

THE ECONOMIC AND SOCIAL BENEFITS OF THE AMADIBA ROAD PROJECT

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ABSTRACT

Amadiba Road is a community-based, labour-intensive, 40 km long gravel road in the north-eastern corner of the Eastern Cape. It was requested by a poor community who had no real roads and needed access to the nearest towns, Port Edward and Bizana. It was also desirable for the purpose of opening up the area to tourism opportunities, surely the industry with the best prospects for employment. The area is one of unspoilt natural beauty and plant life, being in the Pondoland Centre of Endemism, so special care had to be taken not to affect the environment. The project was innovative in the type of contract employed, and in the type of bridges and drifts used. Of the construction funds 55% were spent on wages, 5% on local goods and services and 20% on local haulage contractors resulting in 80% of the funds remaining in the community with the consequent multiplier effect.

1. INTRODUCTION

This paper describes a 40 km long gravel access road project which was recently completed in the Eastern Cape. The project was community based and labour intensive construction was used extensively. The road begins on the R61 (Bizana/Wild Coast Casino main road) and ends near the Mtentu River mouth. The area is one of unspoilt natural beauty and plant life, being in the Pondoland Centre of Endemism, so special care had to be taken not to affect the environment. The design thus had to be sympathetic to this and of low impact. This was achieved in this project by attention to drainage and avoiding the cuts and fills common to conventional construction which have caused degradation elsewhere.

An NGO operating in the area asked the CSIR for assistance in addressing the peoples' need for a road. The CSIR approached SANRAL for funding, which came from the national Poverty Alleviation Fund. The construction cost of the 6 metre wide road including wages, materials and plant and site overheads was R 198 000 per km excluding VAT. The project was a difficult one which needed a certain amount of innovation, especially in the areas of contract type, causeways and drifts. The project management costs proved to be higher than expected primarily because of the increased community liaison required for this type of work. The CSIR fee together with the environment consultant and social consultant costs was R 33 400 per km.

2. POVERTY AND EMPLOYMENT CREATION

The project is situated in the Bizana Local Municipality and falls under the jurisdiction of the Wild Coast District Council. It is listed as the poorest Council area in the entire country (Statistics South Africa, 2000), with an imputed mean monthly household expenditure of only R862. The average recorded for the Eastern Cape was also the lowest provincial average at R1702.

The Bizana Municipality Integrated Development Plan (Bizana Municipality, 2002) indicates that the municipality has a population of 235326 persons. The area is 2806 square km and the population density is 84 per square km. The number of persons between the ages of 20 to 60 is 33% of the population. Unemployment measured in 1999 was 75,6%. The number of households which earn less than R1500 per month is 91,4%, and 33,4% of the households have no income at all.

It can be seen that the area was ideal for an employment creation project. The ward in which it took place has a population of 15542. In terms of government regulations persons under the age of 18 and over 60 may not be employed. The number of people eligible for employment was thus approximately 5900, and of these approximately 75% or 4425 were unemployed. The project employed a total number of 1700 which is 38% of the unemployed. It can be seen that such a project had a huge impact on such an area.

The wage rate was R30 at the beginning of the project and this was raised to R35 after one year. Taskwork was used throughout the project where possible. Of the total funds spent on construction 55% were spent on wages, 5 % on local goods and services and a further 20% was spent on local haulage contractors. This meant that 80 % (or R6.3 million) of the funds stayed in the area with the consequent multiplier effect.

3. PROJECT OBJECTIVES

The objectives were as follows.

- To provide all weather road access to the Amadiba community from the blacktop road especially to schools, clinics, and pension pay-out points
- To encourage agriculture beyond subsistence levels
- To promote public transportation
- To provide as many construction employment opportunities to local people as possible
- To transfer construction skills to the community
- To encourage local business, contractors and suppliers
- To build the capacity of the local community to manage road projects and maintenance thereof
- To reduce the environmental degradation caused by the proliferation of parallel tracks
- To minimise the environmental impact of the project
- To develop the community within the constraint of a proposed national park
- To facilitate tourism opportunities

4. TRAFFIC

Before the project began the track was impassable in bad weather (Figure 1), and was only usable by pick-up trucks and tractors, although bicycles and ox-drawn sleds are also commonly seen. It took 4 hours in good weather from the blacktop road to the end at Mtentu. Traffic volumes and average speeds were measured shortly after the beginning and during the project. The volume generally reduces the further away one goes from the blacktop road. At the point where they meet the volume (total in both directions) had increased from 30 to over 100 vehicles per day by February 2003 (Little, 2003b), and the vehicles using the road include taxis, 50-seater buses (Figure 2), trucks and saloon cars. A study on the average speeds showed that they have doubled from 15 to 30 kilometres per hour (Little, 2003b). The time to reach Mtentu has reduced to under one and a half hours. The economic benefits are clear, as people have become more mobile. Schools, clinics, pension payout points, and the towns of Port Edward and Bizana are now easily accessible during all weather conditions. The greater accessibility has allowed the police to enter the area and arrest some criminals who were operating there and terrorising the neighbourhood unchecked.



Figure 1. The hazard of travelling during wet weather in the past.

5. ROUTE SELECTION

The overall route was selected by the community. The main objectives were to link the community centre with the blacktop road system, and also to provide access to a tourism node on the sea at Mtentu. The existing route contained three pieces of old provincial roads that had fallen into disrepair through years of neglect connected together by tracks in the veld. When this route became really bad in wet weather the drivers had made their own alternative bypasses resulting in a collection of parallel tracks. A major realignment cutting out 23km of the existing track was investigated. This would have shortened the road by 8km but was rejected by the community as it did not go where they wanted to go. Realignments in other parts of the road were investigated, but were found to be unnecessary. Thus the problem was which parallel track to choose. In all cases the original track was chosen. One reason for this was community attitude which wanted the old road to be reinstated as a matter of pride. This cost a bit more to do but was considered worthwhile as there was no good way to rehabilitate the scars of the old provincial roads after stormwater and graders had cut them deep into the landscape.



Figure 2. The finished road - a bus service has been introduced.

6. NEC CONTRACT

Although this was a poverty alleviation project, this should not be confused with a large unconditional hand-out of largesse by the treasury. The client naturally wanted a project as close to the conventional type of contract as possible, which has specifications and guarantees and means of refusing to pay for substandard work. Past experience has shown that it is possible to produce an access road of a reasonable standard by hand alone. The most contentious issue is compaction, and this can be achieved by traffic and the passage of time. Road users must just be aware that immediately after construction that the formation is still soft and be warned not to damage it. One objective of the project is to develop local capacity to manage the construction of roads, so as much responsibility is given to them as possible. The community cannot be sued or held accountable for their work though, so someone has to take that role, and with it the responsibility for producing a reasonable quality product. CSIR took that responsibility; the question was what form the agreement should take between them and the client. The chosen solution was the Cost Reimbursable Contract from the suite of New Engineering Contracts produced by the British Institution of Civil Engineers. In this agreement the CSIR undertook to construct the works according to a broad schedule of works information and a programme. The estimated cost is specified in the contract. Payment is made by the client for actual cost (wages, tools, materials, plant, etc.) on submission of evidence of these costs. The contractor is reimbursed for his efforts by means of an agreed percentage of the cost. In this job it was 14%, which with hindsight was too low when one considers all the work which one has to do. Although there is a reduced design component the amount of community liaison, especially in the preliminary stages is large even with a social consultant on hand.

The work done included the following:

- **Preliminary work:** Community liaison, land issues, labour issues, route selection, borrow pit location, skills audit and interviews, and drawing up the contract.
- **Design:** While no conventional geometric design and drawings were done, a 36 m long causeway and two smaller causeways, with their approaches, storm water pipe culverts, drifts, and minor storm water management was done.
- **Construction supervision: Labour:** Recruitment of site management team, liaison with bank, opening accounts for over 1000 employees, calculation of wages, transfer of funds to bank accounts, payment by cash to about 50% of the employees, labour claims and disputes, instruction of employees, control of tools.
- **Construction supervision: Plant:** Sourcing, maintaining, and instructing in use.
- **Construction supervision: Materials:** Sourcing, ordering, stock control.
- **Project management:** programming at 3 monthly intervals, budgeting, insurance of works, monitoring of progress, management of senior site staff, finding new sources of gravel, liaison with the environmental consultant, site management of environmental constraints, monthly site meetings with the PSC, liaising with the co-ordinator, monthly site meetings with the client, compilation of the monthly certificate, monthly RDP reports, quarterly RDP reports, writing of reports and articles, showing the project to many visitors from all levels of government, liaising with the department taking over the road.
- **Training:** Giving training in many technical and organisational procedures for which no accredited courses are available or which are specific to the job.

It is considered that a fair fee is 24% rather than the 14% actually received. It should be noted that in this type of contract, the client needs to have a contractor he can trust.

7. SITE ORGANISATION

The road falls within one large tribal area, namely the Amadiba but the detailed tribal situation was somewhat complex. There was a sub-tribal area with a lesser chief, as well as numerous tribal

wards. The success of this kind of project depends on the labour being within walking distance of their workplace. Hence the project is divided into sections about 5 km long. This was done resulting in seven sections, and recruitment was done as required in each with the ward headman available to vouch that the employees were in fact local residents.

The community was asked to supply candidates for the posts of construction manager, assistant construction manager and supervisor. Seven suitable candidates were found. After initial training they worked together as supervisors on the formation building under the training officer. As work spread to the seven sections one of them was appointed in each to the post of Assistant Construction Manager responsible for that section. In this way it was easy to assess the abilities of each. When the time came to appoint an overall Construction Manager it was very clear who was the best candidate. This person was also the one put forward by the local community members of the PSC. This person was only rated fifth out of the seven by the formal training provider, indicating that scores in training courses do not necessarily indicate construction management ability.

The maximum number of employees was 460 when work was in full swing. Labour was divided into teams, usually of five persons. Where there was a large number of these teams, such as when the formation building was in progress then the ACM needed supervisors to assist him or her. Only one clerk was employed who calculated the wages from the attendance registers provided by the ACMs. Storemen or women were employed as necessary. At the centre of the site at the causeway was a container and security guards were employed to look after this.

8. PROJECT STEERING COMMITTEE

There were many stakeholders in the project and each needed to be given the opportunity to know what was happening in the project, and be able to make an input to protect their interests.

The PSC for this project consisted of the following constituents:

- **Amadiba Coastal Community Development Association:** this is a local body which has formed a trust with the resulting legal status. Formed originally to manage local community tourism initiatives, it has formed an infrastructure committee as well. It was the major role player in the PSC, and among other things, took responsibility for the drawing, delivery and payment of those wages which were made in cash. They were responsible for monitoring construction on behalf of the CSIR. They supplied the chairman for the majority of the PSC meetings.
- **SANRAL-Eastern Region:** was the client on this project.
- **CSIR-Transportek:** were responsible for the implementation of the project.
- **Amadiba Tribal Authority:** while the power of the tribal authorities has dwindled as they do not control the spending they are still the traditional leaders with much influence.
- **Amadiba Coastal Sub-tribal Authority:** the second half of the road fell in this zone.
- **5 different tribal wards:** the people in these wards are fiercely defensive of the right to decide who may work in their area. They reserve it strictly for their own people.
- **Mbizana Local Municipality:** was of great importance as they will play a major role in the maintenance of the road in the future. The councillor for the municipal ward in which the road falls has great influence over how municipal funds are spent, and the introduction of a road is of great importance to other projects.
- **O R Tambo District Municipality:** while their offices are a long way from the project they have overall responsibility for the road network of which Amadiba road forms part.
- **Eastern Cape Department of Public Works:** as with O R Tambo Municipality the road is relevant to their network and it is in their interest that it is maintained well.
- **Department of Nature Conservation:** as the road falls in an area of value and nature tourism they had an interest as well.

It can be seen that the road brought together many of the role players in the area. The road acts as a catalyst for further development in the area, indicating the important role played by transport.

9. LABOUR ISSUES

There is a Code of Good Practice for employment and conditions of work for the Special Public Works Programme which applied to this project. At the time that this project was planned and begun this code had not yet come into effect. Wages were subject to the regulations for the civil engineering sector, but could be varied upon appeal to the Minister of Labour. This was done and was approved. Preliminary discussions with the community leaders led the planners to believe that the labourers would work for R20 per day. However when work began in January 2002 they would not begin work, demanding a rate of R30 per day, illustrating the importance of skilled community liaison. This had great implications for the budget as can be imagined. A partial solution was achieved by offering the labour two alternative tasks, the normal one and a larger one for R30 with the task size increased in proportion. This was accepted by the labour and work began. Luckily ground conditions were softer than anticipated and no-one ever asked to be given a R20 task, so that complication did not arise. However not all work can be set in task form, so some work did end up costing more than was budgeted for.

The code has a multitude of requirements, and those embarking on labour based programmes are advised to be very careful. As we must have been one of the first projects to use this document, the experiences may be of interest. Topics include recruitment, wage payments, training, and sick leave.

The code has suggestions on whom to recruit, especially the poorest and most disadvantaged persons, and firm recommendations for the categories of women (60%), youth (20%) and disabled (2%). There were usually about 3 times as many applicants as there were jobs. The way recruitment was organised was as follows. Applicants were asked to stand in four queues: men over 25, women over 25, men between 18 and 25 and women between 18 and 25. It is of interest that there were generally significantly more men than women. The men were thus disadvantaged as they were competing for only 40% of the jobs. Also significantly more than 20% of the applicants were youths so they were disadvantaged by the recruitment process. A ballot was done for each of the 4 groups to choose the lucky winners. For example if 100 labourers were needed then we took 8 male youths, 12 female youths, 32 men and 48 women. It was difficult to find work for disabled persons, the only one employed was for traffic counting. It might be better not to have any recommended percentages and give each applicant an equal chance of work.

Recruitment is an activity that is open to favouritism and it was important that a senior local community member was present to vouch that the applicants were from that area. This person was also supposed to enforce the rule that not more than one member from each family was recruited, but it is not believed that this was achieved. This is difficult to enforce when so high a proportion of the unemployed were taken, as happened on this project.

To spread the work out as much as possible labourers were generally employed for two months and then replaced. This caused difficulties with wage payments. Security for payroll delivery is a major problem so from this point of view direct payment into bank accounts is safer than paying out cash. The community was advised before the project that payment would be made electronically. A previous project in the area had resulted in some of the people already having accounts. Standard Bank offers to help in such cases by opening accounts for employees, so they were contacted, and their representative came to site and explained the procedure to the labour. However when the bank found out that the employment was only for 2 months, and that labourers closed their accounts immediately their work ended (because of the punitive bank charges), they were reluctant to open any more accounts. The result was that approximately half the wages were paid out in cash and half via bank accounts, which was far from ideal. Perhaps the banks need to be encouraged not to charge

the poor for not operating their accounts, and not to charge them for closing the accounts. The taxi fare to Port Edward or Bizana was approximately R30 return, a significant amount when one's wages are so low, which favours cash payment. Other ways of paying are available and the best solution will be different for different areas. The code requires payment within 35 days of the work, geared to monthly payment. In our case payment was made fortnightly, and usually within 7 days of the last working day.

The code requires 2 days of training for every 22 days of work for all employees, a significant amount. Wages during training are set at 75% of normal wages, and hence the cost of training is a minimum of 7.5% of the wage bill for actual work. In our case this would have amounted to 3.6% of the project cost, compared to the suggested guideline minimum of 2% in the code. This rule came into effect after the project began, so we had not budgeted for this, so we did not train the labourers formally at all. All the training was given to the semi-skilled and senior staff, and consisted mainly of technical training, mentioned later.

The question of sick leave proved to be a real thorn in our side. The code stipulates that one day of sick leave for every full month worked is payable for workers who work 4 or more days per week. Doctor's certificates are only required if one is absent for 3 days or more. What this means is that every one can take one day off a month and still get paid. In this the code overrides the general principle that payment is only made for work done, and payment is made for doing a task. This disrupts the work as one does not know when the labourer is going to be 'sick', and adds about 5% to the cost of the work. It is an administrative nightmare too as the clerk has to scrutinise the past attendance records in order to decide whether an employee is entitled to be paid for a day on which he or she was absent. When we approached the client with a claim his representative suggested to the PSC that if anyone was sick, then the rest of the team (labourers work in teams of 5 in general) should do the missing person's work for them. This was approved by the PSC and by labour. This resulted in maintaining productivity and it made administration easy as everyone was marked present from then on. It was not satisfactory though as now there was no true record of attendance, and if someone was absent more than one day a month we would not know from the attendance registers. It was a licence to falsify the attendance registers, the thin end of the wedge, and is not a long-term solution. It is believed that sick leave should be eliminated from the rules, especially for short-term casual labourers.

10. FORMATION BUILDING

The main job was the construction of the formation. The method used was to clear the intended space and cut slots at intervals, preferably the same as the team task. On this project the terrain was similar all the way and the standard team task was 11.25 m of formation per day. This included the simultaneous digging and shaping of the side drain(s) and the achievement of a camber of 11%. This was done at a rate of up to 1 km per week.

The earth is not compacted by machine but the local drivers were encouraged to assist by varying their wheel tracks. When the earth road had settled down a reshaping exercise was done. The camber template was altered to 5% and the road, which was hard by then, became smooth. This reshape costs about the same as compaction would have. The method described is much the same as it was for the first such labour based road in this region (Little 1987).

11. CAUSEWAYS

In the middle of the project is a river which was often impassable after rain. Here a 36 metre long reinforced concrete arch causeway (Figure 3) was built entirely by semi-skilled local labour. It is considered that this is a most suitable form of construction as the cost is similar to a causeway with pipes but the flow before overtopping is calculated to be 80 cubic metres per second as opposed to

the 27 cubic metres per second of a pipe solution (Little, 2003a), resulting in a causeway that is open that much more often in heavy rain. The causeway was anchored down by means of dowel bars set in holes drilled into the rock base. The causeway was 5.25 m wide and it was cast in sections 2.3 m long, each containing an arch. The arch diameter was 1.9 m. The arch was formed on purpose made steel moulds.

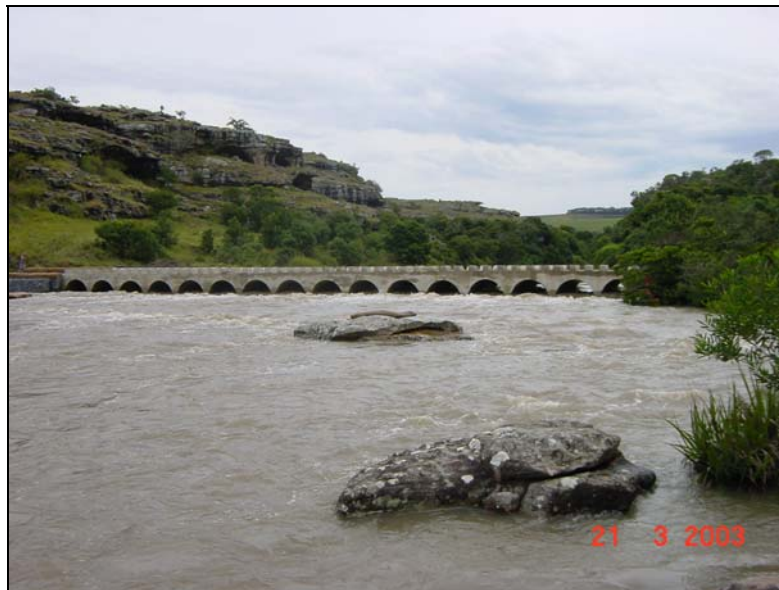


Figure 3. The 36m arch causeway, built entirely by local semi-skilled people.

12. DRIFTS

Substantial use was made of drifts on the project as they were much cheaper than pipe culverts. They carry much more flow and are easier and quicker to build. Also, pipes would have required fill to be brought in to cover them. A total of 64 drifts were built in the 40 km. The drifts have the desirable effect of reducing the speed on the road as they act as inverted speed bumps. In general they were 20 m long with the middle 15m being concreted. The concrete is placed in a grid of geocells (Figure 4), which creates a concrete block pavement of uniform thickness. The longitudinal section consists of two s shaped curves with a flat bottom in the middle.



Figure 4. Concrete geocell drift under construction.

13. GRAVELLING

Such earth roads usually need a gravel surface layer and this was no exception. The soil in the area is generally sandy above the Mzikaba Sandstone Formation. Gravel sources are scarce. In some places a thin seam of pea-gravel is found below the topsoil and above the sandstone. This seam was used extensively for the gravel layer. It is too thin to be won by machine, so this was an operation that was particularly suited to labour based construction. The topsoil was removed and stockpiled and replaced when the gravel had been removed, leaving the landscape basically unchanged in this environmentally sensitive area.

Local haulage contractors were found for the gravelling. Some had tractor/trailers and some had flat trucks. Although some of the vehicles were in poor condition there was no adverse affect on this project. Volumes varied from 1.9 to 7.0 cubic metres. The most successful contractor had a 4 cubic metre flat truck. Twenty-one vehicles were available so when one broke down it could be replaced. The hardest part of supervising this type of project is ensuring that the contractors are carrying full loads, and checking that the number of loads delivered has not been inflated. Full time supervision is really needed, as this is the easiest source of corruption.

14. TRAINING

Technical training was given to the construction management team on site, together with a few other local people selected by the Project Steering Committee. Training comprised modules for the:

- laying of storm water pipes,
- building of head-walls and wing-walls,
- constructing sub-surface drains,
- steel fixing
- erecting formwork,
- concrete batching and placing (Figure 5),
- gabion installation,
- stone masonry construction,
- small plant operation and
- entrepreneurial training.



Figure 5. Training in concrete batching and placing.

The technical training was commissioned during various stages of the project and allowed the trainees to receive hands-on experience during the construction process. In addition three senior community members were enrolled on a project management course towards the end of the job. This has enhanced their ability to manage the maintenance of the road, and to undertake projects other than roads.

15. TOURISM

The community has realised the potential of tourism and have embarked on a comprehensive community-based tourism programme to develop the coast and attract tourists. Initiatives that have already been introduced and are operational include a “catch and release” fly fishing operation in the Mtentu Estuary (Figure 6) and various horse and hiking trails. Now that the road is open it is expected that further developments will take place.



Figure 6. Fly fisherman in the Mtentu Estuary.

16. CONCLUSION

The primary objective of the project was to provide jobs to a very poor community and thus to alleviate poverty. This was done most successfully by using labour intensive construction. Providing accessibility was also a key outcome and the community now have an all weather gravel road, which has been handed over to local government for maintenance. Public and private transport which was scarce in the past is now thriving and provides the community with access to schools, clinics and towns.

Skills transfer and training has ensured that the local site management team have developed to a stage where they could become contractors on their own. The other type of emerging contractor on the project was the haulage contractor. They have made good money and many of them have upgraded their vehicles, and are eager to get new work of similar nature. The community is now well equipped to take care of their road network.

The major spin off that is hoped will follow the construction of the road is tourism. While the road project provided temporary employment for the community, it is envisaged that a booming tourism

industry will provide many permanent jobs in the area. With its natural and interesting beauty, the Amadiba area is a part of South Africa soon to be discovered, thanks to the Amadiba Road.

17. REFERENCES

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BIOGRAPHY

Amith Lachman

After qualifying from the University of Natal in 2000 with a Bachelor of Science in Civil Engineering, I was employed at CSIR Transportek Durban. The labour intensive Amadiba Road Project was my major focus.

My duties on the Amadiba Road Project included preparation of the monthly certificate, preparing fortnightly pay spreadsheets for the payment of the local workers, compiling various reports that included progress reports and RDP reports, design calculations for drainage culverts and general site management and supervision.

My work has been thoroughly enjoyable and fulfilling. It was my dream to make the lives of others better, and because of the Amadiba Road project, I can happily say that this is a no more just a dream.

Rob Little

Rob Little comes from Cape Town originally, having graduated from UCT in 70 and 72 with his bachelor's and master's degrees in civil engineering. He then worked for 10 years in consulting and contracting, mainly on bridges and building structures. He joined the University of Natal and lectured there in structures for 18 years. He became involved in community projects, especially dealing with labour intensive roads in 1983 and pioneered the introduction of the method in KwaZulu-Natal. Since then he has been involved in lecturing on, organising courses on and participating in such projects. He joined the CSIR for two years to manage the project under discussion, and presently is self employed as a consultant.