Output- and Performance-based Road Contracts (OPRC)

WB Transport Forum 2007 - Learning Event -
Course Segments:

Part 1: Concept and Rationale of OPRC’s
   (Andreas Schliessler)

Part 2: Creating a framework for OPRC’s
   (Chris Bennett)

Part 3: OPRC’s using Micro-Enterprises
   (Gerardo Flintsch)

Part 4: How to prepare and procure OPRC’s
   (Patricia Baquero / Andreas Schliessler)
Principles and Rationale of Output- and Performance-based Road Contracts (OPRC)

(…also called PMMR: Performance-based Management and Maintenance of Roads)
What is this contracting modality meant for?

Primarily
- To better respond to a new approach to Road Network Management.
- To achieve better roads for the same money, or ...
- ... to use less money for assuring the same Level of Service
- To reduce the administrative effort for the Road Agency (fewer contracts)
What is this contracting modality meant for?

...but also

- To ensure more stable funding for Road Maintenance.
- To make Road Maintenance a more attractive business for contractors
- To create incentives for technical innovation and higher efficiency
- To satisfy the needs of Road Users
- To support local communities
Washington DC Road
Pre - PBMC
Equipment Innovation: Mobile Pothole Patching

CONVENTIONAL
Average Unit Cost:
- $120 per patch
- $900 per lane mile
- $5,900 per ton

Production = 20-30 patches per day

MOBILE PATCHER
Average Unit Cost:
- $22 per patch
- $38 per lane mile
- $880 per ton

Production = 120 patches per day

Courtesy VMS
Material Innovation: RoadFlex™
Pothole Patching Material

- Permanent patch material
- No failures in 3 years
- No rework required
- Reduced labor and lane closures
- Less disruption to motorists

Courtesy VMS
Cost savings reported by Road Agencies

- Norway: 20–40%
- Sweden: +/- 30%
- Finland: 30-35%
- Holland: 30-40%
- Britain: 10% minimum
- Australia: 10-40%
- New Zealand: 20-30%
- USA: 10-15%
- Ontario, Cda: +/- 10%
- Alberta, Cda.: +/- 20%
- British Columbia, Cda: +/- 10%
## Change of Approach

<table>
<thead>
<tr>
<th>Old Approach</th>
<th>New Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road by Road (fixing bad roads)</td>
<td>Road Sector Efficiency (Network Management)</td>
</tr>
<tr>
<td>Project Lending</td>
<td>Sector Program Financing</td>
</tr>
<tr>
<td>Road Engineer view (Road characteristics)</td>
<td>Road User view (Service Levels)</td>
</tr>
<tr>
<td>Completion of works … Payment … End .</td>
<td>Provision of Service Level over long periods</td>
</tr>
<tr>
<td>Payment based on Input quantities and Unit Prices</td>
<td>Payment based on Outputs (agreed service levels)</td>
</tr>
</tbody>
</table>
OPRC can be used to...

- Manage and Maintain existing roads during multi-year periods
- Bring roads to a maintainable condition and then manage and maintain them for several years
- Rehabilitate and improve roads, and then manage and maintain them for several years
- Construction of new roads, followed by a long period of management and maintenance
OPRC: Four types of activities

- **Management and Maintenance Services**
- **Rehabilitation Works**: Bring roads back to a standard they had before.
- **Improvement Works**: Add new characteristics to the road, in response to new traffic, safety, or other considerations.
- **Emergency Works**: Repair the road after damage from unforeseeable events.
Balance between Initial Upgrading / Maintenance

Contract must remain attractive throughout contract period, and not only during initial period.
Payments under OPRC Contracts: mostly for a Service to be provided:

- Contractor has to ensure that road users get a certain **Level of Service**
- Level of Service defined in terms of usability, road surface conditions, safety features, roadside assistance, etc.
- **Specifications** included in Contract describe Level of Service expected for each road in the network.
Service Level – Unpaved Roads

General
- Road open to traffic
- Average traffic speed

User Comfort & Safety
- Corrugation
- Rut Depth
- Other surface degradations
- Useable road width
- Cleanliness of surface
- Height of tree branches above road, etc.

Durability: Crown Height
Service Level – Paved Roads

- Potholes / Patching
- Cracking
- Cleanliness of Surface
- Rutting / Ravelling
- Loose pavement edges
- Height pavement / shoulder
- Shoulder conditions
- etc. …
Payments under PMMR Contracts:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Payment basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management &amp; Maintenance</td>
<td>Lumpsum per km/month (100% Output- and Performance-based)</td>
</tr>
<tr>
<td>Rehabilitation Works</td>
<td>Output-based Lumpsum for total volume, paid prorata according to actual progress towards target</td>
</tr>
<tr>
<td>Improvement Works</td>
<td>Unit prices per output product</td>
</tr>
<tr>
<td>Emergency Works</td>
<td>Based on input unit prices, for works agreed case by case</td>
</tr>
</tbody>
</table>
Contractor is free to decide …

<table>
<thead>
<tr>
<th></th>
<th>Mgmt. &amp; Maint.</th>
<th>Rehabilitation</th>
<th>Improvement</th>
<th>Emergency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What to do</strong></td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td><strong>How to do</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes / no</td>
<td>no</td>
</tr>
<tr>
<td><strong>When to do</strong></td>
<td>yes</td>
<td>deadline</td>
<td>deadline</td>
<td>no</td>
</tr>
<tr>
<td><strong>Where to do</strong></td>
<td>yes</td>
<td>yes / no</td>
<td>no</td>
<td>no</td>
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<tr>
<td><strong>Subcontract</strong></td>
<td>yes (*)</td>
<td>yes (*)</td>
<td>yes (*)</td>
<td>yes (*)</td>
</tr>
</tbody>
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## Bid Evaluation for OPRC contracts

<table>
<thead>
<tr>
<th>Activity</th>
<th>Bid Evaluation basis</th>
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<tbody>
<tr>
<td>Management &amp; Maintenance:</td>
<td>Network km x Lumpsum per km/month x No. of months</td>
</tr>
<tr>
<td>Rehabilitation Works:</td>
<td>Lumpsum for total rehabilitation works</td>
</tr>
<tr>
<td>Improvement Works:</td>
<td>Output Unit prices x quantities</td>
</tr>
<tr>
<td>Emergency Works:</td>
<td>Hypothetical Input Quantities x input unit prices</td>
</tr>
<tr>
<td>TOTAL BID PRICE:</td>
<td>SUM OF THE ABOVE (Net present value)</td>
</tr>
<tr>
<td>Months since beginning of contract</td>
<td>Usability of the road(s) Compliance required on (% of total length of roads under contract)</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1 and 2</td>
<td>No minimum set</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
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<tr>
<td>5</td>
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<td>20</td>
<td>100</td>
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<td>21</td>
<td>100</td>
</tr>
<tr>
<td>Until end of contract period</td>
<td>100</td>
</tr>
</tbody>
</table>
Evolution of the performance requirements over time

Months

0 20 40 60 80 100 120

Passability (% total length)
Average speed (km/h)
User's comfort (% total length)
Durability (% total length)
Role of Road Agency staff …

… changes for those involved in OPRC:

From counting cubic meters →
  to checking Service Levels
From “policing” contractors →
  to Partnership arrangements (PPP)
From Maintenance Engineer →
  to Road Asset Manager
End of Part 1
Thank you for your attention.
Andreas Schliessler

Next – Part 2: Examples of actual use of OPRC contracts under World Bank financed contracts (Chris Bennett).