Research Digest

FORWARD ALL REQUESTS TO:

The University of Texas at Austin
Center for Transportation Research Library
1616 Guadalupe St. | Suite 4.202 | Austin, Texas 78701
Phone: (512) 232-3126
Email: ctrlib@austin.utexas.edu

In this Issue:

TxDOT Research Publications

Table of Contents

Item 1

Development and MASH Full-Scale Crash Testing of a High-Mounting-Height Temporary Single Sign Support with Aluminum Sign

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)

TTI 1002-12-5 • 2013

Work zone traffic control devices such as temporary single sign supports are a primary means to communicate information to motorists in work zone areas. The Federal Highway Administration and the Manual on Uniform Traffic Control Devices require work zone traffic control devices to be crashworthy. That is, they should not pose a safety hazard to motorists and/or work zone personnel if impacted by errant vehicles. The objective of this research was to develop a nonproprietary, lightweight, crashworthy, work-zone single sign support for use with an aluminum sign substrate mounted at a height of 7 ft. The device is intended to meet the evaluation criteria in MASH. Texas A&M Transportation Institute (TTI) researchers decided to utilize perforated steel tubing for the frame of the new temporary single sign support system to accommodate requests to help make the system lightweight, durable, easy to assemble, and adjustable. Design concepts were developed and evaluated through engineering analysis, developmental full-scale crash tests, and finite element computer simulations. Results were reviewed with the project monitoring committee and a system was selected by TxDOT for evaluation through full-scale crash testing. MASH Test 3-72 with the 2270P pickup truck was performed to evaluate the behavior of the sign support oriented at both 90 degrees and 0 degrees. The sign support system oriented at 0 degrees passed all the MASH evaluation criteria. Secondary contact between the pickup truck and the aluminum sign panel of the sign support system oriented at 90 degrees caused a cut in the roof that constituted occupant compartment intrusion. Consequently, the sign support system did not pass MASH occupant risk criteria. The report recommendations possible design modifications to mitigate this behavior and improve impact performance for the pickup truck.

CONTENTS

This report is available for free download (20.8 MB):
http://tti.tamu.edu/documents/9-1002-12-5.pdf

Item 2

MASH Full-Scale Crash Testing of 4-ft Mounting Height, 24"×30" Chevron Sign Installed on 5.5H:1V Slope Ditch

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)

TTI 1002-12-6 • 2013

Current TxDOT practice allows installation of all existing chevron sizes on 7-ft mounting height, but restricts the use of 4-ft mounting height for the three smallest existing chevron signs---that is, 12 inches × 18 inches, 18 inches × 24 inches, and 24 inches × 30 inches. A common TxDOT practice is to install chevron sign systems in roadside ditches. For this type of installation, the specified sign mounting height is measured from the pavement surface. When a sign support system is installed on a slope, the local mounting height of the sign (calculated from ground level at the location of installation) will be greater than the same mounting height evaluated for the same sign installed on flat level ground. Previous crash testing was performed with the chevron installed on flat, level ground. Since it is common practice for TxDOT to install chevron signs in ditches at a 4-ft mounting height and a lateral offset between 2 and 8 ft from the pavement surface, the actual ground mounting height varies. TxDOT research project 0-6363 suggested the crashworthiness of this configuration be evaluated. The scope of this study was to evaluate the impact performance of a 24-inch × 30-inch chevron sign at a 4-ft mounting height from the pavement surface, installed at an 8-ft lateral offset in a 5.5H:1V sloped ditch. The chevron sign support performed acceptably for MASH Test 3-61 (1100C vehicle impacting at 62 mi/h and 10 degree nominal conditions). Thus, the current TxDOT practice of installing the three smallest chevron signs (12 inches × 18 inches, 18 inches × 24 inches, and 24 inches × 30 inches) at 4-ft mounting height in roadside ditches is acceptable.

CONTENTS

This report is available for free download (4.3 MB):
http://tti.tamu.edu/documents/9-1002-12-6.pdf

Item 3

Guidelines for Using Ultra High Pressure Water Cutting to Remove Excess Asphalt

TEXAS TECH UNIVERSITY. CENTER FOR MULTIDISCIPLINARY RESEARCH IN TRANSPORTATION (TECHMRT)
TechMRT 5230-01-P1 • 2013

"This document presents guidelines for implementing the ultra high pressure (UHP) water cutter as a roadway maintenance tool relative to removal of excess surface asphalt such as exists for flushed asphalt pavements. The following topics are covered: An introduction to the ultra high pressure water cutter, a description of the ultra high pressure water cutting process, maintenance applications for ultra high pressure water cutting, TxDOT's evaluation of ultra high pressure water cutting in terms of effectiveness, durability, production and cost; guidance on selection of candidate projects for ultra high pressure water cutting treatment; specifications for ultra high pressure water cutting; expressed within the broader context of roadway maintenance solutions, the guidance on ultra high pressure water cutting presented herein is intended to help TxDOT maintenance professionals address the problem of flushed pavements on Texas roadways in order to better provide safe and reliable transportation solutions for Texas." --Preface

CONTENTS

This report is available for free download (3.2 MB):
http://www.depts.ttu.edu/techmrtweb/Reports/Products/P1-UHP%20WATER%20CUTTING_09-12-2012.pdf

Item 4

Bioretention for Highway Stormwater Quality Improvement in Texas: Final Report

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)
TTI 5949-4 • 2013

This final report summarizes five years' worth of work in evaluating the applicability and performance of bioretention best management practices (BMPs) for highway environments in Texas. Within the five-year time frame, the research team did a literature review, conducted pilot experiments, and constructed a field demonstration site. The field site was tested with two different designs: (1) dry (or non-internal water storage [IWS]) and (2) internal water storage types. The field site is near the intersection of SH 21 and SH 6 in Bryan, Texas. The site includes a water hydrant for irrigation and synthetic runoff tests. The report includes introduction, research methods, test results, discussion, drawing examples, designs and maintenance guidelines, a special specification, a planting plan guide, a summary of the site selection process, and test data. In summary, bioretention BMPs can reduce peak flow and increase detention time. Non-IWS design moderately removed suspended solids, less effectively removed copper and zinc, less effectively removed total nitrogen, and moderately removed total phosphorus. The IWS layer significantly improved all performances, including hydraulic and water quality. The significance of this research project is that bioretention BMPs are a promising method for highway application in hot, semi-arid areas. Furthermore, the IWS layer is a viable application to improve bioretention performances.

This report is available for free download (11.9 MB):
http://tti.tamu.edu/documents/0-5949-4.pdf

Item 5

Shear in High Strength Concrete Bridge Girders : Technical Report

UNIVERSITY OF HOUSTON (UH). DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

UH 6152-2 • 2013

Prestressed Concrete (PC) I-girders are used extensively as the primary superstructure components in Texas highway bridges. A simple semi-empirical equation was developed at the University of Houston (UH) to predict the shear strength of PC I-girders with normal strength concrete through the project TxDOT 0-4759. The UH-developed equation is a function of shear span to effective depth ratio, concrete strength, web area and amount of transverse steel. This report intends to (1) validate the UH-developed equation for high strength concrete by testing ten 25-feet long full-scale PC I-girders with different concrete strength. (2) validate the UH-developed equation for different sizes of PC girders and studying the possibility of having premature failure due to local failure in end zone.

CONTENTS

- Part I. Maximum Shear Strength As A Function of Concrete Strength
- Part II. Study of Shear Bond Failure

This report is available for free download (23.4 MB):
http://tti.tamu.edu/documents/0-6152-2.pdf

Item 6

Bridge Deck Reinforcement and PCP Cracking: Final Report

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)

CTR 6348-2 • 2013

Bridge decks composed of precast, prestressed panels (PCPs) overlain by cast-in-place (CIP) are popular in many states, including Texas. Optimization of top-mat reinforcement and reduction of collinear panel cracking were addressed in this project. Longitudinal top-mat reinforcement was found to be already optimized. Further optimization of transverse top-mat reinforcement is possible by slightly reducing the area of deformed reinforcement or by using welded-wire reinforcement. Collinear panel cracking can be reduced by reducing lowering the initial prestress or by placing additional transverse reinforcement at panel ends. Measured prestress losses in PCPs were at most 25 ksi, much less than the 45 ksi currently assumed by TxDOT. The comparative efficiency of different types of high-performance steel fibers was examined. Double-punch testing, appropriately standardized as proposed in this report, is a reliable and repeatable measure of the comparative efficiency of high-performance steel fibers.

CONTENTS

- Chapter 1. Introduction
- Chapter 2. Literature Review
- Chapter 3. Optimization of Reinforcement in CIP Slabs: Field Application
- Chapter 4. Optimization of Reinforcement in CIP Slabs: Restrained-Shrinkage Test
- Chapter 5. Double-Punch Testing
- Chapter 6. Control of Cracking in Precast, Prestressed Concrete Panels
- Chapter 7. Summary, Conclusions, and Recommendations

This report is available for free download (14.2 MB):
http://library.ctr.utexas.edu/ctr-publications/0-6348-2.pdf

Item 7

User's Guide for PET: Project Evaluation Toolkit: A Sketch-Planning Toolkit for Evaluating Highway Transportation Projects, Version 2.0

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)

CTR 6487-P1 • 2013

"Transportation planning involves evaluating the congestion, safety, emissions, and other impacts of large-scale network improvements and policy implementations. This document is a User's Guide for the Project Evaluation Toolkit (PET), a sketch planning toolkit developed for evaluating a variety of strategic- and operational-level transportation network improvements. PET's development was sponsored by Texas Department of Transportation (TxDOT) under TxDOT research project 0-6235 (titled "Sketch Planning Techniques to Assess Regional Air Quality Impacts of Congestion Mitigation Strategies") and its associated implementation project (5-6235), along with research project 0-6487 (titled "Development of a Performance Measurement Based Methodology to Objectively Compare Operational Improvements with Capacity Additions"). This Guide provides users with a detailed description of PET's design and specification and a technical guidance in using PET for project evaluation and comparison... PET is a spreadsheet-based application that offer users a familiar and powerful data manipulation interface for evaluation of abstracted networks' improvements and modifications. PET includes a travel demand estimation module implemented as a set of external C++ programs for destination, mode, time of day, and route choices, across multiple user classes. Other functional modules, including economic analysis, environmental impact evaluation, safety evaluation, sensitivity analysis, and budget allocation, are implemented in Microsoft Excel spreadsheets. PET can be used with or without its travel demand model (TDM) component... PET 2.0 was released in summer 2012, and it includes many updates to the Toolkit's trip table calculation process, along with the addition of transit-specific components, origin- and destination-focused trip costs, multi-criteria analysis, and a network visualization module. PET 2.0 also enjoys updated emissions and crash estimation procedures (to rely on MOVES and the Highway Safety Manual's latest equations). All material in this Guide refers to the updated 2.0 version of PET." --p.1-2

This report is available for free download (3.75 MB):
http://library.ctr.utexas.edu/ctr-publications/PETguide.pdf

Item 8

0-6549, Hydraulic Performance of Staggered-Barrel Culverts for Stream Crossing

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT)

TechMRT 6549 PSR • 2013

"The interaction of sediment transport and drainage structures at highway stream crossings is a relatively ignored component of engineering design. Use of hydraulic structures to accommodate aquatic species is progressing, and this knowledge, at least conceptually, is relevant to the transport of stream-carried solids through hydraulic structures. However, when bed material transport rates are relatively high and comprised of solids too large to travel in suspension, then current drainage structures might not function as intended. Under such conditions, solids may become trapped in and around the structure and lead to untimely service failures. This project attempted to understand how to accommodate such episodic loads of solids material using different culvert geometries—in particular the staggered-barrel configuration." --Background

This report is available for free download (746 KB):
http://ftp.dot.state.tx.us/pub/txdot-info/rti/psr/0-6549-s_techmrt.pdf

Item 9

Powerpoint Presentation and Handout Material for Summary of Spec Test Procedures Actions to Take for Non-Compliance

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)

TTI 6621-P2 • 2013

This CD-ROM contains a PowerPoint slide show and handout for a presentation given on October 31, 2012.

CONTENTS

- SB Certification for Mixture-Based Specification for Flexible Base: Summary of Spec Test Procedures Actions to Take for Non-Compliance [presentation]
- SB Certification Handout: Material Requirements, Test Methods, Responsibilities, and Minimum Classification Levels for Mixture-Based Specification for Flexible Base

This report is available for free download:
http://tti.tamu.edu/documents/0-6621-P2.zip

Item 10

Powerpoint Presentation for Developing a Mixture-Based Specification for Flexible Base

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)

TTI 6621-P3 • 2013

This CD-ROM contains a MS PowerPoint slide show (.pptx) entitled "Developing a Mixture-Based Specification for Flexible Base."

This report is available for free download:
http://tti.tamu.edu/documents/0-6621-P3.zip

Item 11

Optimizing Utility Owner Participation in the Project Development and Delivery Process

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)

TTI 6624-1 • 2013

Coordination with utility owners during the project development and delivery process involves multiple activities, such as requesting and collecting data about the location and characteristics of existing facilities to identifying and analyzing utility conflicts, coordinating with utility stakeholders for the resolution of those utility conflicts, preparing and executing utility agreements, coordinating and inspecting utility adjustments, and coordinating reimbursements and audits. Effective communication, cooperation, and coordination among utility stakeholders are critical to keeping transportation projects on schedule. Unfortunately, these elements are frequently lacking during project development and delivery to allow for the adoption of costeffective solution strategies. This report documents the results of research completed to develop strategies to improve the participation and response of utility owners in the project development and delivery process. To achieve this objective, the researchers (1) reviewed strategies that the Texas Department of Transportation (TxDOT) and other agencies use to engage utility owners, (2) developed a set of strategies designed to optimize utility owner participation, (3) conducted stakeholder meetings and workshops to gauge the potential acceptability of these strategies, and (4) developed recommendations for changes to business processes and procedures. The four sets of strategies are: (1) modernization of the utility process, (2) utility conflict matrix approach, (3) streamlining and standardization of utility cost data submissions, and (4) core skill training on utility topics. The research also included the development of an implementation plan and standalone guidebook and training materials to assist in the implementation of each of these strategies.

CONTENTS

This report is available for free download (7.7 MB):
http://tti.tamu.edu/documents/0-6624-1.pdf

Item 12

A Transportation Economics Reference for Practitioners: Final Report

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)

CTR 6628-1 • 2013

Transportation projects and policies are rooted in economic considerations and consequences. This report documents the development of a relatively comprehensive transportation economics reference for practitioners, entitled "The Economics of Transportation Systems: A Reference for Practitioners." This guidebook is tailored for those on the front lines of transportation planning, design, and policy at state Departments of Transportation and elsewhere, so that they can more easily anticipate and evaluate the economic implications of their work. In addition to introducing key transportation economic terms and concepts, the Reference describes a wide variety of tools for project and policy evaluation and analysis, to help transportation professionals address fundamentally complex questions with more confidence, particularly under resource constraints. The Reference's contents address issues ranging from appropriate contractor charges for project delays to optimal budget allocation across capacity-expansion and maintenance projects, and speak directly to the day-to-day needs of practitioners. The Reference's provision of transportation economics fundamentals, analytical methods, and case studies illustrate the endless opportunities for successful economic considerations and applications within transportation.

CONTENTS

This report is available for free download (266 KB):
http://library.ctr.utexas.edu/ctr-publications/0-6628-1.pdf

Item 13

Utility Investigation Best Practices and Effects on TxDOT Highway Improvement Projects

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)

TTI 6631-1 • 2013

The lack of adequate information about the location and characteristics of utility facilities can result in a number of problems, including damages to utilities, disruptions to utility services and traffic, "lost" utility facilities as construction alters the landscape and pre-existing benchmarks are removed, and delays to highway projects. To address this issue, the research team reviewed the state of the practice in utility investigations and developed best practices for timing and use of utility investigation services in the TxDOT project development process. Major activities of the research included a review of current utility investigation techniques and technologies, a review of best practices and use of utility investigation practices in other states, and a review of TxDOT project data to examine effects of utility investigation services. The research team surveyed TxDOT organizational units on current utility investigation practices, developed draft best practices for utility investigations, and conducted workshops to allow feedback from practitioners. Based on the feedback, the research team reviewed and revised the draft best practices for utility investigations, developed draft content for inclusion in the ROW Utility Manual, and developed and tested training materials.

This report is available for free download (9.6 MB (report PDF); 62 KB (CDROM zip file)):
http://tti.tamu.edu/documents/0-6631-1.pdf
http://tti.tamu.edu/documents/0-6631-1-CD.zip

Item 14

0-6644, Development of Guidelines for Operationally Effective Raised Medians and the Use of Alternative Movements on Urban Roadways

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT). RESEARCH AND TECHNOLOGY IMPLEMENTATION (RTI)
TSU 6644 PSR • 2013

"The development of raised medians is an important access management technique commonly used in urban settings. Currently, there are limited official guidelines available for practitioners in design and implementation of raised medians. In addition, alternative movements, such as right turns followed by U-turns as an alternative to direct left turns, are increasingly used in the urban street to reduce conflicts and to improve safety along arterial roads. However, the current available official guidelines do not list all the available tools for practitioners in determining appropriate solutions to some operational and access issues, which makes engineers hesitant to use alternative geometric treatments. The objective of this research project is to develop guidelines for operationally effective raised medians and the use of alternative movements on urban roadways." --Background

This report is available for free download (168 KB):
http://ftp.dot.state.tx.us/pub/txdot-info/rti/psr/0-6644-s_tsu.pdf

Item 15

Signs on Concrete Median Barriers

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)
TTI 6646-1 • 2013

Concrete median barriers have been used throughout the state as permanent and temporary barriers for providing separation of traffic. Typically, these barriers are tested and considered crashworthy through crash testing according to National Cooperative Highway Research Program Report 350 or American Association of State Highway and Transportation Officials Manual for Assessment of Safety Hardware. Due to space restrictions, a sign or a light pole is placed on top of such barriers. However, when signs or light poles are mounted on top of barriers, the crashworthiness of the system is not necessarily guaranteed. There is very limited research on how a combination of device and barrier would perform if impacted by an errant vehicle. Moreover, no full-scale crash tests have been performed to accurately identify the influence of attachments on vehicular deceleration. Therefore, there is a need to identify existing practices of placing hardware on top of median barriers, as well as defining the crashworthiness of such combinations. In this project, a survey of the practice of mounting hardware on top of barriers was performed. Analytical, computer simulation, and testing tasks were conducted to define crashworthy hardware and placement guidelines. This research developed a design guideline and a standard that could be incorporated into TxDOT standards and specifications.

This report is available for free download (23.1 MB):
http://tti.tamu.edu/documents/0-6646-1.pdf

Item 16

Mobile Luminance Data Collection System User Manual

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)

TTI 6647-P2 • 2013

"While nighttime driving volumes are lower than daytime, the percentage of crashes with respect to volume is higher, so it is critical that transportation agencies do everything economically possible to improve nighttime driving safety. One crucial part of nighttime driving safety is the visibility of traffic control devices (TCDs). This manual provides a description of the mobile luminance data collection system designed for TxDOT to evaluate the nighttime visibility of TCDs. The manual also contains detailed guidance on how to install the software and hardware, how to use the system, and how to conduct a post-processing analysis of images taken of the nighttime driving scene." --Introduction

This report is available for free download (5.8 MB (report PDF); 1.57 GB):
http://tti.tamu.edu/documents/0-6647-P2.pdf
http://tti.tamu.edu/documents/0-6647-P2-CD.zip

Item 17

Hydraulic Performance of Small Scale Bridge Deck Drains

LAMAR UNIVERSITY

Lamar 6653-1 • 2013

Efficient removal of stormwater runoff from bridge deck surfaces is an important safety issue. This study investigates hydraulic performance characteristics of a new type of rectangular bridge deck drain. A physical modeling study was conducted to evaluate the hydraulic performance of the innovative rectangular bridge deck drain as a function of the approach discharge, different drain configurations, and bridge characteristics. Experiments included different numbers of open drains in series for variable approach discharge cross slope and longitudinal slope. Measurements included gutter flow depth (Y) and ponding width (T) at different stations along the deck, and the capture discharge and bypass discharge. A model equation is presented for predicting the capture discharge as a function of drain size (L+W), the number of open drains (N), Manning's coefficient (n), depth of approached gutter flow (Y), longitudinal slope (S0), and cross slope (Sx). For experiments considering one through five drains in series (1-5 drains), the rating curve for each individual drain is the same when the drain size is 4 by 8 inches; however, the rating curve decreases slightly with successive drains when the drain size is 6 by 8 inches

CONTENTS

This report is available for free download (4.8 MB):
http://library.ctr.utexas.edu/ctr-publications/0-6653-1.pdf

Item 18

Synthesis of Best Practices for the Placement of Long and Short Patches for Ride Quality : Technical Report

UNIVERSITY OF TEXAS AT SAN ANTONIO (UTSA). DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

UTSA 6667-1 • 2013

Level-up patching is a common corrective maintenance activity in Texas performed by most districts. It involves laying down a thin asphalt mix layer over an existing pavement (rigid or flexible) in areas of sagging or rutting to improve the ride score, reduce pavement roughness, improve drainage, and restore cross-slope. Level-up patching is applied in areas of surface-related failures rather than areas with foundation (base/subgrade) problems. TxDOT uses level-up patching in most of the districts as a corrective pavement treatment. Total expenditures for patching/ overlaying costs are in the order of $180m annually. This report documents the best level-up practices for the benefit of the TxDOT districts. It provides them with guidelines on materials, equipment, and best practices for improving the quality of patching and extending its service life, which ultimately will produce significant cost savings statewide.

CONTENTS

This report is available for free download (3.8 MB):
http://tti.tamu.edu/documents/0-6667-1.pdf

Item 19

Report from the Panama Canal Stakeholder Working Group

TEXAS A&M UNIVERSITY. TEXAS TRANSPORTATION INSTITUTE (TTI)

TTI 6800-1 • 2013

This project assists the Texas Department of Transportation (TxDOT) in assessing the potential impacts of the Panama Canal expansion on Texas ports and the landside transportation system. TxDOT formed a Panama Canal Stakeholder Working Group (PCSWG) to help examine these impacts and possible opportunities for expanding global trade. The PCSWG held a series of meetings to obtain input from shippers and carriers, ports, metropolitan planning organizations (MPOs), regional mobility authorities (RMAs), industry groups, and other organizations. In addition to the Panama Canal expansion, the PCSWG discussed opportunities to expand global trade related to the growth of the state's population and developments in the energy sector. This report summarizes the results of these meetings, along with an examination of current and planned roadway, port, and rail projects. Short-, mid-, and long-term TxDOT transportation improvements, other projects and policies that will better position the state of Texas to take advantage of the Panama Canal expansion, and other opportunities to enhance Texas' role in global trade are presented.

CONTENTS

This report is available for free download (3.2 MB):
http://tti.tamu.edu/documents/0-6800-1.pdf

Item 20

Just in Time Technology Transfer for Portland Cement Concrete Pavement Construction and Rehabilitation

TEXAS TECH UNIVERSITY. CENTER FOR MULTIDISCIPLINARY RESEARCH IN TRANSPORTATION (TECHMRT)

TechMRT 9045-05-1 • 2012

As of 2010, the total lane mileage of CRCP in Texas accounts for about 5.4 percent of total lane mileage. On the other hand, CRCP carries about 25 percent of total traffic. It is quite important to TxDOT and the State to keep CRCP in good condition. In-depth evaluations of CRCP condition in Texas reveal that the overall condition of CRCP is excellent, with actual performance exceeding intended design lives twice or three times in some projects. On the other hand, distresses do occur in CRCP. TxDOT's "Rigid Pavement Database" research study evaluated the distresses in CRCP, and discovered that most of the distresses were not due to the structural deficiency of the pavement system; rather, they were due to the quality issues in materials and construction. Enhancing the quality of materials and construction operations of CRCP is the most cost-effective way to improve performance, rather than increasing slab thicknesses. This implementation project aimed at enhancing the quality of the materials and construction operations for CRCP by developing training materials and providing training to TxDOT and contractor personnel. Three areas that need the most attention were identified: (1) materials and construction issues of CRCP for optimum performance, (2) full- and partial-depth repairs of CRCP, and (3) prevention and repair lane separations in concrete pavement. For the development of training material, district construction and maintenance staff were consulted along with the review of publications on CRCP construction and rehabilitation. Also, the information gathered over the years under various TxDOT research studies was utilized.

CONTENTS

This report is available for free download (1.2 MB):
http://www.depts.ttu.edu/techmrtweb/Reports/Complete%20Reports/5-9045-05-1.pdf