Ultra-Low-maintenance strategy for the road network: a rational alternative for developing countries?

Arnaud Desmarchelier
AFTTR
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The First Best Paradigm for road maintenance

• The principles governing the donors/governments relationships on roads are the following:
  – Maximize the NPV on investments
  – Donors should not bear the recurrent costs of maintenance.

• As a result, donors invest many efforts on developing maintenance-secure strategy as well as investment protection strategy.
Level of service over time

Paid by donors

Paid by governments

The theory

The reality

Level of service vs. Time

Ultra-Low-maintenance strategy for the road network
Government current position is to not maintain their road network. Why? (1/2)

• **Political reasons**
  - High political pressure to deliver something tangible (rehabilitation/reconstruction) to constituents/voters;
  - Enforcing axle-load control is politically risky.

• **Budgetary reasons**
  - Budgetary (or assimilated, i.e. RMF) resources are always limited and often unpredictable.
  - Current financing arrangements between donors and governments artificially increase maintenance costs relative to investment costs for the governments.
  - Road degradation consequences are born by users through higher vehicle costs rather than by the government.
Government current position is to not maintain their road network. Why? (2/2)

• **Technical reasons**
  – Inability to plan and manage the maintenance works despite huge past investments in technical assistance;
  – Lack of appropriate data to monitor the network;
  – Limited contracting capacity and problems with procurement and payment delays;
  – Systems to control axle-load are easily countered.

• **Economic reasons**
  – Enforcing axle load laws induces an immediate increase in transport fares
What if the donors were to yield to this second-best strategy?

- Work from the premise that routine and periodic maintenance cannot be adequately performed → adapting the road technology to the institutional situation rather than the reverse.

- Investment costs: maintainability Vs. service level
  - Some low-maintenance technology may be more expensive than the usual choice for similar level of service.
  - reasonable choice to trade off some level of service (notably speed or full time motorability) for much longer life cycle. → the low-maintenance roads’ initial investment costs may not be significantly higher than usual techniques.
Level of service over time: the alternative

The Theory
The Alternative
The Reality

Paid by donors
Paid by governments

Level of service
Time

Ultra-Low-maintenance strategy for the road network
Strategic Objectives: building roads to last

• Factoring in possible failures in maintenance.
• Heavy-duty
  – Capacity to withstand shocks (high axle loads; high flood levels)
  – Resilient to no/low/curative maintenance
• Simple
  – Consistent with existing technical capacities and skills
  – Allowing for easy curative maintenance (labor intensive and consistent with decentralization)
  – Low building cost through delivery of lower service level
Changes in technological choices would be necessary and are possible.

- There is no technique for absolute zero-maintenance.
- However some technologies are better than others at withstanding the “second-rate” maintenance as well as “shocks” while providing an acceptable level of services.
- Such technologies may have still to be found but many of them are already well known.
- Critical to reconcile proposed technologies and available capacities and skills.
Examples of possible technical changes

- From asphalt to:
  - Traditional Portland Cement Concrete – PCC – pavement
  - Roller Compacted Concrete – RCC – pavement
- From gravel road to:
  - Stabilized earth roads
  - Slurry/composite macadam
  - Low volume seal roads (cf. SSATP)
- From earth roads to:
  - Water-bound macadam:
  - Stone-/Block-paved roads
  - Cement-soil
- From culverts to low water crossings:
  - Un-maintained culverts are a primary source of roads disruption
  - In many occurrences, culverts can be replaced by drifts that if well done will resist to high water flows.
The likely stakeholders’ positions: the government perspective

• Pros:
  – Increased expenditure flexibility
  – Transfer of road expenditure from government budget toward donors
  – Possibility to use available budget to expand the operational road network

• Cons
  – Perception of some proposed solutions as second grade
The likely stakeholders’ positions: Donors’ perspective

- **Pros:**
  - Improved relationship with the governments
  - Improved long term cost-effectiveness of donor funding
  - Higher probability of economic benefit materialization
  - Lower recurrent costs on roads maintenance mean more budget funds available for other critical sectors such as health or education.

- **Cons:**
  - Potentially higher investment costs per km
  - Required changes in project design approach
  - This strategy represents a departure from economic and technical orthodoxy.
The likely stakeholders’ positions: Users’ perspective

• Pros:
  – Better and possibly larger operational network as a whole

• Cons:
  – Decrease in the (initial) level of comfort