

World Bank - Anhui Communications Department, China

Low-Volume Roads Engineering: Road Maintenance and Road Closure



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Welcome!!



Maintenance and Road Closure



Styles of Maintenance

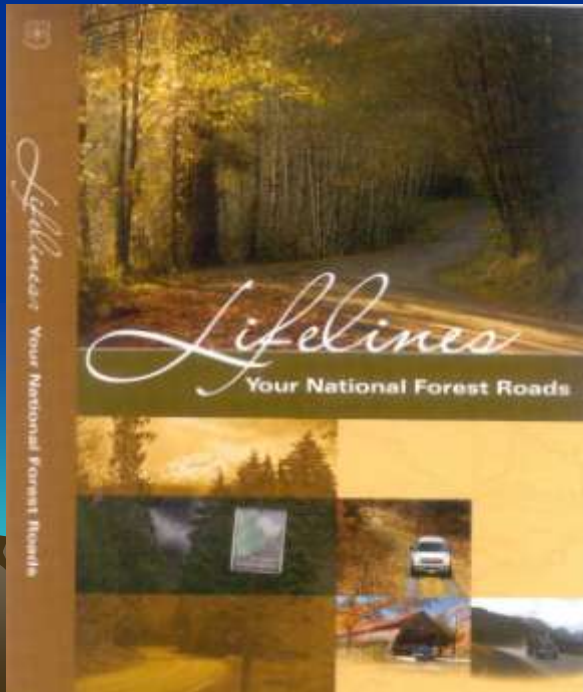
- **Routine and Periodic Maintenance
(Ongoing and Deferred)**
- **Traditional Road Maintenance**
- **Environmentally Sensitive Road
Maintenance**



Road Maintenance Guides

Video Titles

Forest Roads and the Environment
Reading the Traveled Way
Reading Beyond the Traveled Way
Smoothing and Reshaping the Traveled Way
Maintaining the Ditch and Surface Cross Drains



Develop a field guide with
Penn State U, Penn DOT, EPA

Environmentally Sensitive Maintenance for Dirt and Gravel Roads

- Better Roads
- Better Environment
- Better Community
- Less Maintenance

To this!

From
this.....

Alan L. Gesford, P.E.
John A. Anderson, Ph.D.

March 2006

Areas of Maintenance

- Road Surface-Potholes and Ruts
- Ditches
- Armoring/Riprap
- Culverts
- Disposal Areas
- Clearing/Brush Control
- Erosion Control
- Signing/Safety

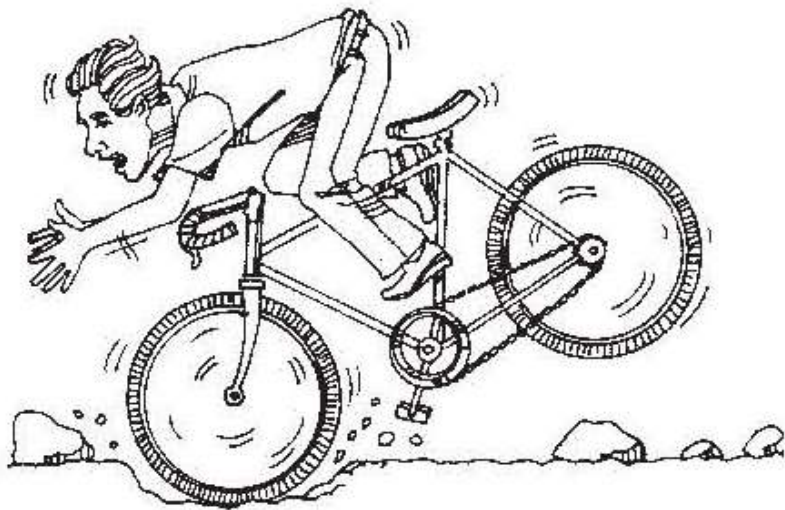


Road Surface



Figure 4.5 Signs of need for road maintenance. (Adapted from PIARC Road Maintenance Handbook)

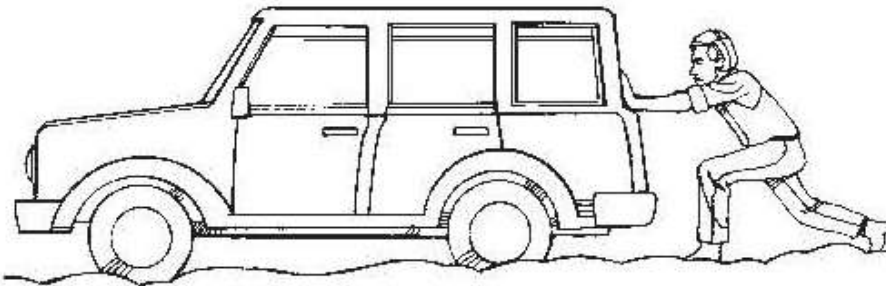
*Implement road maintenance
before significant surface damage occurs!*



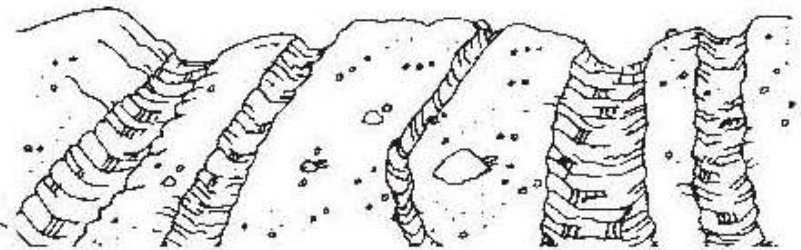
Potholes



Ruts



Soft, muddy, roadway surface



Rills and gullies









Ditches













Ditch Armoring









Culverts









Clearing









Erosion Control





Disposal Areas





Lazy Maintenance



Signing/Safety





The Maintenance Plan

When? How? Where?

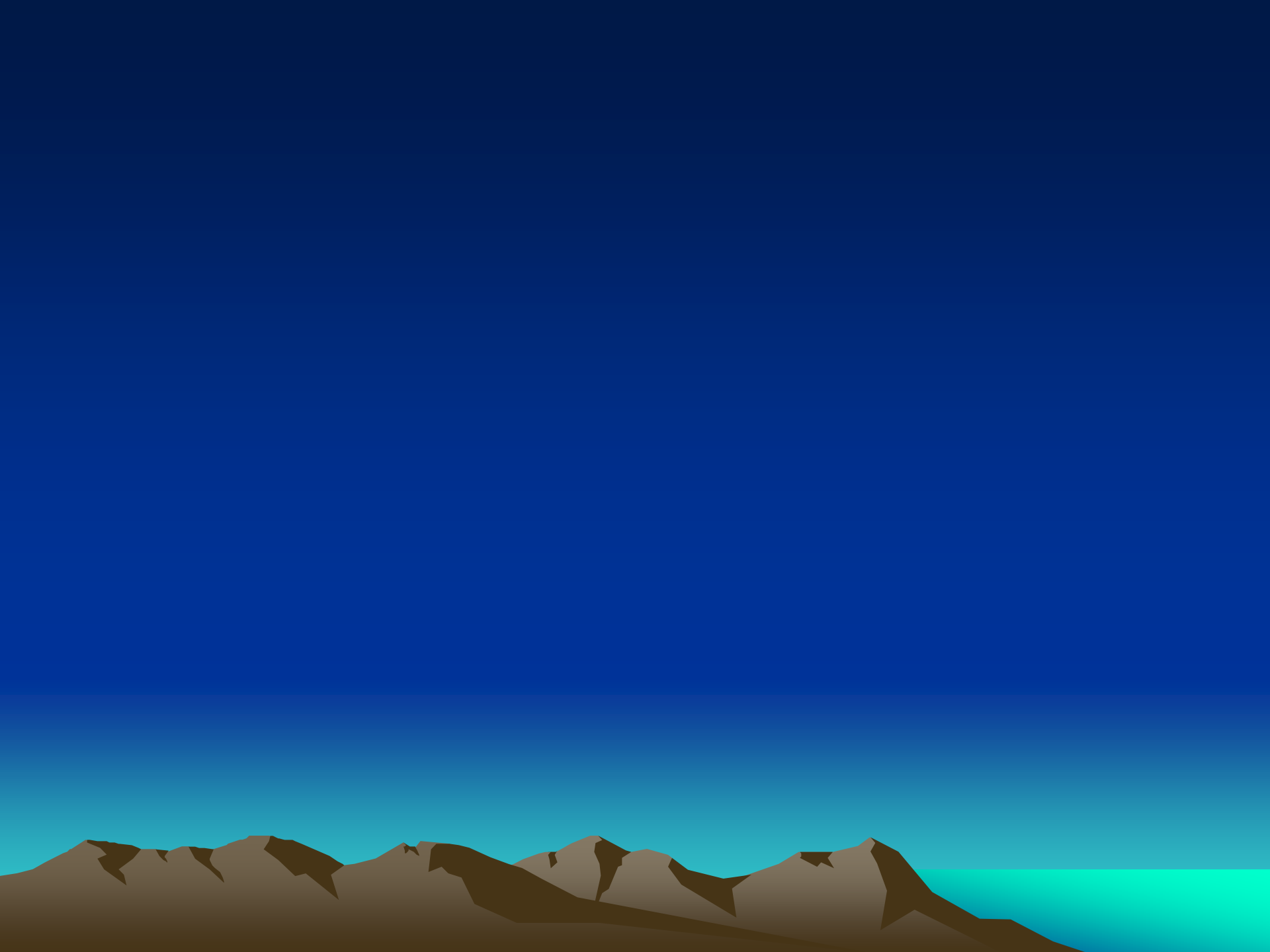
What?

- **Road Surface—R (routine)**
 - **Ditches--R**
 - **Armoring—P (periodic)**
 - **Culverts--P**
 - **Disposal Sites--P**
 - **Clearing--R**
 - **Erosion Control--R**
 - **Signing/Safety--P**
- 

What do we Need for a Maintenance Plan

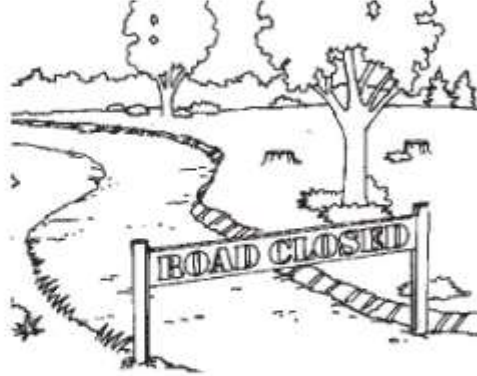
- Road System Inventory.
- Knowledge of your roads.
- Priorities of the worst roads and structures.
- How will we accomplish the maintenance?
- Funds and equipment available.
- The work sequence.
- A mixture of contracting, force account equipment, and manual labor.
- What is routine, What is periodic?



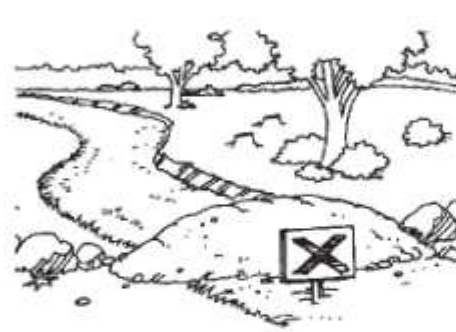


Road Closure and Control





a. Gate Closure (Temporary)

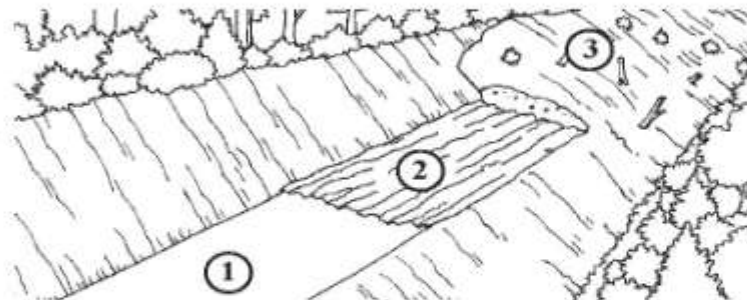


b. Earth Mound or Berm Closure (Temporary)



c. Decommissioning - Permanent Road Closure with Surface Scarification and Seeding for Revegetation, but Keeping Most of Road Template (Shape).

- (1) Road template before obliteration.
- (2) During obliteration, old road is scarified and refilled.
- (3) Final obliteration, with filling and recontouring to the original natural topography, followed by revegetation.



d. Road Obliteration













