

# **PERFORMANCE BASED CONTRACTS – CASE STUDY OF ROAD SECTOR**

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# WHAT IS PERFORMANCE BASED CONTRACT?

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'Payments for the Management and Maintenance of Road Assets Explicitly Linked to the Contractor Successfully Meeting Certain Clearly Defined Minimum Performance Standards'

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# CURRENT SCENARIO

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- Stipulate exactly :
  - What is built?
  - How it is built?
  - What materials are used?
  - How traffic is maintained?
  - Number and type of tests for QC on materials and finished product
- Minimise the risk on contractor
- ~~Require more man-power of highway agency~~

# FUNDAMENTAL QUESTIONS RELATED TO A SPECIFICATION

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- What do you want?
  - How do you order it?
  - How do we know we get what we ordered?
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# WHAT DO WE WANT ? - WHAT DO WE SPECIFY ?

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Strength

Volumetric Properties

Durability

Gradation

Density

Asphalt content

Smoothness

Thickness

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# HOW DO WE ORDER IT ?

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- How do we order what we want?
    - Proprietary product
    - Method or recipe
    - End result
    - Warranty
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# METHOD SPECIFICATION

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- Procedural
  - Prescription
  - Materials and workmanship - descriptive
  - Detailed description of the materials and methods used to prepare the product
  - Maximum control by specifying agency
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# What Do We Do If We Don't Get What We Ordered?

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Mix Properties/  
Characteristics:

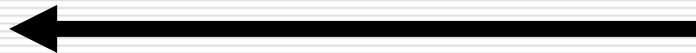
- Density
- Strength
- Durability
- Smoothness
- Thickness
- ~~Etc.~~



Decisions:

- Incentives
- Penalties
- Reject

**Mixture  
Performance**



# PERFORMANCE BASED MAINTENANCE CONTRACTS

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- Maintenance of roads is as important as constructing them
  
  - Poorly maintained roads
    - Increase VoC
    - Delay
    - Affects business
    - Affects environment
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# PERFORMANCE BASED CONTRACT

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- PBMC ensures performance through compliance with output specifications
    - Defined output or performance standard
    - Pre-defined payments based on the contractor's compliance with performance standard and NOT on the amount of works executed
    - Encourages cost-effectiveness – less costly action but more frequent action or relatively costly but less frequent and more enduring solutions
    - Allocation of higher risk to the contractor
    - Penalties for non-compliance
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# PERFORMANCE BASED MAINTENANCE SPECIFICATIONS

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## □ PARAMETERS

- Pavement Condition Index  $> 60$
  - IRI  $< 3$  m/km (Or) UI  $< 3000$  mm/Km
  - Potholes = 0 %
  - Crack Area  $< 10\%$
  - Width Of Crack  $< 3$  mm
  - Ravelling = 0 %
  - Rut Depth  $< 5$  mm
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- Skid Resistance  $> 0.35 < 0.45$

# WHAT IS COVERED IN PBC?

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- Only individual assets (traffic signs, markings, bridges.....).....or..
  
  - All road assets (from right of way to right of way) within a road corridor
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# SCOPE, SERVICES AND ASSETS

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- Simple Service
    - E.g., CDs, traffic control devices etc.
    - Short periods (several months or one year)
  - Comprehensive
    - All road assets within the right of way
    - Full range of services needed to manage and maintain contracted road corridor
    - Includes routine maintenance, periodic maintenance, accident assistance
    - Contract period is long
    - Rehabilitation not compulsory component
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# WHERE HAS IT BEEN USED?

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- British Columbia, Canada (1988)
  - Australia (1995)
  - Argentina (1995)
  - USA (1996)
  - New Zealand (1998)
  - UK, Sweden, Finland, Netherlands, South Africa, Philippines, Thailand, Vietnam
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# WHY IT HAS BEEN USED?

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- Cost savings in managing and maintaining road assets
  - Greater expenditure certainty for road agencies
  - Ability to manage road network with few agency staff
  - Better road user satisfaction with road service and conditions
  - Stable multi-year financing of maintenance
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# PBC LEADS TO COST SAVINGS

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- ❑ Innovation to private sector for innovation and high productivity
  - ❑ Reduction in administrative expenses and road agency overheads – better packaging, fewer agency personnel
  - ❑ Significantly greater flexibility in private sector to reward performance and react quickly to non-performers
  - ❑ Variation orders are minimised
  - ❑ Risk of cost over-run transferred to contractor
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# PRE-REQUISITES

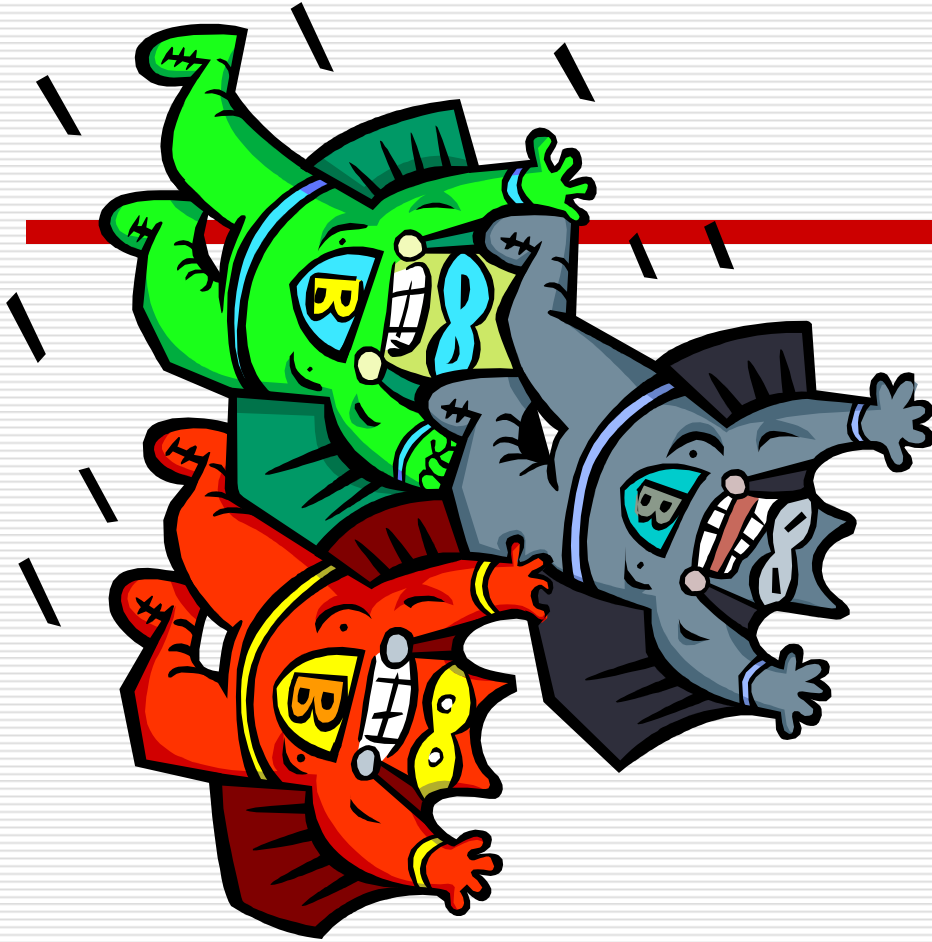
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- Inventory of potentially contracted assets and condition evaluation
  - Define performance indicators and methodology to measure performance indicators
  - Payment conditions
  - Contract conditions
  - Preliminary cost estimate
  - Bid Evaluation and Selection
  - Performance and Payment Security
  - Quality Assurance Programme
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# DISADVANTAGES OF PMBC

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- ❑ Adversely affect small contractors
  - ❑ Higher cost of maintenance initially till contractors get used to the system
  - ❑ Over time, work becomes cost effective as the benefits of longer life costing sink-in
  - ❑ Disadvantages are short term in nature; over long term offer a workable solution
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***Warranties  
to the  
rescue?***

# CONTRACTING TECHNIQUES

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- Warranties
  - Cost + Time + Incentives / Disincentives + Quality
  - Best value – Weights assigned to price and quality
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# WARRANTY CONTRACTING

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- Reduce amount of agency's resource requirements
  - Reallocate performance risk
  - To increase contractor innovation
  - To increase quality of constructed product
  - Reduce life cycle cost of highway project
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# WARRANTY CONTRACTING

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- ❑ Greater emphasis on the quality of constructed product than design-bid-build contracting method
  - ❑ Shift post-construction performance risk from agency to contractor
  - ❑ Quality is measured based on actual product performance and NOT on the property of constructed materials
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# WARRANTY

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- ❑ Warranty could include a combination of QC/QA specifications with PBS
  - ❑ Warranty specs are a form of PBS
  - ❑ Contractor is responsible for the performance of the end product and must have experience with QC procedures to monitor the production
  - ❑ Contractor assumes both construction and post-construction risk.
  - ❑ Annual inspection replaces construction QA
  - ❑ Statistical methods to monitor the performance of the end product
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# ISSUES IN DRAFTING WARRANTY SPECIFICATIONS

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- Description
  - Length of warranty
  - Bonding requirements
  - Maintenance
  - Conflict resolution
  - Contractor responsibilities
  - Department responsibilities
  - Performance Indicators & corrective action
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- Basis for payment

# MULTI-PARAMETER BIDDING

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- ❑ Cost-plus-time with Incentives / Disincentives
- ❑ Contractor bid a contract amount – sum bid for the contractor's work items (A) and the number of days specified by the contractor to complete the work (B)
- ❑ No of days (B) is multiplied by the RUC to determine the value of the time bid.
- ❑ Contract awarded to the bidder who bids the lowest combination of cost and time
- ❑ Incentive for earlier completion than time bid
- ❑ Disincentive to discourage the contractor from over running the time bid

# ADVANTAGES AND DISADVANTAGES

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- Fairly compatible with the low bid system;
    - contractor with the lowest combination of time and cost awarded the work
    - Successful contractor is NOT always the lowest cost bidder
  - Number of contractors bidding for the project; higher project costs
  - More man-power and man-hour requirements both at agency and contractor level
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# ADVANTAGES AND DISADVANTAGES

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- ❑ A+B+I/D Has Not Shown to Increase Project Cost Significantly
  - ❑ Improved Quality Of Works ; Contractors Spend More Time in Preparing Documents/Schedules Etc.
  - ❑ Typically Completed Before Contractual End Date, in View of the Bonus Clause
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# BEST VALUE CONTRACTING

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- Award of contract based on:
    - Technical excellence
    - Management Capability
    - Past performance
    - Personnel Qualifications
  - Selection based on technical and management merit- reduces risk of owner
  - Ensures development of detailed project and procurement plans
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# LESSONS FROM DEVELOPING COUNTRIES

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- Commitment of higher level government
  - Adequate skills and expertise within the road agency
  - Appropriate capability of the contracting and consulting industry
  - Enabling contracting and partnering environment
  - Stable multi-year funding
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# MAIN CHALLENGES

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- ❑ Adequate allocation of risks to the party to manage them best
  - ❑ Establishing a 'partnering' relationship between the contractor and client
  - ❑ Need to acquire a new set of skills and expertise to the road agency staff
  - ❑ Downsizing of the agency
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# MAIN CHALLENGES

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- ❑ Choosing a PBC format that is consistent with the contracting industry capacity
  - ❑ Identification and clear definition of appropriate performance specifications
  - ❑ Design of an incentive payment mechanism
  - ❑ Assured long term funding of multi-year PBC
  - ❑ Determination of liability and indemnity of the contractor and client
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# THE FUTURE

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- Performance indicators
  - Payment schedule
  - Extension or reduction of contract tenure
  - Inclusion of more services and assets in the second round of PBC
  - Rehabilitation works as part of a PBC
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THANK YOU.....

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