

Sub-Saharan Africa Transport Policy Program (SSATP)

Work in Progress and New Developments in RMF

Output- and Performance-based Road Contracts (OPRC)

(Based on presentations by Schliessler/Gericke WB)

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Part 1:

Principles and Rationale of Output- and Performance- based Road Contracts (OPRC)

(...also called PMMR: Performance-
based Management and
Maintenance of Roads)



Change of Approach

| Old Approach | New Approach |
|--|---|
| Road by Road (fixing bad roads) | Road Sector Efficiency (Network Management) |
| Project Lending | Sector Program Financing |
| Road Engineer view (Road characteristics) | Road User view (Service Levels) |
| Completion of works ... Payment ... End . | Provision of Service Level over long periods |
| Payment based on Input quantities and Unit Prices | Payment based on Outputs (agreed service levels) |

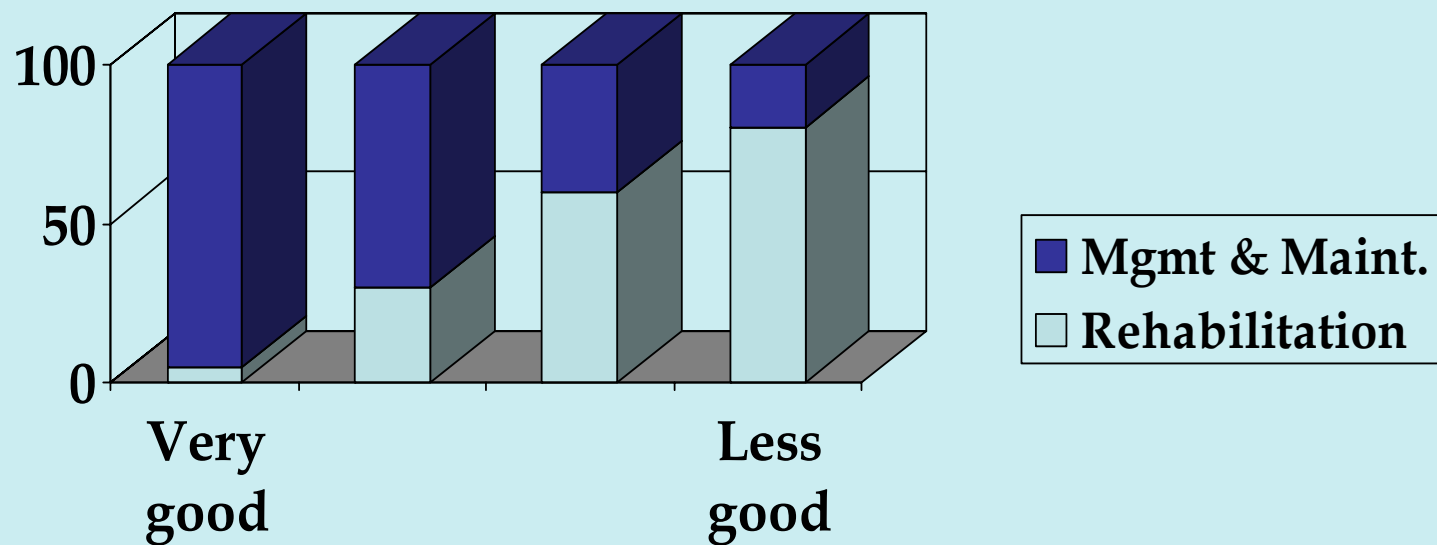


OPRC: Four types of activities

- 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, travel speeds, 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 – Pavements



- Potholes / Patching
- Cracking
- Cleanliness of Surface
- Rutting / Ravelling
- Loose pavement edges
- Height pavement / shoulder
- Shoulder conditions
- etc.



Supervision of Performance-based Contracts

- > Is very different from the traditional Supervision of Works, since it focuses on the four performance criteria only.
- > Is also much cheaper than traditional supervision; instead of 7-10 % of the contract value, it will only be around 3-5 %.
- > For a network of 450 km, supervision should not take more than 3 to 4 days every month.



Performance-based Contracts

Some important principles

- Contractors get paid a fixed monthly amount if they fulfill the agreed performance criteria, and
- are free to decide (i) what to do, (ii) when to do, (iii) how to do, and (iv) where to do.



A new World Bank Sample Bidding Document available for use in Bank-financed projects and elsewhere:

Output- and Performance- based Road Contract

Can be downloaded from WB Procurement Website



<http://www.worldbank.org/procure/>

...PMMR became OPRC...

February 2002 : World Bank publishes
Sample Bidding Document for PMMR –
Performance-based Management and
Maintenance of Road Networks

September 2005 : World Bank publishes
revised Sample Bidding Document, now
called OPRC – Output- and Performance-
based Road Contract



SAMPLE BIDDING DOCUMENT

**Procurement of
Output- and Performance-based
Road Contracts**

(OPRC)

and
Sample Specifications



**The World Bank
Washington, D.C.**

September 2005



**Annex to
SAMPLE BIDDING DOCUMENT**

**Procurement of
Output- and Performance-based
Road Contracts
(OPRC)**

**SAMPLE SPECIFICATIONS
for OPRC**



**The World Bank
Washington, D.C.**

September 2005



Developed jointly by

- Road Specialists
- Procurement Specialists

In response to a growing need to find

- adequate contracting modalities for Public-Private Partnerships (PPP) in the Road Sector, especially for existing Road Networks
- alternatives to traditional works contracts



WB finds increasing difficulties under traditional works contracts to ensure:

- That design is adequate
- That the quality of construction is adequate
- That road is completed at the price given by winning contractor
- That road is maintained after construction works are completed

OPRC is another option which is now available, which has the potential to resolve problems of traditional works contracts.



End of Part 1

Thank you for your
attention



Part 2:

Practical Application of OPRC in CHAD









Pilot Application of OPRC Contract in Chad

- 440 km of unpaved main roads
- 4 years (48 months), extended to 55 m.
- Contractor: DTP (Bouygues Group, France)
- Supervision: SADEG (Cameroon)
- Contract signed in April 2001
- Contractor started in July 2001



Pilot Application of OPRC Contract in Chad

- Included (implicitly) full initial rehabilitation spread out over 21 months
- 10 % of contract amount reserved for Emergency Works
- Included reconstruction of drainage structures, signaling, emergency assistance for road users in case of accidents, cleaning up of accident sites, management of rain barriers, axle load control, etc.



Pilot Application of OPRC Contract in Chad

- Contract value of US\$ 11.9 million
- 10% reserved for Emergency Works
- Rehabilitation, Management & Maintenance -- equivalent US\$ 5.740 per year/km
- Paid in fixed monthly payments of US\$ 210.000 (if full compliance)
- Initial payment of 20%
- Performance Guarantee of 10%

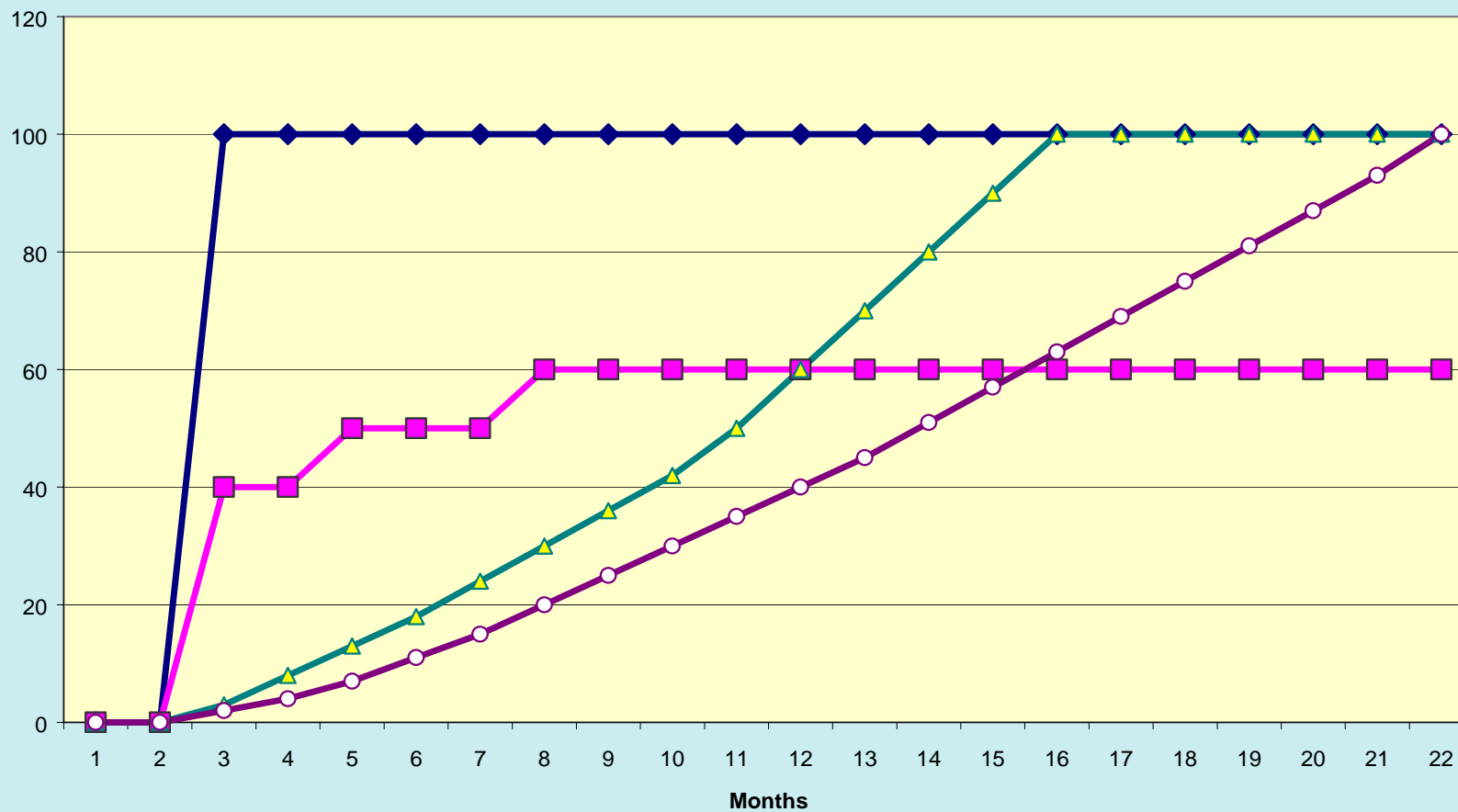


Timetable of compliance with service quality requirements

| months since ginning of Contract | Usability of the road(s) Compliance required on <i>(% of total length of roads under contract)</i> | Average Traffic Speed Minimum safe traffic speed which can be maintained <i>(in Km/h)</i> | Road User Comfort Compliance required on <i>(% of total length of roads under contract)</i> | Durability of the road(s) Compliance required on <i>(% of total length of roads under contract)</i> |
|--|---|--|--|--|
| 1 and 2 | No minimum set | No minimum set | No minimum set | No minimum set |
| 3 | 100 | 40 | 3 | 2 |
| 4 | 100 | 40 | 8 | 4 |
| 5 | 100 | 50 | 13 | 7 |
| 6 | 100 | 50 | 18 | 11 |
| 7 | 100 | 50 | 24 | 15 |
| 8 | 100 | 60 | 30 | 20 |
| 9 | 100 | 60 | 36 | 25 |
| 10 | 100 | 60 | 42 | 30 |
| 11 | 100 | 60 | 50 | 35 |
| 12 | 100 | 60 | 60 | 40 |
| 13 | 100 | 60 | 70 | 45 |
| 14 | 100 | 60 | 80 | 51 |
| 15 | 100 | 60 | 90 | 57 |
| 16 | 100 | 60 | 100 | 63 |
| 17 | 100 | 60 | 100 | 69 |
| 18 | 100 | 60 | 100 | 75 |
| 19 | 100 | 60 | 100 | 81 |
| 20 | 100 | 60 | 100 | 87 |
| 21 | 100 | 60 | 100 | 93 |
| until End of tract period | 100 | 60 | 100 | 100 |



Evolution of the performance requirements over time



Legend: Passability (% total length) (dark blue line with diamonds), Average speed (km/h) (magenta line with squares), User's comfort (% total length) (teal line with triangles), Durability (% total length) (purple line with circles)



Criterion 1: Passability

- It must be possible to pass at any day during the year.
- Maximum permitted interruptions are specified (No. of hours per interruption, how many times during the month / year).
- It is verified with a vehicle of a type specified in the contract (operated by contractor).
- Non compliance penalty: 1% of the total monthly payment, for every day of interruption.



Criterion 2: Average Speed

- Road conditions should permit a certain minimum average traveling speed at any time
- Measured by driving in a safe manner, in a vehicle owned and operated by the contractor; the vehicle may not experience any damage during the trip.
- Non-Compliance Penalty: 0.5 % of the total monthly payment will be retained for every 5 km/h under the required average speed.



Criterion 3: User Comfort

A certain level of user comfort must be assured in the maintained roads; it is linked to 3 types of road surface damages which negatively affect driving comfort:

- Corrugation
- Rutting
- Other surface degradations, especially potholes



User Comfort (3.1): Corrugations

- A 3 m long ruler is laid on the road surface, and a measuring stick/tape is used to check the amplitude of the corrugation.
- Measurement is made at least once a month, anywhere where the supervisor suspects that the criteria may not be met.
- The max. allowed *average* amplitude on any 1.000 m is 3 cm; but nowhere may it be more than 4 cm.
- Procedure: The 1.000 m average is taken from measurements in five sections of 50 m; if the average value is higher than 3 cm, the performance level is not met.
- Non-compliance penalty : 10 % of the monthly payment for each km on which the criteria is not met. 50% of the monthly payment per km is deducted for sections not meeting the second performance criterion.



User Comfort (3.2) Rutting

- A 3 m long ruler placed perpendicularly to the road axis, and a measuring stick.
- Measurement is made at least once a month, anywhere where the supervisor suspects that the criteria may not be met.
- The max. allowed *average* rut depth on any 1.000 m is 3 cm; but nowhere may it be more than 5 cm.
- Procedure: The 1.000 m average is taken from measurements in two sections of 100 m; if the average value is higher than 3 cm, the performance level is not met.
- Non-compliance penalty : 10 % of the monthly payment per km is deducted for every km not meeting the first performance criterion. 50% of the monthly payment per km is deducted for sections not meeting the second performance criterion.



User Comfort (3.3): Surface degradation

- It is measured at least once a month, in 1.000 m long sections where the supervisor suspects that the conditions may not be met.
- If there are localized surface degradations (potholes, etc.) adding up to more than 0,60 m² in any 1.000 m section, the performance level for that section is not met. However, no 1.000 m section may have individual damages of more than 1m².
- Non-compliance penalty: 10 % of the monthly payment per km will be deducted for every 1.000 m section not meeting the first performance criterion. 50% of the monthly payment per km will be deducted for each km not meeting the second performance criterion.



Criterion 4: Durability

This criterion is mainly related to the objective of preserving the existing investment in the roads included in the contract. It is evaluated through the following criteria:

- Vegetation along and on the road
- Effective road width
- Longitudinal profile/Altimetry of the road axis
- Condition of drainage

All these performance criteria must be met during the dry season. During the rainy season, the altimetry of the road is not verified.



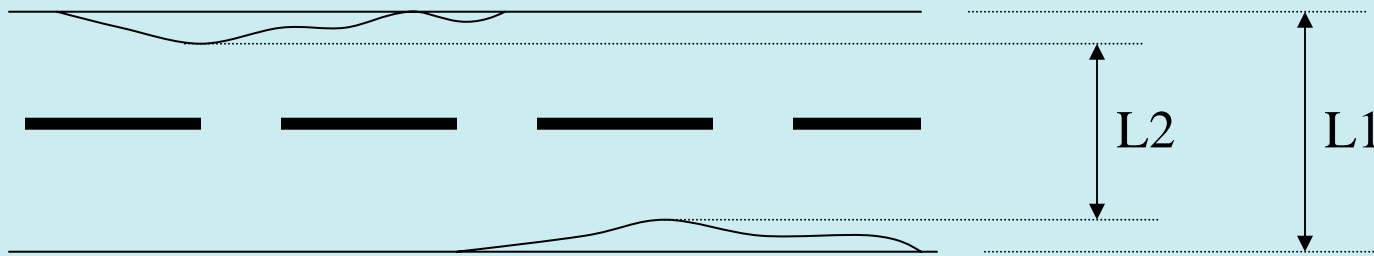
Durability (4.1): Vegetation

- Height of vegetation measured at least twice a year (during and after the rainy season), on the road and within a 2 m wide band on each side of the road, in sections of 1.000 m where the supervisor deems appropriate.
- Within a 1.000 m section, measurements are taken in five sections of 50 m; if the average height more than 10 cm, the performance level is not met. However, the maximum height of vegetation permitted anywhere is 20 cm.
- There must be a minimum height of 4.50 m between the road surface and the lowest tree branches over the road.
- Non-compliance penalty : 10 % of the monthly payment per km is deducted for every km not meeting the first performance criterion. 50% of the monthly payment par km will be deducted for every km not meeting the second and third performance criteria.



Durability (4.2): Road width

- A target road width $L1$ is defined in the bidding document for every road included in the contract.



- If in any section of 1.000 m $L1 - L2$ is more than 20 cm, the performance standard is not achieved for that section.
- Non-compliance penalty : 10 % of the monthly payment per km will be deducted for every km not meeting this performance requirement.



Durability (4.3): Road Profile

- The contractor must gradually reach a projected longitudinal profile. This profile is defined and optimized by the contractor, based on an overall volume (m^3) of gravel to be added to the roadbed.
- The altimetry of cross sections where the contractor has reached the target height is measured every 50 m in each section of 1.000 m. If there is more than two points in a section whose height is more than 3 cm below target, that section does not comply.
- Measurements for any one section are taken once a year.
- Non-Compliance Penalty: 3 % of the monthly payment per kilometer will be deducted for every non-performing km, multiplied by the number of additional points that do not achieve the requirements.



Durability (4.4): Drainage

- Drainage structures and ditches maintained in the month preceding the rainy season, and at least once a month during that season.
- At least two sections of 50 m each will be reviewed per km. If lateral ditches are not clean in more than one section, the km is not in compliance. Drainage works (culverts, etc.) must be in working condition.
- Non-compliance penalty : 10 % of the monthly payment per km is deducted for every km not meeting the first performance criterion. 50% of the monthly payment per km will be retained for any section of 1.000 m not meeting the second performance criteria.



Accumulation of penalties

- Deficiencies are to be remedied within thirty days (by the time of next supervision).
- If the same deficiencies persist for more than 30 days, unit penalties for the following period are multiplied by a factor of three.















Difficulties encountered (1):

- No major difficulties
- Contractor tried to make use of reserve for Emergency Works – without true justification
- Contractor tried to exploit weaknesses of Supervision Consultant – especially on the side of contract management (claims and response to claims)



Difficulties encountered (2):

- Dispute Resolution mechanism used at one occasion (successful).
- Service level set rather high – many accidents!
- Contractor had to learn how to do maintenance (... a lost art !!)
- Financing would have been impossible without donor support, because of cost for rehabilitation



Results after 4.5 years:

Road Users

- Are very happy, since service quality much better than ever before
- Appreciate that road is always good, not only after works are done
- Can now travel even in rainy season, which was impossible before

Road Administration

- Satisfied until now with the experience
- In process of expanding the %age of the network to be covered by PMMR contracts
- Road Maintenance Fund Board also positive



Lessons learned (1)

- Include only “maintainable” roads.
- Do not include roads which need a large volume of reconstruction works before the desired level of service can be reached.
- You need to understand well the required service levels (... adequate definition of service levels in Bidding Documents is crucial.)
- Do not try to impose too many risks on the contractor
- Keep performance criteria as simple as possible
- Use contractors with good technical and management capacity



Lessons learned (2)

- Use of small local contractors: Only after adequate preparation and training, and for contracts with very simple requirements (or as subcontractors for sub-tasks)
- Supervision consultant needs to fully understand their role (... control service level and assure overall technical quality - - but no micro-control and micro-management)
- Road Agency staff need to understand their changed role



Lessons learned (3)

- Prequalification highly recommended
- Hold information seminars before launching prequalification process
- **IMPORTANT:** Before launching Request for Bids, hold pre-bid technical seminars with bidders (detailed review of concept and specifications)



Lessons learned (4)

- Build in a Dispute Resolution Mechanism
- In Pilot Contracts, have Dispute Resolution Expert intervene on a regular basis, even before disputes arise
- Ensure solid and credible financing of contract during whole contract period
- Hold regular review sessions, with support from specialists, as training tool for all parties involved



Summary

