

PROGRESS WITH THE NATIONAL INFRASTRUCTURE MAINTENANCE STRATEGY

Kevin Wall

CSIR, P.O. Box 395, Pretoria, 0001; Cell: 082-4593618, Email: kwall@csir.co.za

ABSTRACT

The *National Infrastructure Maintenance Strategy* was approved by Cabinet in August 2006. This strategy sets overarching policy for sector-based initiatives, and describes the framework for a coordinated programme of actions. Simultaneous infrastructure investment and maintenance that will result from this strategy will not only improve infrastructure performance and underpin services sustainability, but will also contribute significantly towards national and local economic growth and will add long term jobs.

The paper describes the background to the strategy, the strategy itself, and progress with its implementation.

1. INTRODUCTION

Infrastructure, in the form of public buildings, roads, water and sewerage systems, electricity and other services, supports quality of life and is the foundation of a healthy economy. This paper describes the *National Infrastructure Maintenance Strategy* (NIMS)¹, its background, and progress with its implementation. Approved by Cabinet in August 2006, this is a coordinated programme of actions that is an essential part of government's vision of delivering infrastructure services to all.

2. PROBLEM STATEMENT

All three spheres of government, together with the state owned enterprises (SOEs), manage major portfolios of immovable infrastructure assets. (For the purposes of this paper, "public sector" includes SOEs such as Eskom, Transnet and Telkom.) While there is much emphasis on "delivery" of infrastructure, delivery does not in fact end with the commissioning of the infrastructure asset. Once the infrastructure has been commissioned, various activities must be carried out which are necessary to ensure that it continues to perform – such as the allocation of necessary budgets and the retention of appropriate staff to maintain the operation of the assets. "Delivery" needs to be universally understood as embracing not just constructing the infrastructure, but the appropriate operation and maintenance thereafter, for the whole design life of the asset.

In this paper, "maintenance" is used as a generic term to include planned maintenance,

¹ "National Infrastructure Maintenance Strategy. In support of ASGISA and government growth objectives." Department of Public Works, Construction Industry Development Board and Council for Scientific and Industrial Research. 7 August 2006 (<http://www.cidb.org.za>).

repair, refurbishment and renewal, and provision for replacement of the infrastructure.

In 1994 the democratic government evaluated the imbalance in infrastructure that characterised the nation, and embarked on an ambitious plan to put matters right by addressing the backlog. For example, the government has invested significantly in providing water to 15 million people. Other infrastructure provided at the same time, such as sanitation and road infrastructure, has further improved the quality of life of the people of South Africa. Government is committed to increasing levels of infrastructure investment at national, provincial and municipal government level as a foundation for service delivery, economic growth and social development.

The blueprint for a new South African Economy, the *Accelerated and Shared Growth Initiative for South Africa* (ASGISA), identified six "binding constraints", which, if removed or mitigated, would have a considerable effect on accelerating and sharing growth in the short to medium term. One of these is the provision of infrastructure. Clearly, the impact of increased infrastructure investment would be negated should that infrastructure fail to deliver services, and therefore ASGISA recognises the need to simultaneously address backlogs for investment in maintenance and in new infrastructure.

Government should not change its focus on new infrastructure to address backlogs from the past. The challenge is to supplement this by, at the same time, also focussing on the maintenance of both new and old infrastructure.

All spheres of government, as well as the SOEs, face the challenge of operating and maintaining infrastructure. Some public sector institutions maintain their infrastructure at a high standard. Budgets are adequate (even if barely so), skilled staff are in place, leadership is committed, and policies support sound infrastructure maintenance practices. Other sectors have lagged behind, but the risks of this are recognised, and in some sectors maintenance needs are being addressed by targeted programmes.

Of wider importance than programmes targeted at individual sectors, the Government Immovable Asset Management Bill (GIAMA) is before Parliament. The Act will be binding on national, provincial and local government and will guide improved public sector infrastructure asset management.

Despite the good performance in some sectors, there is strong evidence that in other sectors much of the infrastructure, of both pre- and post-1994 vintage, is not being properly maintained. Older infrastructure is often not being refurbished and renewed when it needs to be, and there is inadequate planned preventative maintenance on new infrastructure.

Wastewater treatment works are of particular concern. Other sectors of concern include water treatment works, water and sewer reticulation, and on-site sanitation, some provincial and municipal roads, and some provincial health and education facilities. Ultimately, unless maintenance is improved in these sectors, funds to address the cost of repairs and unplanned replacements (as opposed to planned, preventative measures) will have to be found from capital budgets, which will severely limit the programme for addressing backlogs and expanding service delivery.

Generally, the larger institutions are performing the best with regard to maintenance - for example DWAF water resources, the larger water boards, Airports Company (ACSA), Telkom,

Eskom, national roads (SANRAL), Transnet and most of the metropolitan municipalities. On the other hand, some services in some of the rural-based municipalities have already failed.

From an accrual accounting perspective, there is no real saving in reducing maintenance budgets, because the resulting reduction in asset values is invariably greater than the saving in maintenance. Furthermore, there are other significant costs associated with inadequate maintenance and consequent breakdowns. These costs could include loss of production and consequent economic loss, health risks, injury or loss of life, and the cost of alternative emergency measures needed during breakdowns.

Given that some public sector institutions are not likely to be able to improve their maintenance policies and practices without strong direction and assistance from national government, a holistic national infrastructure strategy is needed, to ensure that existing and new infrastructure is maintained in good working order.

3. INFRASTRUCTURE MAINTENANCE: A STRATEGIC TOOL

While the importance of the provision of infrastructure to support socio-economic growth has to date been well recognised within government, the potential of infrastructure maintenance as a powerful tool of economic growth and service delivery needs to come more to the fore.

Infrastructure maintenance must be regarded as a strategic tool to promote improved service delivery, to unlock funding to extend infrastructure to historically disadvantaged communities, and to support the nation's economy. Maintenance of existing infrastructure should not be seen as of secondary importance to the apparently more attractive prospect of new infrastructure.

Appropriate infrastructure maintenance also creates jobs. For example, maintenance needs to be done year after year, and personnel to do this maintenance will therefore always be needed – not just for the limited period of construction, but also for the whole of the designed life of the infrastructure. Furthermore, much maintenance can only be done, or can best be done, by labour-intensive methods, and it is thus important that government's plans for employment creation and the Expanded Public Works Programme (EPWP) give prominence to maintenance. There is substantial scope for maintenance contracts to promote SMME development, Broad-Based Black Economic Empowerment (BBBEE), involvement of women and youth, and local employment coupled with appropriate enterprise development.

Based on a conservative estimate of 12 equivalent full time jobs for a year per million Rand, a maintenance budget of R10 billion would provide employment to approximately 120 000 people for a year. Where labour-intensive methods are appropriate, for example on selected civil engineering works, much greater levels of employment are attainable (approximately 50 jobs per million Rand).

Maintaining infrastructure comes at a cost, but this is a prudent investment which will save government significantly in the medium to long term and will promote both economic and human capital development.

4. REVIEW AND ANALYSIS

A sector by sector review of the state of infrastructure and facilities, the state of their management, and current initiatives to enhance maintenance was undertaken for the purposes of the Strategy^{2,3}. This revealed that maintenance of the stock of infrastructure that is owned by government and its agencies varies greatly from sector to sector, and often also from institution to institution within a sector. Specific sectors have their own unique challenges. Commonalities and differences between sectors are described and discussed in “Key contrasts”.

The review indicated that all public sector institutions could, in respect of the state of their infrastructure and facilities maintenance, be placed in one or the other of two broad categories described below and set out in Table 1:

- Category A: They have sound asset management plans for their strategic infrastructure (if not for all of their infrastructure), maintenance budgets are adequate (even if they could always do with more funding), capacities and skills are adequate, and their leadership has a strong maintenance ethic. OR: They are largely missing one or more of the elements listed above -- for example they might have the plans and the skills, but maintenance budgets, although substantial, are not adequate. However they recognise this, improvement is taking place, and further improvement is programmed.
- Category B: These are not as strong in each of the elements as the institutions of Category A are. Furthermore, this situation is not improving, and might even be deteriorating. OR: They do not have asset management plans, maintenance budgets are not adequate, they lack capacity, and their leadership does not regard maintenance to be very important.

Table 1 Public sector institutions by their state of maintenance

Category	Brief description	Institutions
A	Adequate and/or improving maintenance	SANRAL, national government public buildings, DWAF, ACSA, Eskom, Telkom, Transnet, some provincial roads, some provincial health and education, some municipalities, some water boards
B	Inadequate maintenance and/or deteriorating	Some provincial roads, some provincial health and education, most municipalities, some water boards

The main differences between Category A and B institutions are:

- Although nearly all institutions have in recent years been given responsibility for significant amounts of newly constructed infrastructure, the Category B institutions have become responsible proportionately for much more than they had before; and
- Within the Category B institutions, the maintenance budgets and the numbers and skill of their staff have not increased in step with the increase in responsibility for infrastructure. In some cases, the numbers of skilled staff have reduced, whereas, in the Category A

² Ibid.

³ cidb (2007). “The State of Municipal Infrastructure in South Africa and its Operation and Maintenance; An Overview”. (<http://www.cidb.org.za>)

institutions, budgets and staff are more closely keeping up with the increase in the amount of infrastructure.

Other significant differences between Category A institutions and Category B institutions relate to:

- political and senior administrative emphasis on maintenance;
- balance between new construction and existing infrastructure and facilities;
- design and construction quality (which affects the amount of future maintenance required);
- age of infrastructure and maintenance history;
- operation of infrastructure;
- usage of infrastructure (e.g. overloading);
- institutional stability or change;
- institutional financial viability;
- external forces requiring that maintenance be attended to (e.g. regulatory and safety requirements);
- external assistance offered or imposed (e.g. funding and of skills);
- procurement of external assistance; and
- ringfencing of services.

It is important to identify which Category B infrastructure and facilities sectors constitute the greatest problem in terms of issues such as:

- severity of problem and how frequently it is experienced;
- effects on human health and economic growth;
- lack of effective countermeasures in the event of failure of the service; and
- the risk generally to government's growth objectives.

Wastewater treatment works are often problematic, as are water treatment works, water and sewer reticulation, on-site sanitation, some provincial and municipal roads and some provincial health and education facilities. These sectors must be the main focus of efforts to assist the Category B institutions. If not, very substantial resources to address repairs and unplanned replacements (as opposed to planned, preventative measures) will ultimately have to be found, which would severely limit the programme for addressing backlogs and expanding service delivery.

5. ACTION PLAN

It is evident that a holistic national infrastructure maintenance strategy is needed. Whereas Category A public sector institutions are on the path to sustained infrastructure service delivery through maintenance improvement, **it does not seem that Category B institutions will (with a few exceptions) be able to improve their maintenance policies and practices without strong direction and assistance from national government.**

The section describes the National Infrastructure Maintenance Strategy (NIMS), aimed at promoting sound maintenance of infrastructure and facilities across the whole of the public sector. While it will assist and set parameters for all public sector institutions, its primary target is the institutions in Category B.

The four thrusts of the National Infrastructure Maintenance Strategy, implementation of which will lead to the achievement of this vision, comprise:

- i. Strengthening the regulatory framework governing planning and budgeting for infrastructure maintenance.
- ii. Assisting institutions with non-financial resources.
- iii. Developing the maintenance industry.
- iv. Strengthening monitoring, evaluation and reporting, and feeding this into a process of continuous improvement.

These thrusts are described briefly below:

I. Strengthening the regulatory framework governing planning and budgeting for infrastructure maintenance

As noted earlier, planning and budgeting for maintenance varies greatly across the public sector. The most effective way to address the needs of those institutions that have not adopted sound infrastructure maintenance policies and practices is to strengthen the performance requirements within the regulatory framework and Treasury guidelines governing the management of immovable assets, the compilation of strategic plans and the annual budgetary process. This will result in improved motivations for additional funding for maintenance, a prerequisite for receiving increased funding.

Some important work is already underway to address these issues. The Department of Public Works has tabled GIAMA in Parliament. In addition, National Treasury is continuing to develop and improve Asset Management Guidelines. These two initiatives will provide a government-wide policy framework for the management of assets; including:

- Planning for new infrastructure (and considering alternatives such as non-asset solutions (eg mobile service centres) and maintaining existing assets better so that they can continue to be used rather than building new assets);
- Compiling and updating of asset registers, including the information required to be kept on asset registers (eg description of the asset, condition of the asset, maintenance history, value, utilisation, etc);

In addition to these existing initiatives, a further initiative is required to ensure that public bodies increasingly link new capital investments to ongoing operational and maintenance budgets, and increasingly budget for maintenance of existing infrastructure over time. It is also important that funding of infrastructure be changed to a life-cycle funding approach rather than a funding approach which focuses on the initial construction costs only. The focus of improved planning should be for institutions to identify the strategic infrastructure that is “mission critical” to their service delivery, and to ensure that this strategic infrastructure is adequately maintained.

Action 1: Review, strengthen and harmonise the strategic planning regulatory framework, so that it includes requirements for planning and budgeting for maintenance especially of infrastructure of a strategic nature.

Action 2: Create links between the capital budget, the operating budget, and the infrastructure asset management plan of each institution, to ensure that financial provision for maintenance is specifically linked to currently owned strategic infrastructure and to decisions on investment in new capital infrastructure. Create mechanisms to monitor this, and to apply corrective action where necessary. Such mechanisms will include:

- Requiring institutions to prepare budgets which reflect sufficient provision for maintenance (particularly for strategic infrastructure to be maintained) – Treasuries should refer back those budget submissions which do not make provision, and should invite the institutions to revise the budgets and to make such provision;
- Checking that the financial statements of expenditure, submitted after the end of the financial year, do not without good motivation diverge from the approved budgets for maintenance.

Action 3: Treasuries (national and provincial) to plan for increasing global allocations for maintenance over time (assuming that adequate motivations for increased maintenance funding are received from institutions), until such time as maintenance funding approaches an optimal level.

In terms of GIAMA, it will become obligatory for public sector institutions to draw up sound multi-year infrastructure asset management plans.

Action 4: Gazette regulations in terms of GIAMA, requiring adequate planning for maintenance (including guidelines for the organisational structures and skilled staff required to manage the planning and implementation of maintenance programmes).

Many public sector institutions do not have the resources to address all maintenance issues and also deal at the same time with backlogs of new infrastructure provision. They therefore need to identify strategic infrastructure for prioritised maintenance funding - i.e. infrastructure which underpins the core economic and social development of the country, and the failure of which due to a lack of maintenance could have serious economic, social, health, safety or security consequences. From the review, it is evident that some of this strategic infrastructure is not being maintained properly -- many wastewater treatment works and health facilities, for example. Until such time as maintenance budgets are adequate to meet all the maintenance needs, strategic infrastructure must receive priority in the allocation of maintenance budgets.

The corollary of this is that public sector institutions should be encouraged to identify infrastructure that is least utilised or in some or other way can be categorised as of least importance. This infrastructure can consciously be dropped from long-term maintenance programmes, so that funding can be released for the maintenance of other, more important, infrastructure.

Action 5: Incorporate in the regulatory framework described above requirements for (i) identifying key strategic infrastructure (for example water and wastewater treatment works, key arterial roads, etc.), (ii) specifically budgeting for the adequate maintenance of this strategic infrastructure, and (iii) reporting performance.

One of the key challenges in increasing funding for maintenance is the financial viability of

some institutions. No programme to improve infrastructure maintenance will succeed in some institutions if their financial viability is not improved. (Several initiatives aimed at improving the finances of targeted municipalities are already underway or planned).

One of the challenges in improving the condition of public buildings lies in finding an appropriate balance between the need to maintain our national heritage embodied in public buildings and the need to comply with government policies and regulations, eg accessibility for disabled people.

Action 6: Carry out an audit of heritage sites in order to identify work to make them compliant with government policies and regulations, and engage with the South African Heritage Resources Agency in this regard.

II. Assisting institutions with non-financial resources

Improving human resources capacity and providing better practice guidelines are measures that will assist institutions to improve maintenance. Supportive interventions that will be introduced include:

- developing norms and standards for maintenance of different types of infrastructure; and
- putting in place appropriate capacity-building, mentoring and direct support programmes.

Maintenance norms and standards will be developed for the various sectors (e.g. roads, water, sanitation, etc.) and good practice guidelines for planning, designing and implementing maintenance programmes will be produced, including guidelines on the skills required to plan and manage maintenance programmes, and guidelines on different implementation models, including private sector participation in maintenance programmes. Based on the maintenance standards, budgeting norms will be developed to facilitate accurate long-term maintenance budget forecasting, taking into account the type, age and condition of infrastructure.

These norms and standards will include maintenance budgeting guidelines on, for example, the percentage of infrastructure asset value that should annually be allocated to the maintenance budgets. The norms will differentiate not just between types of infrastructure, but also take into account factors such as size and extent, appropriate materials for various local conditions, age, usage, standard of construction, operator skills levels, current level of maintenance, residual value, etc.

The norms will also take account of reliability, which will be determined by what constitutes "failure", what the consequences of failure are, and mitigation plans. For example, if the "down time" of the asset must not exceed, say, 1% of the time, the maintenance norms need to be a lot more stringent than if the down time can be as high as, say, 10%.

Action 7: Develop and promote guidelines, norms and standards for the maintenance of infrastructure - covering financial, technical and skills aspects. Extend the Construction Industry Development Board (cidb) "Toolkit for Infrastructure Delivery Management" so that it will support public sector officials to improve the delivery and maintenance of infrastructure.

With regard to human resource capacity, one of the Joint Initiative on Priority Skills Acquisition (JIPSA) initiatives which is under way through the cidb is an audit of existing technical skills in

the construction (and maintenance) industry, together with projections of the skills requirements over the next fifteen years. This initiative is currently developing recommendations for actions to address the projected skills shortages. A similar initiative is required to identify the non-technical skills requirements related to improving the maintenance of infrastructure (eg knowledge of the importance of maintenance and the consequences of neglecting maintenance; skills in budgeting for maintenance, life-cycle planning and budgeting, and supply chain management).

Action 8: Carry out a study of the non-technical human resource capacity requirements for improving infrastructure maintenance, including identifying actions to address the identified skills shortages.

Action 9: Identify the Category B institutions, and build targeted capacity within them, through the Infrastructure Delivery Improvement Programme (IDIP), Project Consolidate and other capacity-building programmes. In particular, provide direct support to assist them (at the very least) to prepare asset management plans including maintenance plans.

III. Developing the maintenance industry

Given the skills shortages and equity imbalances in the infrastructure maintenance and construction industry, there is a need for the government to play a role in developing the maintenance industry particularly with regard to skills development, SMME development, and the promotion of BBBEE in the maintenance industry.

Action 10: Build the maintenance sector within the construction industry, with interventions including:

- Developing models, guidelines and procedures for procurement of maintenance services, particularly ongoing long-term maintenance contracts which will promote SMME development, BBBEE, involvement of women, and local employment coupled with appropriate enterprise development; and
- Building capacity in the industry, through means such as learnerships, mentorships and other forms of skills and contractor development programmes. The EPWP will play an important role in this regard.

IV. Strengthening monitoring, evaluation and reporting, and feeding this into a process of continuous improvement

Monitoring and evaluation processes must be strengthened and implemented -- with mechanisms for the feedback to result in the necessary improvements. This will enable performance change to be measured, but, as important, it will draw the attention of the institutions concerned to non-performance. The annual reporting requirements and the forthcoming GIAMA regulations provide the framework for this to take place.

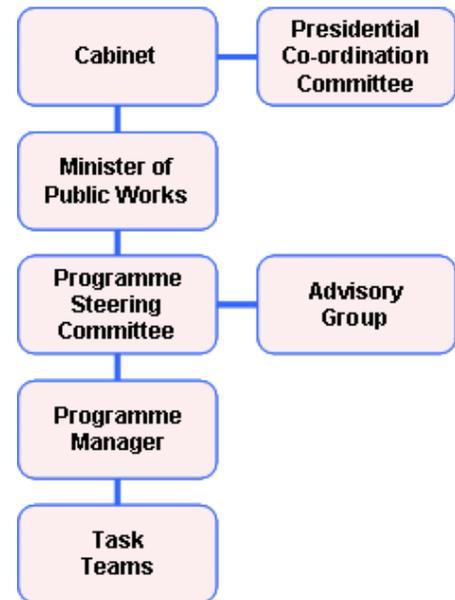
Action 11: Strengthen and implement monitoring and evaluation processes.

6. IMPLEMENTATION PLAN

The Minister of Public Works will provide political oversight within Cabinet of the NIMS, and the national Department of Public Works will perform the role of lead department. The Presidential Coordination Committee will provide political advisory services.

A broad based Programme Steering Committee is at the time of writing (November 2007) being established. This Committee will have oversight over the NIMS programme. Membership of the Committee will include:

- Presidency;
- National Department of Public Works (Chair as lead department);
- National Treasury;
- Department of Provincial and Local Government;
- Department of Public Enterprises; and
- Department of Water Affairs and Forestry.



The Programme Steering Committee may be expanded over time to include other champions as the programme progresses. In addition, it will also be necessary to forge provincial coordinating forums in order to roll out NIMS at a provincial and municipal level.

In addition to the Programme Steering Committee, an Advisory Group will be constituted in order to provide specific inputs and insights to the Programme Steering Committee and task teams. It is likely that this Advisory Group will include institutions such as DBSA, SALGA, IMESA and SANRAL.

A number of Task Teams are at the time of writing being established. These will focus on the implementation of the various actions within NIMS, aligned with the key thrusts described earlier, namely:

- Task Team 1 – Strategic Planning and Regulatory Framework
- Task Team 2 – Non Financial Resources
- Task Team 3 – Developing the Maintenance Industry
- Task Team 4 – Monitoring and Evaluation

The cidb will provide overall programme management for the NIMS.

7. CONCLUSION

Cabinet recognizes the importance of infrastructure maintenance within government and the role that effective maintenance will play in support of ASGISA. To this end, Cabinet has approved the NIMS, and the Department of Public Works is tasked with leading the implementation of the programme to deliver on the strategy.

The NIMS will promote sound maintenance of infrastructure and facilities across the whole of the public sector, and set parameters for all public sector institutions to perform against. These measures include strengthening the maintenance regulatory and governance

framework, requiring infrastructure asset management planning and linking this to budgets, assisting institutions to develop the required maintenance management capacity, developing the maintenance industry, and monitoring progress and feeding this into a process of continuous improvement.

Many of the Category B institutions are not able to improve their maintenance practice without some level of the assistance and regulation that implementation of the Strategy will provide. Although the Category A institutions are not the target of the Strategy, it is likely that the infrastructure maintenance of many of them will also benefit from some of these measures.

Simultaneous infrastructure investment and maintenance will not only improve infrastructure performance and underpin services sustainability, but will also contribute significantly towards economic growth and add long term jobs. The maintenance sector forms an integral part of South Africa's total construction delivery capability. Its activities are ongoing and substantially local in nature. Rapid growth of the maintenance sector, with its inherent labour intensity, will stimulate sustained job creation, skills development, SMME development and BBBEE.

8. ACKNOWLEDGEMENT

The NIMS was prepared under the strong and clear-sighted guidance of Dr Sean Phillips, Acting Director-General of the Department of Public Works during 2006.