

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

RESEARCH NEEDS WORKSHOP

DECEMBER 2006 - (Updated March 2010)

On December 6-7, 2006, the Research Division of the Mississippi Department of Transportation hosted a “Research Needs Workshop” to assist in the identification and development of future potential research topics that ultimately, if researched, would provide the highest benefit to all transportation stakeholders in the State of Mississippi. Over 120 participants from MDOT, FHWA, Industry and Academia attended the Workshop to assist in the prioritization of Departmental research needs. The participants divided up into the following six (6) focus groups based on their experience and expertise:

- Traffic, Safety, and ITS
- Structures and Hydraulics
- Maintenance
- Materials and Geotechnical
- Construction
- Intermodal Planning

On February 23, 2010, this prioritized results were sent to the relevant divisions. Each division determined which potential research projects had been completed either internally or externally through research studies. The list was updated with changes in March of 2010.

The remainder of this document gives the updated prioritized results for each focus group.

TRAFFIC, SAFETY, & ITS

Priority

Research Need

- 1 Effect of Information Overload and Oversaturation of Warning Signs (Review and Remove Unnecessary Signs)
- 2 Predicting Queue Length in Work Zones
Strategy for Legislation Regarding Moving Vehicles Out of Road to Minimize Incident Impact to the Traveling Public
- 3
- 4 Guidelines/Warrants for Placement of Sheeting/Striping on Concrete Barriers
- 5 Development of Training Program for Traffic Signal Construction Inspectors

STRUCTURES AND HYDRAULICS

Priority

Research Need

- 1 Accurate Determination of Driven Pile Bearing Capacity
- 2 Inspection/Inventory of Overhead Sign Trusses and High Mast Lights
- 3 Bridge Scour in Cohesive Soils
- 4 Evaluation of Current Bridge Deck Construction for Long-term Durability and Serviceability (Deck Grinding Effects)
- 5 Explore Cost Effective Ways to Paint Existing Steel Structures Containing Lead Paint
- 6 Research Abutment Design Options to Eliminate Approach Slab Settlement
- 7 Improvement of Curb Inlet Design
- 8 Evaluation of Pipe Culvert Options
- 9 Determination of Sound Wall Requirements in Areas with Post Construction Growth
- 10 Evaluation of Maintenance Measures to Counter De-Icing Agents

MAINTENANCE

Priority

Research Need

- 1 Pavement Preservation – Treatments for Interstate and Four-Lane and Bridge Decks
- 2 Chip Seals/Fog Seals on High ADT Routes
- 3 Reclamation of Asphalt Pavement With Cement or Emulsion (Project Planned)
- 4 Optimal Maintenance Employee Composition of Field Crews, Salaries, and Training
- 5 Rut Filling Techniques That Will Work
- 6 Raised Pavement Markings (RPM) Versus Stripe on Edge Line - Wet-Night Reflectivity
- 7 Warm Mix Technology
- 8 Better Materials and Techniques for Restriping Pavements
- 9 Encroachment and Outdoor Advertising Permit Fees
- 10 Aggregate Durability - Using Correct Aggregate and Gradation
- 11 Subgrade Treatments - Alternate to Lime and Fly-Ash Treatments - Do we need this on every project?
- 12 Pavement Maintenance to Decrease Traffic Delays - Scheduling Work Night Versus Day Urban Versus Rural
- 13 Ultra Thin Bonded Wearing Course
- 14 Snow and Ice Treatment Effects on Bridges - Look at Other States and Alternates to Salt
- 15 Interstate Fencing

MATERIALS & GEOTECHNICAL

Priority

Research Need

- 1 Characterization of Engineered Emulsions for Base Stabilization and/or Full Depth Reclamation
- 2 Concrete Mix Design Based on Performance Specifications
- 3 Degree of Bonding and Application Rate of Tack Coat
- 4 Vibration Transmission Characteristics of Construction Activities in Urban Environments
- 5 Geogrid Reinforcement for Mechanically Stabilized Base Courses
- 6 Evaluate use of Mississippi Limestone and Micro Silicate in Concrete
- 7 Post-Grouted Drilled Shafts
- 8 Effect of Fillers on HMA
- 9 Correlation between DCP & Strength of Stabilized Base, Evaluate Effect of Moisture Change on Resilient Modulus of Subgrade Soils
- 10 Low Modulus Layer within Structure
- 11 QC/QA Concrete Paving, Blending Aggregates for Concrete based on Performance
- 12 Pavement Noise Mitigation (Tire/Road Interaction)
- 13 Spread & Cure Techniques for Soil Cement Stabilization
- 14 Moisture Content of Stockpiles, Fuel Usage of Plant
- 15 Correlation Factors for Load Resistance Design Factor (LRFD) Foundation Design
- 16 Evaluation of Dynamic Properties of Geomaterials
- 17 Non-Nuclear Density Gauges
- 18 Sediment Flocculation for Best Management Practices (BMP) in Field
- 19 Rapid Subgrade Characterization with Mini-Piezocone

CONSTRUCTION

Priority

Research Need

- 1 New and Innovative Erosion Control Methods Including an Economical Alternative to Paved Ditch
- 2 Determine the Need for Drainage Layers Under Concrete Pavements
- 3 Evaluate the Use of Open Graded Friction Courses as Wearing Courses on HMA Pavements
- 4 Evaluate the Use of Real Time Quality Control Equipment in the Production of HMA and Concrete (Gradation, Moisture Content, etc)
- 5 Evaluate the Overall Value of a Pavement Warranty Project
- 6 Determine Standardized Method of Determining Life Cycle Cost for Various Pavements
- 7 Control of Turbid Run-Off on Construction Projects and the Resulting Effects on the Environment

INTERMODAL PLANNING

Priority

Research Need

- 1 Use of ITS to Improve Transit
- 2 Utilize Universities as an Information Clearinghouse
- 3 Evaluate the Impacts of Bypasses\Reroutes on Mississippi Communities
- 4 Successful Rural Transit Providers (What makes them successful) Impacts of Additional Investment
- 5 Identify Fuel Tax Alternatives
- 6 Cost benefits of an Improved Rail Safety Program
- 7 Real time Analysis of Freight Flows to Identify Bottlenecks\Incidents and Use History to Aid in Design
- 8 Alternative Fuels and Their Impacts on Transit, and Fuel Taxes
- 9 State of Practice of Traffic Data Collection
- 10 Comparison of Traffic Projections to Current Counts
- 11 IT Opportunities for Traffic Flow Monitoring
- 12 Regional Real Time Freight Movements for Trip Planning and Analysis
- 13 Policy and Regulatory Barriers to Coordinated Transportation
- 14 IT Opportunities for Freight Monitoring and Dissemination To Freight Providers