

Research Digest

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Research Digest

Item 1

Crash Test and Evaluation of Locking Architectural Mailboxes

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

TTI 1002-12-9 Test Report • 2014

Some homeowners and businesses are becoming increasingly concerned about mail-identity theft. Consequently, there is a growing demand for the use of locking mailboxes for theft deterrence and vandal resistance. There are a number of mailbox products on the market that offer enhanced security for mail and small parcels. They typically feature an upper hopper for incoming mail, and a lower lockable compartment for mail retrieval. These lockable mailboxes are significantly larger and can be 4-5 times heavier permitting their use on the state highway system. Under this project, crash tests were performed following MASH guidelines and procedures to assess the impact performance of lockable, secure mailboxes on both single and multiple mount configurations. A single locking mailbox was successfully crash tested on a thin-wall steel tube support post installed in a releasable wedge-an-socket foundation. Testing of the larger, heavier locking mailboxes on multiple-mount support posts was unsuccessful due to windshield deformation and intrusion.

(xv, 149 pages)

CONTENTS

- Chapter 1. Introduction
- Chapter 2. Test Requirements and Evaluation Criteria
- Chapter 3. Crash Test Procedures
- Chapter 4. Locking Architectural Mailbox on SHUR-TITE® Single-Mount Post
- Chapter 5. Dual Locking Architectural Mailboxes on SHUR-TITE® Multiple-Mount Post
- Chapter 6. Locking Architectural Mailboxes and Standard Mailboxes on Multiple-Mount Supports
- Chapter 7. Summary and Conclusions
- Chapter 8. Implementation Statement
- References
- Appendices A-F. [Crash Tests 490023-9-1 through 490023-9-6]

This report is available for free download (13 MB):

<http://tti.tamu.edu/documents/9-1002-12-9.pdf>

Research Digest

Item 2

Improvements to Rural Intersections to Improve Motorist Compliance

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

TTI 1529-1 • 2014

The Texas Department of Transportation (TxDOT) has placed improving safety as one of its top objectives. Improving safety in rural intersections is a means to improve roadway safety especially in rural districts such as the districts in West Texas. The Texas A&M Transportation Institute (TTI) in consultation with TxDOT engineers developed a low-cost system that can be configured with off the shelf components and can be installed fairly easily. The system uses wireless sensors to complete contact closures in a cabinet that was built by TTI researchers to activate beacons on the Stop sign and Stop Ahead sign when a vehicle is arriving on a stop-controlled approach. The system also would keep the beacons on the Stop sign flashing till the vehicle at the Stop Bar leaves the intersection. The system was demonstrated at the Pecos Test Track. A TxDOT expert panel reviewed the system both during daytime and nighttime. The expert panel was overall supportive of the system, made some recommendations for improving the system, and was interested in implementing the system in their districts. The system was implemented at an intersection near Pecos. Based on panel's recommendation a system that would activate the beacons on the Stop sign if vehicle speed is above a user defined threshold was also designed, implemented, and demonstrated to the district engineers.

(vii, 42 pages)

CONTENTS

- Introduction
- Traffic Control Devices
- System Objectives
- Conclusions
- References

This report is available for free download (6.2 MB):

<http://tti.tamu.edu/documents/9-1529-1.pdf>

Research Digest

Item 3

Construction and Monitoring of Thin Overlay and Crack Sealant Test Sections at the Pecos Test Track

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

TTI 1529-2 • 2014

In this project, several crack sealant sections were constructed at the Pecos RTC. Six different sealants were applied in routed and non-routed configurations on both older and newer pavement. The following summer, the sections were reevaluated including simulated heavy traffic testing. The sealants were also tested in the lab with a sealant adhesion test. Also in this project three different thin overlays were constructed at the test track, these being the fine-graded permeable friction course, fine stone matrix asphalt and a crack attenuating mix. The fine PFC used at Pecos was also placed on Loop 338 around Odessa. These new thin overlays and crack sealant demonstration projects will be evaluated in coming years for future research projects. The researchers recommend applying more test sections on regularly trafficked pavements using a standard sealant (TxDOT Class A or B), and the two best performing sealants (AR Plus and Roadsaver 203). These should be applied to pavements with different levels of traffic and different amounts of crack movement. The thin overlays first demonstrated in these test section have now become widely used around Texas. They are now included in the most several specification (SS 3228 and Item 347) and sections constructed in at least half of the Texas Districts.

(ix, 42 pages)

CONTENTS

- Field and Laboratory Evaluations of Crack Sealant
- Construction and Monitoring of Demonstration Projects in Texas Districts
- Placement and Top Performing Crack Seals in Texas Districts
- Appendix A. Crack Sealant Pictures
- Appendix B. Statistical Analysis

This report is available for free download (2.6 MB):

<http://tti.tamu.edu/documents/9-1529-2.pdf>

Research Digest

Item 4

RTI Special Studies for TxDOT Administration in FY 2014

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6581-CT-7 • 2014

"Seven policy briefs were completed under [TxDOT Research Project 0-6581-CT,] Task 19, and were presented to TxDOT Administration and the new Executive Director. This report combines the policy briefs for easy reference. The seven policy briefs are presented individually in Volumes 1 through 7 of this report. Conclusions and recommendations are contained within each volume." --p.5

"This research project was established by the Texas Department of Transportation's (TxDOT) Research and Technology Implementation Office (RTI) in fiscal year (FY) 2009 and renewed in FYs 2011–2014 to evaluate transportation issues as requested by TxDOT's Administration, and develop findings and/or recommendations.... The Center for Transportation Research (CTR) contracted with RTI to provide rapid response teams when work requests came from TxDOT's administration. Task teams were assembled based on the technical requirements in each case, and worked independently of other task teams. Each team coordinated directly with the administration member requesting the study, submitting technical memorandums for the task to provide TxDOT with implementation information in a timely manner. This report combines the various technical memoranda completed in FY 2014 for easy reference, and is a follow-up to Reports 0-6581-1, -2, -3, -4, and -6, which documented the work completed in FYs 2009, 2010, 2011, 2012, and 2013, respectively, and a special report 0-6581-5 compiled in December 2012 to comprehensively document Task 12. This is the last report for this project, which terminated in August 2014." --p.1
(xiv, 170 pages)

CONTENTS

- Introduction
- Volume 1. Transportation Policy Brief #1: Air Transportation in Texas
- Volume 2. Transportation Policy Brief #2: Autonomous Vehicles in Texas
- Volume 3. Transportation Policy Brief #3: North Carolina's Strategic Mobility Formula
- Volume 4. Transportation Policy Brief #4: Oregon's Voluntary Road User Charge Program
- Volume 5. Transportation Policy Brief #5: Potential Use of Highway Rights-of-Way for Oil and Gas Pipelines
- Volume 6. Transportation Policy Brief #6: State Energy Severance Taxes and Comparative Tax Revenues
- Volume 7. Transportation Policy Brief #7: U.S.-Mexico Transportation and Logistics

This report is available for free download (11.1 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6581-CT-7.pdf>

Research Digest

Item 5

Revamping Aggregate Property Requirements for Portland Cement Concrete: Final Report

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

CTR 6617-1 • 2014

Current Texas Department of Transportation (TxDOT) procedures for evaluating coarse aggregate for portland cement concrete (PCC) have been in place for over 39 years. Item 421 in the TxDOT “Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges” describes the tests and test limits that must be met by aggregates before they can be approved for use in portland cement concrete applications. The intention of Item 421 is to ensure that only strong, durable aggregates are used in concrete so that the life of concrete is not cut short by common distress mechanisms, which ultimately lead to costly repairs and replacements. The two main tests currently used by TxDOT to evaluate aggregates are the magnesium sulfate soundness test and the Los Angeles abrasion and impact test. Unfortunately, past research has shown that the magnesium sulfate soundness test and the Los Angeles abrasion and impact test are not able to successfully predict the field performance of an aggregate in concrete. The requirements of Item 421 have thus far done a reasonably good job of ensuring long-lasting concrete; however, the current tests and test limits may be unnecessarily precluding the use of some local materials. As high quality aggregate sources are depleted and transportation costs increase, it will become more necessary to distinguish good performers from marginal and poor performers in the future. If aggregate tests can be found that demonstrate better correlations with field performance, it may be possible to use more local aggregate sources and still provide the desired level of reliability for pavements, bridges, and other TxDOT concrete applications. Researchers will attempt to relate this test data to concrete behavior and ultimately recommend tests for improved TxDOT aggregate specifications.

(xvi, 277 pages)

This report is available for free download (15.2 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6617-1.pdf>

Research Digest

Item 6

Water Quality and Hydraulic Performance of Permeable Friction Course on Curbed Sections of Highways

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6635-1 • 2014

This paper presents the results of a study on the use of porous overlays on urban highways. Permeable friction course (PFC) is a layer of porous asphalt applied to the top of conventional asphalt highways at a thickness of around 50 mm. The first objective of the study was to determine the impact of porous asphalt on the quality of stormwater runoff on highways with a curb and gutter drainage system. The quality of highway stormwater runoff was monitored before and after the installation of PFC on an eight-lane divided highway in the Austin, Texas, area. Observed concentrations of total suspended solids from PFC were 92% lower than those in runoff from the conventional pavement. Concentration reductions were also observed for nitrate/nitrite and total amounts of phosphorus, copper, lead, and zinc. The data shows that the pollutant reductions on highway sections with curb and gutter are similar to those with a rural cross section. The effect of two different binder compositions was also compared, showing an increase in zinc when recycled rubber is used. The second objective focuses on the drainage capabilities of PFC. While porous overlays can reduce stormwater accumulation on roadways, conveyance capacity at high rainfall intensities is limited. Installing subgrade underdrains within PFC could further improve stormwater conveyance. This research determined the hydraulic profile of runoff as it approached an underdrain with varying flow rates and grades. The results could assist TxDOT in the sizing and configuration of drains based on rainfall intensity and roadway geometry.

(xii, 91 pages)

This report is available for free download (6.8 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6635-1.pdf>

Research Digest

Item 7

Texas Cracking Performance Prediction, Simulation, and Binder Recommendation

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

TTI 6674-2 • 2014

Recent studies show some mixes with softer binders used outside of Texas (e.g., Minnesota's Cold Weather Road Research Facility mixes) have both good rutting and cracking performance. However, the current binder performance grading (PG) system fails to justify/identify this phenomenon, particularly as it applies to softer but highly modified binders. Therefore, it is necessary to improve the current asphalt grading system and recommend associated specification limits, especially for modified binders. The major objectives of this research were to (a) identify/develop simple lab evaluation methods to characterize binder properties, (b) recommend potential binder specification changes, (c) track the field performance of pavements using different binders including softer but highly modified binders, and (d) develop a statewide catalogue of binder recommendations for each district based on cracking performance simulation and life cycling analysis results.

(x, 78 pages)

CONTENTS

- Chapter 1. Introduction
- Chapter 2. Information on Constructed Field Test Sections
- Chapter 3. Performance Prediction of Field Tests Sections
- Chapter 4. Cracking Performance Simulations and Statewide Binder Recommendations
- Chapter 5. Life Cycling Cost Analysis
- Chapter 6. Summary and Conclusions
- References
- Appendix. Laboratory Measured Engineering Properties for Different Binders and Mixes

This report is available for free download (11.7 MB):

<http://tti.tamu.edu/documents/0-6674-2.pdf>

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Item 8

Revised Pay Adjustment Factors for HMA and Concrete Pavements

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6675-1 • 2014

The current pay adjustment system for HMA production, placement, and ride consistently rewards contractors, but does not necessarily result in improved performance of constructed HMA pavements and longer service life. The current system needs to be changed in order to improve the quality of pavements in Texas and provide performance-related incentives. A database framework was developed incorporating TxDOT's SiteManager QC/QA database and network-level performance data in the Pavement Management Information System (PMIS) database, yielding a large dataset comprising more than 600 pavements across Texas with available QC/QA data and performance records spanning 3 to 10 years. The research team evaluated the influence of variations in the construction QC/QA parameters on pavement performance. Advanced statistical modeling of these relationships using econometric approaches was conducted to establish the significance, sensitivity, and consistency of these parameters in regard to pavement performance. The statistical models provided the tools necessary to evaluate the current pay adjustment system with an eye to developing new performance-related specifications. This report provides recommendations for revising the production and placement pay adjustment factors for HMA pavements and revised pay adjustments for the ride quality of HMA and concrete pavements.
(xiv, 176 pages; 106.7 MB)

- Accompanying CD-ROM contains "Revised Pay Adjustment Factors for HMA and Concrete Pavements: Addendum" (February 2014): HMA Plots [1,120 .tiff files], Concrete Plots [13 .tiff files]

This report is available for free download (3.1 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6675-1.pdf>

Research Digest

Item 9

Task 3, Finalized Workshop Materials and Presentations for Each Two-Hour Session

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

TTI 6694-01-P3 • 2014

This disc contains 22 files related to the Managing Operating Costs workshops conducted for TxDOT Implementation 5-6694-01: (Powerpoint presentations, activity documents, and handouts). Sessions included: "Alternative Fuels for Transit," "Leveraging Data and Service Design," "Contracting for Transit Services," "Managing Shifts, Managing Costs," "Peer Comparison and Benchmarking," "Technology and Social Media: Future Trends and Forward-Thinking Approaches," "Minimizing No-Shows and Late Cancellations," "Maintenance: Vehicles and State of Good Repair" (55.2 MB)

CONTENTS

- Alternative Fuels for Transit
- Leveraging Data and Service Design
- Contracting for Transit Services
- Managing Shifts, Managing Costs / Jonathan Brooks
- Peer Comparison and Benchmarking
- Technology and Social Media: Future Trends and Forward-Thinking Approaches
- Minimizing No-Shows and Late Cancellations
- Maintenance: Vehicles and State of Good Repair
- Transit Service Delivery Models: Directly Operated/Contracted

This report is available for free download (53.4 MB):

<http://tti.tamu.edu/documents/5-6694-01-P3.zip>

Research Digest

Item 10

Integrating Public and Private Data Sources for Freight Transportation Planning

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6697-CTR-1 • 2014

The Moving Ahead for Progress in the 21st Century Act (MAP-21) stipulates that state transportation agencies expand their interest in freight initiatives and modeling to support planning efforts, particularly the evaluation of current and future freight transportation capacity necessary to ensure freight mobility. However, the understanding of freight demand and the evaluation of current and future freight transportation capacity are not only determined by robust models, but are critically contingent on the availability of accurate data. Effective partnerships are clearly needed between the public and private sectors to ensure adequate freight planning and funding of transportation infrastructure at the state and local levels. However, establishing partnerships with firms who are both busy and suspicious of data-sharing, remains a challenge. This study was commissioned by the Texas Department of Transportation (TxDOT) to explore the feasibility of TxDOT entering into a data-sharing partnership with representatives of the private sector to obtain sample data for use in formulating a strategy for integrating public and private sector data sources. This report summarizes the findings, lessons learned, and recommendations formed from the outreach effort, and provides a prototype freight data architecture that will facilitate the storage, exchange, and integration of freight data through a data-sharing partnerships.
(xiv, 146 pages)

CONTENTS

- Chapter 1. Introduction
- Chapter 2. Identifying Texas Freight Data Needs
- Chapter 3. Freight Data Collection Methods
- Chapter 4. Identification of Freight Data Gaps
- Chapter 5. Data-Sharing Partnerships
- Chapter 6. Data Architecture Review
- Chapter 7. Proposed Data Architecture
- Chapter 8. Recommendations
- References
- Appendix A: List of Available Freight Databases
- Appendix B: Sample Workshop Agenda
- Appendix C: Review of Data Collection Methods Used in Currently Available Freight Data Sources
- Appendix D: Data Gap Scenarios
- Appendix E: Bilingual Brochures
- Appendix F: Online Survey Responses

This report is available for free download (4.7 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6697-ctr-1.pdf>

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Item 11

Use of Highway ROW for High-Speed Intercity Passenger Rail and Dedicated Freight Transportation Systems. Guidebook

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6698-P3 • 2014

"The purpose of this guidebook is to help TxDOT staff evaluate proposals for using new or existing highway right-of-way (ROW) for high-speed intercity passenger rail (HSIPR) or dedicated freight transportation systems. This guidebook is intended to provide the foundation for a new manual covering such evaluations." --p.3
(127 pages)

CONTENTS

- Section 1. Introduction
- Section 2. Legal and Administrative Considerations
- Section 3. Design Considerations, Feasibility Analysis Methodology, and Approval Conditions
- Section 4. Accommodating High-Speed and Dedicated Freight Transportation Systems
- Section 5. Procedures for Review and Approval
- Section 6. Guidelines and Procedures for Leveraging Use of Existing ROW
- References

This report is available for free download (10.8 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6698-p3.pdf>

Research Digest

Item 12

Design Parameters and Methodology for Mechanically Stabilized Earth (MSE) Walls

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

TTI 6716-1 • 2014

Since its appearance in 1970s, mechanically stabilized earth (MSE) walls have become a majority among all types of retaining walls due to their economics and satisfactory performance. The Texas Department of Transportation (TxDOT) has primarily adopted the Federal Highway Administration (FHWA) and American Association of State Highway and Transportation Officials (AASHTO) guidelines for the design of MSE walls. Researchers (1) conducted laboratory tests on backfill materials and the statistical analysis to determine variability of soil properties (such as friction angle and unit weight) for soils meeting the TxDOT specifications, (2) performed Monte Carlo simulation using the determined soil property variation to assess the effect of spatial variability of material properties on the calculated factor of safety on sliding and overturning, (3) carried out numerical analysis using a Fast Lagrangian Analysis of Continua (FLAC) program to investigate possible failure modes under conditions of complicated geometries and rapid drawdown, and (4) evaluated the effect of precast panel on the compound failure analysis. Researchers evaluated design parameters for sliding analysis recommended by AASHTO and recommended modified design parameters calculated from FLAC simulations for different geometries and for different soil parameters. Similarly, a parametric study was performed to address issues related to bearing capacity for MSE walls and justify AASHTO recommendation with German code (EBGEO) for MSE walls. (xxi, 333 pages)

This report is available for free download (24.1 MB):

<http://tti.tamu.edu/documents/0-6716-1.pdf>

Research Digest

Item 13

Flexible Pavement Narrow Widening Best Practices and Lessons Learned

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

CTR 6748-2 • 2014

The Texas Department of Transportation (TxDOT) has experienced problems with construction quality and performance on narrow widening projects (i.e., projects that notch and widen pavement to increase lane width 2–8 ft or add a 2- to 5-ft shoulder). Texas has approximately 64,000 lane-miles of pavement with 9- to 11-ft wide lanes, which includes over 35,000 lane miles of FM roads (MapZapper 2011). In addition, approximately 20%, 26%, and 36% respectively of roadways with 9-, 10-, or 11-ft lanes have either no shoulder or a 1-ft shoulder. These roads are potential candidates for lane or shoulder widening to improve safety performance and increase capacity. However, due to constraints regarding construction equipment widths and other limitations, material selection options and compatibility, construction methods, and other issues, narrow widening projects can present construction and performance problems. These challenges include inadequate compaction of the subgrade, compaction of the base material at the notch-and-widen 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.

(xviii, 175 pages; 160.6 MB)

• Accompanying CD-ROM contains "0-6748-P1, NARROW PAVEMENT WIDENING DECISION SUPPORT TOOL AND MASTER DOCUMENT" / MooYeon Kim [and six others]

CONTENTS

- Chapter 1. Introduction and Background
- Chapter 2. In-Person and Telephone Interviews
- Chapter 3. Webinar Workshop: Expert Opinions
- Chapter 4. Assessment of Alternatives
- Chapter 5. Development of the Decision Support Tool
- Chapter 6. Webinar Workshop: Decision Support Tool
- Chapter 7. Summary and Conclusions
- [Appendices A-F]

This report is available for free download (14.5 MB):

<http://library.ctr.utexas.edu/ctr-publications/0-6748-2.pdf>

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Item 14

Business Process Model / Logical Data Model

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6759-P2/P3 • [2014]

"Changing modeling needs over the past few years, spurred by the evolving policy contexts of transportation planning and emerging technologies, have led the planning community to explore tour-based and activity-based modeling paradigms as an alternative to the traditional trip-based modeling paradigm. As a leading travel model practitioner, the Texas Department of Transportation (TxDOT) Transportation Planning and Programming Division sponsored an earlier study to synthesize tour-based modeling approaches in the country and identify potential benefits and costs of transitioning to this emerging modeling paradigm in Texas. Based on the results of that study, the current research effort developed a business case for a tour-based travel demand model system. The business case discusses the justification and need for a tour-based model, and includes a business process model and a logical data model that provide the step-by-step actions and procedures needed to support the design and development of a tour-based travel model. The business case not only justifies the need for tour-based models, but also proactively identifies potential challenges and constraints that may arise in implementation, and provides pathways to address them. It also addresses the need to continue to operate trip-based models in parallel with tour-based where needed or required, and assesses any impacts of tour-based modeling on the Technological Services Division of TxDOT. Although TxDOT has not yet transitioned towards a tour-based modeling approach, the current study can facilitate the model's implementation if TxDOT decides to move forward." --
Report 0-6759-1
(2.3 MB)

CONTENTS

- [PDF] 0-6759-P2 BPM.pdf: Texas Package Model Development & Application Flow Chart: Tour-based Design Option #1 (DRAFT 08/25/2013, RR 0-6759)
- [Folder] 0-6759-P3 LDM: Tour-Based Model Design: Logical Data Model Data Dictionary version 18 (.pdf); Tour Based Logical Data Model Rev. 08/16/2013 (.pdf); 0-6759-v18.erwin

This report is available for free download:

<http://library.ctr.utexas.edu/ctr-publications/0-6759-P2.pdf> (568 KB)

<http://library.ctr.utexas.edu/ctr-publications/0-6759-P3.zip> (1.6 MB)

Research Digest

Item 15

Introductory Guide to Integrated Ecological Framework

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

TTI 6762-P1 • 2014

This guide introduces the Integrated Ecological Framework (IEF) to Texas Department of Transportation (TxDOT) engineers and planners. IEF is step-by-step approach to integrating ecological and transportation planning with the goal of avoiding impacts, minimizing mitigation costs, conserving resources, and improving project delivery.

(21 pages)

CONTENTS

- Introduction – Why This Guide?
- What Is Integrated Ecological Framework?
- How to Use IEF Process
- Things You Can Do
- References

This report is available for free download (3 MB):

<http://tti.tamu.edu/documents/0-6762-P1.pdf>

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Item 16

Development of NTCIP-Based Portable Traffic Signal Evaluation System

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

TTI 6775-1 • 2014

The objective of this project was to develop a custom toolbox for monitoring and troubleshooting operational issues and faults at signalized intersections and diamond interchanges, and for providing a mechanism to facilitate signal timing optimization using third-party optimization programs. This report describes work conducted by Texas A&M Transportation Institute (TTI) researchers to achieve the above objectives, which resulted in three software modules: (1) a monitoring module that uses National Transportation Communications for ITS Protocols (NTCIP) messages to monitor and record real-time statuses of events in a traffic controller and logs collected and processed data for later use, (2) an analysis module that generates various easy-to-interpret reports to allow assessment of controller event data, and (3) an update module that reads optimized signal timing from a selected universal traffic data format (UTDF file) and uses NTCIP messages to download these timing data to a controller. The report also describes in-lab and field testing that researchers conducted to verify the operations of these modules. (ix, 76 pages)

CONTENTS

- Introduction
- Toolbox Development
- In-Lab Testing
- Field Testing
- References
- Appendix A. NTCIP Object Identifiers
- Appendix B. UTDF Data Exchange Format
- Appendix C. Maps and Timing Data for Test Sites
- Appendix D. Controller Timing from FM 1960 and Stuebner Airline Intersection

This report is available for free download:

<http://tti.tamu.edu/documents/0-6775-1.pdf>

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Item 17

Work Plan for the Completion of Strategic Business Plan

UNIVERSITY OF TEXAS AT AUSTIN. CENTER FOR TRANSPORTATION RESEARCH (CTR)
CTR 6803-P5 • 2014

"After General Appropriations Bill, S.B. No. 1m 83rd Legislature, item 44, VII-31 (2013) was passed, TxDOT and the [Texas Technology Task Force were directed to oversee a study on transportation technology. Through guidance from a technology industry expert panel, the TTTF has developed a vision for the future of Texas transportation system that [improves safety, reliability, congestion, and connectivity] via technology-based solutions. The TTTF met from March to August 2013 (Phase I) to develop a set of recommendations for continuing work in a second phase of a technology study. The recommendations from Phase I are provided in [the Background]; subsequent sections synthesize and discuss work complete in Phase II" --p.1
(41 pages)

CONTENTS

- Background
- Existing Transportation Technology Strategic Plan
- Implications for Texas Transportation Technologies Strategic Business Plan
- Work Plan for Developing TTTF Strategic Business Development Plan
- Timeline and Schedule
- Appendix 1. Business Plan Creation Process
- Appendix 2. Accelerator Texas: Creating Autonomous Vehicle Economic Development
- References

This report is available for free download (438 KB):

<http://library.ctr.utexas.edu/ctr-publications/0-6803-P5.pdf>

Research Digest

Item 18

Evaluation of the Benefits of Diamond Grinding of CRCP: Final Report

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

CTR 9046-01-1 • 2014

This report outlines the testing and evaluation of a continuously reinforced concrete pavement (CRCP) on IH35W near Fort Worth rehabilitated using diamond grinding instead of applying an asphalt overlay to extend the serviceability of the old concrete pavement. Surface macrotexture, skid, roughness and noise testing was done prior to the diamond grinding to establish reference levels for comparison. After grinding, the macrotexture, skid, roughness and noise testing of the surface was repeated after 4, 9, and 15 months to evaluate the effectiveness and efficiency of this rehabilitation strategy. Statistical analyses of the data collected were done to investigate the change in surface properties with diamond grinding and how the macrotexture, skid, roughness, and noise of the surface changed over time. The influence of pre-existing surface condition as well as traffic load and speed on the deterioration of the diamond-ground surface was also investigated. The study indicates the benefit of diamond grinding as a rehabilitation strategy for enhancing the functionality of aged CRCP but extended monitoring of the diamond-ground sections is recommended to better define the serviceability, service life and benefit/cost ratio of this strategy. (xii, 60 pages)

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