CONVERTING DISTRESSED LOW VOLUME PAVED ROADS TO RESILIENT ENGINEERED UNPAVED ROADS

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Unpaving

FIFTY SHADES OF GREY
Unpaving
Unpaving
Outline

- Introduction
- Suggested approach
  - Candidate determination
  - Public involvement
  - Investigation
  - Design
- Conversion
- Conclusions
Introduction

- Increasing number of paved rural roads are in very poor condition and very expensive to maintain
  - Many “evolved” from unpaved roads
  - Some should never have been paved originally
- Limited funds available to maintain and/or rehabilitate
- Alternative options, including “unpaving”, are being considered (passive and active)
  - People complain about the paved road, but unpaving is not the solution they would like
Passive vs. Active Conversion
Passive vs. Active Conversion
Introduction

- Increasing number of paved rural county roads are in very poor condition and very expensive to maintain
- Limited funds available to maintain/rehabilitate
- Alternative options, including “unpaving”, are being considered (passive and active)
- There is no documented guidance on the process and a general lack of expertise
Introduction

- Can’t take a bad paved road and turn it into an even worse unpaved road
- Guides developed for California and Minnesota along with training courses as part of a comprehensive study on in-place recycling
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Candidate Determination

- Key issues to consider:
  - Who is affected?
  - What is it going to *cost* in the long run?
  - Will it be more or less *safe* after conversion?
  - What type of *traffic* is using/will use the road?
  - What are the main causes of *distress*?
  - What are the potential *environmental impacts*?
  - Do we have *agency resources* and *maintenance capability*?

- Decision support flow chart is included in the guides
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Public Involvement

- Key issues to consider:
  - Identify all interested and affected parties
  - Prepare fact sheets
  - Send out notifications
  - Hold public meetings to explain process (use case studies of successful conversions)
  - Send out updates

- Templates are included in the guides
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Investigation

- Key issues to consider:
  - Desktop study to collect relevant information
  - Visual assessment of the road
  - Dynamic cone penetrometer survey to check layer thickness and bearing capacity
  - Visual thickness check and material sampling
  - Material testing and classification
  - Identify any fatal flaws
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Design

- Key issues to consider:
  - Thickness design (based on subgrade CBR [from DCP] and truck traffic)
  - Material design (predicted performance)
  - Drainage design
  - Chemical treatment selection
  - Safety considerations
  - Conversion plan and specifications

- Guides include tools (manual & web-based) for:
  - Determining thickness of supplemental material ratios and recycling depth
  - Chemical treatment selection
Welcome to the Unpaved Road Material Design Tool

There are millions of kilometers of unpaved roads around the world managed by numerous authorities, land owners, and public and private organizations. Common to all of these roads are unacceptable levels of dust, poor riding quality (caused by erosion, washboarding, and/or rutting), and/or impassability in wet weather, and expensive maintenance and gravel replacement activities. Along with good construction practices, these problems can often be mitigated through better gravel selection, or by blending two or more materials to meet a performance-based specification.

With the growing interest in converting severely distressed low-volume paved roads to engineered unpaved roads, understanding expected performance is key to the success of the conversion, which typically involves pulverizing the existing surface and blending it with the underlying layers. It is increasingly important to ensure that the unpaved road is “better” than the paved road was. Mechanical stabilization of unpaved roads through blending of two materials is a new process. However, determining appropriate blending ratios to meet performance-based specifications tends to be done on a trial and error basis until a satisfactory blend is achieved. This tool aims to eliminate the trial and error nature of material blending by providing a more accurate starting blend that can then be refined to provide optimal performance for a given application.

An overview of performance-based specifications for unpaved road materials can be downloaded [here]. Use of this tool is fully described in the UCPRC guidelines entitled Guidance on the Conversion of Severely Distressed Paved Roads to Engineered Unpaved Roads and Guidance on Performance-Based Material Selection and Blending for Unpaved Roads.

Disclaimer
This Unpaved Road Material Design Tool has been developed to guide selection and/or blending of materials to meet a performance-based specification. Using the tool requires input of laboratory test results for the actual materials that will be used. Slipping the laboratory testing and guessing input values, or using default values, will lead to inaccurate output values. Output from the tool provides a starting point for a blend, which will need to be tested to confirm that it meets the required specification. In no event shall the University of California be liable to any party for direct, indirect, special, incidental, or consequential damages, including lost profits, arising out of the use of this system, even if the University of California has been advised of the possibility of such damage. The University of California specifically disclaims any warranties, including, but not limited to, the implied warranties of merchantability, fitness for a particular purpose and noninfringement.

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Conversion

Key issues to consider

• Choice of equipment
• Importing and spreading materials
• Recycling and mixing
• Compaction and shaping
• Chemical treatment application
• Maintenance
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Conclusions

- Conversions are increasing, but no clear guidance on how to do it
- Build on current knowledge of unpaved road performance prediction and chemical treatments
- Case studies show that acceptable conversions can be achieved
  - Effective communication so affected parties believe that their road has been “upgraded”
- Converted road can be surfaced again later when funds become available or traffic justifies it
Thank-you!

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