**Presentation**

**Performance Specifications**

Virginia Concrete Conference
Ted Ferragut, P.E.

**Renewal**

- Goal: to renew aging infrastructure through rapid design and construction methods that cause minimal disruption and produce long-lived facilities.
- Integrated approach involving engineering, finance, contracting, planning, safety, maintenance, customer relations.

**Heart of Renewal**

Renewal “Environment” Demands New Methods and Approaches
- ‘True’ Performance Specifications
- Longer Term Warranties
- Risk Management and Risk Sharing
- Improved Partnerships

**SHRP II R07**

- Assure work performance properly
- Reduce prescriptive measures
- Define performance factors
- Develop measurement approaches
- Develop clear language
- Apply to all contract types
- Evaluate and adopt

5 years - $3M
SHRP II R07 Benefits

- Reduced completion time
- Improved quality
- Creative innovation
- Improved service life
- Clarity in roles and responsibilities between contractor-DOT

SHRP II R07 Team

Trauner Consulting Services, Inc
- Sid Scott, Co-PI
- Ted Ferragut, Co-PI
  (TDC Partners, Ltd)

SHRP II R07 Major Subcontractors

- The Transtec Group, Inc.
  - Rob Rasmussen
- Michael Baker, Jr.
  - Steve Wilson
- Virginia Transportation Research Council
  - Mike Sprinkel

SHRP II R07 Consultants

- Gerry Huber, Heritage
- Mike Loulakis, A/E/C Training Technologies, LLC
- Bill Roberds, Golder Associates
- Keith Molenaar, U of Colorado
- Stu Anderson, TTI

SHRP II PS

Performance Specifications - TRB ec074

Specifications that describe how the finished product should perform over time.

SHRP II PS

Performance Specifications - DOD

A performance specification states requirements in terms of the required results with criteria for verifying compliance, but without stating the methods for achieving the required results.

A performance specification defines the functional requirements for the item, the environment in which it must operate, and interface and interchangeability characteristics.
aggregate, binder, cement, labor force, material availability, costs
mix methods, mix components, virgin vs. recycled, construction schedules
charging, mixing, handling, automation
precast, monitoring (QC)
transport, placing, curing, sawing, recycling, clearance/load limitations, worker safety
density, air, thickness, strength, modulus, time-to-construct, geometry, steel location
comfort, sustainability, investment value, context sensitive
accessibility, delays, long lasting, safety

Performance Specifications

End Result
Performance-related
Performance-based
Warranty

Performance Specifications - Products
- Embankment
- Geotech
- Structures
- Pavements
- Miscellaneous
(with many subsets)

Performance Specifications - Project
- Time Management
- Public Relations
- Utility Management
- Work Zone Management
- Worker / Public Safety
- Total Quality Index
- Total Project Goals

Approach
1. Work Categories
2. Goals
3. Performance Measures
4. Measurement Strategy
5. Measurement Values
6. Specification Language
### Example - Bridge

<table>
<thead>
<tr>
<th>Work Category</th>
<th>Goals</th>
<th>Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Bridge</td>
<td>Longevity</td>
<td>Loading</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>Deflection</td>
</tr>
<tr>
<td></td>
<td>Functionality</td>
<td>Vibration</td>
</tr>
<tr>
<td>Deck</td>
<td>Longevity</td>
<td>Smoothness</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>Cracking</td>
</tr>
<tr>
<td></td>
<td>Functionality</td>
<td>Corrosion</td>
</tr>
</tbody>
</table>

### Example - Pavements

<table>
<thead>
<tr>
<th>Work Category</th>
<th>Goals</th>
<th>Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement (new)</td>
<td>Longevity</td>
<td>Loading</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
<td>Smoothness</td>
</tr>
<tr>
<td></td>
<td>Life Cycle $$</td>
<td>Noise</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>Sustainability</td>
</tr>
</tbody>
</table>

### Approach

1. Work Categories
2. Goals
3. Performance Measures
4. Measurement Strategy
5. Measurement Values
6. Specification Language

### Performance Specification – Best Fit

- Low Bid
- Design Build
- Design – Build - Maintain
- Design – Build – Maintain - Operate

### End Result

- Performance-related
- Performance-based
- Warranty

### Additional Tasks

1. Risk Analysis
2. Application Guide
3. Contract Type Guide
4. Experimental Plan

### Concrete Pavements

- National Ready Mixed Concrete
  - Prescription to Performance (P2P)

### Concrete Bridges

- PPP
Establish Performance Specifications as a Viable Contract Option

(http://www.fhwa.dot.gov/construction/pso04tc.htm)

Technical Challenges
- Garner technical knowledge on performance factors
- Garner ways to measure key properties

Business Challenges
- "It's new – It's not!!"
- Mix/match method with performance
- Inability of DOT to 'let go' control
- Inability of industry to respond
- Reduced industry competition
- Loss of consistency from one job to another

Performance Specification
- What do we want?
- How do we order it?
- Did we get what we wanted?
- What do we do if we don't?
- And is the product better?

Let's Begin the Journey!!!

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