Study on Enhancing Labour Intensity in the
Expanded Public Works Programme
Road Infrastructure Projects

FINAL REPORT

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South Africa

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Acronyms and Abbreviations

CETA	Construction Education Training Authority
CIDB	Construction Industry Development Board
CSIR	Council for Scientific and Industrial Research
DfID	Department for International Development (United Kingdom)
DORA	Division of Revenue Act
DoT	Department of Transport
DPW	Department of Public Works
EIIP	Employment Intensive Investment Programme
EPWP	Expanded Public Works Programme
FTE	Full Time Equivalents (Person years)
ILO	International Labour Organization
LBC	Labour-based construction
LDPW	Limpopo Department of Public Works
LI	Labour Intensity
LIC	Labour Intensive Construction
MIG	Municipal Infrastructure Grant
MIS	Management Information System
NQF	National Qualifications Framework
NTIP	National Tooling Initiative Programme
IGP	Infrastructure Grant to Provinces
PRD	Provincial Roads Department
R	Rand
RAI	Rural Access Index
RAL	Road Agency Limpopo
SADC	Southern Africa Development Community
SAFCEC	South African Federation of Civil Engineering Contractors
SALGA	South African Local Government Association
SANRAL	South African National Road Agency Limited
SETA	Sector Education and Training Authorities
TA	Technical Assistance
ToR	Terms of Reference
US$	United States Dollars

Current August 2011 exchange rate: 1 US$ = 7.1Rand

Preface

The Expanded Public Works Programme (EPWP) is a nationwide programme in which public expenditure is systematically used to generate additional employment through the use of labour-intensive work methods thereby contributing towards national poverty alleviation goals. The programme spans four sectors comprising infrastructure, social, non-state and environment and culture, of which infrastructure works is the largest component. Within the infrastructure sector, roads provide the highest employment creation potential.

This report contains the findings of a study which explores how employment is currently generated in the EPWP and how additional jobs can be created by enhancing the labour-intensity of infrastructure works and in particular the road works component of the programme.

The study was carried out by two consultants, Lucky Gamoo and Bjorn Johannessen, during the period from 1 August to 3 September 2011. This report is based on extensive discussions with programme stakeholders including staff from the EPWP management, public works departments, contractors and consultants involved in the programme. As the final report for this study, it also incorporates feedback received during a workshop where the initial findings were presented and comments provided to an earlier draft report submitted on 30 September 2011.

Although this study was commissioned by the ILO technical assistance project to the EPWP, the assignment was carried out in collaboration with both the EPWP and the ILO. Gamelihle Sibanda, the ILO Chief Technical Adviser to the EPWP backstopped the research study. Since the study forms part of the ILO technical assistance to the EPWP, the ultimate client for the study is the EPWP.

The consultants take this opportunity to thank all the staff that provided valuable assistance and information to the study as well as the facilitation of the field trips organised at short notice. Furthermore, the consultants wish to thank all who provided valuable comments to the draft report thereby improving the quality of the final output of this exercise.

Acknowledgements

The production of this report was made possible by the collaboration and input of various stakeholders. Some made their input through direct interaction with the research study consultants and others indirectly through provision of information and data. The people who met with the research study consultants are listed in Appendix 1.

Most of the data was provided by the Expanded Public Works Programme (EPWP) Monitoring and Evaluation Unit and officials in the EPWP Infrastructure Sector. The ILO teams based at National and Limpopo Province also facilitated access to other sources of information, especially historical data and information regarding the Gundo Lashu Programme that was carried out in Limpopo Province.

Additional information provided by other stakeholders such as the Department of Transport and consulting engineers is greatly appreciated. The research study team also benefited from interacting with people who have been associated with the EPWP since its inception such as Ignatius Ariyo (Chief Director EPWP Infrastructure Sector), Augustus Asare (ILO Limpopo Team Leader) and Prof Robert McCutcheon.

Ultimately, the value of the contribution of various stakeholders (including those not mentioned above) will be in the use of the findings and implementation of the recommendations of this study. Therefore, the anticipated input in taking forward the findings and recommendations of this study is gratefully acknowledged.

1 Executive summary

Background and context

The Expanded Public Works Programme (EPWP) is a nationwide programme which makes systematic use of public expenditure using labour-intensive methods to generate employment and to develop marketable skills among targeted marginalised sections of society thereby contributing towards the national goal of alleviating poverty.

Phase I (2004/5-2009/10) of the EPWP achieved its target of creating one million work opportunities a year ahead of schedule. Phase II (2009/10-2013/14) has a target of creating 4.9 million work opportunities, equivalent to creating two million full time jobs over a year.

The programme comprises four sectors namely: infrastructure, social, non-state and environment and culture. The Infrastructure sector provides the highest levels of employment generation in the EPWP. Within the infrastructure sector, roads provide the highest employment creation potential. Therefore, the enhancement of the labour intensity in road works has a significant impact on the overall performance of the EPWP.

The use of labour-intensive work methods is well supported by the government as a means of generating employment. This approach is included in various policy documents. Extensive research has been carried out in the effectiveness of this technology by reputable technical institutions including the major universities and the country's central road research institute. In terms of policy formulation, research, organisational measures and also funding, South Africa has certainly done their homework in terms of preparing for a large-scale labour-intensive public works programme. Yet, with all these good intentions, it is generally perceived that levels of labour intensity are low and further efforts should be made to increase the use of labour-intensive work methods. It is estimated that only 12 percent of the road sector expenditure in the financial year 2010/11 was used for works classified as truly labour-intensive projects.

Data analysis

The programme generated a total of 48 million Persondays of employment during the last financial year (2010/11). This equates to employing 209,000 persons full-time (Full Time Equivalents) for an entire year. The total programme expenditure during the same period amounted to nearly R 35 billion of which 8.1 percent was spent on wages.

Infrastructure is the largest sector in the programme with 66 percent of total expenditure. As the largest of the four sectors in the EPWP, it also creates the most jobs, generating some 82,000 work years, providing temporary employment to 277,100 persons.

The EPWP infrastructure sector includes building works, electricity supply, road works, sanitation, storm water drains, waste management and water supply. Building works is the largest component, constituting nearly 61 percent of total expenditure in 2010/11, but records the lowest labour intensity at 2.6 percent. The low labour input also results in a very high cost to create a job at a rate of R 642,000, which is more than twice the sector average.

The second largest component in the infrastructure sector is the road works programme, with 28 percent of total expenditure, generating 57 percent of employment in this sector and 22 percent of all employment generation in the EPWP as a whole. The level of labour intensity of the road works component have been fairly constant during the last five years of the programme, varying from 8 percent to slightly above 11 percent during the last financial year.

It seems to have been no substantial changes in the extent to which labour-intensive work methods has been utilised in the road works programme during this period.

The daily wage rates are higher in the infrastructure sector, last year at R 90. The social sector provides the longest average duration of employment at 6.4 months. In the infrastructure sector, the average job opportunity lasts for 3.7 months. In road works projects it is slightly higher at an average of 3.9 months.

Within the road sector, 73 percent of all employment is created on road maintenance works. The labour intensity rate for maintenance is 27 percent as compared to 4.7 for road construction works. Of the total employment generated in the road works programme, the largest contributions were made in KwaZulu-Natal with 41%, followed by 22% in the Eastern Cape and 13% in Gauteng, with all the other provinces contributing between 1% and 6%. The high employment numbers in Kwazulu-Natal and the Eastern Cape are due to the high number of workers employed in their lengthman systems established for routine maintenance works.

There is a wide variation in the cost of job creation in the provinces. On average, it cost R 139,500 to create one Full Time Equivalent (FTE) for a year in the road sector. The lowest cost to create a full year job is achieved in Eastern Cape at a rate of R 64,000 as compared to the highest rate in North West Province where it costs on average R 452,000. The overall average job creation cost for maintenance works is 54,000 R/FTE as compared to 368,000 R/FTE for road construction works.

As opposed to labour-intensive road works in other countries, a major portion of the employment generation in EPWP road works takes place in urban areas (60%).Provincial public works departments managed works covering two thirds of road sector expenditure during the last financial year. Municipal authorities implemented the remaining one third. The labour intensity rate is 13 percent for road works under the provincial departments and 9 percent for works carried out by the municipalities. The difference is due to the fact that the provincial departments manage most of the labour-intensive maintenance programmes. Large construction projects have a low labour intensity at only 3 percent.

Reaching Phase II targets

At the time of this study, the EPWP is half way through the second phase. The current figures indicate that in terms of work opportunities, the progress so far is pretty much as planned, short of 50,000 jobs. However in terms of workdays, the programme is behind schedule with a total of 208,000 Person years, achieving only 68 percent of planned employment generation. This shortage is equivalent to the total employment generated last year.

If the employment generation in the infrastructure sector continues at the same rate as the last financial year, this will result in reaching only 45 percent of the planned target for this sector. Assuming that the road sub-sector is expected to continue to cater for 57 percent of employment generation in the infrastructure sector, there is a need to create some 282,000 additional Person years through road works – or 94,000 additional FTEs in each of the remaining three years, compared to 46,089 FTEs generated during the last financial year.

The increase in employment outputs can be secured either through a substantial budget increase or by expanding the use of labour-intensive work methods. Solely relying on a budget increase to meet the employment targets seems unrealistic. Therefore, a substantial portion of the planned increase in employment needs to come from a wider use of labour-intensive methods in the programme.

In the road works programme this can be achieved essentially by (i) the continued expansion of Zibambele type road maintenance activities and (ii) shifting emphasis of funding from urban first world infrastructure towards more support to improving road access in poor rural areas and townships. Labour-intensive work methods are more appropriate for improving access roads and streets, rather than highways. It is therefore recommended that clearly defined labour-intensive rural/township road works programmes are initiated in all provinces with specific outputs for employment as well as physical works - with ring-fenced funding. The main components of this programme involve (i) the construction of 2,700 km of roads in rural areas and townships and (ii) the expansion of labour-intensive road maintenance works to all nine provinces.

The highest potential for increasing employment in the programme lies within maintenance works as the cost of creating jobs in routine maintenance is considerably lower that for construction works. It is also a sound approach from an infrastructure asset management point of view. It is however recommended to include a substantial component of road construction works for the purpose of addressing infrastructure investment demands in underdeveloped areas. The current practice of maximising labour-intensive works methods in machine-based works yields the lowest potential for increasing employment generation.

In order to implement the proposed increased labour-intensive road works programme there is a need to create dedicated units in each province for the planning and management of works. This in turn require strong support from local champions at provincial and municipal levels who can take the necessary decisions to establish and implement such schemes and also to secure the required funding.

In order for this to take place in a timely and efficient manner, there is a need to establish necessary management arrangements and also improve quality of training. Training materials and training delivered in currently available courses need significant improvement as it is of too general natureand not relevant to the specific works. Training needs to be conducted in a practical environmentpreferably through the use of demonstration work sites.

There is a need for detailed manuals and guidelinesdescribing appropriate design standards and work methods conducive to labour-intensive road construction works. Equally, there is a need for detailed guidance for consultants and project managers on design options for labour-intensive road works.

2 Programme description

2.1 Programme background

Given the persistently high unemployment situation in South Africa,[1] the Government launched the Expanded Public Works Programme (EPWP) in 2004, with the objective to provide essential services and infrastructure to disadvantaged communities, develop skills among the unemployed and create the much needed employment through the application of labour-intensive work methods.

During the first phase of the EPWP, from 2005 to 2009, the target was to provide employment opportunities and training to at least one million unemployed people. The programmecovered four major sectors in the economy in which additional employment were created: (i) infrastructure sector - increasing the labour intensity of government-funded infrastructure works; (ii) environmental sector - creating jobs in public environmental programmes; (iii) social sector - creating additional employment in social programmes such as community-based health and social welfare care and early childhood development, and (iv) economic sector,developing small businesses and cooperatives, including utilising general government expenditure on goods and services to provide the work experience component of small enterprise learnership/incubation programmes.

The infrastructure sector was identified as the largest employment generator, targeting the creation of 900 000 jobs during the first phase of the programme. It was envisaged that this component would be a large-scale expansion of the use of labour-intensive construction methods to build, upgrade and maintain the social and economic infrastructure in the underdeveloped rural and urban areas of the country where such infrastructure is lacking.At the same time local people would be employed and given basic training and skills development.

At present the programme is in the third year of the second phase. The targets have now been increased, aiming for the creation of nearly 5 million work opportunities, equivalent to some 2 million work years of full-time employment generated during the current five year period. The infrastructure sector is still the largest sector of the EPWP with a target of employing more than two million persons creating a total of 900,000 Person years.

Although the EPWP is a national programme, it is implemented by the provinces and municipalities. In practice, this implies that the programme is dependent on (i) the capacity of local government institutions to manage and implement works and (ii) their support of the use of labour-intensive works technology in their respective works programmes.

The majority of job opportunities are created within the framework of the Infrastructure Grant to Provinces (IGPs) and the Municipal Infrastructure Grant (MIG).Conditions are placed on the PIGs and MIGs via the 2004 Division of Revenue Act (DORA), which require provinces and municipalities to execute public works such as low-volume roads, stormwater drains and trenching work using labour-intensive methods in accordance with guidelines produced by the Department of Public Works (DPW), and approved by the South African Local Government Association (SALGA) and National Treasury.

Training forms an important part of the EPWP implementation strategy. In 1994, a National Qualifications Framework (NQF) and a system of Sector Education and Training Authorities (SETAs) were established. In 2004, upon request of the DPW, the Construction Education

[1]As of second quarter of 2011, the unemployment rate is estimated at 25.7 percent according to Statistics South Africa.

Training Authority (known as the CETA) funded the development of unit standards for the design, supervision and management of labour-intensive construction at NQF levels 2, 4, 5 and 7 for small contractors, supervisors, technicians and engineers. In order to secure that works are carried out using labour-intensive work methods, provinces and municipalities should appoint contractors and consulting engineers who have been trained in the design, supervision and management of labour-intensive works.

Together with CETA, the DPW has developed a labour-intensive Contractor Learnership Programme, Vukuphile. This was closely modelled on the successful Gundo Lashu Programme in Limpopo Province, offering contractors and their supervisors formal CETA registered learnerships, with training provided by accredited local training providers.

A guiding framework for the implementation of labour-intensive projects was issued by the EPWP in 2004 and updated in 2005.These include specific directions regarding contract clauses to be included in order to promote the use of labour-intensive work methods.

The DPW is the overall EPWP-coordinating department and the sector-coordinating department for the infrastructure sector. As the overall coordinating department, the DPW is responsible for monitoring and evaluation, progress reports to Cabinet, promoting linkages between sectors, establishing common support programmes, and common monitoring, evaluation, exit strategies, and training frameworks.

ILO involvement in the EPWP

During the first phase of EPWP, the ILO provided support to the programme at national level through the fielding of a technical assistance (TA)team of three specialists comprising a Chief Technical Adviser and two Labour Intensive Specialists. The ILO TA team was attached to the Programme Implementing Unit of the National Department of Works in Pretoria to support the implementation of the infrastructure component of the EPWP. During the second phase, this TA has been rearranged with only one adviser in Pretoria and the two specialists based in KwaZulu-Natal and Eastern Cape.

In addition, the ILO has since 2001 provided technical assistance to Limpopo Province, which initially started as technical support to the Gundo Lashu Programme. Both TA components are expected to continue until the end of the second phase of the EPWP in 2014.

The objective of the ILO technical assistance is *"To enhance the capacity of the EPWP infrastructure sector to deliberately optimise the creation of decent work opportunities in a manner that enhances labour intensity of government-funded infrastructure projects"*.[2] This objective is supported by activities grouped into five result areas, (i) policy development and promotion, (ii) skills and capacity development, (iii) technical and managerial advisory support (iv) research and studies contributing to the optimization and mainstreaming of the use of labour-intensive methods, and (v) advocacy of strategies, processes and tools that contribute to up-scaling of the EPWP.

This study forms part of the ILO technical assistance services to the EPWP.

[2] Ref: ILO Inception and Progress Report, June 2009 to May 2010

2.2 Current practice

Employment generation through the road works programme in the EPWP is achieved through two main fields of action, (i) routine road maintenance and (ii) earmarking certain activities to be carried out using labour-intensive work methods in projects predominantly using conventional machine-based work methods.

The bulk of the employment is generated from labour-intensive routine maintenance work, commonly organised through lengthman systems, providing jobs to poor households living in close vicinity to the roads being maintained. There are very few road construction projects in which labour-intensive methods are used as the main work methods, essentially consisting of two to three pilot projects in some of the provinces. Instead, employment generation in road construction projects takes place by identifying some few work activities which are carried out using manual labour in order to create some additional jobs.

Routine maintenance

The main bulk of labour-intensive road works in the EPWP is centred on routine road maintenance. This type of works was first initiated in KwaZulu-Natal Province through the Zibambele programme and later replicated in other provinces.

Zibambele

In 1999, the KwaZulu-Natal Department of Transport (DoT) piloted the Zibambele programme by awarding 2,700 routine road maintenance contracts as part of its Road to Wealth and Job Creation initiative.This programme is essentially adopted from the Kenyan lengthman model, recruiting local labour to carry out routine road maintenance applying labour-intensive work methods.

Instead of appointing an individual, the DoT appoints a household. Women-headed households are targeted because they make up the majority of the poorest families. Training includes technical skills on the correct way to maintain roads as well as a social development and life skills component.

Each contract requires a maximum of 60 hours of work per month to maintain a specific length of road. Contracts are awarded for twelve months and renewed annually. The programme targets the poor who are identified and selected by their own community.

A typical works contract include activities such as maintaining the road drainage system, ensuring good roadside visibility, maintaining the road surface in good condition and clearing road shoulders and reserves of litter and weeds.

Contracts are awarded with equipment, which includes a wheelbarrow, a pick or a hoe, a shovel, a machete and a slasher or a sickle. There is also safety equipment that must be used by contractors at all times while working so that they are visible to road users viz. safety vest and plastic cones.

Zibambele households have been organised into savings clubs as a further means of improving livelihoods.

The Zibambele programme forms part of the EPWP and guidelines are currently being developed to assist with its implementation by other authorities and in other provinces. The eThekwini version has proved that the programme can be implemented successfully in both urban and rural areas.

The total annual expenditure in the Zibambele programme in KwaZulu-Natal for the 2010/11 financial year was R 225 million, of which 206.9 million was spent on wages. This generated nearly 45,000 work opportunities equivalent to 16,000 FullTime Equivalents (FTEs) or Personyears.

A similar programme in Eastern Cape Province, the Sakha Sizwe, currently employs some 25,000 households carrying out routine road maintenance. From a total expenditure of 132 million during 2010/11, 90 percent was spent on labour wages, creating 8,500 full-time work years.

Equally, Mpumalanga has a routine maintenance programme, the Siyatentela, which last year created 2,000 work years of employment. Limpopo recently embarked on a similar scheme which this year employs 15,000 workers.

Road construction

In terms of labour-intensive road construction works the situation on the ground is rather bleak. Most construction works, including upgrading, rehabilitation and periodic maintenance works are carried out using conventional equipment-intensive work methods. A majority of this work is carried out relying on private contractors while some provinces still keep an in-house capacity to carry out works relying on force account arrangements

Resurfacing works carried out by force account in Eastern Cape

All road works projects are required to generate additional employment through the use of labour-intensive work methods. The road construction projects generate some additional employment although way below its full potential. Jobs are normally created for labour employed for traffic management at the work site, clearing of side drains or other minor activities. Some projects have increased job creation in road construction by engaging small-scale entrepreneurs to build sidewalks using manual labour. In the total picture, the labour-intensive works amount to a very small portion of the total expenditure on road construction and have little impact on the overall labour-intensity of the projects.

At present, it seems as if fully labour-intensive road construction projects are only carried out on a pilot basis on community or access roads. The consultants visited the sole project in Eastern Cape Province. In KwaZulu-Natal there were two similar on-going projects.

Attempts have also been made to combine the use of both technologies in some of the larger projects in which smaller components of the road works projects have been set aside as a labour-intensive operation. A common activity for labour-intensive works is the construction of pedestrian sidewalks on new and existing roads. Although this activity normally constitute a small portion of overall project budgets, and thus have very limited impact on the labour-intensity of a project, it does provide some employment opportunities for the local communities along the road.

The main labour-intensive road construction programme found in the EPWP was the Gundo Lashu programme in Limpopo, however, this programme ended in 2009.

Labour-intensive road construction in Eastern Cape

The above trends are confirmed when analysing the results of the expenditure of the public works departments in the various provinces. As can be seen from the table in Chapter 4.5, the expenditure on labour is low on construction projects while the results on maintenance show a higher use of labour.

Despite this limited use of labour-intensive work methods in road construction, there is a wealth of experience in the use of the technology from various places in South Africa dating back to the early 1990s. The technology has been successfully applied for urban roads in Soweto in the early 1990s, relying on small-scale contractors. Rural access roads have been constructed in KwaZulu-Natal using labour-intensive work methods. The most notable is the Gundo Lashu programme, which commenced in 2001 in Limpopo, initially as a gravel road construction programme eventually graduating into a programme constructing bitumen surfaced roads using labour-intensive work methods. Key elements of the EPWP implementation strategy are based on the setup in the Gundo Lashu.

Gundo Lashu

Launched in 1991 by the Road Agency in Limpopo (RAL), Gundo Lashu aimed to improve roads in poor and disadvantaged rural areas in order to increase access to basic services such as health and education and to markets and economic activities. It involved the construction of drainage structures and reshaping, gravelling and low-cost sealing of rural roads with the primary objective of providing good quality, cost-effective rural roads using labour-intensive work methods.

The programme was implemented in partnership with the British Department for International Development (DfID) – which provided seed funding for technical assistance and training during the first five years, and the International Labour Organization (ILO) – which provided technical assistance.

The contractors employed local people as the work force on a project by project basis. Each contractor was responsible for the construction of between 4 and 15 km of roads on a contract basis.

Gundo Lashu was the first long-term labour intensive road works programme in South Africa where emerging contractors were given extensive formal training and a series of practical on-site training projects in labour-intensive road works over 21 months. The programme trained 24 emerging contractors to undertake road construction works with a strong emphasis on training the contractor's supervisory staff, to ensure that they had sufficient capacity to efficiently manage works applying labour-intensive methods.

The training also sought to strengthen the capacity of technical staff in RAL and private consultants. Seventeen technicians and six engineering consultants from six firms and 10 RAL staff were trained in the management and supervision of labour based road works. In total, more than 18,000 training days were provided.

Assurance of continuous funding and workload during the developmental stage was a key element in ensuring effective contractor capacity development. Funding for road construction works was therefore provided over time, thereby securing long-term market prospects for the contractors.

A total of R 293 million was spent on road works projects during the period from 2002 to 2009 of which nearly 42 million was spent on wages. Over the total duration of the programme, expenditure on wages constituted 18 percent of the construction costs. When including the costs of consultants, the wage component amounted to 14 percent.

The programme improved more than 370 km of rural roads up to RAL standards (207 km of sealed roads and 170 km of gravel roads). It generated 1.3 million workdays of employment (5,600 FTEs) of which 47% were provided to women and 44% to youth.

An independent review of the programme found that it constructed roads to required quality standards at no extra cost compared to conventional machine-intensive roads projects.

2.3 Road network

South Africa's road infrastructure can be divided into two parts. In the urban areas and on high volume roads and highways the road network is similar to what is found in first world countries, which is often the case in countries with emerging economies. This road infrastructure is also well maintained using modern management methods and latest technology. The country can pride itself with competent contractors, in-house departmental road works units, consultants and a road research laboratory of international repute.

Another part of the network, commonly found in rural areas, is similar to rural roads in developing countries where the road network predominantly consists of gravel roads which receive insufficient maintenance and are often under-designed for the current type and volume of traffic. This part of the network is actually of lower quality compared to the rural road networks found in other emerging economies.

Department of Transport estimates that the total road network consists of approximately 750,000 km of roads of which some 153,000 km are paved. The remaining 593,000 km, constituting nearly 80 percent of the network, are gravel roads of varying quality. This distribution between paved and unpaved roads is a common feature also found in other African countries.

Authority	Paved	Gravel	Total
SANRAL	16,170	0	16,170
Provinces - 9	48,176	136,640	184,816
Metros - 9	51,682	14,461	66,143
Municipalities	37,691	302,158	339,849
Total	153,719	453,259	606,978
Un-proclaimed (estimate)	0	140,000	140,000
Estimated Total	153,719	593,259	746,978

SANRAL, the provincial road works departments and the metros perform the best maintenance. These agencies plan their maintenance on the basis of modern maintenance management systems. Paved roads are generally in good condition since adequate funding priority is being given to such infrastructure assets. Maintenance on municipal roads is more random.

> "The South African road network currently contains both positive and negative elements. For instance, the national road network system is among the best in the world providing connectivity between major economic centres, part of our provincial road network system is under heavy strain and is undergoing accelerated deterioration which threatens logistics and safety, while part of our access road system is among the poorest in the world often denying communities access to opportunities."
>
> *From the Executive Summary, Road Infrastructure Strategic Framework for South Africa, Department of Transport, October 2006*

The picture is more mixed on the gravel roads. The provincial road agencies and the municipalities are struggling with an extensive gravel road network with traffic varying from 20 to 1000 vehicles per day. The poor condition of many of these roads can often be traced back to the apartheid days, when a large portion of these roads was under the jurisdiction of the homelands. Similarly, there still remains a large challenge in terms of upgrading roads and streets in the townships.

Providing basic road access in the rural areas is still a challenge. The lack of proper road transport facilities is also linked to the poverty levels in the country with the largest challenges in the "deep rural areas".

Rural access

The World Bank carried out a survey which essentially measured the degree of access to proper road connections in the rural areas. The Rural Access Index (RAI) was established to focus on the critical role of access and mobility in the reduction of poverty in developing countries. The RAI measures the number of rural people who live within two kilometres (typically equivalent to a walk of 20-25 minutes) of an all-season road as a proportion of the total rural population. An "all-season road" is a road that is motorable all year round by the prevailing means of rural transport (typically a pick-up or a truck which does not have four-wheel-drive). Occasional interruptions of short duration during inclement weather (e.g. heavy rainfall) are accepted, particularly on lightly trafficked roads.

The distribution of RAI values suggests significant associations between rural access and the MDGs, such as poverty, maternal mortality and gender equity. The current RAI estimates for 178 countries indicate that over one billion (31 percent) of the world's rural population (98 percent of them in developing countries) do not have adequate access to transport. Sub-Saharan Africa has the poorest level of rural access at only 30 percent. The same survey established an RAI of 21 percent for South Africa, estimating that more than 14 million rural inhabitants lived more than 2 kilometres away from an all weather access road. Unfortunately, the survey for South Africa is based on 1993 data, and the situation has probably improved since then. Still, the result indicates that South Africa is struggling with similar access problems as the rest of Sub-Saharan Africa.

From: Rural Access Index: A Key Development Indicator, Rural Transport Paper, Peter Roberts, Shyam KC and Cordula Rastogi, World Bank, March 2006

Labour-intensive road works technology is most suitable for the construction and maintenance of rural roads. Considering the expansive gravel road network in the country, there is obviously no shortage of roads on which such work methods can be applied.

At the moment, most funding for the sector focuses on the paved road network. From an asset management point of view, this is the correct priority. South Africa has an impressive paved road network and it is important that these investments are protected with timely and adequate maintenance. There is, however, a strong demand for improving road access in rural areas and in the townships. Ideally, this should be secured through additional investments and not on the expense of the paved roads. Roads in many rural areas remain in poor condition and restrict social and economic development. A labour-intensive rural road works programme could serve a two-fold purpose of both improving access as well as providing immediate employment.


Provincial road in Eastern Cape

The need for improving access roads are well recognised by the government and is also addressed in key policy documents such as the Road

Infrastructure Framework for South Africa. In this context, the merits of labour-intensive work methods are also recognised. It is further acknowledged that although good experience already exists in the country, the initiatives in terms of using this technology has been on a piecemeal basis and has unfortunately not developed to its full potential.

Developing labour-intensive construction capacity

"South Africa has had extensive experience with using labour-intensive construction technologies/methods to deliver infrastructure. There are best-practice examples of road construction and maintenance using labour intensive methods across the three spheres of government and across the country. Lessons have also been learned from experiences in other parts of Africa and in other countries across the world e.g. Kenya's Lengthman system. Provinces such as Kwazulu-Natal, Limpopo, Western Cape and Gauteng have successfully implemented labour intensive construction, capital and maintenance programmes that have not only delivered good quality infrastructure and created jobs but have also developed a substantial skills-base for infrastructure provision through labour intensive methods.

Until now, what has been lacking is a nationally led process to integrate existing initiatives in order to maximise the economic and social potential of such programmes and their contribution in building skills, creating jobs and infrastructure. In addition, there has been a central platform for the dissemination of information and the promotion of best practice relating to labour intensive construction. This shortcoming has kept even the most successful of initiatives/programmes at a local or regional level with the impact only being felt by the local communities.

The DoT intends to lead a process of integrating existing labour-intensive construction and maintenance programmes within the road construction industry. In addition, all provincial roads authorities will be encouraged to establish formal capital and/or maintenance labour intensive construction programmes. This process will create a platform for roads authorities to share information and experiences on the delivery of infrastructure using labour intensive methods; promote best practice in the use of labour intensive technologies; enable roads authorities to jointly tackle challenges that are experienced and also act as co-ordinating mechanisms for the roads sector. For instance, this platform will be used for the co-ordination of the road construction industry's contribution to key government programmes and strategies such as the EPWP."

Ref. Chapter 6 Human Capital of the Road Infrastructure Strategic Framework for South Africa, Department of Transport, October 2006

The intentions of DoT to lead a process of integrating existing labour intensive construction and maintenance programmes within the industry has taken place with mixed results. So far, this has only taken place on a significant scale with routine maintenance in three provinces. In addition, the Gundo Lashu programme in Limpopo was a good attempt along this line of thought, however, this programme ended in 2009.

Still, all the pilots and larger past and current programmes provide a good basis for resuscitating these good intentions. Equally, the framework created through the Vukuphile contractor training programme is an important asset in terms of realising the goals relating to the use of labour-intensive methods in the road sector.

3 Scope and methodology

3.1 Purpose and scope of study

The International Labour Organization (ILO) commissioned this study on behalf of the EPWP with the objective of optimising employment creation in infrastructure projects. This objective is envisaged to be achieved through the analysis of key variables and cost structure of infrastructure projects, and the development of innovative approaches to increase the labour intensity and use of local material resources in EPWP road projects.

The activities under this assignment included:

- Review of the current road works programme forming part of the infrastructure component of the EPWP.
- Assessing labour intensity of various types of road works implemented and reported under the EPWP, over time, disaggregated by province and project type.
- Assessing the quality of infrastructure produced.
- Assessment of cost structure mainly focusing on expenditure of wages againsttotal project cost, also referred to as labour intensity (LI).
- Assessment of the range of wage rates used for road projects and the impact of the wage rate on labour intensity of road works.
- Exploring ways and means for increasing labour intensity for road projects during various stages of the project cycle (project identification, design, implementation, operation and maintenance).
- Identifying appropriate types of road works that could be implemented based on EPWP principles.
- Identifying road works activities that are amenable to implementation using labour intensive methods.
- Exploring other options and measures to increase the employment generation in the road sector.
- Establishing reasonable estimates of labour intensity targets for road construction and maintenance.
- Review of current training and capacity building in the EPWP and identifying measures to improve skills and knowledge development.
- Recommend improvements to the document "EPWP infrastructure Implementation Manual – A Practical Guide".

The study focuses mainly on roads infrastructure implemented under the EPWP banner. On the request of EPWP management, field visits were carried out to water and sanitation projects to explore whether these sectors followed the same trends as found in the road works programme.

3.2 Study methodology

The consultants carried out an extensive review of EPWP related documents, including programme guidelines, technical literature, progress reports, workshop presentations and other literature in order to gain a proper understanding of the past and current application of labour-intensive works technology in South Africa.

Information sourced from project related documents was verified through field visits and interviews with government staff, ILO technical assistance personnel and programme implementing partners including both consultants and contractors. Equally, the results from the extensive data analysis carried out as part of the study was compared with the findings from the field visits.

The consultants held extensive discussions with ILO technical assistance staff involved in the EPWP as well as consulting ILO headquarters in Geneva and technical backstopping staff in Pretoria. The consultants met with key staff in the provincial departments of works and transport, management staff at EPWP headquarters and EPWP staff in the provinces.

Data analysis

The main efforts to produce this report went into the data analysis of the current programme, attempting to establish the true characteristics of the road works programme which forms part of the EPWP infrastructure component. The main source of the data analysis is the raw database from the management information system (MIS) of the EPWP.

The type of infrastructure projects is not clearly indicated in the database, requiring a detailed review of project entries in order to distinguish the road works from other infrastructure works. Due to frequent data entry errors, considerable time was also spent on verifying data in each of the individual projects.

Although time consuming, the data analysis in turn provided an important quantitative and qualitative basis for the recommendations on how to increase employment generation in the road works programme of the EPWP.

Appendix 1 provides a schedule of activities and list of persons met during the assignment.

Although the majority of the mission took place in Pretoria, considerable time was spent on field visits to the provinces. The consultant carried out brief visits to road works projects in Limpopo, KwaZulu-Natal, Eastern Cape and Western Cape Provinces. Field visits were also carried out to on-going water and sanitation projects in Gauteng. The field trips were arranged to enable the consultants to obtain a sample impression of works being carried out as part of the programme as well as to obtain the views of technical staff from the provincial technical departments. Appendix 1 describes when and where field travels were undertaken.

The assignment commenced on 1August 2011 when an external collaboration contract was secured between the ILO and the international consultant. The national consultant was recruited five days later.

The preliminary findings and recommendations were presented to the ILO and EPWP management on 2 September 2011. A draft reportcontaining the full data analysis and other findings was submitted to the ILO on 25 September for comments before delivering the final report.

3.3 Clients for the study

Although this study was commissioned by the ILO technical assistance project to the EPWP, the assignment was carried out in collaboration with both the EPWP and the ILO. Since the study forms part of the ILO technical assistance to the EPWP, the ultimate clients for the study is the EPWP.

4 Findings

4.1 Definitions

The document "Guidelines for the Implementation of Labour-Intensive Infrastructure Projects under the Expanded Public Works Programme (EPWP)" provides general guidance on how labour-intensive work methods can be applied in infrastructure works. In this guideline, labour-intensive work methods are defined as follows:

Labour-intensive: refers to methods of construction involving a mix of machines and labour, where labour, utilising hand tools and light plant and equipment, is preferred to the use of heavy machines, where technically and economically feasible. (Note: The normal emphasis on the cost-effectiveness and quality of the asset must be retained.)

The "EPWP Infrastructure Implementation Manual – A Practical Guide" provides a more detailed definition. It also distinguishes between 'labour-intensive'and'labour-based' work methods and finally compares it to machine-intensive methods:

"Labour-based or Labour-Intensive Technologies:"
Both of the terms Labour-Based Construction (LBC) and Labour-Intensive Construction (LIC) are used interchangeably by many to refer to the 'preferred' technology used in EPWP project implementation. On closer examination, though, practitioners attempt to distinguish between the Labour-Based (LB) and Labour-Intensive (LI) methods. Such distinctions are mainly based on the emphasis attached to the use of equipment in relation to the main resource – labour. Based on current writings on the subject the nuances are clarified hereunder:

"Labour Based Construction (LBC):"
"Labour Based" is a generic connotation used to describe the whole philosophy, methodology and sets of tools and work regime adopted to implement works. As such the practitioners' definition of LBM (as it appears in current ILO literature) summarizes well the concept of the technology selected for implementation of EPWP infrastructure projects as follows: "Labour-based Method (LBM) is a construction technology which aims to apply a labour and equipment mix that gives priority to labour but supplements labour with appropriate equipment where necessary for reasons of quality or cost". Whilst the method recommends the use of labour as a predominant resource it permits for flexibility to optimize the use of labour and allows for its accompaniment by appropriate light equipment. Although the main basis for the works is labour, ultimately an optimum mix of labour with equipment is sought.

"Labour Intensive Construction (LIC):"
Is also a method in which one seeks to maximize the use of labour. LIC argues that wherever there is the possibility to do works by labour, it should be done by labour as a matter of policy. In this case the overriding considerations are given to the creation (and consequent income generation) for workers. Because emphasis is given to job creation, works based on adoption of such a method may, from a narrow financial cost implication viewpoint (financial outlay of the client) be assessed as less efficient, less competitive or less cost-effective.

"Machine Based (MB) / Machine Intensive Methods (MBM):"
Adopt construction technologies which are primarily designed and planned for the use of plant and equipment. The use of labour is, in such cases, limited to activities where the option of using equipment or machinery does not exist, is financially unfeasible or is simply difficult to implement or justify. So labour is only engaged where and when machines and equipment ideally cannot or should not be used. The assumption here is that convention is given priority over employment.

The second definitionas given in the EPWP Infrastructure Implementation Manual is very much in line with the terms used by the ILO in its Employment Intensive Investment Programme(EIIP). Labour-intensive works generally refers to works where very little equipment, if any at all is used, while labour-based work methods emphasise the use of a balanced mix of plant and labour in order to carry out regular infrastructure works to established standards and competitive costs. Labour intensive works are often associated with cash/food for work programmes, drought relief programmes and other pure make work projects. Therefore the term 'labour-based' has been introduced in order to distinguish these schemes from programmes in which the main objective is to create/improve infrastructure assets while still optimising employment creation.

In South Africa, the term 'labour-intensive' is generally used for all the works in the EPWP in which additional employment is generated through the substitution of machines with labour. According to the Infrastructure Implementation Manual most of this work would be classified as labour-based. Only the lengthman system applied in routine road maintenance would qualify as labour-intensive. However, this issue is not important as in practice when the term labour-intensive is used it refers to labour-based and labour-intensive works.

For the same reason, this document mainly refers to the term labour-intensive as defined in the EPWP Guideline mentioned above - as this is the term most familiar to the various stakeholders of the EPWP.

The degree to which a project is carried out using labour-intensive methods is commonly measured by the portion of the total expenditure used for the payment of labour wages. In this report, it is being used as a key indicator to assess the extent to which labour-intensive methods are applied. A second performance indicator is of course the number of Persondays orfull-time equivalent work years (FTEs) generated by the programme.

The extent to which the works are labour-intensive can also be presented as the cost of creating one job with a defined time duration (i.e. cost per workday or work year). This cost essentially follow the labour intensity rate. In highly labour intensive work the cost of creating a job will be close to the wage costs, while projects with limited use of labour intensive work methods will have a comparatively high cost of creating jobs. The difference between the wage costs and the cost of creating a job is the expenditure on materials, equipment, supervision and other overheads. For comparison purposes, the cost of creating one full time job for a year has been included in some of the tables presenting the findings in the ensuing analysis.

The last unit of measurement commonly used in labour-intensive works programmes is the number of work opportunities generated. Strictly speaking, this unit only indicates how many persons have been employed in the programme. Since the duration of employment varies, this is not an exact unit of measurement for employment generation. It merely indicates how many people have received employment at one stage or another in the programme.

The above indicators are normally used for post evaluation of projects. When planning a works project, it is more common to use labour productivity rates such as inputs of Persondays per produced output (e.g. number of workdays to excavate a cubic metre of soil, work days per linear metre of trench excavation, square metres of bush clearing or workdays per kilometre of road construction). Once a detailed work plan has been prepared, it is of course possible to estimate the labour-intensity and total employment generation in the planned project.

4.2 Data analysis

The study has carried out a detailed analysis of all road works projects in the EPWP. The analysis is based on the reporting carried out on all EPWP projects through its Management Information System (MIS). Most of the results presented in the report are based on the specific data entered for each project. As the analysis focus is on road works all such projects were extracted from the database. The analysis essentially covers the road works under the management of the provincial road agencies, metros and municipalities.

The data from each project has been reviewed to ensure that data entry is correct to avoid that the results are skewed due to wrong or inconsistent data entry. The verification was done in more detail for data from 2010/11 as most of the analysis is based on works from this period.

The results are presented for both maintenance and construction works. The MIS in its present form does not include any data field distinguishing between these two categories of work. This therefore required a review and interpretation of the descriptions of each of the projects as entered into the MIS. All references to upgrading, construction, installation and rehabilitation are classified as construction works. Maintenance works include re-graveling, resurfacing, patching works, most of the clearing works and any reference to repair works.

The main data analysis focused on establishing the total employment generated and the labour intensity of the road works programme. Employment results are therefore presented in what is commonly referred to as full-time equivalent (FTE) jobs. These are essentially the workdays reported divided by 230 to calculate equivalent work years. This unit of measurement is consistent with unit of measurement used in the EPWP targets and also the reporting of employment numbers in other programmes and sectors of the job market in South Africa.

Secondly, the analysis presents the extent to which the programme has applied labour-intensive work methods, referred to as the labour-intensity. The LI is calculated as the portion of expenditure on labour wages as a percentage of the total expenditure incurred during the same period.

The analysis also includes the number of work opportunities generated. Although this is one of the main indicators of the programme, the study gives less emphasis on this information and has been included mainly to establish the duration of the employment offered in the programme.

The results presented on labour intensity and employment is based on all projects on which reliable reporting has been provided and included into the MIS. Unfortunately, information is not complete for all the projects entered into the MIS. Individual projects, which have not reported the data necessary to carry out the analysis, have been omitted. This required a detailed review of the results of the individual projects to ensure that the compilations were based on correct input data. On calculating the labour-intensity of the various components of the programme, some projects had to be omitted, as they did not include the total project expenditure. Equally there are frequent data entry errors. In some cases, projects were recorded with higher labour expenses than total project expenditure. In all, some 15 percent of the records were excluded.

For this reason, the average numbers and totals in each of the tables may be slightly different, as the information has been obtained from different sources. All the same, the differences appear to be small and therefore do not affect the main conclusions drawn from the tables.

The figures presented in this report have been compiled from the database in the MIS of the EPWP. Some of the PWDs are also operating separate reporting systems with more detailed information relating to their infrastructure works programmes and the specific nature of the works. As some of the records from the EPWP database are incomplete, there may be some differences between the results deriving from this exercise and the reports produced by the provincial works departments.

Data entry

For future monitoring and evaluation purposes, it would be useful if the reporting on infrastructure were clearly categorized into types of works, such as roads, water supply, sanitation, buildings, electrification, etc. This would facilitate closer and regular follow-up and monitoring of each of the infrastructure sub-sectors.

Since the potential for employment on maintenance and construction works are different, it would be useful if the data records make a clear distinction between these types of work. Furthermore, it would be useful to be able to separate routine road maintenance from periodic and emergency works - since routine maintenance has a significantly higher employment potential.

Data processing

The data analysis carried out in this study indicates the type of results compilations required in order to monitor the use of labour-intensive road works in the programme. With the additional data entry mentioned above, the compilation of the summaries can be secured as part of the automatic data processing carried out for the quarterly reports.

As a major shift from current practice, it is suggested that the employment generation of the EPWP is monitored using labour intensity and Full Time Equivalents (FTEs) as the main indicators as opposed to the current practice of relying on work opportunities. As shown in the data analysis, the duration of the work opportunities vary significantly and for this reason, it is not an exact indicator. Still, it would be useful to monitor the number of work opportunities as it indicates the number of beneficiaries in the programme and duration of the jobs offered, however these figures should be treated as secondary output indicators.

Work outputs

The current management information system emphasize on the reporting of employment with no information on the work outputs. In the labour-intensive road works programme it is also important to monitor the cost and labour inputs in relation to the assets being constructed and maintained. At provincial level, it would be useful to monitor the overall outputs such as kilometres of maintained roads, new construction, rehabilitation and upgrading.

Equally, the most common work activities such as bush clearing, earthworks and pavement works should be monitored in order to establish reliable productivity rates. This is important for costing of new projects and also for evaluation of tenders.

4.3 Sector overview

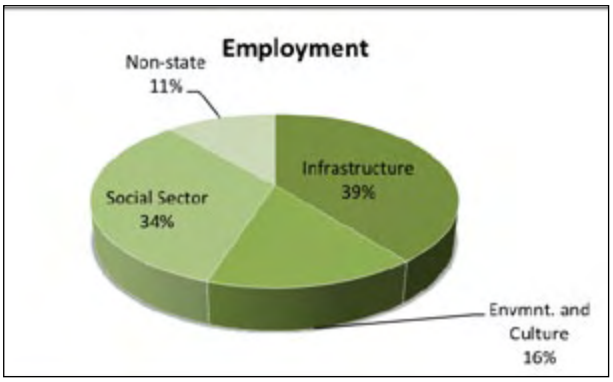
Last year (2010/11), the four sectors of the EPWP created some 48 million workdays of employment, equivalent to employing 209,057 persons full-time for an entire year. The total expenditure on wages constituted 8.1 percent of total expenditure. The average wage rate in the programme was R 62 per day. In the infrastructure sector the wage rate was higher at nearly R 90 per workday.

Infrastructure works form the largest component of the EPWP. During the last financial year (2010/11), R 23 billion was spent on infrastructure, constituting 66 percent of the total expenditure in the programme. As the largest of the four sectors in the EPWP, it also creates the most jobs. The infrastructure investments generated some 82,000 work years, providing temporary employment to 277,100 persons. Still, with a wage component of only 6 percent of the total expenditure, the infrastructure component has a low labour intensity.

Sector	No. of projects	Percent of total expend.	Total Expenditure	Person years (FTEs)	Job oppor-tunities	% Youth	% Wom.	Average wage rate	LI %	Expend. per FTE
Infrastructure	3,828	66.0	23,092,122,352	82,112	277,100	46	47	89.95	6.0	281,227
Envmnt. and culture	1,585	15.1	5,273,413,250	32,813	107,189	58	52	73.73	9.4	160,711
Social sector	12,122	17.2	6,017,208,684	70,371	131,979	50	91	52.44	12.0	85,507
Non-state	175	1.7	597,571,016	23,761	126,848	56	70	44.62	38.2	25,149
Total nationwide	17,710	100.0	34,980,315,302	209,057	643,116	51	62	62	8.1	167,324

Source: EPWP Quarterly Report 1 April - 31 March financial year 2010/11

Infrastructure works created 39 percent of the employment generated in the EPWP. It is the largest sector in terms of providing jobs, however this is mainly due to the significantly higher expenditure on infrastructure. The other three sectors of the EPWP reached higher degrees of labour-intensity. The social sector, which has twice the labour intensity, generates nearly the same amount of employment from a total sector expenditure of approximately a quarter of the infrastructure budget.



Creating jobs in infrastructure is more expensive than in the other sectors. This is due to the fact that infrastructure investments require considerable inputs of materials and equipment. Last year, it cost R 281,000 to create a full time job for one year in the infrastructure sector of the EPWP, as compared to R 85,500 in the Social Sector.

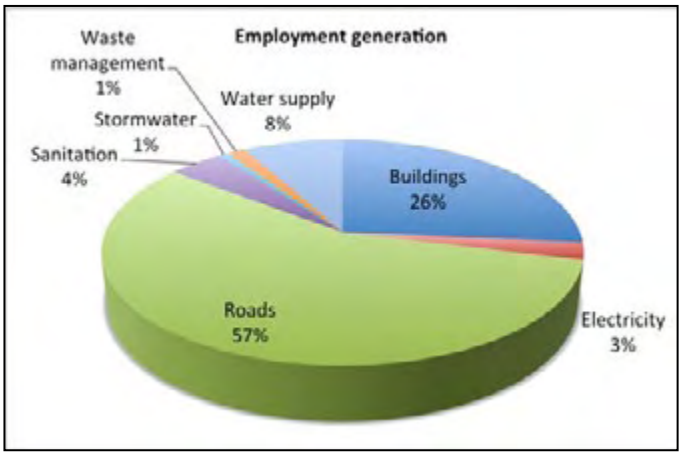
4.4 Types of Infrastructure works

Infrastructure works carried out as part of the EPWP consist of building works, electricity supply, road works, sanitation, storm water drains, waste management and water supply. Building works was the most common type of infrastructure works in the programme constituting nearly 61 percent of total expenditure during the last financial year. It includes construction and repair of low-cost housing, schools, hospitals, clinics, community centres and other public buildings.

EPWP infrastructure works								
Type of work	No. of projects	Portion of total expend.	Total expenditure	LI	FTE	W/O	Average employm. months	Expend. per FTE
Buildings	894	60.8	13,815,171,893	2.6	21,523	71,321	3.6	641,890
Electricity	574	1.0	222,593,366	23.1	2,011	8,971	2.7	110,692
Roads	1,262	27.7	6,429,835,937	11.1	46,089	142,898	3.9	139,509
Sanitation	235	3.6	815,884,302	8.0	3,586	13,118	3.3	227,536
Stormwater	79	1.5	343,805,346	3.7	573	1,879	3.7	599,714
Waste management	55	0.2	51,484,479	38.5	1,188	3,925	3.6	43,327
Water supply	391	5.2	1,175,064,748	11.6	6,474	24,547	3.2	181,498
Total Infrastructure	3,490	100.0	22,853,840,071	5.8	81,444	266,659	3.7	280,608

Financial year 2010/11

Building works record the lowest labour intensity rate at 2.6 percent. At this low level, it would be fair to conclude that the building works contain no or very little labour-intensive work activities. Being the largest component within the infrastructure sector, it has a significant impact on the total labour intensity rate. The low labour input also results in a very high cost to create a job at a rate of R 642,000, which is more than twice the sector average.



The second largest component in the EPWP infrastructure sector is the road works programme, covering 28 percent of total expenditure on infrastructure. Although this component is only half the size of the building works programme, it generates more than twice the amount of employment. Road works contribute 57 percent of total employment in infrastructure and 22 percent of all employment generation in the EPWP as a whole.

It cost R 139,500 to create a full year job in the road sector, which is less than most of the other infrastructure sectors (except waste management). In comparison, it cost five times more to create a job in the building sector.

Other types of works include power supply, sanitation, storm water works, waste management and water supply, however each of these are small in comparison, covering the remaining 11 percent of the programme expenditure on infrastructure.

Sanitation works cover piped systems, treatment facilities as well as construction of latrines. Similarly, water supply works include both large and small systems. Both of these components have a labour intensity rate similar to the road works programme.

Power supply, although a small component of the programme reports a high use of labour with a labour-intensity rate of 23 percent. This is mainly due to the fact that the large works on power stations and high voltage transmission lines are not included in the reporting.

Waste management is the smallest component of the civil works programme, mainly consisting of rubbish collection in public areas.

4.5 Labour intensity of road works

A total of 46,089Person years of employment was created as a result of applying labour intensive work methods in road works during the last financial year (2010/2011). At an average daily wage rate of R 75, it cost the programme R 139,500 to create one year of employment for one person.[3] During the same period, the road works programme produced 142,898 work opportunities, at an average duration of 3.9 months.

The road works activities under the infrastructure component of EPWP achieved a labour intensity of 11.1 percent. For a public works programme, which aims to use labour-intensive works technology as a means of creating employment, this result is low compared to what would be common practice in such programmes in other countries where labour intensity rates are in the range of 30 to 50 percent.

The overall labour intensity rate is lower for road construction works than for maintenance. The average LI for construction works is only 4.7 percent, indicating that the road construction is essentially a conventional equipment based works programme. Technical staff in the provincial road works departments visited during the study period also confirmed this conclusion. With few exceptions, very limited changes have been made to the work methods applied on construction works, which continues to rely on heavy construction equipment with very limited labour inputs. Only a fifth of all the employment is generated on construction works despite the fact that nearly 75 percent of funds are used for this purpose.

Road works programme											
Province	Construction/Upgrading			Maintenance			Total				Exp/job R/FTE
	Expenditure	LI	FTE	Expenditure	LI	FTE	Expenditure	LI	FTE	W/O	
Eastern Cape	483,643,994	2.9	1,072	146,029,516	84.0	8,801	629,673,510	23.8	9,874	31,054	63,773
Free State	522,667,057	3.5	782	140,542,022	28.3	1,536	663,209,079	8.8	2,318	4,801	286,103
Gauteng	753,967,618	6.7	4,017	118,818,489	21.7	1,884	872,786,107	8.4	5,900	12,883	147,926
KwaZulu-Natal	1,224,198,532	4.2	2,963	290,322,439	74.3	16,101	1,514,520,971	17.7	19,064	56,216	79,442
Limpopo	170,624,501	8.4	904	59,193,311	30.1	1,489	229,817,812	13.5	2,392	13,202	96,072
Mpumalanga	554,147,693	3.0	822	482,029,180	6.4	1,973	1,036,176,873	4.5	2,795	6,769	370,768
Northern Cape	35,607,374	9.2	224	29,827,985	8.9	293	65,435,359	9.1	518	4,006	126,418
North West	236,406,174	5.3	518	175,403,155	3.1	392	411,809,329	4.4	910	4,919	452,527
Western Cape	634,510,787	5.6	1,244	371,896,110	8.2	1,075	1,006,406,896	6.6	2,318	9,048	434,122
Total	4,615,773,731	4.7	12,545	1,814,062,206	27.4	33,544	6,429,835,937	11.1	46,089	142,898	139,509

Source: EPWP MIS database 2010/11

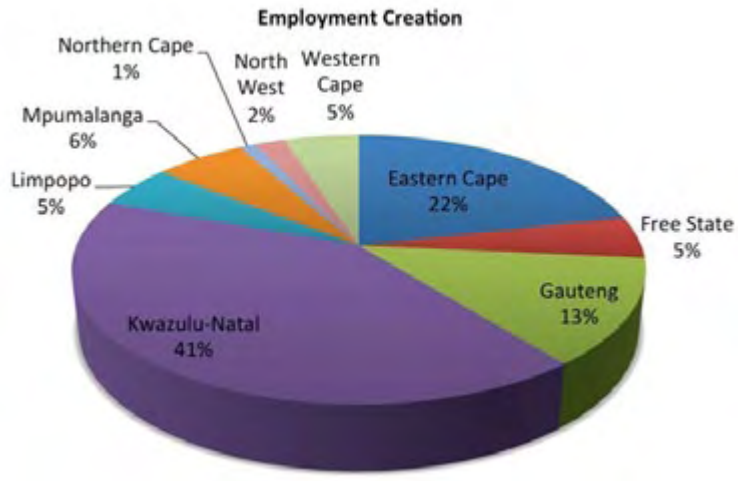
73 percent of all employment under the road works component is created on road maintenance works. Road maintenance, due to its nature, is more compatible to the use of labour. Still, this component as a whole has only reached a total labour-intensity rate of 11.1 percent.

As compared to the construction works, the employment generation from road maintenance varies significantly between the provinces. Eastern Cape, KwaZulu-Natal and more recently Limpopo Province have established large-scale lengthman systems for routine maintenance works, thereby increasing the labour component in their programmes, which is the main reason for the higher overall labour component in road maintenance. Since labour-intensive methods are mainly used for routine maintenance and not used to any noticeable extent on

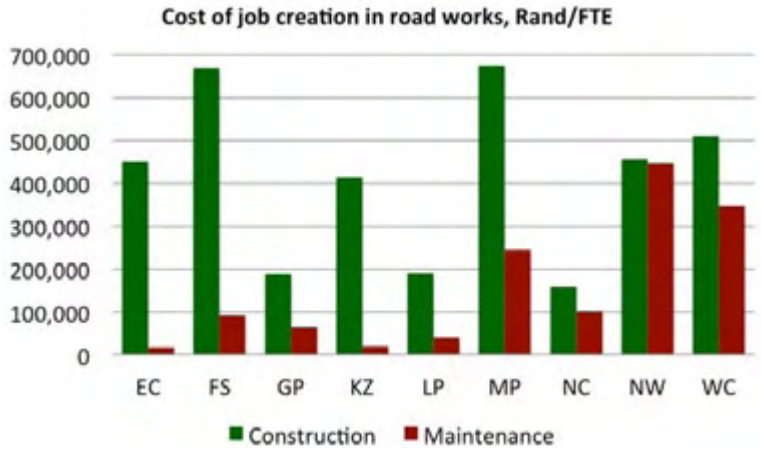
[3] A full work year has been calculated on the basis of 230 workdays in conformity with EPWP practice.

periodic maintenance works, the overall LI figures for maintenance remain low in all provinces and the country as a whole.[4]

Of the total reported Personyears (or FTEs) generated in the road works programme, the highest contributions was in KwaZulu-Natal with 41%, followed by 22% in the Eastern Cape and 13% in Gauteng, with all the other provinces contributing between 1% and 6%. The high employment numbers in Kwazulu-Natal and the Eastern Cape are due to the large number of workers employed in their lengthman systems established for routine maintenance works.



There is a wide variation in the cost of job creation in the provinces. These figures essentially follow the labour intensity rates. The lowest cost to create one full-time job for a year is achieved in Eastern Cape at a rate of R 64,000 per FTE as compared to the highest rate in North West Province where it costs on average R 452,000. There is also a significant difference between construction and maintenance works. The overall average job creation cost for maintenance works is 54,000 R/FTE as compared to 368,000 R/FTE for road construction works.



[4]For comparison, the Roads 2000 programme implemented in Western Kenya reached a LI rate of 50 percent during the same period. This programme is essentially a road maintenance programme consisting of both periodic and routine maintenance works.

On average, each road works project generated 111 work opportunities. The road construction projects have on average generated 55 work opportunities. For maintenance projects, the average is higher at 209 persons employed. Equally, the maintenance works creates on average 70 work years of employment as compared to an average of 16FTEs on the construction projects.

Employment generation										
Province	Number of projects			Average FTE per project			Average W/O per project			Av. empl months
	Constr	Mtnce	Total	Constr	Mtnce	All	Constr	Mtnce	All	
Eastern Cape	146	26	172	7.3	338.5	57.4	37	986	181	3.8
Free State	58	59	117	13.5	26.0	19.8	45	37	41	5.8
Gauteng	85	21	106	47.3	89.7	55.7	109	173	122	5.5
KwaZulu-Natal	88	29	117	33.7	555.2	162.9	120	1,573	480	4.1
Limpopo	105	40	145	8.6	37.2	16.5	32	246	91	2.2
Mpumalanga	95	128	223	8.7	15.4	12.5	21	37	30	5.0
Northern Cape	41	37	78	5.5	7.9	6.6	53	50	51	1.6
North West	52	17	69	10.0	23.1	13.2	48	143	71	2.2
Western Cape	114	121	235	10.9	8.9	9.9	44	33	39	3.1
Total	784	478	1,262	16	70	37	55	209	113	3.9

The main conclusion from the above tables is that labour-intensive work methods are at present mainly used for routine maintenance, while construction works and periodic maintenance still utilise conventional equipment-intensive work methods with very limited employment generation. The higher employment generation figures from Kwazulu-Natal and Eastern Cape clearly shows that there is great potential for increasing employment in the other provinces.

The labour-intensive routine maintenance activities have a significant impact on the total employment generation in the road works component. At present, 75 percent of the employment is generated from maintenance works. As labour-intensive maintenance is only taking place on a significant scale in three out of nine provinces, there is considerable scope for increasing the employment generation in the maintenance works.

Although increasing employment in the routine maintenance programme of the provinces is the easiest measure to boost employment in the programme, further efforts should also be made to increase employment in road construction and periodic maintenance where the potential seems close to untapped at this stage.

4.6 Urban versus rural road works

The following table describes the distribution of expenditure and employment on road works in rural and urban areas.[5]

Province	URBAN				RURAL			
	Maintenance		Construction		Maintenance		Construction	
	Expenditure	FTE	Expenditure	FTE	Expenditure	FTE	Expenditure	FTE
Eastern Cape	134,596,651	8,127	66,682,684	189	17,433,420	676	369,206,241	320
Free State	23,265,000	403	483,089,339	652	116,963,582	1,111	39,577,718	130
Gauteng	72,211,889	583	658,714,659	1,381	13,119,638	28	8,413,525	44
KwaZulu-Natal	144,554,114	8,041	305,030,422	1,265	145,768,325	8,060	918,896,778	1,688
Limpopo	15,379,127	348	33,350,572	101	34,239,554	570	130,126,235	520
Mpumalanga	117,134,435	265	60,585,846	185	364,894,744	1,707	492,563,847	632
Northern Cape	3,579,519	38	5,308,610	34	22,216,367	58	29,519,585	147
North West	11,138,006	118	75,299,063	177	161,944,569	131	160,598,711	319
Western Cape	31,170,476	251	277,225,854	697	340,133,299	795	356,015,692	502
TOTAL	553,029,218	18,174	1,965,287,048	4,682	1,216,713,498	13,136	2,504,918,332	4,302

Source: EPWP MIS database 2010/11

Approximately 60 percent of the expenditure on road works activities takes place in rural areas, while only 43 percent of the employment is generated on works in rural areas. As opposed to most labour-intensive road works in other countries, a major portion of the employment intensive road works in the EPWP apparently takes place in urban areas.[6]

28 percent of the total expenditure is spent on maintenance works. 69 percent of the total maintenance expenditure is carried out in rural areas.

The distribution of expenditure and employment follows significantly different patterns in the provinces. In Eastern Cape the majority of employment is generated from road maintenance in urban areas. In Kwazulu-Natal the employment is mainly generated from maintenance works evenly distributed in urban and rural areas. Only Mpumalanga seems to follow the international trend of generating more employment in the rural areas. In Gauteng, there is as expected limited employment from work in rural areas, however, the majority of jobs are generated on construction works.

In most provinces, more than two thirds of total expenditure on roads is spent in rural areas with the exception of Gauteng (3%) and Free State (24%). Similarly, all provinces except Gauteng and Free State spend a majority of their construction budgets in rural areas.

Most provinces spend more on maintenance in the rural areas with the exception of Eastern Cape and Gauteng. In Eastern Cape, the portion of the expenditure on maintenance in rural areas was surprisingly low at only 11 percent. Considering the vast rural areas in Eastern Cape, it would have been expected that the distribution would be more in line with the national average, somewhere above 60 percent. KwaZulu-Natal has an even distribution of its maintenance works between urban and rural areas. The remaining provinces spend more than 60 percent of the maintenance budget in rural areas with North West and Western Cape above 90 percent.

[5] Each of the projects are classified in the MIS as urban, rural or both. In order to give a clearer picture of the overall situation, the expenditure and employment on projects classified as both urban and rural have been distributed evenly under the urban and rural columns.
[6] The exact distribution of the employment figures between urban and rural areas is not clear as a major portion of the labour-intensive works in Kwazulu-Natal is recorded as both urban and rural. Even if these figures are disaggregated, there remains a significant amount of employment generated from urban projects.

4.7 Road works in Provincial Road Departments (PRDs)s versus municipalities

Provincial Road departments carried out two thirds of road works expenditure during the last financial year.[7] Municipal authorities implemented the remaining one third. In terms of number of projects, there seems to be an even distribution of road works projects between municipalities and provincial works departments. Projects managed by the provincial departments are roughly twice the size of the works projects carried out by the municipalities. The average annual expenditure on projects managed by provincial works departments is R8.0 million compared to R 3.7 million in municipalities.

Employment generation is four times higher among the PRD projects. The labour intensity rate is 13 percent for road works under the provincial departments and 9 percent for works carried out by the municipalities. The difference is due to the fact that the provincial departments manage most of the lengthman programmes.

The Provincial Roads departments carry out the majority of road maintenance projects. Of a total of 410 maintenance projects, municipal authorities carried out only 69. Metropolitan authorities carry out a majority of the municipal maintenance projects. If these are deducted from the total amount of maintenance projects in the municipalities, there are very few left. This most probably reflects the different condition of the road networks managed by PRDs and smaller municipalities. While the PRDs are in charge of well-developed road networks, the main challenge of smaller municipalities is yet to establish reasonable road and street networks. Hence the heavy emphasis on construction works. Municipalities spend 12 times more on construction works than on maintenance.

Province	Provincial Road Departments								Municipalities							
	Maintenance				Construction				Maintenance				Construction			
	No.	Expenditure	LI	FTE	No.	Expenditure	LI	FTE	No.	Expenditure	LI	FTE	No.	Expenditure	LI	FTE
Eastern Cape	9	132,846,805	92.8	8,600	13	272,072,421	1.2	136	17	13,182,711	31.3	201	133	211,571,574	13.2	936
Free State	58	140,228,582	28.3	1,514	3	4,018,475	33.4	56	0				55	518,648,582	3.3	726
Gauteng	0				4	51,247,990	26.8	538	12	85,331,527	21.7	610	49	615,862,641	5.1	887
KwaZulu-Natal	28	290,184,844	74.3	16,100	68	1,128,596,382	1.8	689	1	8,614,810	98.3	622	16	95,330,817	32.9	2,264
Limpopo	18	44,997,930	33.1	913	2	22,852,562	3.7	25	3	4,620,751	0.9	6	76	140,624,245	9.2	596
Mpumalanga	122	466,175,847	6.5	1,955	45	471,310,139	2.3	551	6	15,853,333	1.8	17	49	81,839,554	7.0	265
Northern Cape	14	20,387,203	6.4	63	9	11,126,259	11.4	69	6	5,408,683	18.4	33	23	23,701,936	8.2	112
North West	6	166,430,228	2.0	161	6	107,477,535	4.5	132	6	11,296,096	17.9	123	38	123,776,489	6.2	331
Western Cape	86	362,446,421	7.7	949	31	470,972,818	4.8	751	18	8,857,354	26.9	96	61	162,268,728	8.0	448
TOTAL	341	1,623,697,860	28.1	30,255	181	2,539,674,581	3.1	2,948	69	153,165,265	24.0	1,508	500	1,973,624,566	7.5	6,565

Source: EPWP MIS database 2010/11

When looking at the performance at province level, there are PRDs and municipalities that reach reasonable degrees of labour intensity in their works programmes. KwaZulu-Natal and Eastern Cape record the highest LIs due to their lengthman based routine maintenance activities. Municipalities in KwaZulu-Natal also have a high labour intensity on their road construction works at a rate of 33 percent. Although they have few projects, the PRDs in Free State and Gauteng have achieved good labour intensity on their construction projects. Municipalities in Gauteng, Northern Cape, North West and Western Cape record a LI rate around 20 percent for its road maintenance works.

Mpumalanga record a consistently low LI both for maintenance and construction in PRDs and municipalities.

[7]Works on provincial roads are essentially carried out by provincial road departments. In some provinces this work is under the responsibility of dedicated road works agencies while in most provinces this mandate is vested with a provincial publicroads and transport department. The reference to a PRD is merely indicating that the works is under the jurisdiction of a provincial roads authority.

4.8 Large versus small road works projects

The EPWP has a sub-programme dealing with employment generation in large-scale infrastructure works programmes. For this reason, an analysis has been carried out to compare large and small projects.

There are 95 "large projects" with a budget of more than R30 million in last the financial year. 77 of these are road construction projects. The majority of the large projects were implemented in the Eastern Cape, Gauteng and KwaZulu-Natal.[8] Northern Cape had the least number of large projects, reporting only one.

Roughly two thirds of total expenditure on road works is on large projects. The average expenditure on each of the large projects last year was R 41 million as compared to 2.5 million on small projects.

Employment generation is evenly distributed between large and small projects. The average labour intensity of large projects is 9 percent and slightly higher at 15 percent for small projects. If the large maintenance projects in Kwazulu-Natal are excluded from the large projects, the respective LI drops to only 3 percent. The conclusion would therefore be that most large projects have very limited use of labour-intensive work methods.

Province	LARGE PROJECTS								SMALL PROJECTS							
	Maintenance				Construction				Maintenance				Construction			
	No.	Expenditure	LI	FTE	No.	Expenditure	LI	FTE	No.	Expenditure	LI	FTE	No.	Expenditure	LI	FTE
Eastern Cape	1	7,682,711	9.2	18	7	294,480,858	1.5	145	23	144,347,360	88.0	8,785	74	137,451,459	5.9	361
Free State	0	-	-	-	5	329,684,281	2.4	303	58	140,228,582	28.3	1,514	53	192,982,775	5.3	479
Gauteng	2	21,477,519	6.1	33	15	570,626,327	6.2	1,098	10	63,854,008	26.9	577	39	96,501,857	10.1	327
KwaZulu-Natal	5	286,949,795	74.9	3,513	20	1,155,478,363	3.4	15,034	24	3,372,644	25.7	37	63	67,877,060	17.9	470
Limpopo	0	-	-	-	3	23,067,287	4.0	28	20	47,671,296	28.9	847	75	140,409,520	9.1	593
Mpumalanga	0	-	-	-	8	416,869,164	1.4	293	128	482,029,180	6.4	1,973	86	136,280,530	7.7	524
Northern Cape	0	-	-	-	1	377,916	15.6	1	20	25,795,886	8.9	96	31	34,450,278	9.1	180
North West	2	154,902,699	1.2	48	3	95,720,685	3.0	89	10	18,179,876	18.7	202	42	140,177,089	6.9	408
Western Cape	8	139,998,130	3.9	156	15	422,017,474	4.9	656	97	231,305,645	10.8	889	76	211,224,072	7.2	543
Total	18	611,010,854	36.7	3,768	77	3,308,322,356	3.6	17,648	390	1,156,784,478	22.5	14,919	539	1,157,354,640	7.9	3,884

Source: EPWP MIS database 2010/11

[8] In Kwazulu-Natal, several Zibambele road maintenance projects have total budgets above 30 million Rand.

4.9 Construction of sidewalks and block pavement

Several provinces have used construction of sidewalks to train and develop local small-scale contractors in the use of labour intensive work methods. Equally, concrete block pavement works have been used to generate additional employment when upgrading streets. The table below shows the employment generated in such projects during the last financial year.

A first observation from these figures is that this type of works does not constitute a major part of the total road works programme. The expenditure on sidewalks is 1.2 percent of the total expenditure for road works last year. Projects including concrete block paving works constituted 0.3 percent of the same total.[9] As a result of this, the total employment creation is also limited at 740 Person years.

Province	Sidewalks					Block Paving				
	No.	Expenditure	LI	FTE	Exp/FTE	No.	Expenditure	LI	FTE	Exp/FTE
Eastern Cape	6	1,044,650	27.5	13	80,817	4	2,969,172	18.4	32	93,345
Free State	1	2,063,110	20.4	16	129,578	2	2,097,638	8.8	10	219,998
Gauteng	4	26,285,655	22.9	284	92,704	0	-	-	-	-
KwaZulu-Natal	14	21,308,331	15.6	144	148,333	0	-	-	-	-
Limpopo	1	784,704	7.5	3	229,913	5	8,818,010	9.3	37	239,592
Mpumalanga	4	2,634,000	29.5	34	76,657	0	-	-	-	-
Northern Cape	0	-	-	-	-	3	724,935	22.3	9	81,215
North West	2	9,468,444	4.5	15	644,493	1	1,066,330	24.4	14	77,392
Western Cape	11	10,450,361	22.8	101	103,791	2	4,858,743	16.1	30	164,461
Total	43	74,039,255	18.5	609	121,536	17	20,534,828	13.4	130	157,481

Source: EPWP MIS database 2010/11

As intended, the works on sidewalks and block paving seems to generate higher employment outputs than the average in the road sector. In many provinces, the sidewalk construction has achieved LI rates from 20 to 30 percent. Considering the fact that materials constitute a significant portion of the total costs, these LI rates are at optimal levels. The cost of creating employment in sidewalk construction is R 122,000 per full-time work year, which is very close to the average for the road sector as a whole.

The block paving works are on average generating less employment at an average of 13 percent, however some Northern Cape and North West have achieved LI rates at 22 and 24 percent. These rates can probably be increased further as the current practice is to use manual works methods only for the pavement works. More labour-intensive work methods can also be introduced for the construction of the base course and drainage.

Still, these two types of projects demonstrate positive results in terms of the use of labour intensive work methods in the programme.

[9]The projects listed here consist of all projects in which the data records identified such works. There are probably additional projects in which such activities formed part of the works, which are not included in these calculations.

4.10 Historical trends

During the first phase of the programme, the infrastructure sector on its own produced more than one million work opportunities. Each job had an average duration of 3.5 months. The road sector produced 42 percent of the jobs and also 42 percent of the total Persondays generated in the sector.

The road works component is increasingly providing the employment generation in the infrastructure sector. Road works have provided 50 percent of employment within the sector during the two first years of the second phase and 57 percent during the last financial year.

The average duration of employment during the first phase was 3.4 months in road works. During the last financial year, it increased to 3.9 months. With an increase in the labour intensive routine maintenance works, this figure may continue to grow.

	Year	Road Works Component								Total Infrastructure						
		No. of proj.	Portion of Infra. Expend.	Expenditure	LI	FTE	W/O	Exp/FTE	Av. Dur. Empl.	No. of proj.	Expenditure	LI	FTE	W/O	Exp/FTE	Av. Dur. Empl.
Phase II	2010/11	1,262	27.7	6,429,835,937	11.1	46,089	142,898	139,509	3.9	3,490	22,853,840,071	5.8	81,444	266,659	280,608	3.7
	2009/10	745	24.9	6,054,945,922	9.0	34,006	117,427	178,057	3.5	2,450	24,350,160,865	5.4	78,419	261,662	310,514	3.6
	Total					80,095	260,325						159,863	528,321		
Phase I	2008/09	1,331	26.8	5,539,730,729	11.6	38,343	130,186	144,477	3.5	9,603	20,696,333,405	9.0	118,582	398,733	174,532	3.6
	2007/08	1,045	37.5	4,335,803,933	9.8	31,138	95,143	139,246	3.9	2,813	11,539,352,289	9.6	77,816	251,271	148,290	3.7
	2006/07	826	60.4	3,358,629,487	7.8	21,408	81,762	156,888	3.1	1,696	5,560,385,728	7.6	32,779	150,854	169,634	2.6
	2005/06	652	68.5	1,040,490,350	24.3	22,261	77,672	46,741	3.4	1,146	1,512,143,399	21.8	28,224	109,357	53,577	3.1
	2004/05	458	32.6	805,900,175	21.0	15,245	61,850	52,864	3.0	1,915	2,471,784,406	26.1	50,554	158,277	48,894	3.8
	Total			15,080,554,676		128,395	446,613		3.4				307,954	1,068,492		3.5

Source: EPWP MIS database

The level of labour intensity of the road works component seems to be fairly constant during the last 5 years of the programme, varying from 8 percent to slightly above 11 percent during the last financial year.[10] Taking into account the quality of reporting, it seems as if there has been no substantial change in the extent to which labour-intensive work methods has been utilised in the road works programme during this period. This is interesting as the trend for the infrastructure sector as a whole shows a drop in the LI rates.

It is also worth noting that the cost of creating one Full Time Equivalent (FTE) in the road sector is now lower than most of the earlier years during this period. This implies that the increase in jobs created in the roads programme is not only due to an increase in budgets but also due to an increased use of labour-intensive work methods in the road works programme. This is a positive trend within the road sub-sector. However, in the infrastructure sector as a whole, the cost of job creation is increasing.

It is also worth noting that although the portion of expenditure on road works within the infrastructure sector has decreased (constant during the last three years) the road sub-sector's contribution to employment generation is growing.

[10] The results from the first two years of the programme show substantially different LI rates, which is most probably due to the fact that more selective reporting was carried out during the initial years, essentially not reporting on projects which did not use any labour-intensive work methods. The last five years seem to have more consistency in its reporting.

4.11 Reaching Phase II targets

The first phase of the programme reached its target of creating one million work opportunities of employment by the end of March 2009. In the second phase the targets have been increased to 4.5 million work opportunities, estimated at the equivalent of 2 million work years (FTEs).

At the time of this study, the programme is half way through the second phase, and it is therefore appropriate to assess whether it is on schedule to reach its current targets. The table below describes outputs of employment so far in the entire programme as compared to the planned targets.

Year	Planned EPWP total			Actual		Acc. Progress	
	FTE	% increase	W/O	FTE	W/O	FTE	W/O
2009/2010	210,870		550,000	134,851	625,859	-76,019	75,859
2010/2011	260,870	24	642,000	209,058	643,116	-127,832	76,975
2011: 6 months	180,870		434,000	100,000	308,000	-208,702	-49,025
2011/2012	361,739	39	868,000				
2012/13	502,174	39	1,210,000				
2013/14	684,783	36	1,650,000				
Target 2nd Phase	2,020,436		4,920,000	0.4 mill.	1.6 mill.		

The current figures indicate that in terms of work opportunities, the progress so far is pretty much as planned, short of 50,000 jobs. As mentioned earlier though, the work opportunities are not an exact unit of measure so it is preferred to deal with the actual workdays or years of employment generated. As shown in the table above, the programme is behind schedule with a total of 208,000 Person years or 68 percent of planned employment generation by the middle of Phase II. This shortage is equivalent to the total employment generation last year. In essence, it seems as if the planned increase in employment has not taken place to the extent desired.

For the infrastructure sector the total employment targets for Phase II have been set at 2,374,000 work opportunities, equivalent to 900,000 FTEs.

The infrastructure sector generated 78,419 Person years in 2009/10 and 81,444 work years in 2010/11. If the employment generation in the infrastructure sector continues at the same rate as the last financial year, this will result in 404,195 FTEs for infrastructure works by the end of Phase II, which is only 45 percent of the planned target. This implies that an additional 495,805 work years needs to be generated between now and the end of Phase II, which is more than a doubling of the employment generation during the remaining period.

If the road sub-sector is expected to continue to cater for 57 percent of employment generation in the infrastructure sector, this implies that some 282,000 additional work years need to be generated through road works – or 94,000 additional FTEs in each of the remaining three years. Road works generated 46,089 FTEs during the last financial year.

The increase in employment outputs can be secured through two approaches, either through a substantial budget increase while maintaining LI rates at current levels or by a significant increase in the use of labour intensive work methods. An increase in the infrastructure budgets to the extent required to meet the planned increase in employment outputs seems unlikely. Therefore, a substantial portion of the planned increase in employment needs to come from an increased use of labour intensive methods within the current budget frames.

4.12 Quality of Works

South Africa has been known for a long time as having the best paved road network on the continent. The urban road systems are similar to road and street networks in developed countries. The highways and other strategic roads are well maintained and stretch across vast distances. South African consultants and contractors seem to be carrying out first class work when involved in upgrading or rehabilitation of such roads. Engineers, technicians and plant operators are proficient in work standards, materials technology and quality assurance. Except for routine road maintenance and a few pilot projects, most road works in South Africa is at present carried out using machine based work methods. The general consensus is that the machine-based works is of high quality applying sound work standards and technology.

For the unpaved road network, the situation is more mixed. The country has an extensive gravel road network of nearly 600,000 km. Similar to other developing countries, not all of this network receives sufficient and timely maintenance. On many of these roads traffic is increasing, and therefore require upgrading to higher standards. In several provinces, it is hard to obtain good sources of gravel for resurfacing, which is an added justification for upgrading to bitumen-based surface standards. There is also a huge backlog of roads in need of maintenance, rehabilitation and upgrading works in the former homelands.

At present, the employment generation in the road sector is achieved through two main principles, (i) by carrying out a minor part of conventional equipment-based road works using labour and through (ii) routine maintenance carried out using manual labour. In the past, there has been a number of trial projects carried out both in urban and rural areas. A number of these are well documented and all tend to conclude that quality of work is adequate and that the technology is feasible.[11] Among the more significant programmes of the past, it is worth mentioning the Gundo Lashu programme in Limpopo Province in which local contractors were trained in the construction of provincial roads.

Creating jobs in Machine-based Construction Works

A key strategy of the EPWP is to increase the use of labour-intensive work methods in existing civil works programmes and thereby generate more employment. As compared to programmes elsewhere where all works are carried out using labour-intensive methods, the EPWP is a programme in whichasignificant part of the labour-intensiveactivitiesare carried out on works projects which predominantly use machine-based construction methods. Current policy is that all civil works projects should make efforts to generate additional employment opportunities for people living in the local communities adjacent to the roads. A common practice is therefore to select some work activities for the purpose of creating temporary jobs, such as clearing works, cleaning activities, additional labour for traffic management, minor drainage works, etc.

In general, the employment generation from this approach is low. Some projects have taken the challenge of additional job creation more seriously by setting aside slightly larger portions of work which are let out to small-scale contractors who have graduated from the Vukuphile contractor training programme. A common work activity organised in this manner is the construction of sidewalks.

All such labour-intensive works have been carried out to sound quality standards.

[11] Ref: Employment and High-Standard Infrastructure, Robert McCutcheon and Filip LM Taylor Parkins, 2003

The road construction carried out using labour-intensive work methods has also proved to be of good quality. Although the sample on which such assessments can be made is much more limited, the literature as well as impressions from field visits lead to the conclusion that roads built using a high degree of manual labour is of high quality and adequately caters for the current traffic volumes in a similar manner as on roads built using conventional machine based work methods. The best evidence is found in Limpopo, where roads constructed using labour-intensive work methods during the Gundo Lashu programme remain in very good condition.

Road built by the Gundo Lashu programme with Otta Seal

The Gundo Lashu programme has however been terminated. This was the only programme of a significant size that utilised labour as the main means of constructing and upgrading roads. Currently, there are a few on-going road construction projects which rely entirely on labour-intensive methods, however, as they are few in numbers they have the features of a pilot project.

Community road construction project in Eastern Cape

Labour-intensive work methods have for many years been used for routine maintenance of roads. This practice was first started on a grand scale in KwaZulu-Natal under its Zibambele programme and has since been replicated in other provinces. The main emphasis of these schemes is off-road maintenance activities mainly occupying people on cutting grass in the road reserves and to some extent cleaning the drainage systems. A major concern in relation to these routine maintenance schemes is the limited scope of works carried out. With additional training and strengthened supervision, these routine maintenance programmes could carry out more maintenance activities crucial to the lifespan of the road assets.

A good example in this respect is the use of small-scale contractors hired to carry out routine maintenance in the Western Cape Province. These contractors have received more comprehensive training, some through the Vukuphile programme, and are therefore qualified to carry out more sophisticated works such as pothole patching, shoulder repairs, fixing road furniture, gabion works and erosion control.

Routine maintenance in Limpopo

4.13 Increasing labour-intensive road works

An attempt has been made to explore how additional labour-intensive road works can be initiated to meet the projected shortfall in employment generation mentioned in Chapter 4.11. In brief, the following options are available:

(i) Continue to expand Zibambele type road maintenance activities. There is still a large potential for expanding these schemes to roads where machine-based work methods are used and on roads currently not receiving adequate maintenance.

(ii) Start Gundo Lashu type (Labour-intensive Contractor Development) programmes in all provinces. At present, there is very little labour-intensive road construction works taking place. True to the original intentions of the EPWP, a rural roads improvement programme could improve access in the rural areas and also generate employment in poor communities.

(iii) Shift emphasis of funding from urban first world infrastructure towards more support to improving road access in poor rural areas and townships. There is a large demand for improvement of infrastructure in such areas and the EPWP could be the appropriate vehicle in the long-term for addressing such needs. Furthermore, labour-intensive work methods are more appropriate for improving access roads and streets, rather than highways.

(iv) Increase periodic and routine maintenance in poor rural areas. Access to many rural areas is worse during the rainy season during which many communities are isolated. With spot improvement and period maintenance works, access roads in rural areas can be kept open throughout the year.

(v) Increase the amount of labour-intensivework activities in projects which mainly useconventional machine based methods; and

(vi) Develop and implement a clearly defined labour-intensive rural road works programme with specific outputs for employment as well as physical works - with ring-fenced funding.

In relation to the approaches mentioned above, there is a need to provide detailed guidance to managers, consultants, and contractor staff on how to carry out the works using labour-intensive work methods.

Ring-fencing of funding against clearly defined work outputs was done in the Gundo Lashu programme and is in effect taking place in the routine maintenance schemes in several provinces. This arrangement would be an effective approach for establishing clearly defined rural access road improvement programmes. The planning of such programmes should be based on functional targets relating to providing all-weather access to rural villages, which in turn is translated into a works programme of improving a defined length of rural roads. Once the physical works programme and budgets have been established, targets are also set in terms employment generation based on clearly defined work methods in which labour-intensive works technology is made mandatory.

The options identified above can be combined in a number of arrangements with varying emphasis on each of the approaches. The table below describes one version, put together through calculations in a simple spreadsheet. The exact combination of the various approaches would eventually need to be developed at province and municipal levels to fully reflect already on-going activities, the specific features of the respective networks and local political priorities.

Additional labour-intensive road works for the remaining part of Phase II						
Activity				**Employment**		**Cost**
Construction of rural roads	5,000	wd/km				
300km in each province	1,150,000	R/km				3,105,000,000 R
Total	2,700	km		58,696	FTEs	
Routine road maintenance						
12 workdays per month	30,000	km				
1 person per 2 km	2,160,000	wd				
	9,391	FTEs				
5 new provinces 2012	FS, GT, NC, NW, WC			46,957	FTEs	889,411,765 R
5 same provinces 2013				46,957	FTEs	889,411,765 R
Municipal roads 2012	120,000	km		37,565	FTEs	711,529,412 R
Municipal roads 2013	150,000	km		46,957	FTEs	889,411,765 R
Increase in Mpumalanga	7000	FTEs/year				
2 years				14,000	FTEs	265,176,471 R
Increase in Limpopo	6000	FTEs/year				
3 years				18,000	FTEs	227,294,118 R
Increase in Eastern Cape	3000	FTEs/year				
rural areas 2 years				6,000	FTEs	113,647,059 R
Total maintenance				216,435	FTEs	3,985,882,353 R
Labour maximisation						
Currently 2010/11	14,000	FTEs				
2012	39%	increase		5,460	FTEs	
2013	36%	increase		7,006	FTEs	
Total				287,596	FTEs	7,090,882,353 R
Required increase in road works to reach target				282,000	FTEs	
Expenditure roads 2010/2011						6,429,835,937 R

Total Cost 2012	900	km	Construction	1,035,000,000 R
			Maintenance	1,904,000,000 R
Total Cost 2013	1800	km	Construction	2,070,000,000 R
			Maintenance	2,081,882,353 R

Notes:
The wage rate has been estimated at a flat rate of 70 Rand/day
The labour intensity rate of routine maintenance is set at 85%

In the road construction component, it is suggested that an average of 300 km of rural/access roads are constructed in each of the provinces. The estimated average labour input and cost per kilometre is based on the experience from the Gundo Lashu programmein Limpopo.[12] The roads will be built to bitumen surface standards and expected to cater for traffic volumes in the range of 500 to 2000 vehicles per day using designs and work methods developed in Gundo Lashu.

[12] The figures used are not the average results from the Gundo Lashu, but instead based on a selection of projects from this programme considered as representative for the purpose of these estimates – adjusted to current price levels applying the construction price index published by the South African Federation of Civil Engineering Contractors, (SAFCEC).

Developing contractors for labour-intensive road construction works

Experience from other labour-intensive road construction programmes involving small-scale contractors suggest that each contractor can achieve an average monthly output of 1.5 km of completed road improvement works. Outputs are obviously lower during the initial training stages. However, once they have completed their initial trial contracts, the production rates increase to 2 km per month.

Based on these figures, a contractor would be able to complete on average 36 km of road construction over a period of two years. In order to construct a total of 2,700 km, there would be a need for 75 contractors. This is equivalent to 9 contractors in each province.

The Vukuphile programme has already trained more than 500 contractors. It is envisaged that these contractors may need additional training and capacity development support to take on full-scale road construction works, however, the fact is that these firms provide a valuable human resource asset which with further development can play an important role in a future labour-intensive road construction programme.

Employment in routine maintenance works has been calculated on the basis of an average of one person allocated to a road section of 2 kilometres, working 12 days per month. The need for labour inputs in routine maintenance varies across the country with less input required in the dry and arid areas. However, the total labour input of 9,391 FTEs for a network of 30,000 km corresponds well with current experience from the on-going Zibambele type programmes.[13]

It is suggested that labour-intensive road maintenance programmes are established in the remaining five provinces where such schemes do not exist. The exact implementation arrangements in each of these programmes need to be developed on an individual basis. Some provinces may opt for the lengthman system while others may chose to utilise small-scale contractors some of which have received training through the Vukuphile programme. Equally, the exact length of the road network in the respective provinces needs to be determined locally.

In Mpumalanga there is scope for increasing the size of the labour-intensive routine maintenance programme. A similar scheme is being expanded in Limpopo this year and is expected to produce more employment generation than what was reported during the last financial year. In Eastern Cape, there is a potential for increasing routine maintenance works on roads in the rural areas.

Improving access to poor communities

Labour-intensive road works programmes in other countries are commonly formulated with clear poverty alleviation goals in which the improved infrastructure plays a central role in improving livelihoods. A key element in such strategies is to improve transport access thereby integrating poor communities into mainstream society with better access to social services and economic opportunities.

A similar approach could be applied in the road construction programme suggested as part of escalation of labour-intensive works in the road works programme of the EPWP, in which poverty alleviation is not only sought through the provision of employment but also by directing the construction works to roads currently in a bad condition which are serving communities with high poverty levels. It could then become the intended vehicle "*to build, upgrade and maintain the social and economic infrastructure in all the underdeveloped rural and urban areas of our country without such infrastructure*".

By installing a poverty audit system for road identification and selection into this programme and establishing similar procedures for monitoring and evaluation could safeguard its key objectives and also secure its existence for a long period to come while these road access challenges remain.

[13] It is recognised that there is scope for increasing productivity in some of these programmes, however, any spare labour capacity resulting from such improvements should be redirected into other routine maintenance works as well asspot improvements and periodic road maintenance activities.

Finally, there is considerable scope for expanding this type of routine maintenance on municipal roads both in urban and rural areas.

At present, there are approximately 14,000 FTEs generated through labour-intensive works in the predominantly equipment-intensive road works projects (referred to as labour maximisation in the table above). It is suggested that this approach is continued, and efforts are made to increase the practice of earmarking certain activities for labour-intensive works in these projects. The suggested percentage increases for the next two years are the same as the overall percentage increases for the infrastructure sector as a whole (see table in Chapter 4.11).

From the calculations shown above, it is evident that the highest potential for increasing employment in the programme lies within the routine maintenance works. The suggested road maintenance programme would probably cover most of the existing roads in the country. The cost of creating jobs in routine maintenance is considerably lower that for construction works, so it is the best option in terms of maximising employment generation. It is also a sound approach from an infrastructure asset management point of view. Although, routine maintenance is a cheaper option, it is however important to include a substantial component of road construction works for the purpose of addressing infrastructure investment demands in underdeveloped areas.

The labour maximisation is the component providing the least amount of employment generation. It is currently argued that all road works projects should be generating employment, however, considering its meagre outputs in comparison to the potential in "fully labour-intensive" works projects it can be questioned whether this pursuit is worthwhile.

Still, with the great efforts invested into this process, it would be too risky at this stage to abandon this component. It is still a significant generator of employment and for this reason it is recommended that to continue efforts in this field while the proposed escalation takes place in the other suggested components.

4.14 Institutional issues

Resistance to the use of labour-intensive work methods

Discussions with EPWP management seem to conclude that the resistance to a wider use of labour-intensive work methods is endemic in the programme, ranging from decision makers, project managers, design consultants, contractors and other stakeholders. This phenomenon is not unique to South Africa. The same has been experienced in other countries where labour-intensive works technology was introduced.

There are many reasons for this, ranging from unclear policy direction, lack of guidelines, vested interests, lack of knowledge of the technology and general inertia to adopt new work methods and technology. In the EPWP, there is already very good policy direction. Decisions to use this technology have been taken by the most senior policy makers in the country and are fully supported by a well-resourced central agency dedicated to the implementation of public works using labour intensive work methods. Furthermore, the most senior political bodies in government have reviewed the programme and encouraged a further increase of the application of this technology. The conclusion would therefore be that the limitations or bottlenecks must be somewhere at implementation level.

At implementation level, there have been and still are some good examples of when and where the technology has been successfully used on a significant scale – the most well known being the Zibambele programme and earlier on the Gundo Lashu. From these and other schemes, it is possible to draw certain lessons. First of all, these programmes had solid local political backing when they commenced. Strong support came from both the local political leadership as well as from the management in their respective public works organisations. In other words, there is a need for local champions to drive these schemes.

A second common feature of these programmes, is that they established clear targets in terms of how and what they intended to achieve. Goals were set in terms of physical works outputs and clear guidelines were developed for how to carry out the works. The works followed standardised work methods and technology, which were documented in detail. Consultants had clear guidelines on how the works should be designed and contractors were trained in well-defined work methods that needed to be adhered to throughout the works.

This was supported with purpose specific training based on the standardised works methods and technology applied. Emphasis was given to training in the field where technical staff was given practical on-site training in all relevant work activities. The end result was that all stakeholders became fully conversant with all work activities, having been drilled in skills, techniques and work methods at full-scale work sites used for training and demonstration.

The general situation at present is that most consultants in charge of work design have not had such exposure to labour-intensive technology. Equally, most contractors have not received such comprehensive training. And finally, the decision makers in the technical departments only have scant or at best theoretical knowledge of the technology.

Local champions

In order to establish a substantial labour-intensive rural road works programme in each of the provinces it is necessary to ensure that the right political decisions are made in its favour. This implies that local champions are required at provincial and municipal levels who can take the necessary decisions to establish such schemes and also to secure the required funding. These champions should be at a senior management or political level within the institutions so that they have the necessary authority to influence decisions taken. This is an important lobbying activity which the EPWP management would need to initiate. This

process can be combined with study tours and general orientation training/workshops in (i) the merits of labour-intensive work methods and (ii) the need for improvement of rural/township roads.

In addition, there is also a need for local champions to support such initiatives in the provincial public works organisations who can facilitate the mobilisation of sufficient management resources to implement such a programme.

Labour-intensive works units

In order for the labour-intensive road works programme outlined in Chapter 4.12 to take place, there is a need to create an organisation dedicated to the planning and management of the works implementation. To construct 300 km of rural roads over the next two years in each of the provinces requires dedicated units in charge of works programming, management of the design and planning process and overall supervision of the works.[14] Equally, such units could play a central role in improving the technical quality of new and on-going road maintenance works in which labour-intensive work methods are used.

These units would also be responsible for identifying the road projects, engaging and supervising consultants for the design of the works, act as the representative of the client during works implementation and provide programme management and monitoring of works. The units would be in charge of a specific budget allocated for such works. They would also take charge of coordinating training activities and ensuring that all parties involved in the programme are mobilised and trained at the right time before taking on their respective responsibilities.

For work on the provincial road networks, this capacity can be established within the provincial departments of works and transport. It is however important that the units are staffed with technical personnel who have had past exposure to labour-intensive road works. At present, there is very limited capacity among local road authorities to implement labour-intensive works. In the municipalities, it is safe to claim that there is none. Although there are people in South Africa with expert knowledge and experience in this subject, they are mainly found among some select private consultancy firms.

Although extensive training in labour-intensive work methods has been provided to road agency staff as well as consultants and contractors, most of this training has been of a general and introductory nature and not specific to works currently taking place.

The ideal solution would be to recruit engineers who possess hands-on experience from management and supervision of labour-intensive rural road works in other countries in the region. Local technical staff can be sent for training in labour-intensive road works at specialist training institutions such as the Kisii training centre in Kenya. The current ILO technical assistance should be linked to these units, providing direct implementation support and training.

Most municipalities have limited technical staff and it would be difficult to build the necessary capacity in labour-intensive works technology within these institutions. Instead, it would be more practical for them to rely on the technical capacity of the labour-intensive units established at province level.

[14] In some provinces, this construction programme could include a significant component of improvement of roads and streets in the townships.

4.15 Training

As shown in Chapter 4.13, the two major potentials for increasing employment generation lies in routine road maintenance and the construction of rural and township roads. In order to implement the proposed road works programmethere is a need to improve current training to address the real skills requirements of the staff.The current training programmes provided under the EPWP banner does not cater for the full training needs of client, consultant and contractors staff in order to plan and implement works using labour-intensive technology.

The training needs to be designed to meet the specific skills requirements of the various categories of staff and address their respective roles and responsibilities in the programme. The table below summarises the key staff categories and suggests a first stage of training. At this stage, it is suggested that some of the training is sourced overseas. Eventually, this training capacity should be developed in the country, relying on local experience and linking up with model/demonstration work sites in the provinces.

Training audience	Category of staff	Training
Decision makers	Programme champions	Briefing workshops, ILO course in Turin
Client	EPWP staff	Study tours, training at Kisii and Mt. Elgon, need immediate exposure to labour-intensive road works sites
	PRW technical staff	Extensive technical and practical training. First batch could receive training in Kenya or Uganda before model roads established in-country
	Municipal Engineers	
Consultants	Design Engineers	Training in design options and good knowledge of work methods
	Resident Engineers	Current NQF course needs to be replaced with comprehensive training which includes practical training on a road works site
Contractors	Supervisors/foremen Engineers/contractor	

Define labour-intensive work technology in detail

Training materials and training delivered in currently available courses need significant improvement.Current training material is of too general natureand not relevant to the specific works.

With a dedicated labour-intensive road works programme there is a need to standardise the work programme. The current guidelines and training material available are too general and does not describe in practical and detailed terms how to implement labour-intensive road works. In order to conduct effective training there is a need for clear guidance on how the works is to be carried out. The following measures are therefore recommended:

Infrastructure Design

Extensive research and development has been carried out in South Africa and elsewhere in the appropriate design of rural infrastructure built using labour-intensive works technology.

As a result, there is today a wealth of guidelines and manuals describing best practices, designs and optimal work methods for carrying out this type of works. Standard designs serve to reduce the inputs required during project preparation. Furthermore, they have been developed on the basis of detailed research of materials and work methods and the performance of the built infrastructure during operation and maintenance.

The absence of such guidelines leaves important decisions with the consultants. When the designers hold limited experience in this field, there is a risk of sub-standard designs being applied which may have a detrimental effect on the quality of the works and in turn place the use of labour-intensive technology in a bad light.

- Produce specific manuals and guidelineswith detailed descriptions of design standards and work methods for labour-intensive road construction works. This

literature should be based on the technical documentation produced in the Gundo Lashu programme, other past pilot works in rural areas and townships and relevant ILO literature.

- Prepare detailed design options for consultants and clients. These can then be used for project preparatory works and also as a reference when engaging consultants for design works. The former or present ILO technical assistance staff together with the CSIR could easily assemble a design options manual. CSIR participated in the development of the pave ment designs and work recipes applied in the Gundo Lashu and several other labour-intensive projects in the country.
- Elaborate on these standards in training material with an emphasis on describing technical designs and appropriate work methods.
- Improve current training courses by including sessions during which design standards and work methods are described in detail, combined with a significant component of practical on-site training.

Training for consultants

Private consultants play a major role in both the design and supervision of infrastructure works in the EPWP. In comparison, labour-intensive works programmes in other countries generally rely on in-house human resources for design and work supervision.

The inputs and role of consultants in the EPWP is even more important due to the fact that there are very limited guidelines on how works are to be designed and carried out. Therefore, the complete design and implementation arrangements of projectsare left to the consultants to decide. Considering the limited experience of the consultants in labour-intensive works, combined with a similar lack of capacity within the client agency, the result is that works are essentially designed as conventional machine-based projects.

As mentioned, the training provided to consultants is too short and too general. The current courses would be appropriate as a general orientation course introducing the merits of labour-intensive works technology. It does not provide consultants in any practical training on how to design and build infrastructure using labour-intensive work methods. There exists today in South Africa and elsewhere a wealth of information on how labour-intensive infrastructure works have been effectively implemented including appropriate designs for such works. This experience is not reflected in the current training provided to the consultants.

Training provided by the ILO technical assistance

The training provided by the ILO technical assistance team mainly consists of short orientation courses. As the TA team is not accredited as an official training provider, they do not deliver core training to contractors and consultants.Any training provided by this team will not be considered when assessing the qualifications of technical staff involved in the EPWP.

This appears to be an inefficient utilization of the capacity of this team, considering their extensive experience in the implementation of labour-intensive works technology. Rather than competing with the accredited courses, the experience of the ILO team could be utilised to review current courses with the objective of delivering training more in line with the knowledge and skills needs of the various categories of staff involved in the EPWP.

Future training courses for consultants, contractors and road agency staff need to include a practical component during which the trainees are exposed to actual works.

This experience needs to be synthesised into appropriate formats such as design guidelines and works manuals, which in turn are used as the basis for training of road agency staff and consultants. It may not be possible to make these designs mandatory for the design and implementation of rural infrastructure works. Instead this documentation can however be presented as best practices guidelines. When designs are prepared for new projects, it is then possible to refer to such guidelines and request designers to use these. If

alternative designs are proposed, the onus would then be on the consultant to justify these. This will improve and streamline design works, improve quality of designs and bidding documents and ensure that uniform practices are applied in the works programme.

Contractor training

At present, established contractors only need a short course to qualify for labour-intensive works. This is insufficient. It is only in the Vukuphile programme that theoretical training is combined with practical skills development. This training however needs strengthening in order for such contractors to take on larger works contracts envisaged in the proposed road construction programme. They probably already have sufficient theoretical training, but would benefit from further practical training.

Vukuphile

The Vukuphile labour intensive contractor and supervisor learnership programme was developed by the Department of Public Works together with the Construction Education Training Authority(CETA). It is today the main training programme of the EPWP. Largely modelled on the Gundo Lashu programme in Limpopo and taking into account lessons learned in other programmes such as Vukuzakhe[1] in KwaZulu-Natal, Vukuphile builds capacity amongst emerging contractors to execute public works applying labour-intensive work methods.

The training is generally provided to the owner and two of its supervisors. The contractors receive training in business management, while supervisors are trained on technical issues related to labour-intensive construction. Both the contractors and the supervisors receive a NQF qualification upon completion of the training.

The training programme consists of:

- two to three year full-time learnerships for contractors and site supervisors.
- learners receiving formal institutional training and on-the-job training, with the latter provided through three negotiated trial contracts.
- mentoring to support the training and ensure that woks are executed as specified.
- involvement of a financial service provider in providing learners with access to finance and to develop a financial track record.

The programme is linked to the contractor classification system of the Construction Industry Development Board (CIDB), targeting Grade 1 and 2 contractors. They exit the programme at level 3 or 4 in the CIDB register in terms of civil engineering and general building works

For the Vukuphile Contractor Learnership Programme to be implemented, provincial works departments and municipalities enter into an agreement with the DPW and CETA. Provincial departments and municipalities are tasked with identifying and allocating suitable projects for the trial contracts.

The training projects largely involve the construction of side walks, stormwater drains, sewer reticulation, water supply, building of houses, schools, clinics and low-volume roads. Contract values range from R 500,000 to R 5 million.

Since the start, the programme has trained 500 contractors across all 9 provinces which includes a total of 1,500 persons. The current target is to train another 500 contractors before 2014.

Comprehensive training for rural road construction works was however carried out in the past in South Africa through the Gundo Lashu programme in Limpopo Province, and as such provides a good model for what is required in terms of training for rural road construction works.[15]

[15] Ref: Project Completion Report,Procurement and Management of Technical Assistance and Provision of Advisory and Training Support to the Limpopo Province Roads Agency for the Introduction of Labour-based Methods in Road Rehabilitation Works using Private Contractors, ILO Polokwane, August 2005 and Guidelines for construction of bituminous seals using labour and light plant and equipment, RAL, CSIR and ILO, September 2007

Retaining a cadre of professional staff

A key element in any contractor development programme for labour-intensive road works is to provide the trained contractors with a steady supply of works. The long-term objective and justification for investing considerable resources in training is to receive professional services in return, through good design and supervision services from the consultants and high-quality works performed by the contractors. The achievement of such goals is only gradually achieved. Some results are evident from the initial training, however the full benefits are only achieved after several works contracts when the technical staff involved has carried out the same work activities a number of times. There is a strong element of "training by doing" in labour-based road works and for this reason, it is important that the training programme leads into a long-term construction programme where the trained personnel from consultants, contractors and the client road agencies are given the opportunity to perfect their skills.

Training of technical staff from PRDs and municipalities

This staff category should ideally possess the same qualifications in labour-intensive road works technology as the consultants and contractors involved in the programme. In order to protect the interests of the client in this particular field, the technical staff from the PRDs and municipalities should therefore receive the same training. To quickly boost this capacity within the PRDs and municipalities it is recommended that they are sent for training at Kisii in Kenya where courses are currently conducted in rural road construction applying similar technology and work methods as once used in the Gundo Lashu programme.

Training for EPWP Staff

EPWP staff is posted at the central office in Pretoria as well as with the PRDs in the provinces. This team plays an important role in advocacy for the programme as well as coordination, monitoring and evaluation. In carrying out these functions, it would be to the benefit of the staff to have more exposure to labour-intensive works technology. As a starter, it would be useful if they could receive training at a labour-intensive works training centre such as the ones found in Kisii in Kenya or at Mount Elgon in Uganda.

Training of foremen and supervisors

When building capacity to implement labour-intensive infrastructure works, the main focus of the training needs to be on site supervisory staff. This includes the foremen of the contractors and the on-site staff from the consultants acting as the supervising engineer.

The same applies to the routine maintenance works. The backbone of a sound road maintenance programme is to develop qualified supervisors who plan and inspect the works and provide guidance and instructions to the contractors or lengthmen who carry out the works.

Maintenance Training

Several provinces have now established a labour-intensive routine road maintenance scheme similar to the Zibambele lengthman system in Kwazulu Natal. It is important that this maintenance is organized in an efficient manner in order to serve its main purpose of prolonging the lifetime of the road assets.

A common weakness in many labour-intensive road maintenance schemes is that workers tend to place too much emphasis on grass cutting and ignore other more important maintenance activities. This seems to be the case also in South Africa.

Equally, there is a need for improving procedures for the supervision of such work. To address these issues, it is therefore highly recommended that specific training is developed for the effective organization of routine road maintenance. The supervision staff for the routine maintenance would be the prime target for this training.

A revision of the guidelines for labour-intensive routine road maintenance is currently in progress.

Demonstration sites

Current training provided to consultants and contractors is deemed to be too theoretical and too general. Training providers are at present poorly qualified to deliver the required training. A trainer cannot effectively train a practical skill that he/she has never practised on a real worksite. The training programme needs to be closer aligned to physical works activities.

Providing training through the use of demonstration sites has been a hallmark of training in labour-based works technology in all the successful programmes of this nature. In order to reach the desired effects of a training programme the most effective approach is to expose the trainees to a real working situation provided through full-scale demonstration work sites.It is therefore recommended that such training sites be established at strategic locations across the country.

To reduce travel distances it would be useful to establish several demonstration projects. One such site in each province would be useful, thereby providing sufficient training grounds for all the contractors and other technical staff in need of training. It is also useful to have several such work sites to cover different geographic conditions and any variations in technical designs and work methods. It is important to select roads preferably with a significant length and with a fair amount of traffic thereby proving that the technology can be used on typical roads found in the rural areas and not only on short access roads with limited traffic.

The demonstration roads are an effective means of standardising work methods, designs and technology. This not only facilitates the skills and knowledge development of the technical staff participating in the programme but also serves to increase uniformity in works. Demonstration projects are also important in terms of adopting the technology and work methods to the specific conditions in the various parts of the country. Once an efficient works project is up and running, it can also be used for lobbying purposes. The best method for convincing decision makers and local politicians about the merits of this technology is by showing them work in progress as well as the completed infrastructure.

Sites should be established for both maintenance and construction works.

4.16 Labour wages

A key concern in any labour-intensive public works programme, including the EPWP, is the determination of appropriate wage rates. A basic concept behind the justification for using labour intensive work methods is that such technology is cost-effective due to the prevailing low wage rates in most developing countries. In low income countries, the issue of the wage rates is more simple as the daily wage rates are normally in the range of US$ 2 to 5 and therefore, the use of labour-intensive work methods remain highly competitive to the use of equipment based works technology. However, in middle-income countries such as South Africa, wages are considerably higher in the range of 10 to 20 US$ per day.

The setting of the appropriate wage rates in public works programmes is a comprehensive exercise in itself, which require careful consideration of a multitude of issues. Besides the competitiveness of the technology, it is important to observe existing collective agreements in the sector as well as the prevailing wage rates in the labour market. Furthermore, it is important to consider the living costs in a given geographical area to ensure that workers actually earn an income sufficient to meet basic costs of living. Finally, the wage rate needs to be regarded as attractive not only to recruit sufficient workers but also regarded as attractive enough to motivate them to carry out the established task rates for the works being offered. Establishing the optimal wage rates is a comprehensive exercise in itself and is best done together with specifically designed field studies dealing which each of these issues.

EPWP wage policy

Because the EPWP crosscuts sectors and departments, there is no single set EPWP rate although there is a minimum rate per day . For the infrastructure sector, there is no single set rate of pay. Municipalities and provinces must be guided by the prevailing minimum wage in the area and on-going poverty relief projects. The aim is not to displace workers from existing employment to new EPWP projects. Allowance is made for EPWP projects to pay below the minimum wage as gazetted in the Code of Good practice for Employment under the Special Public Works Programme.

Source: EPWP web site, www.epwp.gov.za

A number of studies have been carried out in the EPWP on the appropriate level of the wage rates and its effect on poverty alleviation.[16] In this study, the wage rate is only assessed in relation to the labour-intensity of works and the resulting cost-effectiveness. Furthermore, the wage rate in the road works programme is compared to other wages paid in other cash earning employment in the rural areas.

Current situation

The infrastructure sector continues to pay the highest wages in the EPWP as a whole. Wage rates in road works appear to be slightly higher than in building works (R 71.31) and lower than sanitation works (R 79.52) and water supply works (R 91.67). The table below shows the average wage rates applied in road works in the provinces during the 10/11 financial year.

Wages rates in the road works programme vary considerably across the provinces. Gauteng, being a predominantly urban area, has the highest wage rates, followed by Western Cape and Free State. The more rural provinces have the lowest daily wage rates. Average wage rates in KwaZulu-Natal are less than half of the rates offered in Gauteng.

[16]Ref: Assessing the wage transfer function of and developing a minimum wage framework for the Expanded Public Works Programme in South Africa, William F. Mitchell, Centre of Full Employment and Equity, University of Newcastle, June 2008
Quantification of labour supply response to a “demand driven” expanded public works programme, Kirit Vaidya and Fahad Ahmed, IT Transport Ltd, United Kingdom, 2007

Daily wage rates – road works			
Province	Construction	Maintenance	Total
Eastern Cape	106.32	63.07	65.44
Free State	101.75	114.12	109.91
Gauteng	137.02	131.75	135.44
Kwazulu-Natal	76.50	58.26	61.09
Limpopo	96.19	70.71	80.99
Mpumalanga	87.42	67.50	73.33
Northern Cape	77.02	103.93	86.36
North West	110.04	91.90	103.97
Western Cape	129.71	126.58	128.25
Total	101.31	67.38	74.95

Figures from financial year 2010/11

There are wide variations on the wage rates applied in the individual projects. Schemes such as the Zibambele set a uniform rate for all their respective projects. Daily wage rates applied for labour-intensive routine maintenance were in the range of R 50 to R 70 during the last financial year. Being the type of works requiring the lowest skills levels, it also has the lowest offered pay levels. Projects containing works requiring higher skills also offer higher wages. The higher average daily pay for road construction works at R 101 confirms this trend.

Impact of wage rate on LI

The impact of the wage rate on the overall labour-intensity of a project is pure arithmetic. A higher daily wage rate increases the wage bill and thus increases the labour intensity of the project. Depending on the extent to which a project is labour-intensive, it will also affect the total cost of the project.

In projects with limited use of labour, the effect of the wage bill is limited. In a typical EPWP road construction project with a labour-intensity of 5 percent, a 50 percent increase of the wages paid to unskilled workers results in an increase in the labour intensity to 7.3 percent. The total cost of this project would increase by 2.5 percent.

On the other hand if the labour intensity is 30 percent, as encountered during the early years of the Gundo Lashu programme, a 50 percent wage raise would increase the LI to 39 percent, assuming that all other costs remain constant. In this case, the total cost increase is more significant at 15 percent.

The current minimum wage in the construction industry is R17.43 per hour for a general worker (applicable from 1 September 2010).[17] For an 8 hours workday this equates to a daily rate of R 139.44. If the average wage rate in the road works programme was raised to this level, this constitutes an 86 percent increase, resulting in a labour intensity of 18.7, up from last year's level of 11.1 percent, assuming all other costs remain constant. Such a significant wage hike would still only have a modest impact on the total cost of the current EPWP road works programme, increasing it by 9.5 percent.

The increase would of course be more dramatic for labour-intensive road maintenance works. With a LI rate of say 85 percent, the same wage hike would result in total costs increasing by 73 percent. As the LI rate is already high, this wage hike will only increase it to 91 percent.

Wage impact on cost effectiveness

The impact of wage rates on the cost effectiveness of labour-intensive road works require a comparison with similar works using conventional machine-based construction methods.[18] Ideally, comparisons of costs on road works should be done when there is a substantial amount of work carried out and when works have graduated from its pilot stages. The works

[17] Source:SAFCEC,August 2011
[18] A good example of such a comparison is found in the publication: Jobs or Machines, Comparative Analysis of Rural Road Work in Cambodia, Paul Munters, ILO 2003

being carried out should be of comparable standards and designs and need to be in sufficient quantities of work so project specific variations can be averaged out on the basis of a statistically significant number of samples.[19]

The best indication of cost effectiveness of labour-intensive works is therefore found in the progress reporting from the Gundo Lashu programme in Limpopo Province.

Looking back at this programme, the most relevant works took place in 2004. At that time, the works were achieving reasonable LI levels in the range of 20 to 35 percent. The daily wage rate paid in the active road construction projects in 2004 was R 30. From 2004 to 2010, prices in the construction industry in Limpopo escalated by 40 percent according to SAFCEC. If this cost escalation factor was applied to the wage rate this would imply an equivalent daily wage rate of R 42. In other words, if the wage rate paid in labour-intensive road construction works in 2010 was R 42, it would be equally competitive as it was in the Gundo Lashu programme in 2004.

As shown in the table above, the daily wage rate in EPWP road construction works in Limpopo in 2010 was R 96.19, which is 129 percent higher than the adjusted rate paid in 2004 (R 42:-). Assuming that prices on all other road works activities have increased at the rate of the construction industry cost index, this implies that the wage bill is higher today as compared to in 2004. With an average labour intensity rate of 21 percent[20], this would equate to a 27 percent cost increase for the construction works as a result of the higher wages paid in 2010.

At the time, the average cost of constructing bitumen-surfaced roads in the Gundo Lashu was around R 790,930 per km.[4] In 2010 prices, this would amount to R 1,107,300 per km when adjusted for the general price increase in the industry. Adding the additional increase in labour wages, the cost would be R 1,406,000 per km.

Although the roads were built to bitumen surface standards with stabilised base courses, the adjusted cost in current prices appears to be high. There are a number of uncertainties in the above calculations. First of all, the original costs in 2004 are based on a small sample of works at a time when the contractors were still inexperienced with the use of labour-intensive methods for the type of works carried out. Equally, the cost increases in road construction may not necessarily follow the price adjustment index for the construction industry as a whole. The best way of establishing current cost of labour-intensive road construction works would be to establish demonstration sites where works are closely supervised and costs are properly analysed.

Comparisons to other employment

The road works programme currently pays the highest wage rate in the EPWP, however, on average still only 54 percent of the current industry norm of 17.43 R/hour. In road construction works the average is higher, reaching 73 percent of the official minimum rate.

When compared to the rates paid in other forms of employment in the rural areas such as hired labour in agriculture and forestry, the average wage rate in EPWP road works is higher. The minimum wage set in agriculture was 53.92 R/day during the financial year 2010/11. In the forestry sector the daily wage rate is currently R 52.40.[21]

[19] In the history of labour-intensive works in South Africa, there exists a wealth of studies on the effectiveness of such work methods, however, most of these are based on case studies of individual projects and in many of these cases pilot projects.
[20] Selected representative projects
[21] Source: Ministry of Labour

Statistics South Africa carries out regular surveys of household earnings.[22] It is interesting to note that the median earnings for persons with only primary school education is R 1,500 per month, which is equivalent to R 78.95 per day, or five percent higher than the average wage rate paid in the EPWP road works programme. The same survey also reports that the median monthly earning for an "Elementary" worker was R 1,507 in 2010.

Concluding remarks

As mentioned earlier, there is an array of concerns to be carefully considered when establishing the wage rate in labour-intensive public works programmes, some of which are highlighted in this section. Rather than restarting the discussion on what should be the appropriate wage rate at this stage, it is worth considering the following key questions relating back to the basic feasibility of using labour-intensive work methods. Firstly, is the wage rate high enough to attract sufficient workers for the works? Secondly, are the rates sufficiently attractive to secure established task rates?

The literature from past research seems to conclude that there is no shortage of job seekers to the programme. A general opinion among workers is that they would have liked to see more and longer employment offered. These opinions indicate that wages are attractive enough for people to seek the jobs on offer. The other significant feature of the wage regime in the EPWP is its in-built flexibility. Wage rates are not fixed. They can be adjusted across regions, between urban and rural areas and from one project to another. This also allows employers to set the rate at levels that maintain adequate recruitment and also sufficient work motivation.

[22]Monthly Earnings of South Africans, Statistics South Africa 2010

4.17 Labour-intensive road works activities

Work methods

Job creation in road works is currently achieved through two mechanisms, (i) labour-intensive construction and maintenance and (ii)maximising the use of labour in projects applying conventional machine-basedwork methods. In practice, the two approaches represent a continuous range of production methods, using various combinations of labour and machines.

Depending on the nature of the road works, the degree of labour intensity varies ("labour-intensive" programmes use more labour-intensive methods than "labour maximisation" programmes). In principle, both mechanisms emphasise the use of labour rather than machines where technically and economically feasible. Machines should only be utilised when the construction specifications cannot be met using manual labour. Unfortunately, the current practice is still that machines are often used for activities which could have been carried out using manual labour.

The main work activities when constructing, upgrading or rehabilitating a road consist of clearing, earthworks, pavement construction and drainage works. The table below shows how these operations are normally carried out when relying on labour-intensive or conventional machine-based work methods:

Use of labour and equipment in road construction works		
Activity	**Labour-intensive methods**	**Machine-based construction**
Bush clearing	labour only	bulldozer or front wheel loader
Grubbing	labour only	bulldozer or front wheel loader
Earthworks	labour rollers and water bowsers for fills	rollers and water bowsers excavator and/or grader
Camber formation	rollers water bowsers and labour	rollers water bowsers grader
Drains	labour only	grader or excavator
Culverts	labour only	labour and excavator
Pavement works	rollers water bowsers labour	rollers bowsers for water and bitumen paving machines
Material supply	Various forms of transport depending on distance gravel excavated by labour spreading by labour	excavator or front wheel loader transport by tipper trucks spreading by grader

Earthworks normally involve (i) excavation of drainage systems and preparation of the camber, (ii) cut to fill, or (iii) building up or lifting the road embankment in flood prone areas - activities which are well suited for the use of manual labour. Pavement materials are commonly transported using conventional equipment (tipper trucks) and compacted using rollers. Levelling works can be carried out by labour. Although most bridge and culvert rely on a high degree of manual labour, using labour for excavation of trenches and foundations and backfilling for abutments can further increase the labour intensity.

Instructions in current manuals and guidelines

The EPWP Infrastructure Implementation Manual provides limited guidance on road works activities that can be carried out using labour-intensive work methods. Chapter 2 of the Manual suggests that the following types of road work are appropriate for labour-intensive work methods:

- Construction of minor, access and feeder roads around populated areas;
- Improvement/upgrading of existing minor/feeder roads in populated areas;
- Maintenance of all categories of roads (main, minor and feeder) and mainte nance of related structures.

In addition, Annex 8 contains a box with task rates on excavation works, loading soils, levelling and kerbing works.

The document "Guidelines for the Implementation of Labour-Intensive Infrastructure Projects under the Expanded Public Works Programme" provides more details on how labour-intensive methods can be used in road works projects. In Chapter 2 of the Guideline, under the title "Responsibilities of the public body, the following instructions are provided:

"The public body must implement the following types of civil infrastructure projects labour-intensively, in accordance with these guidelines:

- low-volume roads (typically less than 500 vehicles per day);
- sidewalks and non-motorised transport infrastructure
- stormwater drainage; and
- trenching,

where such projects contain a significant amount of the construction activities for which the use of labour is specified in the Generic Labour Intensive Specification in section 3.3.3 below, i.e. excavation, loading, short-distance hauling, offloading, spreading, grassing, and stone-pitching."

This Guide also suggests that where higher standards of roads are to be constructed then the following operations may be carried out using labour-intensive methods:

- Macadam base course either dry, water bound or emulsion bound; foamed bitumen gravel; emulsion treated gravel; or slurry bound or composite macadams.
- Application of bitumen bound surface treatment (cold) including spreading and drag ging of chips.
- Slurry treatments to existing or new road surfaces.
- In situ concrete roads.
- Segmented block paved roads.
- Cast in-situ block pavements (Hyson-cells).

Further guidance is provided in the NQF training materials on the use of labour-intensive work methods in road works.

The guidance in both the Manual and the Guideline for when labour-intensive methods can be applied on roads is misleading. The reference in the Manual to populated areas may give the impression that the technology can only be applied in urban areas. Most rural areas are sparsely populated, however, this does not restrict the use of labour-intensive work methods. Equally, the reference in the Guideline to roads with less than 500 vehicles per day is incorrect as the suggested pavement designs can cater for traffic above this threshold. Both of these limitations should therefore be removed.

Increased use of LI methods on highly trafficked roads

Most works take place on existing roads, usually consisting of rehabilitation or upgrading works. Certain limitations should be acknowledged when attempting to promote labour-intensive work methods in road projects with high traffic volumes.

A common problem in urban areas is the need to carry out works during a short period of time to limit the amount of disturbances to existing traffic patterns. Labour-intensive methods are not necessarily slower than when using equipment, however, in order to complete works during short periods of time may require the recruitment of a large number of workers for a short duration which in turn may not be practical or socially acceptable. In rural areas and on roads with less traffic, this is less of a problem.

Some of the recommended activities are already taking place, however, there is great potential for increasing labour-intensive practices across the large number of projects forming part of the EPWP road works programme.

Construction works

Bearing in mind the challenges of catering for traffic during the construction period, labour-intensive activities can still be introduced on all types of road works projects if it is carefully planned. The following activities should be considered for both roads with high and low volumes of traffic:

- Clearing works is probably the easiest work activity to organise as a labour-intensive activity. When properly organised as task work, it can achieve good progress rates. This work is located outside the road surface and does not interfere with traffic.
- Introduce labour-intensive methods in spreading of materials during construction of base course layers and in sub-base fills. Spreading and levelling works can be organ ised relying on manual labour and do not need to be slower than when using machines.
- Drainage works in most cases can be carried out using labour-intensive work methods. If properly supervised, the use of manual labour for this activity creates better quality results than what is achieved with heavy construction equipment.
- Culvert works can be organised using more labour. Trenches and foundations can be excavated by hand to increase the labour content. Equally, backfilling can be carried out by labour.
- Allocating sidewalk construction to small-scale labour-intensive contractors has shown to have a positive effect on employment generation.
- The use of concrete block pavements increases the labour content. As mentioned above, efforts should also be made to carry out base course works using labour-inten sive methods.
- In Lesotho there is a tradition of using stone for building retaining walls. These skills can be imported for the same purpose in neighbouring areas in South Africa for both retaining walls and surfacing works.
- Stone surfacing and stone pitching of side drains are also effective measures used to protect road sections with steep longitudinal gradients.

[23] In Ethiopia, stone pavement works has recently become a popular approach for creating jobs in both rural and urban areas. See http://germany-wuf.de/upload/CS_brochure_0709.pdf, http://www.gtz.de/en/presse/25985.htm and also http://www.global-briefing.org/2011/04/old-ideas-are-sometimes-best/

- Stabilisation of base course materials with emulsion, cement and lime has been successfully implemented using labour-intensive methods in the Gundo Lashu programme. Such designs should be considered for roads with low to medium levels of traffic. These designs are appropriate for existing gravel roads with excessive levels of traffic.
- As mentioned in the Guideline, the practice of using cold-mixed surface treatments and modified Otta seals with emulsion, carried out using labour-intensive methods can be applied on the same type of roads.

Pavement works

When carrying out labour-intensive road construction works, the two most common equipment inputs are for compaction works and transport of materials. Most other works activities can be carried out using manual labour.

A major cost component on rural road works is transport of materials. When distances between the quarries and the works sites are long, the cost of operating haulage equipment becomes a significant cost item in the project budget. For gravel roads, the construction of the surface layer commonly constitutes some 30 percent or more of the total construction costs. A major portion of these costs is tied to the transport of the materials. Equally, the supply of aggregate for bitumen based surface treatments often involves long hauling distances and is therefore the heaviest cost item in the surfacing works.

In many areas, appropriate materials for base courses or gravel surfaces are sourced at locations far away from the road works sites. Depending on the prevailing local geology, materials such as gravel and aggregate are often supplied from quarries 30 to 50 km away. For this reason, it is important to carefully consider design options that make use of material sources located closer to the work sites. Stabilisation of materials with lime, cement and/or bitumen may allow for the use of materials from closer locations.

When consultants are engaged to prepare designs for labour-intensive road construction works, it is important that such considerations are part of their brief. In other words, it would be useful to include as a specific task in their terms of reference to select technical design solutions which minimise the transport distances. Design solutions requiring long haulage distances for gravel and aggregate results in transport taking up a significant portion of the project budget and thus reducing the overall labour-intensity of the works.[24]

Maintenance works

Routine road maintenance is a widely dispersed activity, requiring small resource inputs over a large number of widely separated points. Most of these activities are well suited for manual labour. The amount of work needed to keep a length of road in good condition depends on several factors, such as type of road surface, traffic volume, the severity of climatic conditions, especially rain fall, prevailing soil types, the susceptibility of the terrain to erosion, road gradients and the presence of bush and vegetation.

Based on impressions from the field visits, the following activities need closer attention:

- Soil erosion is a frequent problem observed along many provincial roads. The erosion is often found in side drains, entry and exit drains for culverts and other cross-road drainage structures. Installing protective measures to counter this erosion is in

[24]The use of locally available materials is a concern for all road builders, not only in relation to labour-intensive works. In the SADC region, extensive research has taken place dealing with this issue, resulting in the publication Guideline, Low-volume Sealed Roads, June 2003, ISBN 99912-0-456-3.

many cases best carried out using labour-intensive work methods such as installing scour checks, gabions or using bio-engineering solutions.

- Equally, erosion protection for bridge and culvert structures is important for the safeguarding of such structures. Common measures include protecting abutment walls with gabion works, repairing, installing or extending inlet and outlet aprons and building check-dams downstream from the structures.
- Re-instating drainage systems on roads in poor condition is an effective meas ure to halt further road deterioration. This applies both to paved and unpaved roads.
- Spot improvement of maintenance trouble spots such as steep road sections can be done using stone pitching of side drains and dressed stone surfacing.

The following table describes common routine road maintenance activities for gravel roads.

Activity	Productivity guidelines for routine maintenance					
	Unit	Task difficulty				Notes:
Inspection 5.0 km/day		1	2	3	4	
Clean culverts + inlets and outlets	as shown	5 rows/wd	3 rows/wd	1 wd/row	2 wd/row	Difficulty = Silt depth in culvert 1. Up to ¼ 2. ¼ to ½ 3. ½ to ¾ 4. Over¾ Tasks for 600 dia. culverts with 6 rings
Clear debris from bridges	m^3/wd	0.5	2.5			Difficulty = type of work 1. Removing loose debris. 2. Excavating silt
Clean side drains	m^3/wd	4.0	3.5	3.0		Difficulty = soil condition 1. moist and loose 2. average 3. hard and dry
Clean mitre drains	m^3/wd	4.0	3.5	3.0		Difficulty = soil condition 1. moist and loose 2. average 3. hard and dry
Repair scour checks	No/wd	6				
Side slope repair	m^3/wd	2.5	2.0	1.5		Difficulty = soil condition 1. moist and loose 2. average 3. hard and dry
Shoulder repair	m^3/wd	2.5	2.0	1.5		Difficulty = soil condition 1. moist and loose 2. average 3. hard and dry
Patch potholes	m^3/wd	1.7	1.5	1.3		Difficulty = soil condition 1. moist and loose 2. average 3. hard and dry
Fill ruts in carriageway	m^3/wd	1.7	1.5	1.3		Difficulty = soil condition 1. moist and loose 2. average 3. hard and dry
Reshape carriageway*	m/wd	40	20			Difficulty = soil condition 1. moist and loose 2. hard and dry
Grass cutting and bush clearing	m^2/wd	300	200			Difficulty = Denseness of vegetation 1. Light 2. Dense
Grass planting	m^2/wd	3				

* Tasks measured in linear metres covering both sides of the road.
Source: Rural Road Maintenance Management, Central Region Infrastructure Management Programme, Malawi

Small-scale contractors are already engaged by provincial works departments for this type of activities.[26] Besides the work activities mentioned above, these contractors are also involved in strengthening retaining walls, maintaining road furniture and bitumen surface repairs.

[25] The Lesotho labour-based road works programme has developed appropriate design solutions for erosion control.
[26] Western Cape Province has developed an efficient routine maintenance system relying on small-scale contractors which contains good practices well worth considering when strengthening maintenance practices in other provinces.

4.18 Target labour intensity rates

The table below compares common labour intensity rates in conventional machine-based road works with the achievements in labour-intensive roads works in the EPWP and feasible targets for such works.

Road works activity	Labour intensity (LI)		
	Conventional machine-based works [%]	EPWP achievements [%]	Labour-intensive works targets [%]
Gravel road construction	2 - 6	11 – 49	30 - 45
Bitumen surfaced provincial roads	2 - 6	2 – 32	20 - 35
Sidewalk construction	6 - 10	5 – 30	20 - 30
Concrete block pavement	6 - 10	8 – 24	20 - 35
Periodic maintenance and spot improvements	3 - 6	-	30 - 50
Routine maintenance	10 - 20	50 – 95	70 - 90

Notes: Figures for gravel and bitumen roads are based on Gundo Lashu results
Sidewalks and concrete block pavement works are based on 2010/11 expenditure

The EPWP achievements in road construction are based on the results from works in the Gundo Lashu programme. This programme however shows wide variations in labour intensity. During the initial years, the spreading and levelling of the base course and sub-base were carried out using manual labour, while later in the programme such works were carried out using heavy equipment. Also, in the early years, the involvement of consultants was more limited. During the later years, consultancy fees commonly amounted to more than 20 percent of the total project costs. The current pilot projects in Eastern Cape and KwaZulu-Natal fit into the ranges shown in the table above.

The general trend when construction gravel roads using labour-intensive work methods is that costs are equally distributed on labour, equipment and materials. Materials for gravel roads are mainly used for culverts and surfacing works. The supply of gravel can constitute 30 to 40 percent of project costs. If good gravel is available locally, the cost of gravel can be significantly reduced, which in turn will increase the labour intensity of the project. Other equipment use is mainly related to compaction works, which is at more constant inputs.

Roads with higher pavement standards demand more material inputs, which in turn reduce the LI rates. Roads with bitumen-based surfaces usually set higher quality standards for the base course materials requiring transport equipment its supply. It is also becoming more common practice to use bitumen, cement or lime as a stabiliser to improve the strength of the base course. Finally, the bitumen and aggregate for the surface layer are significant cost items. Similarly, the construction of block pavements has considerable materials costs related to the base course and surface layer.

No exact figures are recommended for the targets. The targets set for road construction works are based on international experience (including South Africa), for works performed to comparable quality and design standards. It is possible to achieve higher rates of labour intensity by reducing the use of equipment, however, then the same level quality may not be achieved. In some areas, good gravel materials can be sourced along the road alignment, thereby achieving significant reduction in transport costs, reducing the overall use of equipment. Roads with very low traffic volumes can also be built using lower material specifications for the base course and thus rely on material sources closer to the project site.

Also, the nature of road works varies significantly from one project to another. In mountainous terrain, road construction works normally involve more earthworks than in gently rolling terrain. Earthwork can normally be carried out using labour-intensive work methods. Avoiding large cuts and fills can reduce transport distances, thereby limiting the need for transport equipment. Some projects involve lower quantities of earthworks, with the result that materials for pavement works constitute a larger portion of project expenditure. Pavement works require materials with higher quality, which is often imported from sources far away from the sites and thus increasing the equipment component. Finally, as experienced in the Gundo Lashu, it is important to keep control of the supervision costs. On past and current labour-intensive road construction, the costs of consultancy fees are commonly a fifth to a quarter of the total project budgets.

The sidewalk construction and concrete pavement works are based on the results extracted from the MIS for the financial year 2010/11. Once again, there are wide variations in the achieved LIs. The reasons for this is partly that the projects span across several years and the data captures only the situation in each financial year and thus only parts of the expenditure timeline. Secondly, there are most probably varying ambitions to generate employment in these projects. Still, the figures indicate considerable potential for labour-intensive works. If the base course is also built using manual labour, the LI of concrete block pavement works can be further improved.

Spot improvement and periodic maintenance using labour-intensive works methods are included as a new category of road works, with which there is limited experience in South Africa. The targets here are based on recent experience from such works in Kenya.

The labour intensity of routine maintenance is based on an assessment of the on-going schemes in South Africa. The works in the provinces show wide variations in the labour intensity. A concern is the low rates currently achieved in Limpopo where only 50 percent of expenditure is for labour wages. Although it is necessary to factor in costs of supervision, tools and other overheads, it should still be possible to maintain the resulting LI above 70 percent.

4.19 Incentives and punitive measures

The Government has allocated considerable funding under its incentive grant to provinces and municipalities, with the intention to encourage the use of labour-intensive work methods in their respective infrastructure works programmes.[27] It is still unclear whether the grant has lead to an increased use of labour-intensive work. It does however seem to have improved the reporting of employment generated in the programme. The reason for this is simply that the grant is disbursed on the basis of achieved employment generation.

The issue of whether to introduce punitive measures is more complex. In principle, such procedures can be installed at several stages of the project cycle, from early project conception, during the design stage or against the contractor in charge of the construction works. The main challenge in this respect would however be how to assess compliance. In order to establish whether the client, consultant or contractor has performed their respective role, resulting in the sufficient use of labour-intensive work methods, it is necessary to establish clear performance criteria against which such assessments can be made.

This would have been easier to implement if the work methods were defined in detail. In such a scenario, it would be easy to compare actual works with the prescribed work methods. If funds were specifically earmarked for labour-intensive works only, this would be easier to implement. Designs and bidding documents which do not comply to established and well-defined standard designs and work methods could then be rejected or denied funding. Equally, a contractor who decides to use equipment instead of labour for a certain activity intended to be carried out using labour-intensive methods could be refused payment.

In the current programme, the main approach is to augment the use of labour-intensive work methods in projects, which mainly use machine-based work methods. The use of punitive measures then becomes more complicated. Some projects have very high material costs (e.g. resealing of asphalt roads) and limited potential for job creation. Since road works projects have varying potential for employment generation, it would be necessary to establish individual criteria for each project. With the current size and number of projects, this seems like a complicated process requiring intensive management inputs, which are currently not available to the programme.

The only sensible scenario in which punitive measures could be applied would be in a dedicated labour-intensive road works programme. With clearly defined design standards, consultants would be instructed to apply these. Equally, contractors would be required to use construction methods as defined in best practices manuals and guidelines. Specific references to such documentation could be included in the contracts for both consultants and contractors.

The experience from other programmes, however, is that when the work methods are properly defined in works manuals, the compliance to the use of labour-intensive methods can be easily enforced by the site supervision. When contractors have attempted to use machines for labour-intensive works activities they have been instructed to remove the machines from the work site and instead organise the workforce to carry out the works using manual work methods.

Furthermore, this issue is more a matter of adequate training and demonstration of the merits of labour-intensive work methods. With proper training sites where the technology is applied in a real environment demonstrating the viability of the technology and where it is proven that it can be used for road works which is representative of the type of works included in a large-

[27] For the financial year 2011/12, the incentive grant allocations amount to R 267,269,000 to provinces and R 679,583,000 to the municipalities to increase job creation efforts in infrastructure, environment and culture programmes. Ref. DORA 2011.

scale labour-intensive road works programme, then technical staff will accept the real facts. Technical staff is not necessarily convinced if only told about the merits of the technology in a classroom environment. The convincing takes place when engineers and technicians see the full construction process and obtain a full understanding of the measures installed to secure the necessary quality of works.

Rather than developing a complicated system of punitive measures, it is firmly believed that better results can be achieved by establishing clearly defined labour-intensive road works programmes in the provinces. With agreed design standards and work methods and a physical works programme in which the works are identified combined with projections of employment for each of the sub-projects there is a better chance of achieving reasonable outputs in terms of job creation. Furthermore, improved training for the purpose of implementing such dedicated road works programmes in the provinces would reduce the prevailing resistance to the use of labour-intensive work methods.

4.20 Water and sanitation

Water and sanitation works make up a small portion of the total expenditure on infrastructure at 5.2% and 3.6% respectively, as compared to 27.7% for roads. Road works also account for a larger percentage of employment creation than water and sanitation projects.

The water and sanitation projects are by and large of a capital construction nature where new services are being installed in areas where no services existed or where existing services are being upgraded to accommodate increased capacity requirements. As in roads the larger construction projects, require large expenditure on materials which results in the overall labour intensity of the projects being low.

Province	No. of projects	Water and Sanitation				Av. Empl.	Expend.
		Expenditure	LI	FTE	W/O	months	per FTE
Eastern Cape	131	396,255,693	7.5	1,863	9,844	2.3	212,749
Free State	51	233,592,184	6.4	1,184	2,633	5.4	197,352
Gauteng	77	378,296,563	5.6	1,322	3,526	4.5	286,185
Kwazulu Natal	97	186,577,378	32.8	3,244	12,635	3.1	57,508
Limpopo	64	90,636,732	26.3	955	3,803	3.0	94,916
Mpumalanga	68	216,510,473	7.7	797	3,471	2.8	271,718
Northern Cape	31	54,888,645	4.7	125	902	1.7	438,012
North West	39	149,630,976	9.1	701	1,877	4.5	213,594
Western Cape	52	75,040,528	4.8	149	1,128	1.6	505,057
Total	610	1,781,429,170	10.5	10,339	39,819	3.1	172,308

The labour intensity across most of the provinces shows that projects are implemented using conventional machine based methods with labour intensities ranging between 5% and 10%. KwaZulu-Natal and Limpopo have achieved higher labour intensities which fall within the 25% and 35% range which is the international benchmark for labour intensive water and sanitation construction projects.

KwaZulu-Natal and the Eastern Cape generated the highest proportions of FTEs at 31% and 18% respectively. Both these provinces have a high number of underdeveloped communities requiring services, yet KwaZulu-Natal achieved a higher employment rate than the Eastern Cape with an expenditure of half of that of the Eastern Cape. Expenditure in provinces like Limpopo, Northern Cape and the Western Cape is much lower than the rest of the country according to the last financial year's reported figures. Limpopo, in particular, has the potential to increase expenditure given its large rural population where new services are needed.

The cost to create a job varies considerably across the provinces. The lowest amount achieved is R 57,000/FTE in KwaZulu-Natal and R 505,000/FTE in the Western Cape being the highest. This can be attributed to the variation of works designs across the country. The higher labour intensities achieved by KwaZulu-Natal and Limpopo proves that there is great potential to increase the labour intensity in the other provinces across the country by ring fencing projects for labour-intensive works particularly in the rural areas and townships where there is still a huge backlog of water supply and sanitation services.

The construction of water treatment plants is highly machine-intensive with very little use of general labour. Mainly skilled labour is utilised for tasks such as steal fixing. Due to the high

volumes of concrete required, ready mix concrete supplies are preferred to site batching. General labour is utilised in the masonry works which form a small component of the projects.

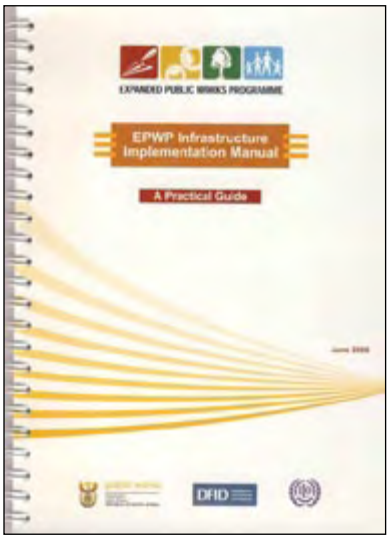
The typical labour tasks on pipeline installations are the laying of bedding and backfilling of trenches. Due to the varying depths of trenches, the excavations are carried out by machine. Small volumes of concrete required for encasing of pipes are batched on site. Manholes are available in both pre-cast and brick form and are installed by labourers. Other projects in water supply involve the installation of meters to households in order to manage payments for water consumption. Leakage detection and repairing/replacing pipes and joints also presents an opportunity for increased employment opportunities in the rural areas and townships.

The construction of latrines offers an opportunity for job creation and training in building works and laying of pipes for erf connections.

4.21 EPWP Infrastructure Implementation Manual

Description of the manual, purpose and audience

The purpose of the EPWP Infrastructure Implementation Manual is explained in its foreword as a document that *"concisely presents the whole set of procedures and processes that need to be followed, and gives clear directions and instructions on how to go about successfully implementingan EPWP infrastructure project"*. Furthermore it aims to be *"a guiding manual that presents the total picture; highlights the critical issues and how to deal with them; and points out all relevant reference material"*. Finally, it is meant to *"emphasise the strengthening of areas where currently weaknesses are clearly witnessed in effective and efficient EPWP project implementation"*.



The Manual is targeted *"as a practical guide to public bodies, other implementing partners and practitioners, assisting them to implement EPWP infrastructure projects, efficiently and effectively"*.

It attempts to describe management processes and procedures and as such would be comparable to what is often referred to as an Operations Manual. As such, it is not a technical manual describing work methods and design standards. Furthermore, it is a reference document to be used for all types of infrastructure works.

The Manual provides a good summary of the processes and procedures in the EPWP. As claimed it presents a total picture in a short and concise manner. It falls short of addressing the current weaknesses in the programme. The limited use of labour-intensive work methods in the programme does not appear as an issue in the document. If it was, one would have expected that more specific guidance was given on how to "labour intensify" current works.

The current version of the Manual was published in June 2008. It contains references to the targets of the first phase of the EPWP. Since the first phase ended in 2009, this information is no longer relevant. Equally, the annexes contain the EPWP logical framework for the same period. Such time-bound information is impractical to include in this type of document as it quickly becomes out-dated. This information would be easier to maintain up to date if it was posted on the EPWP website. On the website, such information can be frequently updated, also with key figures on progress against the current targets.

Duplication of information

In addition to this Manual, the EPWP has prepared a guide with the title "*Guidelines for the Implementation of the Labour Intensive Projects under the Expanded Public Works Programme*". The main content of this guideline consists of instructions on how additional clauses can be included in contractors for consultants and contractors involved in planning and implementation of labour-intensive infrastructure projects. To some extent, there is also a duplication of information in these two documents as both documents provide guidance on what type of works can be carried out using labour-intensive work methods. In any case, both deals with core management issues. As they are both brief documents with a similar purpose and dealing with the same main topic, it would be useful to combine them into one single guide.

Improving the Manual as an Operations Manual

The Manual provides a general description of EPWP management procedures. This is useful for new staff members joining the programme. However, there is also a need for a full description of the management procedures and processes. Considering the size and extent of the EPWP and the number of staff involved in the programme, it would be useful to develop a comprehensive operations manual. This is a type of document which is subject to frequent changes and revision. Rather than printing it in large numbers, a better solution is to distribute its latest version on an annual basis by email to all stakeholders in the programme, or alternatively post it on the web and inform all parties by email where it can be downloaded.

The production and updating of an operations manual is a process in itself. It requires the active participation of several units of EPWP management in order to ensure that the procedures and processes described are accurate and up to date.

At this stage, rather than revising and printing a new version of the Manual, it would be more effective to embark on a process of developing a comprehensive operations manual.

Reference documents

A number of references are provided to other documents containing further detailed information to be used during the various stages a project. Unfortunately, there is no single depository from which these documents can be obtained. At present, the references are from various departments and organisations. Some of these can be found on the web, however, many key documents can only be obtained by contacting the respective organisations where they were produced. It would be useful if the documents were posted on the EPWP website thereby making them more accessible to the potential users. Important templates and forms should be included in the annexes of a comprehensive operations manual.

The Guide mentioned above contains a useful list of technical reference literature. It would be better if all this literature were available in electronic format, downloadable from the web. This reference literature provides a wealth of information however not all is equally relevant to the works taking place in the EPWP. This literature is also weak on describing labour-intensive work methods. The ideal scenario would be to have references to purpose designed EPWP manuals describing standard work methods and best practices which can be applied to common work in the EPWP.

Templates and forms

The Manual refers to several templates and forms. It would be useful to either include these templates in the Manual or at least provide references to where they can easily be accessed. Posting such information on the EPWP website where they can be downloaded is a quick and easy way of referring elsewhere to such documents.

Labour-intensity rates

This study gives considerable attention to the labour intensity rates of the road works programme. The reason for this is that the LI rates for on-going works give a clear and objective assessment of the extent to which labour-intensive work methods are used in the programme. This does not however imply that the target LI rates are unknown to the staff involved in EPWP projects. Despite the deficiencies in current NQF training of consultants and contractors, this is actually a subject well covered in the current courses and corresponding course literature.

Still for illustrative purposes it is worthwhile including the target LI rates presented in the table in Chapter 4.18 in a future guide. The great challenge with LI rates is not related to knowing the appropriate targets, but rather how to achieve them. This requires practical training in how to organise labour-intensive works. With the exception of the Vukuphile programme, this type of training is lacking in current courses.

Similar target unit rates could be developed for other types of infrastructure works.

Technical guidance

The use of labour-intensive work methods is predominantly a technical issue. The two manuals mentioned in this section are not technical documents. Although other organisations and individuals have prepared good documents on how labour-intensive infrastructure works can be implemented in South Africa, the EPWP lacks technical literature specifically designed for its works programme. The existing literature is useful as general background material, however, there is a need for detailed guidance on work methods and appropriate designs for the most common infrastructure works in the EPWP.

In road works, there is an urgent demand for comprehensive manuals describing (i) the most common design options appropriate for labour-based infrastructure road construction works, (ii) a detailed description of appropriate work methods targeting site supervisory staff and (iii) a manual describing the effective management and implementation of routine road maintenance works. These are the key technical documents found in most large-scale labour-intensive road works programmes elsewhere. The EPWP also needs such documentation.

Considering the fact that road works is a major contributor to the employment generation in the EPWP, it would also be useful to include more technical guidance in a future document describing the management processes. Some of the recommendations made in Chapter 4.17 could be used for this purpose.

Using the EPWP website as a management tool

Procedures and processes in large public works programmes such as the EPWP are never static. In order to maintain and improve the effectiveness of the programme, new procedures are introduced and old ones are revised. This is a continuous process and for this reason printed manuals and guidelines quickly become out-dated. The use of the Internet as a management tool is an effective way of keeping information on processes and procedures up to date. Information posted on a website can be easily revised and disseminated to all the stakeholders in a large-scale programme such as the EPWP with little efforts and at limited costs. It is also an excellent depository for manuals, guidelines and other programme documentation.

It can also be used at implementation level for contracts management and progress reporting. Good examples and further information on the potential use of the web for managing large scale public works programmes can be found by visiting thewebsites of public works programmes such as the Prime Minister's rural road programme or the National Rural Employment Guarantee Scheme in India.[28] Similarly but on a smaller scale, the Commune Sangkat Fund in Cambodia uses the web for programme management purposes.[29]

[28] See www.pmgsy.nic.inand www.nrega.nic.in and www.nrega.net
[29] See www.ncdd.gov.kh and http://db.ncdd.gov.kh/pid

5 Recommendations

5.1 Increasing labour intensity inthe various stages of the project cycle

The limited support to the use of labour-intensive methods seems to permeate the entire project cycle, starting already at project identification and design. Projects are designed as predominantly machine-based works, with only small components of labour-intensive works activities and the contractors and consultant make no additional efforts to increase the use of labour intensive methods during implementation.

For this to change, there is a need to establish well defined road works programmes at provincial level with clear policy frameworks which includes (i) clear objectives and targets for the use of labour-intensive work methods and (ii) detailed method specifications describing the labour-based works activities in technical manuals and guidelines.

The on-going Zibambele type programmes and the Gundo Lashu in the past provide good examples of clearly defined programmes at province level where there is clear and strong commitment to the use of labour-intensive work methods. A common feature of these programmes is that they were initiated with strong support from key decision makers in the provinces. Another feature is that they developed clear and standard procedures on how works were to be carried out, thereby establishing a common understanding among road agency staff, consultants and contractors as regards to how works were to be carried out.

5.2 Increased employment in the road works programme

A significant increase in the use of labour-intensive work methods in the road sector can be achieved essentially through two approaches, (i) by expanding labour-intensive road maintenance activities and (ii) by commencing significant labour-intensive road construction programmes in all provinces.

True to the original intentions of the EPWP, it is recommended that the emphasis of funding is shifted from first world urban infrastructure to more works related to improving access in poor rural areas and townships. There is a large demand for improvement of infrastructure in such areas and the EPWP could be the appropriate vehicle in the long-term for addressing poverty through a twin objective of improving essential infrastructure and providing jobs in the same process. Furthermore, labour-intensive work methods are more appropriate for improving access roads and streets, rather than highways.

It is therefore recommended that the programme establish and implement a clearly defined labour-intensive rural road construction programme with specific outputs for employment as well as physical works - with ring-fenced funding. Construction of all-weather access roads to poor communities has proved to be an effective means of contributing to poverty alleviation in many developing countries. Besides providing short-term employment through labour-intensive work methods, the improved access is an important facilitator for improved access to social services and other job opportunities and economic activities.

It is recommended to continue the current practice of labour maximisation in road construction projects mainly usingconventional machine-based work methods. Although the potential for increased employment generation in this approach is less than the above recommended approaches, it is still a significant generator of jobs and should therefore be encouraged to continue and also intensified.

5.3 Road maintenance works

More technical inputs are required in the on-going labour-intensive road maintenance works. Engaging local households and workers for simple tasks such as bush clearing and maintaining the drainage system is a sound approach, however, it only addresses some of the regular maintenance demands. Routine maintenance covers several additional activities, which require more technical inputs. The Vukuphile contractors can play a central role in carrying out such works. Equally, there is a need for closer supervision and monitoring of such works.

There is a significant potential for increasing periodic and routine maintenance in poor rural areas and townships. Access to many such areas is worse in the rainy season during which many communities are isolated. With spot improvement and periodic maintenance works, access roads can be kept open throughout the year. A considerable amount of such work can be carried out using labour-intensive work methods.

5.4 Types of road worksconducive to labour-intensive methods

The EPWP has already developed appropriate road designs which can be implemented using labour-intensive methods. The Gundo Lashu programme tested out several pavement design options conducive to the use of labour-intensive works methods. There is also a wealth of experience from earlier projects in South Africa demonstrating how the technology can be implemented in practice.

The pavement designs developed in the Gundo Lashu programme include good technical solutions for upgrading existing gravel roads with high traffic levels to bitumen surface standards at reasonable costs.

This experience needs to be compiled into a best practices guide, thereby providing managers and consultants with clear and specific direction on how road construction projects can be designed and implemented using labour-intensive methods.

5.5 Road works activities amenable to the use of labour-intensive methods

The use of labour-intensive methods in road works projects consists mainly of bush clearing, drainage works and traffic management. It can also be applied during excavation works, pavement and surfacing works. Employment generation can also be increased through the introduction of stone pavements and stone masonry for retaining walls.

There is also a great number of activities which need closer attention in current maintenance works, all of which can be carried out using labour-intensive methods.

5.6 Institutional issues

The implementation of a significant labour-intensive road works programme require dedicated units at province level in which adequate and relevant capacity is established. Furthermore it requires local champions at provincial and municipal levels who can take the necessary decisions to establish such schemes and secure the necessary funding.

To construct 300 km of rural roads over the next two years in each of the provinces it is suggested to establish dedicated units in charge of works programming, management of the design and planning process and overall supervision of the works. It is important that the units are staffed with technical personnel who have had past exposure to labour-intensive road works. At present, such experience is limited in local road authorities.

The ideal solution would be to recruit engineers who possess hands-on experience from management and supervision of labour-intensive rural road works in other countries in the region. At the same time local technical staff can be sent for training in labour-intensive road works at specialist training institutions such as the Kisii training centre in Kenya. The current ILO technical assistance should be linked to these units, providing direct implementation support and training.

5.7 Required capacity building

Current training for contractors and consultants in labour-intensive road works technology is inadequate. It is clear that graduating from the existing short courses does not make the trainees qualified to design, supervise or manage labour-intensive road works. In order to implement the proposed labour-intensive road works programme there is a need to improve current training to address the real skills requirements of the staff.

The training needs to be designed to meet the specific skills requirements of the various categories of staff and address their respective roles and responsibilities in the programme. At this stage, it is suggested that some of the training is sourced overseas in order to secure that engineers from the PRD are exposed to actual labour-intensive works as part of the training.

At the same time, in country training courses need to be closer aligned to physical works activities and with more emphasis on training supervisors. In order to reach the desired effects of a training programme the most effective approach is to expose the trainees to a real working situation provided through full-scale demonstration work sites.It is therefore recommended that such training sites be established at strategic locations across the country.

The ILO technical assistance team can be utilised to facilitate and support the proposed changes to the training and actively assist in establishing appropriate demonstration sites.

5.8 Manuals and guidelines

Labour-intensive road construction works lacks proper documentation in the EPWP. Comprehensive manuals on how to build roads using labour-intensive work methods are required. Equally, consultants need guidance on design options that are compatible to labour-intensive works. This documentation needs to be developed and should be presented as best practices guidelines based on earlier labour-intensive road construction works carried out in South Africa. Contract documents for hiring consultants during design and engaging contractors for works implementation can then refer to these manuals.

5.9 Punitive measures

Rather than developing a complicated system of punitive measures, better results can be achieved by establishing clearly defined labour-intensive road works programmes in the provinces. With agreed design standards and work methods and a physical works programme in which the works are identified combined with projections of employment for each of the sub-projects there is a better chance of achieving reasonable outputs in terms of job creation. Furthermore, improved training for the purpose of implementing such road works programmes in the provinces would reduce the prevailing resistance to the use of labour-intensive work methods.

APPENDICES

Appendix 1 Mission schedule and persons met

Mission itinerary, 1 August to 30 September 2011

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1. Travel from Bangkok to Pretoria. Meeting with CTA.	2. Report reading and meetings with EPWP staff	3. Report reading and meetings with EPWP staff	4. Meetings with ILO office and EPWP staff	5. Meetings with NTIP and EPWP staff.	6. Report reading	7. Report reading and writing
8. Meeting with M&E consultant.	9. Report reading and writing	10. Meetings with ILO TA and PWP staff.	11. Travel to East London and visit to community road works project at Ngcingcinikwe	12. Visit to resurfacing works on road to Coffee Bay and return to East London. Fly to Jburg	13. Data analysis and report writing	14. Travel to Kwazulu Natal.
15. Site visit to labour-intensive access road project and sidewalk construction	16. Return from Pietermaritz-burg to Johannesburg	17. Meeting with McCutcheon. Travel to Cape Town	18. Site visits in Western Cape Province	19. Meeting with DPWT and EPWP in Cape Town	20. Report reading and writing	21. Travel from Cape Town to Limpopo.
22. Briefing at Limpopo PWD and site visits.	23. Site visits and return to Pretoria	24. Briefing EPWP and ILO on initial findings	25. Data analysis and report writing	26. Meeting with DoT and data analysis	27. Data analysis	28. Data analysis
29. Meetings with M&E EPWP and ILO Reg. Adviser	30. Meeting with McCutcheon	31. Meeting with EPWP M&E and data analysis	1. Data analysis and prepare presentation of preliminary findings	2. Present preliminary findings. Meeting with ILO and EPWP	3. Departure of international consultant to Bangkok	4. Arrival Bangkok.
5. Field visit to water purification plant and report writing	6. Field visit to sewer network installation and report writing	7. Report writing and data analysis	8. Visit to water and sanitation projects in Tshwane	9. Report writing and data analysis	10. Report writing and data analysis	11. Report writing and data analysis
12 – 18. Report writing and data analysis						
19 - 25. Report writing and data analysis						
26 – 29. Report writing and data analysis				30. Submit draft report.		

Persons met

Gamelihle Sibanda, Chief Technical Adviser, ILO Technical Assistance to the EPWP
Agnes Mapela, Admin Secretary, ILO/EPWP
Lindelani Mulaudzi, Director Provincial Roads, EPWP
Odwa Tiya, Director Technical Support, EPWP
Ignatius Ariyo, Chief Director, Infrastructure Sector, EPWP
Tania Smith, Deputy Director GIS, EPWP
Gwynne Borcherds, Deputy Director Large Projects, EPWP
Thembakazi Maluleke, Deputy Director Monitoring, EPWP
Mapule Mkhatshwa-Ngwenya, Deputy Director Monitoring, EPWP
Dalene Seymore, National Programme Manager, NTIP
Sheila Kubayi, Deputy Director, Provincial Roads, EPWP
David Mashaba, Director: Monitoring and Evaluation, EPWP
Kgomotso Zantsi, Director, Evaluation and Research, EPWP
Thembani Makaukau, Director: Vukuphile

Basotho Seetsa, ILO Technical Adviser, Eastern Cape Province
Mthetheleli Mabona, Senior Manager for Community-based Public Works Programme, Eastern Cape Province
Zweli, Resident Engineer, Coffee Bay road works project

Mpayo Kasure, ILO Technical Adviser, KwaZulu-Natal Province
Zinhle Ngcamu, Assistant Manager: Pilot Projects, KwaZulu-Natal Department of Transport
Ncumisa Mnguni, Deputy Director: EPWP Monitoring and Evaluation, KwaZulu-Natal

Gian Schalkwyk, DPWT, Western Cape Province
Richard Hutton, DPWT, Western Cape Province

B.M. Molongwana, Manager, LDPW, Limpopo Province
M. Mashane, Manager, LDPW, Limpopo Province
Salome Maphalla, Acting General Manager, LDPW-EPWP, Limpopo Province
Moses Malungana, Project Manager, Roads Agency, Limpopo Province
B. Legodi, Project Manager, LDRT, Limpopo Province
Walter Mothapo, Sector Manager, EPWP Planning & Support, LDPW, Limpopo Province
Augustus Asare, ILO Chief Technical Adviser, Limpopo Province
Htun Hlaing, ILO Training Adviser, Limpopo Province

Vic van Vuren, Director, ILO Office South Africa
Boshigo Matlou, Programme Manager, ILO Office South Africa
Kwaku Osei-Bonsu, Regional Technical Adviser, ILO Pretoria

Johanna Mulaudzi, Director Planning Road and Rail, Department of Transport, Pretoria

Malani Padayachee-Saman, CEO, MPA Consulting Engineers, Randburg

Thulani Khoza, Infrastructure Provision, City of Tshwane Metropolitan Municipality
Hendri Strauss, Resident Engineer, Aurecon Group

Thulani Khoza, Infrastructure Provision, City of Tshwane Metropolitan Municipality
Lucky Masinga, Resident Engineer, Bicon Consulting Engineers

Appendix 2 Literature reviewed

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Best Practice Guide, Labour-based Methods and Technologies for Employment-intensive Construction Works, January 2002

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Employment and High-Standard Infrastructure, Robert McCutcheon and Filip LM Taylor Parkins, University of Witwatersrand, 2003

EPWP Infrastructure Implementation Manual – A Practical Guide, Expanded Public Works Programme, Department of Public Works, June 2008

EPWP Operational Level Guidelines, ILO

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EPWP Review of Selected Reports and Focus Group Discussions, McIntosh Xaba and Associates, August 2009

Expanded Public Works Programme, Five-year report 2004/05 – 2008/09, Reaching the one million target, Department of Public Works

Government Gazette, 28 April 2011, Republic of South Africa, Division of Revenue Act, 2011

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Project Completion Report, Procurement and Management of Technical Assistance and Provision of Advisory and Training Support to the Limpopo Province Roads Agency for the Introduction of Labour-based Methods in Road Rehabilitation Works using Private Contractors, ILO Polokwane, August 2005

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Scaling-up the Expanded Public Works Programme, Briefing Document – Roads, Jobs and Skills Development, Department of Transport and Department of Public Works, 2007

South Africa's Expanded Public Works Programme: a case study in government sponsored employment creation and poverty alleviation focusing upon the infrastructure component, McCutcheon and Taylor Parkins, December 2009

The generation of productive employment opportunities for the unskilled: principles, potential and pitfalls of labour-intensive construction, McCutcheon, December 2008

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Appendix 3 Field visits

Observations from the field trip to Eastern Cape Province 11 August 2011

Eastern Cape has 43,000 km of provincial roads of which 80 percent are gravel roads. The first road works project visited is an access road construction project to Ngcingcinikwe village built by the community with supervision from a private consultant. PWD is the client. On completion, it will be handed over to the local municipality. The total budget is R 5 million for a total road length of 2.1 km. The labour intensity is at present 27.5 percent of direct construction costs. If the cost of consultancy services is included, the LI rate drops to 20.3 percent.

Labour availability is around 75 workers recruited from the communities adjacent to the road. Works are in effect organised as force account. There is no contractor engaged on this work site. A local consultancy firm based in East London is responsible for work supervision. The consultant has recruited a supervisor who provides the daily management of the work site and organisation of workers.

Quality of works is average and reflects the limited knowledge of the consultant in labour-intensive road works technology. The works does not seem to be organised using task rates. Setting out works seems substandard with limited level control. Side drains are not excavated at the time of preparing the sub-base and camber. This leads to unnecessary additional work. The Department does not appear to offer much technical oversight on the project and it seems they have left all technical decision making to the consulting engineer, which leads to some of the results as stated above.

The road alignment goes through mountainous terrain with some sections with steep gradients. It is not certain that the slurry seal surface treatment will last on these sections.

12 August 2011

Road to Coffee Bay

This road works project consists of resurfacing works on a District Road managed by the PWD. The works essentially consists of recycling the existing deteriorated surface and adding a layer of hot mixed asphalt. The works are carried out by force account. All construction equipment utilised is owned by the PWD. The funding of the works is sourced from the PIG so they are required to carry out some LI activities. According to the resident engineer, local labour had only been recruited for managing the traffic.

Labour employed for traffic management only, as the works only involve resurfacing. Some minor cleaning works were carried out on the drains, however this was carried out using a backhoe. On remarks that this work could have been carried out using labour, the resident engineer responded that he did not have sufficient supervisory staff to organise this as a labour-intensive activity. He also stated that this is part of a series of ''Emergency Projects'' on the strategic provincial network that had not received attention for a long time and had to be completed in the shortest possible time. The Department has recently been criticised by the media regarding the bad state of the road as it was utilised by tourists. Besides the drainage works, there was no further scope for labour-intensive works on this work site.

29,000 household contractors are employed in Eastern Cape for routine road maintenance. Next year this is expected to increase to 36,000 households.

Observations from the field trip to KwaZulu-Natal

15 August 2011

The study team visited two projects in the vicinity of Pietermaritzburg, both of which are implemented by the KwaZulu-Natal Department of Transport.

The first is a 0.5 km access road which links the Mzimba School to the adjacent main road. This is an LIC project where four contractors were hired for training purposes, each contractor carrying out one stage of construction clearing, earthworks, pavement and block pavement surfacing.

At the time of the visit the project was employing 25 workers.

Of particular note were the high consultant fees as a portion of the total project cost. Total project budget is 3 million Rand.

The second project involved the construction of a concrete sidewalk. This type of works was often contracted out to small-scale contractors trained in the use of labour-intensive work methods. Other tasks that were performed on the project include the construction of gabions, drainage channels and the installation of guardrails.

The study team was unable to a visit the third project in the Bergville area because the site was not accessible due to snow.

In discussions with the EPWP and ILO technical adviser the following points were noted:

- There are currently about 120 infrastructure projects managed by the KwaZulu-Natal Department of Transport.
- The EPWP unit is not involved in the oversight of the design of projects.
- The Zibambele programme is managed by the Development Directorate but reported as part of the EPWP.
- The Operations Directorate manages the rest of the infrastructure projects, but the officials do not understand or adhere to the EPWP principles.
- Rural upgrade projects should be targeted for LIC works.
- The targets are too low and future planning should set a target of 15-30% LI for public projects.

Observations from the field trip to the Western Cape

18 August 2011

The first project visited was the widening of the M5. This is a conventional project involving the addition of lanes to a major urban road with a high traffic volume. The project has a 4% labour component with the following tasks done by labour: paining of median barriers, traffic accommodation and general unskilled labour. 12% of the contract has been subcontracted to BEE companies.

Then travelled on the Gordons Bay-Rooi Els route where a routine maintenance is carried out by a small contractor. The work activities are identified by a consulting engineer before the contractor attends to them. Payments are based on actual works completed. At the time of the visit the contractor was repairing road furniture. The road is in a very good condition.

The Main Road 172 Helshoogte-Stellenbosch Maintenance Contract has also been awarded to a small contractor. The contractor met on site said she was one of the remaining contractors that were trained by the Western Cape Public Works Department.

Meeting with Paarl District Engineer:

- There are 6,500km of surfaced roads, 11,000km higher order gravel roads, 10,000km lower order gravel roads.
- Mainly re-gravelling works were performed on the unpaved network as there were no funds available for upgrades.
- There is no scope for labour-intensive construction due to the high haulage costs.
- A test pilot of the Zibambele programme was done and it was deemed unsuccessful due to the long distances along the roads where there are no residents.
- The Department has an in-house team of 280 people in the regional offices and also utilises 400 personnel from the District Municipalities across the province.

19 August 2011

Meeting with Richard Hutton and Provincial EPWP team:

- The Department has received an equitable share allocation of R1.4 billion. The network in the province requires no new road construction. Therefore budgets are allocated to routine and periodic maintenance, reconstruction, upgrades, resealing and re-gravelling. Most projects are carried out using machine intensive work methods with a large portion relying on departmental units (force account).
- The Department plans to improve 300km of roads per year.
- The routine road maintenance projects have a larger scope to increase labour content and are more value for money in terms of quality output. The Zibambele type approach is time based and not output based and is too supervision intensive.
- Contractors supervise workers and the Department does not specify to them how many people they should employ.
- The scaling up of the EPWP conditions were too vague as to what the requirements were.
- The incentive amounts are too low and not worth it.
- The EPWP unit does not have any input into the design of projects.
- Infrastructure units in charge of budgets are not complying with the guidelines.

Observations from the field trip to Limpopo

22 August 2011

Meeting with EPWP, Department of Roads and Transport and ILO staff:

- 620 officials and 172 consultant staff has been trained by the ILO technical assistance team in Limpopo.
- 105 small contractors have been trained through learnerships.
- The CSIR has carried out extensive research on sealing options.
- High staff turnover in the respective departments is affecting the understanding and acceptance of EPWP.
- There is a general lack of proactive planning.
- The maintenance systems in use are ineffective.
- EPWP projects are at a small scale.
- Some EPWP implementers do not report on the progress of their projects.
- In many cases, service providers do not submit beneficiary data.
- Due to the lack of proactive planning, contractors are always pressured to conclude projects and therefore discard LIC principles.
- Implementation of projects is influenced by politicians.
- The political turnover has affected the support for the EPWP in the province.

Visit to the Lebowakgomo-Marulaneng Road Upgrade project:

- Upgrading from gravel to black top surfacing of 18.8km at a project cost of R 77.5 million.
- Labour is used on ancillary works such as final clearing works and installing lined drains. Roughly 100 workers employed.
- Concrete for bridges is ordered form ready mix suppliers.
- Only concrete required for culverts is batched on site.
- On the job training is provided for steel fixers.

Sidewalk construction:

Visit to a completed block paved sidewalk project. This project was completed by learner contractors who were responsible for 2 km each. The overall quality of the works was good.

Mkweng Cluster (Viking Labour-intensive Road Construction Project):

Located in the vicinity of the Zion Christian Church (ZCC) Headquarters in Moria. This project formed part of the Gundo Lashu Programme. The road has a single Otta seal using emulsion as a binder. It is still in good condition after 4 years with no maintenance. 8 km were completed in 6 months by one contractor who was awarded two contracts. Total cost of construction amounts to 600,000 R/km. An adjacent road was built by machines to similar geometric standards with DBST surface cost around 2 million R/km.

Routine Road Maintenance:

Routine road maintenance teams were visible on the roadside of some of the routes travelled. Unlike the Zibambele programme these workers are not always sourced from communities located close to the segment of road that they are responsible for. Many of them have to be transported for long distances which had not been budgeted for. Apart from grass cutting and bush clearing, it does not seem that there are any other tasks that the workers have been trained to carry out. The supervisor contractors too have not had any training in this regard. They are now being brought back to classroom for basic training in task work.

The routine maintenance contracts cover on average 300km of roads at a cost of R13 to 20 million each with 600 workers employed. At present there are25 ongoing contracts totaling 15,000 workers. Thee workers work 12 days each month at a daily wage of R 70.

Bochum: Blouberg Municipality

Visited a township 2 km road upgrading project using concrete block paving. The base course works were done by machine with labourers laying paving blocks resulting in a LI rate of 10-12 percent. All concrete works are done by labour.

Ga-Nkwakjane

Visit to road which was improved six years ago. All works were done by labour-intensive work methods. Equipment was only used for gravel excavation. The surface consist of cold mix asphalt. The road has performed well although it has received no maintenance since completion. At the time it was improved the average costs of cold mix surfacing works was 25 R/m^2 compared to 20 R/m^2 for single Otta seal. Total cost for 10 km was R 7 million.

23 August 2011

Sodoma-Setupulane

Upgrading of a 7m wide access road from gravel to black top surfacing at a budget of R10.5 million for a total length of 2.6 km. Conventional machine-based methods are used on this road which could have been ideal to implement labour-intensive methods. EPWP scaling up funds were used to implement this project. Labour-intensive methods were only used for traffic management and culvert works. At the most 31 workers employed. Some workers were used for spreading slurry works for base correction. The works was managed by the PMU.

Bakenberg

Visit to a township roads upgrading project using concrete block paving. Total road length is 1.8 km with a total project cost of R 5 million. Cost of design and supervision was R 1.4 million.

This upgrading of these roads improved access to the local clinic.

Vaalwater-Modimolle (R33)

The project involves the rehabilitation and increase in capacity of the road as there will be an increase in coal truck traffic carrying coal to a power station in the province. Funded by the Infrastructure Grant to Provinces (IGP), the total budget for this project is R173 million for 48km. Works are carried out using conventional machine-based methods. Currently there are 230 labourers on site, most of whom are used for traffic accommodation.

Appendix 4 Terms of reference

Study on enhancing labour intensity for the Expanded Public Works Programme (EPWP) road infrastructure projects

I INTRODUCTION AND JUSTIFICATION

The Expanded Public Works Programme (EPWP) is a nationwide programme which makes systematic use of public expenditure to boost productive employment and to develop marketable skills among targeted marginalized section of the community thereby contributing towards the national goal of alleviating poverty.

Phase 1 (2004/5-2009/10) of the Expanded public Works Programme (EPWP) achieved its target of creating one million work opportunities a year ahead of schedule. Phase 2 (2009/10-2013/14) has a target of creating 4.5 million work opportunities. This is equivalent to creating 2 million full time jobs over a year {2 million Full Time Equivalents (FTEs)}.

Achievement of the EPWP Phase 2 targets requires deliberate enhancement of labour intensity in the delivery of EPWP projects. In the South African context labour intensity is measured as the percentage of the total project expenditure that goes to labour. However, it is imperative to ensure that increasing labour intensity does not translate into simply increasing the wage rate, but increasing the number of work opportunities created per unit of expenditure and their duration at a fair wage rate that does not distort the local economy.

The EPWP implementation spans four sectors comprising Infrastructure, Social, Non-state and Environment and Culture. The infrastructure sector is envisaged to deliver the bulk (48%) of the employment opportunities. Within the infrastructure sector, representing a target of 30% of work opportunities, roads provide the highest employment creation potential. Therefore, enhancement of the labour intensity in the provision of roads has potential to significantly impact on the overall performance of the EPWP.

II OBJECTIVES OF THE ASSIGNMENT

The International Labour Organisation (ILO) is commissioning this study on behalf of the EPWP with the objective of optimizing employment creation on infrastructure projects. This objective will be achieved through analysis of key variables and elemental cost structure of infrastructure projects, and development of innovative approaches to increase the labour intensity and the use of local material resources in EPWP road projects. The immediate objectives include:

1. Identification of different types of projects implemented under the EPWP infrastructure component.
2. Assessment of labour intensity of various roads projects implemented and reported under the EPWP, over time, disaggregated by province and project type (construction and maintenance of access roads and high volume roads carrying more than 500 vehicles per day).
3. Assessment of the same variables as in (2) above for projects implemented by the same bodies, but not categorised as EPWP.
4. Assessment of the quality of infrastructure produced under EPWP.
5. Assessment of cost structure (inputs expenditure as percentage of total project cost) of the various project components (unskilled labour wages, superviser wages, professional fees for design and supervision, materials, equipment, and transport).

6. Assessment of expenditure on wages as compared to total project expenditure (Labour-intensity).
7. Assessment of the range of wage rates used for road projects and the impact of the wage rate on labour intensity of road works.
8. Assessment of wage rate paid in EPWP projects relative to wages in other conventional infrastructure and sectors/projects within the same geographical context.
9. Identification of lessons learned and recommendations on;

- Ways and means for increasing labour intensity for road projects during various stages of the project cycle (project identification, design, implementation, operation and maintenance).
- Types of infrastructure projects that could be implemented based on EPWP principles.
- A list of road provision activities that are amenable to implementation using labour intensive methods (separate lists for low volume and high volume roads) and provide typical respective technical specifications.
- An objective basis for estimating/setting optimal labour intensity targets for construction and maintenance of access roads and high volume roads.
- Required capacity building initiatives commensurate with implementation of enhanced labour intensity projects; including contractor development. programs and in-house capacity of public bodies that goes with engagement of local/emerging/small scale contractors.
- Recommended enforcement (incentives and punitive) measures that will encourage delivery to expectations.
- Proposals on innovative options to enhance the labour intensity of EPWP projects.

10. Updating and revision of the "EPWP infrastructure Implementation Manual – A Practical Guide".

III SCOPE

The assignment is limited to

- Mainly roads infrastructure;
- Field visits to four provinces (likely KwaZulu-Natal, Gauteng, Eastern Cape and Limpopo provinces);
- Low and high volume roads; and
- Provincial roads and municipal roads.

The projects sampling matrix does not have to be statistically significant. The sample should consist of construction and maintenance projects. The objective is to enable balanced assessment and generate generic recommendations.

IV EXPECTED OUTPUTS

1. Portfolio of different projects implemented under the EPWP infrastructure component and their corresponding, quality, cost, and labour-intensity.
2. Achieved labour intensity for various projects over time disaggregated by province, project type, EPWP and non EPWP projects.
3. Matrix of various project cost structure (expenditure on inputs/components and their relative share) of the total project budget.
4. Impact assessment of the wage rate on labour intensity of road projects
5. Recommendations on;

- How labour intensity for road projects could be improved for various types of projects during various stages of the project cycle (project identification, design, implementation, maintenance).

- Typical target optimal labour intensity for various types of road projects and corresponding specifications based on South African and international experience.
- Institutional arrangement for EPWP projects and support for role players
- Improvements to the framework for recording and reporting on EPWP projects in a manner that minimises rejection of submitted data to the EPWP Management Information System (MIS)
- Guidelines on how project implementers can distinguish (for reporting purposes) between EPWP and non EPWP compliant infrastructure projects.
- Innovative options to enhance the labour intensity of EPWP projects

6. Updated and revised (in line with EPWP Phase 2) of the "EPWP infrastructure Implementation Manual – A Practical Guide".

V METHODOLODY

In pursuit of the above mentioned objectives, the methodology will include inter alia,

- Desk study of South African and international literature including the Presidential Report which flagged the low labour intensity.
- Consultations with key EPWP stakeholders
- Field visits to consult with stakeholders and review live projects in Limpopo, KZN, EC, Gauteng provinces or other areas as agreed with the client
- Review the data in the MIS versus project data at source.
- Review of projects for compliance to EPWP guidelines, at the planning and implementation stages.
- Assessment of the contractor development programs with specific reference to uptake of knowledge and practice of LIC methods
- Consultations with those managing the learnerships and National Qualifying Framework
- Assessment of institutional arrangements for the EPWP
- Review of the "EPWP infrastructure Implementation Manual – A Practical Guide" and revise/update so that it is more about "HOW to " than "WHAT to"

VI ACTIVITIES

In pursuit of the above mentioned objectives, the activities will include inter alia, consultations with

1. EPWP infrastructure team at National Department of Public Works
2. National Department of Transport
3. Provincial Departments/Directorates responsible for Roads and Public works
4. Municipal officials involved in the implementation of the EPWP road works
5. ILO team members based at National, Limpopo, KwaZulu Natal and Eastern Cape provinces
6. Beneficiaries of active projects that will be visited
7. Project managers at active projects that will be visited
8. Consultants and Mentors involved/doing the Technical support and related activities.
9. Design and supervision consultants.
10. Contractors implementing the EPWP.
11. Desk review of relevant documents and write up.

VII COMPOSITION OF THE TEAM

The team will comprise two civil engineers (BSc Engineering Degree or equivalent) with;

1. **International experience** (minimum 10 years of which at least 5 years is international)

- In provision of infrastructure including roads,

- Experience in the design of labour based projects, particularly road works,
- Field experience in management of labour based and equipment based road works,
- Familiar with public works programs implemented in Africa and/or elsewhere in the past 5 years,
- Experience in government and municipal institutional development would be an advantage.
- Experience in private sector (contractors, consultants) development would be an advantage.

2. **South African experience** (minimum 10 years of which at least 5 years is on site)

- In provision of infrastructure including roads ,
- Experience in the design and/or supervision of labour based road works
- Familiar with the EPWP and roles of implementing partners,
- Local knowledge of the South African construction industry (operations of public bodies implementing road works, CIDB, NQF, Contractor and Consultants associations),
- Experience in government and municipal institutional development would be an advantage,
- Experience in private sector (contractors, consultants) development would be an advantage.

VIII REPORTING

The Team Leader shall be the engineer engaged on the basis of their international experience. The team will submit at least 5 sets of reports in hard format and the rest in electronic format (MS Office compatible as much as possible). The team will submit a draft report and then submit a final report after incorporating comments consolidated by the study backstopping officer.

The ILO National CTA, Mr. Gamelihle Sibanda will backstop this assignment. The ILO Secretary Ms. Agnes Mapela will coordinate travel arrangements.

VI INPUTS AND TIMEFRAME

The timing and inputs of the team will be as follows:

Person	Desk study and report writing (at home)	Data collection (Pretoria)	Days in provinces (possibly KZN, EC, Limpopo, Western Cape)	Revision/ updating guide (at home)
International Engineer	3	10	15	10
National Engineer	3	10	15	10

Each team member will spend 13 days working from home and 25 days in either Pretoria or travelling in provinces. The team will hire and share a self-drive Class B vehicle for the duration of the assignment whereby transport is required. Agreed transport (including flights to the provinces) and accommodation costs will be covered by the ILO.

The study is envisaged to commence by 25 July 2011 and be completed by 15 September 2011.

Data and Facilities Provided to the Task Team
The Department of Public Works will supply all data and information in its possession and give assistance as will reasonably be required for the conduct of the study by the Team. This

may include introduction of the Task Team to the relevant public bodies, assistance in obtaining any information necessary for the successful completion of the assignment.

Protection of Government Information

The Consultant is required to agree and undertake to abide by and adhere to government legislation, regulations and directives dealing with the protection of government information as if such legislation, regulations and directives were applicable to him/her and that all reasonable steps shall be taken to ensure that persons under the management of the assignment who will be engaged in the fulfilment of the Consultant's contractual obligations are aware of these statutory requirements. These statutory stipulations will continue to apply to them even after the expiry or termination of the contract.

Conflict of Interest

The Consultant shall at all times during the execution of the assignment use their best endeavours to ensure that no action is taken by themselves, their personnel, agents or sub-contractors which may result in or give rise to the existence of conditions which are prejudicial to or in conflict with the best interests of the client.