
LABOUR INTENSIVE ROAD CONSTRUCTION

by R.D. Little

Throughout the Third World labour intensive road construction is used as a method of employment creation and poverty relief. South Africa has seen this used before, but it is only in the last few years that it has been considered again in a serious light. The commonly held view amongst engineers is that machinery is more efficient than labour. It turns out that this is not so and that the comparison must be made for the different construction activities. While one might think that the crushing of rock for concrete aggregate is certainly a machine-made activity, this is not so. A gang with hammers and chisels and the experience of knowing where to apply the impact uses far less energy than the brute force method of mechanical crushers.

South Africa is a country where the labour intensive method is particularly appropriate at the present time. Much of the heavy construction machinery is imported at great and increasing cost as the Rand depreciates. The threat of sanctions is imminent. Furthermore Durban is said to be the second fastest growing city in the world. Unemployment compounds the serious problems we already face. The cost of a project can be measured in purely financial terms and it is found that the cost using capital intensive methods and labour intensive methods is similar. The cost can also be measured with more difficulty in economic terms. Here the social benefits of replacing capital with labour are apparent and the method comes into its own.

The Valley of 1000 Hills has a large population who commute to Pinetown and Durban to work. The roads are all unsurfaced. The main roads are maintained by the KwaZulu Roads Department. The minor roads are built by the people themselves. Needless to say these roads are barely passable, many of them, and the need for better roads together with the need for fresh water are the most pressing felt needs of all.

For the last three years road projects have been undertaken and administered by the Valley Trust and funded by the Department of Manpower. The first of these was a new road, four kilometres long, to a community who had no road access. The method of taking the sick to the nearest clinic was by wheelbarrows. The route was designed by conventional means, but the setting out was not done with a theodolite, only with a tape and an abney level. The route was deviated to avoid houses and crops. Cut to fill was avoided wherever possible. The road followed the contours of the ground creating a pleasant winding alignment. The road is not suitable for large buses but adequate for the minibus. Where the grade

was high concrete strips were cast to give traction. It is recommended that grades should be kept to twelve per cent where possible. With the abnormal rainfall in the last year and the steep terrain, erosion is a major problem and roads need constant maintenance. The in situ material was suitable for road making and gravel did not have to be imported. Compaction was done by the passage of traffic and time and there has been no noticeable adverse effect due to the absence of machine compaction. The settlement does cause a change to the crossfall which is corrected by routine maintenance.

At one point the road crosses a stream. Here a ferrocement arch culvert was built with a waterway opening equal to four 600 mm dia. pipes. This was a labour intensive activity which cost forty per cent less than it would have if commercial concrete pipes had been bought.

The labour force consisted of ten teams of thirty people who were each paid five rand per day. To obtain good productivity it was found essential to use the task work system. By this method everyone is given a daily task to complete, after which they may go home. It goes without saying that labour relations are extremely important. A set of site rules has evolved to cope with the more common issues such as rain stoppages and dismissal of staff. Men and women were employed and no problems were experienced with this. Where hard excavation was required this was usually done by the men while the women moved it to fill. The job was finished in four months. These projects can be started up quickly and finished quickly. In India 250 000 people were employed on one project.

The second project completed was a new road of five kilometres. Here a new feature was the making of ferrocement stormwater pipes on site. When the water supply to Durban was cut off in September 1987 this road was the only access left open to the area.

The third project consisted of maintenance work. A team was set up in each of the five tribal areas in the valley. They worked on a total of thirteen roads identified by the local people as those most needing attention.

The fourth project is about to begin, involving maintenance and upgrading work on local roads - some worked on earlier and some attended for the first time. Several students are involved in aspects of the project, which gives useful opportunities for fieldwork and research. □