

# ROADEX

Implementing Accessibility



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# The importance of drainage

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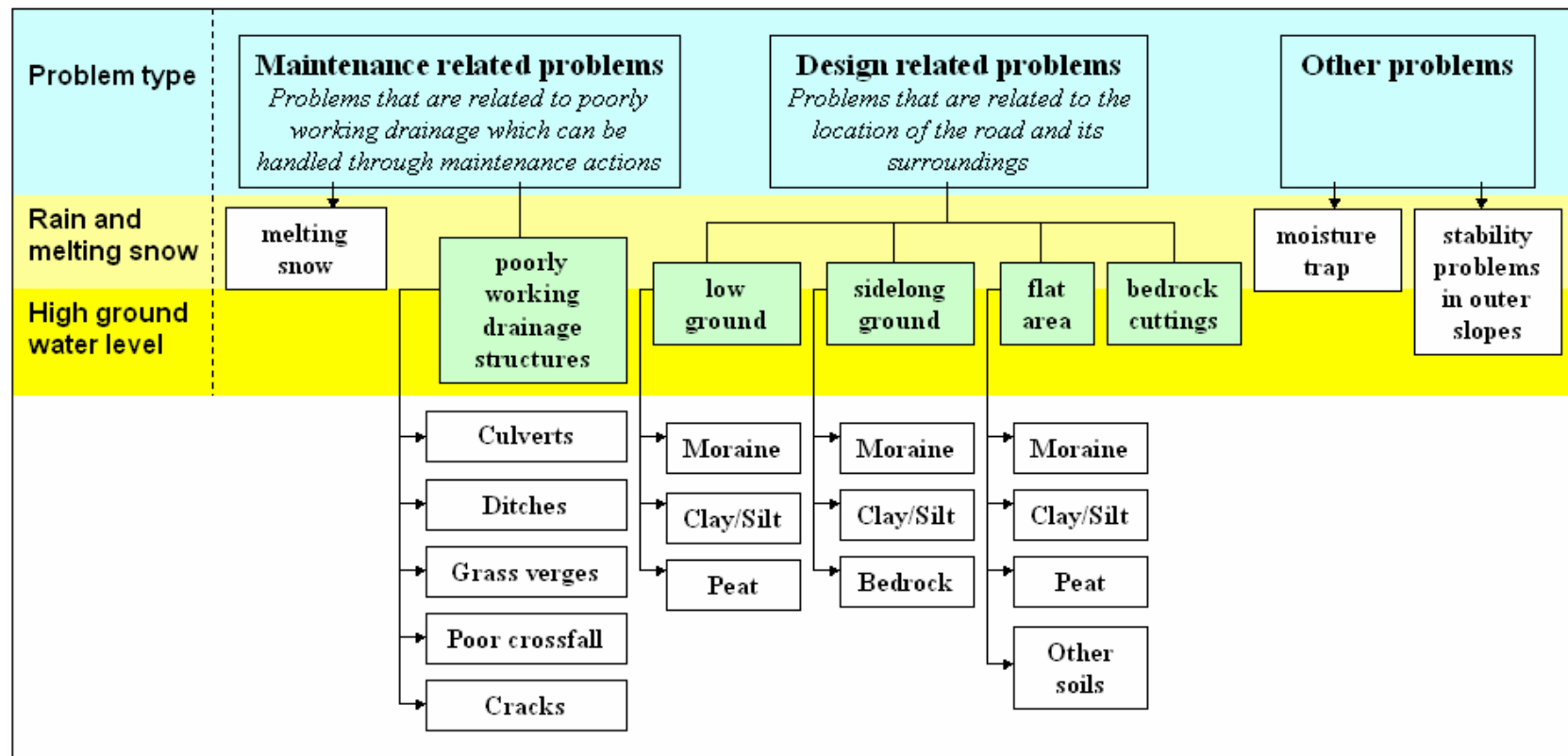
# Drainage

- “Everyone knows” that good drainage is important

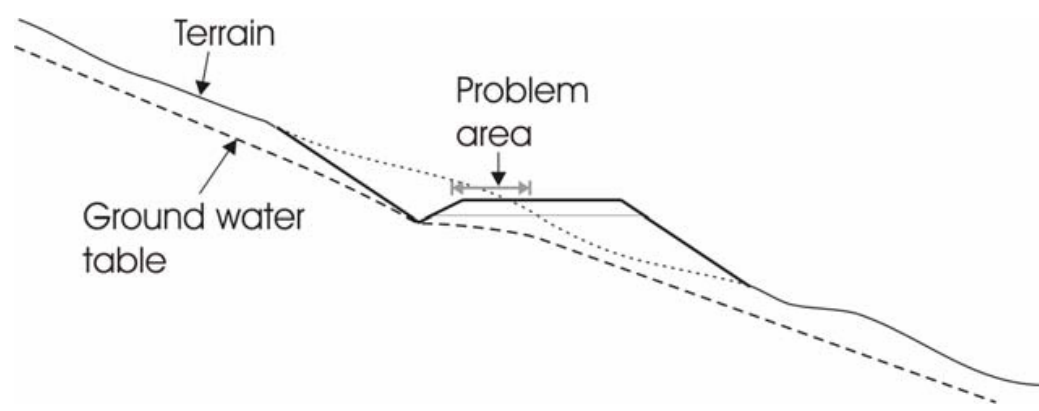
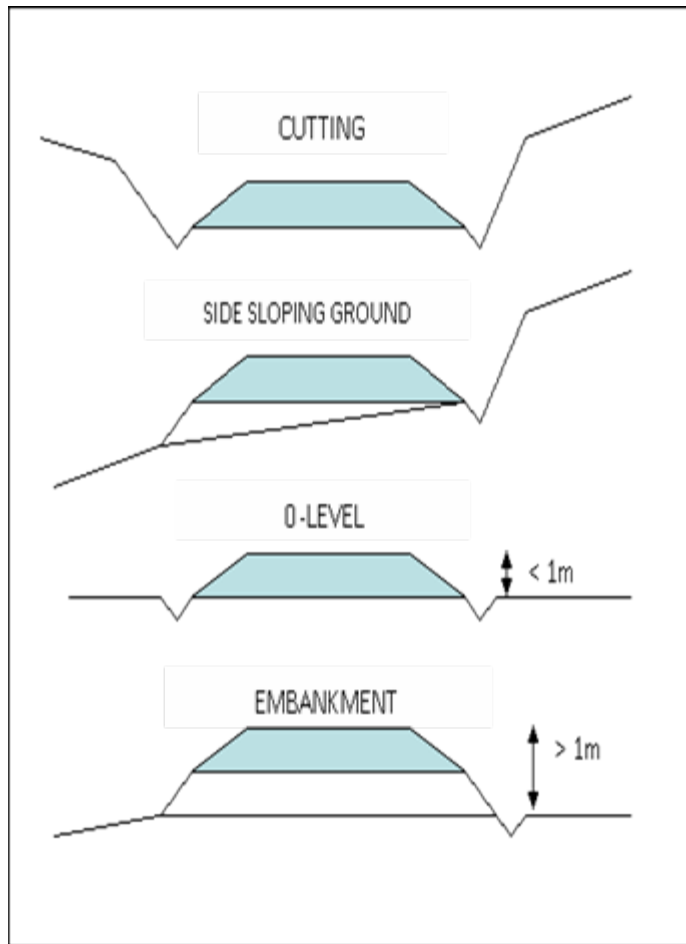
# Drainage

- More moisture in the road decreases the bearing capacity
- Degradation in the road increases
- More and bigger need of reparations
- Bad drainage costs money

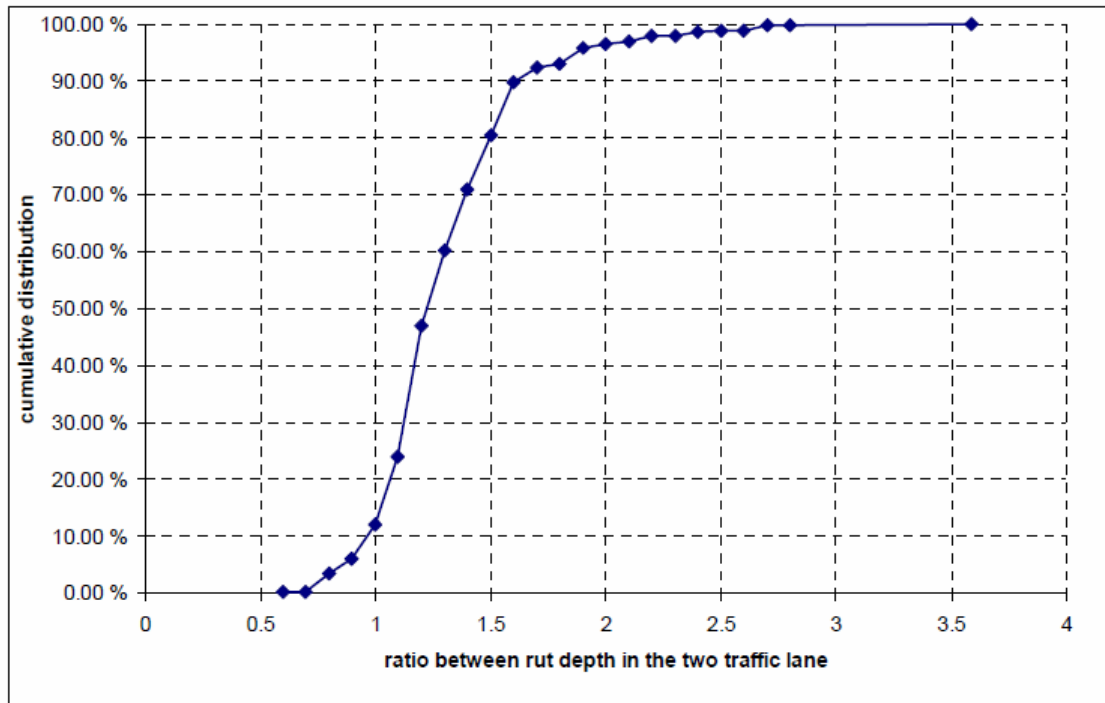
# Why bad drainage?



# Different road cross-sections



# Drainage impact on permanent deformation



The diagram shows the rutting ratio between the two traffic lanes in sloping ground

# The importance of drainage

Drainage condition	Drainage class (VVK Sweden)	Change in length of life if the drainage is improved
<p><i>Class 1</i> Drainage system does not function. Water susceptible materials in road structure and subgrade. Very high ground water table. Groundwater flow blocked.</p>	<p>&gt;3</p>	<p>&gt;2,5</p>
<p><i>Class 2</i> The drainage does not function. Some better materials in road structure and subgrade compared to Class 1.</p> <p>The drainage system is functioning poorly due to a lack of maintenance (ditches and culverts not cleared), and water susceptible materials</p>	<p>3</p>	<p>2-2,5</p>
<p><i>Class 3</i> Drainage system is functioning poorly due to a lack of maintenance. (Ditches and culverts not cleared.)</p>	<p>2</p>	<p>1,5-2</p>
<p><i>Class 4</i> Drainage system is working unsatisfactorily due to a lack of maintenance or the maintenance guidelines are insufficient.</p>	<p>1-2</p>	<p>1-1,5</p>



# Does it pay off?

- The results from life cycle cost analyses show that drainage is almost always good value for money
- On paved roads it is sometimes economic to check and fix drainage even every second year
- When short of money always start with drainage

# ROADEX classification

- Divided into 3 classes
- 1 = good, functioning
- 2 = adequate, could be better
- 3 = poor, does not function

# VISUAL ASSESSMENT OF DRAINAGE CONDITIONS ON GRAVEL ROADS

## Class 1: good drainage



### Description:

Faultless. The cross-section of the road has preserved its form well and water flows from the pavement to the ditch unrestricted. Water also has a clear passage in the ditches.

# VISUAL ASSESSMENT OF DRAINAGE CONDITIONS ON GRAVEL ROADS

## Class 3: Poor drainage



### Description:

Deformation and damage on the road cross-section. The innerslope crest has a high edge and/or vegetation causing pools to be formed on the road. Vegetation in the ditch restricts water flow and causes damming in the ditch. Unstable soil flows from ditch slopes into ditches and blocks the water flow. A clogged culvert or outlet ditch prevents water from flowing in the ditch.

# Sources

- [WWW.ROADEX.ORG](http://WWW.ROADEX.ORG)

Geir Berntsen, Timo Saarenketo

## DRAINAGE ON LOW TRAFFIC VOLUME ROADS

Problem description, improvement techniques and life cycle costs

Timo Saarenketo

## DEVELOPING DRAINAGE GUIDELINES FOR MAINTENANCE CONTRACTS

Results of a ROADEX III pilot project in the Rovaniemi  
Maintenance Area in Finland



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