NCHRP 12-98
Recommended Guidelines for PBES Tolerances and Dynamic Effects

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• Note

This investigation is sponsored by TRB under the NCHRP Program. Data reported is work in progress. The contents of this presentation has not been reviewed by the project panel or NCHRP, nor do they constitute a standard, specification, or regulation.
AASHTO Format Guide Specification

- Guidelines for ABC Tolerances
- Guidelines for Dynamics of SPMT and ABC Construction
- Guideline/commentary format
WHY ARE TOLERANCES IMPORTANT?
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EFFECT OF ELEMENT TOLERANCES

Tolerance issues are the most common source of problems with prefabricated construction

- Nothing is fabricated to exact dimensions
- Nothing is erected to exact dimensions
- All details must account for this
  - Width of Joints
  - Horizontal element layout
  - Location of connecting items
    - PT Ducts
    - Grouted couplers and reinforcing
  - Vertical erection tolerances
TYPES OF TOLERANCES

• Element Size and Shape Tolerance
• Location of Element Insert and Void Tolerance
• Horizontal Erection/Setting Tolerance
• Vertical Erection/Setting Tolerance
ESTABLISHMENT OF TOLERANCES

PCI and ACI both have tolerance guidelines

NCHRP 12-98 Plan

- Obtain actual fabrication dimensional data from ABC projects
- Actual tolerances are a function of specified tolerances
  - Fabricators can fabricate to tight tolerances (at a cost)
- Complete a statistical analysis of the data to establish a REASONABLE tolerance specification.
DYNAMIC METHODOLOGY - SPMT

• Methodology
  • Treat the problem similar to seismic
  • Measure base shear of loaded SPMT
  • Can then be applied to design of falsework

• Approach – Vertical Dynamics
  • Drive over obstacles at the highest speed recommended by the manufacturer

• Approach – Horizontal
  • Start to full speed
  • Full speed to stop

Proposed SPMT Test Setup

Loads:
- Empty
- 25% Capacity
- 50% Capacity
• SIBC moves are essentially static load events
• The only significant unknown is the friction in the sliding systems
  • Start up friction
  • Dynamic Friction
• **Previous studies**
  • Limited research in this field
  • Minor study done at Iowa State University – Limited to forces for one bridge move

• **Approach**
  • Perform friction testing of most common sliding systems – PTFE Bearings
  • Proprietary rolling systems are not to be studied
    • Manufacturer has data
    • Forces are less than sliding systems
NCHRP 12-102
Recommended AASHTO Guide Specification for ABC Design and Construction

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AASHTO Format Guide Specification

• ABC Design
• ABC Construction
• Guideline/commentary format
OBJECTIVES

Owners and designers are thirsty for Design and Construction Specification guidance.

Significant research has been completed to date
- More is on-going

Goals of this research
- Consolidate and Synthesize Design and Construction completed to date
- No new research is proposed in this project
- Not an ABC program management document
- No design examples
- Establish a framework for incorporation of future research
- Publish as a Guide Specification (AASHTO)
AASHTO format is proposed
  • Guideline/Commentary

Overall approach to format
  • Stand alone document
    • Not a amendment to AASHTO
  • Current AASHTO LRFD provisions will be referenced where appropriate
Phase 1 of Both Projects is complete

- Literature search
- Synthesis
- Draft Outlines for all guide specifications

Project Completion Date: 2016
QUESTIONS