Otta Seal: A Low-Cost Alternative to Traditional Bituminous Surface Treatments for Unpaved Roads

Motivation
- Unpaved roads constitute a significant portion of the national road infrastructure in both developed and developing countries.
- Due to exposure to traffic and environment, these roads experience continuous loss of gravel with the need for replacement at regular intervals.
- Otta seal as a surface treatment for low volume unpaved roads utilizes local aggregate including a variety of aggregate gradation such as dense, open, and gap graded.

Background
- Otta seal (first developed and applied in the Otta valley in Norway) was developed in 1963 by the Norwegian Road Research Laboratory (NRRL) as a low-cost maintenance alternative.
- Otta seal is a low-cost alternative to traditional bituminous surface treatment (BST) that has been recently introduced in the United States.
- The service life of Otta seal depends on different factors including the following:
  - Type of Otta seal
  - Average daily traffic (ADT)
  - Quality of surfacing (aggregate strength, binder durability, construction quality, etc.)

Objectives
- Evaluate the feasibility of Otta seals as an alternative surface treatment on low volume roads using local aggregates.
- Evaluate the cost effectiveness and performance of Otta seals compared to traditional bituminous seal coat surface.
- Develop a guide for road selection in regard to the use of Otta seals as an alternative and develop guidelines for construction of Otta seals.

Design Procedure

Binder Spraying Rate
- If ADT is less than 100: 1.8-2.2 l/m²
- If ADT is between 100-500: 1.8-2.0 l/m²
- If ADT is more than 500: 1.6-1.8 l/m²

Aggregate Gradation

Importance of Research
Identifying alternative roadways to traditional bituminous seal coat is crucial for enabling practical and cost effective unpaved roadways.