Implementing employment intensive road works

A cidb practice manual

Contributing to contractor development in job creation

MANUAL 2
Planning and contract management

cidb
development through partnership

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cidb is a public entity established in terms of the CIDB Act, 2000 to provide strategic direction for sustainable growth, reform and improvement of the construction sector and its enhanced role in the country's economy. In pursuit of this aim cidb partners with stakeholders and regulates the construction industry around a common development agenda underpinned by best practice procurement and project processes.

Construction Industry Development Board

Private Bag X14, Brooklyn Square, 0075
Tel: 27 12 - 481 9030 Fax: 27 12 - 343 7153
email: cidb@cidb.org.za website: www.cidb.org.za

Constructing shared growth

This set of practice manuals for employment intensive road construction, draws on the experience of the South African Construction Industry in the development of road building contractors, supervisors and designers, in implementing road works and creating jobs; and builds upon the labour-based best practice guidelines that have been published by the Construction Industry Development Board. (cidb) (see www.cidb.org.za):

"…..with the right construction technology, South Africa can successfully address infrastructural backlogs in a cost-efficient way and to acceptable engineering standards. We are saying we can do this while maximising job opportunities.…"
(Ms Thoko Didiza, Minister of Public Works. Vuk'uphile learners welcoming ceremony, Nkangala, Mpumalanga, 29 June 2006.)

In assembling this publication, the cidb has collaborated with the Council for Scientific and Industrial Research (CSIR), and the International Labour Organisation (ILO) in fulfilment of the cidb's mandate to promote *"national social and economic objectives, including the labour absorption in the construction industry"*. (CIDB Act 38 of 2000). The cidb is committed to further partnerships with industry and stakeholders, to promote the use of these manuals and the training of SME contractors within the framework of the National Contractor Development Programme and the Construction Charter.

These manuals are supported by the Expanded Public Works Programme (EPWP), which directs a significant and increasing proportion of South Africa's public investment towards a labour intensive programme of construction, drawing the unemployed into productive work and providing access to skills development.

Implementing employment intensive road works

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OVERVIEW of the practice manuals

The South African White Paper *Creating an Enabling Environment for Reconstruction, Growth and Development in the Construction Industry* (1999), expresses a vision for public-sector delivery aimed at optimising employment opportunities through labour-intensive construction. This can be realised in the delivery of infrastructure through the adoption, where technically and economically feasible, of

- labour-based methods of construction and manufacture where labour, utilising hand tools and light equipment, is preferred to the use of heavy equipment for specific activities.
- labour-based technologies where there is a shift in balance between labour and equipment, in the way the work is specified and executed for selected works components.

This cidb practice manual for *Implementing Employment Intensive Road Works* follows on from the cidb's guide to best practice for *Labour-based Methods and Technologies for Employment-Intensive Construction Works*. The latter covers a broad spectrum of construction works. It establishes desirable and appropriate standards, processes, procedures and methods; relating to the design and implementation of labour-based construction technologies, methods for earthworks and for materials manufacture. This first set of guidelines provides sufficient technical information to enable those, responsible for the design of projects, to make confident and informed choices on their use in projects.

Implementing Employment Intensive Road Works aims to provide practical and technical guidance to small and medium sized (SME) contractors, supervisors and designers who are involved in the construction and upgrading of roads using labour and light plant. The need for these technical manuals was identified during the training of SME contractors, involved in the Gundo Lashu programme in Limpopo Province – a programme of labour-based upgrading of rural roads, promoted by the Department of Public Works, Roads and Transport in collaboration with the International Labour Organisation (ILO).

The development of this series of manuals is based on:

- experience gained in South Africa over the last ten years, including that of the Gundo Lashu project presently being implemented by the Road Agency Limpopo, with technical assistance from the ILO,
- best practices implemented by a number of Sub-Saharan countries,
- the relevant cidb best practice guidelines, in its series of *Labour-based Methods and Technologies for Employment-Intensive Construction Works.*

These manuals support the objectives of South Africa's Expanded Public Works Programme (EPWP), and are aligned with the *Guidelines for the Implementation of Labour-intensive Infrastructure Projects under the Expanded Public Works Programme (EPWP)* of the Department of Public Works, obtainable on www.epwp.gov.za.

Acknowledgements

These manuals were compiled by the CSIR in collaboration with, and funding from, the ILO and cidb to promote the implementation of employment intensive road works.

A cidb Focus Group of industry specialists and stakeholders has further reviewed and refined these manuals.

The contribution of these individuals whose passion, commitment and knowledge has enabled the development of this publication as a common resource in the fight against poverty and joblessness, both in South Africa and globally, is acknowledged. Special thanks to:

- Adrian Bergh and Alex McKay of the CSIR.
- Jon Hongve of the ILO.
- Rob Little, Bryan Westcott, Ian van Wyk and Ron Watermeyer of the cidb Focus Group.
- Maikel Lieuw Song, Basotho Seetsa and Mpayo Kasure of the Department of Public Works, as members of the cidb Focus Group.
- The many organisations and individuals referred to in the references quoted in these manuals.

MANUAL 2: Planning and contract management

Contents

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Introduction

1. Aim

The aim of this manual is to provide contractors, who are involved in the labour-based construction and upgrading of low volume roads, with an introduction to and an understanding of the basics of planning and contract management.

2. Composition

The manual comprises the following modules:

Module 1: Documentation on which a contract is based
Module 2: The role and authority of the parties involved in a contract
Module 3: The establishment and management of a construction camp
Module 4: Health and safety issues
Module 5: Contract planning and preparation of a programme
Module 6: Quality control of the work
Module 7: Local labour employed on special public works programmes (EPWP)
Module 8: Broad environmental issues

3. Notes to designer/consultant

A set of 'Notes to designer/consultant' is included at the end of certain modules comprising this manual, where applicable. These notes are provided to highlight important aspects applicable to that module which the designer/consultant should take into account.

4. Supplementary manuals

Manual 1: The fundamentals of road construction
Manual 3: Gravel pavement layers
Manual 4: Bituminous seals
Manual 5: Concrete and masonry drainage works and structures

5. Bibliography

Manual for smaller builders. 1996. BIFSA Education Technology Department.

Technical manual for labour based road rehabilitation works. March 1999: Lusaka: Republic of Zambia; Ministry of Works and Supply.

Guidelines for low-volume sealed roads. July 2003: South African Transport and Communications Commission (SATCC).

Guidelines for the Implementation of Labour-Intensive Infrastructure Projects under the Expanded Public Works Programme (EPWP) : Republic of South Africa: Department of Public Works.

Course material. CSIR workshops.

MODULE 1: Documentation on which a contract is based

1. Procurement documentation

1.1 Aim

The aim of procurement documents is to obtain a tender offer from a tender and to enable a contract to be entered into with the successful tenderer.

1.2 Composition of a procurement document

Procurement documents comprise several component documents, dealing with different topics, bound together in a logical sequence. The first cluster of documents contains only those documents that are relevant to the tender enquiry (see Table 2.1) and the second cluster contains those documents that relate to the contract that will be created, upon the acceptance of the tender (see Table 2.2).

Contents		Function and broad outline of contents
Number	**Heading**	
Part T1: Tendering procedures		
T1.1	Tender Notice and Invitation to Tender	Alerts tenderers to the nature of the supplies, services and engineering and construction works required by the employer, and should contain sufficient information to enable them to respond appropriately.
T1.2	Tender Data	States what the applicable conditions of tender are and where they may be found. Tender Data also provides the variables for standardised conditions of tender.
Part T2: Returnable documents		
T2.1	List of Returnable Documents	Ensures that everything the employer requires a tenderer to submit with his tender is included in, or returned with, his tender submission.
T2.2	Returnable Schedules	Contains documents that the tenderer is required to complete for the purpose of evaluating tenders; and other schedules which, upon acceptance, become part of the subsequent contract.

Table 2.1: Documents that relate solely to the tender

Contents		Broad outline of contents
Number	**Heading**	
Part C1: Agreements and contract data		
C1.1	Form of Offer and Acceptance	Formalises the legal process of offer and acceptance.
C1.2	Contract Data	States the applicable conditions of contract and associated contract specific data that collectively describe the risks, liabilities and obligations of the contracting parties and the procedures for the administration of the contract.
Part C2: Pricing data		
C2.1	Pricing Instructions	Provides the criteria and assumptions which it will be assumed (in the contract) that the tenderer has taken into account when developing his prices, or target in the case of target and cost-reimbursable contracts.
C2.2	Activity Schedule / Bill of Quantities	Records the contractor's prices for providing supplies, services, or engineering and construction works which are described elsewhere in a specification, within the Scope of Work section of the contract.
Part C3: Scope of work		
C3	Scope of Work	Specifies and describes the supplies, services, or engineering and construction works which are to be provided and any other requirements and constraints relating to the manner in which the contract work is to be performed.
Part C4: Site information (engineering and construction works contracts only)		
C4	Site information	Describes the site as at the time of tender, to enable the tenderer to price his tender and to decide upon his method of working and programming.

Table 2.2: Documents that relate solely to the contract (See SANS 10403)

1.2.1 Contract data

The contract data identifies the general conditions of contract published by an industry body that applies to the contract.

One of the most commonly used general conditions of contract, applicable in road and civil engineering work, is the *General Conditions of Contract for Construction Works* (First Edition 2004) (GCC-2004) published by the South African Institution of Civil Engineering.

GCC-2004 sets the rules for the execution of the contract, the responsibilities of the contracting parties and remedies in the event of conflict or failure to perform, and covers aspects such as:

- Definitions, interpretations and general provisions
- Engineer and engineer's representative
- Basis of contract
- Commencement of work
- Contractor's general obligations
- Contractor's employees
- Materials, workmanship and construction plant
- Care of works, damage, injury and insurance
- Excepted risks
- Variations
- Progress and time for completion
- Claims, certificates and payment
- Completion and approval certificates and defects liability period
- Cancellation, disagreements and disputes
- Contract price adjustment issues

The general conditions of contract need to be made contract-specific, through the provision of contract data.

1.2.2 Standard specifications

As with the general conditions of contract, the standard specifications cover the specification for executing the various activities associated with various fields in the construction industry (e.g. building, general civil, major roads).

The standard specifications applicable to road works are the *Standard Specifications for Road and Bridge Works for State Road Authorities* prepared and drafted by the Committee of Land Transport Officials – 1998 Edition (commonly known as the COLTO or COTA Specifications).

For example, the standard specifications for road works include specifications, which set out the common requirements, for:

- General (setting up of camp, establishment on site and general obligations)
- Earthworks
- Layer works
- Drainage
- Surfacing
- Structures

Where it is desirable to make a general amendment, addition or other change to the Standard (General) Specifications applicable to the industry, without having to withdraw the document and revise and issue a new document, a set of Supplementary Specifications of Contract can be included in the scope of work.

1.2.3 Documents to be completed by tenderers

The list of tender returnables identifies all the documents that a tenderer needs to submit with his tender.

The tenderer is required to complete the Form of Offer and Acceptance and the Bills of Quantities. In addition, tenderers are required to complete the following forms/submit the following documentation, as part of their tender submissions:

- Certificate of attendance at the site inspection
- Authority for signatory
- Schedule of constructional plant
- Schedule of work carried out by the tenderer
- Schedule of proposed subcontractors
- Schedule of estimated monthly expenditure
- Preliminary programme
- Contractor's establishment on site
- Certificate of non-collusive tender
- Amendments or qualifications to tender
- Declaration regarding tax
- Financial statements and bank references
- Rates for special materials
- Contract data
- Information relating to the involvement of emerging contractors, and employment of labour including local labour, training, equity.

2. Contract administration procedures and documents

2.1 Site handover

Site handover marks the physical commencement of the contract by the contractor. It is at this meeting that drawings necessary for the construction of the works, as well as relevant documentation, are formally handed to the contractor; and many of the ground rules are laid down for the contract execution, important issues highlighted and roles of the parties involved in the contract defined and clarified.

2.2 Programme

The contractor is required, in terms of the contract documentation, to submit a programme in the required format and, within a stipulated period, to indicate how he proposes to complete the contract within the contract period as well as projected cash flow over the contract period.

The contractor's progress is measured against this programme.

2.3 Site instructions

A site instruction book, of a format acceptable to the client, must be available on-site at all times. This book is used for recording all instructions, requests, rainfall records and important occurrences on-site.

All relevant parties must, timeously, sign the site instructions.

2.4 Variation orders (VOs)

A variation to the contract is formalised by the issuing of a written variation order by the client (or his representative). In many instances, a variation order is required to confirm a site instruction.

On roads contracts where the variation is being executed at tender rates, a VO will probably not be required.

2.5 Progress certificates

Interim payments for work executed during the contract are effected by progress payment certificates.

It is important that work is approved and measured as it proceeds and that certificates are processed in accordance with the requirements of the contract documentation.

2.6 Site meetings and minutes

Regular site meetings are a necessity to provide a forum for all the contracting parties to monitor the progress of the contract and address issues of concern.

Minutes must be kept of all site meetings and circulated to all the contracting parties' representatives. These minutes provide valuable information on the status and administration procedures of the contract.

Points to be covered in the minutes include those in Figure 2.1.

2.7 Other certificates in terms of the contract documentation

2.7.1 Certificate of practical completion or completion of the works

These certificates are issued following inspection visits arranged by the consultant, with the purpose of issuing, to the contractor, a certificate of practical completion or completion of the work and commencement of the defects liability period.

2.7.2 Final approval

At the end of the defects liability period, and subject to satisfactory inspection by the consultant, the certificate of final approval for the work is issued to the contractor.

1. File references

2. Number, date and time of meeting

3. Contract information
   a. Contract description
   b. Name of contractor
   c. Contract period
   d. Extensions granted
   e. Date of:
      i. Tender acceptance
      ii. Site handover
      iii. Completion
      iv. Extended completion

4. Attendance (and party represented)
   a. Present
   b. Apologies

5. Body of site minutes (including an action column)
   a. Approval of previous minutes
   b. Matters arising from previous minutes
   c. Accommodation of traffic and safety – accident report
   d. Progress
   e. Information required (with deadlines)
   f. Delays (with description)
   g. Drawings issued (with dates)
   h. Site instructions issued (with short description)
   i. Variation orders
      i. Approved
      ii. Submitted
      iii. Required
   j. Claims
   k. Rainfall records
   l. Compliance with legislative and regulatory requirements
   m. Plant and labour returns
   n. Special returns (e.g. local labour and empowerment returns)
   o. Date, location and time of next meeting

6. Signatures of parties with authority to approve minutes

7. Distribution list

Figure 2.1: Example of aspects to be covered in minutes

MODULE 2: Role and authority of parties involved in a contract

1. Introduction

The role of the parties, as described in this module, is based on contract documentation and legislation; and procedures are those that generally form the basis for the execution of contracts in South Africa.

2. Client

The client is responsible for the provision and maintenance of the infrastructure which falls under its area of jurisdiction.

As such, the client is responsible for the planning, design, documentation and administration of all contracts relating to the construction, rehabilitation and maintenance of this infrastructure.

Rate of pay:

In South Africa for special public works programmes (e.g. EPWP), in accordance with the *Code of Good Practice for Employment and Conditions of Work for Special Public Works Programmes* (clause 10.4), the public body (client) is responsible for setting a rate of pay (task-rate) for workers to be employed on the labour-intensive projects.

In order to assist in fulfilling this task the client makes use of the services of consulting civil engineering firms.

The execution of the contracts is undertaken by private contracting firms based on a tendering process.

3. Consultant

The consulting engineer, appointed by the client, is responsible for designing, documenting, supervising and administering the construction of the contract on behalf of the client, in terms of his conditions of appointment.

The involvement of the consultant during the construction stage of the contract will normally include the provision of site staff to supervise (quality, safety, and contractual obligations) the work being carried out by the contractor; the measurement of the work as it progresses; and certifying for payment and assessing claims due to delays, changed circumstances, etc.

The duties of the consulting engineer, as set out in *Government Gazette No. 27422* of 1 April 2005 (Board Notice 37 of 2005) during the construction stage of a contract, are reflected in Appendix 2.1 to this module.

4. Contractor

The contractor is responsible for the timely completion of the contract in terms of the contract documentation (conditions of contract, specifications, and schedules of quantities, drawings and variations).

MODULE 3: The establishment and management of a construction camp

1. Location

The site of the construction should be conveniently situated for the execution of the works and should be accessible to motor vehicles. It should have access to drinking water and, if at all possible, electricity.

It is possible that the contract documentation may dictate the location of the camp and special requirements relating to the use of the site.

The location of the camp site and its facilities must not have a detrimental affect on the environment.

2. Approval

Where the construction site is to be established on private or community property, the approval of the land owner or recognised community structure must be obtained, as well as any requirements they may have which could affect the running of the construction camp.

Any matters relating to the construction camp site should be clarified at the site hand-over and approval of the site obtained.

If the proper procedures are not followed and the necessary approvals obtained, expenses could be incurred at a later stage as a result of possible relocation of the site.

3. Facilities and services

The facilities and services required at the construction camp are defined in the specifications and measured in the schedules of quantities.

The facilities and services can be identified as follows:

For the consultant and the resident engineer:

- An office for the resident engineer with electricity (if feasible) for a computer and lights and a properly stocked first aid kit.
- A room for site meetings.
- Toilet and ablution facilities.

For the contractor's own use:

- An office with electricity (if feasible) for the site representative where plans and a properly stocked first aid kit can be kept.
- Stores and storage areas for:
  - materials (special requirements for storage of cement, emulsion, etc.)
  - fuel, lubricants and oil
  - plant, equipment and tools.
- Toilet and ablution facilities.

It is possible to share some of the facilities, such as toilets and ablution facilities.

Note:

In addition to the facilities at the camp site, the contractor should provide the following for his workers at the workplace:

- A supply of drinking water (by way of a person carrying water to the workers while they continue working).
- Some form of shade where the workers can shelter during lunch breaks.
- Toilet facilities (male and female).

The extent of the facilities and services to be provided will depend largely on a number of factors including:

- The extent of the work
- The nature of the work
- The location of the construction site

4. Security

The site should be securely fenced and provided with a lockable gate.

Consideration should be given to the appointment of a gate watch to control all in and out movements.

5. Storage and issuing of materials, tools and equipment

5.1 General

All materials, tools, plant and equipment should be stored in suitable secure enclosures and strict control kept over the issuing of any of the above. Tools, plant and equipment should be issued to specific workers/operators and be returned and checked at the end of each day's work.

5.2 Storage of materials requiring special attention

5.2.1 Cement

Cement should be carefully handled and stored to prevent breakage of the bags and spillage. Cement must be stored on a wooden floor off the ground in a shaded and well-ventilated place.

If stored for any time, the use of tarpaulins or plastic sheeting is not recommended as they allow moisture to collect on the underside.

Cement should be stored in such a manner so that the bags that arrived first are used first.

5.2.2 Bituminous emulsions

Drums of bitumen emulsion should be stored in a secure area such that full drums are stored in a horizontal position and empty drums in a vertical position.

Different types and grades of emulsion should be stored separately and clearly marked to ensure that the wrong emulsion is not used for the wrong application.

5.3 Control of labour tools, plant and materials

5.3.1 Labour

The names and identity numbers of all local workers should be recorded in a labour register, and their presence on-site recorded by the site clerk at the start and end of each work day. Where the local workers are employed on a task-based payment system, the task record sheets must also be kept by the site clerk.

Check tasks are done properly

The contractor's staff must set out the tasks to be carried out in a timely manner and the consultant's staff should check that this has been properly and accurately done.

In the case of task-based working it is important that, in addition to the work force, the contractor's (and consultant's) site staff must be fully conversant with the task-based payment system and its implications so as not to delay the work force in executing their work.

5.3.2 Hand tools

Tools should be issued every morning to the labour force by the storekeeper and record must be kept of the tools issued in the site issue book.

Tools should be returned at the end of the day and signed off by the storekeeper.

5.3.3 Equipment

Equipment (shutters, screeds, gauges, etc.) should be issued every morning to the labour force by the storekeeper and record kept of the equipment issued in the site issue book.

Equipment must be kept clean as the work progresses as well as at the end of the day, when it should be returned and signed off by the storekeeper.

5.3.4 Plant

The designated plant operator must be responsible for the daily maintenance cleanliness of his plant (e.g. pedestrian roller, hand spray, chip spreader, concrete mixer, wheelbarrows etc.), in accordance with the manufacturer's instructions (as applicable) and good housekeeping.

At the start of each day he must check oil, fuel and lubricant levels as applicable, and at the end of the day he should clean down the plant and do the required maintenance before the next day's work.

All plant should be securely stored in the camp site when not in use.

5.3.5 Materials/consumables

All materials/consumables (emulsion, plastic sheeting, pegs, string, fuel, etc.) issued must be measured and recorded by the storekeeper. Quantities must be recorded against the task for which it is issued and for the consumables register.

Only the type of oils and lubricants required for the specific plant should be kept on-site. The consumption of fuel and lubricants should be carefully recorded and monitored.

MODULE 4: Health and safety issues

1. Applicable act

The contents of this module are to a large extent influenced by the Health and Safety Act – Act 85/1993.

Health and safety for all road work operations

The contents of this module are of a general nature as Manuals 3, 4 and 5 each contain a module (Module 1) relating to the safety of the workers and travelling public, with special reference to the activities dealt with in those manuals.

This act has important implications for the contracting parties; and it is important that the parties are conversant with the act and its implications, and its effect on the execution of the contract.

The main objectives of this act are

- to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; and
- the protection of persons other than persons at work against hazards to health and safety arising out of, or in connection with, the activities of persons at work.

Implementing the act, therefore, includes the identification of all hazardous and unsafe conditions and then taking all possible measures to improve these conditions.

2. Application of the act

2.1 Preparation of Occupational Health and Safety Specification and Plan

The act calls for the preparation of an Occupational Health and Safety Specification by the client for each project and an Occupational Health and Safety Plan by the contractor appointed for the contract.

It further requires that the client and contractor must agree on the Occupational Health and Safety Plan before any work commences.

An Occupational Health and Safety Plan must therefore be prepared by the contractor based on the client's specification, included in the tender documents, and agreed with the client prior to any work being undertaken.

2.2 Implementation of the plan

Implementing the Occupational Health and Safety Plan includes:

Awareness

- Being aware of the objectives and implications of act and their role in the plan.
- Being aware of all hazardous and unsafe conditions and taking all possible measures to improve these conditions.

Training

- Training of all involved in the contract (management, supervisors and workers) to minimise unsafe conditions.
- Induction to safety on-site is essential for all newly recruited workers, but even more important for first-time workers.

Simplicity

Keep safety planning as simple as possible, allocate enough people to the implementation of the plan, and set up a user-friendly system.

Talking about safety

Safety must be on the agenda of any planning and construction meeting as well as any other meeting (on-site and off-site). People must be made aware of safety and the part they can play to promote safety.

Talks should be given by supervisors to the workers. These talks should take no more than 10 to 15 minutes and can be used to introduce a new activity or to discuss generic health and safety issues. If held at the start of a work day, they will have less impact on work time than when presented during the day.

The talks should encourage worker participation and engender teamwork and should be attended by senior members of the contractor to indicate that they take safety seriously.

Apart from safety issues they can provide the opportunity to discuss quality, productivity or any other matters.

3. Notes to designer/consultant

In advising the client on the nature and extent of the Occupational Health and Safety Specification and the contractors obligations in terms of the act, cognisance must be taken of the nature of the activities making up the contract; as well as the capacity of the contractor to comply with the specification when preparing the Occupational Health and Safety Plan to comply with the specification.

The provisions of the Occupational Health and Safety Act (Act 85 of 1993) have to be met. Employment-intensive sites are sometimes more informal than conventional construction sites, and either ignore the OHS act or make the application of strict safety regulations more difficult. Safety is not a matter that can be neglected, so whatever shape or form the management of employment intensive sites may take, it must be aware of safety and all its implications.

Take special care

Employment-intensive construction – as an industry – is more likely than the conventional construction industry to employ people that have no previous employment experience at all. These people are most vulnerable to becoming involved in accidents, because they have not learned the potential dangers.

MODULE 5: Contract planning and preparation of a programme

1. The principles of planning and programming

The success of a contract – financial and quality – depends on the quality and proper allocation and management of the resources required to execute the contract within the stipulated period.

These resources include:

Human resources:

- Stores and clerical staff
- Supervisors
- Operators
- Work force

Material resources:

- Purchased materials:
  - Aggregate
  - Bitumen products
  - Cement, etc.
- In-situ or local materials:
  - Gravel
  - Water

Plant and equipment resources:

- Plant:
  - Pedestrian rollers
  - Concrete mixers
  - Water trailers
  - Motorised hand sprayer
  - Mobile drum heaters, etc.
- Equipment:
  - Shutters
  - Screed rails
  - Gauge rails
  - Drum stands
  - Measuring equipment
  - Drum lifters, etc.

In order to complete a contract successfully, it is, therefore, necessary to have an understanding of

- the construction processes and sequence of the activities making up the contract;
- the production capacities of both the work force and the plant to be used, in executing the various activities making up the work force; and
- the delivery periods of materials to be used in the execution of the various activities.

For example, the surfacing operation cannot commence before the base has been completed (and approved by the engineer), the required plant (in good working order) and labour is available, and the necessary materials have been delivered.

Based on this information, the time available for the execution of the various activities can then be determined; the required resources needed to complete the work in the determined time can be calculated, and a programme for the execution of the contract within the specified time constraint (contract period) can be prepared.

It is further necessary to ensure that there are, as far as is feasible, no obstacles in the way of this production being achieved i.e. that

- operators are properly trained in the use of their equipment;
- the work force is properly trained and understand their tasks;
- materials are ordered timeously;
- plant is in good running order and is properly operated and maintained and that fuel is available for the plant to operate;
- equipment is in good condition and is properly used and cleaned; and
- work is timeously and correctly set out.

2. Construction programme

2.1 Types of programmes

As stated earlier, one of the major tasks facing a contractor is how to organise and manage his resources in order to

- complete the contract on time to specification; and
- complete the contract within his financial expectations.

A system of capturing all the essential information (over which the contractor has control) that can affect the completion of the contract, is required. This system needs to be easily understood by all the parties involved in the contract.

For reasonably straightforward types of contract, the bar chart (or Gantt chart) is probably the most common system used for conveying basic information.

2.2 The bar chart

The bar chart consists of a listing of all the activities involved in a contract (usually based on the items in the schedules of quantities) against a set time frame (the contract period).

The list of activities appears down the left hand side of the page with the time allowed set out horizontally. Bars are then drawn against each activity, showing the start and finish dates.

Figure 2.2 is an example of a simple road contract bar chart.

ACTIVITY	Dur. days	March 2005			April 2005				May 2005				June 2005					July 2005		
		WEEK ENDING																		
		11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	25	1	8	15
Set up camp	14																			
Clearing and grubbing	21																			
Sub-grade preparation	35																			
Construction of sub-base	42																			
Construction of ETB base	56																			
Construction of seal	63																			
Clean site	49																			

CONTRACT: …… DATE: ……..

CONTRACT NO: …….. PREPARED BY: …….

CONTRACTOR: …… SHEET NO: ……..……

Figure 2.2: Example of simplified bar chart

Note the following features:

1. The list of activities down the left hand side, with the length of time allocated to each activity in calendar days.
2. The time scale along the top of the page, divided into months and weeks.
3. The bars against each activity show when, in the total time period (contract period), the activity is to take place. The length of the bar represents the duration (as shown in the column Dur.); and its position, the timescales when it is expected to start and finish.

The figure shows the completed job, with all the activities indicated.

2.3 How to draw a bar chart

The first important step in drawing a bar chart is to think through the activities that make up a contract, the order in which they must be completed, and the effect their completion will have on subsequent activities.

Information will be required on the production capacities of the plant, and work force required, for the execution of each activity.

Establishing production rates

Manuals 3, 4 and 5 making up the set of manuals, each have a module which have indicative production rates for the type of work covered by that manual. These can be used as a guideline for determining production rates, but it must be borne in mind that there are a number of factors which influence these figures, such as:

- Type of material
- Climatic conditions
- Skills of the work force
- Skills of the supervisory team, etc.

Example of clearing and grubbing

1. *The area to be cleared and grubbed is the area measured in the schedules of quantities (width of roadbed × length of road). Say 30 000 m^2.*
2. *The area is covered mainly by grass and small bushes.*
3. *From Manual 3 Module 5, the indicative production rate for clearing and grubbing by hand is 80 – 150 m^2/day (or per task) per worker. Based on the site conditions 100 m^2 is selected.*
4. *The available work force is 20 workers.*

Based on this information:

20 workers can do: 30 × 100 m^2 = 2 000 m^2 per day.
To clear 30 000 m^2 would take: 30 000/2 000 = 15 days.

Assuming a five-day working week, there are 15 working days in three weeks, so the time required to complete the activity is three weeks.

(The way to increase or decrease the period is to decrease or increase the number of workers.)

Example of construction of 100 mm ETB

A period of nine weeks (45 working days) is scheduled for this activity.

This period of eight weeks is determined by asking three questions:

1. *What area of 100 mm thick ETB base has to be constructed?*
2. *What are the subactivities making up this activity and which of these governs the production rate?*
3. *What is the production rate for a balanced team constructing the ETB?*
4. *What resources are available?*

Answers:

1. *The area of 100 mm thick ETB is given in the schedules of quantities (width of surfacing × length of surfacing). Say 21 000 m².*
2. *The subactivities making up the activity would include the following:*

- *Setting up the shutters between which the material is to placed along the edge and centre line of the road.*
- *Hauling the gravel from stockpiles along the side of the road.*
- *Batching and mixing the gravel, cement and emulsion in a suitably sized concrete mixer.*
- *Placing the material on the road.*
- *Screeding the material between the shutters.*
- *Compacting the material.*

The main subactivity, determining the production rate, is determined as the production rate of the mixing team.

3. *The production rate of balanced team using a 300/400 concrete mixer is between 1,8 m³ and 3,0 m³ per hour, say 2,4 m³/hour or ±19 m³ per day.*
4. *Four teams are available, that is a production rate of 76 m³ per day of ETB.*

Based on the above:

The volume of the ETB to be produced and compacted in the 100 mm thick layer is: 21 000 × 0.1 = 2 100 m³.

However, to obtain a compacted thickness of 100 mm, the loose thickness of the material must be 150 mm thick i.e. 1,5 times thicker.

The volume of ETB to be produced is therefore 2 100 × 1,5 = 3 150 m³.

With four teams using 400/300 mixers, the production rate is 4 × 19 m³ = 76 m³/day.

The time required to construct 3 150 m³ is therefore 3 150/76 = 41 days.

2.4 Monitoring progress using the bar chart

Figure 2 shows part of the bar chart programme for just one activity clearing and grubbing. The activity is intended to start on 21 March 2005 and finish on 8 April 2005, a period of three weeks. This bar is lightly shaded.

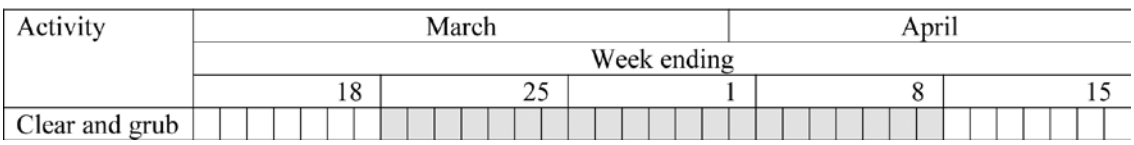

Figure 2.3: Bar for clear and grub

On 28 March, the work is inspected and according to measurement, one half of the work has been done. Half of the bar can thus be coloured in. If a line is then drawn on the chart at that date, it will show that this is the amount of work that should have been done according to the programme and that, as the coloured section runs to this date line, work is progressing as planned. (Figure 2.4)

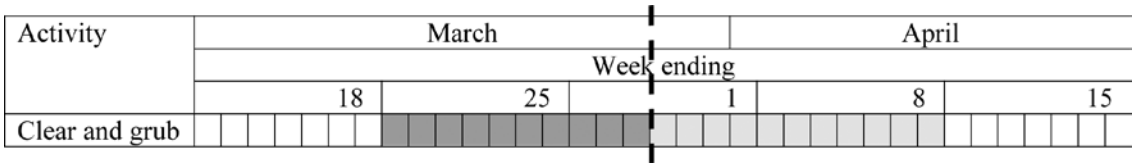

Figure 2.4: Progress as on 28 March – progress as planned

If on 28 March, the work is inspected and according to measurement a third of the work has been completed, then only a third of the bar can be coloured i.e. 1/3 of 21 days = 7 days. The work is therefore three days behind schedule. (Figure 2.5)

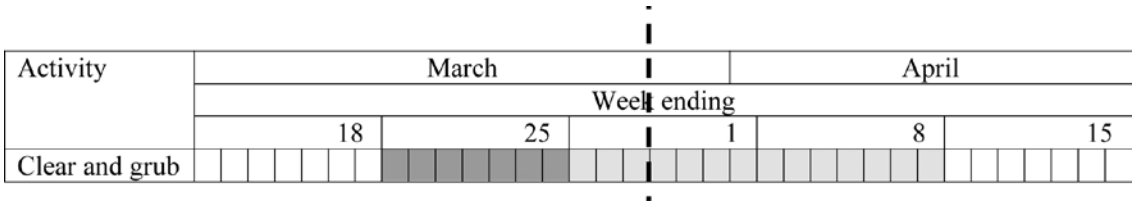

Figure 2.5: Progress as on 28 March – progress behind planned

Thus, if at any time the work is running as planned, everything to the left of the date line should be coloured in, showing that it has been done. If any portion of the bar to the right of the date line is coloured in, the work on that activity is ahead of planned progress. (Figure 2.6)

In this figure the work is six days ahead of planned progress.

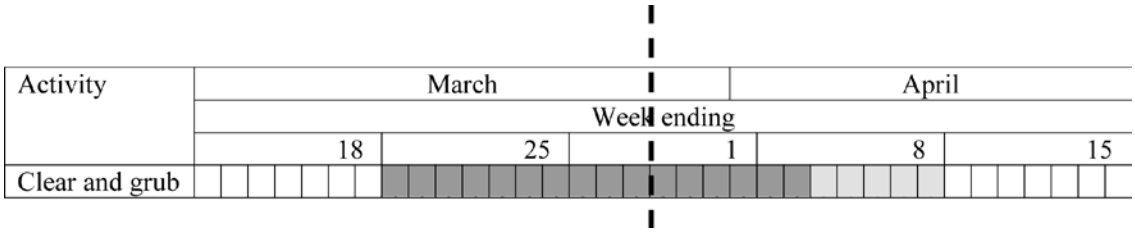

Figure 2.6: Progress as on 28 March – progress ahead of planned

2.5 When the work does not go as planned

Many things can affect the progress of a contract – workers not arriving for work, plant and equipment breakdown, bad weather, late delivery of material, site problems, etc.

When a project falls behind, there are three alternative courses of action:

- Catch up with the programme.
- Let the delayed activity keep on at the same rate without changing the programme.
- Move/revise the whole programme (with the clients approval).

A selection of just one of these three alternative courses of action, or a combination of them can be taken. Which one or which combination is used to put the project back on the right track depends on the reason for the delay, the available work force and other resources.

Catching up

This course is normally followed where the late completion of the activity will delay other critical activities in the programme.

Catching up means speeding up the activity which is falling behind programme. Catching up can be done in several ways, depending on the situation e.g.:

- Increase the labour force
- Arrange overtime
- Increase the plant and equipment
- A combination of the above

Keep on at same rate

Look at the programme to see how the activities that follow are affected by the delay. If they are not seriously affected, then it may not be worth the effort to speed up the delayed activity or revise the programme.

A factor to consider is whether by delaying the activity, workers or plant, that are required for other operations, may then be occupied. The activity may be able to proceed despite the activity being late.

Move the whole programme

Sometimes there are factors which delay the whole contract, such as bad weather, administrative delays by the client, etc.

If the client accepts that there are good grounds for an official contract extension, the contract completion date can be moved.

3. Planning

With the programme for the execution of the various activities in place, the contractor can now plan his actions to meet his obligations in terms of the programme, for example:

- When to order materials so as not to delay an activity.
- The type and numbers of plant required, and when to bring items of plant onto site and when to safely remove them.
- The type and quantity of specific items of equipment required, and when they are required.
- The size of the work force required at any specific time of the contract.
- Any actions required to bring the contract back on track.

MODULE 6: Quality control of the work

1. General

The quality of the final product is dependent on the measures applied during the construction of each of the activities regarding:

- Materials used.
- Training and supervision of the plant operators.
- Training and supervision of work force.
- Adherence to correct procedures and methodology:
  - Setting out and control of levels.
  - Preparation of materials.
  - Placing of formwork and gauges.
  - Placing and spreading of materials.
  - Compaction of materials.
  - Curing of materials.
- Plant, equipment and tools:
  - Ensuring the correct plant is available.
  - Use of the right plant, equipment and tools for the task.
  - Correct use of this plant and equipment .
  - Cleanliness and maintenance of the plant, equipment and tools .

As the bituminous surfacing seals covered in Manual 4 are relatively thin, it is important to ensure good quality assurance is applied during construction, especially with regard to the base course and surfaced pavement layers, to ensure good riding quality and a prolonged life for the pavement.

Quality products produced

A quality product will be produced provided that specified materials, light plant, labour and equipment are used; and construction procedures, in these manuals, are followed.

2. Materials

2.1 Compliance with specification

It is important that the correct materials as specified are used for a particular task, and that these materials are tested by a reliable materials laboratory regarding their specified properties e.g.:

- Grading
- PI
- ALD (aggregate for surfacing)
- Grade and type (emulsion)

2.2 Handling

Once it has been established that the materials being used are to specification, it is important to ensure that the materials do not become contaminated with other material during handling e.g.:

- When working with or loading in quarries (borrow pits).
- Placing along the road (area should be prepared before placing).

- In plant (e.g. anionic and cationic emulsion in hand sprayer).
- When placing in position on road surface.

2.3 Mixing

During mixing of the materials (e.g. for the emulsion-treated base, slurry and concrete) it is important that the procedures proposed in Manuals 3, 4 and 5 are strictly followed regarding:

- Batching.
- Process adding materials to the mixer and of mixing materials.
- Operation of the mixer.
- Discharging of mixed product.
- Systematic cleanliness of plant.

2.4 Placing and spreading

Placing and spreading of the materials has an important impact on the quality of the final product.

Spacing of the materials before spreading, at too small or too great a distance, can result in uneven distribution of the material and segregation of coarse and fine material.

This will not only make the work of the spreading team more difficult but can result in a variation of the quality and density of the material before rolling, which can result in uneven compaction, a poor riding quality and areas of poorly graded materials in the layer. This will lead to areas of substandard work and potential failure.

Uneven placing of surfacing materials (aggregate) and spraying of the binder (both spraying and temperature of binder) can result in riding surfaces that are dangerous to road users and subject to early failure.

It is therefore imperative that all workers involved in the construction of the surfacing (seal) are fully conversant with the correct procedures and that the operation is strictly controlled regarding aspects such as:

- ALD of aggregate
- Type and grade of binder
- Quality of aggregate
- Application of binder (spray rate)
- Distribution of aggregate

3. Levels

3.1 Vertical alignment

Proper setting out, and control of the levels along the vertical alignment of the road, has a marked effect on the earthworks quantities and therefore the cost of the road – greater than necessary excavations and fills.

If the road is set out at too low a level, it could have the following results:

- More material might have to be excavated to accommodate the layers.
- Drainage problems may occur.

If the road is set out too high, extra earthworks could result in further costs.

3.2 Cross-fall

The cross-fall of the road has a big effect on the speed at which water on the road surface is carried to the side drains.

If the cross-fall is too flat, water will not drain off the road surface in an efficient manner, and this could

- form sheets of water on the surface resulting in loss of grip of the vehicle tyres with the road surface (aquaplaning) and loss of control of the vehicle;
- result in ponding of the water on sections of the road causing failure of the road – potholes; and
- affect the visibility of drivers behind other vehicles as a result of the spray being thrown up by the tyres of the front vehicle.

If the cross-fall is too steep, it could affect the handling of the vehicle.

3.3 Layer thickness

If the finished levels of layer are not properly controlled this will mean that the correct thickness of layer is not being obtained. If this deviation of thickness exceeds the allowable limits, the following could occur:

- Uneven compaction of the layer – resulting in failure under traffic.
- An uneven riding surface resulting in poor riding quality and unnecessary stresses being generated on the road structure – resulting in early failure.

The smoother the riding surface, the longer the life of the road – no impact loading.

It is therefore critical that the side shutters are carefully placed in accordance with the procedures proposed in the modules in Manual 5, and thicknesses checked between the shutters.

4. Compaction

Provided strict quality control has been exercised on the aspects and operations described above then, with proper compaction, a quality product will be produced.

The aspects that need to be controlled to ensure that the required compaction is achieved, over and above those described earlier in this module, include:

- Control of the moisture content of the material during compaction (method of addition of water to material) and prevention of evaporation before compaction – plastic sheeting.
- Application of the factor of 50% reduction in thickness of the layer from the loose to compacted state (e.g. 150 mm loose reduces to 100 mm compacted thickness) to obtain the required degree of compaction.
- The correct use of the correct plant and equipment.

MODULE 7: Local labour employed on special public works programmes

1. General

The content of this module is based on the employment of temporary local workers, on projects designated under special public works programmes, in accordance with the *Code of Good Practice for Employment and Conditions of Work for Special Public Works Programmes* issued in terms of the *Basic Conditions of Employment Act* (Act No. 75 of 1997) and promulgated in *Government Gazettes Notice No. P64* of 25 January 2002.

This involvement of local labour in projects is enhanced by the establishment of local community structures, and the appointment of individuals within the community to promote the smooth operation of protects – for example, the establishment of a Project Steering Committee (PSC) and Community Liaison officer (CLO).

Reducing unemployment

The Expanded Public Works Programme (EPWP) is a programme, introduced by the South African Government, aimed at alleviating and reducing unemployment through the provision of work opportunities coupled with training.

An example of 'Terms of reference' which provide a framework, within which a PSC and other stakeholders could operate, is attached as Appendix 2.2 to this module.

Similarly, an example of a 'Terms of reference' which provide a framework within which a CLO could operate is attached as Appendix 2.3 to this module.

2. Setting rate of pay

In accordance with the *Code of Good Practice for Employment and Conditions of Work for Special Public Works Programmes* (clause 10.4), the public body must set a rate of pay (task-rate) for workers to be employed on the labour-intensive projects.

3. Recruitment of local labour

The contractor shall inform the local (targeted) community of the labour-intensive works and the employment opportunities presented thereby, in accordance with the requirements and preferences of the tender documents.

An example of procedural guidelines for worker selection is attached as Appendix 2.4 to this module.

4. Task-based work

Task-based working is a means of empowering the work force so that it will work in a productive manner and have a degree of responsibility for its own actions.

Practical experience has indicated that the community can resist the use of task-based working, and even when the community has agreed its use, problems can occur once construction starts.

Where agreement has been reached with the community to the task-based payment system for remuneration of the local work force, the work force must be employed and a contract must be entered into between the contractor and the worker, as provided for in the *Code of Good Practice* referred to above.

The contractor will need to finalise and agree on the task sizes with the work force that he has employed. It is advisable that, wherever possible, the actual tasks agreed are physically demarcated at a convenient location so that they may be referred to during the construction of the work. Where a revised or new task size is agreed to, it should be demarcated.

Record of the tasks completed by each member of the work force must be kept by the contractor's supervisor/s. These should be understood by the worker and should be agreed between the supervisor and the worker as the work proceeds. (Figure 2.7)

CONTRACTOR:							
EMPLOYEE:		I.D. NUMBER:			PERIOD:		
		TASKS COMPLETED				SIGNATURE LIAISON OFFICER	SIGNATURE CONTRACTOR
		SIGNATURE WORKER			ACCUMULATIVE TASKS		
DATE	DAY	TASK 1	TASK 2	TASK 3			
	THURSDAY						
	FRIDAY						
	SATURDAY						
	MONDAY						
	TUESDAY						
	WEDNESDAY						
DATE	DAY	SUB-TOTAL WEEK 1:					
	THURSDAY						
	FRIDAY						
	SATURDAY						
	MONDAY						
	TUESDAY						
	WEDNESDAY						
			SUB-TOTAL WEEK 2:				
			TOTAL TWO WEEKS:				

Figure 2.7: Example record of tasks completed

As set out in paragraph 5, the pay slip advises those members of the work force who are working on a task basis, it must show in a clear and unambiguous manner the number of tasks accomplished, the task rate and the amount being paid. (Standard pay slips that show hours worked, whether or not converted to equivalent tasks, should not be used as uncertainty might result.)

In addition to the work force, the contractor's (and consultant's) site staff must be fully conversant with the task-based payment system and its implications. The contractor's staff must set out the tasks to be carried out in a timely manner and the consultant's staff should check that this has been properly and accurately done.

If the worker/s has/have been prevented from completing a task within a working day because of poor site management, the worker/s should be paid the task rate for the day.

5. Payment of task-based workers

- A task-based worker will only be paid for tasks that have been completed.
- Payment in cash or by cheque must take place:
  - At the workplace or at a place agreed to by the worker.
  - During the worker's working hours.
  - In a sealed envelope which becomes the property of the worker.
- An employer must give a worker the following information in writing:
  - The period for which payment is made.
  - The numbers of tasks completed worked.
  - The worker's earnings.
  - Any money deducted from the payment.
  - The actual amount paid to the worker.

MODULE 8: Broad environmental issues

1. Main acts

1.1 Environment Conservation Act – 73/1989

Many of the sections of this act have been repealed by the *National Environmental Management Act* (107/1998).

Relevant sections of the act, which are still applicable and could impact on the contract, include:

- Control of littering.
- Activities which could have a detrimental effect on the environment.

1.2 National Environmental Management Act – 107/1998

Relevant principles of this act, which could impact on the contract, include:

- That pollution and degradation of the environment must be avoided or, where they cannot be altogether avoided, are kept to a minimum and corrected.
- That waste is avoided, or where it cannot be altogether avoided, minimised.
- That negative impacts of the contract, on the environment and the people in the environment, are prevented and where they cannot be altogether prevented, are kept to a minimum and corrected.

2. Implications of the act on the contractor

2.1 Construction

Construction activities, or actions which could impact negatively on the environment and therefore be a transgression of the above acts, include:

Pollution of water sources:

- At water points – by destroying the river banks, vegetation and contamination by workers.
- When disposing of left-over bituminous binders, cement, oil/lubricants and other construction products, spillage or inappropriate and clumsy usage or handling of these materials.
- When washing and cleaning of equipment.
- Contamination by workers.
- Contamination due to construction activities e.g. gravel and spoil in water courses.

Soil pollution:

- When disposing of left-over bituminous binders, cement, oil/lubricants and other construction products, spillage or inappropriate and clumsy usage or handling of these materials.
- When washing and cleaning of equipment.
- Contamination by workers.

General:

- Noise pollution
- Litter, cement bags, empty drums and pieces of equipment and plant
- Dust pollution e.g. bypasses
- Erosion due to poor work methods or inadequate protection
- Damage to fauna and flora

2.2 Camp site

The location of the camp site and its facilities must not have a detrimental affect on the environment, for example:

It should be located in such a manner that

- any run-off from the site does not pollute a water source or cause erosion;
- it is not a nuisance or hazard to local people, e.g.:
  - noise
  - access to their properties
  - open pits or ponds of water
  - affect privacy
  - workers being a nuisance
  - it does not impact on any sacred ground, e.g. graves;
- adequate arrangements must be made for the disposal of any litter or waste (e.g. paper and plastic, food waste, old oil, lubricants, etc.);
- pit latrines must not pollute any underground water source;
- the camp site must generally be kept in a neat and tidy condition and lend itself to the breeding of mosquitoes and flies; and
- fauna and flora in the vicinity of the camp site must be protected.

3. Notes to designer/consultant

An environmental impact assessment for projects will need to be prepared and submitted in accordance with the act and the client's requirements.

Appendix 2.1: Duties of Consulting Engineer during construction

Extract from *Government Gazette No. 27422*, **1 April 2005**
Board Notice 37 of 2005

2. GUIDELINE SCOPE OF SERVICES

2.1.5 Construction Stage

The overall contract administration and co-ordination, as well as construction monitoring of the execution of the works in accordance with the contract, including all or any of the following:

(1) Placing orders for the works on behalf of the client.

(2) Advice to the client as to the preparation of the contract documents, or preparation of the contract documents in consultation with the client.

(3) Overall contract administration and co-ordination, as well as construction monitoring of the execution of the works for compliance with the contract and attending site meetings on a combined average frequency of at least one day every two weeks for the duration of the construction of the specific works for which the consulting engineer is engaged or at such more frequent intervals as the consulting engineer may deem necessary.

(4) Directing construction monitoring operations, but excluding detail day-to-day construction monitoring of the works and contract administration, as provided for under clause 2.2.2.

(5) Advice to the client as to the provision of a construction monitoring service in accordance with clause 2.2.2, over and above that provided for in this clause.

(6) Checking contractor's drawings of structures, plant, equipment and systems for the works for conformity with design requirements, but excluding detailed checking of manufacture and installation details for erection or installation fit.

(7) Advice to the client on any further alternative designs, but excluding detailed inspection, reviewing and checking of alternative designs and drawings not prepared by the consulting engineer and submitted by any contractor.

(8) Issuing instructions to contractors on behalf of the client.

(9) Issuing certificates or recommendations for payment of contractors and submitting regular reports regarding works finances and anticipated completion dates and final costs.

(10) Advice to the client in regard to or the resolution of disputes or differences that may arise between the client and the contractor, except mediation, arbitration and/or litigation.

(11) Preparation of and issuing variation orders on behalf of and after consultation with the client.

(12) General inspection of materials and equipment for compliance with the original design and tender, including checking of marks or documentation for adherence to National and International standards and advice to the client regarding further inspection and testing of such materials and equipment as may be necessary and arranging for such inspection and testing to be carried out on behalf of and at the client's expense.

(13) Making arrangements on behalf of the client for the provision and reproduction at the client's expense of such drawings and documents as may be required by the contractors and site staff for the execution of the works.

(14) Agreeing final quantities with contractors, compiling final accounts and issuing final payment certificates.

(15) Prepare and, on completion of the works, provide the client with record drawings. Making arrangements for the contractor to supply detailed operation, operating and maintenance manuals as part of the contractor's contractual obligations, receiving such and handing it over to the client. Both sets of documents shall be in formats as agreed to with the client.

(16) Evaluating results of contractor's commissioning procedures and tests and witnessing final performance or acceptance tests on site, only, but excluding day-to-day routine tests.

2.2 Additional Services

The following services are additional to the normal services provided by the consulting engineer, unless specifically agreed otherwise between the consulting engineer and the client. The agreement on the scope of services and remuneration shall be in writing and should, if at all possible, be concluded before such services are rendered.

2.2.2 Construction Monitoring

(1) If the construction monitoring, as set out in clause 2.1.5(3), is deemed to be insufficient by the consulting engineer, the consulting engineer may, with prior written approval having been obtained from the client, appoint or make available additional staff for such construction monitoring as are necessary to undertake additional construction monitoring on site to the extent specifically defined and agreed with the client. The functions in respect of additional construction monitoring are to be limited to detailed inspections and exclude those mentioned under clause 2.1.5.

(2) Alternatively, the client may appoint or make available staff, as intended in clause 2.2.2(1), subject to approval by the consulting engineer.

(3) Staff, as intended in clauses 2.2.2(1) and 2.2.2(2), shall report to and take instructions from the consulting engineer or an authorized representative of the consulting engineer only and shall be deemed to be in the employ of the consulting engineer.

(4) Should any change regarding the persons utilized for additional on-site monitoring or their remuneration be necessary, the utilization of such persons and/or their remuneration must be agreed in writing with the client prior to the implementation thereof.

(5) If, for any reason, no additional staff or inadequate staff for construction monitoring is appointed, the consulting engineer shall provide additional services, including additional site visits, as required and agreed to in writing with the client prior to commencement thereof.

(6) The duties of the consulting engineer for the following four defined levels of construction monitoring, respectively, are as follows:

(a) Level 1:

The construction monitoring staff shall:

(i) Monitor the outputs from another party's quality assurance programme against the requirements of the plans and specifications.

(ii) Visit the works at a frequency agreed with the client to review important materials, critical work procedures and/or completed elements or components.

(iii) Be available to advise the contractor on the technical interpretation of the plans and specifications.

(b) Level 2:

The construction monitoring staff shall:

(i) Review, preferably at the earliest opportunity, a sample of each important:

(a) Work procedure.
(b) Construction material for compliance with the requirements of the plans and specifications and review representative samples of important completed work prior to enclosure or completion as appropriate.

(ii) Visit the works at a frequency agreed with the client to review important materials, critical work procedures and/or completed elements or components.

(iii) Be available to provide the contractor with technical interpretation of the plans and specifications.

(c) Level 3:

The construction monitoring staff shall:

(i) Maintain a part-time presence on site as agreed with the client to review random samples and review important completed work prior to enclosure or on completion as appropriate.

(ii) Where the consulting engineer is the sole consultant or principal agent, carry out such administration of the project as is necessary on behalf of the client.

(iii) Be available to provide the contractor with technical interpretation of the plans and specifications.

(d) Level 4:

The construction monitoring staff shall:

(i) Maintain a full time presence on site to constantly review:

(a) Work procedures.
(b) Construction materials for compliance with the requirements of the plans and specifications and review completed work prior to enclosure or on completion as appropriate.

(ii) Where the consulting engineer is the sole consultant or principal agent, carry out such administration of the project as is necessary on behalf of the client.

(iii) Be available to provide the contractor with technical interpretation of the plans and specifications.

Appendix 2.2

EXAMPLE: PROJECT STEERING COMMITTEES
Terms of Reference

(Based on the employment targets of temporary workers in accordance with the EPWP)

1. Introduction

These terms of reference provide a framework within which the Project Steering Committee (PSC) and other stakeholders would operate in the smooth running of a roads project.

2. Composition

The Steering Committee will comprise of the following representatives:

- Representatives from the implementing agency e.g. Roads Agency.
- Local Government Representative (preferably the councillor/ officials/ civic, traditional structures, tasked with the responsibility of overseeing the mandate of the constituency they represent.
- Representatives from Project Consultants (Social, Engineering, Environmental).

There will be one PSC per cluster and each village nominate two representatives to the PSC. In line with government policy, women and youth will be given special preference on PSC representation. At least 20% of the PSC members should be youth (between the ages of 18 and 35) and 2% persons with disabilities with the following as the target gender representative composition:

- 60% female
- 40% male

3. Role

Members of the PSC are engaged to provide advice and support to the broader interest of the implementing agency. The following will, inter alia, be the responsibilities of the PSC:

- Contribute towards smooth running of the project.
- Serve as sounding boards in the development and implementation of project strategies.
- Through other forums disseminate project related information to the community they are based in.
- Articulate the objectives of the implementing agency to the community at large.
- Assist implementing agency team/contractors in obtaining the required road alignment (right of way), and access to appropriate water discharge points.
- Assist contractors in obtaining access to sources of locally available materials (e.g. water, sand, gravel/borrow pits, stones etc.).
- Assist in dispute resolutions between contractors and local workers.
- Represent the interest of the villages within the cluster.
- Receive, monitor, evaluate and communicate information on the Key Performance Indicators (KPIs) to the communities within the cluster.
- Provide advice on how the projects within the cluster will be implemented so that maximum benefits are attained with local communities in terms of employment, empowerment, quality of life and poverty reduction.
- Manage the Community Liaison Officer.

4. Delegations

The Steering Committee will assist contractors in selecting a pool of workers and giving preference to target groups as outlined in the

- implementing agency labour selection criteria guideline document; and
- any basic conditions of employment requirements (e.g. Clauses 1.3 and 6.0 sections 87(2) of the *Basic Conditions of Employments Act*, 1997, section 87(1)(a) *Code of Good Practice for Special Public Works Programmes*).

The PSC will

- appoint a Community Liaison Officer, who will be the link between the workers, contractors and the PSC on workers welfare; and
- constitute working groups to attend to issues of particular interest as and when necessary.

The PSC will appoint a Chairperson who will be the presiding officer at all PSC meetings. With the assistance of a secretary, the Chairperson will be responsible for the following:

- Ensuring the timely and smooth running of meetings
- Distribution of minutes
- Approve CLO timesheet for payment
- Recommending re-imbursement payments for PSC members travel allowances.

5. Participation

Commitment of participation will be required from all PSC members, to ensure an energetic and fully functional Steering Committee. Networking with other structures should be of paramount importance and decisions taken by the PSC should be an indication of the aspirations and interest of affected stakeholders.

The PSC will normally meet once a month. In addition special meetings / workshops may be scheduled after consultation with Project Management. The PSC will distribute minutes to all Steering Committee members with the letter of invitation and agenda for the next meeting.

Standing agenda items should include:

- Work programme/progress
- Labour issues (recruitment, welfare/health and safety, prompt payments of wages to workers, disciplinary issues, child care, etc.)
- Youth development
- Equality issues
- Social awareness programmes
- Safe keeping of contracting equipment
- Environmental issues.

PSC members will be paid travelling allowances on a monthly basis for travelling to meetings/workshops in accordance with the approved travel allowances of the implementing agency as attached. An attendance register will be kept and submitted along with the minutes for travel allowance payment purposes.

Councillors and other political structures, including Trade Unions, are welcome to attend PSC meeting to assist and support the PSC in making fruitful decisions. The implementing agency through Social Facilitators will be responsible for providing training to capacitate the PSC in performing their task efficiently and assertiveness to promote accountability and transparency in the handling of all project activities.

Appendix 2.3

EXAMPLE: COMMUNITY LIAISON OFFICER
Terms of Reference

Introduction

These terms of reference provide a framework within which the Community Liaison Officer (CLO) would operate in the context of the road works.

The CLO must be a respected member of the community and the method of appointment should be transparent and agreed with the Project Management Committee.

Scope of work

The CLO will be responsible to the PSC, but will liaise with the following people in performing these activities:

Social Facilitators:

- Assist in convening of workshops
- Disseminate information to PSC members
- Articulate implementing agency (e.g. Road Agency) policies to PSC members
- Communicate labour requirements
- Attend induction training programmes for workers and induct labourers
- Submit monthly welfare reports to the social facilitators PSC
- Communicate labour and skills requirement to the PSC
- Assist in the recruitment and engagement of work force
- Verify labour records and ensure all engaged qualify as per Special Public Works Programme (e.g. EPWP) Code
- Investigate and report all labour dispute matters to the PSC, advice site agent on resolution
- Attend all disciplinary proceedings and ensure procedures are adhered to and hearing are fair and sanctions reasonable

Contractor:

- Organise and assist the contractor in explaining to all workers the labour-based construction model
- Ensure labourers understand their task and the principles behind task work
- Ensure labourers are informed of their conditions of temporal employment
- Attend all site meetings and briefings for work procedures
- Keep written record of interviews and community liaison which should be summarized and included in the monthly progress reports
- Collect monthly welfare reports and submit to social facilitators
- Ensure that contractor's workers are paid what is due to them and in time

Key deliverables

The CLO is responsible for achieving the following key deliverables within the cluster:

- Effective monitoring of workers and ensure the contractors treat everyone fairly
- Collect and submit the Welfare Report Form
- Provision of monthly progress reports
- Resolution of problems, conflicts and blockages that may occur at the cluster level
- Ensure monitoring of the employment target required
- Report on Key Performance Indicators

Appendix 2.4

EXAMPLE: PROCEDURAL GUIDELINES FOR WORKER SELECTION

(Based on the objectives and employment targets of temporary workers of the EPWP)

LABOURERS RECRUITMENT PROCEDURE

Whenever there is a need to recruit labourers at any of the implementing agencies (e.g. Road Agency) projects, the following guidelines should be followed:

1. Contractor signs a contract with the implementing agency for construction work to be done, including the number of workers required.
2. The implementing agency writes a letter or coordinates a meeting with the district and the local municipality to inform them about the road works to be carried out by contractors in the district.
3. The local community, through all structures available including the local administration, are informed and consulted about the establishment of the roads project. The Project Steering Committee is established.
4. The Project Steering Committee makes an announcement of workers required from relevant communities within the road corridor. The recruitment of the workers is announced at least a month in advance using appropriate community structures.
5. Notice of recruitment is placed in public places within the community and announcements are made in all community gatherings, events and meetings.
6. The recruitment notice should specifically state the following requirements:

- Villages where the recruits would come from within a radius of 7 km of the road construction area
- Target group/s
- Recruitment date and venue
- Number of workers needed
- Recruitment requirement e.g. positive identification ID
- Exclusion criteria

7. The following people should be present to witness the recruitment :

- Implementing agency representative
- Social Consultants
- Project Steering Committee
- The Contractor.

8. The community representatives and residents should be informed about the recruitment procedures and are to be assisted to understand them clearly.
9. Members of the community are given an opportunity to apply for work. A roster of all interested and eligible workers is prepared and distributed to the Contractor and Project Steering Committee
10. The Contractor is required to make maximum possible use of the local labour force from the communities where the road project is being implemented. Communities in this regard refer to all the surrounding villages or settlements or any group of people living within a radius of 7 km from the road corridor.

    Local labour is defined as people who reside in the community who have been identified and selected to be workers in this programme.

11. Key personnel are defined as foremen and skilled labourers without whom the particular job could not be accomplished. As far as possible these people should impart their skills to individuals within the community work force who show a keen interest and display a willingness to learn. The use on non-local labour should, where possible, be limited to key personnel only.

SELECTION PROCEDURE

1. A general list of all interested people per village willing to work in the project is prepared and submitted to the PS and the contractor.

The PSC and contractor go through the list and ensure that each individual meets the preference requirements of the programme.

The targeted gender composition in the programme is (EPWP for example):

- Female = 60%
- Male = 40%

It is also recommended that from the gender balance above (EPWP for example):

- 20% comprises of Youth (18-35) and
- 2% Disabled

N.B. The above target is set for both the semi-skilled and unskilled local labourers.

2. From the list of able-bodied people, ID documents are collected and placed in containers and each village would have two containers with the following categories:

- Female
- Male

3. One representative from the PSC would then pick from the container each ID and the person will be called, assigned a number and then proceed to complete employment records.

4. Numbers would be assigned in ascending order, starting from number 1.

Candidates who are given numbers 1 to the maximum number required, would be employed, those who are left on the list once all positions have been filled, would be on the stand-by list and would be called when new vacancies are available, or to fill up worker turnover.

5. The maximum number of workers required per village is calculated as stated below:

Symbols:

A = number of people from first village
B = number of people from second village
C = number of people from third village
X = total number of people to be recruited
Y^1= number of people to be recruited from first village
Y^2 = number of people to be recruited from second village
Y^3 = number of people to be recruited from third village
Y = total number of people to be recruited from all villages

Therefore $$Y^1 = \frac{A}{A + B + C} \times X$$

$$Y^2 = \frac{A}{A + B + C} \times X$$

$$Y^3 = \frac{A}{A + B + C} \times X$$

Hence $$Y = Y^1 + Y^2 + Y^3 \ \ldots\ldots\ldots\ldots$$

(Numbers have to be rounded up or down, as there are no fraction people.)

Example

If the number of people to be recruited is 100

And the number of people willing to work from each village is

80 from first village = A
100 from second village = B
140 from third village = C

X = total number of people to be recruited is 100
Y^1= number of people to be recruited from first village
Y^2 = number of people to be recruited from second village
Y^3 = number of people to be recruited from third village
Y = total number of people to be recruited from all villages

Therefore $$Y^1 = \frac{80}{80 + 100 + 140} \times 100 = 25$$

$$Y^2 = \frac{100}{80 + 100 + 140} \times 100 = 31$$

$$Y^3 = \frac{140}{80 + 100 + 140} \times 100 = 44$$

Hence $$Y = Y^1 + Y^2 + Y^3 \ \ldots\ldots\ldots\ldots (25 + 31 + 44 = 100)$$

(Numbers have been rounded up or down, as there are no fraction people.)

Thus from the first village out of 80 people who seek employment, only 25 would be employed from that village, of which 15 would be female.

To ensure the programme recommended gender balance, for every 5 IDs picked, 3 would be from the female container.

The final results would be

	Number seeking employment	Maximum number to be employed	Female workers	Male workers
First village	80	25	15	10
Second village	100	31	19	12
Third village	140	44	26	18
Total		100	60	40

On the day of the recruitment, the terms and conditions of employment are explained to all job seekers. This will include:

- Function and organisation of the contract
- Type of work the job seekers will be expected to carry out
- Period of employment
- Method of working, task rate system (Task rate system is advantageous to workers as they do not need to stay at work for the entire day after completing their task.)
- Terms of employment
- Pay rate, timing and arrangement for payment including first payment date.

The following criteria are suggested to target the able-bodied poorest of the poor:

(a) The persons first considered must be those with little or no other sources of food or income.
(b) Non-working individuals, vulnerable or disadvantaged communities without any social security pension income.
(c) People who come from households where the head of the household has less than a primary school education.
(d) One person per household.
(e) People who come from households that have less than one full-time person earning an income.
(f) People who come from households where subsistence agriculture is the source of income.

At least three local community representatives or leaders present at the recruitment/selection meeting should sign the list of the selected people. The Community Liaison Officer would be tasked with verifying this list against the criteria and where a person does not meet the criteria, after consultation with the PSC, the person's name would be removed from the list and would not be eligible for employment.

At least 25% more labourers should be put on a waiting list; this list would assist when some labourers desert work after the first few days of appointment. The waiting list should be signed at the day of the selection of workers and should be kept by the PSC. The waiting list should at least be proportional to the employment target.

Example:

If 100 people were to be employed in a project, the following criteria would apply:

- 60 Female
- 40 Male

Of the 100 people, 20 should be youth (18 - 35 yrs) and two disabled.

N.B. The gender split as per the target group should be maintained throughout the recruitment process.

The waiting list would have 25% of 100, which is 25 people. To be proportional, the waiting list will consists of

- 15 Female
- 10 Males

From the waiting list five of the people should be youth and at least one disabled.

After the selection, each labourer should be issued a personal employment form in duplicate, one copy is to be given to the labourer and the other copy is to be retained by the contractor as a copy for reference.

It may not be possible to call all the labourers to start work as from the first day of operations. They will have to be engaged and disengaged in according to the planned work sequence.

Notes

Notes

"We have made the firm commitment to confront the challenges of poverty and joblessness. We have made the solemn pledge that we will do everything possible to achieve the goal of a better life for all our people."

President Thabo Mbeki