

FA5: Innovative Practice to Optimise Road Network Delivery

(SUSTAINABLE INFRASTRUCTURE OF THE FUTURE)

PROBLEMS WITH THE QCBS PROCUREMENT OF CONSULTANCY SERVICES - A CONSULTANT'S VIEWPOINT

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SYNOPSIS

This Paper considers the affect that the procedures used for the selection and appointment of a consulting engineer for road project design has on the results that can be expected from the appointed consultant. It is suggested that for future infrastructure to be sustainable those methods need drastic revision.

Having spent 25 years with roads consultants in South Africa, nearly two years as Business Development Manager (Transportation) representing a consortium of four of South Africa's foremost roads consultants in their bid to obtain work elsewhere in Africa, and (following the failure of that bid) eighteen years as an independent 'Consultant's consultant' leading Design, Design Review, Road Safety Audit and Project Audit teams the author is familiar with procurement procedures applied both within South Africa and throughout sub-Saharan Africa.

The failure of the South African initiative was attributed to the Quality and Cost Based Selection (QCBS) system of procurement of consultancy services used by all Major Development Banks (MDBs), and the separation of Design from Construction Supervision was identified as the reason for both the poor quality and the low level of safety of designs produced around Africa, and the absence of any innovative ideas.

After more than 50 years of trying, the Funding Agencies are still claiming that their methods promote 'technology transfer'. In reality, the considerable progress made in many quarters has been achieved in spite of, rather than because of, such methods.

It is suggested that for future road developments to be sustainable African Roads Authorities must wean themselves off of their dependence on loan funds and concentrate on developing indigenous consulting and contracting expertise because the MDBs have shown no interest in changing their procurement practices to improve the quality and safety of the designs they fund.

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1. INTRODUCTION

This Paper considers the affects that the consultancy procurement procedures used by the Major Development Banks (MDBs) have had on the quality and safety of road design and construction in Africa.

The nature and extent of problems identified during 20 years of design review, road safety auditing, project auditing and project assessment throughout Africa are first discussed, to establish the background to further comments.

The reasons for those problems are identified and compared with the relatively high quality and safety of design found on South Africa's major road network. In particular, the Quality-and-Cost-Based-Selection (QCBS) system for procurement of design consultants, and the separation of Design from Construction are identified as the primary causes of the lack of quality and safety in the designs produced for African Road Authorities and the total absence of innovative ideas and Value Engineering.

It is suggested that these MDB procedures have made road construction excessively costly whilst at the same time negatively impacting both the quality and the safety of the end product.

Proposals for both a short-term solution (whilst the MDB funding is still needed) and a longer-term optimal solution (once African Road Authorities gain control over their own destinies) are briefly discussed.

The objective of the former would be to address the perceived deficiencies in the QCBS system.

The objective of the latter would be to make each African nation self-sufficient in the design and construction of roads, with inputs from 'international' consultants and contractors only being needed for items of a specialised nature (major bridges, tunnels, etc).

2. BACKGROUND

The following brief summary of the author's career experience is presented to provide an understanding of the background to viewpoints expressed in this paper:

- a 2-year graduate indenture with a major UK road contractor, of which one year was spent on the site of the Tyne Tunnel Approach Road and one year was spent in the Tendering, Construction Planning, Temporary

- Works Design and Claims departments at the London Head Office;
- two years with a London-based roads consultant on the planning and supervision of preparatory site works for London's Ringways 2 and 3 (subsequently superseded by the M25 orbital motorway);
- 25 years with South African roads consultants on the planning, design and construction supervision of every conceivable type of road project (from low cost township roads in Lesotho, through residential, commercial and industrial township roads and parking areas, rural main and secondary roads, urban and rural dual carriageways to 6-lane freeways (including a 4-level directional systems interchange);
- following the lifting of sanctions, 2 years as the Business Development Manager (Transportation) for a consortium of four of South Africa's foremost roads consultants, preparing bids for road design and supervision assignments around Africa; and
- 18 years as a freelance 'consultant's consultant' as Team Leader on road design, design review, project audit and road safety audit assignments.

3. THE NATURE AND EXTENT OF THE PROBLEMS

The results of dozens of formal and informal design reviews, road safety audits, project audits and project evaluations carried out throughout Africa as an independent freelance consultant have indicated that designs produced for African Road Authorities are generally of average to mediocre quality and riddled with errors and omissions.

Some of the more significant problems noticed can be summarised as follows:

- No understanding of the Forgiving Roadside concept has been noted in ANY of the designs reviewed or on the many thousands of kilometres that have been travelled in the course of undertaking assignments. Numerous accidents resulting from this failing have been noticed.
- Some designs showed no understanding of the concept of Design Speed. The existing road alignment had simply been retained and a safe speed identified for each curve, rather than the alignment being improved to a uniform standard. In one instance individual Speed Limit signs had been posted for each curve.
- Several instances of long, fast sections of alignment ending at minimum or sub-standard radius curves were noted.
- The application of superelevation at locations where longitudinal gradient was negligible was commonplace.
- Sag vertical curves in cuttings were not unusual.
- Roundabouts are seldom correctly designed.
- Old bridge designs are frequently reused with inadequate modification to new locations. 'Blinding concrete' over 3m thick had been used in two cases to avoid redesign of the substructure. On one project the old photocopies issued for construction had been taken from different bridges so the reinforcement drawings did not match the concrete layout drawings – deck widths, cross slopes and thickness were all different.
- Applications of safety barriers seldom show any understanding of the warrants and appropriateness of such barriers, which are frequently incorrectly installed, rapidly demolished and never replaced.

- Mass-Haul Diagrams are never produced and huge volumes (in excess of 1.0million cubic metres) of 'Cut to spoil' are sometimes billed with no indication of where such material can be spoiled.
- Bidding Documents are often poorly prepared, riddled with errors and omissions and lacking in fundamental information necessary for the preparation of competitive bids.

Since it might be thought that these deficiencies are the responsibility of African consultants it should be noted that the names on the design documents and drawings were those of leading English, French, German, Belgian, Irish, American and Indian consultants. Clearly, something is seriously amiss.

It should also be noted that all of the design assignments were carried out under the auspices of the MDBs, who had reviewed the work produced and issued their No Objection to proceeding with the design proposals.

4. THE ROOT OF THE PROBLEMS

4.1 Background

In the late 1990s a delegation of South African roads contractors visited the World Bank (WB) in Washington to decry the poor standard of design and documentation that they had found prevalent in Africa subsequent to apartheid sanctions against them being lifted. Coincidentally, a partner in a major South African consulting firm was there on a similar mission. The response from WB senior management was that they knew there was a problem but not what they could do about it. On their return the author was tasked with preparing a paper to enlighten WB about what to do. In the 20 years since that paper was submitted nothing has changed.

After nearly two years of tendering for MDB-funded assignments the consortium of four of South Africa's leading roads consultants that the author represented realised that to win work they would have to be more financially competitive, which meant minimising their inputs, reducing the quality of designs and kowtowing to the prescribed way of doing things in Africa. Being unwilling to lower their standards, and since the World Bank procurement procedures were so costly to meet, the consulting consortium abandoned the initiative of moving into Africa and the Transportation section of the consortium was disbanded.

In recent years the almost total withdrawal of American, Canadian, European and South African consultants from the African scene has been noteworthy. It seems that only those with interests apart from roads can afford to survive in the cut-price market that prevails. The void has been filled by less competent performers, and hence the numerous problems identified with recent designs and documentation. The total absence of South African contractors can be attributed to similar problems.

Whilst the development of local skills and expertise should be the long-term objective of any nation, current procurement procedures actively frustrate such objectives by assisting outside influences to control the consulting and contracting scenes.

4.2 Grouping the Problems

The problems identified during the two years of tendering for MDB-funded assignments can be divided into two distinct groups, as follows:

- problems rooted in the Funding Agencies' Quality-and-Cost-Based-Selection (QCBS) procedure ; and
- problems resulting from the separation of Construction Supervision from Design.

Both groups are discussed in the following sections.

4.3 Problems Caused by the QCBS Procedure

4.3.1 Experience of Road Authority Personnel

A road authority's personnel cannot, and should not, be expected to be expert in all of the specialised disciplines that are needed to put together a competent road design – if they were able to do so they would surely be consultants themselves. Whilst a reasonable level of understanding is clearly an advantage, RA personnel ought to be able to trust their consultants to produce a quality product, without having every last detail of what is required spelled out to them.

By procuring consultancy contracts using similar methodology to that used to procure construction contracts, the QCBS system engenders the same mistrust between Client and Consultant as frequently arises between Employer and Contractor.

By eliminating ToR preparation and proposal evaluation RA personnel would be freed to spend more time on roads sector activities that only they can perform.

4.3.2 Inadequate and Unproductive Terms of Reference

The experience of using scores of Terms of Reference (ToRs) is that they are, in general, poorly prepared, frequently repetitive and self-contradictory, overly prescriptive, poorly edited versions of previous offerings that often include items that are irrelevant, or omit completely items that are of a very significant nature to the costing of Financial Proposals.

Given that it is seldom possible to identify in advance what will need to be done it should be no surprise that Terms of Reference (ToRs) are often lacking.

Despite their 50 years or more of involvement (one might say 'meddling') in the engineering field, the Funding Agencies have still not be able to define, name and number a set of Activities and Tasks that define the basic needs of any road project. Consequently, despite recent attempts by some Road Authorities to standardise their ToRs no standardised structure has been developed and often new text is added into an Annex by different ToR compilers that contradicts what the standard text requires.

The failure of the Funding Agencies to commission a Standardised Methodology for Road Design to support their QCBS system by defining the scope, quality and payment conditions for the desired end product is exactly comparable to trying to procure construction contracts without issuing Standard Specifications for such construction.

Any time spent by the Client's personnel in preparing ToRs should be viewed as being time wasted. The whole purpose of appointing a consultant is that the consultant's personnel are expected to know better than the Client's what needs to be done in any particular circumstance. Consequently, the writing of ToRs ought to be unnecessary and should be expected to produce inadequate and unproductive results. Work should be allocated to an approved panel of local consulting engineers who all know what is expected of them. Any special or particular circumstances, arising either before or during the assignment, should be cause for negotiation of additional payment, and perhaps for the appointment of specialist assistance.

4.3.3 Inclusion of Shopping Lists

Whilst the purchase of expensive items such as vehicles through construction contracts is standard practice such 'shopping lists' should never be included in consultancy contract tenders because consultants do not have tender departments to call for prices and the cost is very significant in relation to the total value of the contract. Consequently the order of Financial Proposals can be severely distorted by such prices.

4.3.4 Irrelevant Economic Assessments

The economic assessments required by the Funding Agencies are merely very expensive window-dressing to provide the Funding Agencies with 'justification' for lending funds that they have already budgeted to authorities that have already decided to spend them. There is never any question of the 'No Project' option being acceptable, and if an economic assessment shows that such should be the case it must be 'adjusted' to 'prove' the contrary.

The other purpose is to cover the Funding Agency against any comeback from the Client's government in the event that the project turns out to be a white elephant. Since any road improvement invariably exceeds expectations and nobody would investigate a white elephant anyway the whole economic exercise is a profligate waste of funds that could be better invested in a more complete design.

After due delay (usually many months in spite of the Client's contract with its Consultant specifying a much shorter time period) whilst the Funding Agency pretends that it is considering the economics and whether or not it will condescend to fund the next stage of the project (which is a foregone conclusion because otherwise it will not meet its schedule for 'shoving money

out the door’) it will issue its ‘No Objection’ for Detailed Design to commence.

Since the outcome of this whole charade is decided from the start it amounts to nothing less than a shocking waste of time and money.

4.3.5 Excessive Cost of Proposal Preparation

Since some parts of every ToR are unique (being project-specific) each Technical Proposal must be written from scratch, at huge cost for the six selected proposers, five of which will not have any means of recouping that loss.

4.3.6 Non-Transparent Evaluation

Apart from the notification of results, the evaluation of proposals is not transparent and there is no feedback to tenderers to assist in improving future efforts. The absence of such feedback seems to indicate a lack of interest in making the Funding Agencies’ methods more user-friendly.

4.3.7 No Independent Arbitrator to Evaluate Complaints

In the event of obvious preferential treatment of preferred submissions there is no independent arbitrator appointed to evaluate complaints. However, it is doubtful that even if a method of arbitration were available it would do much to improve the system, which is so badly flawed in so many other ways.

4.3.8 Corruption

The impression given by the lack of transparency and arbitration in the procedures adopted for procurement of consultancy services is that transparency and arbitration might expose corruption to an uncomfortable degree, although the World Bank’s response to Brian Cooksey’s paper (*‘A Worm’s-Eye View of Donor Policies and Practices’*, which can be found at http://iacconference.org/en/archive/document/aid_and_corruption_a_worms-eye_view_of_donor_policies_and_practices/ and which was presented to the 11th International Anti-Corruption Conference in Seoul, South Korea in May 2003) indicates that it is a very thick-skinned organisation in that regard.

Since the system devised by World Bank for procurement of consultancy services actively encourages corruption changing the system seems to be the obvious first choice for addressing the problems it causes.

4.3.9 Appointment of Incompetent Consultants

Any roads authority should be able to appoint any consulting firm from amongst those on a panel of accredited local firms in the sure knowledge that a competent design will be received from it. The 50 years of involvement of the Funding Agencies have failed to produce such panels of experienced and competent African consulting firms to which the borrowing country can limit its

workload for the simple reason that that was never their intention, in spite of claims to the contrary - that should by now be obvious to everyone because any Service Provider that claims to have been striving towards an objective for 50 years and which is now as far from achieving that objective as when it was first appointed has, in truth, failed miserably, and it should be replaced.

4.3.10 High Cost of Construction Due to Inadequate Design

The inadequate and unsafe designs that have formed the basis for construction of many thousands of kilometres of Africa's roads are directly responsible not only for hugely expensive projects that have wasted many millions of dollars, but also for the loss of many thousands of African lives. Furthermore, retrofitting safety measures that would have been easy to adopt initially will be very expensive, which raises the question – who pays? The obvious answer is – those responsible for the defects. The MDBs now owe Africa many millions of dollars to correct the faults that they have actively propagated.

4.3.11 Irrelevance of Design Reviews and Road Safety Audits

Whilst a design review is a common requirement at the commencement of construction supervision assignments it is pointless unless a mechanism and funding is in place for correcting any errors that might be found. That, in essence, means that either the Client must be prepared to pay whatever cost is involved or, preferably, the Design Consultant must be held responsible and accountable for correcting its own mistakes. A Supervision Consultant cannot afford to include the redesign costs in its Financial Proposal if it wants to retain any hope of winning the supervision assignment.

Two roads authorities did take notice of the design review comments that earthworks were excessive and paid for redesigns that in both cases saved over 20% of the billed fill volumes. Thus those RAs' small investments in the redesign costs were recouped many times over.

The same applies to Road Safety Audits, which are being called for more frequently of late, but since no funds are ever allocated to making any agreed design changes the RSA recommendations are commonly ignored.

4.3.12 Inadequate Supervision Teams

The level of supervision required by different projects is seldom the same, but the team identified by the Funding Agencies seldom differs – a three- or four-man team is considered adequate to cope with all eventualities. In that they are frequently very wrong.

A four-man team was specified for the supervision of two contracts on the outskirts of Kampala, one for rehabilitation of a rural road and four short urban roads scattered around the city, and the other for new construction. On the latter, the alignment had to be redesigned to miss the Vice President's property

and significant savings could have been made on earthworks. Since the design files had been lost a small VO was submitted to cover the cost of establishing and equipping a design team on site for the first three months, but the World Bank's representative said "*We expect the site staff to make any design changes necessary*" thus demonstrating his total ignorance of the whole consulting field.

4.3.13 No Development of Indigenous Expertise

Whilst the Funding Agencies claim that their aim is to support the growth of local consulting and contracting firms, through such catch-phrases as 'Technology Transfer', that claim is demonstrably untrue. The fact that local consultants are often not paid or are short-paid by international lead consultants for work done is even more detrimental than their not being involved at all.

The total failure of the Funding Agencies does not mean that highly experienced and competent indigenous consulting firms have not developed, but they have done so in spite of, not because of, the activities of the Funding Agencies.

4.3.14 Inadequate Remuneration

The responsibility for all of the above problems must be laid fairly and squarely at the door of the Funding Agencies. Having no understanding of how to procure **Quality** design work from consulting engineers the bankers are solely committed to getting cheap-and-nasty designs. That is why so many of the best consultants have opted out of the scene that the bankers have created. Competent consultants want fair remuneration for quality work. The Lump Sums that Funding Agencies are prepared to offer never have constituted fair remuneration for quality work, which is why the standard they are prepared to accept has been set so low.

The World Bank's approach might charitably be described as 'Penny wise; Pound foolish'. By insisting on cheap designs the MDBs are ensuring that the cost of construction is very much higher than it ought to be. The mediocrity of the designs recently completed for roads projects in Africa provides evidence that **QUALITY IS NEVER CHEAP** – any Rolls Royce owner will confirm that fact.

In fact, the reference to **Quality** in the Quality-and-Cost-Based-Selection system is misleading in that it does NOT refer to the quality of design work required but rather to the quality of the CVs and Methodology submitted in consultants' Technical Proposals. The CVs may bear no comparison to the team that actually does the work. A client in Botswana was amazed that the three engineers who turned up to a project inception meeting had all been included in the project Technical Proposal, and commented that "This has never happened before"! Continuing to use a CV long after the person it belongs to has left a company is a regular practice. Claiming that personnel are no longer

available and replacing them with cheaper 'equivalents' from Asia who may never see any part of Africa is not uncommon. Some 'consulting firms' are known to be merely proposal compilers with a filing cabinet of CVs of independent freelancers.

Similarly, the quality of a Methodology can never exceed the quality of the Terms of Reference for an assignment because adding additional tasks to improve quality means adding extra design costs, so to have any chance of winning the award of an assignment even obvious shortcomings must of necessity be ignored. Pointing out such shortcomings in Comments on the Terms of Reference and covering the cost as an 'Optional Extra' in the Financial Proposal may even count negatively if the authors of the ToR also adjudicate the methodologies. In some countries adjudication is left to junior staff with checklists to tick, so attempting to show technical excellence and understanding is unlikely to gain any recognition.

4.3.15 Causing Division

A further problem that arises as a result of the current MDB procurement system is that using the same methods as are used to procure Works **construction** contracts to procure **design** contracts causes the same confrontational relationship between Client and Consultant as often arises between Employer and Contractor. That should never happen – a Client and its Consultant should work as a team having the same aims and objectives, in just the same way as doctors and their patients, and lawyers and their clients. Clients should be able to trust their consultants to give them the best advice and should not need to be as informed as their consultants so they can check on everything they are told – that is tantamount to 'keeping a dog and barking yourself!' However, the best advice often comes at a price to the Consultant, and so the Consultant must be able to trust that such additional costs will be recoverable.

4.4 Problems Caused by the Separation of Construction Supervision from Design

Insisting that a second round of QCBS must be applied to appoint consultants for Construction Supervision of a project creates the following problems:

- it doubles the Road Authority's workload involved in the preparation of Terms of Reference and evaluation of proposals.
- it doubles the Funding Agencies' workload involved in the vetting of ToRs and approval of selected consultants, which judging by the extensive delays invariably experienced they are not adequately equipped to carry out.
- it doubles the opportunities for corruption.
- it encourages inadequate design and gives rise to the excessive use of the term "*To be decided by the Engineer on Site*", which is

acceptable if the intention is to defer input until a more appropriate time when the Design Consultant becomes '*the Engineer on Site*' during construction, but which is simply a cop-out when applied by a Design Consultant shifting the design work onto a different Supervising Consultant. Deferment of the design of some details of the project until a more appropriate time when accommodation is available on site and a design team can be established there is often the preferable option for the preparation of local details.

- it divides responsibility for the project and in the event of the massive cost overruns that are commonplace on aid-funded projects responsibility is impossible to apportion (although, in fact, it should be laid fairly and squarely at the door of the funding agency that dictated the division of responsibility in the first place).
- it effectively blocks any development of innovative ideas because no feedback will be forthcoming during construction and there will be no opportunity to amend the implementation methods if the initial concept is not 100% successful, always assuming that the Supervising Consultant does not allow the Contractor to reject it and revert to conventional methods simply because that is easier or more profitable for the people involved.
- it can place an additional load on site supervision team members, who are specialists in their own particular field, which is primarily concerned with implementation of designs and specifications and not their preparation. They are seldom as qualified to do design work as the design engineers who prepared the design. That is especially the case when the RA has lost the electronic versions of the design model and drawings, which is all too frequently the case.
- it makes no provision for the additional cost of applying Value Engineering principles, which are best applied (or confirmed) after rates for construction of the Works have been tendered, and which could lead to very significant savings on the contract value.

One wonders at times whether obvious gross errors by a design consultant such as issuing concrete layout and reinforcement drawings for different bridges, or providing drawings for a cambered bridge in a superelevated road section, might be intentional, so that other consultants competing for supervision of construction of the project are obliged to price the cost of redesign into their proposals. Pointing out such gross errors during the tender process never seems to gain the recognition that it should be accorded.

5. SOUTH AFRICAN EXPERIENCES

Whilst those who have had no experience of procurement systems other than those currently used by funding agencies may doubt that these proposals can work it may help to know that in 25 years as a consultant in South Africa the

author had:

- never seen a Terms of Reference (all consultants knew what was expected of them, and strove to exceed it);
- never written a Technical Proposal (all Clients knew what they were going to get, and that consultants could not necessarily see the end from the beginning, so things might change during the course of an assignment);
- never priced a Financial Proposal (fees were determined according to a Scale of Fees agreed between SAACE and the Clients, or gazetted by the government); and
- never had to write up a CV (consultants were judged on past performance, not on who they employed).

The **QUALITY** of the design work produced using those procurement procedures bears testimony to the fact that they far surpassed the funding agencies' methods, which are primarily based on **COST**, with the result that a design consultant is obliged to cut costs (primarily design input time) to a minimum if it is to have any hope of making a profit. However, it also cannot be denied that the SA system was flawed in that it depended on the Value of the Works as a determining factor in calculating what fees were due. A different approach is needed.

6 CONCLUSIONS AND SOLUTIONS

The general conclusions that might be drawn from the problems outlined above are that the funding agencies have no interest in the quality or safety of designs prepared under their aegis. Cost is all-important, Quality is irrelevant.

That being the case, it is suggested that to achieve the highest level of engineering excellence in the roads design and construction sector in Africa two things are needed, those being:

- Firstly, a method of making the current procurement procedure more efficient, less time-consuming for all concerned, and more cost-effective in the short- to medium-term, and which can be adopted immediately within the prescriptions of the Funding Agencies' QCBS procurement system; and
- Secondly, a longer-term solution for the procurement of consulting engineering services that will lead to the development of strong indigenous consulting and contracting branches of the highway engineering profession of any nation willing to work towards that objective.

The first step is seen to be necessary to cover the period up until roads projects can be fully funded out of national budgets because the Funding Agencies have

demonstrated that they have no interest in improving their procurement methods. However, if they wish to remain relevant in the Transport Sector they would be well advised to fund the upgrading of their methods.

The second step should be aimed at achieving the high level of engineering excellence amongst local consulting firms that the Funding Agencies' methods are currently thwarting.

This paper has summarised the first two of a series of four Procurement Discussion Papers (PDPs). The second two are named 'PDP3: Short Term Remedies'; and 'PDP4: Longer Term Remedies'.

'PDP3: Short Term Remedies' provides, *inter alia*:

- Proposals for improvement of the QCBS procurement and compensation methodology;
- Proposals for a Standard Road and Bridge Design Methodology and a preliminary list of design Activities, Tasks and Sub-Tasks; and
- Proposals for ensuring the continuity between Design and Construction Supervision.

'PDP4: Longer Term Remedies' provides:

- Proposals for a more efficient methodology for road network planning and design based on the South African 3-stage methodology.
- Discussion of factors that contribute to the cost of producing quality road and bridge designs.
- Discussion of the costs of running an engineering design consultancy.
- Discussion of the attributes of a fair method of determining remuneration for road design work.
- Some thoughts on alternative funding methods and peripheral supporting activities.

These PDPs are available to anyone interested in further discussion from segar.brian@gmail.com.