Steps for Development of Successful Precast Pavement Projects

HFL Showcase I-280 Project,
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The Fort Miller Co., Inc.
The Reality of Precast Paving

- It’s new and unfamiliar to most everybody!
- There are few design guidelines to go by
- Most engineers, contractors and inspectors have never seen the process
- Specialized equipment is not yet widely available
- Contractors may resist it
- Precast pavement costs more than conventional cast-in-place pavement
Two (overwhelming) Reasons for Precast Pavement

- When work windows are very short
- To accomplish long lasting repairs in high traffic areas
Pre-Design
Pre-Design

- Establish need based upon traffic volume
- Determine allowable work window
- Consider all other pavement alternatives
  - Especially less costly ones
- Determine life cycle costs of each option
- Determine feasibility of precast
- Develop an overwhelming case for precast pavement on that project

_for presentation to stakeholders_
Determining Feasibility of Precast Pavement

- Determine technical feasibility
  - Does the system actually work?
- Determine economic feasibility
  - Determine all costs of Slabs, grout, bedding material, post-tensioning (if used)
- Develop a realistic installation cost
  - Solicit input from previous users & contractors
  - Use realistic production rates
Develop Consensus Between Stakeholders

- **Internal Agreement**
  - Present case to personnel from Materials, Design, Construction, Program Managers and Top Management

- Inform industry stakeholders (contractors)

- Discuss with public community
  - Disclose work windows and MPT issues
  - Be up front about higher costs
Final Design Phase
Finalize Construction Feasibility

- Develop detailed installation/MPT plan
- Determined applicability of each System for that particular project
- Make sure there are qualified precasters in the area
- Make sure production rates are consistent with required MPT plan
Develop Required Pavement Details

- For JRCP pavement show:
  - Slab thickness, lengths, widths
  - Size & spacing of dowels and tie bars
  - Joint details

- For post tensioned systems show:
  - PT requirements – strand spacing & size
  - Show stressing sequence
  - Slab length, width, thickness & mild steel reinforcement details
Develop/Select Workable Specifications

- Consider existing specifications that have worked on previous projects
  - Make sure pay items are clearly delineated!
- Develop job-specific Special Provisions
  - Delineate responsibility for gathering field data
  - Clearly present work window rules
Way-Pre-Bid Phase
Way-Pre-Bid Activity

- Discuss rapid repair options with industry – at annual joint DOT/Contractors Association Meetings
  - Let contractors know reasons why precast will be used
    - Very tight work windows
    - For long life pavement in high traffic, inaccessible areas, etc.
  - Let contractors know it is only a “tool” for certain locations, not a major shift in pavement types
Pre-Bid Phase
Pre-Bid Activity

- The DOT should discuss use of precast pavement in pre-bid meeting with prospective bidders
  - Explain reasons for use (MPT, long life, etc.)
- Suppliers (of slabs) should meet with all contractors to acquaint them with:
  - Collecting field data
  - Fabrication time
  - Shipping constraints
  - The entire installation process
Pre-Construction Phase

(before any fabrication)
Pre-Construction Meeting

- Assemble System Designer, precaster, contractor, surveyor, DOT design review personnel, Engineer-in-Charge, inspectors
- Discuss collection of field data
  - “x”, “y”, “z” of all utilities, matching edges, etc.
- Discuss shop drawing review process
Pre-Construction Meeting (cont.)

- System Designer should present:
  - Man power requirements for each operation
  - Equipment and material needs
  - Key saw-cutting requirements
  - Key placement techniques
  - Key grouting issues
- Discuss acceptance criteria
  - Establish match tolerances
Pre-Installation Phase
(within one week before installation)
Pre-Installation Meeting (and Training)

- Assemble System Designer, precaster, contractor’s superintendent & foreman, grout foreman, inspectors
- System Designer should review entire installation process in detail
  - Make sure everyone understands the process
- System Designer should conduct grout training
Installation Phase

(show time)
On-Site Installation Training

- Don’t tackle too many slabs the first night!
- System Designer should monitor and train each crew (including inspectors)
- Make sure everyone understands the process
Realities

- There is a learning curve!
  - Expect it to take at least one week (possibly more) before full production is realized
- Precast slabs are not “swiss watches”
  - Recognize and understand the tolerances
- Weather happens!
  - Precast slabs can be set in wet and colder weather – use common sense!
Keys For Increased Production

- Establish work crew with proper skills
- Keep crew together after it has been trained
- Keep “on” the saw cutter
- Check hole sizes to preempt problems
- Maximize work windows
  - Go for “one more slab” each night
What’s Needed for Rapid (Overnight) Repair
## Actual Production Rates on (Selected) Completed Projects

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>TYPE</th>
<th>WORK WINDOW</th>
<th>TOT. NO. SLABS</th>
<th>SLABS PER SHIFT</th>
<th>AREA PER SHIFT (SF)</th>
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<tbody>
<tr>
<td>I-287(TZ)</td>
<td>CONT.</td>
<td>8 HOURS (DAY)</td>
<td>1062</td>
<td>20 – 24</td>
<td>3064</td>
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<tr>
<td>i-90</td>
<td>INT.</td>
<td>8 HOURS (NIGHT)</td>
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<td>ALBANY, NY</td>
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<td>5 HOURS NIGHT</td>
<td>800</td>
<td>6-8</td>
<td>960</td>
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<td>I-95</td>
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<td>WEEK END</td>
<td>193</td>
<td>58</td>
<td>9,280</td>
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<td>NEW YORK</td>
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<tr>
<td>MONTREAL</td>
<td>CONT.</td>
<td>WEEK END</td>
<td>193</td>
<td>58</td>
<td>9,280</td>
</tr>
</tbody>
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Keys to Success
(Still More to Learn)

- Good Engineering
- Open Minds
- Real Partnering
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