

# CONSTRUCTION QUALITY IN SOUTH AFRICA; A client perspective

A DISCUSSION DOCUMENT

## CONSTRUCTION QUALITY IN SOUTH AFRICA; A CLIENT PERSPECTIVE

### **A DISCUSSION DOCUMENT**

Rev 1

January 2011



### CONSTRUCTION QUALITY IN SOUTH AFRICA; A CLIENT PERSPECTIVE A DISCUSSION DOCUMENT

#### EXECUTIVE SUMMARY

The cidb was established by an Act of Parliament (Act 38 of 2000), with a mandate (amongst others) to:

.... promote the contribution of the construction industry in meeting national construction demand and in advancing:

- i) national, social and economic development objectives;
- ii) industry performance, efficiency and competitiveness; and
- *iii) improved value to clients.*

Value to clients is a very complex and often subjective issue, but it is recognised that quality of construction is a key component of perceived value to clients. As noted by FIDIC, "*lack of quality in construction is manifested in poor or non-sustainable workmanship, and unsafe structures, and in delays, cost overruns and disputes in construction contracts*". Value and quality of construction is of concern to both public and private sector clients.

Against this background, the cidb has undertaken this study on the quality of construction in South Africa. This investigation is undertaken largely from a client perspective (and largely from a public sector client perspective), and concludes by highlighting those actions that clients can implement to derive higher quality on their construction projects. The report investigates the factors impacting on construction quality through the value chain in creating new capital works, namely design, procurement and construction. (The impact of operation and maintenance on construction quality is not discussed here, and reference to this can be found in various documents dealing with the National Infrastructure Maintenance Strategy.)

The report on construction quality draws on two key studies, namely the annual cidb *Construction Industry Indicators* (CIIs) which contain a significant amount of information on construction quality, together with a research report on the state of construction quality commissioned for this study. This later study included surveys of clients, designers and contractors.

The report first presents an overview of the state of construction quality in South Africa, from which it is shown that clients are neutral or dissatisfied with the quality of construction on around 20% of all projects, and around 12% of the projects surveyed had levels of defects which are regarded as inappropriate. It is argued that clients should not be complacent with these levels of dissatisfaction, and that clients should strive to get better value for money.

The report also notes that client dissatisfaction is highest in the residential building sector, followed by special works and non-residential building. Specifically, low- and middle-income residential construction was ranked the lowest in terms of quality achieved (typically ranked poor to average quality), while the quality of upper-income residential was ranked as average to good. The report then notes that due to a regulatory constraint in which homebuilders are exempt from registering with the cidb, clients in fact do not have the flexibility to specify a requirement for using cidb registered contractors (in addition to the existing NHBRC requirements).

Significantly, it is concluded that client dissatisfaction with the quality of completed on around 2% of the projects surveyed in 2009 translates to dissatisfaction on completed work in the public sector to a value of around  $R3\frac{1}{2}$  billion per year!

The report then investigates the barriers to quality in construction, which include the traditional barriers within the design, procurement and construction processes. However, it is noted that corruption, political interference and institutional barriers are becoming increasingly more dominant in South Africa. It is then

postulated that the majority of those cases in which clients are dissatisfied with construction quality could probably be attributed largely to procurement related barriers (including fraud and corruption) in the appointment of contractors that were not capable of undertaking the necessary work. It is further postulated that the majority of those cases in which clients are neither satisfied nor dissatisfied (i.e. neutral) with construction quality could probably be attributed largely to design or construction related barriers, or attributable to barriers in the role of the client's agent in not ensuring quality.

The barriers to quality in designing for and specifying quality are then investigated, which highlights concerns that are being observed regarding a deteriorating capacity necessary to develop and maintain technical standards, codes and specifications, as well as a deteriorating design capability in South Africa. A review of international experience follows, which highlights the importance of adopting procurement methods that specifically provide for the selection of professional services for the appointment of design services based on quality criteria.

Barriers to quality arising through the process of procuring contractors are then investigated, namely that of matching a contractor's capabilities to the requirements of the project, as well as political interference, cronyism, and fraud and corruption. Specifically, it is noted that the cidb *Register of Contractors* and the NHBRC *Register of Homebuilders* do not provide a reliable indicator of a contractor's ability to deliver quality – and specifically for the lower Grade contractors. International practice suggests that an assessment of competencies, construction management systems, and previous performance should be used to prequalify contractors and/or to assess their potential to deliver quality – on which the cidb *Best Practice Contractor Recognition Scheme* has been based.

Specifically, this report has highlighted the use of procurement systems in the public sector based on price and preference only, and not taking into account functionality (or quality), as a barrier to construction quality. For example, 25% of provincial and local authority contracts awarded were not adjudicated on the basis of quality, and 13% of provincial and local authority contracts were not awarded in line with tender committee recommendations.

The report has also highlighted international trends aimed at enhancing construction quality and value for money by promoting procurement strategies and contract types that support the development of collaborative relationships between government clients and its suppliers, including the early appointment of integrated supply teams. The report also notes that in the UK, for example, that traditional, non-integrated procurement approaches should not be used unless it can be clearly shown that they offer best value for money – which means, in practice they will seldom be used.

Together with a lack of procurement capacity in client departments, a contributing factor to the focus on price and preference is insufficient information to be able to select professional services and/or contractors based on quality criteria – and it is seen that the cidb *Best Practice Contractor Recognition Scheme* together with cidb *Contractor Performance Reports* will contribute towards providing the necessary information.

Of specific concern in the report are indications that corruption is increasing rapidly in South Africa – and one such view is that South Africa is reaching a tipping point beyond which it may be very difficult to reverse corruption in the public sector. It is noted in the report that the cidb has aggressively dealt with corruption linked to the cidb Register of Contractors, and that the cidb investigates cases of fraudulent award of tenders that are reported to it. However, it is noted that the cidb has not adequately dealt with the broader issue of developing and implementing mechanisms to proactively prevent and/or identify corruption within construction procurement. Strong consideration should be given by the cidb to introducing requirements for integrity management and transparency in construction procurement.

Finally, the report investigates the key construction site related barriers to quality, namely process issues and skills and competence issues, as well as the effectiveness of the client's representative in ensuring compliance by the contractor with the client's quality specification.

The report highlights the various actions that are being developed by the cidb which are aimed at enhancing construction skills and construction quality, and recognises and acknowledges the initiatives being undertaken by the industry in addressing the skills shortages – particularly at the level of the skilled and semi-skilled workers.

The report also highlights local and international experience that suggests that greater attention also needs to be focused on the role of the client's agent in construction quality – for example using performance management systems similar to those advocated by the cidb for assessing the performance of contractors and design services.

In addition, this section has also presented a brief overview of the highly successful CONQUAS system developed by the BCA in Singapore, which is being used in Singapore as the basis for a construction quality bonus scheme, using merit and demerit points. The report notes that strong consideration should be given to introducing CONQUAS in South Africa – as a basis for 'absolute' measurements of construction quality.

Finally, the report notes that a consistent underlying theme to improving the quality of construction in South Africa is the 'management of quality' – which must permeate across all stakeholders in the construction delivery chain (as well as, in fact, the operation and maintenance of infrastructure). Key to this is the need for adequate exposure to quality management in the course content at all levels of schooling in the built environment, and the CBE therefore needs to assess and, where appropriate, strengthen the requirements for 'quality management' in the course content within built environment academic institutions.

The report concludes with specific recommendations that the cidb and other stakeholders could action to support enhanced construction quality in South Africa, namely:

- i) In addition to the existing NHBRC requirements, clients should be able to have the flexibility to specify requirements for procuring from cidb registered contractors in the residential building sector where appropriate.
- ii) The cidb should advocate for the maintenance of the necessary technical capacity for the development and maintenance of construction standards, codes and specifications including that at the SABS and the CSIR.
- iii) Strong consideration should be given by the cidb to introducing requirements for integrity and transparency in construction procurement.
- iv) Strong consideration should be given by the cidb to advocate for procurement and delivery models promoting collaborative relationships and integrated supply teams (including design and build contracting strategies).
- v) The cidb needs to continue to advocate for and to strengthen requirements for the appointment of professional services and contractors based on quality criteria supported by performance assessment reports for professional service providers and contractors.
- vi) The cidb should investigate the possible use of performance assessment reports for the client's agent in the public sector as a best practice.
- vii) The cidb must continue to advocate for a building and construction component to be incorporated into the South African World Skills activities and should actively seek to incorporate a construction skills component into the South African delegation.
- viii) Strong consideration should be given by the cidb to piloting and testing the Singapore BCA CONQUAS system in South Africa.
- ix) The CBE should assess and (where appropriate) strengthen the requirements for 'quality management' in the course content within built environment academic institutions.

### CONSTRUCTION QUALITY IN SOUTH AFRICA; A CLIENT PERSPECTIVE A DISCUSSION DOCUMENT

Exec	utive Summary	i
1	Background and Introduction	1
2	State of Construction Quality	3
2.1	Overview	3
2.2	The Residential Building Sector	4
2.3	Client Perceptions	6
2.4	International Trends	6
2.5	Summary	7
3	Barriers to Quality	8
3.1	Overview	8
3.2	A Case Study: Low Income Housing	9
3.3	Summary	11
4	Designing and Specifying Quality	12
4.1	Standards and Specifications	12
4.2	Designing for Quality	13
4.3	Procuring Design Quality	14
4.4	International Trends	15
4.5	Summary	18
5	Procuring Quality Construction	19
5.1	Matching Capabilities with Requirements	19
5.2	Bribery, Fraud and Corruption	23
5.3	International Trends	27
5.4	Summary	29
6	Constructing Quality	31
6.1	Process, Skills and Competence Factors	31
6.2	Quality and Small Contractors	34
6.3	Inspecting Quality	35
6.4	cidb Best Practice Project Recognition Scheme	36
6.5	International Trends	36
6.6	Summary	38
7.	Synthesis and Recommendations	40

#### 1 BACKGROUND AND INTRODUCTION

The cidb was established by an Act of Parliament (Act 38 of 2000), with a mandate (amongst others) to:

.... promote the contribution of the construction industry in meeting national construction demand and in advancing:

- *i) national, social and economic development objectives;*
- *ii) industry performance, efficiency and competitiveness; and*
- iii) improved value to clients.

Value to clients is a very complex and often subjective issue, but it is recognised that quality of construction is a key component of perceived value to clients. As noted by FIDIC<sup>1</sup>, "*lack of quality in construction is manifested in poor or non-sustainable workmanship, and unsafe structures, and in delays, cost overruns and disputes in construction contracts*". Value and quality of construction is of concern to both public and private sector clients.

As the public sector accounts for around 80% of all civil works and around 20% of residential and nonresidential building works, value and quality are particularly important to public sector clients. Furthermore, the public sector also has a role and responsibility towards the development and the transformation of the building and construction industry. This transformation, however, must be achieved within acceptable value and quality norms.

Against this background, the cidb has undertaken this study on the quality of construction in South Africa. This investigation is undertaken largely from a client perspective, and concludes by highlighting those actions that clients can implement to derive higher quality on their construction projects. The report investigates the factors impacting on construction quality through the value chain in creating new capital works, namely design, procurement and construction. (The impact of operation and maintenance on

construction quality is not discussed here, and reference to this can be found in various documents dealing with the National Infrastructure Maintenance Strategy (NIMS)<sup>2,3</sup>).



The report on construction quality draws on two key studies, namely the annual cidb *Construction Industry Indicators*<sup>4</sup> (CIIs) which contain a significant amount of information on construction quality, together with a research report on the state of construction quality commissioned for this study<sup>5</sup>. This later study included surveys of clients, designers and contractors.

This report concludes by focusing on recommendations that the cidb could implement in support of the need to enhance quality in construction, and provides an assessment of those actions which the cidb has already begun to implement.

An overview of the report is given below:

• Section 2 presents an overview of the state of construction quality in South Africa, from which it is shown that, overall, clients are satisfied with the quality of construction. However, it is argued that clients should not be complacent, and clients should strive to get better value for money.

<sup>1</sup> FIDIC. *Quality of Construction; Policy.* International Federation of Consulting Engineers, Geneva. http://www1.fidic.org 2 cidb. DPW & CSIR (2007). *The National Infrastructure Maintenance Strateav in Support of ASGISA and Government Growt*.

<sup>2</sup> cidb, DPW & CSIR (2007). The National Infrastructure Maintenance Strategy in Support of ASGISA and Government Growth Objectives. Construction Industry Development Board, Pretoria. http://www.cidb.org.za

<sup>3</sup> cidb & CSIR (2007). The State of Municipal Infrastructure and its Operation and Maintenance: An Overview. Construction Industry Development Board, Pretoria. http://www.cidb.org.za

<sup>4</sup> cidb (2010). *The cidb Construction Industry Indicators Summary Results: 2009*. Construction Industry Development Board, Pretoria. http://www.cidb.org.za

<sup>5</sup> CREATE (2010). *Status Report on Construction Quality in South Africa; Draft.* Construction Research Education and Training Enterprises, Port Elizabeth.

- Section 3 investigates the barriers to quality in construction, which include the traditional barriers within the design, procurement and construction processes but corruption, political interference and institutional barriers are becoming increasingly more dominant in South Africa. These barriers are investigated in more detail in the sections that follow.
- Section 4 investigates designing for and specifying quality, and highlights concerns that are being observed regarding a deteriorating capacity necessary to develop and maintain technical standards, codes and specifications, as well as a deteriorating design capability in South Africa. This section then reviews international experience, which highlights the importance of adopting procurement methods that specifically provide for the selection of professional services for the appointment of design services based on quality criteria.
- Section 5 investigates the barriers to quality arising through the process of procuring contractors, namely that of matching a contractor's capabilities to the requirements of the project, as well as political interference, cronyism, and fraud and corruption. The section concludes with a review of local and international mechanisms that enhance procuring construction quality including the cidb *Best Practice Contractor Recognition Scheme* that is currently under development and internationally used integrity and transparency systems aimed at reducing corruption.
- Section 6 investigates the key construction site related barriers to quality, namely process issues and skills and competence issues, as well as the effectiveness of the client's representative in ensuring compliance by the contractor with the client's quality specification. This section also reviews cidb and international initiatives to enhance construction quality.
- Section 7 presents a synthesis of the preceding sections on the barriers to construction quality, together with local and international initiatives to strengthen construction quality. This section also presents recommendations that clients could focus on to enhance construction quality, as well as actions that the cidb could adopt.

#### 2 STATE OF CONSTRUCTION QUALITY

Quality: The degree to which a set of inherent characteristics fulfils requirements. ISO 9000; 2000

#### 2.1 Overview

The cide *Construction Industry Indicators* (CIIs) have been captured annually since 2003, and contain a significant amount of information regarding construction quality, including<sup>6</sup>:

- client satisfaction with the quality of the completed construction work delivered;
- client satisfaction with the resolution of defective work during the construction period by the main contractor;
- the condition of the facility at the time of handover / practical completion with respect to defects; and
- client satisfaction with the overall quality of materials used.

The 2009 cidb *Construction Industry Indicators* drew on responses from 332 client departments and 1 169 contractors from across all nine provinces, and a summary of key quality related issues are given in the following figures:



From the above, it can be seen that, overall, clients are satisfied with the quality of the completed work being delivered. However, while the overall quality performance indicators for the industry are satisfactory, the following key issues were observed:

• clients were neutral or dissatisfied with the quality of completed work on around 20% of the projects surveyed;

<sup>6</sup> cidb (2009). *The cidb Construction Industry Indicators Summary Results: 2009*. Construction Industry Development Board. Pretoria. http://www.cidb.org.za

Client dissatisfaction with

the quality of completed on

surveyed in 2009 translates

completed work to a value in the public sector of around R3½ billion per

around 2% of the projects

to dissatisfaction on

- around 12% of the projects surveyed had levels of defects which are regarded as inappropriate;
- clients were neutral or dissatisfied with the resolution of defective work on around 23% of the projects surveyed; and
- clients were neutral or dissatisfied with the quality of materials used on around 11% of the projects surveyed.

#### 2.2 The Residential Building Sector

While, overall, clients are satisfied with the quality of work delivered by contractors, of significance is the breakdown in the quality of the completed constructions works by type given in the adjacent figure – from which it is seen that client dissatisfaction is highest in the residential building sector, followed by special works and non-residential building.

Similar results were obtained in a survey undertaken for this report on construction quality, which investigated the perceptions of a range of stakeholders and various construction sectors. Again, low- and middle-income residential construction was ranked the lowest in terms of



Satisfaction by Project Type

quality achieved (typically ranked poor to average), while the quality of upper-income residential, commercial, industrial and other infrastructure were ranked as average to good.

Scale: $1 = \text{very poor}; 3 = \text{average}; 5 = \text{very good}$									
		М	ean Sco	ore					
Sector	Clients	Designers	Project Managers	Contractors; Grades 2 to 4	Contractors Grades 5 to 9	Overall Mean	Rank		
Commercial	3.5	3.1	3.7	3.9	3.5	3.5	2		
Industrial	3.6	2.8	3.6	3.8	3.7	3.5	3		
Infrastructure	3.6	3.0	3.3	3.0	3.5	3.3	4		
Residential:									
Low-income	2.4	1.4	1.5	2.0	2.1	1.9	6		
Middle-income	3.3	2.4	2.8	3.0	2.8	2.9	5		
Upper-income	42	35	40	40	3.8	39	1		

Perceptions of the Quality of Construction per Sector

Of interest from the above survey is that contractors and clients typically rated quality as being higher than that rated by most other stakeholders.

The dissatisfaction with quality in the low-income residential housing sector is well publicised, as is illustrated by the following reports and investigations into subsidy-housing in the public sector:

 investigations and audits by the Department of Human Settlements have shown that it would cost South Africa R1,3-billion, or 10% of its 2009/10 year's budget, to rectify badly built Reconstruction and Development Programme (RDP) houses<sup>7,8</sup>;



http://blogs.dispatch.co.za/brokenhomes

<sup>7</sup> Engineering News (2009). Sexwale says he is ready to take tough action against fraudulent contractors. Christy van der Merwe. 2 November 2009. http:// www.engineeringnews.co.za

- a NHBRC forensic investigation estimated the rectification costs to be around R400 million to re-instate
- structural integrity and with NHBRC minimum technical requirements and the NBRs on around 41 000 houses investigated<sup>9</sup>;
- a report by the Department of Housing of the Province of the Eastern Cape (which is included in the NHBRC report above) noted that of around 20 000 houses assessed, the rectification costs were put at around R360 million<sup>10</sup>.

Although reports of poor quality appear to be dominant in the low-cost public housing sector, poor quality is also regularly observed in the private residential housing sector. For example, Brandon Abdinor, Director of KwaZulu's Masterbuilders Association, notes that:



Dispatch Online; http://blogs.dispatch.co.za/brokenhomes

It is unfortunate that complaints about builders generally, as well as personal accounts of unhappy relations with builders, are all too common. Clients of all types often recount stories of how their various building projects have been fraught with difficulty and have ultimately caused financial and emotional hardship. .....

The truth is that the industry, and the standards to which various participants operate, is extremely varied. On the one hand you have sustainable and successful enterprises, regardless of the magnitude of projects undertaken, which are skilled, professional and conduct themselves in such a manner which leads to satisfaction on the part of clients and agents alike. On the other hand there are innumerable unscrupulous, unskilled and opportunistic operators whose conduct is totally unacceptable.

It should however also be noted that while the cidb does not regulate the homebuilding sector, due to a regulatory constraint in which homebuilders are exempt from registering with the cidb, clients in fact do not have the flexibility to specify a requirement for using cidb registered contractors in addition to the existing NHBRC requirements – which could enhance the procurement of contractors that are most suitable for requirements of the job. This constraint is particularly important when considering the potential benefits of the cidb *Best Practice Contractor Recognition Scheme* being

Clients in the residential building sector (including the subsidy housing sector) are presently effectively excluded from deriving any benefits from the cidb Register of Contractors.

developed (see Section 5.1 to follow). Strong consideration should therefore be given to removing this constraint.

<sup>8</sup> Engineering News (2010). *Fight against housing corruption begins to gain traction with over 900 arrests.* Dennis Ndaba. 16 April 2010. http://www.engineeringnews.co.za

<sup>9</sup> NHBRC (2008). NHBRC Report to Confirm the Progress Made in Terms of Forensic Projects that were Undertaken and to Confirm the Estimated Rectification Costs on these Projects; Confidential report. http://blogs.dispatch.co.za/brokenhomes/wpcontent/themes/Ghosttown/images/NHBRC Forensic Audit.pdf

<sup>10</sup> EC Housing (2009). *Rectification and Enrolment Progress Report as at end June 2009*. Province of the Eastern Cape; Housing. http://blogs.dispatch.co.za/brokenhomes/wp-content/themes/Ghosttown/images/Rectification and Enrolment progress report.pdf

#### 2.3 Client Perceptions

While clear conclusions and trends can be drawn from the cidb *Construction Industry Indicators* (Section 2.1), these results however also point to the need for further research to explain some trends and observations that are counter intuitive. One such specific issue that needs further investigation is the trend of increasing client dissatisfaction with increasing project size, which could be interpreted as:

 larger projects are typically more complex, require multi-disciplinary inputs, non-integrative, more time consuming, etc., and hence there could be a bigger likelihood of non-compliance with quality requirements; or



Influence of Project Size

• clients involved in small projects are less discerning than clients with larger projects.

Similarly, a further issue of concern is the aggregated client satisfaction in the public and private sectors – and specifically that the private sector appears to be far less satisfied with the quality of work delivered than the public sector does. This could be interpreted as either:

- the quality of work delivered to private sector clients is less than that delivered to public sector clients; or
- public sector clients are less discerning than private sector clients.



#### 2.4 International Trends

The issue of raising construction quality has received attention world-wide – and was integral to the *Rethinking Construction* initiative in the UK that flowed from the Egan Report "on the scope for improving the quality and efficiency of UK construction". Specifically, the Egan Report notes that<sup>11</sup>:

Under-achievement can also be found in the growing dissatisfaction with construction among both private and public sector clients. Projects are widely seen as unpredictable in terms of delivery on time, within budget and to the standards of quality expected.

Similarly, enhancing construction quality has also been at the core of various initiatives in Singapore (see Section 6.5), Hong Kong<sup>12</sup>, Malaysia, and other countries.

Along similar lines, the International Federation of Consulting Engineers (FIDIC) notes that<sup>13</sup>:

The survey on Quality of Construction by FIDIC within Member Associations in 2001 confirmed that failure to achieve appropriate Quality of Construction is a problem worldwide. The pressure to reduce the initial costs of construction and supervision were found to have had an adverse effect on quality, as could be



<sup>11</sup> Egan (1998). Rethinking Construction; The Report of the Construction Task Force to the Deputy Prime Minister, John Prescott, on the Scope for Improving the Quality and Efficiency of UK Construction. Department of the Environment, Transport and the Regions, London. http://www.construction.detr.gov.uk/cis/rethink/index.htm

<sup>12</sup> Coffey, V (1999). Constructing Quality: the Hong Kong Housing Department Journey. Proceedings of the 4th ICIT Conference: TQM and Innovation, 7–9 April 1999, School of Business, Hong Kong Baptist University, Hong Kong.

<sup>13</sup> FIDIC. *Quality of Construction; Policy.* International Federation of Consulting Engineers, Geneva. http://www1.fidic.org/about/statement20.asp

predicted. The problem is serious and is evident in both developed and developing countries. ... Lack of quality in construction is manifested in poor or non-sustainable workmanship, and unsafe structures, and in delays, cost overruns and disputes in construction contracts.

In response to the need for improving quality, FIDIC established a Quality of Construction Task Force, which has resulted in a range of quality management guides.

#### 2.5 Summary

This section has shown that, overall, clients are satisfied with the quality of construction in South Africa, but that the quality of construction does vary between projects and between contractors. Specifically, surveys have shown that clients are neutral or dissatisfied with the quality of construction on around 20% of all projects, and around 12% of the projects surveyed had levels of defects which are regarded as inappropriate.

Clients, and in particular public sector clients, should however not be complacent with not being satisfied with the quality of construction on 20% of their projects, nor should clients be complacent with around 12% of projects having levels of defects which are regarded as inappropriate. Rather, clients should strive for better value and higher quality construction.

Surveys, and media reports, also show that poor quality of construction is most prevalent in the residential building sector, in both the public and the private residential building sectors – which is not regulated by the cidb. In fact, due to a regulatory constraint in which homebuilders are exempt from registering with the cidb, clients do not have the flexibility to specify a requirement for using cidb registered contractors (in addition to the existing

Clients in the residential building sector (including the subsidy housing sector) should have the flexibility to procure from cidb registered contractors.

NHBRC requirements). It is therefore recommended that clients should be able to have the flexibility to make it a requirement to use cidb registered contractors in the residential building sector in addition to the existing NHBRC requirements.

(Note that this will require a change to the cidb regulations, which currently states that "Any contractor who is registered as a homebuilder in terms of section 10 of the Housing Consumer Protection Measures Act ..... is <u>exempt</u> from registration in terms of these Regulations for the purpose of construction works in relation to the provision of a home as contemplated in those Regulations." Rather, the regulations should place emphasis on that it is not mandatory for clients to appoint cidb registered contractors for homebuilding, but can specify requirements for procuring from cidb registered contractors where appropriate.)

A somewhat unexplained finding, however, is that these surveys also show that private sector clients are less satisfied with the quality of construction than public sector clients. A likely explanation for this is that public sector clients are less discerning than private sector clients.

Evidence suggests that public sector clients are less discerning than private sector clients.

Poor quality of construction is however not unique to South Africa, and the trends observed in South Africa are probably comparable with that observed in many developed and the newly industrialised countries. Specifically, the International Federation of Consulting Engineers (FIDIC) notes that:

.... failure to achieve appropriate Quality of Construction is a problem worldwide. ..... The problem is serious and is evident in both developed and developing countries.

#### 3 BARRIERS TO QUALITY

#### 3.1 Overview

Several studies into the barriers to the achievement of construction quality have been undertaken in South Africa over the past 20 years or so. Although these studies are all not directly comparable, many commonalities have been observed – but new barriers to construction quality have also begun to be observed in recent years.

Various studies undertaken in 1989<sup>14</sup>, 1998<sup>15</sup> and in 2000<sup>16</sup> conducted among architectural practices and/or general contractors consistently identified construction and procurement related barriers as the dominant barriers to the achievement of quality, often together with design related factors as barriers, such as:

- design related factors: inadequate details and inadequate specifications, and poor design coordination;
- procurement related factors: including emphasis on time and budget, shortened project periods, lack of prequalification, competitive tendering and awarding of contracts primarily on price; and
- construction related factors: including skills shortages and insufficient workforce training, lack of management commitment, lack of strict quality control.

However, more recently, in addition to these predominantly construction and procurement related factors, corruption is being identified as one of the major barriers to achieving construction quality in South Africa. This is illustrated in the key factors summarised below, obtained from a survey of clients, designers, project managers, Grade 2 to 4 contractors and Grade 5 to 9 contractors that was undertaken for the present study.

Corruption is currently identified as one of the major barriers to achieving construction quality in South Africa.

#### Stakeholder Perceptions of Barriers to Construction Quality

	Scale:	1 = minor; 3 =	average; $5 =$	major influence
--	--------	----------------	----------------	-----------------

		Mean Score					
Interventions / Situations	Clients	Designers	Project Managers	Contractors; Grades 2 to 4	Contractors; Grades 5 to 9	Overall Mean	Rank
Poor site management (planning, organising, leading, controlling, and coordinating)	4.4	4.6	4.3	4.7	4.0	4.4	1
Lack of contractor quality expertise	4.6	4.6	4.2		4.2	4.4	2
Corruption	3.7	4.1	4.5	4.9	4.2	4.3	3
Inadequate resourcing by contractors	4.0	4.1	4.3		4.1	4.1	4
Lack of understanding of quality	4.0	4.4	3.8	4.6	3.7	4.1	5
Level of subcontracting	4.0	3.9	4.2	4.6	3.7	4.1	6
Inadequate information	3.6	4.0	4.3	4.5	4.0	4.1	7
Detail	3.8	4.4	4.3		3.7	4.1	8
Focus on cost by contractors	4.3	4.1	3.8	3.8	4.1	4.0	9
Poor constructability	3.8	4.2	4.2		3.8	4.0	10

<sup>14</sup> Alman, M (1989). Barriers to Quality in the South African Building Industry. MBA research paper, The Graduate School of Business, University of Cape Town.

<sup>15</sup> Smallwood, J.J. and Rwelamila, P.D. (1998) The Need for thelimplementation of Quality Management Systems in South African Construction. Proceedings of the CIB World Building Congress, Symposium D: Managing for Sustainability – Endurance Through Change, Gavle, Sweden, 2225-2234.

<sup>16</sup> Smallwood, J.J. (2000). A Study of the Relationship Between Occupational H&S, Labour Productivity and Quality in the South African Construction Industry. Unpublished PhD Thesis. Department of Construction Management, University of Port Elizabeth, Port Elizabeth.

Furthermore, although not specifically identified in studies referred to previously or in the survey undertaken for the present study, as shown in Section 4.4 to follow, the procurement model itself has a significant impact on construction quality. Specifically, the studies drawn on in this section refer largely to the classical "design by employer" procurement approach – whereas internationally (as well as increasingly so in South Africa) it is recognised that procurement and delivery models that favour an integrated design and construction approach on complex projects are more appropriate to deliver enhanced quality.

#### 3.2 A Case Study: Low Income Housing

The barriers to quality are examined further here through a case study involving low cost housing – which illustrates the barriers highlighted previously, but also introduces the impact of institutional barriers to construction quality. The case study used was undertaken by the Public Service Accountability Monitor (PSAM) of Rhodes University<sup>17</sup>, which investigated the key challenges that have an impact on the structural quality of state-subsidised housing in 2007, drawing on the Ngqushwa Local Municipality as a case study.

The most common complaint obtained regarding the quality of the state-subsidised housing at the Ngqushwa Local Municipality was that when it rained, water would come in through the roof, along the bottom and top edges of the walls and around the doors. Beneficiaries said that they routinely needed to move all their furniture and possessions to the centre of the house when it rained to avoid water-damage.

Key structural quality defects which gave rise to these defects included:

- Roofs were not always firmly secured to the walls and/or trusses, causing them to rattle, or even blow off, when windy. Beneficiaries had taken to placing stones and tyres on roofs to prevent this.
- Doors did not fit securely into their frames and beneficiaries usually had to stuff material or newspaper along the frames, especially at the bottom, to stem the water that comes in when it rains.
- Cracks in the walls developed soon after beneficiaries moved in, particularly around the windows, doors and corners.
- Foundations were often cracking where they met the top structure. In addition, some top structures did not gliga and
- proof course appears to have been laid incorrectly in a number of homes inspected with some beneficiaries complaining of rising damp.

When the beneficiaries were asked by PSAM in this case study if they had complained to the municipality or Department, most beneficiaries said no, adding that there was no point because officials seldom came to inspect the houses when other people had complained. Those who indicated that they had complained said that even when officials did come to look at the house, they never came back to tell beneficiaries if anything would be done about the poor quality of their homes.

One beneficiary said that some officials from the municipality came in 2005 and promised to renovate her house, but they had never returned. This particular beneficiary had a number of problems with her home, including numerous cracks on the



Source: Public Service Accountability Monitor; Rhodes University

structure. In addition, some top structures did not align and square off with the foundations. The damp



Source: Public Service Accountability Monitor; Rhodes University

<sup>17</sup> de Nobrega, C (2007). *The Challenge of Delivering Quality Housing in the Eastern Cape*. Grahamstown: Public Service Accountability Monitor (PSAM), Rhodes University, Grahamestown.

inside and outside, water damage to the walls and floor, no handles on windows so they could not be opened and a rusting doorframe which had warped, leaving her door unable to close properly. Another beneficiary said that municipal officials had visited her house in 2006 and promised to come back – but by the time of writing the PSAM report in 2007, the beneficiary had not yet heard anything from them.

The quality of housing that the PSAM saw in this case study raised questions about why some houses are of such a poor quality, where the breakdown in the delivery process occurred and how service delivery in this regard can be improved. The PSAM report then identified the key challenges and the reasons for the poor quality housing, which are summarised below:

i) Weak capacity at provincial and local levels was consistently noted as a contributing factor to quality concerns, including a lack of control and monitoring of standards in respect of housing projects due to the limited number of project managers and technical staff.

"Given the current severe capacity constraints in the municipality (with only person in the housing unit and one building inspector), the Department's already strained human resources are likely to be stretched even more, even with the assistance of Thubelisha, which has been commissioned to manage the completion of these projects."

 ii) Emerging contractors: The PSAM report also highlighted that the Municipalitie's policy (in the terminology used in the report) "of using emerging contractors rather than established contractors" was repeatedly mentioned as a problem by the officials. The general consensus was that "political interference", as one official termed it, has compromised the quality of state subsidised housing.

"..... sometimes such contractors cannot be contacted by the developer to arrange and confirm payment or discuss the progress of the projects because they do not have a reliable method of communication. In addition, emerging contractors often experience cash flow constraints. Because of weak capacity on the part of developers, payment is frequently delayed and emerging contractors usually lack the financial capability to continue construction until payment blockages are resolved at the local or provincial level. Emerging contractors also tend to produce the final product more slowly, because of a lack of skills and experience, resulting in delayed completion of projects. In addition, the lack of skills sometimes results in an inferior product."

iii) Building 40m<sup>2</sup> with a 30m<sup>2</sup> budget: The PSAM report notes that prior to the revision of the Housing Code, the national norm for top structures of state subsidised housing was a gross floor area of at least 30m<sup>2</sup>. The Eastern Cape increased the minimum floor area to 40m<sup>2</sup>, but still required that contractors complete the house to a budget applicable to a 30m<sup>2</sup> house.

In the case of "emerging contractors", this underfunding resulted in a cutting into their profits, so they tend to cut corners instead. In the case of "established contractors", this underfunding caused the established contractors to pull out of the low-cost housing sector, forcing government to continue using emerging contractors that were prepared to work under such cost pressures.

"We've gone too long providing 40m<sup>2</sup> from a 30m<sup>2</sup> budget and that has proved to be our biggest ... blunder, because I'm sure that the money we are going to use to go back and fix those houses, it's even much higher than that 10m<sup>2</sup>. We could have just provided that 10m<sup>2</sup> money and I'm sure we would be paying a lesser price today in terms of the rectification amounts that we're going to require."

iv) **Department structure and monitoring systems**: Prior to 2006, the absence of a Chief Directorate dedicated to monitoring the technical aspects of housing delivery, combined with the lack of a monitoring system, impacted negatively on the quality of housing. Officials also cited the lack of a Department dedicated to housing as being problematic and hampering their performance.

"..... in the absence of a Chief Directorate for ... project management and quality assurance, there has been an uncoordinated quality assurance management. You find that you tended to manage the quality that you can see – even our systems were not there – coverage couldn't give us the effectiveness of picking up these things as we would have liked but we have since improved by implementing systems that actually make us ... go to each and every house that we have built in the province in terms of quality.

#### 3.3 Summary

This section has first examined the barriers to attaining quality, drawing largely on surveys undertaken over the past 20 years or so. The dominant barriers identified were:

- design related: largely intricate and impractical details, poor design coordination and unrealistic specifications;
- procurement related: largely a lack of contractor prequalification, pressure due to shortened project periods, but also:
  - fraud and corruption, or "political interference" (including cronyism and nepotism); as well as
  - institutional barriers (such as inadequate procurement and/or monitoring capacity);
  - the procurement and delivery model (such as the "design by employer" model) on complex projects; and
- construction related: largely an inability of the contractor to deliver the required quality.

Drawing on the cidb *Construction Industry Indicator* survey results which show that clients are neutral or dissatisfied with the construction quality on around 20% of projects surveyed, it is postulated that the majority of those cases in which clients are dissatisfied with construction quality could probably be attributed largely to procurement related barriers in the appointment of contractors that were not capable of undertaking the necessary work.

It is further postulated that the majority of those cases in which clients are neither satisfied nor dissatisfied (i.e. **neutral**) with construction quality could probably be attributed largely to design or construction related barriers, or attributable to barriers in the role of the client's agent in not ensuring quality.



Client Satisfaction with Quality of Construction

#### 4 DESIGNING AND SPECIFYING QUALITY

The ISO 9000 definition of quality is "the degree to which a set of inherent characteristics fulfils requirements". In construction related activities, a client's requirements are

usually translated into a series of specifications that the builder or contractor undertakes to construct through a planning, briefing and design process. Appropriate specifications and compliance with the specification are therefore a key measure of construction quality.

In line with the above, it is useful to note that FIDIC defines quality as<sup>18</sup>:

..... that Quality, which meets or exceeds the requirements of the Employer, as specified in the contract documents, whilst complying with law, codes, standards and regulatory policy, which apply to the contract.

The design and specification component as a barrier to the attainment of construction quality has already been introduced in Section 3.1, and is examined further in the following sections.

#### 4.1 Standards and Specifications

South Africa has a well developed, but outdated, set of technical standards that can be used to describe the standards of materials and workmanship for construction works. These include a range of South African National Standards (SANS) and ISO standards, such as:

- the SANS 1200 and 2001 series of Construction Standards;
- the SANS 1921 series of construction and management requirements for works contracts;
- the SANS 10155 code of practice for accuracy in buildings; as well as
- numerous standards relating to products and processes, such as:
- SANS 10107 for the installation of ceramic tiles;
  - SANS 10070 for the installation of plastic flooring;
  - etc.

The SANS and ISO standards are managed by the South African Bureau of Standards (SABS), and the SANS standards have largely been developed by industry task teams which have included, largely, the CSIR, and volunteer support from the learned societies (including the South African Institution of Civil Engineering, SAICE), and trade associations. However, the capabilities of the SABS, the CSIR and these industry

associations to support the development of standards and specifications are under strain, and volunteer support has decreased significantly. It is therefore important that this formal capability for the development and maintenance of technical standards and specifications is retained and strengthened for the future.

It is important that the capabilities of organisations such as the SABS, the CSIR and industry bodies for developing standards and specifications are maintained.

Various other technical standards and specifications also exist, including:

- in-house client standards and specifications, such as SANRAL, NHBRC, ACSA, and various government departments; and
- those of product manufacturers and associations.

Again, it is important that the in-house specification capability within these organisations is retained.



<sup>18</sup> FIDIC (2004). Improving the Quality of Construction: A Guide for Actions. International Federation of Consulting Engineers, Geneva. http://www.fidic.org

#### A Case Study; Research at the CSIR in Support of Codes, Standards and Specifications

The CSIR has a long history of supporting the development of codes, standards and specifications for the construction industry, and were instrumental in supporting the development of the structural concrete, masonry, loading and other codes, as well as many materials specifications. In addition the CSIR has been instrumental in supporting a range of standards and specifications supporting the roads industry. However, other than the capacity to support the development of codes, standards and specifications in the roads and transportation sector, this capacity has all but been lost since the 1990's – due to changing research priorities and changes in funding streams for R&D, including the withdrawal of funding of R&D programmes by several national government departments<sup>19</sup>.

Some of this capacity has since been rebuilt at some Universities in South Africa, but overall, this capacity to support the development of codes, standards and specifications in South Africa is severely strained.

However, while South Africa has a well developed set of technical standards that can be used to describe the standards of materials and workmanship for construction works, some materials are often not supplied to these standards, and in many cases this is very difficult to detect. Furthermore, there is an increasing trend of overseas sub-standard products entering the South African market.

#### 4.2 Designing for Quality

Notwithstanding that adequate reference can be made to quality standards for materials and workmanship, adequate quality requires that such standards for materials and workmanship are translated into design specifications, and appropriately implemented – including through construction specifications.

One measure of the impact of design specifications on quality is shown in the following figures, in which the satisfaction of contractors with client documentation is shown – which have been obtained from the 2009 cidb *Construction Industry Indicators*. Overall, contractors were neutral or dissatisfied with the quality of the client's documentation on 26% of the projects surveyed, which is a reflection of the contractor's dissatisfaction with the design specifications.







Contractor Satisfaction with Client Documentation; Satisfaction by Client Sector

Furthermore, the increasing dissatisfaction of contractors with contract documentation and with increasing project size is clearly seen from above, which (again) is likely to be due to the increasing complexity with increasing project size. In fact, on projects of R100m and larger, contractors were neutral or dissatisfied with the quality of client documentation on 44% of the projects surveyed!

On projects of R100m and larger, contractors were neutral or dissatisfied with the quality of the client's documentation on 44% of the projects surveyed.

In addition, the results suggest that the quality of the client documentation is marginally better from private sector clients than public sector clients.

<sup>19</sup> Milford, R V, Rust, C and Qhobela, M (2001). Innovation in Construction: An International Review of Public Policies, Chapter 16; South African Public Policy Instruments Affecting Innovation in Construction. Edited by André Manseau & George Seadon. Spon Press, 2001.

The perceptions of project managers and Grade 5 to 9 contractors as to design related barriers to quality are given in the following table, in which the barriers have been rated on a 5 point scale. Specifically, inadequate information, construction details, poor constructability and inadequate specifications are seen to be rated as having a significant influence on poor quality.

	Mea	n Score	Quarall				
Interventions / Situations	Project	Contractors;	Magn	Rank			
	Managers Grades 5 to 9		meun				
Inadequate information	4.3	4.0	4.2	1			
Detail	4.3	3.7	4.0	2			
Poor constructability	4.2	3.8	4.0	3			
Specification	4.0	3.8	3.9	4			
Focus on time by clients	3.8	3.8	3.8	5			
Lack of designer quality expertise	3.8	3.8	3.8	6			
Focus on cost by clients	3.5	3.8	3.7	7			
Design	3.8	3.4	3.6	8			
Variations	3.7	3.4	3.5	9			
Contract documentation	3.3	3.4	3.4	10			

#### Influence of Design Related Factors as Barriers to Construction Quality

Scale: 1 = minor: 3 = average: 5 = major influence

Similarly, construction details, appropriate specifications appropriate design and contract documentation have all been identified by project managers and contractors as factors that could result in a significant influence on improving construction quality.

### Influence of Design Related Factors as Improvements to Construction Quality

Scale: 1 – minor; 5 – average; 5 – major initience									
	Quarall								
	Project Managers	Contractors; Grades 2 to 4	Contractors; Grades 5 to 9	Mean	Rank				
Details (Appropriate)	3.7	4.3	4.2	4.0	1				
Specification (Appropriate)	3.8	4.1	4.2	4.0	2				
Design (Appropriate)	3.7	4.0	4.1	3.9	3				
Contract documentation	3.3	4.1	3.8	3.7	4				

The impact of poor quality documentation on construction quality, and the potential for client documentation to support improvements in construction quality is clear from the above. However, because of skills shortages and lack of capacity in certain sectors, concerns are increasingly being raised that the quality of client documentation could deteriorate further in the future.

Concerns are increasingly being raised that the quality of client documentation could deteriorate further in the future.

#### 4.3 Procuring Design Quality

The cide *Standard for Uniformity in Construction Procurement* (SFU)<sup>20</sup> establishes minimum requirements within the public sector that:

- promote cost efficiencies through the adoption of a uniform structure for procurement documents, standard component documents and generic solicitation procedures;
- provide transparent, fair and equitable procurement methods and procedures in critical areas in the solicitation process;
- ensure that the forms of contract that are used are fair and equitable for all the parties to a contract; and
- enable risk, responsibilities and obligations to be clearly identified.

<sup>20</sup> cidb (2010). Standard for Uniformity in Construction Procurement; Board Notice 86 of 2010. Construction Industry Development Board, Pretoria. http://www.cidb.org.za

The SFU provides specifically for the selection of professional services for the appointment of design services based on quality criteria, and further guidance on the application of the SFU in the appointment of professional services is given in cidb Practice Note 9 *Evaluation of Quality in Tender Submissions*<sup>21</sup>.

However, the application of the recommended procurement methods for the selection of professional services for the appointment of design services based on quality criteria is not always applied appropriately due to, for example:

- lack of capacity and capability amongst clients, and in particular public sector clients;
- inadequate information in assessing, or a lack of consistency in applying, quality criteria in relation to the appointment of consultants; and
- political interference in the appointment of consultants.

One of the mechanisms currently being considered by the cidb in support of providing consistent information to evaluate quality criteria of consultants is the introduction of consultant performance reports (see Section 4.4 to follow) as part of possible a cidb *Register of Professional Services Providers*.

(The capacity and capability of clients to appropriately procure professional services as well as political interference in the appointment of professional services is not discussed in this section, but analogues can be drawn with the appropriate appointment of contractors in Section 5.2 to follow.)

#### 4.4 International Trends

Internationally, many of the trends observed here of a well developed set of technical standards (but possibly a decreasing capacity to maintain these standards), conformity of materials to these standards and the impact of design on quality in South Africa is similar to those being observed in most developed economies. Developing countries, on the other hand, are often characterised by weak technical standards, lack of conformity of materials to standards, and weak design capabilities – all contributing to lower construction quality.

#### i) Design Quality

Of importance to note is the 1998 *Rethinking Construction* report on the scope for improving the quality and efficiency of UK construction specifically identified the need for improving construction quality through design.

Quality must be fundamental to the design process. Defects need to be designed out before work starts.

The central message of *Rethinking Construction* was that the construction industry's main clients must take the view that the construction industry does

not deliver consistent quality and value for money. Too often the performance of the industry is unreliable, projects run neither to time nor budget and too much effort and resource is invested in making good defects, premature repair and replacement and in litigation.

One of the key messages developed in *Rethinking Construction* is that of "Design for Construction in Use" – specifically that "suppliers and contractors have to be fully involved in the design. Quality must be fundamental to the design process. Defects need to be designed out before work starts."

# DISCUSSION DOCUMENT

The appointment of design services based on quality criteria is often constrained by a lack of capacity amongst clients; inadequate information in assessing quality criteria; and political interference.



<sup>21</sup> cidb (2007). Practice Note 9: Evaluation of Quality in Tender Submission (Version 1, November 2007). Construction Industry Development Board, Pretoria. http://www.cidb.org.za

16

### **DISCUSSION DOCUMENT**

Various initiatives were developed in the UK in response to the theme and messages of improving construction quality through design within the *Rethinking Construction* report. These initiatives include the Achieving Excellence in Construction (AEC) initiative of UK Office of Government Commerce (OGC), the establishment of the UK *Better Public Building* initiative, the *Commission for Architecture and the Build Environment* (CABE) and the development of *Design Quality Indicators* (DQIs).

The OGC's Achieving Excellence in Construction initiative was introduced in March 1999 by the Chief Secretary to the Treasury to improve the performance of Government as a client of the construction industry. The AEC was launched as a three-year initiative and its key aspects include:

- partnering;
- the development of long-term relationships;
- reduction of financial and decision-making approval chains;
- improved skills development and empowerment;
- the adoption of performance measurement indicators; and
- the use of tools for value and risk management and whole life costing.

Specifically, building on the *Rethinking Construction* theme that "*suppliers and contractors have to be fully involved in the design*" the OGC has mandated minimum construction procurement standards, which has mandated that<sup>22</sup>:

- procurement strategies and contract types must support the development of collaborative relationships between the government client and its suppliers and shall facilitate the early appointment of integrated supply teams (each part of which should incorporate an integrated supply chain); and that
- traditional, non-integrated procurement approaches should not be used unless it can be clearly shown that they offer best value for money (this means, in practice they will seldom be used).

The UK *Better Public Building* initiative was initially launched in the UK in 2000, when the then Prime Minister demanded *"a step change in the quality of new public buildings in Britain"*. The *Better Public Building* initiative aimed to ensure that high standards of design, construction, delivery and performance are being widely achieved in public buildings and infrastructure projects. The initiative is currently being resourced and driven by CABE, and supported by initiatives within the OGC.

CABE is the UK government's advisor on architecture, urban design and public space,

and its aim is to influence and inspire the people making decisions about the built environment. CABE champions well-designed buildings, spaces and places, runs public campaigns and provides expert, practical advice, and works directly with architects, planners, designers and clients. The DQIs are promoted extensively by CABE for achieving better design.

The DQI applies a structured approach to assess design quality in terms of<sup>23, 24</sup>:

- functionality: the arrangement, quality and interrelationship of spaces and how the building is designed to be useful to all;
- build quality: the engineering performance of the building, which includes structural stability and the integration, safety and robustness of the systems, finishes and fittings; and
- impact: the building's ability to create a sense of place and have a positive effect on the local community and environment.

COO

procurement approaches should not be used for UK construction procurement.

Traditional, non-integrated



quality.

<sup>22</sup> OGC (2010). Common Minimum Standards for the Procurement of Built Environments in the Public Sector. Office of Government Commerce, UK, London. http://www.ogc.gov.uk/documents/Common\_Minimum\_Standards\_PDF.pdf

<sup>23</sup> Gann et al. (2003). Design Quality Indicator as a Tool for Thinking. Building Research and Information, London: Spon Press

<sup>24</sup> Wikipedia. *Design Quality Indicator*. http://en.wikipedia.org/wiki/Design\_Quality\_Indicator

DQI is completed by a range of stakeholders in the briefing and design stages of a building project, or on a completed building. Stakeholders who participate include<sup>25</sup>:

- building users (or potential users);
- building clients;
- facilities managers (or future facilities managers);
- architects;
- structural and building services engineers;
- quantity surveyors; and
- project managers

DQI is applied in a facilitated workshop that is led by a certified DQI facilitator.

The DQIs are endorsed by, and recommended for use, in the UK Office of Government Commerce (OGC) *Achieving Excellence in Construction Procurement Guide*<sup>26</sup>, and in the OGC *Gateway Process*.

The DQI is available on-line in both the UK and the USA.

#### *ii) Procurement of Design Services*

The recognition that quality must be fundamental to the design process is incorporated into most internationally accepted procurement models for the appointment of design services. For example FIDIC

stresses the pre-eminence of quality in the selection process, and recommends the *Quality Based Selection* (QBS) method as the preferred selection method for consultancy services, particularly for nationally funded projects where the competition is between national consulting firms of more or less similar characteristics<sup>27</sup>. FIDIC also recognizes the QBS method as the only method for those projects where there is a multiplier effect, or significant complexity or significant potential damage if the project fails.

In line with the above, an important client driven approach to the performance of consulting services is the *Consultant Performance Reporting and Exchange of Reports between Government Agencies* in New South Wales, Australia<sup>28</sup>.

The guidelines for *Consultant Performance Reporting* were developed by the Construction Policy Steering Committee (CPSC) and arose from the identified need to enhance the level of quality management in the industry. Arising from this, *Consultant Performance Reporting* was developed and introduced in NSW Australia to obtain a measure of a consultant's performance under the terms of its agreement with an agency, namely:

- to help both the agency and the consultant to reach a common understanding of the expectations of both parties about the work;
- to identify areas where the consultant is excelling and any areas that need improvement.

Quality management and systems are one of several standard criteria against which consultants are assessed within the performance reports.







<sup>25</sup> ibid

<sup>26</sup> OGC (2007). Achieving Excellence in Construction Procurement Guide; Design Quality. UK Office of Government Commerce, London. http://www.ogc..gov.uk

<sup>27</sup> FIDIC (2006). Quality Based Selection for the Procurement and Consulting Services. International Federation of National Associations of Independent Consulting Engineers. Geneva. http://www.fidic.org

<sup>28</sup> DPWS (2000). Consultant Performance Reporting and Exchange of Reports Between Government Agencies; Guidelines. NSW Department of Public Works and Services, New South Wales. http://www.nswprocurement.com.au

These performance reports are used by infrastructure agencies in NSW in the assessment of a consultant for future engagements (registration, pre-qualification, expressions of interest or approving a consultant engagement). Reports indicating unsatisfactory performance may also support the termination of a consultancy engagement.

### 4.5 Summary

The previous sections firstly highlighted two potential areas of concern impacting on construction quality in South Africa, namely:

- indications of a deteriorating capacity necessary to develop and maintain technical standards, codes and specifications; and
- the quality of client documentation on larger projects in particular appears to be negatively impacting on construction quality and concerns are being raised that the quality of client documentation could deteriorate further in the future.

The previous sections then expanded on the quality of design and of documentation on construction quality, by drawing on international experience that highlights that quality must be recognised as being fundamental to the design process, and that quality is therefore influenced by the procurement of the appropriate design team. Internationally and in South Africa, preferred procurement methods are recommended that specifically provide for the selection of professional services for the appointment of design services based on quality criteria.

However, it is noted that the application of the recommended procurement methods for the selection of professional services for the appointment of design services based on quality criteria in South Africa is not always applied appropriately due to, for example:

- lack of capacity amongst clients, and in particular public sector clients;
- inadequate information in assessing, or a lack of consistency in applying, quality criteria in relation to the appointment of consultants; and
- political interference in the appointment of consultants.

The challenge therefore lies in the procurement of professional design services appropriate to the needs and demands of the particular project on hand – and international experience suggests that consultant performance reports are a useful instrument to support this.

Internationally, government and non-government advocacy and advisory initiatives and programmes promoting design quality have been established, which have played a very important role in promoting and enhancing design quality. Tools have also been developed and promoted to assess design quality, which have been incorporated into these design quality initiatives, programmes, and processes.

Specifically, in support of enhanced quality, the OGC in the UK has mandated minimum construction procurement standards, which has mandated that procurement strategies and contract types must support the development of collaborative relationships between the government client and its suppliers and shall facilitate the early appointment of integrated supply teams.

#### 5 PROCURING QUALITY CONSTRUCTION

Procurement processes, together with the actual process of construction, have the largest impact on construction quality. Specifically, the key factors within the procurement process that influence construction quality are:



- the ability to match a contractor's capabilities to the requirements of the project; and
- political interference, cronyism, and fraud and corruption.

These barriers to construction quality are discussed in the following sections.

#### 5.1 Matching Capabilities with Requirements

Matching a contractor's capabilities to the requirements of the project depends largely on:

- the ability to recognise a contractor's capabilities; and
- a procurement system that provides for the recognition of a contractor's capabilities.

These factors are discussed in more detail in the following sections.

#### i) cidb Register of Contractors

The cidb Act requires that the Board must:

.... establish a national register of contractors, which categorises contractors in a manner that facilitates public sector procurement and promotes contractor development.

The aim of the cide *Register of Contractors* is to facilitate public sector procurement, and it is mandatory that only cide registered contractors be used for public sector procurement (other than for home building).

Registration of contractors is based on financial capability and on the size of projects completed, and until recently included a requirement for a registered professional person to be in the employ of the contractor for certain Grades. These requirements however do not necessarily give an indication of the capability of the contractor to meet the client's requirements of "on brief, on budget and on time", and the client is still required to follow their own risk management processes. Guidance on evaluating the capability of a contractor to meet the requirements of a tender are given in cidb Practice Notes<sup>29, 30</sup>.



The degree to which "ineffective contractor registration" is seen to negatively affect  $\square$ 

quality, or to be a barrier to achieving quality, is given in the following table, in which stakeholders were asked to rate some 40 parameters in terms of being a barrier to achieving quality on a 5 point scale (where 1 = minor influence and 5 = major influence).

<sup>29</sup> cidb (2007). Practice Note 9: Evaluation of Quality in Tender Submission (Version 1 - November 2007). Construction Industry Development Board, Pretoria. http://www.cidb.org.za

<sup>30</sup> cidb (2008). Practice Note 14: Selecting a Contractor on a Competitive Basis (Version 2 - October 2008). Construction Industry Development Board, Pretoria. http://www.cidb.org.za

#### Perception of Ineffective Contractor Registration as a Barrier to Quality

Scale: 1 = minor; 3 = average; 5 = major influence

	Mean Score	Rank
Clients	4.2	4
Contractors; Grades 5 to 9	3.9	13
Designers	3.7	29
Project Managers	24	40

From the above table, it can be seen that very different views, and in fact almost opposing views, were obtained regarding the perception of ineffective contractor registration being a barrier to attaining construction quality. Specifically, it is seen that clients view ineffective contractor registration as the 4<sup>th</sup> most significant barrier to quality, whereas Project Managers ranked ineffective contractor registration as being a barrier being very low, namely 40<sup>th</sup>. It should be noted however that project managers are typically only involved on large projects, and their views are more likely to reflect their perceptions regarding the contractor registration of Grade 5 to 9 contractors (which they view as being effective).

In general, however, it can be concluded that clients, contractors and designers view the current mechanisms for registration of contractors as an ineffective indicator of a contractor's potential of delivering quality – and specifically for the lower Grade contractors. Note however, that the survey reported on above did not differentiate between cidb registration of contractors and NHBRC registration of contractors (see Section iii below).

#### *ii) cidb Best Practice Contractor Accreditation Scheme*

The inability of the current cidb *Register of Contractors* to be a reliable indicator of a contractor's ability to deliver quality was well recognised at the time of writing the cidb Act, and the cidb Act requires that the Board must, within a reasonable period after the establishment of the register of contractors, establish a *Best Practice Contractor Recognition Scheme* which:

- enables organs of state to manage risk on complex contracting strategies; and
- promotes contractor development in relation to best practice standards and guidelines developed by the Board.

The cidb *Best Practice Contractor Recognition Scheme* is currently under development, but the objective is that the *Best Practice Contractor Recognition Scheme* will recognise:

- the construction management qualifications and experience of contractors;
- the construction management systems adopted by contractors; and
- the performance of contractors.

Once prescribed by the Minister of Public Works, the recognition of a contractor's abilities or performance within the cidb *Best Practice Contractor Recognition Scheme* will be used on public sector contracts for the purpose of:

- assessing the suitability of contractors for registration, pre-qualification, selective tender lists or expressions of interest; and/or
- adjudication for the award of a contract.

The private sector would also have access to the recognition of a contractor's abilities or performance, and would be encouraged to use this information in their procurement methods.



The cidb Best Practice Contractor Recognition Scheme will recognise a contractor's capability and performance track record.

20

Clients, contractors and designers view registration of contractors as an ineffective indicator of a contractors potential of delivering quality –and more so for the lower Grade contractors.

#### *iii)* NHBRC Contractor Registration System

The National Home Builders Registration Council (NHBRC) was established in terms of the Housing Consumer Protection Measures Act, 1998 (Act No. 95 of 1998)<sup>31</sup>. The functions of the NHBRC are to keep a register of home builders, oversee the construction of residential homes to see to it that proper building standards are adhered to, and to provide a warranty service for major structural defects.

The NHBRC has a mandate over all new homes, including in the bonded, cash markets and subsidy sector.

All builders of new homes must be registered with the NHBRC, and a contractor's registration is evaluated in terms of the following criteria<sup>32</sup>:

- financial;
- technical;
- construction; and
- management.

However, as illustrated by the low quality observed in the low-income housing sector (see for example Sections 2.2 and 3.2), the credibility of the NHBRC contractor registration system is certainly in question. However, it must be recognised that not all low income housing has been built by NHBRC registered contractors. This is however in contravention of the Housing Consumer Protection Measures Act, and this raises the question as to how contracts could have been awarded to un-registered contractors!

The credibility of the NHBRC contractor registration system as an indicator of contractor's ability to deliver quality is in question.

#### NHBRC to crack down on unregistered home builders

The National Home Builders Registration Council (NHBRC) warned industry on Wednesday that it has been "given teeth" by South Africa's Department of Human Settlements to shut down unregistered home builders.

Newly appointed NHBRC CEO Sipho Mashinini ..... was already reviewing about 40 projects in KwaZulu-Natal and planned to shut down builders as early as next week.

On concerns raised around possible lead times for nonregistered builders to comply, Mashinini said that there was "no room to break the law". He said that the council was in the business of ensuring that homebuilders consistently delivered sustainable quality houses.

The council pointed out that registration was not only applicable to developers and home builders, but also to contractors and subcontractors.

The NHBRC said that an inspection company would be set up in South Africa's nine provinces by May 28, to ensure that quality houses were delivered. Mashinini noted that the council was also considering the possibility of setting up its own inspection company.

Engineering News Loni Prinsloo 12 May 2010

#### iv) Preferential Procurement Policy Framework Act

The *Preferential Procurement Policy Framework Act* (PPPFA) (Act 5 of 2000)<sup>33</sup> provides for the evaluation of tenders and the award of contracts in the public sector on the basis of price and preference, as well as "other objective criteria" such as functionality (or quality). In terms of construction contracts, the cidb *Standard for Uniformity in Construction Procurement* elaborates on quality criteria, which amongst others could include:

<sup>31</sup> Rep. of SA (2007). Housing Consumer Protection Measures Act, 1998 (Act No. 95 of 1998 as amended). SA Government Gazette, Vol.401, No. 19418, Pretoria.

<sup>32</sup> NHBRC (2010). http://www.nhbrc.org.

<sup>33</sup> Rep. of SA (2001). Preferential Procurement Policy Framework Act No. 5 2000. Government Gazette No. 22549, 10 August 2001. Pretoria.

- response to (ability to relate to) the proposed scope of work/project design;
- quality control practices and procedures which ensure compliance with stated employer's requirements;
- qualifications and demonstrated experience of the key staff (assigned personnel) in relation to the scope of work; and
- demonstrated experience of tendering entity with respect to specific aspects of the project / comparable projects.

All of the above could impact directly on the quality of construction, and the PPPFA therefore provides for the selection of contractors on their ability to deliver quality construction.

The extent to which quality is taken into account in the adjudication of public and private sector contracts is given below. It is seen that in the 2009 cidb *Construction Industry Indicators*, around 60% of all contracts from national Departments are adjudicated on the basis of price, preference and quality. In contrast, only around 25% of provincial and local authority construction contracts are adjudicated on the basis of price, preference and quality!

Only 25% of provincial and local authority construction contracts are adjudicated on the basis on the basis of contractor's ability to deliver quality.

A breakdown of the condition of the facility at handover / practical completion  $\square$ 

for various client categories is included below – from which a weak correlation can be deduced between adjudication of contracts based on quality and the condition of the facility at handover.



A related issue to that raised above in which procuring construction contracts based on functionality or quality criteria is not the norm is the awarding of contracts which are not in accordance with the client's procurement policy – such as overturning the recommendations of a tender evaluation committee. Such overturning of recommendations often (but not exclusively) arises due to political interference (see Section 5.2 to follow).

The extent of contracts being awarded that are not in accordance with the client's procurement policy is shown in the following figure, obtained from the 2009 cidb *Construction Industry Indicators*. The results show that, on average, around 13% of contracts are not being awarded in terms of the client's procurement policy. Of concern, around 22% of contracts are not being awarded within Provincial Department in terms of their procurement policy.

Around 22% of Provincial contracts are not being awarded within the Department's procurement policy.

Was the contract awarded in acc employer's procurement policy?	ordance witl	n the	National	Yes	No			
	Yes	No	Department					
Public Corporation	84%	16%	Provincial					
National Department	93%	7%	Department					
Provincial Department	78%	22%	Local Authority					
Local Authorities	93%	7%	-					
Total	87%	13%	Public Corporation					
				× 2	5%	50%	75%	100

#### 5.2 Bribery, Fraud and Corruption

An empirical study undertaken in 2005 indicated significant areas of concern developing with regard to ethical standards practiced within the South African construction industry<sup>34</sup>. The range of ethical problems identified include collusion, bribery, negligence, fraud, dishonesty, and unfair practices of which significant parts of the issues resided with contractors among other identified participants in the construction process. It is notable that Architects (100%), Quantity Surveyors (94%), Consulting Engineers (67%), and Contractors (60%) all stated that they have observed / experienced professional negligence in South African construction with poor material quality and poor workmanship indicated as the most frequent professional negligence.

Corruption in the construction industry in South Africa was further identified as being a growing and major concern in the survey undertaken for this study, and was ranked as one of the most significant barriers to the attainment of quality in construction by contractors and project managers.

<b>Scale</b> : 1 = minor; 3 = average; 5 = major influence						
	Mean Score	Rank				
Contractors; Grades 2 to 4	4.9	1 of 13				
Project Managers	4.5	1 of 40				
Contractors; Grades 5 to 9	4.2	1 of 40				
Designers	4.1	21of 40				
Clients	3.7	34 of 40				

Perception of Corruption as a Barrier to Quality

In addition to the concerns raised about corruption in the survey undertaken for this study, evidence of the growing concerns about corruption are reflected on a regular basis in the media, press and other forums. Politicians and representatives of civil society are also increasingly raising concerns about corruption in South Africa and in the construction industry – including for example Minister of Finance Pravin Gordhan (see below) and Minister of Monitoring and Evaluation Collins Chabane.

#### Measures to combat fraud and corruption

Mister Speaker, corruption is an ever-present threat to our ambitions. All South Africans must constantly and consciously work to root out this cancer. If we are to address this scourge, we need improved management capability, governance, enforcement, and oversight in government, and in the business sector. Poorly managed tender processes are all too often open to such abuse. Greater transparency and accountability in procurement systems will therefore be a key focus of reform in the period ahead.

Minister of Finance Pravin Gordhan; 2010 Budget Speech www.info.gov.za/speeches/budget/budget 2010.pdf

Corruption however does not necessarily result in the paying of financial bribes, but also often takes the form of political interference in the tender process, or cronyism, nepotism, etc. Such political interference is also of growing concern in the construction industry, and frequently results in the appointment of contractors that do not have the necessary abilities to deliver the required quality.

Hard evidence of this is often difficult to obtain, but the most common form of political interference is where public sector officials override tender committee recommendations in the favour of, for example, local contractors to gain political influence, or in the favour of family and friends. Comments supporting such allegations are frequently reported on in the cidb *Construction Industry Indicators*.

A more detailed overview of bribery, fraud and corruption in the South African construction industry is given in the following sections.

<sup>34</sup> Pearl, RG, Bowen, PA, Makanjee, N, Akintoye, A and Evans, KM (2005). Professional ethics in the South Africa construction industry – A Pilot Study. In: AC Sidwell (Ed.) Annual International RICS Foundation COBRA Conference, Brisbane: RICS, pp. 60-71

### i) Low-income Housing Sector

Corruption in the low income sector in particular has been reported on widely in the press and other media, and Minister Tokyo Sexwale recently provided an update on his department's anti-corruption investigations (see Section 2.2). Specifically, Minister Sexwale noted that the Department of Human Settlements has drawn

up a shortlist of 20 problematic housing projects with a total value of R2 billion which are currently under investigation<sup>35</sup>. The probes are being conducted by the National Audit Task Team appointed by Minister Sexwale in November 2009, headed by the Special Investigating Unit (SIU).

In a recent media briefing, Minister Sexwale noted that the focus of the investigation is on housing and on "dodgy contractors". To date, a conveyancing attorney in KwaZulu-Natal has been charged with 142 counts of fraud and theft and two criminal cases have been registered with SAPS for fraud in respect of a contractor and engineer who defrauded the department of more than R10 million. Minister Sexwale also stated that the process of restriction in respect of more than 40 contractors is in an advanced stage.



Furthermore, the national audit task team appointed the Department of Human Settlements has recovered R44 million and arrested 1 910 government officials who were illegally benefiting from housing subsidies.

#### *ii)* ci**d**b Register of Contractors

Fraud and corruption has occurred within the cidb *Register of Contractors*, including contractors submitting forged documentation in support of their registrations, and bribing of cidb employees to gain higher grades.



The cidb has resolved to deal with this very firmly, and has established an *Anonymous Fraud Reporting Hotline*. The cidb

has also appointed external investigations companies to assisting it with forensic investigations into suspected fraudulent activities.

Contractors found guilty of fraud and corruption are suspended from the cidb *Register of Contractors*, effectively barred corrupt contractors from receiving government tenders for construction. Details of suspended contractors are published on the cidb's website, and published in the government gazette.

Between August 2007 and March 2010, 34 contractors have been found guilty of fraud related to their registration, and have been either been suspended and/or fined. In addition, three cidb employees have to date been dismissed for accepting bribes.

<sup>35</sup> Engineering News (2010). *Fight Against Housing Corruption Begins to Gain Traction with over 900 Arrests.* Dennis Ndaba. Engineering News. http://www.engineeringnews.co.za

#### Contractor Registration Fraud Alert

The cidb has unfortunately discovered that some people have established businesses which are marketed as "cidb agents". These individuals/businesses contact unsuspecting contractors and entice them to pay large sums of money, promising them registration in grades higher than they qualify for. This is a scam and contractors must not register through these 'agents'. We have been informed of contractors paying up to R25 000 to be registered on a grade.

'The cidb continuously conducts fraud and corruption investigations and contractors found to have been registered through fraudulent processes are downgraded immediately as per legislative requirements. The cidb also conducts forensic investigations and institutes disciplinary procedure as set out in the cidb Regulations, 2004. The names of contractors that are successfully prosecuted are published in the government gazette and on the cidb website.

Likewise, employees suspected of accepting or soliciting bribes, selling or facilitating the selling of registered companies are also investigated. Apart from carrying out disciplinary procedures on employees, the cidb also lays criminal charges once the employees have been internally charged – we have already dismissed employees who were found to have accepted bribes from contractors' said Ronnie Khoza, CEO of the cidb.

ci**d**b 11 July 2010 http://www.cidb.org.za

#### *iii)* cidb Standard for Uniformity

The cide *Standard for Uniformity in Construction Procurement* (SFU) establishes requirements for public sector procurement within the construction industry which are aimed at bringing about standardisation and uniformity in construction procurement documentation, practices and procedures.

Amongst others, the SFU prescribes standards for:

- procurement documents;
- standard procurement procedures and tender evaluation methods;
- applying the cidb Register of Contractors to public contracts; and
- registration of projects on the cidb *iTender / Register of Projects*.

Specifically, the SFU and the cidb regulations requires that all public sector projects above a value of R200k are required to be registered on the cidb *iTender / Register of Projects*.

The SFU allows for auditing of a tender at any stage during tendering and project implementation – which therefore provides a platform for the identification of irregular and/or unauthorised expenditure. However, investigations by the cidb into reports of fraudulent award of tenders have not resulted in any prosecutions to date.

To date, investigations by the cidb into reports of fraudulent award of tenders have not resulted in any prosecutions.

#### Alarm over missing tender records

"How does a document about a tender get lost ... that cannot happen without a person explaining and this creates fertile ground for corruption," Minister of Monitoring and Evaluation Collins Chabane was quoted as saying in a statement. *Fin24.com, 19 October 2010* 

www.fin24.com/Business/Alarm-over-missing-tender-records-20101019

#### *iv)* cidb Code of Conduct

Section 5(4) of the cidb Act mandates the cidb to establish and promote uniform and ethical standards and stipulates that the cidb "*must publish a code of conduct for all construction-related procurement and all participants involved in the procurement process*..."



The *Code of Conduct* published by the cide requires all parties engaged in construction procurement<sup>36</sup>:

- behave equitably, honestly and transparently;
- discharge duties and obligations timeously and with integrity;
- comply with all applicable legislation and associated regulations;
- satisfy all relevant requirements established in procurement documents;
- avoid conflicts of interest; and
- not maliciously or recklessly injure or attempt to injure the reputation of another party.

The Board may, as appropriate, sanction those who breach the *Code of Conduct* by:

- issuing a warning or a fine;
- referring the matter to the South African Police Services;
- referring the matter where a breach is in respect of an official to the accounting officer for action in terms of the Public Service Act;
- deregistering contractors for a period of time; or
- referring the matter to a statutory body that has jurisdiction over the matter.

The cidb notes, however, that sanctions by the Board are, however, a reactive way to enforce the *Code of Conduct*, and a more proactive way is for all parties to *commit to adhere to the code and to do business only with those who do likewise*. Should this be done, adherence to the principles of the code will form an integral part of all business processes.

To date, no breeches of the cidb *Code of Conduct* have reported to the cidb, and hence no sanctions issued under the *Code of Conduct*. (This, however, excludes sanctions against contractors and clients in respect of non-compliance with the cidb regulations and the *Standard for Uniformity*, as well as sanctions issued for fraud and corruption related to the cidb *Register of Contractors*.)

To date, no sanctions have been issued under the cidb Code of Conduct.

#### v) CESA / FIDIC Business Integrity Management System

Consulting Engineers South Africa (CESA) has also recently initiated a major focus on anti-corruption within the industry, and its president in 2009, Felix Fongoqa, has advocated a "zero tolerance approach to all forms of corruption." CESA has also recently announced that member firms will be required to incorporate business integrity as part of quality management. CESA is also advocating the adaption of FIDIC's *Business Integrity Management System* (BIMS) and the FIDIC *Government Procurement Integrity Management System* (GPIMS) to the local context, and is exploring ways to fight corruption by forging partnerships with government.

ESA Oceane Medie

Source: Duane Daws Engineering News

The FIDIC BIMS requires 100% integrity audits on critical projects and random audits on non-critical projects.

#### vi) World Economic Forum's 'Partnering Against Corruption' Initiative

In an effort to combat global corruption, the World Economic Forum's *Partnering Against Corruption Initiative* (PACI) was formally launched by CEOs from the Engineering & Construction, Energy and Metals and Mining industries in January 2004<sup>37</sup>. PACI is business driven global initiative with commitment from the top, and



<sup>36</sup> cidb (2003). Code of Conduct for all Parties Engaged in Construction Procurement. Government Gazette 25656 of 31 October 2003. Construction Industry Development Board, Pretoria. http://www.cidb.org.za.

<sup>37</sup> WEF (2004). Partnering Against Corruption; Principles for Countering Bribery. Partnering Against Corruption Initiative (PACI). World Economic Forum, Geneva. http://www.weforum.org/en/initiatives/paci/index.htm

has developed multi-industry principles and practices that it aims will result in a competitive level playing field, based on integrity, fairness and ethical conduct.

Signatories to the PACI undertake to implement a zero-tolerance policy towards bribery, and to develop a practical and effective implementation program in support of this.

South African signatories to the World Economic Forum's *Partnering Against Corruption Initiative* is given below – which includes several of South Africa's major contractors and clients.

5	55	
African Rainbow Minerals (ARM)	Patrice T. Motsepe	Executive Chairman
Aveng Limited	William Rodger Jardine	CEO
Basil Read	Marius Heyns	CEO
Bowman Gilfillan Inc.	David Adrian Loxton	Director and Partner
Eskom	Jacob Maroga	CEO
Group Five Ltd	Michael R.Upton	CEO
Murray & Roberts Holdings	Brian C. Bruce	Group CEO
Sasol Limited	Pat Davies	CEO
Wesizwe Platinum Limited	Michael H. Solomon	CEO
Wilson Bayly Holmes - Ovcon Limited	M. S. Wylie	Chairman

#### South African Signatories to World Economic Forum's Partnering Against Corruption Initiative (PACI)

5.3 International Trends

International trends in matching a contractor's abilities with the requirements of the contract, and international experience in addressing bribery, fraud and corruption are discussed below.

#### *i) Pre-qualification, Performance Assessment and Licensing Schemes*

Internationally, many risk management systems have been introduced that support the matching of a contractor's capabilities with the requirements of the work – including pre-qualification, performance assessment, licensing and incentive systems. Many of these system share similar elements to the cidb *Best Practice Contractor Recognition Scheme* being developed (see Section 5.1).

Examples of such systems are highlighted briefly below:

• *Registration of Building Practitioners, Victoria, Australia*: Registration and licensing systems, such as the Vitoria Building Practitioners licensing scheme are found in several countries – obstetrically to provide some form of quality assurance of builders and contractors.

Specifically, the Building Act of Victoria (1993) requires most people who carry out or undertake work in the business of building, to be registered as building practitioners with the Building Practitioner Board (BPB). The BPB registers individuals, and not companies or businesses, and the various categories and classes of building practitioners are outlined in the Building Regulations of Victoria (2006), and include:

- *Commercial Builder*: responsible for the construction of shops, offices, factories and other buildings; and
- Domestic Builder: responsible for the construction of residential buildings.

Registration of building practitioners is based on a peer review of experience and competence, as well as a requirement for indemnity insurance.

• The NSW Australia Department of Commerce Contractor Prequalification and Best Practice Accreditation Scheme (2008 to 2010): The system provides for the prequalification of contractors on the New South

28

**DISCUSSION DOCUMENT** 

Wales Government's capital works program for projects over A\$2,5m (about R17m). Prequalification requirements include<sup>38,39</sup>:

- compliance with the NSW Government Code of Practice for Procurement;
- in-house corporate Project Management Systems;
- experience and performance requirements;
- submission of Contractor Performance Reports;
- compliance with NSW Government Quality Management Systems Guidelines;
- compliance with requirements for NSW Government Occupational Health and Safety Management System Guidelines.

### ii) Bribery, Fraud and Corruption

Throughout the developed and developing world, the construction sector is recognised as one of the most corrupt industries. For example, in the *2008 Bribe Payers Index* (BPI) by Transparency International, public works contracts and construction was ranked worldwide as the sector in which bribery of public officials was the most common, followed by real estate and property development<sup>40</sup>.

Similarly, the Chartered Institute of Building (CIOB) report published in 2006 revealed that 51% of UK construction professionals feel that corruption is

commonplace within the UK construction industry, 60% felt that fraud within the industry is rampant, and 41% had been offered a bribe<sup>41</sup>.

#### Monuments of corruption

Corruption in the development planning process is not an isolated phenomenon, nor is it confined to Indonesia. The Bataan nuclear power plant is the Philippines' largest investment project and cost more than US \$2 billion. Westinghouse was controversially awarded the main contract after the late Filipino dictator, Ferdinand Marcos, personally overturned the initial contract decision. Westinghouse admitted paying US \$17 million in commissions to a friend of Marcos, though it maintained that the payments were not a bribe. The reactor sits on an active fault line that is part of the Pacific's 'rim of fire', creating a major risk of nuclear contamination if the power plant ever becomes operational. Completed in the 1980s, the plant has never produced a single unit of electricity.

Corruption in Construction and Post-Conflict Reconstruction Global Corruption Report 2005 Transparency International

Initiatives aimed at combating corruption in the construction industry have already been introduced in Section 5.2, namely:

- FIDIC's *Business Integrity Management System* (BIMS) and the FIDIC *Government Procurement Integrity Management System* (GPIMS); and
- the World Economic Forum's *Partnering Against Corruption Initiative* (PACI).

A further initiative to note is the *Construction Sector Transparency Initiative* (CoST), which is an international multi-stakeholder initiative designed to increase transparency and accountability in the construction sector. It is supported by the Department for International Development (DFID) and the World Bank and is being piloted in seven countries<sup>42</sup>.



Corruption in the

seen as the most

managers.

significant barrier to

construction quality by contractors and project

construction industry in is

of growing concern, and is



<sup>38</sup> NSW (2010). 2008 – 2010 Contractor Prequalification and Best Practice Accreditation Scheme. NSW Government Department of Services, Technology & Administration. Sydney. http://www.nswprocurement.com.au

<sup>39</sup> NSW (2008). NSW Government Guidelines for Construction Projects; Procurement eBook. NSW Government Procurement. Sydney. http://www.nswprocurement.com.au

<sup>40</sup> Transparency International (2008). Bribe Payers Index 2008. Transparency International. Berin. http://www.transparency.org

<sup>41</sup> CIOB (2006). Corruption in the UK Construction Industry: 2006 Survey. Chartered Institute of Building, Berkshire, UK.

<sup>42</sup> CoST (2010). The Construction Sector Transparency Initiative. http://www.constructiontransparency.org

The core concept of CoST is that it introduces the transparency and accountability concept to the construction sector and focuses specifically on public disclosure of information. The ultimate aim is to enhance the accountability of procuring bodies and construction companies for the cost and quality of public-sector construction projects.

Ensuring greater disclosure of information relating to public construction projects, in particular the basis on which the project was commissioned, project evaluation and any significant changes from the original tender document along with the reasons, in particular on cost, it can help to raise the level of scrutiny. It also aims to ensure greater awareness of the project evaluation. By allowing the public to make the comparisons between what was planned and what was delivered as well as to raise questions the aim is to reduce wasted opportunities and expenditure.

CoST is based on a set of key guiding principles and must be implemented following a set of agreed criteria<sup>43</sup>.

#### Govt to target tender fraud: Gordhan

Presenting his midterm budget statement today, Finance Minister Pravin Gordhan announced that the government was aiming to improve its supply chain management – especially the highly lucrative tender process – which has been open to abuse by unscrupulous officials and bidders.

Among the measures to be introduced are a transparent disclosure practice whereby departments and government entities will be required to furnish the names of companies and individuals bidding for tenders as well as the reasons for the awarding of a tender to a particular company or individual.

According to Gordhan, possible tender and procurement fraud to the value of R25-billion is currently under investigation by government.

By Caiphus Kgosana, Timeslive 27 October 2010

#### 5.4 Summary

The previous sections have highlighted the following key factors within the procurement process that influence construction quality:

- the ability to match a contractor's capabilities to the requirements of the project; and
- political interference, cronyism, and fraud and corruption.

Specifically, it has been shown that the cidb *Register of Contractors* and the NHBRC *Register of Homebuilders* do not provide a reliable indicator of a contractor's ability to deliver quality – and specifically for the lower Grade contractors. International practice suggests that an assessment of competencies (including qualifications), construction management systems, and previous performance should be used to

prequalify contractors and/or to assess their potential to deliver quality. Such systems are in fact currently under development within the cidb – namely the cidb *Best Practice Contractor Recognition Scheme*, which has been modelled on international best practice.

The impact of the ci**d**b Best Practice Contractor Recognition Scheme on construction quality of should be closely monitored.

The cide *Best Practice Contractor Recognition Scheme* is due to be phased-in from 2011/12, and its impact on quality of construction should be closely assessed.

The previous sections have also shown that corruption in construction procurement is a global phenomenon, but indications are that corruption is rapidly increasing in South Africa. In fact, one such view is that South Africa is reaching a tipping point beyond which it may be very difficult to reverse corruption in the public sector<sup>44</sup>.

<sup>43</sup> CoST (2010). UK Pilot Consultation: Increasing Transparency and Accountability in Procuring Infrastructure; Background Document. CoST. The Construction Sector Transparency Initiative. http://www.constructiontransparency.org

<sup>44</sup> News24 (2010). Corruption: SA at Tipping Point. SAPA, 26 October 2010. http://www.news24.co.za

The previous sections have also shown that while the cidb has aggressively dealt with corruption linked to the cidb Register of Contractors, and that while the cidb investigates cases of fraudulent award of tenders that are reported to it, the cidb has not adequately dealt with the broader issue of developing and implementing mechanisms to proactively prevent and/or identify corruption within construction procurement. Strong consideration should be given by the

The cidb has to date not adequately dealt with the broader issues of corruption within construction procurement.

cidb to introducing requirements for integrity management and transparency in construction procurement.

In line with international best practice, transparent public disclosure will be required at each stage of the supply process, in all spheres of government, including reasons for award decisions.

Speech by Pravin Gordhan, Minister of Finance Medium Term Budget Policy Speech - October 27 2010 http://www.politicsweb.co.za

#### 6 CONSTRUCTING QUALITY

The previous sections have investigated the influence of design and procurement related factors on construction quality. This Section investigates the key construction related barriers to construction quality, together with the



related barriers to construction quality, together with the actions which clients can adopt to encourage contractors to deliver to, or even exceed, quality requirements.

#### 6.1 Process, Skills and Competence Factors

A survey of the barriers to construction quality undertaken for this study is given below, in which the top 15 factors under the influence of the contractor are shown, as viewed by contractors and by project managers. Key barriers are seen to include:

- poor site management;
- focus on time and cost;
- skills and competence issues;
- lack of quality improvement processes; and
- lack of worker participation (such as quality circles, quality improvement teams, etc.).

#### Barriers to Attaining Quality; Internal Factors

Scale: 1 = minor; 3 = average; 5 = major influence

		Overall			
Interventions / Situations	Project Managers	Contractors; Grades 2 to 4	Contractors; Grades 5 to 9	Mean	Rank
Poor site management	4.3	4.7	4.0	4.3	1
Lack of contractor quality expertise	4.2		4.2	4.2	2
Inadequate resourcing by contractors	4.3		4.1	4.2	3
Level of subcontracting	4.2	4.6	3.7	4.2	4
Lack of understanding of quality	3.8	4.6	3.7	4.0	5
Lack of worker participation	3.5	4.2	4.1	3.9	6
Focus on cost by contractors	3.8	3.8	4.1	3.9	7
Focus on time by contractors	3.7	4.0	4.0	3.9	8
Inadequate skills quality training	3.8		3.7	3.8	9
Lack of insight relative to the role of quality	3.8		3.7	3.8	10
Lack of quality improvement processes	3.2	4.3	3.7	3.7	11
Inadequate generic skills training	3.7		3.7	3.7	12
Lack of minimum requirement to contract	3.2		3.9	3.6	13
Reliance on inspections	3.5		3.6	3.5	14
Inadequate production skills	3.5		3.5	3.5	15

The key barriers identified above can largely be grouped together as:

- process issues (poor site management, focus on time and cost, lack of quality improvement processes and lack of worker participation); and
- skills and competence issues.

Similarly, internal areas that would improve construction quality that were identified by contractors and by project managers in the same study are given below, and include:

- management commitment;
- worker participation;

- education and training in quality; and
- quality management systems and standard operating procedures, etc.

#### Improving Construction Quality; Internal Factors

Scale: 1 = minor; 3 = average; 5 = major influence

		Mean Score		-	
Practices	Project Managers	Contractors; Grades 2 to 4	Contractors; Grades 5 to 9	Overall Mean	Rank
Management commitment	4.2	4.2	4.1	4.2	1
Organisation culture	4.4		3.8	4.1	2
Training in quality	4.2	4.2	3.9	4.1	3
Worker participation	3.5	4.3	4.2	4.0	4
Education in quality	3.8	4.2	3.9	4.0	5
Standard operating procedures (SOPs)	4.0		3.9	3.9	6
Goal setting	3.8		3.9	3.9	7
Quality improvement processes	3.3	4.2	4.0	3.8	8
Contractor project quality plans	3.5		4.2	3.8	9
Benchmarking	3.8		3.8	3.8	10
Measurement	3.7		3.9	3.8	11
Contractor Quality Management Systems	3.3		4.1	3.7	12
Safe work procedures (SWPs)	3.3	3.9	3.9	3.7	13
Reengineering	3.4		4.0	3.7	14
Contractor ISO 9000 series certification	2 3		3.8	3.5	15

Together with management commitment, these key improvement areas are again largely process related and skills/competence related issues.

#### il Quality Management Systems and Plans

As shown in the following table, and as confirmed by previous studies<sup>45</sup>, quality management systems (QMSs), quality management plans (QMPs) and quality improvement processes have the potential to contribute to improved construction quality.

Management commitment, construction process related factors, and skills and competence factors are key focus areas for improving construction quality delivered by contractors.

l l	1	1	'
Improving Construction Qu	iality; Quality Manageme	nt Systems and Plan	.s

Scale: 1 – minor; 3 – average; 5 – major initience		
	Contractors; Grades 5 to 9	Rank
Contractor project quality plans	4.2	2
Contractor Quality Management Systems	4.1	4
Quality improvement processes	4.0	7
	2.0	14

Contractor ISO 9000 series certification

However, notwithstanding the perceived benefits of quality management systems and quality management

plans, ISO 9000 certification is often only seen to be relevant to the large contractors. This is confirmed by the limited number of contractors that are ISO 9000 accredited – namely of the approximately 8 000 cidb registered General Building (GB) or Civil Engineering (CE) companies in Grades 5 to 9, less than 10 are ISO 9000 accredited. All of these are Grade 9 contractors, and include:

Of the more than 4 000 cidb registered GB and CE Grade 5 to 9 contractors, less than 10 are ISO 9000 accredited.

- Civcon;
- Concor Building;

<sup>45</sup> Rossouw, J-H and Smallwood, JJ (2008). The Implementation of Quality Management Systems in South African Construction. Proceedings of the COBRA 08 Conference of the Royal Institute of Chartered Surveyors, Dublin, Republic of Ireland, 4-5 September.

- Murray & Roberts Projects;
- Stefanutti Stocks Building; and
- WBHO Construction.

This low number of ISO 9000 accredited contractors and the strong view expressed that project quality plans and contractor QMSs will contribute significantly to improving construction quality points to the need for much greater adoption of construction specific quality management plans and systems.

Recognising that the more well known management systems such as SANS ISO 9000 and 14000 and SANS OHSAS 18001 are often only appropriate for large organisations (such as Grade 8 and 9 contractors), the cidb has introduced complementary accreditation of construction management systems to promote and recognise performance improvement by contractors in, typically, Grades 5 to 7. This cidb standard is based on recognisable industry minimum standards covering:

- health and safety management;
- quality management; and
- environmental management (covering air, water, land and waste).

This cide standard for management systems allows for easy expansion and conversion to meet the ISO or OHSAS requirements in the future.

#### *ii) Skills and Competence*

The survey undertaken for this study on construction quality clearly highlights the importance of skills, and education and training, in attaining quality. Furthermore, numerous studies have highlighted the acute shortages of trained artisans and first level supervisory staff, which clearly impacts on the demands for quality control, standard operating procedures, training, etc.

These skills shortages are further exacerbated by the aging profile of artisans in South Africa, for which the average age of the country's artisans is reportedly around 55 years old. This has led Dr Azar Jammine to note that, "(t)his shows the danger that most of the people available to transfer skills are getting older and older and there won't be sufficient mentoring<sup>746</sup>.

Shortages of skilled artisans and first level supervisory staff are impacting negatively on construction quality.

While many of the larger contractors are implementing programmes to address their skills requirements, smaller contractors, and in particular new entrants, generally do not have the resources necessary to address these quality factors – which points towards the need for public and private sector interventions to facilitate skills development at a broad level and within contractor development organisations. Examples of such interventions currently being implemented or under development include (see also Section 6.4):

- the skills development component of the Construction Charter;
- the cide *Requirements and Guidelines for Contractor Competence Assessment*, which sets competence standards for contractors and site supervisors<sup>47</sup>;
- the cidb *Requirements and Guidelines for Indirect Targeting* for Enterprise Development of Sub-Contractors, which promotes skills development<sup>48</sup>;
- the cidb *Building Skills Policy* under development, requiring skills development leading to nationally accredited outcomes on qualifying public sector contracts<sup>49</sup>; and

<sup>46</sup> Jammine, A (2010). SA falling behind rest of Africa - Economist. Business Report & Independent Online (Pty) Ltd, 29 July 2010. http://www.busrep.co.za

<sup>47</sup> cidb (2010). cidb Best Practice Contractor Recognition Scheme; Requirements and guidelines for contractor competence assessment. Construction Industry Development Board. Pretoria. http://www.cidb.org.za

<sup>48</sup> cidb (2010). cidb Best Practice Project Assessment Scheme; Requirements and guidelines for enterprise development of subcontractors. Construction Industry Development Board. Pretoria. http://www.cidb.org.za

<sup>49</sup> cidb (2010). *cidb Best Practice Project Assessment Scheme; Requirements and Guidelines for the Building Skills Policy.* Construction Industry Development Board. Pretoria. http://www.cidb.org.za

• the cidb construction industry ESDA currently being piloted, which facilitates the placement of unemployed learners.

The above interventions are, however, by no means sufficient. In addition, the cidb continues to advocate for a building and construction component to be incorporated into the South African World Skills activities.



#### 6.2 Quality and Small Contractors

Potential differences in the quality delivered by Grade 2 to 4 contractors and by Grade 5 to 9 contractors have been alluded to in previous sections. In particular, Section 2.3 suggests that client the quality of completed work delivered decreases with increasing project size. However, it was noted in Section 2.3 that this trend needs further understanding, and could be due to (i) increasing complexity with increasing project size, or (ii) the inability of clients to discern quality on small

However, in Section 2.2 it is shown that the quality of construction is perceived to be lowest in the residential building sector – which is largely dominated by small contractors.



The perceptions of stakeholders of the quality delivered by Grade 5 to 9 contractors and by Grade 2 to 4 contractors are examined further in the following table. Overall, the view expressed by stakeholders is that the quality delivered by contractors is "average", with the quality delivered by Grade 5 to 9 contractors being slightly better that Grade 2 to 4 contractors. However, it is noticeable that Grade 5 to 9 contractors and Grade 2 to 4 contractors and (to a lesser extent) clients rate the difference in quality between Grade 5 to 9 contractors and Grade 2 to 4 contractors as being somewhat more noticeable.

#### Perception of Stakeholders of Quality Delivered by Contractors Scale: 1 = very poor; 3 = average; 5 = very good

	Mean Scores				
Practitioner / Stakeholder	Clients	Designers	Project Managers	Contractors; Grades 5 to 9	Overall Mean
Contractor; Grades 5 to 9	3.3	2.9	3.5	3.6	3.3
Contractor: Grades 2 to 4	2.9	2.8	3.3	2.9	3.0

Further somewhat conflicting perceptions regarding construction quality is given in the following table, in which common internal barriers to attaining quality perceived by Grade 2 to 4 contractors and Grade 5 to 9 contractors. It is seen that Grade 2 to 4 contractors perceive the level of sub-contracting as the 2<sup>nd</sup> highest internal barrier to attaining quality – presumably a reflection of the abilities (or inabilities) of Grade 2 to 4 contractors. However, Grade 5 to 9 contractors do not rate this significantly.

#### Barriers to Attaining Quality; Internal Factors

**Scale**: 1 = minor; 3 = average; 5 = major influence

Interventione / Situatione	Contractors; Grades 2 to 4		Contractors; Grades 5 to 9	
	Mean Score	Rank	Mean Score	Rank
Poor site management	4.7	1	4.0	3
Level of subcontracting	4.6	2	3.7	6
Lack of understanding of quality	4.6	3	3.7	7
Lack of quality improvement processes	4.3	4	3.7	5
Lack of worker participation	4.2	5	4.1	1
Focus on time by contractors	4.0	6	4.0	4
Focus on cost by contractors	3.8	7	4.1	2

Of significance, however, is that small contractors rate poor site management, a lack of understanding of quality and a lack of quality improvement processes as significant barriers to attaining construction quality.

In summary, intuitively it is expected that smaller contractors have less resources to devote to construction quality than do larger contractors, and it would be expected that smaller contractors do not have as well developed quality management systems as do the larger contractors. However, while stakeholder perceptions confirm that the quality delivered by smaller Small contractors rate poor site management, a lack of understanding of quality and a lack of quality improvement processes has significant barriers to attaining construction quality.

contractors is somewhat less than that delivered by larger contractors, this difference in construction quality is not substantive.

#### 6.3 Inspecting Quality

Within South Africa, including within the public sector, the client's agent is responsible and accountable for accepting that the contractor has delivered the construction works to specification. Where such work has not been delivered to the required specification, the client's agent has the right to ensure that the contractor undertakes the necessary remedial action. The client's agent is therefore the primary mechanism to ensure compliance with the client's specification.

However, as illustrated in the adjacent figure, it has been noted previously (Section 2.1) that in the 2009 Clls, notwithstanding the role of the client's agent:

- clients, or the client's agents, were neutral or dissatisfied with the quality of completed work on around 20% of the projects surveyed; and
- around 12% of the projects surveyed had levels of defects which are regarded as inappropriate.

In relation to the role of the client's agent, this dissatisfaction with the quality of construction can be attributed to several factors, including:

- a lack of skills or experience of the client's agent; and/or
- the client overruling the client's agent.



Similarly, houses enrolled with the NHBRC are also required to be inspected to check for compliance with the NHBRC home building technical manual. Inspections of subsidy housing is undertaken by the NHBRC itself, while inspections of housing other than the subsidy sector have been outsourced to agencies – such as the KZN Master Builders Association which covers KwaZulu Natal, Eastern Cape and the Free State.

However, research and anecdotal information suggests that the capacity of the NHBRC inspectorate is severely lacking. For example, a recent study into the role of the building inspector on construction in the homebuilding industry in the

The NHBRC inspectorate is viewed as being ineffective. Gauteng and Western Cape provinces considered inspectors not only from the local authorities (inspecting compliance with the National Building Regulations), but also inspectors from the Department of Housing and the NHBRC<sup>50</sup>. The study determined that inspectors from the Department of Housing conducted inspections "*sometimes to often*", while local authority inspectors visited sites "*seldom to sometimes*" and NHBRC inspectors were the only inspectors that were reportedly "*never*" visiting sites during construction. These findings lead to the conclusion that the lack of inspection by the building inspectorate could be a contributor to poor construction quality.

The study also rated the competence and / or knowledge of local authority and NHBRC inspectors as marginally "*above average*", and inspectors from the Department of Housing inspectors as "*below average*". Specifically, contractors interviewed in the study reported a general lack of expect advice from the inspectors. These observations led the study to conclude that the building inspectors do not know the Regulations well enough to enforce them.

#### 6.4 cidb Best Practice Project Recognition Scheme

The cidb Act requires the cidb to establish a *Best Practice Project Assessment Scheme* which can be used, amongst others, to promote best practices that enhance construction quality. The various components of the cidb *Best Practice Project Assessment Scheme* are still under development, but are likely to include:

- the cidb *Building Skills Policy*, requiring skills development leading to nationally accredited outcomes on qualifying public sector contracts<sup>51</sup>;
- the cidb Requirements and Guidelines for Indirect Targeting for Enterprise Development of Sub-Contractors, which promotes skills development<sup>52</sup>;
- the cidb *Requirements and Guidelines for Management Plans*, requiring site specific QMPs<sup>53</sup>; and
- the cidb Requirements and Guidelines for Contractor Performance Reports, providing, amongst others an assessment of the construction quality<sup>54</sup>.

The cidb *Best Practice Project Assessment Scheme* provides a framework for enhancing construction skills, rewarding good construction quality, and enhancing construction quality through QMPs.



#### i) CONQUAS

The *Construction Quality Assessment System* (CONQUAS®) was developed by (what is currently) the Building Control Authority (BCA) in Singapore to improve the workmanship standard of contractors. CONQUAS contains objective quality standards for construction work and adopts a sampling system to



The cidb Best Practice

framework for enhancing

Project Assessment Scheme provides a

construction quality.

<sup>50</sup> Mpambane, S. (2008) An Investigation into the Effectiveness of the Inspectorate in the South African Home Building Industry. Unpublished MTech: Construction Management Dissertation. Cape Town: Cape Peninsula University of Technology.

<sup>51</sup> cidb Best Practice Project Assessment Scheme; Requirements and Guidelines for the Building Skills Policy. Construction Industry Development Board. Pretoria. http://www.cidb.org.za

<sup>52</sup> cidb (2010). cidb Best Practice Project Assessment Scheme; Requirements and Guidelines for Enterprise Development of Sub-Contractors. Construction Industry Development Board. Pretoria. http://www.cidb.org.za

<sup>53</sup> cidb (2010). cidb Best Practice Project Assessment Scheme; Requirements and Guidelines for Quality Management Plans (Draft). Construction Industry Development Board. Pretoria. http://www.cidb.org.za

<sup>54</sup> cidb (2010). cidb Best Practice Contractor Recognition Scheme; Requirements and Guidelines for Contractor Performance Reports. Construction Industry Development Board. Pretoria. http://www.cidb.org.za

assess conformance to these standards, and the resulting CONQUAS score out of a 100 reflects the quality standard of the project<sup>55</sup>.

CONQUAS was introduced in Singapore in 1989, and has been periodically fine-tuned to keep pace with changes in technology and increasing quality demands. In 1998, the BCA introduced a number of new features to CONQUAS resulting in the launch of CONQUAS 21.

CONQUAS is a key element of the *Bonus Scheme for Construction Quality* (BSCQ) in Singapore. In terms of this scheme, contractors accumulate merit or default points depending on their CONQUAS score achieved for a completed project relative to the mean score for similar building types.

In terms of the merit system, a bonus or penalty of 0,2% of the effective contract sum is applied for each point scored above or below the applicable threshold score. The bonus/penalty is subjected to maximum of 3% of the effective contract sum or S\$2 million, whichever is lower.

Accumulation of CONQUAS default points are applied as follows:

- when a contractor has accumulated default points in the latest five (5) contracts, a price-loading of 0,2% for each CONQUAS default point, subject to a maximum of S\$2 million, is applied against any tender proposal by the contractor in the evaluation of tender;
- if the contractor accumulates more than 5 CONQUAS default points in the latest five (5) contracts, it will be downgraded by one grade for up to a period of 12 months; and
- Debarment is recommended if the contractor accumulates 10 or more default points in the latest five (5) contracts.

As illustrated in the adjacent figure, there has been a steady increase in the measured construction quality in Singapore since the introduction of CONQUAS in 1989.

CONQUAS is being marketed internationally, and is being used in Malaysia, China, Thailand, Hong Kong, India and Vietnam, and has also been adapted for conditions in the UK.



#### *ii)* Quality Management Plans

International initiatives in Australia, Singapore and other countries requiring accredited Quality Management Systems (QMSs) for prequalification of contractors for certain types of construction works was discussed in Section 5.3. In addition to requirements for accredited QMSs, the NSW *Government's Procurement System for Construction* requires site specific Quality Management Plans (QMPs) and Inspection and Test Plans (ITPs), depending on the type of work and risk<sup>56</sup> (see below). The requirements for QMPs and ITPs are specified in the tender and contract documents, as well as the requirements for monitoring, auditing and reporting of the QMS and ITPs.

<sup>55</sup> BCA (2010). *Construction Quality Assessment System CONQUAS*. Building and Construction Authority, Singapore. http://www.bca.gov.sg

<sup>56</sup> NSW (2006). *Quality Management System Guidelines for Construction*. NSW Government Procurement. Sydney. http://www.nswprocurement.com.au

		Type of Work and Risk under the Contract		
		<b>Complex</b> , with a definite possibility of nonconformity with the specification and significant impacts	Simple, or simple and repetitive with some or little possibility of nonconformity with the specification	
l Type of ract	Valued at \$1m or more	High – Service provider must have an agency accredited Quality Management System, and implement a Quality Management Plan and ITPs	Medium – Service provider must implement a Quality Management Plan and ITPs	
Value an Con	Valued at under \$1m	Medium – Service provider must implement a Quality Management Plan and ITPs	Low - Service provider must have and implement a ITPs	

NSW Quality Management Requirements

While the intent of specifying requirements for site specific QMPs and ITPs together with requirements for auditing and reporting is clear, the impact of this requirement on construction quality has not yet been documented. Notwithstanding this, requirements for QMPs and ITPs will drive industry

Requirements for site specific QMPs will drive quality improvements.

behaviour – ultimately leading to contractors gaining experience and competence with QMPs and ITPs.

#### iii) Performance Management

The NSW government approach to performance management and performance assessment of the design team and of the contractor has already been introduced in Sections 4.4 and 5.3. However, of significance, is that the NSW government has also introduced performance management and performance assessment of the "project manager" (or client's agent) by the client body and by the contractor<sup>57</sup>.

Performance areas of the project manager assessed by the client body include, amongst others, time, cost and quality management, while areas assessed by the contractor include:

- accuracy and completeness of contract documents;
- sufficient access provided to the site to carry out work;
- responsiveness and timeliness;
- claims resolved in accordance with the contract;
- adequacy of reasons given for rejecting claims; and
- responsiveness to Requests for Information.

While such systems would clearly support continuous improvement of the project manager, such systems can only be applied successfully within an environment of a "knowledgeable client". Notwithstanding this, there is clearly merit in some form of performance assessment of the client's agent.

#### 6.6 Summary

This section has first identified the key construction site related barriers to quality, which can largely be grouped together as:

- process issues (poor site management, focus on time and cost, lack of quality improvement processes and lack of worker participation); and
- skills and competence issues.

In addition, lack of performance by the client's agent in ensuring compliance by the contractor with the client's specification is a further barrier to construction quality.

<sup>57</sup> NSW (2010). Project Manager Performance Report. NSW Government Procurement. Sydney. http://www.nswprocurement.com.au

It has also shown that while it can intuitively be expected that smaller contractors do not have as well developed quality management systems as do the larger contractors, stakeholder perceptions confirm that the difference in construction quality between large and small contractors is not substantive.

This section has then investigated actions which clients can adopt to encourage contractors to delivery to, or even exceed their quality requirements, including:

- enhancing and strengthening the role of the client's agent on construction projects;
- encouraging the use of, or mandatory requirements for, CMSs and site specific QPMs; and
- merit and demerit schemes based on construction quality achieved.

In addition, enhancing the skills and competencies of skilled and semi-skilled workers must remain a key priority in the industry – which requires a multi-stakeholder response. In this regard, this report recognises and acknowledges the initiatives being undertaken by the industry in addressing the skills shortages – particularly at the level of the skilled and semi-skilled workers.

In line with international experience and trends, various actions are being developed by the cidb which are aimed at enhancing construction skills and construction quality, including requirements for training opportunities on public sector projects, the establishment of the cidb/industry ESDA, contractor performance reports, and requirements for QMSs (Section 5.3) and QMPs.

However, notwithstanding this, local and international experience suggests that greater attention also needs to be focused on the role of the client's agent in construction quality – for example using performance management systems similar to those adopted by the NSW government. Such a performance management system may also be of relevance to the NHBRC inspectorate – which appears to be ineffective.

In addition, this section has also presented a brief overview of the highly successful CONQUAS system developed by the BCA in Singapore, which is being used in Singapore as the basis for a construction quality bonus scheme, using merit and demerit points. Strong consideration should be given to introducing CONQUAS in South Africa – as a basis for 'absolute' measurements of construction quality.

Greater attention needs to be focused on the role of the client's agent in construction quality.

Consideration should be given to introducing CONQUAS in South Africa.

#### 7. Synthesis and Recommendations

The cidb has undertaken this study on the quality of construction in South Africa largely from a client perspective, and with the objective to identify those actions that can be implemented to derive higher quality on their construction projects.

This report has shown that, overall, clients are satisfied with the quality of construction in South Africa, but that the quality of construction does vary between contractors. However, clients in general, and in particular public sector clients, should not be complacent with this, and should strive for better value and higher quality construction.

While the issues of poor construction quality can be identified across all sectors, this report has shown that poor quality of construction is most prevalent in the residential building sector, in both the public and the private residential building sectors – which is not regulated by the cidb. In fact, due to a regulatory constraint in which homebuilders are exempt from registering with the cidb, clients do not have the flexibility to specify a requirement for using cidb registered contractors (in addition to the existing NHBRC requirements).

*Recommendation:* In addition to the existing NHBRC requirements, clients should be able to have the flexibility to specify requirements for procuring from cidb registered contractors in the residential building sector where appropriate. (This will however require a change to the cidb regulations which exempts contractors who are registered as a homebuilder in terms of section 10 of the Housing Consumer Protection Measures Act from registration with the cidb.)

This report has then highlighted that while South Africa has a well developed set of technical standards that can be used to describe the standards of materials and workmanship for construction works, these technical standards are in many cases outdated. Furthermore, it is noted that there are strong indications of a deteriorating capacity necessary to develop and maintain technical standards, codes and specifications – specifically at the SABS and the CSIR, but also at some client bodies and industry associations. It is therefore important that this formal capability for the development and maintenance of technical standards and specifications is retained and strengthened for the future.

*Recommendation:* The cidb should advocate for the maintenance of the necessary technical capacity for the development and maintenance of construction standards, codes and specifications – including that at the SABS and the CSIR.

This report has shown that the major contributors to poor quality of construction in South Africa are likely to be procurement related barriers. Such procurement related barriers include:

- fraud and corruption, or "political interference" (including cronyism and nepotism);
- the procurement and delivery model (such as the "design by employer" model);
- the use of procurement systems based on price and preference only, and not taking into account functionality (or quality); and/or
- insufficient information to be able to select professional services and/or contractors based on quality criteria.

This report has concluded that while the cidb has aggressively dealt with corruption linked to the cidb Register of Contractors, and that while the cidb investigates cases of fraudulent award of tenders that are reported to it, the cidb has to date not adequately dealt with the broader issue of developing and implementing mechanisms to proactively prevent and/or identify corruption within construction procurement

*Recommendation:* Strong consideration should be given by the cidb to introducing requirements for integrity and transparency in construction procurement.

The report has also highlighted international trends aimed at enhancing construction quality and value for money by promoting procurement strategies and contract types that support the development of

collaborative relationships between government clients and its suppliers, including the early appointment of integrated supply teams. The report also notes that in the UK, for example, that traditional, non-integrated procurement approaches should not be used unless it can be clearly shown that they offer best value for money – which means, in practice they will seldom be used.

*Recommendation:* Strong consideration should be given by the cidb to advocate for procurement and delivery models promoting collaborative relationships and integrated supply teams (including design and build contracting strategies).

The cidb has consistently recommended the appointment of professional services and contractors in the public sector based on quality criteria (Method 4 in the cidb *Standard for Uniformity*), and has supported this with the development of cidb Practice Notes. The appointment of professional services and contractors based on quality criteria will be further supported through the development and implementation of performance assessment reports for professional service providers and contractors that are currently under consideration – and for which a degree of compliance with will be set out in legislation.

*Recommendation:* The cidb needs to continue to advocate for and to strengthen requirements for the appointment of professional services and contractors based on quality criteria – supported by performance assessment reports for professional service providers and contractors.

International experience also suggests that the concept of performance assessment reports can also be applied to a client's project manager that is accountable and responsible for ensuring that contractors deliver construction quality in accordance with the client's specifications.

*Recommendation:* The cidb should investigate the possible use of performance assessment reports for the client's agent in the public sector as a best practice.

This report has also highlighted the impact of skills and capacity constraints on construction quality, including:

- indications of a deteriorating capacity necessary to develop and maintain technical standards, codes and specifications;
- indications of a deteriorating capacity the quality of client documentation; and
- ongoing shortages of appropriately trained skilled and semi-skilled workers.

Addressing these skills and capacity constraints requires a multi-stakeholder response, and various initiatives being undertaken by the cidb have been highlighted in the report. This report also recognises and acknowledges the initiatives being undertaken by the industry in addressing the skills shortages – particularly at the level of skilled and semi-skilled workers.

*Recommendation:* The cidb must continue to advocate for a building and construction component to be incorporated into the South African World Skills activities – and should actively seek to incorporate a construction skills component into the South African delegation.

This report has also highlighted examples of construction quality merit and demerit systems, including the Singapore Quality Bonus Scheme based on the highly successful CONQUAS system. This report has also highlighted that the cide *Contractor Performance Reports* will be used on public sector projects to preference contractors that have a track record of delivering good quality.

*Recommendation:* Strong consideration should be given to the cidb piloting and testing the Singapore BCA CONQUAS system in South Africa.

In addition to the above, a consistent underlying theme to improving the quality of construction in South Africa is the 'management of quality' – which must permeate across all stakeholders in the construction delivery chain (as well as, in fact, the operation and maintenance of infrastructure). Key to this is the need for adequate exposure to quality management in the course content at all levels of schooling in the built environment.

*Recommendation:* The Council for the Built Environment (CBE) needs to assess and, where appropriate, strengthen the requirements for 'quality management' in the course content within built environment academic institutions.

# Notes


