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JOB CREATION IN PUBLIC SECTOR ENGINEERING AND CONSTRUCTION WORKS PROJECTS : WHY, WHAT AND HOW ?

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SYNOPSIS

Several employment-intensive works programmes have been implemented in Africa and Asia over the last two decades. These labour and resource based works programmes aim to serve several purposes simultaneously. Above all, they aim to influence infrastructural investment policies so as to maximise employment and income generation, the creation of productive assets and poverty alleviation.

The choice of technology, has a marked influence on the number and location of employment opportunities generated. The choice of construction method can, particularly in the case of civil engineering projects, significantly influence the total number of person hours employment generated. The choice of manufacturing methods of components and materials can also significantly affect the number of employment opportunities generated. There is considerable scope for increasing employment opportunities through the use of employment-intensive methods of manufacture.

It may be argued that engineering and construction works projects can be closely linked with the targeting of employment opportunities. The question "how many employment opportunities are created ?" is no less important than "who is to be employed and which persons will benefit from such employment ?"

Increased employment opportunities can be generated in engineering and construction works projects by :

- encouraging the substitution of labour for capital and local resources for imports.
- supporting the use of "labour friendly" technologies which utilise a higher degree of labour input than is the case for conventional technologies, or are well suited to implementation by small-scale enterprises.
- encouraging and developing small-scale enterprises to implement employment-intensive practices and "labour-intensive" technologies.

The primary strategies which organs of state can adopt to implement job creation programmes in engineering and construction works include :

- reviewing the manner in which they employ their internal resources.
- adopting targeted procurement practices when outsourcing.

Governments should also ensure that the foreign content in goods, services and works contracts is minimised and provision is made for the employment of project-specific workers (temporary workers) in labour legislation.

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INTRODUCTION

Expenditure in any sector of the economy will create employment opportunities. Some sectors of industry are, however, more efficient than others at generating employment opportunities for a given capital inflow.

Industries where the potential for the effective substitutions of labour for capital and local resources for imports exist, can expect to achieve enhanced performance in the provision of employment opportunities.

The construction industry is an industry which may be regarded as being amongst the most efficient in generating employment for a given capital inflow. Employment-intensive works have been highly visible in the civil engineering sector. The civil engineering sector is plant-intensive when compared to the building sector. The building sector, in general, generates more employment opportunities per unit of expenditure than does the civil engineering sector. If, however, labour is substituted for machines, this position can be reversed. Alternatively, if a blend of labour and light equipment is used on civil engineering projects, the difference in labour-intensiveness between the two sectors reduces.

Several employment-intensive works programmes have been implemented in Africa and Asia over the last two decades. These labour and resource based programmes have aimed to serve several purposes simultaneously. Above all they have aimed to influence infrastructural investment policies so as to maximise employment and income generation, the creation of productive assets and poverty alleviation.

Employment-intensive methods have been employed in South Africa on construction projects which include rural gravel roads; low level bridges; small dams; residential township roads (surfaced and gravel); water and sewerage reticulation for townships; bituminous surfacing of roads; low voltage electrical reticulations; stormwater drainage systems; and on-site sanitation. Road maintenance projects have included regravelling, and routine road maintenance.

Other employment-intensive construction-related projects have included materials manufacture (precast concrete products, timber roof trusses, metal window frames); agricultural structures (dams, erosion control measures, irrigation projects); building works (community centres, clinics, schools, classrooms, housing); and electrification.

PROBLEM STATEMENT

If employment-intensive works were always more economical than plant-based works there would be no problem. The quality of the end product can be readily measured and compared whereas economic efficiency cannot. Value for money assessments, where socio-economic considerations prevail, are subjective. What are the socio-economic parameters ? What is value for money ? There is also the question of sustainability. Can employment-intensive works lead to sustainable job creation / income generation ?

Concerns regarding the implementation of labour-intensive construction methods on projects, as expressed by government departments and provincial bodies at a workshop convened by the Procurement Forum (an initiative of the Ministry of Finance and Ministry of Public Works) at the outset to the procurement reform process in South Africa during January 1995, may be summarised as follows :

- There is a limited scope for increasing labour intensity in electrification and building work.
- The affordability of the end product.
- The impact on budgets of increased wage demands, particularly where marginal projects were economically justified on the basis of remunerating work at sub-statutory level wages which were

- agreed to by communities during the basic planning stages of the project.
- The impact of changes in community leadership on projects which have a high level of community involvement.
- The absence of clear and workable guidelines regarding labour intensive contracts.
- The status and remuneration of workers (permanent versus casual).
- The long lead times caused by lengthy up front community negotiations over wages and task-based payment issues.
- Transient local labour replacing a contractor's permanent labour force.
- The short term nature of the employment generated.
- The imposition of restrictive practices by means of contractual requirements which interfere with the free market system with concomitant inflationary effects.
- The choice of construction method should be left to the contractor.

Clear policy directives, supported by a practical and workable implementation strategies, procurement systems and associated contract documentation are required to facilitate the implementation of employment-intensive construction practices in order to address the socio-economic objectives associated with such works. Such directives, strategies and systems must address the aforementioned concerns in a pragmatic manner.

THE EMPLOYMENT POTENTIAL OF CIVIL ENGINEERING CONSTRUCTION PROJECTS

Research has indicated that the construction industry can generate between 11 and 23 direct, indirect and derived jobs per million Rand invested in the different sectors of the industry. (Average of approximately 17 jobs per million Rand invested). Although these figures are slightly higher than other industrial sectors they do not justify infrastructure investment beyond the immediate requirements in order to create jobs. If, however, the number of jobs created can be increased for example by substituting people for machines, investment in infrastructural projects will become more attractive.

The employment potential of the civil engineering sector should employment-intensive construction practices be adopted has, however, in recent years been grossly over estimated. This has led to the situations where investment in labour-intensive construction programmes has been put forward as a means of addressing unemployment as opposed to the growth of the sector as a whole. It is important to understand where this has come from and what the job creation potential of these practices are.

Labour-intensive construction which was introduced into South Africa during the late 1980's was based on the Kenyan Rural Roads Programme. In Kenya, a Government department provided the necessary administration, materials, plant and management and hired labour directly. A tacit assumption in this approach was that the cost to government was the cost of outsourced items viz., materials and labour. In South Africa, Government's role in this model was outsourced viz., established contractors and consultants took on the administrative and management functions; trade unions, the regulatory side of government; the cost of the works being the cost of outsourcing.

A focus group of the National Economic Forum, based on statistics obtained from the Kenyan Rural Roads programme, and other programmes outside and within South Africa tabulated spending patterns for targeted labour for a variety of projects. The National Public Works programme in their implementation guide used this table to illustrate the potential spending on targeted labour which could be achieved in various sectors, should labour-intensive practices be adopted. (See Table 1).

Economists, based on the data presented in Table 1 predicted, that should R100m be spent on employment-intensive projects, the number of jobs that would be created would be as set out in Table 2. They argued that, depending on the wage rate which was adopted, and the nature of the work undertaken, upto a 15 fold increase in employment could be achieved. The National Public Works Programme Task Team in 1995 asserted that "*if labour-based methods become widely adopted, between 150 000 and 200 000 people should be employed at any one time on labour-intensive civil construction sites countrywide by the year 2000*". These statements and predictions raised high expectations for the civil engineering sector to create jobs as civil engineering contractors at that time collectively employed less than 60 000 persons.

TABLE 1 : CURRENT AND MAXIMUM SPENDING ON TARGETED LABOUR

(Source : National Public Works Programme Task Team)

Sector	Current spending on targeted labour	Maximum spending on targeted labour
Simple projects	60 - 80%	60 - 80%
Low cost housing	25 - 35%	30 - 40%
Social buildings	20 - 30%	25 - 35%
Water reticulation	5 - 15%	25 - 35%
Stormwater	5 - 15%	40 - 50%
Sanitation	5 - 15%	25 - 35%
Roads	5 - 15%	30 - 80%
Dams	10 - 20%	50 - 80%
Railways	5 - 15%	20 - 30%
Forestry	25 - 35%	35 - 45%
Electrification	10 - 15%	12 - 17%
Small-scale agriculture related infrastructure	40 - 80 %	40 - 80%

Notes :

1. Spending on Targeted Labour is expressed as a percentage of spending on labour, plant and material.
2. Examples of projects with low capacity building requirements are painting of public buildings and one-off refuse collection services. Such projects are conventionally highly labour-intensive, and hence there is little room for increasing labour-intensity.
3. Similarly, the construction of small-scale agriculture-related infrastructure, is conventionally highly labour-intensive, and hence there is little potential for increasing labour intensity in this sector.

TABLE 2 : INDICATIVE IMPACT OF LABOUR COSTS ON THE NUMBER OF JOBS PER YEAR PER R100 MILLION

Wages R / day	Wage costs as % of cost	Cost / job per annum	No. of jobs per R100 m
10	60%	4,200	23,800
10	40%	6,300	15,900
20	60%	8,300	12,000
20	40%	12,500	8,000
30	60%	12,500	8,000
30	40%	18,800	5,300
40	60%	16,700	6,000
40	40%	25,000	4,000
50	60%	20,800	4,800
50	40%	31,300	3,200

Notes :

1. This table is based on the following formulae :

$$\text{Cost of job per annum} = 100 \times 252 \text{ days} \times \text{daily wage rate}$$

$$\text{Number of jobs} = \frac{\text{Wage costs as percentage of total cost}}{\text{R100m}} \times \text{Cost of job per annum}$$
2. The average number of jobs created by the civil engineering industry during 1994 amounted to approximately 1500 jobs / R100 m.

Various statistics have been put forward to quantify the impact of introducing employment-intensive construction practices. Many of them relate to the method of measurement which is adopted. The following parameters are commonly used to evaluate employment-intensive construction practices :

- **The multiplier in employment opportunities** (i.e. the ratio of the total number of personhours generated in the construction of a specified structure, service or activity using labour-based technologies, to that using plant-based technologies).
- **Expenditure per unit of employment generated** (i.e. the ratio of the total construction costs in Rands excluding VAT but including any management fees directly related to construction activities to the total volume of employment generated (manhours) in the construction of a structure or service).
- **Construction cost retained by the community.**

Each of the abovementioned parameters measures different aspects of employment-based construction and should not be used to evaluate increases in expenditure on targeted labour on their own. The multiplier in employment opportunities, for example, can, at best only provide an indication of the chosen technology's performance over conventional methods. Although individual construction activities may exhibit increases in employment opportunities, the entire sequence of activities and the total construction cost needs to be taken into consideration for meaningful statistics to be developed.

The NPWP's maximum spending targets as set out in Table 1 are optimistic as some of them relate to the construction cost retained by the community as opposed to wages paid to the targeted group. Furthermore, they were reported in isolation from overhead and supervision costs. (On labour-based works, construction plant costs reduce while overhead and supervision costs increase). Thus when the labour-component is expressed as a percentage of the total construction cost, the yield in employment opportunities reduces significantly.

The abovementioned model also makes the assumption that the productivity of workers at lower wage levels is the same as that for workers remunerated in terms of higher wage levels. Experience has shown that this is not the case. Generally, the management and overhead costs increase as productivity decreases.

In general the most employment-intensive urban infrastructure projects (construction of roads and stormwater, sewers and watermains) rarely have an unskilled/semi-skilled wage component in excess of 25% of the total cost of construction. Recent research has indicated that provided that there is little or no cost premium associated with employment-intensive practices, **the overall increase in employment opportunities for a given project over conventional plant-based practices seldom exceeds a factor of 2 in urban infrastructure and 3 in rural road construction.** Thus the increase in employment opportunities should 10% of the annual turnover of the civil engineering industry be executed by means of employment-intensive construction practices with little or no cost premium, will probably yield less than 10 000 additional jobs. Put in another way, employment-intensive infrastructure projects will probably realise less than 1500 additional jobs for each R100 million Rand expenditure; an increase in employment opportunities which is nevertheless well worth having.

With regard to employment sustainability, work on infrastructure construction is, by its nature, temporary. It is also self-targeting towards the poorest members of society, because unskilled wages in construction are traditionally low. Workers with better options tend to go into other kinds of work and leave the temporary jobs in construction to those with fewer options, the poorest. Thus, although the jobs created are not necessarily permanent, the total volume of work available to the poor is increased considerably.

TARGETING

It may be argued that engineering and construction works projects can be closely linked with targeting of employment opportunities. The question "how many employment opportunities are created ?" is no less important than "who is to be employed and which persons will benefit from such employment?".

Accordingly, a distinction needs to be made between the increase in the volume of jobs available and the allocation of jobs to local labour. Frequently, what is perceived as being **job creation is in fact job displacement as local labour or temporary labour is substituted for permanent labour.**

Targeting requirements for local labour can conflict with other developmental objectives. For example,

community contractors who aspire to become fully fledged contractors need to build up core staff. Stringent requirements for the use of local labour will work against contractor development.

CHOICE OF TECHNOLOGY

A recent International Labour Organisation (ILO) report (1996) states that "*labour-based technology is a construction / maintenance technology which optimises employment opportunities for unskilled and skilled labour, supported by light equipment and the use of locally available materials and other resources without compromising costs and quality of outputs*".

The choice of technology has a marked influence on the number and location of employment opportunities generated. For example, a masonry house may generate 3,5 times more personhours of employment than an equivalent precast concrete house. The same precast concrete house may in turn generate 1,25 times more personhours employment in the manufacture of materials than the masonry equivalent. (See Table 3).

TABLE 3 : COMPARISON OF THE NUMBER OF MANHOURS REQUIRED TO CONSTRUCT NON-MASONRY AND MASONRY HOUSES
(Source : Watermeyer and Band (1994))

CONSTRUCTION TYPE	NUMBER OF MANHOURS (hours)			NUMBER OF MANHOURS FOR EQUIVALENT MASONRY HOUSE (hours)		
	Materials	Site Labour	Total	Materials #	Site Labour	Total
Timber	300	1180	1480	200	1700	1900
Precast concrete	150	210	360	120	1120	1240
Steel frame with 110 mm brick infill panels	330	880	1210	160	1400	1560

Plant-based masonry manufacture.

The choice of construction method can, particularly in the case of civil engineering projects, significantly influence the total number of personhours of employment generated. On building and electrification projects, significant increases in the number of employment opportunities per unit of expenditure are generally only possible where earthworks activities for which labour-intensive construction methods are feasible, from a significant part of the works, e.g. where underground cables are to be laid.

The choice of manufacturing method of construction components and materials can also significantly affect the number of employment opportunities generated. For example, a housing study has shown that the ratio of personhours of employment generated in conventional construction on site to that generated in the off-site manufacture of materials was, in the case of house construction, 9 : 1, and in the case of internal township services (roads, stormwater drainage, water supply and sewerage) 6,5 : 1. There is accordingly considerable scope for increasing employment opportunities through the use of employment-intensive methods of manufacture.

Changes in methods and technologies, which increase the labour content in construction and in the manufacture of materials, yield the greatest increase in the number of employment opportunities generated per unit of expenditure. This requires well established companies to change their work methods and to reduce their reliance on capital intensive technologies. Such methods and technologies are usually readily implemented by small scale enterprises, who by being small, have limited access to capital and invariably operate and conduct their business in a more employment-intensive fashion and favour light equipment-based forms of construction.

The choice of technology is generally made during the basic design phase of works contracts, whereas the choice of construction method / method of manufacture is usually decided upon during the construction phase. Two alternative approaches to implementing employment-intensive works methods can be adopted.

Method 1 : lay down the use of specific employment-intensive technologies and methods of construction / manufacture in the contract document.

Method 2 : afford tenderers the opportunity to choose the technology / construction method / method of materials manufacture which they wish to use in order to implement employment-intensive methods.

Either method may be used to increase the quantity of employment generated per unit of expenditure.

Method 1 usually achieves the objective by restricting the use of certain types of plant / manufacturing methods and by specifying particular technologies. Method 2, on the other hand, requires tenderers to tender the amount of targeted labour, measured in accordance with a human resource specification, which they undertake to engage in the performance of the contract. Method 2, accordingly, permits tenderers to use their knowledge, skill and creativity in arriving at an optimum economic mix of equipment, technologies and labour in order to meet their obligations e.g. a tenderer on a roads contract may choose to manufacture kerbs and precast concrete components on site rather than to excavate the box cut for the road by hand in order to provide employment for a target group.

Method 1 is well suited to the targeting of local labour. The economic viability of this approach is, however, dependent on the ability of the designer / specifier to forecast cost. Method 2 can be used for the employment of relatively unskilled labour and any potential price premium can be readily assessed by the adjudication of tenders in accordance with a development objective / price mechanism i.e. a points scoring tender adjudication system in terms of which tenderers are awarded points for in the first instance, their financial offers and, in the second instance, their offers to exceed socio-economic objectives. (Refer to implementation mechanisms). Method 2 therefore has the distinct advantage that tender prices will usually fall within acceptable limits and economic justification of decisions relating to employment generation will not be necessary.

WAGE ISSUES

If labour-intensive methods of construction were generally cheaper than plant-based methods, established contractors would have utilised such methods to realise a financial advantage over their competitors in tendering on the open market. Wages and productivity on projects in South Africa where employment-intensive construction practices have been employed vary widely. Wage levels have varied from a small fraction of the statutory wage applicable to the civil engineering industry to the full statutory wage and beyond.

Productivity, on the other hand, is dependent on the method of payment to labourers and is highest where labourers are paid on a piecework basis, i.e. on the number of tasks completed in a day. Productivity is also dependent, to a lesser extent, upon the skill of management; the skill of labourers; wage levels; the method of payment; climatic conditions; the health of the labour force; the supply of quality hand tools; physical conditions such as ground conditions, depth of excavation, etc.; and the work ethic of labourers.

Given an accepted daily wage, three options exist for payment of labour. Labourers can be paid :

- i) The daily wage for attending work for a set number of hours, regardless of productivity;
- ii) The daily wage for achieving a set daily production target, regardless of hours spent on the job;
- iii) In multiples of the daily wage, according to the number of tasks of one day standard duration they have completed (piecework).

While the first system gives a predictable cash flow and is attractive to trade unions, it incorporates no incentive to produce. The second system is suitable for areas where labourers live close to their work and there is an advantage to them getting through their work early. Where a labourer is not able to return home after each day's work, as is experienced on certain road projects, there is no real incentive for

option 2. The third system is good for any situation, in that while the wage rate might be set to what an average person will produce in an average day, most people become above average when given a good reason for being so. Productivity increases of 60% on average workers are widely observed with options 2 and 3. Some individuals have been known to achieve twice and three times the daily quota when working on a piecework basis.

The jobs created by construction projects usually last only as long as the construction phase of the project. Some have argued that it is necessary to link employment to education and training in the form of vocational training (technical, managerial and administrative), generic training (life skills, adult basic education) and institutional training (developing a community to manage its own governance) in order to achieve a measure of sustainability. Others have argued that the minimum wages need to be substantially lowered to make the substitution of labour for construction plant viable. Frequently compensatory wage packages have been offered to workers to sweeten the low wages which are negotiated i.e. training is provided in lieu of minimum wages. Training is usually funded from a separate budget in order to offset costs attracted to these projects. If, however, the minimum wage is adopted, there would be no need to negotiate wages or compensatory wage packages.

It is acknowledged that a significant proportion of the targeted labour will comprise workers who are employed on a project specific basis. It is imperative that certain minimum labour standards be laid down to enable contractors to compete for works on an equitable basis as much confusion exists regarding the employment of temporary workers.

The Green Paper on Public Sector Procurement Reform in South Africa, in this regard proposes that *conditions of employment should be developed and promulgated for project-specific workers (temporary workers) whose status is neither that of casual or permanent workers. This will reduce delays in procurement.*

IMPLEMENTATION MECHANISMS

In several countries in Africa, long term national programmes of labour-intensive road construction and maintenance have been established. These national programmes have resulted in the creation of employment and efficient production of as good a quality of construction and maintenance as is allowed by the funding available. These programmes have been established within government ministries. Concomitantly, training programmes have been established to provide the skilled personnel required to supervise the site works, liaise with the communities and plan and administer these programmes. Although responsibility for the programme is clearly located within the public sector, the labourers are hired to work as individual contractors. In Kenya monthly contracts have been signed with each individual labourer.

The World Bank has recently completed a comprehensive report on labour-based construction methods in the roads sector. This report lists six basic delivery mechanisms, viz. :

- I) The **force account model** (departmental workforce) whereby a government department hires labour directly.
- II) The **conventional model** whereby an established contractor hires labour directly.
- III) The **sub-contracting model** whereby an established contractor or firm sub-contracts the portions of the projects that are labour-based.
- IV) The **government-run model** whereby the responsibility for all aspects of contractor development (including small contract administration and payment) lies with a government agency.
- V) The **agency model whereby** the responsibility for all aspects of contractor development (including small contract administration and payment) lies with an independent non-profit management agency or with a for-profit consulting firm.
- VI) The **development team model** whereby this responsibility is divided among the Employer, a Construction Manager and a Materials Manager.

Models II) and III) promote the use of labour-based construction practices amongst established contractors; models IV) to VI) promote the expansion of such methods among small-scale contractors. Model V) is commonly encountered in the French speaking nations in West Africa and is referred to as

the Agetip model (non-profit contract management agency). Generally, model IV) involves fixed rate contracts.

In South Africa, five of the six models have been implemented, the typical nomenclature associated with each approach being:

- Direct Employment Approach (model I)
- Conventional Contractor (model II)
- Managing Contractor (model III)
- Managing Consultant / (Project Manager (model V)
- Development Team (model VI)

All the approaches have demonstrated that it is possible to implement labour-based and labour-intensive construction using the methodologies associated with the particular approach, in given circumstances and with specific objectives in mind.

The Conventional Contractor approach has frequently been used to engage workers from specific communities in accordance with the provisions of the Framework Agreement. In effect this approach facilitates the implementation of labour-pool worker programmes and may be regarded as a private sector driven "force account" model (direct employment). The Managing Contractor approach has usually been used where significant portions of the works need to be constructed by means of plant-intensive methods.

This approach requires the Managing Contractor to execute some of the works with his own workforce and to provide the necessary support to labour only subcontractors on the remaining portions of the works. Usually, the labour only subcontractors are appointed on a nominated basis.

The Development Team approach is a refinement of the Project Manager / Managing Consultant approach. The Development Team clearly assigns the rights, risks and obligations of the parties and so overcomes the inherent contractual flaws associated with the Project Manager approach. This approach, has been successfully employed to facilitate the development of contractors or the engagement of community contractors who make use of employment-intensive construction practices on a wide range of building and construction projects in various parts of South Africa.

TARGETED PROCUREMENT

Targeted or affirmative procurement is a form of procurement which has been developed in South Africa by the Procurement Forum (an initiative of the ministry of finance and ministry of public works) which has been tasked with effecting public sector procurement reform in South Africa. Targeted procurement is a methodology which ensures that those who provide goods, services and works will mobilise and structure their resources in the provision of the required quality of product in a manner which achieves pre-determined socio-economic or developmental objectives.

Targeted procurement permits socio-economic objectives to be achieved through a combination of :

- the classification of contracts in order to "package" contracts for targeted group;
- the use of human resource specifications to govern the manner in which prime or main contractors marshal or structure their resources in order to meet their contractual obligations.
- the use of development objective / price mechanisms (i.e. points scoring tender adjudication system in terms of which tenderers are awarded points for, in the first instance, their financial offers and, in the second instance, their offers to exceed socio-economic objectives, or for their current enterprise status).

The targeting strategies have been designed to facilitate one or more of the following :

- *The development of small, medium and micro enterprises particularly those owned and operated by previously disadvantaged persons;*
- *increasing the volume of work available to the poor and the income generation of marginalised sectors of society; and*
- *affirmative action to address the deliberate marginalisation from economic, political and social power of black people, women and rural communities and to empower communities and individuals from previously disadvantaged sectors of society.*

The awarding of tenders in terms of a development objective / price mechanism in terms of which certain socio-economic objectives relating to labour-based works are promoted by a weighting in favour of the targeted groups, without preventing those who fall outside such target groups from tendering, ensures that :

- tenders are free to choose the degree to which they wish to meet stated labour-based works objectives, based on economic considerations, but are penalised should the degree to which they propose to meet such objectives are limited.
- tenderers are free to decide on how they are to marshal resources in the performance of the contract based on economic considerations and their skill, knowledge and creativity.

The mechanism also ensures that tenders are structured in a manner so that those who fall into targeted groups cannot hold a project to ransom for financial or any other reasons.

The Procurement Forum has made provision for implementing employment intensive works through :

- Prime (Major) Contracts where use is made of development objective / price mechanisms and human resource specifications.
- Structured Joint Venture (Targeted) where small-scale contractors using employment-intensive practices work in joint venture with conventional contractors.
- Prime (Minor) Contracts where the technology / construction methodology is prescribed.
- Development and Community contracts where local small-scale enterprises are developed to impact employment-intensive technologies.
- A combination of Prime (Major) and Development or Community contracts.

The Procurement Form has developed six human resource specifications to define targeted groups and to measure, quantify, verify and audit the Rand value of work allocated to such groups in a contract. Four of these specifications relate to the engagement of targeted enterprises, one to the engagement of targeted labour and one to a combination of targeted enterprises and labour. The APP4 specification (Targeting of Local Resources) targets a mix of local labour and local enterprises. The APP5 (Engagement of Targeted Labour) specification focuses solely on targeted labour and can as such be used to measure the increase in employment generated in respect of unskilled and semi-skilled workers should the target be defined on the basis of wage levels and local labour, should, it be defined on an area bound basis.

Targeted labour may be defined as persons who satisfies one or more of the following :

- is a resident of a specific geographical location
- is a female
- has an age within a prescribed band
- has certain disabilities
- has been unemployed for a specific period of time
- is a South African citizen
- earns an hourly wage less than a prescribed limit

The APP4 and APP5 specifications allow a number of definitions to be set and permits each targeted group to be weighted. Both these specifications are accordingly well suited to the targeting of labour in a focussed manner.

The Southern Metropolitan Local Council (SMLC) of the Greater Johannesburg Metropolitan Council has recently implemented a number of projects using the APP5 specification and development objective price mechanisms. Targeted Labour has been defined as South African citizens residing within the geographical area over which the SMLC has jurisdiction and who earn less than R9-00 per hour. The Targeted Labour Goals (Rand value of wages and allowances for which the Contractor contracts to engage Targeted labour in the performance of the contract, expressed as a percentage of the net tender value) of the successful tenderer and the cost premium associated with the first nine tenders which were called for in this manner are reproduced in Table 4. As tenderers become more familiar with the system

and become more experienced in managing targeted labour, the target labour goals which are achieved are expected to increase.

TABLE 4 : RECENT TENDER RESULTS OF 9 MUNICIPAL CAPITAL WORKS PROJECTS WHERE USE WAS MADE OF THE APP5 SPECIFICATION

CONTRACT NO.	DESCRIPTION	TENDER VALUE (RAND)	TARGETED LABOUR GOAL (%) ¹	COST PREMIUM (%) ²
STS 0005	Construction of watermains	R3,6 m	5 (5)	NIL
STS 0022	As and when roads and stormwater	R5,1 m	20 (15)	NIL
STS 0037	Construction of sewers	R1,7 m	15 (5)	NIL
STS 0038	Construction of sewers	R1,2 m	25 (5)	8
STS 0039	Construction of sewers	R1,7 m	10 (5)	NIL
STS 0040	Construction of sewers	R2,7 m	10 (5)	NIL
STS 0041	Construction of sewers	R1,6 m	10 (5)	NIL
STS 0047	Improvements to stormwater drainage	R1,2 m	20 (7)	1
STS 0048	Culvert repair	R1,4 m	4 (4)	NIL
TOTAL		R20,2 m	13 (8)	(0,5)

- Notes :**
- 1) A minimum Targeted Labour Goal which was set is given in brackets.
 - 2) The cost premium is based on lowest tendered price.
 - 3) 90 points (max) were awarded for price; 10 points (max) were awarded for Targeted Labour Goals.
 - 4) Tender value excludes VAT and contingencies.

The Namibian government has embarked upon a process to develop a policy on labour-based works. The objective of this policy is *to improve living standards in a sustainable way, through increasing income generation and employment opportunities, where technically and economically feasible, for the poor and marginalised sectors of Namibian society, in a focused and targeted manner.* The paper identifies targeted procurement as a key strategy to implement labour-based works.

ENCOURAGING CONTRACTORS TO MAKE MORE USE OF TARGETED LABOUR IN EXCAVATION ACTIVITIES

In order to meet goals for the engagement of Targeted Labour or to tender increased goals, contractors may have to undertake some, or all, soft excavations by the use of hand labour. In order to minimise their risk exposure to performing such activities, there needs to be :

- a labour policy in place which sets out the conditions of employment for temporary workers (i.e. project specific workers);
- a mechanism in terms of which contractors can define the portion of the excavation works which will be excavated by hand methods.

If this is not done, contractors will not be able to increase job opportunities in earthworks activities as they would be exposed to unacceptable risks. The abovementioned employment policy and mechanism should accordingly be clearly set out in the tender documents and form an integral part of the contract.

A suitable mechanism to enable contractors to define portions of excavation work which may be excavated by means of hand methods is to permit contractors during the tender stage to nominate the quantity of materials which they wish to execute using hand methods. The approach outlined below is suggested.

The initial classification of material to be excavated should be in accordance with the relevant provisions

of standard earthworks specifications such as SABS 1200 D and 1200 DA. However, soft excavation to be undertaken by hand labour, using hand tools, can be further broken down by the introduction of an additional class of material, viz., soft excavation Class A, in accordance with the provisions of the project specification as tabulated in Table 5.

TABLE 5 : CRITERIA FOR CLASSIFYING MATERIALS AS SOFT CLASS A EXCAVATION

DYNAMIC CONE PENETROMETER - MINIMUM NUMBER OF BLOWS REQUIRED TO PENETRATE 100 MM	GRANULAR MATERIALS	COHESIVE MATERIALS
		7 - 15
Consistency	Dense - high resistance to penetration by the point of a geological pick; several blows required for removal of material.	Stiff / Very stiff Stiff - can be indented by thumb-nail; slight indentation produced by pushing geological pick point into soil; cannot be moulded by fingers. Very Stiff - indented by thumb-nail with difficulty; slight penetration of point produced by blow of geological pick.

* Soft excavation Class A is material which, using a pick or equivalent hand swing tool, can only be excavated with difficulty.

The total estimated quantity of excavation, as classified in terms of a standard earthworks specification, should be indicated in the Schedules. The tenderer should be permitted to sub-divide this quantity into two components, viz., the quantity of material to be excavated by the use of powered, mechanical equipment and the quantity to be excavated by hand labour using hand tools.

One third (a) of every quantity of excavation to be undertaken by hand labour should be entered against the appropriate extra-over items provided in the Schedules, but left blank, for soft excavation Class A.

This will ensure that material which can be picked with difficulty is catered for and the transition from hand excavation to machine excavation is graded.

Should the tenderer fail to indicate a quantity of excavation to be undertaken by hand labour, notwithstanding that he would find it necessary to utilize hand labour, it will be assumed that all excavation, whether undertaken by machine, or by hand labour, is to be paid for at the rates tendered for machine excavation.

The contractor, should be required to undertake at least the quantities of excavation by hand labour which he tendered, unless the total quantity of excavation proves to be less than scheduled, in which case the minimum quantity to be undertaken by hand labour will be reduced pro-rata by the employer's representative. This procedure will also provide a basis for reducing Targeted Labour Goals should such adjustments be necessary.

Should the total quantity of excavation prove to be greater than that scheduled, the contractor may choose the method of excavation for the excess quantity, unless the rates for excavation by machine, would result in lower costs than to hand excavation, in which case the employer's representative will have the right to instruct the contractor to undertake the excavation by machine.

CONCLUSIONS AND RECOMMENDATIONS

- 1) A distinction needs to be made between the targeting of local labour in order to stimulate local economies and the increase in employment opportunities generated per unit of expenditure. Construction projects which do not involve significant quantities of earthworks or incorporate elements or components which can be constructed or manufactured using labour-intensive methods and/or technologies are unlikely to yield increases in employment per unit of expenditure.
- 2) Increased and targeted employment opportunities can be generated in engineering and construction projects by:
 - Encouraging the substitution of labour for capital and local resources for imports.

- Substituting the use of "labour friendly" technologies which utilise a higher degree of labour input than is the case for conventional technologies, or are well suited to implementation by small scale enterprises.
 - Encouraging and developing small scale enterprises to implement employment intensive practices and "labour-intensive" technologies.
- 3) Government procurement should :
- ensure that the foreign content in contracts involving goods, services and works is minimised.
 - encourage the substitution of labour for capital.
 - support the use of "labour friendly" technologies which utilise a higher degree of labour input than is the case for conventional technologies or are well suited to implementation by small scale enterprises.
 - encourage and develop small scale enterprises to implement employment-intensive practices and labour friendly technologies.
- 4) Targeted procurement which makes use of human resource specifications and development objective price mechanisms should be used to encourage cost effective employment intensive practices when outsourcing.
- 5) Increased credits in development objective / price mechanisms should be granted to encourage an increase in employment opportunities generated per unit of expenditure where tenderers are permitted to choose technologies and work methods.
- 6) Any premiums to be paid in respect of employment-intensive practices should be determined and accepted prior to the award of contracts.
- 7) Employment-intensive practices should result in the generation of jobs and not to the displacement of permanent jobs.
- 8) Departmental works (i.e. works executed using the Department's internal resources) should only be embarked upon when the total project cost (materials, labour (all grades), plant, fuel, administration, technical support, supervision, overheads and the like) is comparable with those which could be obtained by outsourcing the work to contractors using similar work methods.
- 9) In Departmental works :
- Labour should only be substituted for capital where this is technically feasible, economically viable and results in an increase in employment generated per unit of expenditure when account is taken of the whole chain of delivery.
 - Employment-intensive technologies should only be implemented where an appropriate level of quality (as opposed to best quality available) can be achieved, it is economically viable when compared to conventional technologies and results in an increase in employment generated per unit of expenditure.
- 10) Labour standards pertaining to wages should provide for a payment based on specific outputs. Conditions of employment should be developed and promulgated for project-specific works (temporary workers as opposed to casual / permanent). Wage levels of project specific works should be linked to those of casual / permanent workers.
- 11) A common wage order applicable to all engineering and construction works projects, which is flexible enough to accommodate payment on the basis of outputs in specific circumstances, must be strived for in order to remove market distortions and enable tenderers to tender on an equitable basis.

REFERENCES

- 1) Department of Finance and Public Works. *Green Paper on Public Sector Reform in South Africa* Gazette No. 17928, Pretoria. April 1997.
- 2) National Public Works Department. *Draft Green Paper on Creating an Enabling Environment for Reconstruction, Growth and Development in the Construction Industry*. Pretoria 1997.
- 3) Ministry of Works, Transport and Communications, Department of Transport. *Green Paper on Labour-Based Works*. Government of Namibia. February 1997.
- 4) Procurement Forum : *Procurement Task Team's 10 Point Interim Strategies*. September 1995.
- 5) National Public Works Programme Task Team. *National Public Works Programme : One year on - challenges ahead and issues to be resolved*. Fifteenth Annual Transportation Convention, 2D Papers, 1995.
- 6) National Public Works Programme Task Team. *The National Public Works Programme : What is it ? How does it work ? : A guide for communities, trade unions, government departments, contractors and NGOs*.
- 7) Miles D (Editor). *Towards Guidelines for Labour-Based Contracting : A framework document*. Management of Appropriate Road Technology in association with International Labour Organisation, 1996.
- 8) Bentell P, Twumasi A and Watermeyer R. *Labour-based contracting : A study to Develop Guidelines for Project Formulation and Implementation*. Phase I. Collection and Collation of Data. ILO Geneva, July 1995.
- 9) Stock E and De Veen J. *Expanding Labour-Based Methods in Road Works in Africa : Approach Paper*. World Bank (Technical Paper no. 347, Washington 1996).
- 10) Watermeyer R and Band N. *The development of small scale enterprises, skills, entrepreneurship and employment opportunities through the provision of Housing*. National Housing Forum. November 1994.
- 11) Watermeyer R, Nevin G, Amod S and Hallett R. *An evaluation of projects within Soweto=s Contractor Development Programme*. Journal of the South African Institution of Civil Engineers. Volume 37, Number 2, 1995.
- 12) Procurement Task Team. *Specification for the implementation of an Affirmative Procurement Policy : APP4 : Targeting of Local Resources*. Procurement Forum, Development Draft, August 1996. Department of Public Works.
- 13) Procurement Task Team. *Specification for the implementation of an Affirmative Procurement Policy : APP5 : Engagement of Targeted Labour*. Procurement Forum, Development Draft, Department of Public Works, October 1996.