FIELD STUDY OF BRIDGE CONCRETE APPROACH SLAB (LTRC 05-1GT)

2007 LOUISIANA TRANSPORTATION ENGINEERING CONFERENCE
BATON ROUGE, LA
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ZHENGZHENG "JENNY" FU, P.E.
BRIDGE ENGINEER MANAGER
LADOTD BRIDGE DESIGN
PROJECT TEAM

ZHENGZHENG “JENNY” FU, PI
LADOTD BRIDGE DESIGN

ZHONGJIE “DOC” ZHANG, CO-PI
LTRC

PROJECT REVIEW COMMITTEE (PRC) MEMBERS

ARTURO AGUIRRE, FHWA
KIM GARLINGTON, LADOTD (GEOTECH.)
CHING TSAI, LADOTD (GEOTECH.)
ARTUR D’ANDREA, LADOTD (BRIDGE DESIGN)
KIAN YAP, LADOTD (BRIDGE DESIGN)
RYAN REVIERE, LADOTD (BRIDGE DESIGN)
STEVE CAI, LSU
PROJECT STATUS

PRELIMINARY PROPOSAL SUBMITTED
FOR PRC REVIEW

FIRST PRC MEETING HELD ON DEC. 12, 2006

PROPOSAL AND COST ESTIMATE TO BE
FINALIZED IN MAR. 2007
PROJECT OBJECTIVE #1

FIELD TEST AND VALIDATE THE FINDINGS AND DESIGN RECOMMENDATIONS DEVELOPED IN LTRC RESEARCH PROJECTS 02-2GT & 03-4GT.
PROJECT OBJECTIVE #2

DEVELOP NEW DESIGN AND CONSTRUCTION GUIDELINES FOR IMPLEMENTATION.
CURRENT DESIGN GUIDELINES

LADOTD BRIDGE DESIGN MANUAL
CHAPTER 6

CUT SECTIONS
STANDARD 20’ FLAT APPROACH SLAB

FILL SECTIONS
STANDARD 40’ FLAT APPROACH SLAB

LARGE SETTLEMENT
PILE SUPPORTED APPROACH SLAB
NEW DESIGN OPTIONS

20’ FLAT APPROACH SLAB

40’-60’ FLAT APPROACH SLAB

60’-80’ RIBBED APPROACH SLAB

PILE SUPPORTED SLAB
IMPLEMENTATION PLAN

FIELD STUDY

REVISE DESIGN GUIDELINES TO INCLUDE EMBANKMENT SETTLEMENT IN DESIGN PROCESS

DEVELOP SETTLEMENT MAP

DEVELOP DESIGN CHARTS AND STANDARD PLANS
PROJECT TASK #1

LITERATURE SEARCH

STUDY NEW TECHNOLOGIES IN FIELD TESTING AND PERFORMANCE MONITORING.
PROJECT TASK #2

PROJECT SELECTION

FIVE PROJECTS WITH VARIOUS RANGE OF EMBANKMENT SETTLEMENT AND DIFFERENT EMBANKMENT DESIGN FEATURES WILL BE SELECTED FOR FIELD STUDY
<table>
<thead>
<tr>
<th>Testing Sections</th>
<th>Estimated Embankment Settlement “S”</th>
<th>Embankment Design Features</th>
<th>Span Length of Approach Slab</th>
<th>Type of Approach Slab</th>
<th>Approach Slab Design Table[4]</th>
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<td>Compact Level, Subsurface Drainage, Protection Layer</td>
<td>20 feet</td>
<td>Flat Slab</td>
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<td>Compact Level, Subsurface Drainage, Protection Layer,</td>
<td>60 – 80 feet</td>
<td>Ribbed Slab</td>
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PROJECT TASK #3

BRIDGE APPROACH SYSTEM DESIGN

EMBANKMENT DESIGN & SETTLEMENT CALCULATION
(GEOTECH. & LTRC)

SLAB DESIGN
(BRIDGE DESIGN)
Strip footing
reinforcement
Soft soil
Stress redistribution
Unreinforced stress zone
Reinforced stress zone
Approach slab
Footing size to produce same influence as the reinforced

Footingsize to produce same influence as the reinforced

BRIDGE APPROACH SYSTEM
PROJECT TASK #4

INSTRUMENTATION AND TESTING PLAN

GEOTECHNICAL INSTRUMENTATION
(GEOTECH. & LTRC)

STRUCTURAL INSTRUMENTATION
(LSU & BRIDGE DESIGN)
MAIN OBJECTIVES:

VERIFY EMBANKMENT SETTLEMENT PREDICTION AND DETERMINE SETTLEMENT PROFILE ALONG SOIL DEPTH

DETERMINE THE IMPACT OF COMPACTION REQUIREMENT ON SETTLEMENT

EVALUATE PERFORMANCE OF REINFORCED SOIL FOUNDATION AT SLAB END SUPPORT

SCHEMATIC DIAGRAM FOR GEOTECHNICAL INSTRUMENTATION
SCHEMATIC DIAGRAM FOR STRUCTURAL INSTRUMENTATION

MAIN OBJECTIVES:

MEASURE SLAB INTERNAL STRESSES AND DEFORMATION AND COMPARE WITH ANALYSIS RESULTS

CHECK CRACKING AT SLAB

RIDABILITY TEST TO EVALUATE THE EFFECTIVENESS OF THE APPROACH SLAB DESIGN

MEASURE STRESS AT SLAB END SUPPORT (SLEEPER SLAB)
PROJECT TASK #5

CONSTRUCTION

WORK WITH CONTRACTOR TO INSTALL INSTRUMENTATION AND MONITOR THE CONSTRUCTION OF EMBANKMENT AND APPROACH SLAB
PROJECT TASK #6

DATA COLLECTION AND PERFORMANCE MONITORING
PROJECT TASK #7

DATA ANALYSIS
FINAL REPORT

APPROACH SLAB DESIGN GUIDELINES

EMBANKMENT CONSTRUCTION GUIDELINE

EMBANKMENT SETTLEMENT ESTIMATION

EMBANKMENT SETTLEMENT CONTROL
THANK YOU!