

LABOUR-BASED CONSTRUCTION, THE DEVELOPMENT OF EMERGING CONTRACTORS AND THE RDP

RB WATERMEYER

Soderlund & Schutte Inc. Consulting Engineers

19 Saratoga Avenue, Berea, Johannesburg 2198

SUMMARY

This paper reviews some of the current trends, thinking and practices in the areas of labour-based construction and the development of emerging contractors in the light of the Reconstruction and Development Programme.

INTRODUCTION

All civil engineering and building projects create a variety of job opportunities. Labour is required to manage and carry out the construction process, to handle materials and to operate and maintain the plant/machinery used. At the same time, opportunities are created for materials suppliers and manufacturers, financial institutions and professional firms. Indeed, construction projects offer meaningful employment opportunities to a wide spectrum of the labour force, ranging from unskilled workers to professionals. (Watermeyer, 1993 a).

In recent years, following the successful implementation of job creation programmes in Kenya and Botswana, South African civil engineering projects have been critically examined to see if more job opportunities can be created to provide relief to the masses of unemployed. As a result, the terms labour-intensive, labour-based and, more recently, community-based construction have entered the vocabulary of South African engineers. At the same time, labour-based construction has been linked to the development of emerging contractors.

The government's Reconstruction and Development Programme (RDP) suggests that in regard to construction, *our people must be involved in these programmes by being made part of the decision-making on where infrastructure is located, by being employed in its construction and by being*

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empowered to manage and administer these large scale programmes ... (cl 1.4.3) ... infrastructural programmes must take into account the implications for micro enterprises (cl 4.4.7.10) (ANC, 1994).

SOUTH AFRICAN CONSTRUCTION PRACTICE

Trends

In recent years, the South African civil engineering industry has followed North American and European mechanisation trends and has favoured plant over manual labour. However, the ever rising cost of such plant and the ever increasing levels of poverty and underemployment have caused the industry to re-examine this policy. At the same time, funding bodies such as the IDT, the DBSA and the Department of Transport and forums such as the National Economic Forum have recognised the potential for job creation in the civil engineering industry should labour-intensive methods of construction be employed and have encouraged the industry to make more use of labour by making funds available for labour-intensive type projects.

Employer, professional and worker bodies representing the industry, namely, SAFCEC, SAACE, SAICE, IMIESA, SARF, COSATU and SANCO became signatories to a Framework Agreement for use on public works where labour-intensive and labour-based construction systems are employed. This frame work agreement provides guidelines for the preparation of contract documentation, training systems and task-based payment systems and conditions of employment as well as criteria for the selection of persons for employment.

Current practice

The civil engineering industry in South Africa differs in many respects from the building industry. The building industry, particularly in the area of house construction, has developed and promoted the emergence of small contractors who may operate at one of three levels, viz., they may provide all the labour and materials to construct the complete house, or they may provide labour only, or they may provide labour only for a specific trade. Small contractors able to operate at one or more of these levels in the building industry can be found within a large number of communities in South Africa. This is not, however, true of the civil engineering industry (Watermeyer 1993 b).

Traditionally, engineering services and structures are constructed by established contractors, whose operations are highly mechanised. These contractors possess all the resources required to execute

the projects, viz., labour, materials, machines and money. They have the finance required for salaries and wages and the purchase of materials, the credibility in commercial circles to obtain sureties, to open accounts with suppliers and to hire plant, the managerial, commercial, technical and administrative skills required to secure and execute contracts. The bulk of their labour force is, normally, recruited from a specific area and, as a result, the community for which the service is constructed is, in the end, left with the service, but with little else, since a negligible percentage of the money spent on the project stays within the community (Watermeyer 1993a).

The barriers which prevent local entrepreneurs or small building contractors in a local community from engaging in civil engineering construction are (Watermeyer, 1993b; Watermeyer and Davis, 1993):

- * Tendering and contractual requirements, such as the provision of sureties, the inclusion of penalty clauses and the tendering of rates.
- * The prevalence of plant-based construction practices.
- * The lack of financial resources to purchase materials, hire plant and tools and to pay wages.
- * The lack of credibility in commercial circles
- * The lack of commercial, managerial and administrative skills.
- * The discontinuity of work.
- * The lack of technical competence.

Emerging practices

In South Africa, machines are available to facilitate most aspects of construction. Consequently, established construction practices in South Africa have become plant-based and projects are planned and designed around the plant available. As a consequence, labour-intensive and labour-based construction practices are approached differently to elsewhere in Africa.

Plant-based, labour-intensive, labour-based and community-based construction may be defined as follows (Watermeyer and Band, 1993):

Plant-based construction

The effective employment of technologies in the implementation of projects which are designed to maximise the use of plant and minimise the size of the workforce.

Labour-intensive construction

The substitution of labour for construction plant in plant-based projects to achieve as great a

component of labour on a project as is technically feasible, whilst achieving the standard of construction specified.

Labour-based construction

The effective employment of appropriate technologies and labour-intensive methods on projects which are specifically designed to maximise the involvement of a workforce recruited in a specific locality and the transfer of skills and competencies to that workforce.

Community-based construction

The use of labour-based technologies and labour-intensive methods on projects in which the community is, in addition, involved in the commercial, managerial and administrative aspects so as to maximise the amount of funds retained within community and to transfer skills and competencies to the community.

There are fundamental differences between labour-intensive, labour-based and community-based construction. Labour-intensive construction is concerned with substituting labour for capital intensive plant and as such is concerned with increasing the number of employment opportunities per unit of expenditure. Labour-based construction, however, incorporates a blend of labour and light equipment. It uses labour-intensive construction methods but with the aim of creating employment opportunities for work forces in targeted localities, with a specific view to transfer skills and competencies to that work force, ie it seeks to mobilise and utilise local labour resources. Labour-intensive construction seeks to maximise the use of labour; labour-based construction to optimise the use of labour. Labour-intensive construction serves, in the short term, to increase the number of unskilled jobs available and provides a measure of relief to depressed communities. Labour-based construction, on the other hand, benefits a community by not only creating employment opportunities but also by facilitating the acquisition of technical skills. In community-based construction projects, the focus is on involving the community in the management and administration of labour-based construction projects, to promote the emergence of local contractors and to mobilise and utilise the resources of the community in an optimal manner.

The goals and objectives of these forms of construction are very different. The benefits accruing to a community depend upon the construction method that is adopted.

With regard to targeting, labour-intensive construction is concerned with the increase in the number of employment opportunities that are created; labour-based construction with the earning capacity and increase in spending on the local labour force and community-based construction with the amount of project expenditure retained by the community.

LABOUR-INTENSIVE AND LABOUR-BASED CONSTRUCTION

General

The ILO has been involved in a world employment programme since 1970 which has sought to substitute labour for capital in a cost effective way. Its focus, however, has been on the construction of rural roads. The ILO's experience of Public Works Programme in Africa, albeit multisectoral at the outset, is that these programmes camp around the construction and maintenances of rural roads and occasionally include irrigation works. Recently, the organisation has been mobilising communities to work on their own needs in urban areas where unlined open drains have been constructed to attend to stormwater problems (Morris 1994).

In South Africa, on the other hand, labour-based methods of construction have been employed on projects which include rural roads (Markman 1991, Boothway 1993, Scott 1993), low level bridges (Otte et al 1993), dams (Manson 1993), residential roads using waterbound macadam bases (Watermeyer 1992, Harrison 1993), block paved roads (Kelly 1993), water and sewerage reticulations for townships (Saxby 1993, Watermeyer 1993 a, b, Powers et al 1994), bituminous surfacing of roads (Powers et al 1994) and low voltage electrical reticulations (Watermeyer 1993 a,b).

Traditionally, the construction industry has been viewed as an industry which produces a high rate of employment per unit of expenditure. Labour-intensive methods of construction and labour-based technologies have been effective in improving upon these figures; eg. in Soweto's Contractor Development Programme, the multiplier in employment opportunities has been found to be (Watermeyer et al 1994):

- | | |
|---|-------|
| • excavate and backfill for water reticulation | - 1,9 |
| • excavate, lay pipes and backfill water reticulation | - 1,4 |
| • construct concrete block paved roads | - 2,3 |
| • construct waterbound macadam roads | - 4,7 |

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The average cost in South Africa to generate a manhour of employment in the civil engineering industry during 1994 was about R37. The building industry, on the other hand, is less machine orientated and, to a large extent, is labour-based by nature. In house construction, depending upon the standard of housing required, the cost per manhour of employment generated lies between R19 and R28 (Watermeyer and Band 1994).

The cost per manhour of employment generated during 1994 on projects involving the construction of water pipelines and surfaced roads in Soweto, where labour-based construction practices are employed, ranged from R17 to R19 (Watermeyer et al 1994). Labour-based construction practices have enabled the construction of township services to yield more employment opportunities per unit of expenditure than is the case for house construction.

Watermeyer and Band (1994), in a report commissioned by the National Housing Forum, concluded that the construction of township services using labour-based methods of construction would probably increase the total number of employment opportunities by a factor of about 2,5. The International Labour Organisation, who have had extensive experience in the construction of rural roads, have recently stated (ILO, 1995) that *... available data comparing local resource-based to capital-intensive approaches show that the use of local resources can be 10 to 30% less costly in financial terms, while reducing the foreign exchange expenditure by about half and creating 2 to 3 times more jobs.*

Approaches to Implementation

Labour-intensive construction methods and labour-based technologies are currently implemented in Southern Africa in one of 5 approaches or a combination thereof, (Watermeyer, 1992; McCutcheon et al 1992, Watermeyer and Band, 1994), viz:

- i) The Public Sector approach, whereby workers, predominantly labourers are trained and employed directly to perform specific tasks.
- ii) The Conventional Contractor approach, whereby restrictions on the use of plant and training obligations are imposed on such contractors.
- iii) The Managing Contractor approach whereby an experienced contractor contracts to administer, manage, finance, train and supply materials and equipment to nominated labour-based sub-contractors.
- iv) The Development Team approach, whereby professionals and specialists provide support to a labour-based contractor in administering and managing his contract, financing the contract, giving technical training, engaging specialist contractors and supplying materials and equipment.

- v) The Project Manager or Managing Consultant approach whereby a project manager in addition to providing conventional engineering services undertakes to manage labour-based contracting teams and thereby provide the support, materials, training and equipment required by such teams.

If labour-intensive construction methods were cheaper than conventional plant-based methods to implement conventional contractors would have utilised such methods to obtain a competitive advantage in tendering on the open market. It is for this reason that the aforementioned approaches have been developed.

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. However, in the Project Manager or Managing Consultant Approach, an approach which has been regarded by many to be an interim method, accountability cannot be adequately assigned as there are conflicts of interest and split responsibilities inherent in the contractual structures of such projects.

Each approach is structured to achieve distinctly different objectives and to deal with differing circumstances, both in rural and urban areas. The Conventional Contractor approach can be used to employ targeted labour on projects. However, this approach does not develop or necessarily employ local small scale contractors in the construction process. On the other hand, the Managing Contractor and Development Team approaches make use of and develops local contractors and sub-contractors in the implementation of labour-intensive methods and labour-based technologies, and as such promotes community-based construction. These two approaches can also be used to develop contractors in a contractor development programme. Both these approaches can be structured to adequately address the client's risk associated with engaging emerging contractors to construct infrastructure and the like.

Wages and productivity

Wages and productivity on projects in South Africa where labour-intensive methods and labour-based technologies have been employed, vary widely. Current legislation determines the minimum wage levels applicable to the formal sector of the industry (Watermeyer and Band 1994).

Productivity, on the other hand, is dependant on the method of payment to labourers and is highest where labourers are paid on a piecework basis, ie on the number of tasks completed in a day.

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Productivity is also dependant, to a lesser extent, upon the following :

- * skill of management
- * skill of labourers
- * wage levels
- * climatic conditions
- * supply of quality hand tools
- * physical conditions such as ground conditions, depth of excavations, etc.
- * work ethic of labourers

One of the major obstacles perceived by the formal civil engineering construction industry in the implementation of labour-intensive methods of construction, are the provisions of the Wage Order issued in terms of the Labour Relation Act. This wage order prescribes a minimum wage level and permits employees to be remunerated on a piecework basis provided that such remuneration is not less than that which would have been paid, had the employee been remunerated on the basis of time worked. The wage order, however, does not apply to an employer who does not employ more than twenty employees at all times and whose annual turnover does not in any 12 month period exceed R1 000 000. Thus in effect, small scale enterprises in many instances, are not required to remunerate employees in accordance with the prevailing minimum wage.

Organised industry has argued that labour-intensive construction methods are only cost effective where labourers are paid at wage levels below the minimum wage and are remunerated on the basis of tasks completed. In terms of the Framework Agreement, civil engineering contractors on projects which meet all the requirements relating to the selection of persons for employment, training and task-based payments, may remunerate labourers at wage levels below the prevailing minimum levels and on the basis of tasks completed. On the other hand, Watermeyer and Band (1994) in a report commissioned by the National Housing Forum, concluded that :

- * *Projects accredited in terms of the Framework Agreement will probably attract a premium of up to 15%.*
- * *Projects implemented using the Conventional Contractor Approach, where labourers are paid sub minimum wages, attract highly variable tenders, the range being from small cost savings to significant cost premiums.*
- * *Projects where local small scale emerging contractors have been employed have attracted little or no cost premiums and in some instance have realised significant savings.*
- * *Wage rates have been highest where small scale emerging contractors have been engaged to implement labour-intensive methods and labour-based technologies on projects.*

COMMUNITY-BASED CONSTRUCTION

General

Community-based construction in a sensitive and non-imposing manner aims at the use of labour-based projects to promote the emergence of local entrepreneurs who, with adequate technical, commercial and financial support and instruction, can, in due course become fully fledged contractors/subcontractors, should they so desire. Community-based construction practices make use of technologies which optimise the use of labour and methods of construction which maximise the use of labour in a cost effective manner, and implement these employment intensive options in construction by means of small scale contractors.

In community-based projects, members of the community can also become involved in the:

- operation of stores facilities;
- support provided to local contractors eg administration, monitoring of progress;
- transport of materials to local labour-only contractors;
- manufacture of certain materials
- supply of minor materials; and
- security of the site;

and, in so doing, be meaningfully exposed to management and administrative activities and further benefit from the employment and entrepreneurial opportunities presented thereby (Watermeyer 1993b).

If communities are to be engaged as contractors in construction, changes both in the construction method and construction process are required.

Development support required

Local entrepreneurs from underdeveloped communities cannot engage in construction without developmental support and the acquisition of external resources. The question which then arises is how should the support be rendered?

Various methods to implement labour-based technologies and labour-intensive methods and to facilitate the involvement of entrepreneurs from targeted communities are presented in a report commissioned by the National Housing Forum (Watermeyer and Band 1994). In this report, two approaches are recommended for engaging local contractors in civil and electrical construction projects, viz, the Managing Contractor and Development Team approaches. The Development Team

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approach ensures that the ownership of the project remains with the community and readily allows the community to participate in construction and materials management and other construction related activities. The Managing Contractor approach, on the other hand, is somewhat restricted in scope and permits the community only to own subcontracts. The contractor support mechanism between the two approaches are, however, similar. To illustrate the support mechanisms and to demonstrate how communities can be meaningfully engaged in as wide a scope of construction activities as possible, the Development Team approach will be used to illustrate the necessary developmental support required.

The Development Team Approach

In the Development Team Approach, experienced and suitably qualified persons assist local community-based contractors with the administration and management of their contracts, offer technical training, engage specialist contractors, and supply the necessary materials and equipment. In addition, the development team employs and trains members of the local community to run stores facilities, monitor progress, assist with administration, etc. Normally, the local contractor enters into a contract with the client/funding body and the development team is appointed on a fee basis directly by the client. The development team may be regarded as construction facilitators who arrange to provide resources that the contractor lacks. In a community-based project, the Development Team must ensure that certain specific functions are carried out, normally by the following individuals who assume distinct responsibilities:

- The Design Engineer.
- The Engineer.
- The Construction Manager.
- The Materials Manager.

Experienced contractors, project managers or consulting engineers may perform the duties and assume the responsibilities of the Construction and Materials Managers. However, the design and supervision of the works, ie, the duties and responsibilities of the Design Engineer and the Engineer must be undertaken by Professional Engineers or Technologists.

It should be noted that the Construction and Material Managers are appointed by the client on a fee basis in terms of a scale of fees. Thus the contractor is motivated by profit to successfully complete his contract whereas the Development Team is motivated by seeking to secure another appointment. Model forms of agreement have been written for the appointment of Construction and Materials Managers (Soderlund and Schutte, 1994).

The developmental support provided by the Construction and Materials Managers may be summarised as follows :

- | | | |
|----------------------|---|---|
| Construction Manager | - | offer advice, practical assistance and training; |
| | - | provides plant other than small tools; |
| | - | arranges for specialist work; |
| | - | arranges for payment of fortnightly/weekly wages; and |
| | - | transport of materials to site. |
| Materials Manager | - | provides all material |

In terms of the model form of agreement, the Construction Manager is required to *advise, assist and train on-the-job the contractor in the execution of his contracts and to this end shall make visits to the Site at such intervals as he deems appropriate during the various stages of construction in order to ensure that the Contractor makes satisfactory progress, shows technical competence in the execution of all aspects of the works and generally fulfils his contractual obligations. The Construction Manager shall procure the services of site staff, as necessary, to assist him and provide continuous support to the Contractor in order to ensure that the Client's objectives are achieved.*

The Construction Manager's function is therefore to minimise the client's contractual risk and to meet the client's objectives of *having the works constructed to specification within a specified period and a given budget using community-based contractors and labour-based construction practices* (Soderlund and Schutte Inc, 1994). Thus the client has the assurance that the local small contractor, by relying on the support provided by the Construction Manager, will have the necessary skills available to adequately complete the contract (Watermeyer and Band, 1994).

The support provided is flexible and can be varied depending upon the needs of the community, eg, if the community is capable of procuring the materials, then there would be no need for a Material's Manager.

Community-based developments

The Managing Contractor and Development Team Approach are not the only way in which communities can become involved in construction projects. The range of options include (Watermeyer and Band, 1994) :

- Labour Pool Worker Programme (NCLIC Framework Agreement type approach)
- Managing Contractor
- Development Team Approach
- Main Contractor
- Contractor Team Approach
- Mentorship Approach
- Joint Venture

Depending upon the community's requirements and the resources and expertise available, any combination of the abovementioned approaches can be utilised to facilitate community involvement as illustrated in Figure 1.

There are different emphases on community involvement and training opportunities in the aforementioned approaches to implementation, the differences are briefly listed hereunder (Watermeyer and Band, 1994).

Labour Pool Worker Programme Approach

- job creation
- training of labour in the appropriate skills required to do a particular project
- ownership of contract rests with main contractor

Managing Contractor Approach

- training as for Labour Pool Worker Programme plus management training
- ownership of contract as a whole rests with the main contractor but nominated emerging sub-contractors owns subcontracts

Development Team Approach

- job creation and entrepreneurial development
- involvement of community in contractor support systems, management of emerging contractors and materials supply, transport of materials and security of site
- training as for Managing Contractor, Approach and Labour Pool Worker Programme plus training in commercial and administrative aspects
- emerging contractor has ownership of contract

Main Contractor Approach

- assets creation
- training of contractor's staff in the traditional manner
- ownership of contract rests with the main contractor

Contractor Team Approach

- job creation and small scale enterprise development

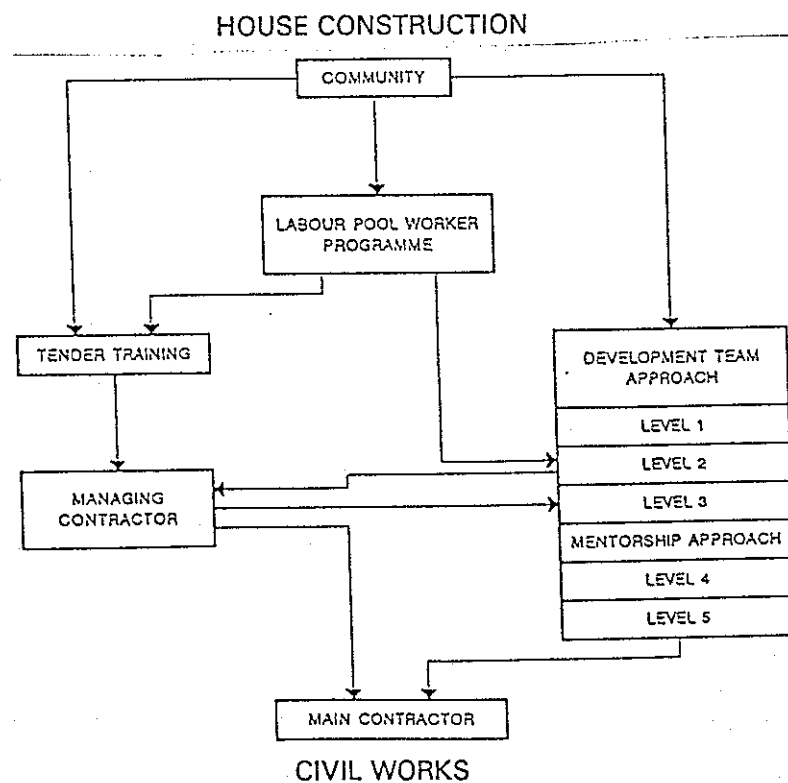
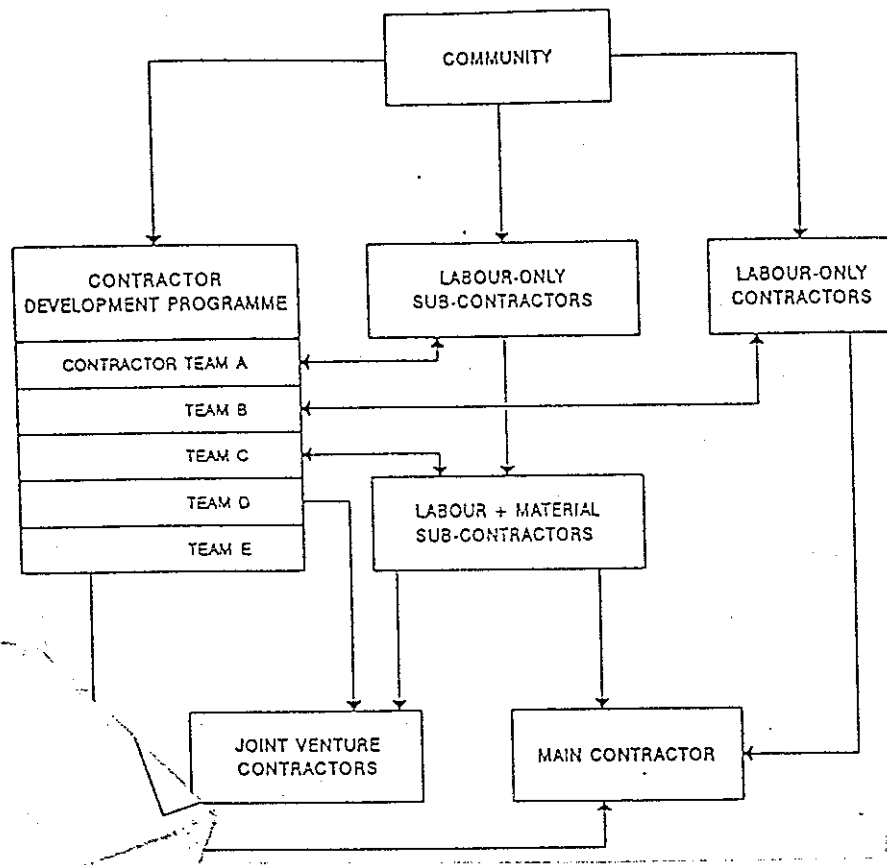


Figure 1 : Human resources development opportunities in the construction of housing in an integrated approach.

Mentorship Approach

- coaching and mentoring of emerging contractors.
- rendering assistance in the setting up of proven systems.
- enhancing business and management skills.

Joint Venture

- business development.

Cost retained by the community

The amount of construction cost retained by the community gives an indication of the degree to which entrepreneurship and small scale enterprises are promoted in the community and is a direct measure of the benefit accrued by the community from the project as well as that of economic empowerment. (Watermeyer et al, 1994).

In community-based construction projects in Soweto, where materials are not manufactured by the community, the amount retained by the community varies from 37 to 50%, depending upon the cost inputs relating to materials. This is achieved through the community's involvement in the construction contracts (25-33%), transport of materials (2 - 9%), construction management (6-7%) and materials management (2-3%) (Watermeyer, et al, 1994). In house construction, the cost retained by the community by means of community-based construction practices can be in excess of 40% (Watermeyer and Band, 1994). Where communities engage in the manufacture of materials, these percentages will increase.

CONTRACTOR DEVELOPMENT PROGRAMMES

General

The employment of local entrepreneurs in community-based developments has led to the establishment of contractor development programmes. Details of such programmes have been published by Watermeyer (1992) in a manual on Soweto's Contractor Development Programme, Watermeyer and Band (1994) in a report commissioned by the National Housing Forum and Milne (1994) in a DBSA publication.

Watermeyer and Band (1994) suggest that a CDP should offer emerging contractors the opportunity to mature into a contractor/subcontractor who has all the resources to execute a project or portion thereof. Such programmes should therefore allow emerging contractors to develop :

- Commercial skills
- Managerial and administrative skills
- Credibility in commercial circles
- Experience in pricing complete contracts while accepting increasingly greater risk and contractual responsibility

The structure of a CDP should be such that the supporting structures and the associated construction processes, effectively eliminate the barriers to entry, for those entering the programme and reimposes these barriers as emerging contractors are developed within the programme. This should be done in such a manner so as to enable contractors leaving the programme to compete in the formal sector of the economy at their level of proficiency. At the same time, the CDP should encourage entrepreneurial flair, provide training to enhance business skills and enable participants to learn and mature through experience.

Watermeyers' Contractor Development programme in respect of civil and electrical construction
Watermeyers' contractor development programme for civil and electrical construction envisages 5 levels of contract viz:

- Level 1 : labour only
- Level 2 : labour plus transport of materials
- Level 3 : labour plus transport plus materials (assisted)
- Level 4 : labour plus transport plus materials (unassisted)
- Level 5 : labour plus transport plus materials plus full surety

The five levels provided for are structured in such a manner that a contractor who has no resources when he enters the programme, can build up his resources while he learns tendering and contracting skills. This is generally achieved by putting profits back into his business. Credibility in commercial circles at the higher levels of contract can be established by successfully completing a number of lower level contracts. Use is made of the Development Team, the Managing Contractor and the Mentorship Approach to provide the necessary development support (see Figure 1.)

The programme is based on the successive introduction of labour, transport, materials, plant and finance. Not all participants will necessarily advance to Level 5 and some may, only, aspire to Level 2 and 3. Competent contractors who operate at Level 2 could, for example, leave the programme and successfully, operate as labour only, subcontractors to established contractors outside of the programme.

All the necessary model forms of agreement, standardised specifications and contract documentation has been developed to support the programme (Soderlund & Schutte, 1994).

Milnes' Contractor Development Framework

Milne in the DBSA publication *Guidelines for emerging contractor development* defines five levels of contractor being artisan assistant (Level 1), artisan (Level 2), emerging small contractor (Level 3), established small contractor (Level 4) and established large contractor (Level 5). Watermeyer and Band (1994), however, point out that this *classification can be readily modified to include the sub-contracts arena ie artisan assistant (Level 1) and artisan (Level 2), as before, followed by "emerging small sub-contractor", (Level 3) "established small sub-contractor" (Level 4) and "established large sub-contractor"*.

Milnes' framework for contractor development is based on guiding principles which offer significantly, from that put forward by Watermeyer and Band (1994), and presupposes that contractors will emerge from artisan ranks. Contract types, documentation and tender procedures at the lower levels of contract are very different from industry norms. The framework is also written around technical and managerial counselling and training at the lower levels of contract as opposed to the proactive on site, continuous management support and "on-the-job training" provided by the Managing Contractor and Development Team approaches used in the Watermeyer and Band programmes.

Bands' Contractor Development Programme in respect of Building Construction

Watermeyer and Band (1994) comment that building construction differs appreciably, from civil engineering construction. The principal reason for this is that building construction is to a large extent reliant on the availability of competent sub-contractors. Many of the large formal contractors dig the excavations, pour the foundations and use sub-contractors to continue and complete the construction. Accordingly, main contractors frequently operate as providers of materials for labour only sub-contracts and as project managers who control the programme and the budget, and assign foremen to check the quality of the work provided by sub-contractors. Most reasonably sized projects comprise a combination of contractors, labour and materials sub-contractors and labour only, sub-contractors. The proposed programme which accommodates the development of the different types of contractors found in the industry is as outlined in Figure 1.

In the Contractor Team Approach, individuals who assume responsibility for a trade (eg. bricklayer, carpenter, plumber, painter, electrician, etc.) or aspect of the works (eg. excavation) are brought together to form a construction team. Each team member operates as a sub-contractor in his own right and is remunerated on the basis of the accepted "market rate". Prices which are too low or too high are not accepted. Certain rules are laid down to ensure that contractor teams complete projects on time, to the correct quality, and within budget.

The development support which is provided, is similar to that provided by the Managing Contractor and Development Team Approach in respect of civil and electrical construction projects. The basis of the appointment of organisations to undertake responsibility for the site and materials management functions is dependant on the developing agents' requirements and organisational structures. Organisations can either contract to perform these functions or be appointed on a fee basis. Wherever possible, members of the local community are trained to enable them to become involved with these functions to further increase the benefits accruing to a community.

Small scale entrepreneurs can develop along two distinct paths in this approach. Each team member has the opportunity to develop as sub-contractors, alternatively ; one of the team leaders from a particular team can take over the role of contractor, if he demonstrates his leadership and organisational attributes to the rest of the team. With the necessary training and experience gained on site, such contractors have the potential to develop into fully fledged contractors. (see Figure 1.) The remainder of his team can either continue to operate as sub-contractors or join the entrepreneur as a part of his management team.

The manner in which both contractors and sub-contractors develop, is shown in Figure 1. This figure shows the various development routes which are possible for emerging sub-contractors and contractors. Not all entrepreneurs will aspire to become main contractors. Many large, medium and small formal sub-contractors, (labour only and labour and materials), have developed their organisations on the basis of one trade only and operate particularly successful businesses. It is therefore unrealistic to assume that the sole objective of such a programme is to produce main contractors. Nevertheless, the opportunity to do so must be built into the programme.

The approach outlined in Figure 1 shows the several courses of action open to those entering the house building arena as well as for those already operating within the industry. Members of the

community can enter projects as members of "contractor teams", labour-only sub-contractors or labour-only contractors. Individual members of "contractor teams" have the opportunity to become labour-only sub-contractors, labour only contractors, labour and materials sub-contractors, joint venture contractors or main contractors in their own right. Labour-only sub-contractors, on the other hand, (generally sub-contracted to the main contractor) have the opportunity to become contractor teams, labour and materials sub-contractors or labour-only contractors. Labour-only contractors have the opportunity to become contractor teams or become main contractors. Labour and material sub-contractors have the opportunity to become contractor teams, become joint venture contractors, or become main contractors. Joint venture contractors, in turn, have the opportunity to become main contractors.

Development of Contractors

Each of the aforementioned programmes develop contractors/sub-contractors in a progressive manner. However, the programmes put forward by Watermeyer and Band are structured in such a manner that contractors can be developed through the support provided. In the Development Team Approach, *members of the community are as far as is practicable employed by the Construction and Materials Managers to assist them in the execution of their duties.* (Soderlund & Schutte Inc, 1994) In this manner, site agents and managers of materials are developed in an affirmative manner. Movement between being a contractor within the programme and being part of the construction managers' staff is also possible. This is not possible where counselling support is provided.

THE RECONSTRUCTION AND DEVELOPMENT PROGRAMME

The Reconstruction and Development Programme (RDP) (African National Congress, 1994) suggest that one of the first priorities in meeting basic needs is to provide jobs (cl 1.4.2). In regard to construction, it suggests that *our people must be involved in these programmes by being made part of the decision-making on where infrastructure is located, by being employed in its construction and by being empowered to manage and administer these large scale programmes ... (cl 1.4.3) ... infrastructural programmes must take into account the implications for micro enterprises (cl 4.4.7.10).*

The RDP makes specific reference to Public Works and sets out that programmes of this nature should:

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- involve communities in the process so that they are empowered (cl 2.3.6)
- create assets which are technically sound (cl 2.3.6)
- not abuse labour standards (cl 2.3.9)
- give priority to job creation and training (cl 2.3.9)
- encourage and support self-employment through small and medium enterprise creation to ensure sustainability of skills (cl 2.3.9)

The RDP in terms of housing and services suggests that such programmes should:

- incorporate the development of small, medium sized and micro enterprises owned and run by black people (cl 2.5.6)
- introduce support mechanisms in order to maximise the use of local materials (cl 2.5.19)
- encourage community-controlled building materials suppliers (cl 2.5.19)
- involve beneficiary communities at all levels of decision-making and in the implementation of their projects (cl 2.5.21)
- benefit the beneficiary community in matters such as employment, training and award of contracts (cl 2.5.21)

Delivery systems should aim to maximise job creation, the use of local materials and local income generation and training. Support must be provided to black and more generally small builders (cl 2.5.20).

In essence, construction projects provide development opportunities in four basic development areas, viz:

- small scale enterprises
- skills
- entrepreneurship
- employment opportunities

There are definite relationships between these four areas. The strength of these relationships and linkages is, however, dependent on the structuring of the delivery systems ie. how the construction process is implemented. For example, the installation or upgrading of services, depending on the structure of the construction contracts, (modus operandi) can either:

- i) Generate "x" employment opportunities.
- ii) Generate "x" and create additional "y" employment opportunities.
- iii) Generate "x" and create additional "y" employment opportunities for a specific community and, in so doing, provide training and development opportunities for both semi-skilled and unskilled persons.
- iv) In addition to that described in (iii) above, allow the community to participate in the commercial, managerial and administrative aspects of the project and thereby maximise the project expenditure retained within that community.

In essence, the structuring of the delivery systems can at one end of the spectrum, lead to an increase in employment opportunities by employing labour-based technologies, and at the other end, create an enabling environment within which entrepreneurs can establish small scale enterprises. Thus the employment of labour-intensive methods of construction, the selection of labour-based technologies, the provision of developmental support to emerging contractors and the establishment of contractor development programmes will ensure that the aspirations of the RDP are addressed comprehensively. In this regard, Watermeyer et al (1994), have developed a Project Index to evaluate and compare the effectiveness of different projects in meeting the requirements of the RDP (Watermeyer, 1995). This Project Index is simply a number arrived at by summing three expressions which, in their own right, index employment opportunities, community opportunities and cost premiums, respectively. Projects which have a high Project Index present more developmental opportunities to targeted communities than those having low ones.

LOOKING AT THE FUTURE

Labour-intensive and labour-based methods of construction have a valid place in the South African construction industry and with the spiralling levels of unemployment will be used to create job opportunities. These methods will not replace plant-based methods but will co-exist with such practices.

Labour-based construction practices will probably become more cost competitive since current cost comparisons with conventional construction practices have been undertaken in a recessionary period where plant on most projects has been priced at unrealistically low levels. This trend may continue when current plant requires replacement. Any boom in the industry may result in a shortage of available plant and cause prices to rise sharply. Labour-intensive and labour-based construction practices, if implemented on a large scale and linked to the development of small scale enterprises, could be effectively employed to maintain competition, to stabilise construction costs and to circumvent the purchase of plant by increasing production capacity.

Communities are expressing a strong desire to participate in the construction and maintenance of their own housing and infrastructure. Accordingly, the demand for community-based construction is going to increase, particularly as communities realise that they can construct their own infrastructure with the support of a developmental team. The cost of community-based

construction practices will probably reduce as the level of competence in community-based contractors increases and the developmental support required is reduced. Community-based construction projects will also empower communities to take charge of their maintenance needs.

Certain restructuring of the industry will need to take place to enable small scale enterprises to have adequate market share and to change the distribution of the size of companies which are currently operating. Should the formal sector work together with the informal sector, contractors can develop together to benefit all.

CONCLUSIONS

The labour-intensive methods of construction and labour-based technologies which have been developed in South Africa can significantly increase the number of employment opportunities presented by construction projects in a cost effective manner. It can in fact transform certain sectors of the construction industry into sectors which attract very low expenditures per unit of employment created. The RDP suggests that one of the first priorities in meeting basic needs is to provide jobs. Accordingly, these methods of construction, technologies and construction practices can make a meaningful contribution to this aspect of the RDP.

Some of the approaches which have been developed to implement labour-based and community-based construction can be used to facilitate the development of local contractors and to provide opportunities for local entrepreneurial involvement on construction projects. The contractor development programmes, which have been developed, can provide the necessary support to emerging contractors and, in so doing, contribute to RDP aspects relating to affirmative action, economic empowerment, micro enterprises and self employment through small and medium enterprise creation and in so doing ensure the sustainability of skills.

Technologies and delivery systems have been developed to such an extent that should the formal sector work together with the informal sector, contractors can develop together and, in terms of the construction industry, turn the RDP from being an *integrated coherent socio economic framework* into a living reality.

REFERENCES

- African National Congress. The reconstruction and development programme : a policy framework. Umanyano Publications, Johannesburg 1994.
- Boothway, DP. Labour-intensive Construction of Rural roads - a Case study : Madedeni Magisterial District SAICE/SARF symposium on Labour-intensive Construction, Midrand, March, 1993.
- Harrison DM Case study on waterbound macadam road construction in Soweto. SAICE/SARF symposium on Labour-intensive Construction, Midrand, March, 1993.
- Kelly PJ. Concrete block paving for labour enhanced construction. SAICE/SARF symposium on Labour-intensive Construction, Midrand, March, 1993.
- Manson EJ. Case study - rural dam. SAICE/SARF symposium on Labour-intensive Construction, Midrand, March, 1993.
- Markman TS. Labour-based Construction of a Rural road in Kwazulu. Annual Transportation Convention. (Developing Areas), Pretoria 1991.
- McCutcheon R. Kenya : The rural access roads programme 1974 to 1986. Labour-intensive Construction - Practical details for success. University of the Witwatersrand. 1989.
- McCutcheon RT, van Zyl CWL, Croswell J, Meyer D and Watermeyer RB. Interim guidelines for labour-based Construction Projects. Development Bank of Southern Africa. 1992.
- Milne JC. Guidelines for emerging contractor development. Development Bank of South Africa. 1994.
- Morris D (International Labour Organisation). Personal Communications. Johannesburg, February, 1994.
- Powers G. (Power Construction), Potgieter J. (Hill Kaplan Scott Inc.), Judd M. (Ninham Shand Inc.), Burgher G. (Western Cape Training Centre), Stoffberg M. (Power Construction), Vorster J. (Wouter Engelbrecht Inc.), Lambrechts A. (BKS Inc.), and Vorster S. (BKS Inc.). Informal discussions and site visits. Cape Town, January, 1994.
- Saxby R. The need for commitment of the 4 C's : Client, Community, Consultant and Contractor. SAICE/SARF symposium on Labour-intensive Construction, Midrand, March, 1993.
- Scott H. Community Contractors and the Construction of Township services. Symposium on Labour-intensive construction, Midrand, March, 1993.
- Soderlund and Schutte Inc. Community-based construction : Documents for the implementation of the Development Team Approach. Johannesburg. 1994.
- Watermeyer RB. (Ed). Contractor Development in Labour-based Construction. The Contractor Development Team. Johannesburg. 1992.
- Watermeyer RB. Community-based Construction. SAICE/SARF symposium on Labour-intensive Construction, Midrand, March, 1993a.
- Watermeyer RB. Community-based Construction : Mobilising Communities to Construct their own infrastructure. XXIst World Housing Congress. Cape Town. May, 1993b.
- Watermeyer RB. Labour-intensive, labour-based and community-based construction : what are their roles in the unfolding new South Africa. Railways and Harbour Division of the SAICE Symposium. Midrand, Oct, 1993c.
- Watermeyer RB. Evaluating employment and community opportunities presented by building and construction projects. Annual Transport Convention. Pretoria. 1995.
- Watermeyer RB and Davies AH. Professional Support Structures employed in Community-based Construction Projects in Soweto. IMIESA Journal, May, 1993.
- Watermeyer RB and Band NG. Implementing Community-based Civil and Electrical Engineering Construction Projects. Continuing Education course on Employment Creation in Construction, September, University of Witwatersrand, Johannesburg. 1993.
- Watermeyer RB and Band NG. The Development of small scale enterprises, skills, entrepreneurship and employment opportunities through the provision of housing. National Housing Forum Working

Group 3, Final, November, 1994.

Watermeyer RB, Nevin G, Amod S, Hallett RA. An evaluation of projects within Soweto's Contractor Development Programme. Paper submitted to Civil Engineer for publication. November, 1994.

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RB Watermeyer