

Transportation Engineering II

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# Books:

- \* Highway Engineering : wright and paquette
- \* " " : Pantho Das Chakroborty

# Low Cost roads : (from A Cook June 2013 pdf)

- \* 5% construction, 95% maintainance
- \* Social Welfare
- \* Development country → road वातावरण टाका नाई

\* # Glossary of Technical terms :

- \* Aggregate
- \* CBR : California Bearing Ratio
- \* Camber
- \* Cape Seal

\* Low volume road (300 motor vehicles per day)

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\* Macadam

\* Slurry

# 1.1: Background

→ Bangladesh

# 1.2: Guideline principles

(1) Task based

(2) Environmentally compatible

(3) Local resource based

\* Fig 1.1: Globally sustainable development target

\* Fig 2.1: low cost  $\rightarrow$  यदि initial cost कम है  $\rightarrow$   
we should also analyze life-cycle cost

\* Fig 2.2

\* Fig 3.1

\* Table 3.1

# 3.9 : Appropriate use of locally available material

# 3.10 : Maintenance

\* Fig : 4.1, 4.5, 5.2

# 5.3.4. Spot improvement

# In summary, the structural design of road pavement depends primarily on the following factors; (page 53)



- paved roads এর খরচ কিছুটা কমতে পারি
- earth road ৷ drainage সুবিধা থাকলে earth road ৷ better

## Low volume road pavement & surfacing options :

\* Unsealed pavement

\* Bituminous seals

\* Block surfacing

\* Base / Subbase

- Natural gravel & Graded crushed stone

↓  
smooth rounded  
(Shingles)

↓  
angular  
cost বেশি

- lime stabilisation : soil এর সাথে

lime compact করলে

- mechanical modification : vibration

\* concrete

- Geo-cell paving

- Non-reinforced concrete

\* Additional

- Wheel track paving  $\Rightarrow$  টাৰাৰ বাৰাণ্ডাৰ জন্ম

# General Construction Note

# Cement Stabilization

- Material

- Field control

# Lime Stabilization

- Material

- Field control

# Engineered Natural Surface (ENS)

# Natural Gravel / laterite

# Rolled-in stone chippings

# Hand-Packed-Stone (HPS)

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- # Table 1 - Schedule of Alternative road surface improvements
- # Low volume road pavement and surfacing options
- # General Construction Note
- # Cement Stabilization
- # Lime " "
- # Jelford Paving " "
- # Bitumen Chip Seals
- # Bitumen Emulsion Slurry Seal
- # Bitumen Cape Seal
- # OTTA seal
- # Penetration Macadam
- # Stone Setts or Pave
- # Mortared Dressed Stone Paving
- # Fired Clay Brick

- # Mortared Block Options
- # Water-Bound Macadam (WBM)
- # Graded Crushed Stone
- # Natural Gravel
- # Armoured Natural Gravel
- # Lime Stabilisation
- # Cement " "
- # Bitumen Emulsion Stabilisation

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## # Mechanical Modification

## # Concrete Options

- Non-reinforced concrete
- Wheel Track Paving Strip Roads

## # Appropriate Seals

- Sand/Grit seals
- Slurry Seal
- Chip seals
- Graded aggregate seals

## # Single surface dressing &amp; Double surface dressing

## # Seal options

Table 1 : Bituminous surfacing for low volume roads

## # Road treatments in Bangladesh

## # Rural road section with HBB Pavement

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- # Rural road section with HBB pavement
- # Herring Road pavement
- # Union road HBB pavement
- # Single and double surface dressing
- # Normal Carpet and normal carpet with seal coat
- # Dense Carpet
- # CARE seal
- # Low cost wrap-up
- # Equipment
  - Compaction equipment
  - Bulldozer
  - Dumpers
  - Scrapers

## ☐ Road Construction

- # General Construction Operations
- # Construction equipment - general requirements
- # Mobilization
- # Maintenance of traffic
- # Alternative Traffic Control Plan
- # Detour
- # Tools and devices

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Construction Management

# General Construction Management

# Construction Management - General Requirements

# Construction

# Construction of Structures

# Construction Management - General Requirements

# Construction

# Construction Management

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Testing frequencies in the Quality Control Plan

- # Asphalt plant
- # Preparation of asphalt cement
- # Blending of aggregates
- # Compacting mixture
- # Standard rolling procedure
- # Surface requirement
- # Planning and execution of construction
- # CPM
- # PERT
- # Construction of concrete pavements
- # Slab curing

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\* Class Test (03/12/16) (today's lecture)

# Slab Curling (CPTV Handout - PDF)

# 6. Getting ready for concrete paving

# Uniformity testing

(\* Highlighted line)

# Critical factors for concrete paving

# 8.5 Dowel Bar installation

# Important items related to finishing are

# 8.8 Concrete texturing

# Consider the following during hot weather concreting

# Joint sawing

# Considerations for reservoir cut

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- # Table (Road, Powerpoint)
- # Maintenance management system
- # Maintenance of bituminous surfaces

# Maintenance management system  
 - (maintenance management system)  
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 - (maintenance management system)  
 - (maintenance management system)  
 - (maintenance management system)

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# Table 1: Some alternatives in pavement maintenance

# Cracks in pavement

# Pavement maintenance

- Cracks (cause & repairs)
- Reflection cracks
- General crack repairs
- channel repair
- corrugation & shoring

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- Utility cut depression
- Disintegration
- Raveling
- Skid hazard
- Loss of cover agg.

# Bituminous pavement recycling involves

# Maintenance of concrete pavement