

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 (August-September 2014)

Table of Contents

Item 1.	0-4562, Corrosion Resistance of Grouted Post-Tensioning Systems (4562 PSR)	1
Item 2.	Implementation of Texas Asphalt Concrete Overlay Design System (5123-03-1)	2
Item 3.	0-6639, Testing of Alternative Supporting Materials for Portable Roll-Up Signs Used for Maintenance Work Zones (6639 PSR)	3
Item 4.	0-6654, Empirical Flow Parameters: A Tool for Hydraulic Model Validity Assessment (6654 PSR)	3
Item 5.	Field Evaluation of Automated Distress Measuring Equipment (6663-2)	4
Item 6.	Recommendations for Selection of Automated Distress Measuring Equipment (6663-P2) ...	5
Item 7.	Trade Flows and Texas Gulf Ports: Panama Canal Expansion and South American Markets (6690-CTR-2)	6
Item 8.	Truck-Rail Intermodal Toolkit: User Manual (6692-P2)	7
Item 9.	Freight Data Architecture Business Process, Logical Data Model, and Physical Data Model (6697-CTR-P1)	8
Item 10.	Companion PowerPoint Presentation to Unity Database (6697-CTR-P2)	8
Item 11.	0-6748, Best Practice for Flexible Pavement Structure Widening Projects (6748 PSR)	9
Item 12.	0-6759, Developing a Business Process and Logical Model to Support a Tour-Based Travel Demand Model Design for TxDOT (6759 PSR)	9
Item 13.	Developing a Mode Choice Model for Small and Medium MPOs (6766-1)	10
Item 14.	Forecasting Tool User Manual (6766-P1)	11
Item 15.	Workshop Presentation (6766-P2)	11
Item 16.	0-6803, New Technology Task Force, Phase II (6803 PSR)	12
Item 17.	Stretch and Flex Program for TxDOT Office and Field Workers (6805-1)	13
Item 18.	Stretch and Flex Guidebook (6805-P1)	14

Research Digest

Item 1

0-4562, Corrosion Resistance of Grouted Post-Tensioning Systems

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT). RESEARCH AND TECHNOLOGY IMPLEMENTATION OFFICE (RTI)

CTR 4562 PSR • [2014]

"Although the vast majority of post-tensioned bridges in the United States have performed satisfactorily, corrosion problems on a small number of bridges have raised concerns about the durability of these types of structures... One major problem that agencies face today is the difficulty of providing sufficient monitoring and inspection techniques for bonded post-tensioned structures. Condition surveys are often limited to visual inspections for signs of cracking, spalling, and surface rust staining. This limited technique can often overlook the deterioration of prestressing steel and can fail to detect the potential for very severe and sudden collapses. This project began in 2003 and was conducted at the Ferguson Structural Engineering Laboratory at The University of Texas at Austin under sponsorship of the Texas Department of Transportation (TxDOT) and the Federal Highway Administration. A new set of specimens was required for exposure to highly aggressive environments to test the new products... the research team designed and developed new specimens. To establish the corrosion resistance of the post-tensioning strands to be used in the new specimens, the researchers performed preliminary companion tests... The specimens were monitored continuously and eventually autopsied to evaluate the final corrosion resistance of each strand, duct, coupler, and anchorage combination." --p.1
(2 pages)

This report is available for free download (69 KB):

<http://tti.tamu.edu/documents/0-4562-S.pdf>

Research Digest

Item 2

Implementation of Texas Asphalt Concrete Overlay Design System

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

TTI 5123-03-1 • 2014

An asphalt overlay design system was developed for the Texas Department of Transportation (TxDOT) under research project 0-5123. The new overlay design system, named the Texas Asphalt Concrete Overlay Design System (TxACOL), can help pavement engineers optimize asphalt overlay design in terms of overlay mix type and thickness, based upon existing pavement structure and conditions (existing distress types and/or load transfer efficiency at joints/cracks), local weather conditions, and anticipated traffic level.

Several districts in Texas expressed interest in implementing this new overlay design system for designing asphalt overlays. To facilitate the implementation in districts, Project 5-5123-03 was initiated. The work performed under this study included (a) developing and conducting district-oriented overlay design workshops, (b) providing asphalt overlay design assistance and monitoring the new constructed overlays, (c) performing laboratory testing and updating the material default values of overlay mixes, (d) surveying the field performance (rutting and cracking) of asphalt overlay projects, and (e) enhancing and calibrating the TxACOL. This report documents the work and findings from this study.

(xiv, 87 pages)

CONTENTS

- Chapter 1. Introduction
- Chapter 2. Overview of Completed Work
- Chapter 3. Field Survey Data Analysis
- Chapter 4. Determination of Key Input Factors
- Chapter 5. TXACOL Enhancement
- Chapter 6. Case Studies [IH 40, SH 24 test sections]
- Chapter 7. Conclusions and Recommendations

This report is available for free download (7.4 MB):

<http://tti.tamu.edu/documents/5-5123-03-1.pdf>

Research Digest

Item 3

0-6639, Testing of Alternative Supporting Materials for Portable Roll-Up Signs Used for Maintenance Work Zones

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT). RESEARCH AND TECHNOLOGY IMPLEMENTATION (RTI)

TechMRT 6639 PSR • [2014]

"Portable roll-up signs are currently used by the Texas Department of Transportation for identification of short-term maintenance/work zones and emergency operations. These signs have fiberglass frames that directly support diamond-shaped and rectangular flexible sign faces. It has been frequently reported that these fiberglass frames have failed due to bending caused by natural winds or gusts generated by passing vehicles. This research project addressed three major issues: [1] Understanding the nature of wind loading on portable roll-up signs. [2] Identifying alternative materials for fiberglass frames. [3] Developing modified/new designs of portable roll-up signs." --Background

(2 pages)

This report is available for free download (98 KB):

<http://www.depts.ttu.edu/techmrtweb/Reports/PSRs/0-6639-S.pdf>

Item 4

0-6654, Empirical Flow Parameters: A Tool for Hydraulic Model Validity Assessment

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT). RESEARCH AND TECHNOLOGY IMPLEMENTATION (RTI)

TechMRT 6654 PSR • 2014

"Hydraulic modeling assembles models based on generalizations of parameter values from textbooks, professional literature, computer program documentation, and engineering experience. Actual measurement adjacent to the model location are seldom available for use in refining model parameters.... This research developed independent ways to assess computed velocities based on prior, authoritative and observational experience as an independent tool to assess hydrologic and hydraulic model validity." --Background

(2 pages)

This report is available for free download (201 KB):

<http://www.depts.ttu.edu/techmrtweb/Reports/PSRs/0-6654-S.pdf>

Research Digest

Item 5

Field Evaluation of Automated Distress Measuring Equipment

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

CTR 6663-2 • 2014

Project 0-6663 Phase 2 involved evaluation of the TxDOT automated visual distress 3D laser system van and three automated systems developed by automated visual distress data collection vendors. The research team selected 20 test sections in the Austin and Waco Districts comprising asphalt concrete pavement, surface treatments, portland cement concrete, and continuously reinforced concrete pavements. Each of the 550-ft-long test sections were subsectioned at 50-ft intervals and were evaluated manually by an experienced Long Term Pavement Performance (LTPP) manual distress rating team and a TxDOT Pavement Management Information System (PMIS) manual distress rating team. In each case the manual raters followed the LTPP or PMIS Rating Manual protocols to identify and measure distress on each test section. In addition, cross slope was measured with the FACE® Dipstick; texture was measured with the circular track meter; and digital crack map images were obtained by manually marking each crack using different colors related to three width categories and then photographing selected 50-ft subsections using a high-end digital camera. These manual measurements provided a baseline for comparison with the TxDOT and vendor automated system data output. The four participants collected automated distress, cross slope, texture, and crack map images during late July and August, finishing on August 30, 2013. Based on previous discussions with TxDOT and the vendors during a webinar held on January 30, 2013, data was reported by TxDOT and the vendors for three time intervals: 1) immediately after data collection with no manual post processing; 2) within 2 business days with minimal post processing; and 3) within 4 weeks with full, manual post processing. The last set of completed data was received in early October, 2013. These data sets were used by the research team to conduct both analytical and visual comparative analysis of output from the four automated systems presented in this report. (xiii, 76, [329] pages; 3.85 GB)

- Accompanying CD-ROM contains Appendices.

CONTENTS

- Chapter 1. Introduction
- Chapter 2. Phase 2 Experiment
- Chapter 3. Phase 2 Data Analyses
- Chapter 4. Recommendations for Selection of Automated Distress Measuring Equipment
- Chapter 5. Quantification of Impact on PMIS Scores
- References
- Appendix A-1: Crack Maps Comparison – TxDOT Fully Automated
- Appendix A-2: Crack Maps Comparison – WayLink-OSU Fully Automated
- Appendix A-3: Crack Maps Comparison – Dynatest Fully Automated
- Appendix A-4: Crack Maps Comparison – Dynatest Semi-Automated
- Appendix A-5: Crack Maps Comparison – Fugro Fully Automated
- Appendix A-6: Crack Maps Comparison – Fugro Semi-Automated
- Appendix A-7: Crack Maps Comparison – LTPP Manual Distress Survey
- Appendix B-1: Distress Statistics for ACP Sections
- Appendix B-2: Distress Statistics for JCP Sections
- Appendix B-3: Distress Statistics for CRCP Sections

This report is available for free download (86 MB ***large file, may take time to download):

<http://library.ctr.utexas.edu/ctr-publications/0-6663-2.pdf>

Research Digest

Item 6

Recommendations for Selection of Automated Distress Measuring Equipment

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

CTR 6663-P2 • 2014

"Phase 2 of Texas Department of Transportation (TxDOT) Research Project 0-6663: Evaluation of Pavement Rutting and Distress Measurements had the objective of evaluating the accuracy and precision of the new automated system developed by a TxDOT research group (composed of staff from the Construction Division's Materials and Pavement Section) for the high-speed measurement of pavement surface distresses, texture, and cross slope.... During this phase: [1] A field experiment consisting of 20 sections was developed, [2] Static manual distress statistics, texture, cross slopes, and digital crack maps were collected, [3] Four participants were invited to collect automated distress, texture, and cross slope measurements at highway speeds, and [4] The results were analyzed and compared to assess the difference between automated and manual measurements and evaluate the change in accuracy between fully and semi-automated results." --p.1, 6
(9 pages)

CONTENTS

- 1. Introduction
- 2. Summary Findings
- 3. Final Recommendations

This report is available for free download (231 KB):

<http://library.ctr.utexas.edu/ctr-publications/0-6663-P2.pdf>

Research Digest

Item 7

Trade Flows and Texas Gulf Ports: Panama Canal Expansion and South American Markets

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

CTR 6690-CTR-2 • 2014

In 2015, a new lock system will allow larger and more productive ships to use the Panama Canal to serve global markets. Widespread interest in the project and the impacts on US Atlantic and Gulf ports resulted in concern that US terminals and state transportation systems might be unprepared for the potential growth in Panama Canal-related trade. This 2-year study examined the impacts and found three irrefutable facts are known at this time. The first is that the new locks will offer global shippers new choices based on routes, cost, and service. That much is certain. The second is that the impact of the new locks on particular ports and trading partners will vary over time and their use by larger (post-Panamax) vessels will be linked to specific trade lanes, commodities, global trends in labor cost and related transportation costs, future free-trade agreements, and advancements in maritime-related technologies, among other factors. Third, the new locks broaden shipper options for Texas exports, particularly bulk commodities, on specific Panama Canal routes. Beyond these three facts, there is no agreement among experts about the likely pace or scale of future port activity due to the Panama Canal expansion.

(xiii, 102 pages)

CONTENTS

- Chapter 1. Background
- Chapter 2. Literature Review
- Chapter 3. Channel Improvement Projects
- Chapter 4. Landside Improvements
- Chapter 5. All-Water Services: Direct Shipment
- Chapter 6. All-Water Services: Transshipment
- Chapter 7. Rail Land Bridge Competition
- Chapter 8. Deep Draft Ship Operating Costs
- Chapter 9. Findings and Recommendations
- Appendix A. Container Terminal and Cargo-Handling Cost Analysis Toolkit
- Appendix B. CTR Vessel Operating Cost Model
- Appendix C. US Gulf Ports Containerized Ocean Trade with the West Coast of South America

This report is available for free download:

<http://library.ctr.utexas.edu/ctr-publications/0-6690-CTR-2.pdf>

Research Digest

Item 8

Truck-Rail Intermodal Toolkit: User Manual

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

CTR 6692-P2 • 2014

"The truck-rail intermodal toolkit (TRIT) was developed to help planners equally compare truck and rail freight movements for specific corridors and to give insight into some of the variables associated with each mode. The rail component of the model (CT-Rail) is designed to help planners and policy makers understand rail corridor operations and examine the opportunities and challenges for modal shifts from truck to rail. CT-Rail uses a mechanistic approach that adequately captures the effects of cargo weight, running speeds, network capacity, and route characteristics—key factors that are essential in any logistical analysis. The truck component of TRIT, CT-Vcost, developed from an earlier TxDOT study, allows planners to simulate truck movements over a specified corridor given factors such as truck speed, equipment depreciation, financing, insurance, maintenance costs, fuel cost, driver costs, road use fees (e.g., tolls), and other fixed costs—factors that influence truck operating costs and delivery time. Comparative variables used in both models include roadway and track characteristics (elevations and grades), travel speeds, changes in fuel prices, maintenance costs, labor costs, and tonnage. The truck corridor model also accounts for toll rates and vehicle insurance costs; drayage costs are included only in the rail corridor model. Outputs from both models include fuel consumption and cost, travel time, and payload cost per ton-mile.

The final report of TxDOT study 0-6692, "Truck-Rail Intermodal Flows: A Corridor Toolkit," will provide a detailed explanation of the methodologies discussed in this user manual." --Introduction
(28 pages; 1.1 MB)

• Accompanying CD-ROM contains "Truck-Rail Intermodel [sic] Toolkit and User Manual," dated July 2013.

CONTENTS

- Introduction and Installation
- CT-Rail
- Rail Line Comparison
- CT-Vcost Lite
- Highway improvement
- Support

This report is available for free download:

<http://library.ctr.utexas.edu/ctr-publications/0-6692-P2.pdf>

Research Digest

Item 9

Freight Data Architecture Business Process, Logical Data Model, and Physical Data Model

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

CTR 6697-CTR-P1 • 2014

"In November 2011, the Texas Department of Transportation (TxDOT) funded a study to integrate data from multiple sources to optimize freight transportation planning efforts in the state. The Center for Transportation (CTR) study team was commissioned to explore the feasibility of entering into a data-sharing partnership with representatives of the private sector (i.e., shippers, receivers, trucking companies, forwarders, etc.), and obtain sample data that can be used in formulating a strategy for integrating multiple data sources... This document summarizes the study team's efforts to establish data-sharing partnerships and relay the lessons learned. In addition, it provides information on a prototype freight data architecture and supporting description and specifications that will facilitate the storage and exchange of data through a data sharing partnership with members of Texas's freight community. Final recommendations on who should be responsible for populating and developing the integrated freight system are also made, and list of items to be considered in estimating the cost for developing and maintaining the system are presented." --p.1 (20 pages)

CONTENTS

- Introduction
- Why Data Partnership?
- Conceptual Freight Data Integration Architecture
- Proposed Mediator Architecture
- Cost Estimation
- Recommendations

This report is available for free download (0.9 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6697-P1.pdf>

Item 10

Companion PowerPoint Presentation to Unity Database

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

CTR 6697-CTR-P2 • 2014

This is a printout of Powerpoint slides from the presentation "Integration of Data Sources to Optimize Freight Transportation in Texas."

([36] pages)

This report is available for free download:

<http://library.ctr.utexas.edu/ctr-publications/0-6697-P2.pdf>

Research Digest

Item 11

0-6748, Best Practice for Flexible Pavement Structure Widening Projects

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT). RESEARCH AND TECHNOLOGY IMPLEMENTATION (RTI)

CTR 6748 PSR • [2014]

"The Texas Department of Transportation (TxDOT) has experienced problems with construction quality and performance on narrow widening projects (e.g., adding a 2- to 5-ft shoulder)... due to constraints regarding construction equipment limitations, material selection options and compatibility, construction methods, and other issues, problems with narrow widening projects can arise. These challenges include inadequate compaction at the base layer joint interface, drainage within the pavement and at the pavement surface, either high or depressed surface layer construction joints, and potential safety concerns. To effectively overcome these challenges, TxDOT has initiated this project to prepare a compendium of best practices and lessons learned regarding narrow widening projects. The primary goal of this project is to identify best practices for improving pavement performance on projects involving widening of narrow pavement structures." --Background
(2 pages)

This report is available for free download (102 KB):

<http://library.ctr.utexas.edu/ctr-publications/psr/0-6748-s.pdf>

Item 12

0-6759, Developing a Business Process and Logical Model to Support a Tour-Based Travel Demand Model Design for TxDOT

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT). RESEARCH AND TECHNOLOGY IMPLEMENTATION OFFICE (RTI)

CTR 6759 PSR • [2014]

"The Texas Department of Transportation (TxDOT) created a standardized trip-based modeling approach for travel demand modeling called the Texas Package Suite of Travel Demand Models (referred to as the Texas Package) to oversee the travel demand model development and implementation for most of the urban areas in Texas... The Texas Package does not currently include the advanced-practice behavioral analysis techniques to examine some specific policy- and behavioral-response questions. This research considers a business case for a tour-based travel demand model system using formal documentation from TxDOT's Technological Services Division (TSD)." --Background
(2 pages)

This report is available for free download:

<http://library.ctr.utexas.edu/ctr-publications/psr/0-6759-s.pdf>

Item 13

Developing a Mode Choice Model for Small and Medium MPOs

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6766-1 • 2014

This project developed a process and framework for generating the inputs needed for estimating a travel mode choice model that includes the transit mode, and developing a framework for implementing the results of an estimated travel mode choice model to project mode shares in response to demographic changes and improvements in transit service. In generating inputs for estimating a mode choice model, an important component is network skims (travel times and costs) by alternative modes. Most metropolitan planning organizations (MPOs) have good geographic information systems (GIS)-based representations of the highway network, which can be used to generate drive-alone and shared-ride skims. However, this is not the case with transit skims due to the lack of a good GIS-based representation of the transit network, especially for bus stops. The project manually geo-coded bus stop information onto the highway network, and used assumptions to generate transit paths and corresponding zone-to-zone transit skims. A guidebook provides a step-by-step procedure for developing skims. The database for estimation was developed using household survey data (2004) on trip characteristics. Two demographic variables were used in the mode choice model: household size and income. The models have been embedded into a software forecasting platform to predict modal share shifts between each pair of TAZs (and the region as a whole) due to changes in income levels and/or household size over time. The models can also be used to assess the impacts of transit improvements for in-vehicle and out-of-vehicle transit times. Further data collection from transit surveys is recommended to enhance the model's capacity to estimate the time and cost effects based on preferences. A georeferenced coordinate system for bus stop locations would also improve the transit skim generation process.

(xii, 122 pages; 29.5 MB)

- Accompanying CD-ROM contains supplementary files: "FORECASTING TOOL USER MANUAL (0-6766-P1)" / Chandra Bhat, et al. (.pdf file); Forecasting tool (.xlsm file); MATLAB script and input files (.m and .csv files)

CONTENTS

- Chapter 1. Introduction
- Chapter 2. Literature Review
- Chapter 3. Incorporating a Mode Choice Component for Small and Medium-Sized MPOs in Texas
- Chapter 4. Develop a Forecasting Approach and Model Design
- Chapter 5. Procedure to Develop Skims
- Chapter 6. Transit Skim Generation for Texas MPOs
- Chapter 7. Procedure to Prepare Data
- Chapter 8. Model Development
- Chapter 9. Conclusions
- References
- Appendix A. Guide to Model Skim Generation Development in TransCAD and ArcMap 10.1
- Appendix B. Forecasting Tool User Manual
- Appendix C. The Multinomial Logit (MNL) Model
- Appendix D. The Nested Logit (NL) Model
- Appendix E. Travel Demand Models of MPOs Outside of Texas

This report is available for free download (3.8 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6766-1.pdf>

Research Digest

Item 14

Forecasting Tool User Manual

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6766-P1 • 2014

"The Excel-based forecasting tool allows users to provide a mode choice model along with various skims (in-vehicle travel time, out-of-vehicle travel time, travel distance, and travel cost) in order to calculate the mode share at both the traffic analysis zone (TAZ) level and individual level. It also has the capability of obtaining the mode share given any change in the model explanatory variables—such as in-vehicle travel time, out-of-vehicle travel time, etc.—via the tool's scenario module." --Introduction
(9 pages; 29.5 MB)

- Accompanying CD-ROM contains "Forecasting Tool and Manual" by Chandra R. Bhat, January 7, 2014

This report is available for free download (27 MB: 1 PDF, 1 .xlsm):

<http://library.ctr.utexas.edu/ctr-publications/0-6766-P1.zip>

Item 15

Workshop Presentation

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6766-P2 • [2014]

"On December 18, 2013, the research team hosted a workshop at CTR to gather feedback on and generate discussion of the mode choice model that was developed [as part of Project 0-6766, "A Generic Mode Choice Model Applicable for Small and Medium-Sized MPOs"]. Attendees included the project monitoring committee (PMC) and TTI personnel who staff a help desk for TxDOT's Transportation Planning and Programming Division. At the same time the PMC and research team followed up with a close-out meeting for the project." --p.1
(18 pages)

This report is available for free download (1.9 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6766-P2.pdf>

Research Digest

Item 16

0-6803, New Technology Task Force, Phase II

TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT). RESEARCH AND TECHNOLOGY IMPLEMENTATION (RTI)

CTR 6803 PSR • [2014]

"Texas' 83rd Legislature charged the Texas Department of Transportation (TxDOT) with examining and evaluating innovative transportation technologies for purposes of reducing costs, reducing traffic congestion, enhancing safety, and increasing economic productivity. As a result, the Texas Transportation Task Force (TTTF) was formed, encompassing a group of experts who discussed four areas of emerging transportation technologies: connected vehicles, autonomous vehicles, electric systems, and cloud computing/crowdsourcing technologies... Phase II aimed to complete initial background work for a strategic technology business plan and establish a work plan for completing the strategic plan in later phases. Once completed, the strategic plan will serve as a guide to bringing together the public and private sectors in the creation of an economic roadmap to diversify and strengthen the state economy and transportation system through transformative emerging technology adoption. The plan will analyze the state's transportation, information, and communication technology industries; establish state goals and objectives; develop an action plan for implementation; and articulate investment priorities and funding sources." --Background (2 pages)

This report is available for free download (342 KB):

<http://library.ctr.utexas.edu/ctr-publications/psr/0-6803-s.pdf>

Research Digest

Item 17

Stretch and Flex Program for TxDOT Office and Field Workers

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6805-1 • 2014

Strain/sprain-related incidents account for 40% of the total injuries of Texas Department of Transportation (TxDOT) employees. Over the past 5 years the most common strain/sprain injury was of the lower back; 50% of these injuries were caused by lifting tasks. The goal of this project is to create a guidebook presenting a set of ergonomic recommendations for common TxDOT workplace tasks and a Stretch and Flex program designed to reduce strain/sprain-related incidents. Research studies have shown that muscle strengthening exercises can reduce workplace strain/sprain-related incidents. However, most of the Stretch and Flex programs currently being implemented involve more stretching than flexing. Thus, current Stretch and Flex programs may not be as beneficial as they could be. Since injury of the low back is the most common work-related injury, strengthening the core musculature is the best preventative strategy. The challenge that current Stretch and Flex programs face in achieving this goal may be that traditional core-strengthening exercises are performed on the ground, which may not work well for employees who work outdoors or are not dressed for being on the ground. Thus, the Stretch and Flex program that will be created will involve exercises done in the standing position to strengthen the core musculature as well as target other muscles and joints susceptible to work-related injuries. The University of Texas at Austin (UT) has developed instructional videos for vertical core strengthening, and has developed and implemented exercise programs for groups of UT employees. The user-friendly guidebook that we will create for TxDOT employees will contain ergonomic recommendations for TxDOT maintenance and office workers as well as a Stretch and Flex program that will be superior to current programs. A guidebook will help TxDOT employees reduce their risk of injury through specific work-related ergonomic strategies and injury-prevention exercises designed to improve strength and flexibility. This program is expected to reduce the incidence of TxDOT strain/sprain-related incidents and substantially reduce associated costs, which have exceeded \$3.7 million over the past 5 years.

(x, 46 pages)

CONTENTS

- Chapter 1. Introduction
- Chapter 2. Literature Review
- Chapter 3. Development of Pilot Stretch and Flex Program
- Chapter 4. Implementation of Pilot Stretch and Flex Program
- Chapter 5. Guidebook
- Chapter 6. Conclusions
- References
- Appendix A. Scripts for Field Worker and Office Worker Videos (0-6805-P2)

This report is available for free download (3.7 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6805-1.pdf>

Research Digest

Item 18

Stretch and Flex Guidebook

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6805-P1 • 2014

"Use this guidebook to teach TxDOT field workers how to most appropriately and effectively use tools in the workplace in order to reduce injury. These guidelines are meant to provide general recommendations for basic tasks that field workers may perform. Note that the guidebook contains only recommendations—the authors realize that specific tasks may require more instruction. In these instances, many of the principles described in this guidebook can be carried over to various specific construction work-related tasks."

(iv, 17 pages)

CONTENTS

- Introduction
- Facts
- Work-Related Musculoskeletal Disorders
- Field Work Ergonomic Positioning Principles
- Ergonomic Hazards
- References

This report is available for free download (530 KB):

<http://library.ctr.utexas.edu/ctr-publications/0-6805-p1.pdf>