities, such as water and sewerage. By allowing these people the opportunity to live and work in the city they have a better quality and standard of life. There is enough commercial space in the inner city to satisfy demand and in order to allow the creation of job opportunities. If the former mine tailings were also developed for these purposes, there would be a tremendous oversupply.

6. Conclusion

The housing developments constructed by private developers thus far have been ineffective in targeting the affordable market; they usually target the middle class and mostly located on the periphery of the city (Beavon, 2004). The most prominent problem contributing to the inadequacy of these developments can be attributed to poor location in terms of closeness to infrastructure, jobs and amenities.

However this article has identified candidate sites for development that are well located in terms of basic services, work, recreation and shopping.

In spite of this good location there is one substantial weakness, namely radon contamination that has occurred due to the gold mining that has taken place there. This contaminant poses two significant challenges that must be overcome or managed to make the sites safe for occupation. The first of these is that it can lead to some serious health problems such as cancer if measures are not introduced to manage the obstacle. The radioactivity cannot simply be cleaned and the problem disappears like many other forms of contamination. The second is the negative perception or stigma attached to development on contaminated land. Despite all the designs proposed being able to overcome this problem successfully there is no guarantee people will buy the property. Therefore marketing strategies will have to be formulated in order to educate the public on the type of contamination, the health risks as well as the safeness of the sites once development has been concluded. It is important now to move toward answering the questions posed in the introduction in order to conclude the article.

There are a range of complications that exist with regard to the construction of affordable housing on the former mine tailings. The most substantial of these is contamination, more specifically the radioactive gas radon. This gas, when confined to a small area and at a higher than normal concentration does pose a health hazard to humans. However through appropriate housing design this risk is narrowed considerably.

In terms of practical solutions for dealing with housing in such areas, the aforementioned housing design typologies in association with the resistance techniques advocated, such as sealing floor slab cracks, creating a gas permeable layer and allowing for natural ventilation, form the practical solution to managing the contaminated sites. These sites cannot be cleared of the contaminant so the best solution is to create an environment that manages the situation.

The willingness to develop the land is currently not forthcoming on behalf of the private developers. The abundance of sites that do not pose the environmental and economic challenges that the former mine tailings do, negates the need for its development. However as the city continues to expand and these opportunities become less plentiful other prospects will be pursued. Currently land is available that offers fewer complications thus affording easier construction. This in turn extends to the motivation of these three developers in regard to residential usage for the land. If land is abundant and more attractive alternatives exist then the need to utilise such sites is negated.

The development of the mine dumps is important in providing the market with greater diversity and offering new home owners or people wanting to leave the low income areas an opportunity to do so. The contaminated areas can undercut the market and could potentially fill a niche.

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The role of value management in achieving best value in public sector service delivery in South Africa: a research agenda

Peer reviewed

Abstract

It is common cause that, for the most part, public sector service delivery in South Africa is in a state of disarray. Problems associated with service delivery include shortages of skilled staff, under-spending of budgets, corruption, and a general lack of capacity. Best value in public service delivery is clearly not being achieved. Best Value is an emerging initiative that aims to improve the quality of public services. The basic premise of the Best Value initiative is that the public service should procure services on the basis of value for money rather than on lowest cost. The literature suggests the use of value management with risk management within a project management framework to achieve value for money. This article outlines a research agenda for examining the role of value management in achieving best value in public sector service delivery in South Africa.

Keywords: public sector, service delivery, value management, best value, South Africa

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Abstrak

Dit is algemene kennis dat die grootste deel van dienslewering in die openbare sektor in Suid-Afrika in wanorde is. Probleme verantwoordelik daarvoor sluit in: personeel tekorte, onderbesteding van begrotings, korrupsie, en 'n algemene tekort aan bekwaamheid. Bestewaarde in dienslewering is nie bereik nie. Bestewaarde is 'n noodsaaklike inisiatief wat daarop gemik is om die kwaliteit van openbare dienste te verbeter. Die basiese doel van die bestewaarde inisiatief is dat openbare dienslewering diense moet verskaf op die basis van waarde vir geld eerder as op die laagste koste. Literatuur stel voor dat waardebestuur met risikobestuur binne 'n projekbestuurraamwerk gedoen word om waarde vir geld te kry. Hierdie artikel gee 'n navorsingsagenda om die rol van waardebestuur in die bereiking van bestewaarde in openbare dienslewering in Suid-Afrika te evalueer.

Sleutelwoorde: openbare sektor, dienslewering, bestewaarde in dienslewering, Suid-Afrika

1. Research context

Best Value is an emerging initiative that aims to improve the quality of public services (Hunter & Kelly, 2004). The basic premise of the Best Value initiative is that the public service should procure services on the basis of value for money rather than on lowest cost. The literature suggests the use of value management with risk management within a project management framework to achieve value for money (HM Treasury, 2004). Keady (1998) describes Best Value as 'representing the greatest challenge local government has ever faced'. Its main goal is to improve service quality (Higgins *et al.*, 2004). The essence of the problem is captured by Raine (2000), who stresses the importance of "bedding Best Value as a philosophy as much as a technical requirement into the thinking and behaviour of local authorities."

This article is concerned with effective public sector service delivery in South Africa and the potential role of value management in achieving best value. More specifically, it outlines the nature of, and problems associated with, public sector service delivery in South Africa, introduces the concept of 'best value' for service quality improvement, outlines the tenets of value management, and describes a research agenda for examining the role of value management in achieving best value in public sector service delivery in South Africa.

2. The nature of public sector services in South Africa

2.1 Background

The new South African Government of National Unity (GNU) inherited a State in 1994 with a public service which was 85% white and 3% female and was tuned to delivering quality public goods and services to a white minority. Communities of non-whites received extremely poor services, to the extent that they were served at all (Ruiters, 2006). The inefficiency of the State in implementing its inequitable approach to service delivery ultimately caused a decline in revenue from state-owned enterprises, which in turn, resulted in mass boycotts of rent and service charges (Smith *et al.*, 2003).

2.2 Public service objectives of the new South African Government

The imperative for efficient public service delivery originates in section 195 (1) of the Constitution of the Republic of South Africa, which stipulates that public administration should adhere to a number of principles, including that services must be provided impartially, and equitably and that resources should be utilised efficiently, economically and effectively (RSA, 1996).

In fleshing out this goal, the need for public services and for an appropriate public service delivery programme in South Africa was clearly articulated in policy papers published by the new Government of National Unity (GNU) in 1995 and 1997 (RSA, 1995, 1997). The *White Paper on the Transformation of Public Service* published in November 1995 identified public services as those necessary to address the basic needs of people, which "extend from job creation, land and agrarian reform to housing, water and sanitation, energy supplies, transport, nutrition, education, health care, the environment, social welfare and security" (RSA, 1995). The 1995 *White Paper's* mandate was to cover those parts of the public sector, both national and provincial, which are regulated by the *Public Service Act* (Proclamation 103/94), but it specifically aimed to be relevant to the remaining areas of the public sector, such as local government and parastatals (RSA, 1995). There was also a clearly stated intention that, in pursuance of the aims of redressing past imbalances in service provision and the promotion of social equity, the GNU would seek to apply affirmative or corrective action principles in the delivery of public services in the "short to medium term". The intention was to concentrate on meeting the basic needs of the

estimated 40% of South African citizens living below the poverty line in urban and rural areas who had been previously disadvantaged in terms of service delivery. However, the 1995 *White Paper* noted as being relevant to South Africa the international trend towards “[a]n increasing emphasis on quality, efficiency and cost-effectiveness” (RSA, 1995).

The GNU intended improvement in public service delivery to apply to three types of delivery agency: (i) administrative agencies such as Ministerial offices which provide services to other departments rather than directly to the public; (ii) service delivery agencies, such as government departments which deliver services directly to the public; and (iii) “statutory agencies, such as the Public Service Commission and the Auditor-General, which are established by the Constitution or other legislation as bodies independent from the executive with important regulatory and monitoring functions with respect to the public service” (RSA, 1995).

2.3 Envisaged problems in public service delivery

For the new government, the most severe problem with the public service and the delivery of public services was that it was largely the same public service that had been in place under the previous *apartheid* government. Consequently, it was unrepresentative and lacked legitimacy. Further, it was characterised by a bureaucratic approach which focused on the administration of rules and procedures rather than on a service culture, and possessed a centralised and hierarchical managerial structure. This created a climate in which accountability was limited to bureaucratic accountability, leaving little incentive for the pursuance of efficiency and productivity. Relatively poor pay levels resulted in a demotivated and unproductive staff. These problems “served to inhibit the development of a professional work ethic and commitment amongst public servants” (RSA, 1995).

The introduction of the new government in 1994 did not immediately remove these historical problems. The 1995 *White Paper* (RSA, 1995) recognised that strategies would need to be developed to deal with both historical and new problems, which were identified as:

- fear of change (especially with regard to the planned rationalisation and affirmative action programmes);
- the high risk of an exodus of skilled public servants ('brain drain');

- public perception that change is not occurring quickly enough;
- lack of clear and well-communicated vision of change;
- lack of clearly defined roles and responsibilities;
- lack of co-ordination;
- persistence of a rule-bound culture; and
- lack of skills and capacity.

2.4 The situation a decade after the transition

Post-1994, public sector functions were divided between three spheres of government. Exclusive functions of the State at National level included national defence, the criminal justice system, higher education, water and energy resources and the administrative functions of home affairs and national taxation. At Provincial level functions comprised provincial roads, ambulance services and provincial planning as well as several concurrent functions. At Municipal level functions included the provision of water, electricity, refuse removal, municipal infrastructure and emergency services (Ruiters, 2006). The original 840 municipalities were collapsed into 284 new, non-racial and democratically-elected local authorities (Ruiters, 2006). These municipalities must generate 90% of their budget from recovering costs of local services from consumers and from property rates. Problems have been experienced in this regard with several municipalities failing to recover costs (77% of South Africa's consumer debt of R24billion in 2003 was owed to the largest 16 municipalities [Ruiters, 2006, citing *Business Day*, 5 March 2003]). In addition, there has been a problem with capital budget underspending by "major and medium-sized municipalities on key service delivery priorities such as housing [and] water" (Ruiters, 2006 citing National Treasury, 2005).

The intended improvements in service delivery have not been realised, prompting central government in 2005 to pursue greater centralisation. This has taken the form of:

- shifting certain functions to other spheres of government (e.g. social security from provincial to national level; and electricity distribution from municipalities to regional electricity distributors);
- the imposition of strict requirements in terms of governance, finance and administration under the Public Management Finance Act which actually allows municipalities to be taken over by provinces; and

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- national government seeking the power to control the deployment of local municipal staff in terms of the Municipal Employees Bill (Ruiters, 2006).

The problems in service delivery can clearly be linked to the government's neo-liberal policies and the consequent reduction in the size of the civil service. Local authorities, for example, lost 35000 workers between 1997 and 2003. At national state department level the losses were even more severe. The resulting exodus of skills is principally responsible for government's inability to spend revenue and deliver services effectively. The consequent trend towards the use of consultants has grown to such a degree that the government has referred to them as a "parallel state" (Ruiters, 2006 citing DPSA, 2001). The high vacancy rate of senior managers in provincial and local government departments is a major problem that, unless remedied, will seriously compromise service delivery. In addition to the problem of a lack of management capacity, underspending, under-qualified personnel and high levels of corruption also threaten service delivery (Ruiters, 2006).

Ruiters (2006) reviews performance in a few sectors as follows. The schooling system is failing to produce school-leavers with the necessary skills; the semi-privatised Telkom telephone company shut down more lines than it made new connections between 2002 and 2004; in several provinces the majority of residents still lack access to water on-site; and the inability of the police services to provide adequate personal and residential security has engendered a trend towards gated communities and private security companies. Clearly, best value in public service delivery is not being achieved.

3. The concept of Best Value

Best Value is a concept that has emerged since 1997. Its main goal is to improve service quality. The key principles of Best Value are accountability, transparency, continuous improvement, and ownership (Higgins *et al.*, 2004). Accountability ensures that simple and robust information is used to demonstrate performance. Transparency requires decisions to be open and transparent, with evidence of clear reasoning. Ownership permits anyone with an interest in local authority services to be involved with a relationship between the public service and its stakeholders. Continuous improvement encourages local authorities to ask questions of themselves, questioning whether they are achieving their goals and if they could do better.

Higgins *et al.* (2004) take this concept further by asserting that local authorities should have to demonstrate the four 'C's' of Best Value, namely: 'challenge', 'compare', 'consult', and 'compete', and produce performance plans and action plans. 'Challenge' involves reviewing the approach to services and ensuring that stakeholders are benefiting. Challenge is considered by Geddes & Martin (1999) to be the most important of the four 'C's' because it encourages local authorities to do a complete rethink of how they are providing their services. 'Compare' ensures that performance is analysed and compared with others through benchmarking and by using key performance indicators (KPIs). 'Consult' serves to ensure that all necessary stakeholders are involved, such as the local community, staff and management. The 'Compete' aspect of Best Value involves the local authority being subject to external competition if in-house services are not performing.

Linked to the four 'C's' are the three 'E's' of Best Value, namely, 'economy', 'efficiency' and 'effectiveness'. 'Economy' involves the careful management of resources by achieving lower process and higher productivity. 'Efficiency' refers to making the most efficient use of resources, processes, procedures, *etc.*, and 'effectiveness' is ensuring that actual performance meets planned performance. The literature Scottish Government Publications (2006: online) also refers to a fourth 'E', namely, equal opportunities requirements.

Best Value aims to improve the quality of local government services by using various tools to support Best Value – through the formulation of a performance plan, by paying due regard to the four 'E's' of Best Value, and assigning targets for performance indicators. Performance can be subject to external review. For example, in Scotland, every five years a *Best Value Review (BVR)* is conducted by Audit Scotland to ensure that the local authority is continuously improving and is performing to a high standard. This review challenges the 'why and how' a service is provided, undertakes comparisons across a range of indicators, consults local taxpayers, users and businesses, and embraces fair competition. A BVR can apply to one service, a sub-service, or can be cross-cutting. An example of a cross-cutting review would be the case of reviewing the quality of life for elderly people in the community by examining services such as library facilities, housing and leisure services (Scottish Government News, 2005: online).

Tools used in local government to support Best Value are quality tools such as the Balanced Scorecard and ISO 9000. Bovaird & Halachmi (2001) assert that the Best Value philosophy has strong links to Value

Management (VM) (known as Value Engineering in the USA). VM is seen as a technique directed toward analysing the functions of an item or process to determine Best Value, or the best relationship between worth and cost (OMB, 1993). Bovaird & Halachmi (2001) suggest the implementation of VM across all government agencies to facilitate the achievement of Best Value.

4. The concept of Value Management

Value Management (VM) has its roots in the manufacturing industry of North America, becoming a recognised methodology in 1947 (Kelly & Male, 1993). VM has been defined as 'a proactive, creative, problem-solving or problem-seeking service which maximises the functional value of a project by managing its development from concept to use'. Bone & Law (2000) define VM as "a structured framework for reviewing any product, process, project, or service," with the VM workshop as its basic tenet (Male *et al.*, 1998). VM has also been described as a powerful method of creating the best value of products or services on the basis that the function must be maintained (Fong *et al.*, 2001). Phillips (2002) suggests that VM is applicable to projects, programmes or services as a business re-focusing tool. In essence, VM is a methodology to be adapted to the nature of the study and the values of importance to the client (see Woodhead & Downs, 2001).

Opinion varies as to when VM should be applied during a project life cycle (see, for example, Green, 1994; Male *et al.*, 1998; Merna, 2002). The UK Office of Government Commerce (2003) procurement guidance on value and risk management applied to government projects specifies that VM should be used throughout the project life cycle and outlines the points in the Gateway Review Process (GRP) when VM should be applied. The Gateway Process is used to review projects above a certain monetary value to determine whether or not the project is ready to progress to the next stage. This is a similar concept to the Process Protocol developed by Cooper *et al.* (2005). In terms of the Gateway Process, the use of VM is suggested prior to each of the six gateways (UK Office of Government Commerce, 2003):

- Gateway Review 0 (Strategic assessment) – to identify stakeholder needs and priorities;
- Gateway Review 1 (Business justification) – to review the various options;

- Gateway Review 2 (Procurement strategy) – to review the options in more detail in relation to the project brief and to develop output specifications;
- Gateway Review 3 (Investment decision) – to review the selection and award criteria;
- Gateway Review 4 (Readiness for service) – to review whole life costs and buildability; and
- Gateway Review 5 (Benefits evaluation) – to review the lessons learned.

Suffice it to say that opportunities to improve value may be lost if VM is applied infrequently, and likewise, if applied too often may retard the progress of the project.

The VM standard (BS EN 12973: 2000) outlines the attributes of value management, namely, better business decisions, increased effectiveness, improved products and services, enhanced competitiveness, a common value culture, multidisciplinary and multitask teamwork, and decisions which can be supported by all stakeholders. Hiley & Paliokostas (2001) distinguish between two categories of benefits resulting from VM: traditional benefits, that include enhancing quality and the elimination of unnecessary cost, and 'soft' benefits, such as better communication, team building and understanding between project members and stakeholders. Their research established that the greatest positive impact of the use of VM was the formation of clear objectives (Hiley & Paliokostas, 2001). Benefits discovered by Woodhead & Downs (2001) from the perspective of VM clients are: the unearthing of the true purpose of the project under review, a connection between strategic and tactical organizational goals, use of a structured process, improved relationships and management of the supply chain, a creative approach to planning and problem solving, provision of an audit trail, and greater commitment to projects.

Various authors have drawn attention to the use of VM in local authorities (see Bone, 1993; Woodhead & Downs, 2001 and Kelly *et al.*, 2002, 2004). Bone & Law (2000) outline a number of business sectors that have used VM to add value to their businesses. These include the construction, manufacturing, automotive, infrastructure and transportation industries, as well as local and central government and the service industry. Given the widespread use of VM in a variety of sectors, there appears no valid reason why VM cannot be applied within local authorities in South Africa to facilitate the achievement of Best Value.

5. Nature and objectives of the project

This project is concerned with determining whether or not value management can be applied effectively and successfully to Best Value projects in the public sector in South Africa. The research will review value management principles as they apply to manufacturing and construction before determining the possible implementation scenarios in local government projects. This will be done through the study of project stages, success factors, and characteristics to develop a generic project model applicable to the public service sector.

The primary research proposition underpinning this research project is that:

'Value management is a service that can maximize the value of public sector services to achieve Best Value'

A preliminary analysis of the literature (see Hunter, 2006) leads to the following 'research propositions':

- The value management methodology can identify opportunities to add value for any type of public service project by making the best use of resources, identifying the project objectives, determining the clients' values, and the requirements of the end-user;
- Current public sector thinking is founded on closed-system thinking and risk-free solutions; the use of value management workshops will encourage 'out of the box' thinking;
- All projects, regardless of industry sector, undergo similar stages throughout the life of the project. Similarly, pre- and post-contract stages are also comparable in terms of activities undertaken to prepare and acknowledge the project in core business (see Cooper *et al.*, 2005). In essence, then, similar issues appear at similar project stages and that these are generic in nature;
- The audit of Best Value can be facilitated by the methodical process of value management, which can illustrate the route taken by local authorities to achieve Best Value;
- A logical project framework is required that involves an integrated team of local authority staff, informed by consultations with stakeholders, to provide a suitable platform for achieving Best Value; and

- Notwithstanding the uncertainty associated with the stages of public sector projects, most time should be spent in the strategic project stage using VM to ensure stakeholder requirements are considered – thus providing project managers with an improvement tool to inform decision making.

To confirm the above propositions, the research objectives of this project are to:

- Review the available literature on the application of value management in the public sector;
- Evaluate existing approaches to managing public sector service projects;
- Examine the differences, if any, between local, provincial, and central government procurement of projects;
- Develop a generic project model to be used to identify project stages in industry sectors such as construction, manufacturing, and services;
- Determine the likely intervention points for a service and construct a new model to indicate the service value opportunities;
- Determine whether different projects (e.g. construction and service related) at comparable intervention points, have similar issues and whether or not these issues can be predicted prior to a VM workshop;
- Determine the scope of being able to predict issues prior to a VM workshop (if this proves to be a possibility from the findings), and analyse the advantages to be derived for a VM practitioner, the construction industry, and the client;
- Review the generic project issues that may be present in a typical local authority project and test on a local authority;
- Provide advice as to the kinds of local government projects that may be susceptible to the VM methodology; and
- Determine the extent to which VM can support Best Value in local government with respect of service delivery.

6. Scope of the research

The scope of research in the context of local government projects will be limited to the Western Cape in general, and the Cape Metro in particular. In the Western Cape there are 30 local authorities. By focusing the research on the 30 local authorities in the Western Cape, this will ensure that there is an adequate analysis of the population in terms of targeting all Western Cape authorities.

Best value is concerned with the ongoing performance of core business services. It will be argued in this article that value management is 'project based'. It will be shown that VM can be used as a value enhancing mechanism once Best Value systems have highlighted a project for action.

The scope of the research does not extend to a comprehensive investigation of value management in construction and manufacturing as the successful application of VM in these sectors has been achieved and is widely documented (see, for example, Kelly & Male, 1993; Pasquire & Maruo, 2001). Notwithstanding this caveat, this research project may utilise examples relating to government projects.

7. The research methodology

The focus of this article is value management (VM), with Best Value as the main thrust. It is recognised that VM and Best Value have the same goal, namely, to maximise value for the customer. A preliminary review of the literature indicates that VM is a project-focused service and that the technique could be used to support the attainment of Best Value on local authority projects.

Given this, the research methodology proposed to confirm the research proposition is:

- A grounded theory study on value management case studies to explore project issues;
- A questionnaire study on local authority projects targeted at all Western Cape local authorities;
- An action research study in a value management workshop on a local authority project(s); and
- A combined desk study and case study to explore the use of VM in a Best Value project to propose a methodology for the application of VM within a Best Value arena.

The purpose of these chosen research methods was to:

- Identify commonalities of project issues (generic project issues);
- Explore local authority understanding of projects and identify the key points in the project life cycle where VM could be applied;
- Confirm that VM could be used successfully on a local authority project and to validate and test the generic issues identified in the grounded theory study; and
- Derive a logical project framework that uses a VM approach to achieve Best Value.

The envisaged research outputs flowing from the application of the research methodology are:

- A predictive framework of generic project issues that can be used in any VM workshop regardless of project type;
- A local authority generic project model;
- A project model that indicates the VM opportunity points – the application points in the project life cycle when VM should be applied; and
- A logical framework that uses a VM approach to achieve Best Value.

8. Proposed work plan

The proposed work plan for this project may be documented as follows:

- Background to the research and literature review: This phase will entail: a background review of Best Value, how it evolved and the emphasis on continual improvement; a review of the nature of public sector services, the function of a public service and the delivery of public services; a background review of value management and the characteristics of VM.
- Project stages and characteristics: This phase will entail: a literature review on project stages in order to inform a generic project model to identify value opportunities for any type of project regardless of type; exploring project success factors by outlining the successful characteristics of a project; the management of projects; and the issues that impact on projects.

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- Development of a generic project model: This phase will entail, firstly, an examination of how Best Value, VM and projects all relate to each other; and, secondly, the development of a generic project model.
- Application of the research methodology: It is envisaged that this phase will most likely consist of 4 sections, namely:
 - exploring the case studies in the form of VM workshop reports using grounded theory;
 - a Western Cape local authority questionnaire survey on projects;
 - an action research study in a VM workshop; and
 - examining the measurement of Best Value and proposing a logical project framework for the application of VM in a Best Value project.
- Development of a logical project framework: This phase will entail exploring the role of VM in the public sector by proposing a logical project framework that brings Best Value and VM together – to help ensure that Best Value is achieved alongside the implementation of VM.
- Feedback and dissemination: The final phase of the study will entail writing a report to summarise the findings of the study. In addition, feedback seminars will be provided to Western Cape local authorities. Finally, the results will be disseminated to the wider academic community via the publication of journal and conference papers.

9. Beneficiaries of the research project

The beneficiaries of the project will be:

- Collaborating local authority clients and their construction supply chains - through the development and implementation of a benchmarked continuous improvement programme;
- Procuring local authorities with major development programmes - by being in a better position to judge the level and extent of the service they would receive from providers, and also how to approach their own internal processes more effectively within development programmes. This will help ensure that good practice is implemented within their programmes and on their projects;

- Providers of construction industry services - by judging the appropriateness of their own service against researched good practice;
- The government - because this study is consistent with the call for quality improvement, value for money, and best practice within both the public and private sectors of the construction industry;
- The construction industry in general - through improved communication and understanding of client needs and requirements.

10. Collaborating local authorities

At this stage it is impossible to state the full nature and extent of local authority collaboration in the project. Swartland Municipality has already agreed to participate in the project. Suffice it to say at this stage that every effort will be made to secure the co-operation of the Cape Town Metro and the local authorities in the Western Cape.

11. Related research

Linked to the above research programme are areas identified for possible concurrent or future research activity, namely:

- using value management for effective client briefing (covering strategic needs analysis);
- uncovering the client's value systems and briefing from a facilities management perspective; and
- the performance measurement of buildings (covering aspects such as briefing; post-occupancy evaluation; the strategic management of space; process mapping; benchmarking; and performance measurement and scaling).

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Reasons for the transformation of facilities management in the public sector

Peer reviewed

Abstract

Facilities managers in the National Department of Public Works (NDPW) have to manage one of the biggest property portfolios in South Africa. This requires a systematic approach to ensure that taxpayers' monies are not wasted. Research was conducted to determine whether the required policies and expertise are in place or whether there is a need for a transformation strategy in the public sector relating to facilities management. Primary data was collected by means of questionnaires to regional, property and facilities managers in the NDPW. Secondary data was obtained from the literature reviewed in relevant publications. The main findings were that more than half of facilities managers are inexperienced, information management systems are not used extensively and that there is a need for the appointment of properly trained facilities managers in the NDPW.

Keywords: facilities management, transformation strategy, public sector.

Abstrak

Fasiliteitsbestuurders in die Nasionale Departement van Openbare Werke (NDOW) is verantwoordelik vir die bestuur van een van die grootste eiendomsportfolios in Suid-Afrika. Hiervoor is 'n sistematiese benadering nodig om te verseker dat belastingbetalers se geld nie vermors word nie. Navorsing is gedoen om te bepaal of die nodige beleidsrigtinge en kundigheid reeds bestaan en of daar 'n behoefte is dat daar transformasie moet plaasvind rakende fasiliteitsbestuur

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in die NDOW. Primêre data vir die navorsing was verkry met behulp van vraelyste aan streeks-, eiendoms- en fasiliteitsbestuurders in die NDOW. Sekondêre data is verkry uit relevante bestaande literatuur. Die hoofresultate dui aan dat die meerderheid fasiliteitsbestuurders nie genoegsame kennis het nie, inligtingstelsels nie genoegsaam gebruik word nie en dat bevoegde fasiliteitsbestuurders dringend aangestel moet word.

Sleutelwoorde: fasiliteitsbestuur, transformasie-strategie, openbare sektor.

1. Introduction

The South African Government has the largest property portfolio in the southern hemisphere; it is in the custodianship of the National Department of Public Works. This portfolio constitutes approximately 243 000 properties at the value of R120 billion and its running costs amount to R4 billion per annum (Sigcawu, 2000: online). It is estimated that the deferred maintenance (backlog maintenance) is in the region of R13 billion (Bici, 2006). This is a huge challenge facing the South African Government as well as facilities managers in this sector. Research by Mavasa (2007) indicated that the National Department of Public Works (NDPW) is currently ineffective in asset life cycle management, there is no clarity on the existence of an immovable asset management plan and that there is an urgent need for competent personnel with adequate skills to verify, capture and correct property data in an effective asset register.

Smith (1995) states that maintenance is a cost that management does not understand well. The result is that it becomes an orphan at the budget table. This result in most of the decision-makers in an organisation failing to understand that maintenance is also an investment, an essential expense that ensures the long-term reliability and availability of operating equipment and infrastructure. Buyts (2004) concludes that having a sound maintenance management system (policy) is one of the most important criteria in any facilities management department. Such a policy should ensure that sufficient funds are provided for maintenance.

Dunn (1990: 19) is of the opinion that "if funding for facility maintenance does not become a regular budgeted item, organisations will soon find themselves mired in the same situation despite today's fix-up campaign". Inappropriate maintenance budget methodology and unstructured facilities management (FM) in the public sector have resulted in inadequate allocation of funds and a substantial

decline in the condition of buildings over a number of years. Hence, this sector now has a huge cost of deferred maintenance. It could be argued that a lack of understanding and the misinterpretation of FM placed it 'in the basement' for too long. The result is that its growth is forcing its place into the boardroom from a hidden function entrusted to the sleepy, slow, and steady to one performed by increasingly bright-eyed and dynamic facilities managers (Becker, 1990). Buys (2004) concurs by stating that it is vital that top management should be made more aware of the importance of maintenance and the consequences of neglecting maintenance/facilities management.

2. Facilities management

Best, Langston & De Valence (2003) define facilities management as "the practice of integrating the management of people and the business process of an organisation with the physical infrastructure to enhance corporate performance." Atkin & Brooks (2005) state that facilities management covers a broad spectrum of real-estate management, financial management, change management, human resources management, health and safety and contract management, as well as building and engineering services, domestic services and other utilities' supplies.

FM is a wide field, which encompasses models that tend to differ considerably from one organisation to another. Atkin & Brooks (2005) also agree with this statement by defining FM as a profession that encompasses multiple disciplines to ensure the functionality of the built environment by integrating people, place, process, and technology. The modern facilities manager has adopted the principles and concept of continuous improvement. Best, *et al.* (2003), in support of this notion, emphasised that any organisation should strive for improvement in its operations whether it is customer satisfaction, increased productivity, better quality of output, better environmental performance, or any other performance indicator. FM emanates from the premise that "no building is perfect and buildings are never perfect" (Cloete, 2002).

It is important that professions involved in property development and occupiers of buildings start to acknowledge mistakes that come with the building and learn to manage them in order that organisational objectives can be achieved and programmatic dysfunction reduced (Cloete, 2002). These are the factors that made FM grow at a very fast rate in the modern business environment.

It is this state of affairs that prompted this research project on FM in the public sector. FM is assumed to be the driving force of the future in the management of buildings and its related services; it could also rescue government from the stated dilemma.

The article reports on attitudes and perceptions regarding FM in the NDPW to establish whether there is a need for a transformation strategy for facilities management in the public sector.

3. Research method

The primary objective of the research was to determine the perceptions and attitudes of people dealing with FM in the public sector and thereby determine whether there is a need for a transformation strategy. Leedy & Ormrod (2005: 1) state, "in virtually every subject area, our knowledge is incomplete and problems are waiting to be solved. We can address the holes in our knowledge and those unresolved problems by asking relevant questions and then seek answers through systematic research". Leedy (1993) continues by stating that 'facts' are needed to solve any research problem.

A quantitative method of data gathering was used to generate important information from the target population. Mouton & Prozesky (2001) agree that, more often than not, data collection methods that are more quantitative in nature are used in action research. Primary data was obtained through questionnaires completed by facilities managers, regional managers and property managers of the National Department of Public Works (NDPW). The secondary data was obtained through a literature review of relevant publications and information sourced from libraries and the Internet. The secondary data played a major role in the establishment of the criteria and theories against which the empirical research was to be measured and in the compilation of the questionnaire for the survey.

4. Target population

The NDPW has eleven regional offices, each headed by a regional manager and supported by heads of divisions who are supported by line managers. The target population consisted of 33 managers comprising regional managers (11), property managers (11) and facilities managers (11) selected by being involved in facilities management one-way or another. Gay & Airasian (cited in Leedy & Ormrod, 2005) have the following guidelines for the identification of a sufficient sample:

- For a small population – less than 100 people – there is no need for sampling;
- If the population size is around 500, 50% of the population should be sampled;
- If the population size is around 1500, 20% of the population should be sampled; and
- Beyond a certain point (at about 5000 units or more), a sample of 400 people is adequate.

Based on the above information, the target population for this survey did not require sampling. Every effort to eliminate the likelihood of biased data has been made, but if any can be identified, it is acknowledged. Buys (2004) defines bias as “any influence, condition, or set of conditions that may singly or together distort the data from what may have been obtained under the conditions of pure chance.”

5. Survey results

Data gathered to achieve results, data analysis, and interpretation was analysed using descriptive statistics, namely frequency and percentages with the help of the Department of Statistics at the Nelson Mandela Metropolitan University.

5.1 Target population and respondents

The first table illustrates the composition of the target population and the respondents. The three functional groups form part of the existing organogram of the public sector and was used for categorisation. The responses are shown in Table 1.

Table1: Target Population and Respondents

| Function | Position | Target population | | Respondents | | Response group |
|---------------------|------------------------------|-------------------|------------|-------------|------------|----------------|
| | | Number | Percentage | Number | Percentage | Percentage |
| Regional Managers | Chief Directors/ Directors | 11 | 33.3 | 4 | 36.4 | 23.5 |
| Property Managers | Directors/ Deputy Directors | 11 | 33.3 | 2 | 18.2 | 11.8 |
| Facilities Managers | Deputy & Assistant Directors | 11 | 33.4 | 11 | 100 | 64.7 |
| | Total | 33 | 100 | 17 | 51.5 | 100 |

A response rate of 51.5% was achieved and this formed the basis for the analysis and the subsequent conclusions. All Facilities Managers responded, but only 36.4% of Regional Managers and 18.2% of Property Managers responded. Although Regional and Property Managers play major roles in the formulation of the policies and programmes in the organisation, the high percentage (64.7%) of the Facilities Managers group, should give a true and accurate reflection of the state of FM in the public sector.

5.2 Experience in facilities management in the public sector

As experience plays a major role in any field it was important to establish how much experience respondents had in FM. Experience is linked to tacit knowledge. Tacit knowledge forms one kind of knowledge, which is sometimes difficult to articulate when using formal language. Nonaka & Takeuchi (1995) state that tacit knowledge is personal knowledge embedded in individual experience and involves intangible factors such as personal beliefs, perspectives, and value systems.

Table 2: Experience in facilities management

| <i>Years</i> | <i>Number of respondents</i> | <i>Percentage</i> | <i>Cumulative Percentage</i> |
|-------------------|------------------------------|-------------------|------------------------------|
| Less than 1 year | 3 | 17.6 | 17.6 |
| 1 - 5 years | 6 | 35.3 | 52.9 |
| 6 - 9 years | 3 | 17.6 | 70.5 |
| 10 years and more | 5 | 29.5 | 100 |
| Total | 17 | 100 | |

Most of the respondents (35.3%) had between 1 and 5 years experience while 17.6% had less than 1 year experience in FM. The table also indicates that more than half of the respondents (52.9%) had less than 5 years of experience in FM. This is not a satisfactory state of affairs taking into account the huge property portfolio of the public sector.

5.3 Definition of FM

Table 3 indicates the respondents' ratings of the definition of FM, measured by using a five-point Likert scale, namely 1 = strongly disagree (SD), 2 = disagree (D), 3 = neutral (N), 4 = agree (A) and 5 = strongly agree (SA). Respondents were not requested to rank the statements but merely to rate each statement on the 5-point scale.

Table 3: Statements describing facilities management

| Description of facilities management | SD | D | N | A | SA | Total | Weighted Average | Ranking |
|--|---------------------|---|---|---|----|-------|------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| | Number of responses | | | | | | | |
| The management of buildings and their related services | 0 | 2 | 0 | 9 | 6 | 17 | 4.11 | 1 |
| Practice of integrating people, business process, and physical infrastructure | 0 | 0 | 4 | 8 | 5 | 17 | 4.05 | 2 |
| Management of specific physical entities to enable the business to carry out its functions | 0 | 3 | 2 | 7 | 5 | 17 | 3.82 | 3 |
| Management of cleaning and gardening services | 1 | 3 | 3 | 6 | 4 | 17 | 3.52 | 4 |
| Management of all services that support core-business | 3 | 3 | 3 | 5 | 3 | 17 | 3.11 | 5 |
| Property management, facilities management, and asset management are the same | 4 | 4 | 3 | 5 | 1 | 17 | 2.7 | 6 |

The results from the table above indicate that the respondents have a fairly good idea of the scope of FM. However, the definition of "Management of cleaning and gardening services" was rated unexpectedly high as FM entails much more than just that. The low rating of 2.7 (disagree) for the last statement also supports the perception that the respondents are knowledgeable about the scope of FM.

5.4 Factors stimulating growth of FM

Table 4 illustrates respondents' perceptions on the factors that have stimulated the growth of the FM discipline. Respondents rated all five factors higher than 3 (thus 'Agree') and this corresponds with the opinion of Becker (1990) who states that the five factors that stimulate the growth of FM is global competition, information technology, the high cost of space, employee expectations, and the cost of mistakes.

Table 4: Factors stimulating growth of facilities management

| Factors stimulating growth of FM | SD | D | N | A | SA | Total | Weighted Average | Ranking |
|----------------------------------|---------------------|---|---|---|----|-------|------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| | Number of responses | | | | | | | |
| Global competition | 0 | 0 | 1 | 9 | 7 | 17 | 4.35 | 1 |

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| | | | | | | | | |
|------------------------|---|---|---|----|---|----|------|---|
| Information technology | 1 | 0 | 0 | 11 | 5 | 17 | 4.12 | 2 |
| High cost of space | 1 | 0 | 5 | 5 | 6 | 17 | 3.88 | 3 |
| Employee expectations | 1 | 1 | 8 | 2 | 5 | 17 | 3.53 | 4 |
| Cost of mistakes | 2 | 3 | 4 | 5 | 3 | 17 | 3.24 | 5 |

Although the public sector does not compete globally with other organisations, it is affected to a large extent by the other factors and therefore plays a major role in the management of its facilities.

5.5 Perceptions of FM

Table 5: Perceptions of FM

| Statements about FM | SD | D | N | A | SA | Total | Weighted average | Ranking |
|--|---------------------|----|---|---|----|-------|------------------|---------|
| | 1 | 2 | 3 | 4 | 5 | | | |
| | Number of responses | | | | | | | |
| A lack of knowledge of FM results in poor performance of state properties | 0 | 1 | 1 | 6 | 9 | 17 | 4.35 | 1 |
| A building needs to be nurtured, understood, and developed to its full potential | 0 | 2 | 1 | 4 | 10 | 17 | 4.29 | 2 |
| Senior-level people should be appointed to interpret the policy in terms of FM to fulfil the role of an 'intelligent client' | 0 | 1 | 4 | 6 | 6 | 17 | 4.0 | 3 |
| FM has developed from its technical base to more of a management discipline | 0 | 3 | 3 | 7 | 4 | 17 | 3.71 | 4 |
| The public sector is far advanced in FM | 0 | 10 | 1 | 1 | 5 | 17 | 3.06 | 5 |
| The availability of funding is the only cause of decay in state properties | 4 | 7 | 1 | 1 | 4 | 17 | 2.65 | 6 |

It can be noted from the results in Table 5 that respondents agree that a lack of knowledge of FM results in the poor performance of state properties whilst they also agree that buildings need to be nurtured, understood, and developed to its full potential; ratings of 4.35 and 4.29 respectively. Respondents also agree that senior-level people should be appointed to interpret the FM policy to fulfill the role of an 'intelligent client'; thereby agreeing with Cloete (2002). Sievert (1992: online) is further of the opinion that the quality of decisions made by facilities managers is directly related to the quality of information available to them. Buys (2004: 185) supports this viewpoint by stating: "Maintenance/Facilities managers have to make important

decisions regarding maintenance work to be carried out such as whether the work must be carried out immediately or whether it can be deferred, redirect or re-allocate resources for maintenance work to be done and determine whether an item should be repaired or replaced. To make these decisions, he/she must have all the relevant information available such as cost implications of the various alternatives and minimum acceptable standards."

Although the previous results indicate that the respondents are 'knowledgeable' about the scope of FM, there appears to be a need for the appointment of properly trained facilities managers in the public sector. This view is further augmented by the respondents' views that the public sector is not really advanced in FM (rating of 3.06 – 'Neutral').

A lack of funding is usually given as the main reason why there is decay in the condition of buildings. Buys (2004: 10) states that "there is evidence that inadequate finance is one of the biggest problems facing maintenance managers as maintenance budgets seem to be the easiest to cut in times of financial stringency. The limited funds are rather used for new buildings than the upkeep of existing buildings with the result that the maintenance manager is faced with a growing portfolio of responsibilities but diminishing resources". It is noted from the above results that respondents generally disagree (rating 2.65) that the availability of funding is the only cause of the decay or poor condition of state properties.

5.6 Information management systems

The use of information management systems can be very beneficial to any organisation as computer software makes it possible to store and retrieve maintenance data making it easier to obtain the required information in order to make the right decisions. Magee (1988) maintains that the computer, because of its ability to store and manipulate large amounts of data, can be a valuable asset to the facilities manager. Corti (2001) states that it is vital to have a system which can respond rapidly to inquiries from senior management, providing accurate and detailed information. Buys (2004) concludes that it is vital for organisations to use computerised maintenance management systems to enhance data and information communication throughout the building life cycle and to assist maintenance managers to record, monitor and predict the maintenance costs associated with the building elements, components or parts.

Table 6 indicates the extent to which Information management systems are used in the NDPW.

Table 6: Information management systems in use

| FM systems in use | Use of Information management systems | | | | | Total | Weighted Average ratings |
|--|---------------------------------------|---|--------|---|---|-------|--------------------------|
| | Never | | Always | | | | |
| | 1 | 2 | 3 | 4 | 5 | | |
| Number of responses | | | | | | | |
| Facilities Management Information Management System | 14 | 1 | 0 | 2 | 0 | 17 | 1.41 |
| Property Management Information Management System | 7 | 0 | 4 | 5 | 1 | 17 | 2.59 |
| Maintenance Management Information Management System | 11 | 2 | 3 | 1 | 0 | 17 | 1.65 |
| Average rating | | | | | | | 1.88 |

The average rating of 1.88 clearly indicates that Information management systems are not used extensively in the NDPW. The highest rating is for using a Property Management Information management system. Although the reasons for the under-utilisation of Information management systems was not made known, it may be that the software is too expensive, users are not trained to use the software, the organisation are not aware of the advantages of using information management systems or do not know which software to use.

The effect of this phenomenon could result in major setbacks for the organisation such as client dissatisfaction, non-competitiveness, and the poor performance of the portfolio. Smith (1995) states that the maintenance management system develops benchmark information from operating data and it helps the maintenance manager to determine where changes for improvement are needed.

5.7 FM activities

FM covers a wide range of activities and a list of these activities was included in the questionnaire to ascertain which activities are included in the portfolio of the respondent and to what degree respondents rate its importance. These are generic facilities management activities which form the core of this discipline. The following table tabulates the activities, the percentage of respondents who are responsible for these activities, and respondents' views on their importance. The literature review formed the basis for identifying the activities.

Table 7: FM activities

| FM activities: | Percentage of respondents responsible for the FM activity | Importance of activity | | | | | Weighted Average ratings | Ranking |
|---------------------------------|---|-------------------------------------|---|---|---|----|--------------------------|---------|
| | | 1=Not important 5=Very important | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | | |
| | | Number of responses | | | | | | |
| Health and Safety | 88 | | | | | | 4.600 | 1 |
| Statutory compliance | 88 | 0 | 0 | 1 | 4 | 10 | 4.60 | |
| Safety environment | 88 | 0 | 0 | 1 | 4 | 10 | 4.60 | |
| Real Estate/Property Management | 85 | | | | | | 4.583 | 2 |
| Condition assessment survey | 94 | 0 | 0 | 1 | 3 | 12 | 4.69 | |
| Unplanned maintenance | 94 | 0 | 1 | 0 | 4 | 11 | 4.56 | |
| Planned maintenance | 76 | 0 | 0 | 0 | 3 | 10 | 4.77 | |
| Building maintenance plan | 76 | 0 | 0 | 3 | 3 | 7 | 4.31 | |
| Financial Management | 75 | | | | | | 4.580 | 3 |
| Budget preparation | 82 | 0 | 0 | 0 | 6 | 8 | 4.57 | |
| Operating cost analysis | 71 | 0 | 0 | 0 | 4 | 8 | 4.67 | |
| Budget reviews | 71 | 0 | 0 | 0 | 6 | 6 | 4.50 | |
| Support services | 57 | | | | | | 4.330 | 4 |
| Cleaning | 71 | 0 | 0 | 1 | 5 | 6 | 4.42 | |
| Catering | 29 | 0 | 0 | 1 | 1 | 3 | 4.40 | |
| Horticulture | 71 | 0 | 0 | 2 | 6 | 4 | 4.17 | |
| Operations | 79 | | | | | | 4.435 | 5 |
| Management of contracts | 82 | 0 | 0 | 0 | 4 | 10 | 4.71 | |
| Preparation of specifications | 88 | 0 | 0 | 0 | 6 | 9 | 4.60 | |
| Analysis of requirements | 82 | 0 | 0 | 0 | 8 | 6 | 4.43 | |
| Benchmarking | 65 | 1 | 0 | 1 | 5 | 4 | 4.00 | |
| Managing Services | 68 | | | | | | 4.275 | 6 |
| FM strategic management | 65 | 0 | 0 | 2 | 6 | 3 | 4.09 | |
| Client satisfaction | 94 | 1 | 0 | 1 | 6 | 8 | 4.25 | |
| Value chain | 71 | 0 | 0 | 1 | 6 | 5 | 4.33 | |
| Research survey analysis | 41 | 0 | 0 | 1 | 2 | 4 | 4.43 | |
| Business Management | 78 | | | | | | 4.200 | 7 |
| Business planning | 82 | 0 | 0 | 0 | 7 | 7 | 4.50 | |
| Strategic advice | 71 | 0 | 0 | 2 | 6 | 4 | 4.17 | |
| Business transformation | 82 | 1 | 0 | 1 | 9 | 3 | 3.93 | |

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|----------------------------|----|---|---|---|---|---|-------|----|
| Business Organisation | 65 | | | | | | 4.090 | 8 |
| Organisational structure | 65 | 1 | 0 | 1 | 4 | 5 | 4.09 | |
| Business strategy | 65 | 1 | 0 | 1 | 4 | 5 | 4.09 | |
| Security | 65 | | | | | | 3.810 | 9 |
| Security systems | 65 | 2 | 0 | 2 | 2 | 5 | 3.73 | |
| Security management | 76 | 2 | 0 | 0 | 6 | 5 | 3.92 | |
| Security risk management | 53 | 2 | 0 | 0 | 3 | 4 | 3.78 | |
| Work Place/Space Planning | 24 | | | | | | 3.743 | 10 |
| IT distribution | 24 | 0 | 0 | 2 | 2 | 0 | 3.50 | |
| Energy conservation | 18 | 1 | 0 | 0 | 1 | 1 | 3.33 | |
| Post-occupancy evaluations | 29 | 0 | 0 | 0 | 3 | 2 | 4.40 | |
| Average | 69 | | | | | | 4.265 | |

The table indicates that, with the exception of one FM 'category' (Work Place / Space Planning), more than half of respondents are involved with the FM activities listed. Only a small percentage (29%) of respondents has 'Catering' as an activity which falls within their scope of responsibility. The table also shows that, on average, 31% of FM activities are not performed by the NDPW. This may be as a result of the outsourcing of some of the FM activities; the questionnaire unfortunately did not make provision to ascertain this. Spedding (1994: 218) defines outsourcing as "the procedure adopted to discover and introduce suppliers and service providers from outside the organisation, often on a competitive basis of price, quality and performance." Although outsourcing has many benefits e.g. management is relieved from the responsibility of managing the activity (e.g. maintenance), competition amongst outside service providers may have economical benefits for the organisation and it can be used where there is insufficient in-house expertise, it also has many disadvantages. Barrett (1995) lists lack of control over suppliers and risk of selection a poor supplier as potential disadvantages while Buys (2004) concludes that many organisations do not find outsourcing to be very cost-effective.

'Health and Safety, Real Estate/Property Management and Financial Management' were rated as the three most important FM activities. Although 'Security and Work Place/Space Planning' were ranked in the 9th and 10th position on the importance scale, it still had

average ratings of 3.81 and 3.74 respectively. None of the individual FM activities had an average importance rating of less than 3 (Neutral). This indicates that although some of the FM activities do not fall within the scope of the respondents' portfolio, they are all rated as important.

6. Conclusion

Government is spending huge sums of money on infrastructure and development, but less on maintaining these structures. This results in the perceived poor condition of state properties.

The results of the survey have indicated that although the facilities managers are fairly knowledgeable about FM and that almost 70% of the respondents are responsible for all FM activities, more than half of them have less than five years experience in FM. This is not satisfactory taking into account the huge property portfolio of the NDPW and the important decisions they have to make regarding managing its facilities. Information management systems are not used extensively in the NDPW and the introduction of such systems could greatly assist facilities managers in managing FM.

A lack of funding should not be seen as the only cause of the decay or poor condition of state properties; other causes may be the lack of properly trained facilities managers and a need for a transformation strategy which should include the appointment of properly trained facilities managers. These managers should set the necessary policies, frameworks, and interventions in place to ensure that taxpayers' money is not wasted through poor management. Tertiary institutions should not only offer built environment related programmes such as engineering, architecture, construction management and quantity surveying, but also programmes in FM to satisfy this need.

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Hoffie Cruywagen

Continuing professional development for the quantity surveying profession in South Africa

Peer reviewed

Abstract

A system of Continuing Professional Development (CPD) was introduced into the quantity surveying profession in South Africa during 1999. After the initial 5-year cycle that ended in 2005, it became clear that the system is not without problems and difficulties. This article investigates the CPD system of the quantity surveying and other professions in South Africa and elsewhere and sets out the perceptions of the participants to the system, specifically registered quantity surveyors. Possible changes and improvements that can be implemented to simplify the current system and make it user-friendlier are also discussed.

Keywords: continuing professional development, quantity surveying

Abstrak

'n Stelsel van Voortgesette Professionele Ontwikkeling (VPO) is in 1999 vir die bourekenaarsprofessie in Suid-Afrika ingestel. Na die aanvanklike 5-jaar siklus wat in 2005 ten einde geloop het, het dit duidelik geword dat die stelsel nie sonder probleme was nie. Hierdie artikel ondersoek die Suid-Afrikaanse bourekenaars- en ander professionele VPO-stelsel en bespreek die persepsies van deelnemers daaraan, spesifiek geregistreeerde bourekenaars. Moontlike veranderinge en verbeteringe wat aangebring kan word om die stelsel eenvoudiger en meer gebruikersvriendelik te maak, word ook bespreek.

Sleutelwoorde: voortgesette professionele ontwikkeling, bourekenkunde

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1. Introduction

Continuing Professional Development (CPD) is defined by the Royal Institution of Chartered Surveyors (RICS, 1993) as the "systematic maintenance, improvement and broadening of knowledge and skills, and the development of personal qualities necessary for the execution of professional and technical duties throughout the practitioner's working life." Similarly, Le Roux (2000) quotes the Institution of Surveyors, Australia who defines CPD as "the process by which professions maintain the quality and relevance of professional services throughout their working lives."

The Association of South African Quantity Surveyors (ASAQS) has introduced a CPD policy approximately 7 years ago, and the purpose of this article is to investigate whether this policy was successful and if any adjustments need to be implemented in future to improve the current system.

2. The need for CPD

Talukhaba (2006) states that CPD policies have been developed in many countries such as the UK, New Zealand, Hong Kong, etc. This was done in order to foster professional competency and sustainability among registered persons. Le Roux (2004) is of the opinion that, as a consequence of the rapid move to a knowledge-based global society, careers have moved from 'jobs-for-life', built on a single, specialised skill, to professionals taking more control over their careers that require multiple skills. Rochester (in Le Roux, 2004) stated that obsolescence of qualifications sets in after 5 years and without continuing education, the holders of obsolete qualifications couldn't hope to compete in the labour market, thereby implying that continuing education and training throughout a person's life is necessary.

3. CPD in the South African quantity surveying profession

Before 1998 the only statutory professional council in South Africa who considered the implementation of compulsory professional skills upgrading for registered members, was the former South African Medical Council (currently the Health Professions Council of South Africa) (Le Roux & Nkado, 2002).

On 1 January 1999, the then South African Council for Quantity Surveyors (currently the South African Council for the Quantity Surveying Profession) invoked its authority in terms of the *Quantity Surveying Act* (Act no. 36 of 1970 as amended), to introduce its mandatory

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CPD policy (South Africa, 1970). When the above act was replaced in 2000 with the *Quantity Surveying Profession Act* (Act no. 49 of 2000, Government Gazette, 2000), the *status quo* was upheld and the existing CPD system continued to be approved by the newly elected Council members of the Council for the Quantity Surveying Profession (SACQSP).

In South Africa, the CPD system is administered by the ASAQS in terms of the responsibility delegated to them by the SACQSP (ASAQS, 1999). The ASAQS, in turn, has an in-house Edutech Centre that administers the whole process of accepting submissions, verifying points, keeping the points database updated, etc. In short, the system works as follows (Ibid):

- CPD runs in 5-year cycles, during which period every quantity surveyor registered with the SACQSP is required to accumulate 200 points with a minimum of 25 points per year.
- The points system is divided into 3 categories of educational and developmental activities, category 1 (1 hour = 2 points): appropriate activities arranged by 'outside' organisations, such as conferences, congresses, workshops, lectures, etc.; category 2 (2 hours = 1 point): small-group activities such as in-house skills training, organised small-group discussions, professional administration (committees, boards, etc.) and category 3 (2 hours = 1 point): individual activities such as self-study (i.e. trade journals), under/post graduate teaching, examinations, etc.
- Registered members must submit details of their CPD points annually (the submission period runs from 1 January to 31 December of each year).
- The Edutech Centre scrutinises all submissions and captures the points earned by every member on its database. A copy of the record is sent back to the member for his/her records.
- The ASAQS is responsible (through its Chapters, which is situated in each province of the country) for the validation and monitoring of courses, seminars, lectures and conferences offered for gaining CPD points. Any institution or organisation such as universities/universities of technology, professional councils, bodies or groups offering education and development programmes or courses, manufacturing organisations, etc may apply to the ASAQS to market their programmes and have the appropriate CPD points validated.

4. CPD in other South African professions and abroad

The Engineering Council of South Africa (ECSA) has introduced CPD from 2006 with the South African Council for the Architectural Profession (SACAP) following suit from January 2007. Because there is little difference between the working of ECSA's and the SACAP's policies, only the ECSA policy will be discussed briefly (ECSA, 2005):

- ECSA's CPD runs in a five-year cycle during which period every registered person is required to accumulate 25 credits in order to retain registration. In any one year, the registered person is required to accumulate a minimum of three credits. Additional credits earned in any one year may be carried over to subsequent years of the five-year cycle.
- The credit system is divided into three categories namely 10 hours of category 1 activities (developmental activities) equal 1 credit; 50 hours of category 2 activities (work-based activities) equal 1 credit and 100 hours of category 3 activities (individual activities) equal 1 credit.
- ECSA conducts random audits of up to 10% of the CPD records of all registered persons. If selected, persons are required to send, within four weeks, verification of their CPD activities for that period.

In the South African medical field, 50 points must be acquired annually and points can be gained for both educational and developmental activities (one hour earns one point). There are three categories, category 1: organisational activities (conferences, workshops, etc.); category 2: small group activities and category 3: individual activities such as self-study, lecturing, higher studies, etc. In addition to complying with these requirements, a maximum of 80% of the points may be accumulated in any one of the above categories. A minimum of two points in professional ethics is required from all practitioners per year.

In the United Kingdom, the Royal Institution of Chartered Surveyors (RICS, 2007: online) seeks to develop ownership of CPD by the individual through:

- Emphasis on learning from a wide range of activities; and
- Integration of learning and work – the concept of work as a learning experience.

The RICS has three categories of CPD, namely professional work-based activities that includes business management skills, coaching/

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mentoring, personnel management skills and planning and running an in-house training event; self-directed and informal learning that includes faculty and forum work and course accreditation exercises; and personal activities outside work such as courses, seminars and conferences.

The RICS requires that all qualified members adhere to CPD requirements, regardless of where in the world they are practicing. The obligation is for members to achieve a minimum of 60 hours of learning every three years, with at least 10 hours completed each year (RICS, 2007).

The Hong Kong Institute of Surveyors (2003) also requires from its corporate members to complete a minimum of 60 hours of CPD activities over a three-year period. It does not have specific categories, but at least 20 of the 60 hours must be in the form of what is termed "formal events" such as courses, seminars, conferences, workshops, etc.

The New Zealand Institute of Quantity Surveyors (NZIQS) introduced a voluntary programme of CPD in 1992 and in 2003 the number of CPD equivalent hours was increased to a minimum of 45 in each three-year period. CPD hours may be claimed for a variety of activities such as attendance at seminars, professional reading, professional body participation, teaching, additional qualifications, research, etc (NZIQS, 2004: online).

From the above it is clear that CPD is not unique to either the quantity surveying profession or South Africa and that the basic concept is fairly similar for different professions and professional bodies.

5. The current situation regarding CPD in South Africa

31 December 2005 was the end of the first 5-year cycle of CPD for the quantity surveying profession in South Africa. It must be noted that the actual time was six and a half years, due to complaints by various members during the start-up period, resulting in the first period of the cycle stretching over two years. The original submission period from 1 July to 30 June of every year was changed in 2003 to run from 1 January to 31 December of every year. This resulted in one 18-month submission period (July 2002 to December 2003). At the end of this first 5-year cycle, the Edutech Centre of the ASAQS received only 135 fully compliant submissions from registered quantity surveyors (ASAQS, 2006). As this was unacceptable to the SACQSP, the deadline for submissions by registered members was extended to 31 December 2006 to bring their CPD programmes up to date (for a 6-year period). This was conveyed via a special, registered letter

to all registered members dated 27 October 2006, followed up by a Council Newsletter during December 2006.

This letter sparked renewed interest among members with a flood of submissions from December 2006 to February 2007. At the end of February 2007, the submissions of fully compliant persons have increased to approximately 550 (Edutech Centre, 2007). With some 1692 persons registered with the SACQSP at the end of 2006 (SACQSP, 2006a), this meant that approximately 33% of the members were fully compliant with their CPD activities by that time. It is interesting to note that the CPD database contained the names of 720 people at the same time, which means that a number of registered persons have submitted one or more CPD submissions during the submission period, but were not fully compliant.

6. Opinion survey among quantity surveyors

In 2006 Gildenhuys (2006) conducted a survey among quantity surveyors in South Africa as part of his post-graduate studies. A questionnaire was drawn up and distributed on a random basis to registered quantity surveyors throughout the country. A total of 56 completed questionnaires out of 70 were returned, a response rate of 80%.

Although the results from the completed questionnaires cannot be seen as a representative indication of the situation regarding CPD in South Africa because of the relatively small sample, some meaningful conclusions can be made from the results. The outcomes of some of the questions are discussed below:

Question: Do you know what the requirements for compliance according to the Council are?

86% of the sample group said that they were aware of the requirements for compliance and therefore it can be assumed that the SACQSP and the ASAQS are successful in informing registered members of what is required of them. On the other hand, all of the respondents indicated in a previous question that they know what CPD is; therefore the question can be asked whether the remaining 14% who are unaware of the requirements are merely not interested?

Question: Have you submitted any CPD points to the ASAQS?

The result of this question was that 64% of the sample group answered "yes". This is in contrast to the reality. As pointed out previously, at the end of 2006 only 720 (43%) of the 1692 registered persons have submitted something.

Question: Is your CPD up to date?

This question went further than the previous and tried to establish how many of the respondents were fully compliant. 43% answered "yes" to this question, again differing from the actual figures as indicated by the Edutech Centre (33% fully compliant by the end of 2006). The only conclusion that can be made from this is that many of the members have enough points to comply and, although they have not submitted it, they consider themselves to be compliant.

Question: If not up to date, what would you say is the reason?

In this question, respondents were given three options to choose from, as well as a combination of the three options. The results were as follows:

1. No time – 40%
2. Not enough points – 20%
3. Not interested / feel it is unnecessary – 11%
4. Combination of 1 and 2 – 6%
5. Combination of 1 and 3 – 11%
6. Combination of 2 and 3 – 3%
7. Combination of 1, 2 and 3 – 3%
8. No response – 6%

From the above it is clear that the lack of time is the most important issue. This is indicative of the current construction boom in the country, but again it must be stressed that the CPD system has been in existence for the past six years and therefore lack of time cannot be put forward as an excuse indefinitely. The good news from the SAC-QSP's perspective is that only 11% of the respondents stated "Not interested/feel it is unnecessary" as the only reason why their CPD is not up to date. Added to this it can be mentioned that two of the respondents qualified their choice of "unnecessary" by indicating that they were close to retirement age and therefore felt that it was unnecessary for them to attend courses, *etc.* Another two respondents indicated that they were recently registered and therefore have not had enough time to accumulate sufficient points.

Question: Does your company or place of employment encourage the gaining of CPD points?

This was an important question to see whether companies / firms support their employees in their effort to obtain CPD points by allowing them to attend such events, paying for their attendance, *etc.* 70% of the respondents answered "yes" to this question, which is encouraging. The 30% who answered "no" seems high, but it can also be that these were one-person or small operations where the onus is on the individual to gain CPD points.

Question: What is your opinion on the administration of CPD points?

The aim of this question was to try and gauge the opinion of the registered persons regarding the feedback that they are getting from the ASAQs on their points standing. Whilst 24% of the respondents indicated this to be "good", 50% of the respondents did not have any opinion, indicating either that they were happy with the state of affairs, or that they have not submitted anything and therefore could not have received any feedback from the ASAQs. Of the remaining 26% of the respondents, it was the opinion of 24% that it can be improved, whilst 2% indicated that more contact with members was required. The only real constructive information that came from the responses was that the CPD system could be monitored on a stricter basis.

Question: Do you feel that CPD is necessary for quantity surveyors? Elaborate please.

This was probably the most important question of the survey, as previous questions have been regarding the CPD system, its requirements, consequences, administration, *etc.* This question however is vital in determining whether the CPD system is or will be supported by the persons registered with the SACQSP. The good news, from SACQSP's point of view, is that 77% of the respondents felt that CPD was necessary, 14% felt that it was not necessary and the remaining 9% had no opinion.

Question: Has the SACQSP / ASAQs made enough effort to market / make you aware of the CPD requirements? Do you have any ideas in this regard?

The views expressed by respondents were not too favourable for the SACQSP / ASAQs as 44% answered "no" to this question. Some of the ideas that were mentioned, with comments / explanations in brackets, are as follows (most of the comments were by individuals and no single point stood out above the rest):

- CPD should be earned for work done and a logbook should be kept.

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- Improving on the ASAQS e-mail database so that individual e-mails can be sent out regarding CPD events (this is already done by some of the bigger ASAQS Chapters, i.e. Gauteng and the Western Cape).
- More opportunities available on the internet [at the time of the questionnaire the GoLearning (2006) website of the ASAQS was in operation for almost a year].
- Monthly Chapter lectures and a greater advertising of the Association of Arbitrators' lectures (monthly lectures will be difficult to organise and sustain as this is done on a voluntary basis by members mostly in private practice).
- Make the ASAQS website more interactive.
- Requiring annual compliance for re-registration as a registered professional with CPD compliance being a requirement (see later recommendations).
- Putting arrangements in place with institutions like CETA, CIOB, CIDB, *etc.* and other relevant professions like architects to try and organise events more often (this already happens in some Chapters, but subjects must be of mutual interest).

Question: Are you aware of the GoLearning website where points can be earned over the Internet?

The results showed that more than half (54%) of the respondents indicated that they are aware of the mentioned website to earn points. The reason why the remaining 46% are unaware of the website may be that they have not been informed, are not interested in CPD or do not have Internet access. Members should be urged to use this facility to earn CPD points.

7. Recommendations to change the current CPD policy

After the poor returns of CPD submissions in 2005 (the end of the first 5-year cycle), the SACQSP decided that it was time to have a re-look at the whole CPD policy and system and a CPD committee under chairmanship of Prof. J.J.P. Verster was appointed. This committee investigated the current system and also looked at systems used by other bodies (both in the built environment and elsewhere). The committee reported back to the executive committee of the SACQSP late in 2006 in the form of a draft updated CPD policy document (SACQSP: 2006b). The main differences between the existing and the proposed policies are as follows:

- In future CPD should be linked to annual renewal of registration of registered persons. Currently it is not expected from registered quantity surveyors to renew their registration on a regular basis. Section 22(1) of the *Quantity Surveying Profession Act* however states the following: "A registered person must, at least three months prior to the prescribed expiry date of his or her registration, apply in the prescribed manner to the council for the renewal of his or her registration." Furthermore, according to Section 22(2) of the Act, the council may determine conditions for renewal of registration.
- There can therefore be little doubt that the Act requires the council to set periods of registration (the South African Engineering Council requires its members to re-register every 5 years) and that it is within its rights to set, as a requirement of registration that members have to comply with its CPD requirements.
- It must be mentioned that the concept of re-registration is not new. The 1999 CPD guideline booklet states (in clause 3) that: "The council has delegated its authority...for monitoring, management, delivery and maintenance of standards and outcomes of professional development and training in quantity surveying leading to registration, renewal of registration with council" (author's underlining) (ASAQS, 1999). Furthermore point 7 of the minutes of a Council meeting held on 3 December 1997 states the following: "It was noted that the ASAQS Executive Committee and the ASQAS Board had considered the proposal by the QS Edutech Centre and had resolved that CPD, including training courses, would be instituted as a prerequisite to continued registration with effect from 1 January 1999. It was agreed that this proposal be accepted in principle" (The South African Council for Quantity Surveyors, 1997). From the before mentioned it is clear that the intention of Council was that registered persons should re-register at some intervals of their careers, and that CPD would be a prerequisite for such renewal, but for reasons that are not clear, this was never put into practice.
- *In lieu* of points, registered quantity surveyors will be required to accumulate 25 hours of CPD activities per year. The reason for this is that the current system can be confusing with some members being uncertain whether to claim two points per hour or one point per every two hours. Time-wise it will not make a big difference. Currently members need an average

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of 40 points per year. According to the CPD guide (ASAQS, 1999), a minimum of 80 points should be accumulated in category 1 over a 5-year cycle (average 16 points per year). Say someone gets 20 points in a year in category 1 (10 hours of CPD), then he/she needs another 20 points for the year, which will take him/her another 40 hours in category 2 and/or 3, giving a total of 50 hours of CPD for the year – double the suggested requirement.

- It is proposed that there should be two categories in which to gain CPD points, *in lieu* of the current 3. The proposed categories are as follows: category 1- appropriate activities arranged by 'external' organisations, such as conferences, congresses, lectures, seminars, web-based learning, post-graduate studies, *etc.* Category 2 will be informal, internal activities such as in-house training sessions, small-group discussions, self-study, undergraduate/post-graduate teaching, mentoring, *etc.* (SACQSP, 2006b). The reasoning behind the reduction in the number of categories was again an effort to simplify the process.
- Registered persons may either submit proof of their CPD activities when applying annually for re-registration, or they can submit an affidavit in which they indicate their CPD compliance. In the latter case, persons must retain documentary evidence of all CPD activities during the previous year.
- Random audits will be conducted annually of records. Although it is not specifically stated in the CPD policy how many persons will be audited, the suggestion is that it will be approximately 20% of registered members. This will mean that over a 5-year cycle, the chances are good that every registered person will be audited at least once.
- Non-compliant members will be requested to submit a written explanation giving reasons for their non-compliance and also what they intend to do to rectify the situation. The member's response will be considered by the registration committee of the SACQSP and the committee can either grant an extension of time, determine remedial measures for compliance (such as a structured programme to be followed in order to catch up) or, if all else fails, refer the matter to the executive committee of Council for a final decision. This committee will then decide whether or not such a person's registration should be terminated.

8. Conclusion

From the above, the following conclusions can be made:

- The principles regarding CPD are embedded in the professional act, rules and code of conduct of the SACQSP and is therefore here to stay, whether some registered persons agree with the concept or not.
- The only way to make CPD compulsory is to link it to the registration of members, i.e. to make it a requirement of re-registration. Although it was previously implied to be the case, previous Councils never enforced it.
- After going through teething problems during the first 5-year cycle (which was partly the reason why the cycle was extended to run over a six and a half year period), the proposed amendments to the current CPD policy should make it a more user-friendly system.
- Although de-registration should be the last option by the SACQSP against non-complying members, it now has got the authority to do so. Previously it would have been difficult to act in such a manner against a non-compliant member, because CPD was never officially incorporated in either the rules or code of conduct as a prerequisite for registration. Members were also not required to re-register periodically.
- Time will tell whether the SACQSP will have the capacity to annually deal with the re-registration of all registered persons (currently approximate 1692) as well as auditing the CPD returns of a portion of the members (approximately 338 returns if 20% of the total current membership is audited). This will however be an administrative problem and should be overcome with the appointment of more staff if it poses to be a problem.

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