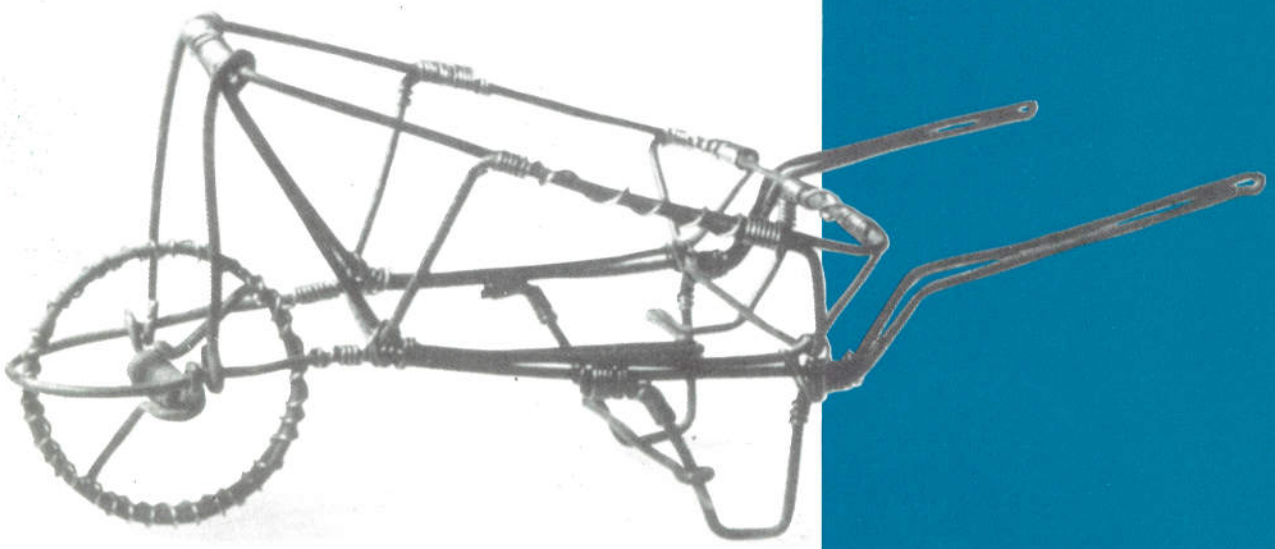
Labour-based opportunities in construction

Construction and development

Herbert Atkins



Number 6

Labour–based opportunities in construction

Construction and development series

Number 6

Development Bank of Southern Africa

Policy Working Paper 10

Guideline Paper

ISSN 1022–0127

ISBN 1–874878–10–2

April 1994

Compiled by Herbert Atkins

Centre for Policy Analysis

Development Bank of Southern Africa

Price: R10

Construction and development series

Titles in this series include

1	Socio–economic enhancement of development projects	R10
2	Interim guidelines for appropriate contract procedures and documentation for labour–based construction projects	R75
3	Guidelines for the identification of appropriate construction methods in developing areas	R10
4	Development and the application of building regulations	R10
5	Guidelines for emerging contractor development	R10
6	**Labour–based opportunities in construction**	**R10**
7	Emerging contractors: framework for estimating	R10
8	Concrete block paved roads: the development potential	R10

These documents can be ordered from:

Development Bank of Southern Africa
P O Box 1234
Halfway House
1685
Tel (011) 313–3911
Fax (011) 313–3086

Series preface

Policies and strategies for promoting development in South Africa are arguably as important a product of the Development Bank of Southern Africa as its loan finance and technical assistance programmes. This series of publications on 'Construction and development' illustrates this point.

Development projects in South Africa have traditionally been undertaken to meet only the physical needs of the recipient community. South Africa's changing social and economic environment demands that such projects are executed in a way that also addresses communities' other needs. To achieve this, projects should be structured so that opportunities for employment and the development of skills and entrepreneurial abilities are maximised.

Construction and maintenance of resultant facilities are an essential part of any growing economy and in South Africa historically an important employer and an industry typifying the overcapitalisation which has bedevilled the economy. These considerations, together with the fact that a large part of DBSA's lending goes to construction projects, suggest that it would be helpful to make practical proposals to assist the industry to adapt and contribute to development in the new circumstances.

The publications in this series present an approach to development that focuses on:

— identification of the broad economic and social needs of communities

— optimal use of resources available to them

— ways in which communities can exploit the opportunities presented by development projects

— approaches to making best use of labour — an abundant but underutilised resource

— appropriate design and methods of building and construction

— the use of, and misconceptions about, building regulations

— entrepreneurial development.

The publications are thus designed to help alleviate the constraints which have inhibited poorer communities from developing the skills at both individual and community level that can lead to entrepreneurship and genuine empowerment. This is perhaps the most important message of the series. It is above all through active participation in the process of development that individuals and communities can improve their quality of life. And it is to this end that the series is dedicated.

The Construction and development series of publications is produced by DBSA staff and consultants contracted to the Technical dimensions of development policy programme, whose advisory panel has recommended the widespread distribution of these publications to further the human development approach pursued by DBSA.

GJ Richter
General Manager

AM Muller
Programme Manager

Mission of the Development Bank of Southern Africa

The Development Bank of Southern Africa is a regional development institution whose primary aim is to facilitate socio-economic development and empower people economically in the region.

Acknowledgements

Many people in DBSA contributed to the opportunities tables, particularly David Alexander, Peter Copley, Hugh Farquharson, Nigel Lowe and Theo van Niekerk, who constituted the Infrastructure Task Team; Don MacLeod's contribution is also acknowledged. Useful suggestions about general content and format were made by Peter Copley, Barry Jackson, Chris Milne, Mike Muller and Helge Switala. Thanks are extended to Sean Phillips for reviewing the document. Typing and formatting were patiently undertaken by Sandra Calitz and June Ntuli.

Modification and additions

Users and readers are requested to share their comments, recommendations and own experiences. Readers who wish to contribute to further editions should contact the compiler.

Copyright

Contents

Part One: Introduction

Part Two: Project issues

Part Three: Project opportunities

Part One: Introduction

1. Purpose

The creation of employment is one of a range of developmental objectives that are priorities for South Africa at present. An outline is therefore provided of the broader context in which employment creation through labour–based construction should be viewed.

This publication has been designed to help decision–makers at project level to identify opportunities for increasing employment through the design, specification, contracting, construction, operation and maintenance of engineering infrastructure, buildings and services at local, regional and national levels of government.

This information should also be of use to project officers in identifying elements and tasks in a project that are suited to labour–based construction.

By employment is meant gainful occupation in the market–place, albeit possibly temporary, and not transient poverty relief.

This publication specifically applies the principles of developmental impact enhancement, as described in the first publication of this series on construction and development entitled *Socio–economic enhancement of development projects*, to projects with the intention of maximising employment creation in implementation, operation and maintenance of the asset being created. Other publications in the series provide particulars on issues only referred to here and should be consulted for clarification and supplementary information on labour–based construction, emerging–contractor development and estimating for small contractors.

2. Background

A non-racial democracy in South Africa will redress the exclusion from political power of the majority of South Africans but will not in itself solve the problems of poverty and deprivation. Differences in opportunity and of control over resources between sections of the population continue to exclude many people from the developmental process.

The South African economy is characterised by:

— A long-term decline in economic growth performance, with the average annual rate of growth falling from around 5 per cent during the 1950s to around 1,5 per cent in the 1980s, leading to a general decline in the standard of living as measured by per capita GDP.

— Growing unemployment due to long-term decline of economic growth and increased use of labour-saving equipment in production processes. The proportion of the labour force without formal employment opportunities in the 1980s fluctuated within a narrow band of 30-33 per cent and numbered about 8,3 million people in 1990.

— An increase in the supply of labour and of the number of people in dire poverty as a result of decline in the labour absorption capacity of the formal economy.

— Unequal distribution of income and wealth, which presents other development challenges, as do also the prevailing spatial distribution of economic activities, escalating urbanisation and vast backlogs in housing, education and health services.

Some developmental efforts, through training and capacity building, have been directed at improving the efficiency of labour. This does little, however, to increase the demand for labour. For this to happen projects that are labour-based and use local resources must be promoted, designed and implemented.

The national budget reflects the three layers of government spending: national, regional (provincial) and local. This paper is mainly concerned with local budgets as these can be immediately accessed, given the will to do so. Many municipal construction and building projects are of a scale and complexity that allow the replacement of equipment with labour, thus reverting to practices of building and construction that were common before the introduction of labour-saving devices. Building of roads and trenching for service mains are examples of work that can be done by hand if conditions are right. It is not intended to carry the substitution to an extreme: trenching through hard rock and road compaction, for instance, will still be done using machinery, otherwise the effort and cost would be too high and the desired standard might not be attained.

Local construction and building projects interest local people since they are the direct beneficiaries as users and so have a stake in what is to be delivered to them. People in poor communities also have an obvious interest in how a project is to be built, operated and maintained: there is a very real need to identify in current municipal budgets those projects that, though designed for capital-intensive methods, may be adapted for greater use of labour. This is an immediately achievable action to create employment as quickly as possible in view of the urgent need.

Over the longer term, given that a project may have a cycle of 4 or 5 years between time of identification and time of completion, the earlier the stage of the project cycle at which the decision is made, the greater will be the possibility of creating more jobs.

Job creation for social upliftment is not only about decisions affecting how particular line items in a municipal budget should be spent, but also essentially an approach to making the maximum use of locally available resources to stimulate the local economy. Building and construction can have a high local multiplier effect when projects are designed with that in mind.

3. Developmental impact approach

The present dire socio-economic conditions are a powerful inducement to re-evaluation of projects to increase their socio-economic impact on disadvantaged communities. The objective of the developmental impact approach is to encourage the participation of local communities throughout the project sequence, from identification to operation and maintenance, so that maximum benefits accrue to them.

The objectives of the developmental impact approach are:

— to provide the opportunities and ability to people to assume responsibility for improving the quality of their lives

— to facilitate the upgrading of the social and physical environment

— to increase employment

— to reduce poverty

— to stimulate economic growth

— to reduce imbalances in access to opportunities.

A labour-based project is an opportunity for job creation whether it is in a disadvantaged community or in a prosperous one, but particularly so in the former because of involvement of the community in the identification, planning, implementation, operation and maintenance of a project of which they are the beneficiaries. Labour-based projects can be as effective as more capital-intensive ones if designed for that purpose and implemented with the appropriate level of support.

Labour-based (labour-intensive) construction has specific technical and managerial requirements that have to be met before a project can be successfully done. In this regard, the proposed action plan (April 1994) of the pre-investment investigation undertaken for the National Public Works Programme of the National Economic Forum states: "Although labour-intensive production methods were used in the past, in many sectors they have been replaced with mechanised methods, and the skills associated with labour-intensive methods have largely been lost. A common misconception about labour-intensive construction is that it is unsophisticated and easy. In fact, the efficient management of large numbers of labourers requires sophisticated management skills and techniques. In addition, innovative ways of organising labourers on construction sites can result in large improvements to labour productivity levels. Another misconception about labour-intensive construction is that it is not proper engineering. However, given the availability of properly trained supervisors, it has been shown that the required quality standards can be achieved using labour.

The ultimate test of any developmental project must be the answer to the question: How better off are the disadvantaged communities after implementation of the project? The developmental impact approach identifies linkages that will enhance the benefit of the project at local level by adhering to the following guiding principles throughout the sequence of project and project-related events:

— Projects should contribute to satisfying broader community needs of job creation, entrepreneurial development, community upliftment, and not only the need of physical facilities.

— Local resource mobilisation should be maximised and sustainable. Once-off or unsustainable projects are palliatives that build up expectations only to dash them.

— Support mechanisms should be available to overcome constraints.

— Planning should be integrated, structured to generate innovative alternatives and involve all parties.

— Appropriate control measures and risk apportionment must be instituted.

— Devolution of decision–making should be maximised. It is important for communities to assist in deciding what is to be built and how if these are to fully benefit from projects.

The benefiting community needs to be satisfied that the project is being designed and implemented in ways that maximise job opportunities. For this to happen the technology employed has to be understood and available locally. The project process should give people a sense of identification with, and ownership of, what is to be built: the school or clinic thus becomes 'our school or clinic; ours because we recognised the need, selected the site, argued the brief, appointed the consultant, built the structure and we will use, operate and maintain it'; the facility being provided becomes an opportunity to create local employment and promote entrepreneurial development and thus uplift the community.

The developmental impact approach is not static and finite but ongoing, requiring evaluation, adaptation and updating as circumstances dictate. The approach adopted for a given community should reflect its degree of development. As a community develops and grows in confidence, so do the resources it can contribute to its upliftment. The developmental impact approach helps to identify opportunities for the local community to make the best use of its own resources and to use those of others only when it is in its own interests to do so.

The success of the developmental impact approach depends on the degree of commitment to it. Public budgets at all levels (national, regional and local) have to be scrutinised for their developmental opportunities. Labour–based construction, together with local entrepreneurial development, are obvious ways of directly benefiting the unemployed by putting money in the pockets of those most in need and willing to work. Money earned locally will be spent locally, thereby fuelling the local economy.

The search for opportunities should not be limited to the budgets of poor communities as those of the better off are likely to be a fruitful source. The belief that labour–based approaches are for the depressed areas since the workforce is likely to live there has to be modified by the realisation that prosperous areas have very considerable potential for job creation in the private as well as the public sector.

Part Two: Project issues

4. Project selection

When reviewing engineering and building projects in municipal budgets for job creation it is important to assess the practicality of the exercise. Embarking on drastic redesign at the moment of implementation after tenders have been awarded is difficult and time-consuming, and the cost may well outweigh the benefits from the extra jobs since the successful contractor would have secured the plant and equipment to do the job as originally specified. This fact could have contractual consequences which should be carefully evaluated beforehand so as not to incur disproportionate penalties that may discredit the approach at a time when labour-based methods may not have gained universal acceptance. When contractors are on site or about to move there, job creation is likely to depend on their goodwill as there is not likely to be legal obligation at this stage.

The job creation potential of municipal engineering and building projects is considerable. To facilitate the process the following actions are recommended:

— *Identification.* Departments should first of all assess their projects for their job creation opportunities. Part 3 gives a comprehensive list of suitable project components.

— *Timing*. When projects are at planning stage, with documentation prepared or in preparation but without a contractor appointed, design alterations to create job and entrepreneurial opportunities are possible, but some redesign costs may be incurred. Replacement of equipment with labour is likely to be the approach to be followed. Job creation by substitution is less than ideal.

  With projects at conceptual stage, that is identified but not yet designed, there is sufficient time to completely rethink the project by adopting standards of design and labour-based methods of construction that make the best use of local resources. The earlier the identification of a need when planning projects the greater will be the potential for supporting labour-based approaches.

— *Resource planning.* If skills are lacking in the area a local resource can be formed by training people in anticipation of the opportunities. The upgrading of skills will expand the scope and complexity of projects that can be designed. When embarking on a programme of labour-based projects there is an obvious need for reliable data on the skills already available in the area and on what future skills are likely to be required.

  The simultaneous development of entrepreneurial skills in disadvantaged communities, directed at benefiting from existing opportunities and ultimately at creating new ones, is essential to ensure continuity of employment beyond the confines of public-funded projects. If these skills are not developed locally, others will benefit by taking advantage of the gap in the market. In these circumstances, even though a physical asset is created its impact at the local level will be far less than if the beneficiaries had been involved throughout the project cycle. An aspect of a labour-based project that should not be overlooked is the close identification of a community with what it builds. 'We built this' gives a sense of achievement and ownership that cannot be equalled when the project is built by others.

  The same approach should apply to the availability of other resources, materials, machinery, and to the possibility of expanding them to satisfy a growing demand. Every community has its own particular mix of resources that has to be assessed beforehand.

— *Project selection.* Given the will to transform municipal engineering and building projects into local job creation undertakings, the following further actions are recommended:
The municipal departments should set themselves attainable targets of local job creation based on the projects in their budgets and on the existing and future quality of the local workforce. In considering projects for inclusion in such a programme the departments should not omit ongoing cleaning, refurbishment and maintenance operations as a source of job creation.

  The projects for a job creation programme should include those with a 3 to 5 year horizon since this is likely to be the time taken from project identification to completion.

Civil works and building, if not programmed to achieve continuity, follow a characteristic employment curve. Once the work is completed the labour force and local contractors often have to look elsewhere for work. High peaks of demand that increase the labour force followed by equally pronounced falls have unsettling consequences. Every effort should be made to even out the peaks and troughs to achieve continuity of local employment. Seen in this light the time allowed for completing a project acquires a significance that it might not otherwise have, particularly if the local labour force is seasonally employed in other activities.

Projects that rely on machinery tend to have completion times in keeping with the requirement to limit idle time, which still has to be paid for as hire time or amortisation even when the machinery is not in use. A similar short completion time when applied to labour–based contracts may imply employing a larger workforce. This may necessitate training more artisans than will eventually be able to find work in the locality after the project is completed. Another option, other things being equal, is to extend the completion time, so that a smaller workforce can be employed longer.

Medium and long term planning is needed to ensure that employment is sustainable within a region and that locally trained artisans need not move far in search of work. Sight should not be lost of the need to integrate local and regional projects. The local and regional planning function is to ensure that benefits (monetary and skills) resulting from one project become inputs for the next project. Sustainable employment implies labour mobility. The degree of success of a labour–intensive works programme in the public sector will influence the extent to which the private sector adopts the approach. This implies that labour–intensive projects will have to be competitive with more capital–intensive ones. This goal will only be achievable if labour–based construction gains full recognition as a viable project delivery option. For this to happen, the training and capacity–building mechanisms will have to be in place to equip communities and their labour force with the necessary skills for improving their performance; contractors will have to perfect their skills in organising and managing large labour–based projects in a competitive environment.

5. Sorts of projects

A variety of contractual and managerial structures should be investigated to determine which is the most suitable for the circumstances of the particular labour–based project. These circumstances are:

— size and complexity of the project

— size and capability of the workforce

— developmental level of the contractors

— location of the project.

The particular circumstance have to be assessed at the planning stage of the project to ensure that full use is made of local resources such as a skilled labour force and competent local contractors. The assessment would also reveal anything that might prevent the project from becoming an opportunity for job creation. The project options include:

— self–help projects where communities are assisted through project management and other support services to carry out the projects themselves

— demonstration projects and pilot projects to test new managerial or technical approaches and develop appropriate procedures and documentation

— training projects with an established contractor or project manager responsible for training local people in technical and managerial skills for labour projects and equipping them to carry out future phases and operate and maintain current phases

— project management contracts where large projects are subdivided for smaller local contractors to implement various labour components

— projects of small labour–based contracts to be executed by smaller contractors

— conventional contract projects in which an established contractor carry out as many areas of the work as possible using labour–intensive techniques

— combination projects combining the above as required by circumstances.

The developmental impact approach requires from the implementing agency a firm commitment to overcome hindrances to local employment; for example comprehensive support is likely to be required by local contractors bidding for labour–based projects. The contractor support requirements are discussed in greater detail in publication No 5 of this series, *Guidelines for emerging contractor development.* The areas in need of support are likely to be:

Finance related

— bridging finance, finance for working capital and equipment and long–term finance

— guarantee arrangements

— access to credit

— levies.

Training related

— capacity building

— technical and managerial training and counselling

— improving credibility

— direct assistance with tendering, site norms, professional practice

— networking with professional bodies, trade forums.

Market related

— marketing assistance

— removing prejudice

— accreditation

— continuity of work

— concentrated location–bound opportunities.

Addressing the support items alone will not result in contractor advancement. Efforts should also be directed to policy, programming, institution–building and financial, project and programme aspects.

6. Project structure

Local labour is a resource, the use of which will provide extra employment, which can be maximised by appropriate design.

The design challenge is to match local resources (both human and material) with project needs. Projects have backward and forward linkages that in turn become sources of local employment, for example the supply of building materials and the employment opportunities created by the facility to be built. These linkages strengthen the economic base of a community and so are important when assessing the employment potential of a project. A local block-making operation set up to satisfy the needs of a project becomes a local resource for future projects.

The use of local resources varies in labour-intensive projects. Initially, when a labour-intensive programme is being set up, the benefits to labour are likely to be at the lower end of the range for a particular type of work. As the programme develops, labour methods will be better understood, and problems anticipated and resolved in the planning and design stages rather than dealt with on site as they arise. With better understanding of the objectives of labour-based methods, the benefits to the labour force will progressively shift to include the higher end of the range.

Publication No. 2 in this series, *Interim guidelines for labour-based construction projects*, gives an assessment of the local-content potential of labour-based projects as follows:

Highest potential: 60 — 80 per cent local content	small earth dams, gravel roads, open stormwater channels, embankments, landscaping, shallow water wells, erosion control, reafforestation, sport fields, felling of trees and clearing, excavation of building sand and gravel, breaking of aggregate
Medium potential: 30 — 60 per cent local content	general building work, cable-laying, blockwork, cisterns, reservoirs, aqua-privies, water mains, paved roads, shallow sewer systems
Lower potential: 10 — 30 per cent local content	maintenance, applicable sealed roads, culverts, small-bore water mains, deep sewer systems

The ranges reflect considerable scope for improvement. Local-content improvement targets could be incorporated in labour-based programmes. As the labour-intensive approach gains acceptance there should be a shift towards the higher ranges of local content.

Part Three: Project opportunities

The tables in this section identify and qualify opportunities for labour–intensive approaches and for entrepreneurial development in civil works, building and provision of municipal services. Each of the project types enumerated is broken down into its constituent activities and these are evaluated for the opportunity they represent for labour jobs. Labour methods do not necessarily mean entrepreneurial development, though the two complement each other since local labour is a resource readily available to the local entrepreneur.

The suitability of a project for creating jobs for the local population can be measured by comparing the labour component of the project using conventional methods of construction with that of the same project when specifically designed for labour.

Labour rates and productivity can vary considerably between regions. Consequently each region will have its own set of costs for projects relying on labour and on equipment. In some regions the seasonal variability of labour may have to be taken into account when designing labour projects.

It is essential that all participants (community, local authority and consultants) agree about rates of pay, whether they are daily, task or piece rates. Productivity will increase with motivation, being highest for piecework, that is payment for the number of tasks completed in a period of time. If the rate is too low the result will be a disgruntled labour force with people turning up for work only when they have no other choice. A high rate of pay will result in higher productivity as the contractor is in a position to select the labour.

Labour–intensive construction does not mean that there should be no construction plant on site. The correct mix of labour–based and equipment–based construction is required to serve the needs of a project in response to the particular circumstances of place. Handling material over long distances, for instance, may not be a reasonable proposition other than by using equipment. If material to be excavated for roadworks is very hard, an option is to machine rip it and then load and spread by hand. Design and specification are important when considering the suitability of an activity for labour–based construction. A storm water drainage design might require the installation of heavy sections difficult to manhandle; other more labour–friendly options might be to install smaller sections or open lined channels.

In conclusion, the tables will have to be adjusted to take account of the particular conditions in a region. As a community prospers the mix between equipment and labour will have to be adjusted to reflect this.

Labour–intensive and emerging contractor opportunities:

Road construction

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
A. GRAVELLING OPERATIONS				
1. Repairing camber formation	x			
2. Quarrying				Environmental reinstatement is arguably easier and more effective on labour–based clearing operations than on machine–based clearing owing to the extent of the operations.
— digging trial pits		x		
— removing topsoil and vegetation		x		
— digging and stock–piling	x			
— passing gravel through screen	x			
— loading gravel onto cart	x			
3. Hauling				Scope on tertiary roads in remote areas for using animal–drawn transport or agricultural vehicles out of planting and harvesting seasons.
— driving cart to transport gravel	x			
— loading and pushing wheelbarrow	x			
4. Unloading and spreading				
— preparing existing road	x			
— control tipping of cart	x			
— making tipped loads	x			
— setting width of road	x			
5. Supporting activities				
— sharpening tools	x			
— carrying water, moving camp	x			
— cutting setting pegs, repairs	x			

Labour-intensive and emerging contractor opportunities:

Road construction

Activity	Applicability			Notes
	Good	Avge	Poor	
B. CONSTRUCTION				
6. Site clearing				
— bush clearing	x			Can also meet energy and building needs of surrounding populace (ie there is additional commercial potential).
— felling trees	x			
— removing stumps	x			
— removing boulders	x			
7. Earthworks				
— excavation				1. Road design should limit material hauling, preferably across the road from side cut to fill, achieved when following contours. Compaction may have to be mechanical. 2. Scope on tertiary roads in remoter areas for using animal-drawn transport or agricultural vehicles out of planting and harvesting seasons.
* soft ground	x			
* hard ground			x	
— excavating and filling	x			
— forming embankments	x			
— trimming and finishing slopes	x			
— gabion type and other patented retaining walls, eg reinforced earth	x			Should be built into design and specified in contract documentation.
8. Subsurface drainage				Transport costs should be reduced through use of readily available materials. Masonry, brick or stone should be used rather than reinforced concrete. The preferred method should be specified in contract documentation.
— pipe trenching and laying	x			
— arch culverts	x			
— box culverts		x		
— ditching	x			
— shaping	x			
— inlets/outlets	x			
9. Surface drainage				As for subsurface drainage. Unlined rather than lined channels give more scope for ongoing work through maintenance.
— lined (concrete, stone pitched, grass, dust palliative)	x			
— drifts		x		
— unlined (gravel, natural vegetation)	x			

Labour–intensive and emerging contractor opportunities:

Road construction

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
10. Layers				
Low Volume Roads				
— sub–base	x			Stabilisation of *in situ* soils should be considered.
— base course of *in situ* soil, natural gravel, stabilised gravel, macadam stone (esp waterbound)	x			These are all suitable for labour–intensification and emergent contractor applications and should be specified.
High Volume Roads				
— sub–base			x	
— base course			x	
Riding surface				
— dust palliative	x			Good for labour–intensification and results suitable even for heavy traffic. Preferably undertaken by a single contractor. Commercial potential exists for continued paver production.
— cape seal	x			
— asphalt–patching	x			
— slurry	x			
— concrete pavers	x			
— brick pavers	x			
— single seal		x		
— double seal		x		
— asphalt new layer			x	
— concrete slab			x	
11. Bridges				
— foundations		x		Equipment–based methods are preferred in the wet. Drifts should be considered as an alternative to bridges particularly on low–traffic rural roads.
— abutments and piers		x		A high content of imported materials, large–diameter or prestressed steel reinforcing and bulk high–strength concrete should be avoided to enhance opportunities for emergent contractors. Focus on masonry, brickwork and timber.

Labour–intensive and emerging contractor opportunities:

Road construction

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
12. Environmental harmonisation and protection				Useful items as they are generally not in the critical path and machines have moved away to other sites. Thought should be given to making the tasks easier (eg petrol–operated augers for post–hole digging).
— guard–rails	x			
— signposts	x			
— road studs	x			
— water channels	x			
— bank trimming/protection	x			
— grass establishment	x			Programming essential for client to avoid time related claims from main contractor. Items should preferably be subcontracted and programmed at site meetings to proceed in parallel with substantial completion of sections of the main contract. Specify main contract time cut–off in contract documentation.
— shrub planting	x			
— erosion control	x			
— gabion–basket handling	x			
— gabion filling	x			
13. Fencing: Manufacturing				1. As guiding principle, adjacent land users should express the desire for a fence, and materials should then be made available to them for erection on a subcontract basis. This reduces the chances of later vandalism and theft. 2. Wooden fence posts should not be used in rural areas as they burn. 3. Transport needs to be available if fencing > 500 m lengths.
— mesh	x			
— barbed wire		x		
— plain wire			x	
Installation				
— post holes/erection		x		
— stringing/straining	x			
— droppers		x		
— transport			x	

Labour–intensive and emerging contractor opportunities:

Road maintenance

	Applicability			
ACTIVITY	**Good**	**Avge**	**Poor**	**Notes**
1. Grass cutting and noxious weed eradication	x			Small contracts with the road authority. Commercial potential exists for sale of cut grass for thatching or winter feed. It is not generally known that 60% of tollway maintenance cost is spent on grass cutting. The road authority should take out insurance cover against legal risk to motorists from actions of emerging contractor.
2. Crack sealing	x			Requires close technical monitoring.
3. Pothole patching	x			Requires close technical training and monitoring. Materials should be made available to avoid wrong choice.
4. Shoulder repair	x			Consider 1 km 'lengthman' contracts. Material should be provided.
5. Subsurface drainage	x			Requires established scheduling and should be done in the dry season. This presupposes access to pipes.
6. Surface drainage — cleaning lined drains — repairing lined and unlined drains	 x x			Should be done in the wet season according to schedule.
7. Culvert and bridge maintenance	x			Assumes some technical skill.
8. Cleaning — road reserve — road surface (washed–on sand/ vegetation and rubbish)	 x x			1. 1 km of road reserve can generate 7 tons of rubbish per annum. Transport necessary (bakkie) and access to a disposal site. 2. Sand needs only to be cleared, hence no transport necessary. Litter on road surfaces can cause premature failure of low–trafficked roads, hence the need to keep roads clean, especially urban.
9. Fencing — repair	 x			Crucial for adjacent land user 'ownership' to be encouraged to minimise vandalism and to prevent destruction of fence to create work.

Labour–intensive and emerging contractor opportunities:

Road maintenance

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
10. Erosion protection	x			Ongoing, rapid response after rains.
11. Associated services				Frequently overlooked owing to in–house capacity. Contracts should be negotiated or set on established piece–work productivity norms.
— painting of depots	x			
— cleaning of depots	x			
— washing of plant	x			
— building repairs	x			
— cleaning and replacing road signs		x		
12. Road surface				
— regravel	x			Preferably done as a continuous process but scope exists for small labour–intensive gravel repair sections, say up to 1 km in length.
— reseal fogsprays	x			Suitable for emergent contractors but not labour–intensive.
— sand/cape/slurry seals	x			Preferably undertaken by a single contractor but scope exists for small 'heavy pothole' repair sections, say up to 500 m in length.
— premix			x	Not suitable for small contractors except in patching using bagged premix.

Labour–intensive and emerging contractor opportunities:

Energy projects (mainly electricity)

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
1. Digging holes for pole erection	x			Procurement and transport assistance required.
2. Bush clearing and continued maintenance of reserves	x			Small–contractor potential as not on critical path.
3. Trenching	x			As philosophy, DBSA support should preferably be for aerial cables/ bundles (ABCS) rather than underground cables.
4. Backfilling trenches	x			Generally uncompacted.
5. Manholes: brick or block, eg in substations	x			1. As contract piece–work. 2. Assistance in procurement and transport required. 3. Block–making preferred as demand more sustainable after project complete.
6. Road crossings	x			Requires close technical monitoring particularly of materials and traffic handling.
7. Substations				
— concrete	x			Supervision required to meet tolerances.
— bricklaying	x			Subcontractor potential.
— cleaning	x			
8. Photovoltaic systems				
— erection	x			Potential for small contractors with technical knowledge.
— maintenance	x			

Labour-intensive and emerging contractor opportunities:

Telecom projects

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
1. Pole erection	x			Procurement and transport assistance required.
2. Bush clearing and continued maintenance of branches.	x			Small-contractor potential as not on critical path.
3. Trenching	x			As philosophy, DBSA support should preferably be for aerial systems rather than underground cables.
4. Backfilling trenches	x			Generally uncompacted.
5. Manholes : Brick or block	x			1. As contract piece-work. 2. Assistance in procurement and transport required. 3. Blockmaking preferred as demand more sustainable after project complete.
6. Road crossings		x		Requires close monitoring of materials used and traffic handling.
7. Wire cleaning	x			Scope for emergent contractors particularly in coastal areas.
8. Cleaning of birds' nests (mainly of crows, which use wire in nests) from insulators, and debris (eg tumbleweed and small branches) as part of maintenance of overhead lines.	x			Small-contractor potential as not on critical path.
9. Fitting of overhead cables (as opposed to overhead wires) on existing pole routes	x			Small-contractor potential. A relatively unskilled operation except for jointing.

Labour–intensive and emerging contractor opportunities:

Construction of buildings

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
1. Foundations				
— spread or strip	x			If ground not too hard.
— piled			x	
2. Superstructure				
— brick	x			
— masonry	x			
— concrete	x			
— soil cement	x			
— block–work	x			
3. Frames				If sections not too heavy.
— reinforced concrete	x			
— steel	x			
— timber	x			
4. Roof				
— timber truss	x			
— concrete	x			
— tiles	x			
— clay tiles	x			
— galvanised steel sheets	x			
5. Joinery	x			
6. Services in buildings	x			The design concept determines the viability and cost of labour–based methods. Low–rise buildings are more suited to labour–based methods using traditional technology.

Labour-intensive and emerging contractor opportunities:

Water supply construction

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
1. Spring protection	x			
2. Manholes: brick or block	x			1. As subcontract piece-work. 2. Assistance in transporting materials to site required if very small contractors used. 3. Procurement of materials would be by others. 4. Brickmaking more practical if demand can be sustained by other consumers after project completion. 5. Blocks can be produced in small quantities.
3. Trenching				1. Labour-based methods are especially appropriate and cost-effective where the location of other existing services is unknown and in restricted sites.
— uniform soft ground	x			
— uniform hard ground		x		
— rock and deep trenches			x	Intensive blasting patterns can enable manual instead of machine for small jobs.
4. Backfilling trenches	x			
5. Bedding for pipes	x			By hand even in equipment-based construction.
6. Compaction				1. Manual or machine compaction in layers in sensitive areas. 2. Usually less compaction in farmland areas. Backfill mounded to allow for settlement.
— above pipes (bulk backfill)		x		
— around sides of pipes	x			Confined space necessitates hand labour.
7. Pipe-laying				1. Jointing of pipes is essentially labour-intensive irrespective of pipe size. 2. Sections of sewer lines are amenable to small contracts.
— small diameter	x			
— large diameter		x		Distribution and handling are a problem in the very large sizes.

Labour-intensive and emerging contractor opportunities:

Water supply construction

	Applicability			
Activity	**Good**	**Avge**	**Poor**	**Notes**
8. Reservoirs				
— small brick/masonry	x			
— concrete		x		
— manufactured elements			x	High material-labour ratio. Competitive with concrete over range of sizes.
— plastic-lined earth reservoirs	x			
9. Canals				
— excavation	x			Restricted in hard and rock: same as for trench excavation.
— lining concrete	x			1. Cast in alternate sections. 2. Brick lining has problem of multiple joints, cracks, vegetation, algae growth.
10. Maintenance of water supply and sewerage systems	x			Generally labour-intensive. Amenable to small contracts approach.

Labour-intensive and emerging contractor opportunities:

Solid waste collection and disposal (including verge cutting and street cleaning)

Activity	Applicability			Notes
	Good	Avge	Poor	
1. Waste collection				
— domestic	x			
— commercial	x			Scattered domestic and commercial waste can offer opportunities for small contractors using animal-drawn carts.
— industrial			x	Depending on material, degree of scatter, and toxicity; small local contractor using mechanical means can collect toxic material if suitably attired.
2. Waste disposal				1. There is scope for job creation in the recovery of materials (cans, glass, plastic, paper), and vegetable matter can be composted. 2. The method of disposal on site has job-creating possibilities.
— domestic	x			
— commercial	x			
— industrial			x	Depending on material.

References

International Bank for Reconstruction and Development and Scott Wilson Kirkpatrick & Partners, 1978. *Guide to competitive bidding on construction projects in labour-abundant economies*. Washington: World Bank.

Kritzinger-van Niekerk L, Eckert JB, & Vink N, 1992. Towards a democratic economy in South Africa — an approach to economic restructuring. Unpublished report, DBSA.

McCutcheon RT, Van Zyl CWL, Croswell J, Meyer D and Watermeyer R, 1993. *Interim guidelines for labour-based construction projects.* Policy Working Paper 15. Midrand: DBSA.

Milne JC, Jackson BM et al, 1993. *Socio-economic enhancement of development projects.* DBSA Policy Working Paper 14. Midrand: DBSA.

National Committee for Labour-Intensive Construction (NCLIC), framework agreement, 1993.

Soweto City Engineer's Department, Bergman BS & Partners Inc, Hattingh GM & Partners, DLM Project Management CC, Project Management Techniques CC, 1992. Contractor development in labour-based construction.

Technical Committee on a Public Works Programme for the National Economic Forum, proposed action plan, April 1994). Pre-investment investigation.

Technical Coordinator, Van Wyk and Louw Inc, 1991. Guidelines to consultants to enhance the use of local communities' labour and skills during the implementation of RKDP projects.

Cover: Wire sculpture by Billy Makhubela

Published by Development Bank of Southern Africa
P O Box 1234 Halfway House 1685
Telephone (011) 313-3911
Telefax (011) 313-3086