

## TI-UP Enquiry: Cost of Roads in Africa

To investigate the costs of roads in Africa, a range of sources were consulted, from internal projects to online resources.

### Unsurfaced roads

| Country/Source                      | Rural –<br>unsurfaced<br>(US\$/km) | Year | Source |
|-------------------------------------|------------------------------------|------|--------|
| Lesotho Average Rehabilitation      | 8,000                              | 2001 | (i)    |
| Lesotho Average Rehabilitation      | 16,000                             | 2002 | (i)    |
| Lesotho Average Rehabilitation      | 19,000                             | 2003 | (i)    |
| Rehabilitation                      | 17,000 - 47,000                    | 2000 | (v)    |
| Mozambique Equipment Rehabilitation | 1,114-3,114                        | 2003 | (vi)   |
| Mozambique Labour Rehabilitation    | 1,479 - 8,271                      | 2003 | (vi)   |
| Uganda construction                 | 15,000                             | 2000 | (iii)  |
| Ghana Labour based construction     | 11,441                             | 1998 | (ii)   |
| Ghana Equipment based construction  | 19,311                             | 1998 | (ii)   |
| Regravelling                        | 9,000 - 13,000                     | 2000 | (iv)   |
| Ghana Average 100mm surfacing       | 4,300                              | 2001 | (i)    |
| Ghana Average 100mm surfacing       | 6,800                              | 2002 | (i)    |
| Improvement                         | 11,000 - 114,000                   | 2000 | (iv)   |
| Paving                              | 62,000 - 609,000                   | 2000 | (iv)   |

Maintenance of unsealed roads using labour in Lesotho was seen to be on average \$127/km. per annum. The AFDB<sup>(iii)</sup> reported that according to the Government of Uganda 1999 Rural Road Strategy Report, US\$3,700 (or 25%) of the capital cost is used for periodic maintenance (which is planned to take place every 5 years after construction and 5 years after every other periodic maintenance). Routine maintenance is assumed to occur every year, except in the first year of capital investment and the years when periodic maintenance is undertaken. Routine maintenance costs were estimated at US\$300 p.a. or 2% of capital costs for the year following full rehabilitation; rising to 3% in PY3; 4% in PY4 and 5% in PY5. The cycle repeats after each periodic maintenance.

A study in Mozambique<sup>(iv)</sup> in 2003 found the costs of periodic maintenance ranged from US\$498 (national roads) to US\$1,807 (rural roads). The average routine maintenance cost of rural roads that used labour based methods was US\$618 (costs ranged from US\$218 to US\$979). In overall terms, the average costs for periodic maintenance were US\$973 for equipment based and US\$626 for labour based maintenance respectively. In the case of routine maintenance the average costs were US\$829 for equipment based (EB) methods and US\$758 for labour based (LB) methods. These values though were seen to be low when compared to other countries.

Ugandan rural feeder road rehabilitation in Uganda was quoted as US\$8,000 at 1999 price. More recent values of rehabilitation were given as US\$14,000 for labour based works this was said to be on a par with Zimbabwe with (1997-2000) US\$ 13,000 per km. The Uganda analysis also suggests an average unit cost of US\$ 7,800 for periodic maintenance. This shows that the calculated full rehabilitation and periodic maintenance unit costs figures (the average full rehabilitation figures are US\$2,114 for EB methods and US\$2,945 for LB methods; the average periodic maintenance figures are US\$973 for EB methods and US\$626 for LB methods) are much lower than the Uganda figure of US\$7,800;

## Surfaced Roads

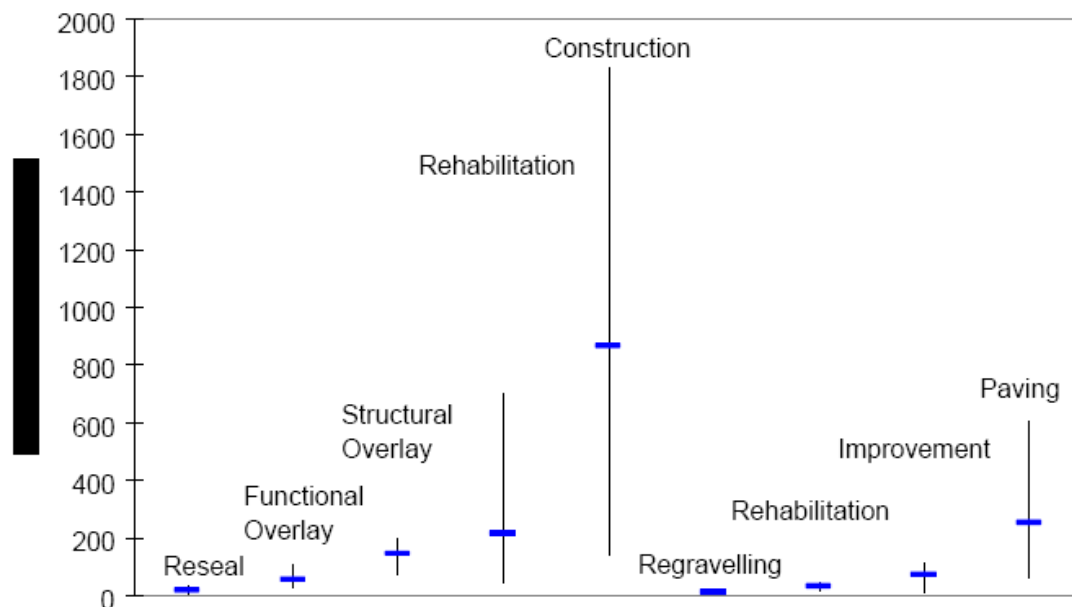
|                     | Surfaced Roads (US\$/km) | Year | Source |
|---------------------|--------------------------|------|--------|
| Ghana               | 484,314                  | 2004 | (v)    |
| Seals               | 5,000 - 32,000           | 2000 | (iv)   |
| Functional Overlays | 30,000 - 107,000         | 2000 | (iv)   |
| Structural Overlays | 74,000 - 198,000         | 2000 | (iv)   |
| Rehabilitation      | 45,000 - 700,000         | 2000 | (iv)   |
| Construction        | 142,000 - 1,832,000      | 2000 | (iv)   |

The World Bank site provided ranges of construction costs from around the world. Median costs were found to be:

|  | \$/Km in 2000 |
|--|---------------|
| Seals (reseals, surface dressings)             | 19,000        |
| Functional Overlays (thickness <= 5.0 cm)      | 56,000        |
| Structural Overlays (thickness > 5.0 cm)       | 146,000       |
| Rehabilitation (strengthening, reconstruction) | 183,000       |
| Construction (widening, new construction)      | 959,000       |

A diagram from the presentation showing global cost ranges is presented below.

### Average and Range of Actual Roads Works Costs per Km



(Source: [http://www.worldbank.org/transport/roads/c&m\\_docs/kmcosts.pdf](http://www.worldbank.org/transport/roads/c&m_docs/kmcosts.pdf))

A select range of global construction and maintenance costs can be found at <http://www.worldbank.org/transport/roads/con&main.htm#unitcosts>

## References

- i. ILO/TRL labour based study
- ii. R6239 Cost Comparison between Labour-Based and Equipment-Based Methods for Roadworks:A Case Study from Ghana
- iii. [http://www.afdb.org/pls/portal/docs/PAGE/ADB\\_ADMIN\\_PG/DOCUMENTS/ECONOMICSANDRESEARCH/ERP-54.PDF](http://www.afdb.org/pls/portal/docs/PAGE/ADB_ADMIN_PG/DOCUMENTS/ECONOMICSANDRESEARCH/ERP-54.PDF)
- iv. [http://www.worldbank.org/transport/roads/c&m\\_docs/kmcosts.pdf](http://www.worldbank.org/transport/roads/c&m_docs/kmcosts.pdf)
- v. <http://www.ghanaweb.com/GhanaHomePage/NewsArchive/artikel.php?ID=53797>
- vi. <http://www.ittransport.co.uk/documents/Mozambique%20Cost%20Comparison%20Study%20Final%20Report%20-%20%20Jan%202004.pdf>

## Conclusions

I think these results show that it is almost impossible to find good estimates of road construction and maintenance costs. There is wide variation. Perhaps the best way of comparing costs is to obtain different costs from the same working and contractual environment, but that will give no more than a national comparison, not absolute international data. The ITT report in the last reference is good in this regard. There are many reasons for the variation, ranging from differences in terrain (compare the problems of a road in gentle terrain with accessible materials to those of a road in unstable mountainous terrain with scarce materials) to commercial differences (different levels of competition, contractor skill and viability, corruption, etc). Perhaps a rough guide would be \$8-10,000/km for an earth road and \$10-15,000/km for a gravel road inclusive of basic structures but exclusive of major structures. Periodic maintenance might be \$2-4,000/km per cycle and routine maintenance up to \$1,000 per year. A simple seal onto a good gravel base might be \$10,000/km. As roads become more substantial, the costs can rise rapidly as the figures above show.

Other factors which affect costs are the choice of technology (with labour based methods typically being around 25% less than equipment based methods) the size of the road (not so much whether a rural road is 4.5 or 6 metres across but whether a road is 2 or 4 lanes), the exact nature of the work (many types of work can be classed as rehabilitation) and the extent of the off-carriageway works.

Data is often very difficult to collect for this type of analysis.

I think that these typical costs are so varied that they cannot be sensibly used as an international guide. If the estimate is required for a particular country, it would probably be better to study historical costs in that country. Otherwise, it is better to acknowledge the high degree of variation.