

# Manual for Asphalt Pavement Repair and Resurfacing Preparation

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## Introduction

This manual was developed as one of several, designed to empower local agency staff and contractors, in conjunction with training, to optimize preventative pavement maintenance funds. Because local agencies are often underfunded and must defer road maintenance over many years, there are thousands of miles of public roads that are currently in poor condition. With new state funding available in California (e.g. Senate Bill 1) for pavement maintenance projects, practicing proper preventative maintenance is an issue of paramount importance. Surface repair and preparation practices (e.g., crack treatments and patching) - used as either stand-alone treatments or prior to other full surface treatments - can help preserve pavements and defer the need for costly road reconstruction.

This manual primarily provides guidance on crack treatments and patching practices. Items discussed include project selection, materials, preparation methods, equipment, material placement, and other construction considerations. Studies have shown that crack treatments and patching are critical pre-treatments for the success of pavement resurfacing, including pavement preservation surface treatments. The most common pavement preservation surface treatments used in California include chip seals, slurry surfacing, Cape seals, and thin asphalt overlays. These treatments all have the ability to extend the life of a pavement via the reduction of the aging and oxidation of the existing asphalt material, and the prevention of moisture intrusion into the underlying pavement layers. But to ensure the full benefits of these treatments, proper repairs such as crack treatments and patching should be performed prior to placing these surface treatments.

This manual also covers other special surface preparation strategies, such as sweeping, use of tack coats, removal of pavement marking and temporary markers, edge milling / key cutting, milling and micro-milling, as well as the raising of manholes and other “iron” in urban environments. Quality assurance is critical to the success of the pavement repair and surface preparation projects. The manual provides a series of field considerations and activities to promote a quality job outcome.

Finally, the manual provides information to assist maintenance personnel with troubleshooting, by presenting common problems associated with pavement repair and their recommended solutions.

## Study Methods

The project consisted of conducting a detailed literature review, and utilizing staff's extensive expertise to develop a detailed manual to help road agencies and industry select the right repair and preparation treatments, and also to design and construct the treatments. It also provides guides for quality assurance of the treatments as well as for troubleshooting problems.

## Key Products

The key product is a new manual on the best practices for the design and construction of crack treatments or patching and other surface preparation practices recommended as part of a pavement preservation program. This timely information can be easily used by both local agencies and industry. The Manual will also be the primer for a training class on the subject.

## Policy/Practice Recommendations

This manual, if followed, should promote proper surface preparation for pavement surface treatments,

and prevent most early failures in the placement of crack treatments or patches for asphalt pavements. It is imperative that better specifications also be used to ensure better performance and fewer failures.

All agencies should follow the best practices laid out in the full manual to ensure that the surface preparation treatments describe in the manual meet the expectations of the agency.

### About the Authors

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Dr. DingXin (Ding) Cheng is a Professor of the department of Civil Engineering at the California State University, Chico, director of the California Pavement Preservation (CP2) Center, and the director of the Tire Derived Aggregate Technology Center. He obtained his Ph.D. in the areas of pavement materials and transportation from Texas A&M University in College Station, Texas in 2002. He is a registered professional engineer in the state of Texas.

#### R. Gary Hicks, Ph.D., P.E.

Dr. Hicks is currently program manager for the CP2 Center at CSU Chico. Prior to joining the Center, he taught at Georgia Tech and Oregon State University for 30 years, rising to the positions of Distinguished Professor of Civil Engineering and Associate Dean for Research for the College of Engineering. He retired from OSU in 1997, and upon retirement embarked on a consulting career with MACTEC Engineering (now Wood LLC), providing on-call consulting services to the California Department of Transportation and other organizations. He is a registered Civil Engineer in the states of California, Oregon, and Alaska.

#### Roger D. Smith

Roger is a consultant specializing in asphalt pavement and materials. In addition to his pavement consulting services, he provides pavement training classes for the California Asphalt Pavement Association (CalAPA) and the Institute of Transportation Studies (U.C. Berkeley), and is a part-time Senior Pavement



a.) What we want

b) What we don't want

Figure 1: Outcomes of Crack Treatment Projects



a.) What we want

b) What we don't want

Figure 2: Typical Outcomes of Patching projects

Specialist with the California Pavement Preservation (CP2) Center at Chico State University. Roger began his career with Caltrans, ending up as the Senior Engineer in charge of the asphalt materials section of Caltrans's Transportation Laboratory (Translab) in Sacramento. After leaving Caltrans, he worked for 10 years as a field engineer for the Asphalt Institute and later served as Executive Director of the Northern California Asphalt Producers Association (NCAPA). He is a graduate of Michigan Technological University with a degree in Civil Engineering.

### To Learn More

For more details about the study, download the full report at [transweb.sjsu.edu/research/2103](https://transweb.sjsu.edu/research/2103)



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