REHABILITATION OF GRIFFITHS MXENGE HIGHWAY

A CASE STUDY

Daniel Mtikulu (Pr Tech Eng)
eThekwini Municipality
## PROJECT INFORMATION

<table>
<thead>
<tr>
<th><strong>Client:</strong></th>
<th>eThekwini Municipality - Roads Provision Department</th>
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</thead>
<tbody>
<tr>
<td><strong>Design Engineers:</strong></td>
<td>Smec (South Africa)</td>
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<tr>
<td><strong>Contractor:</strong></td>
<td>Milling Techniks (PTY) Ltd</td>
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<tr>
<td><strong>Project Value:</strong></td>
<td>R190 million</td>
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<tr>
<td><strong>Project Duration:</strong></td>
<td>24 months</td>
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<tr>
<td><strong>Construction Extent:</strong></td>
<td>34,8 lane-kilometer</td>
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GRIFFITHS MXENGE HIGHWAY

- Major Arterial within the Umlazi Township
  - 1st Section - 6.3km dual carriageway
  - 2nd Section - 4.2km single carriageway

- Only access into Umlazi Township

- Major Trip generators:
  - Regional Hospital (approx. 1,200 beds)
  - Mangosuthu University of Technology (student enrolment approx. 10,000)
  - Three Shopping Malls along the route
  - Soccer Stadium (one of the training ground for World Cup 2010)
  - Intermodal transfer stations (mini bus taxi, buses and rail)

- Public Transport route
How do we implement such a project?

- Tried and tested process?

1. Identify Project
2. Appoint Design Engineer
3. Produce Solution (Pavement Design)
4. Appoint Construction Team
5. Implement solution
But we could do better!!!

WHY?

- Constructability of the solution is not usually given enough attention at design stage
- Construction impacts to traffic flow is generally negative, however in an urban road environment such becomes extremely painful and results in lots of frustrations.
Privileged Position...

Long-term relationships:

- Construction services procured on long-term basis. The arrangement make it possible for the Project Team to interact at an early stage of project development in order to ensure that community’s interest are given adequate attention and best possible solution is applied.
Privileged Position...

- Allows the project team (Consultant, Client & Contractor) to evaluate each rehabilitation option beyond structural capacity and economic benefit.
- Access each pavement design solution against:
  - Impact on **Mobility** during construction
  - Impact to **Access**
  - Impact to construction **Productivity** thus increase construction duration
  - Possibility of **Early trafficking**
  - Impact on **Environment**
Privileged Position...

Decision on appropriate solution was made based on a simple material selection and evaluation matrix.

<table>
<thead>
<tr>
<th>Pavement layer</th>
<th>Mobility</th>
<th>Access</th>
<th>Productivity</th>
<th>Early trafficking</th>
<th>Environmental effect</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| Cement stabilization         | N        | N      | Y/N          | N                 | N                    | - Process is slower and results in reduces traffic mobility particularly on a two lane carriageway. 
- Access during construction is a safety hazard and after construction road needs to be closed from traffic. 
- Curing period of up to seven (7) days required. 
- Dust control from cement is necessary to maintain safe working zone. Possibility of loose aggregates if finishing and slushing process is not undertaken properly. |
| Asphalt                      | Y        | Y      | Y            | Y                 | Y/N                  | - Construction process is quick and access to traffic can be granted as soon as the mat has cooled to required temperatures. 
- Productivity not dependent on paving operation but on available space to pave and capacity of manufacturing plants. 
- Besides heat and some fumes experienced by paving team, this material has limited environmental effects. |
| Bitumen Stabilised Material (BSM) | Y        | Y      | Y            | Y                 | Y                    | - Construction process is comparable to the asphalt but with added advantages viz. ability of advance mixing and stockpiling. Therefore no delay in dispatching materials. 
- It can be trafficked immediately, no cooling period or curing required. 
- Productivity is also not dependent on operation. Mix can be sent anytime to site. 
- Material is easy to work with and possess minimal environmental hazard to both through traffic and workers. |
Some of the solutions...

Existing Pavement:
- 40-80mm AC
- 150mm G2
- 150mm G4-G6
- 500mm sand drainage layer

Pavement Solution:
- 250mm BSM1 (in-place recycled layer)
- 20mm UTFC
- 40mm AC

Subgrade
Construction...

In-place recycling operation:
- Two lane carriageway
- Construction under live traffic
Construction...

Asphalt Paving operation:
- 40mm wearing course on a BSM base
- UTFC Construction under live traffic
Construction...

Poor management of Infrastructure within road reserve:

- Electric cable.
- Effect on the construction operation.
Construction...

- Successful implementation can only be achieved when all stakeholders share the same objectives.
- When conflict arise matters can be addressed amicable.
- Cooperation with law enforcement agencies allowed the project to proceed and assisted in better management of traffic.
- Local entrepreneurial opportunities by means of sub-contracts were created (approx. R9m)
- Local labour employment opportunities were also created
Conclusions...

- Foresight in assessing traffic impact at design stage is critical for major urban projects.
- Material selection at design stage must also include constructability consideration.
- Consideration of incorporating small and medium entrepreneurial opportunities in a project is critical for social development and avoiding undesired conflict with communities.

Our customer demands continue to change. Current view is Development for the people but by local people...
THANK YOU