

**HIGH PERFORMANCE CONCRETE**  
2006-07 FOLLOW-UP SURVEY RESULTS

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**NATIONAL HIGH PERFORMANCE CONCRETE  
FOLLOW UP SURVEY RESULTS**

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**Outline**

- HPC Introduction
- 2006 National HPC Survey
  - Alternative Reinforcement
  - Self-Consolidating Concrete
  - Lightweight HPC
- Conclusion

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**Introduction**


Cost of Corrosion-“Deficient Bridges”



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**Introduction – Cost of Substructure Corrosion**



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**Introduction – Accident Damage**

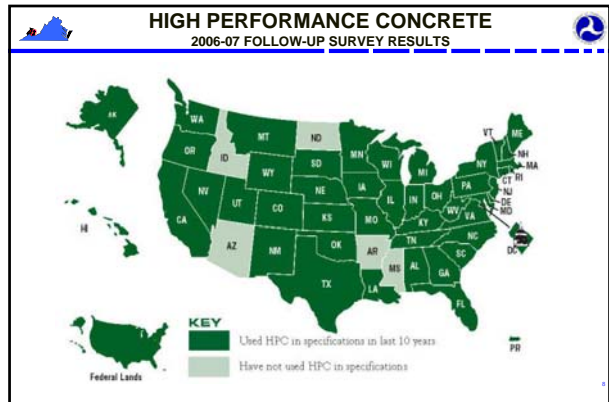
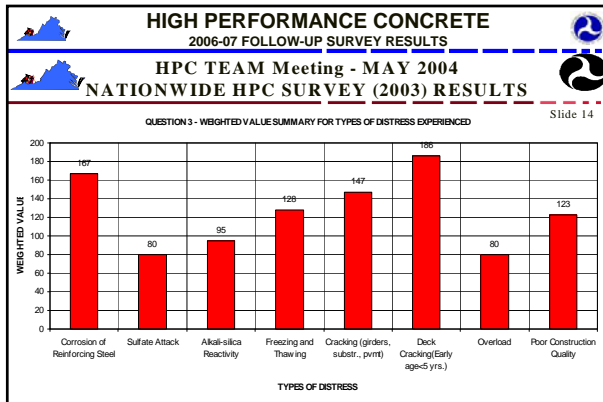


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**Introduction – Act of God Damage**





- HIGH PERFORMANCE CONCRETE**  
2006-07 FOLLOW-UP SURVEY RESULTS
- PURPOSE**
- Quantify the number and application of high performance concrete (HPC) projects across the nation,
  - Obtain information on the use of high performance reinforcement.
  - Follow-up to earlier HPC Survey 2003

- HIGH PERFORMANCE CONCRETE**  
2006-07 FOLLOW-UP SURVEY RESULTS
- QUESTIONNAIRE**
- Prepared by a task force of the FHWA High Performance Concrete Technology Delivery Team
  - Members of task force include
    - State DOT
    - Industry
    - FHWA

- HIGH PERFORMANCE CONCRETE**  
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- SURVEY DISTRIBUTION**
- Survey sent to:
    - 50 States
    - Federal Lands Highway
    - Puerto Rico
    - District of Columbia (DC)

- HIGH PERFORMANCE CONCRETE**  
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- Survey Topics**
- General Use of HPC
  - HPC for Permeability Benefit
  - HPC for Strength Benefit
  - Self-Consolidating Concrete
  - Lightweight HPC
  - Alternative Reinforcement

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### Survey Topics (cont.)

- Alternative Reinforcement
  - Stainless Steel Reinforcement
  - Stainless Steel Clad Reinforcement
  - Epoxy Coated Reinforcement
  - Galvanized Reinforcement
  - MMFX Microcomposite (MMFX-2) Reinforcement
  - FRP Reinforcement
    - GFRP
    - CFRP
    - AFRP

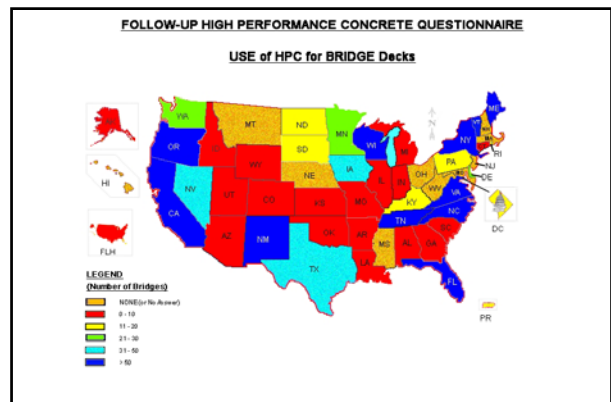
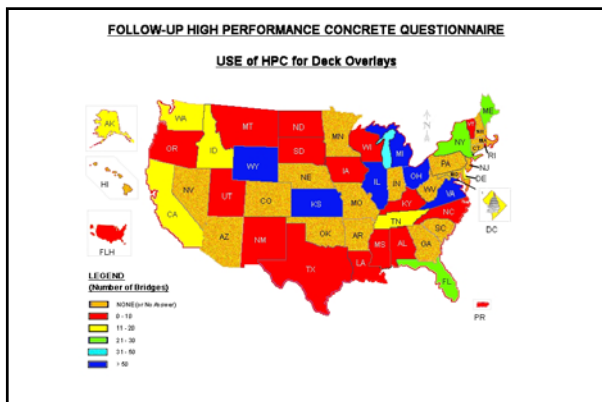
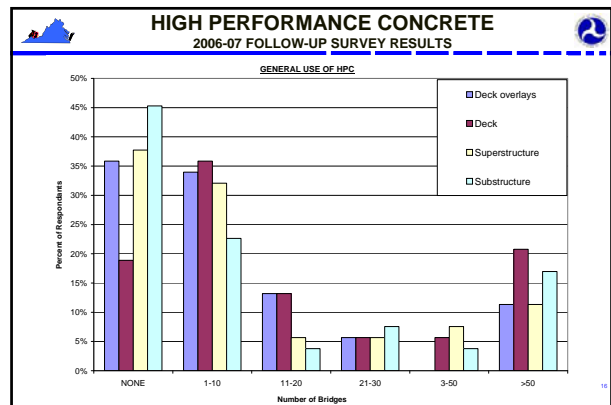
## HIGH PERFORMANCE CONCRETE 2006-07 FOLLOW-UP SURVEY RESULTS

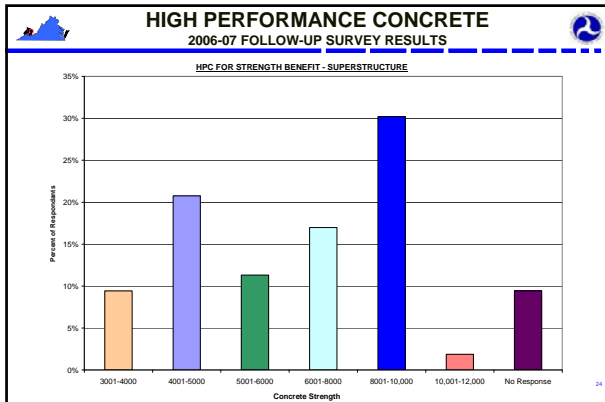
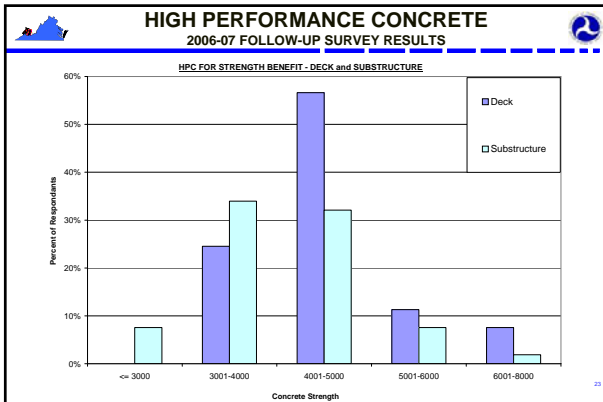
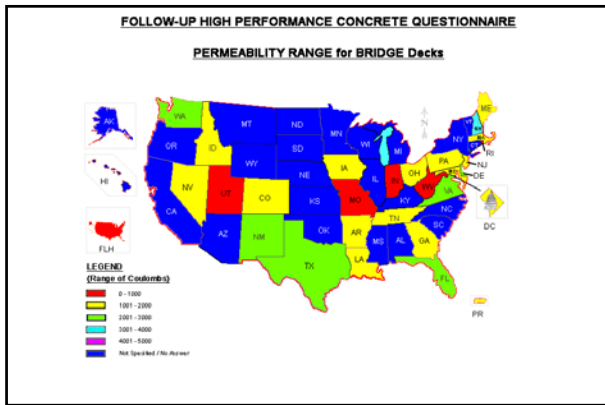
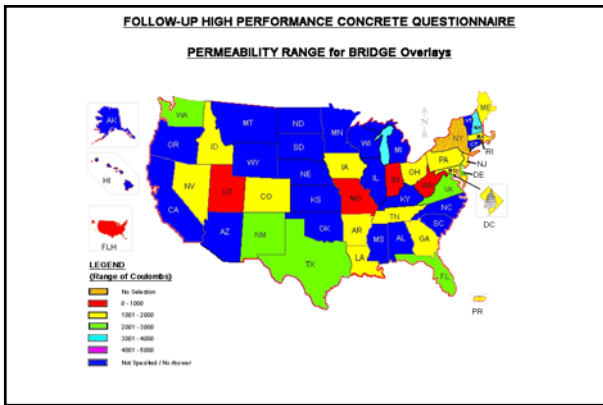
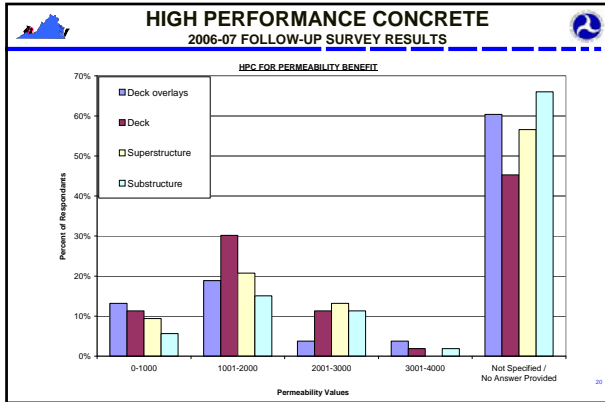
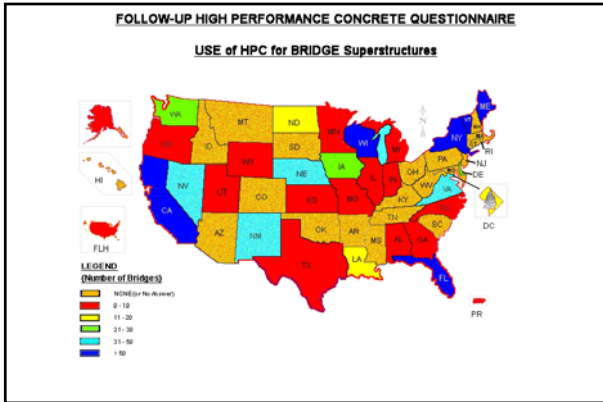
### Survey Topics (cont.)

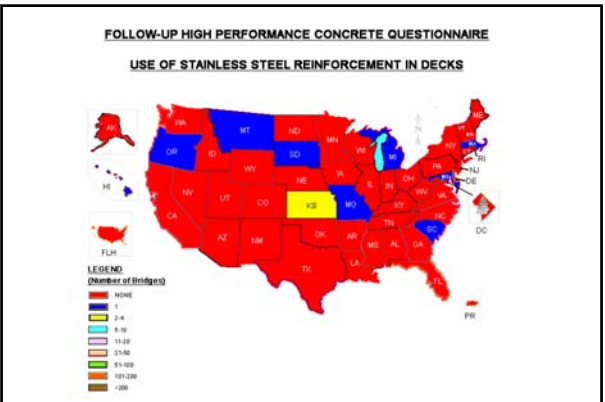
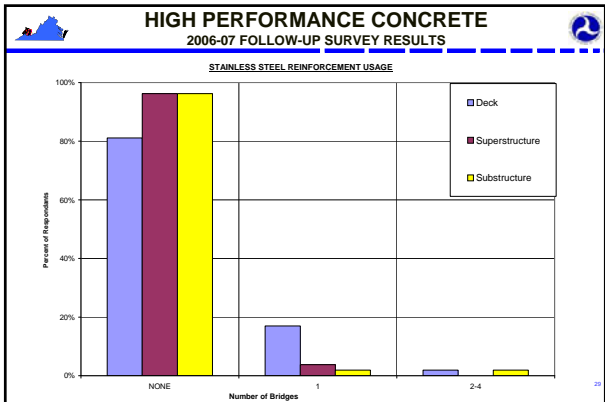
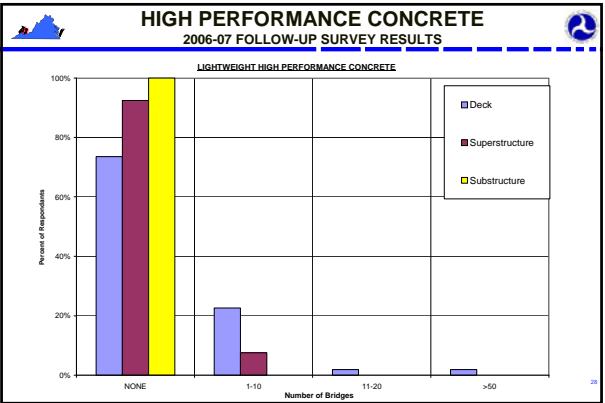
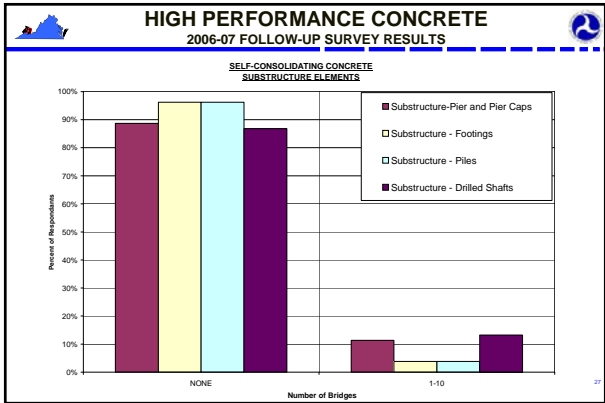
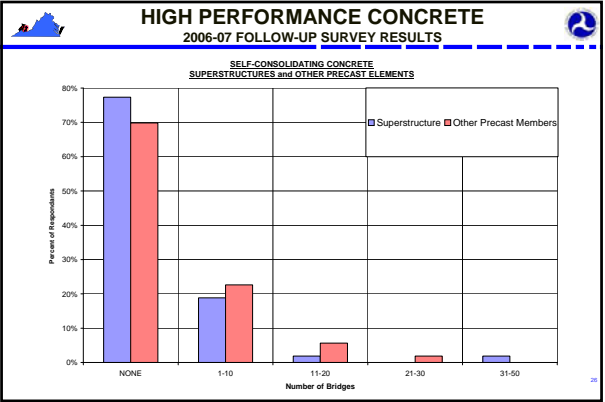
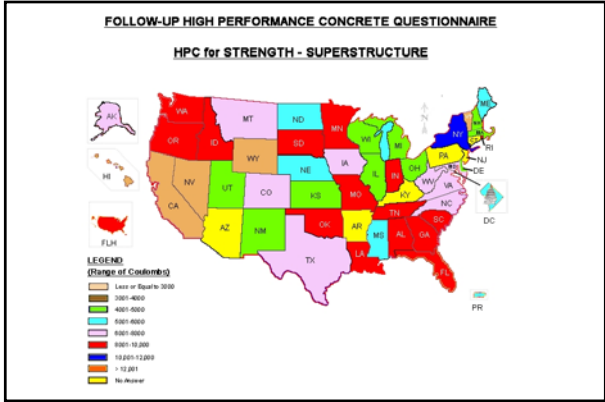
- General Section
  - Primary characteristics of HPC tested
  - Method for specifying HPC
  - Number of projects planned and constructed
  - HPC Specification
  - Percentage of HPC used in the last 3 years (check)

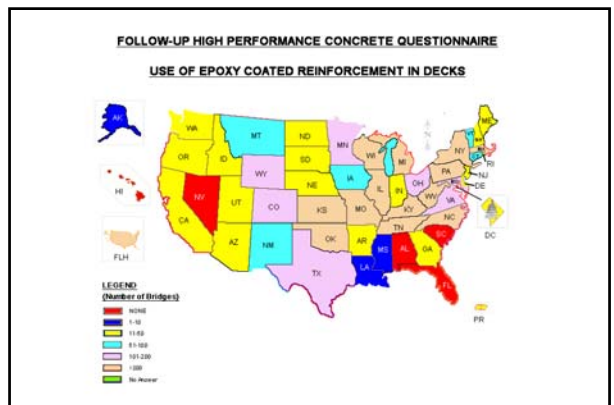
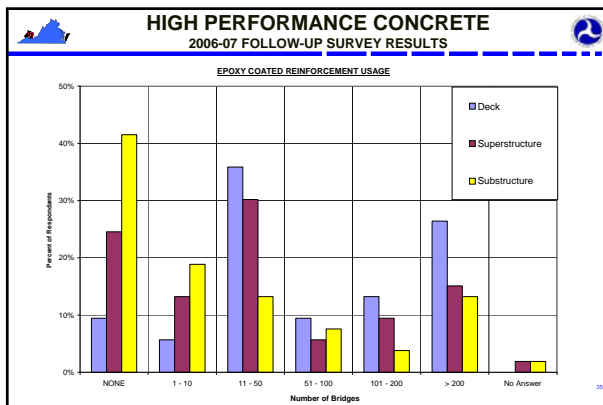
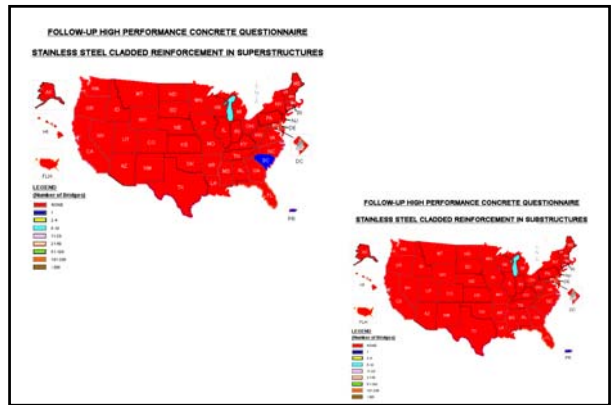
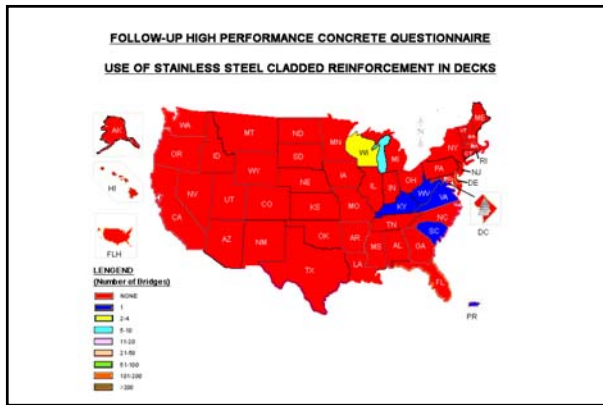
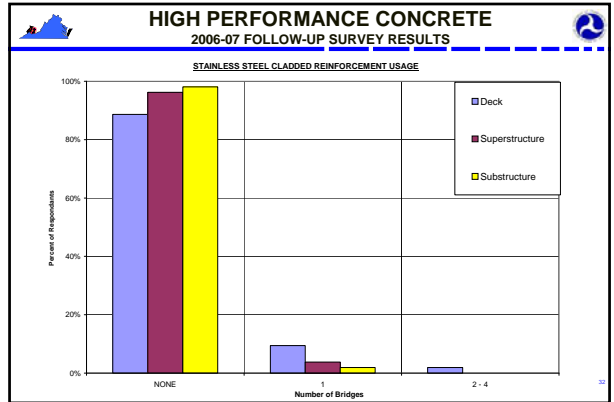
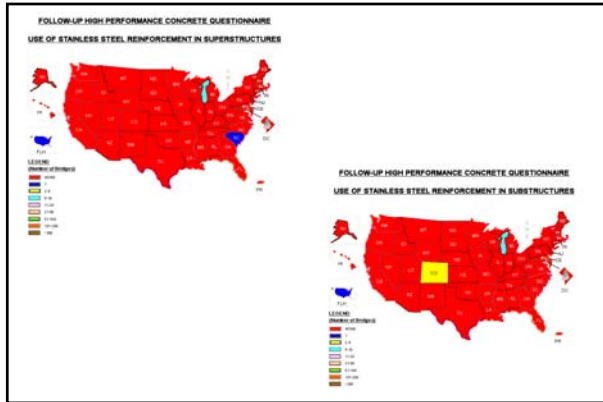
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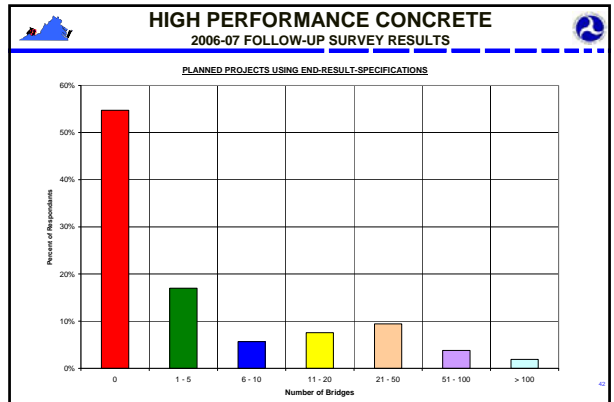
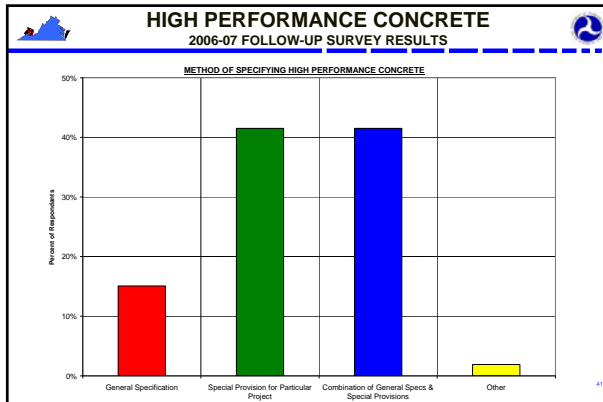
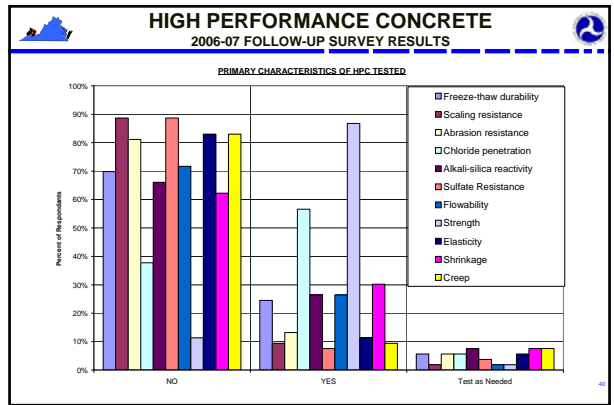
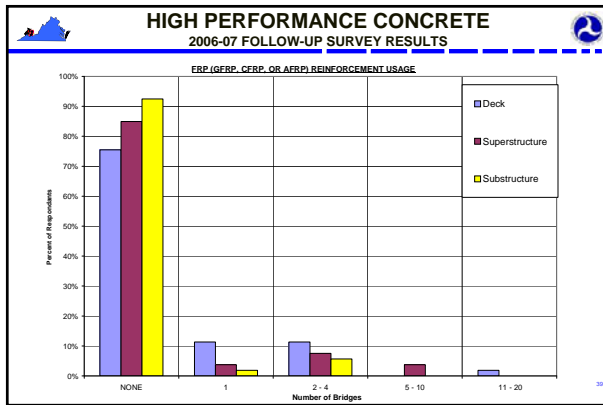
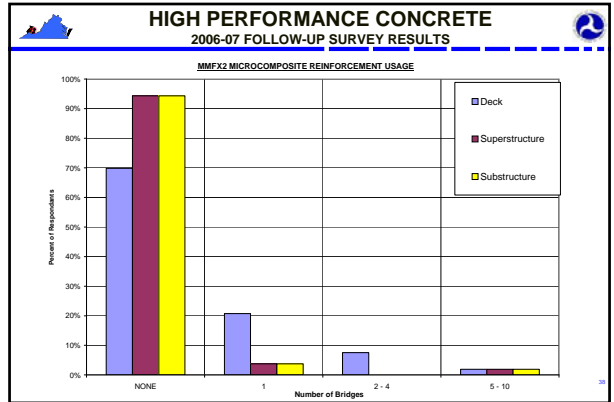
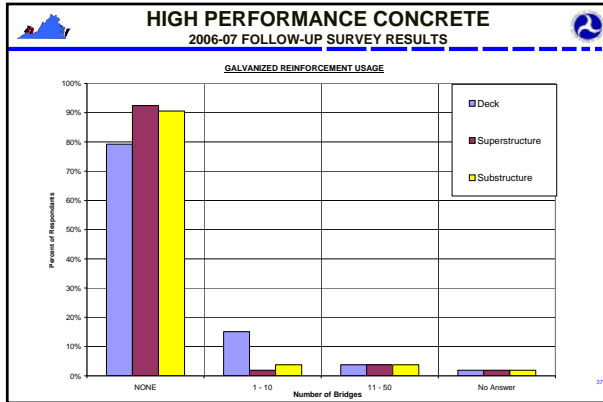
Structural Element	Deck	Deck Overlays	Substructure	Superstructure	Other
<b>General Use of HPC</b>					
For the structure which used HPC, indicate the range of counts which best reflects the project specified providing the quality of the data.					
Structural Element	Deck	Deck Overlays	Substructure	Superstructure	Other
Number of Responses	1-10	11-20	21-30	31-50	>50
Deck	1	1	1	1	1
Deck Overlays	1	1	1	1	1
Substructure	1	1	1	1	1
Superstructure	1	1	1	1	1
Other	1	1	1	1	1
<b>HPC for Permeability</b>					
For the structure which used HPC, indicate the range of counts which best reflects the project specified providing the quality of the data.					
Structural Element	Deck	Deck Overlays	Substructure	Superstructure	Other
Number of Responses	1-10	11-20	21-30	31-50	>50
Deck	1	1	1	1	1
Deck Overlays	1	1	1	1	1
Substructure	1	1	1	1	1
Superstructure	1	1	1	1	1
Other	1	1	1	1	1
<b>HPC for Strength</b>					
For the structure which used HPC, indicate the range of counts which best reflects the project specified providing the quality of the data.					
Structural Element	Deck	Deck Overlays	Substructure	Superstructure	Other
Number of Responses	1-10	11-20	21-30	31-50	>50
Deck	1	1	1	1	1
Deck Overlays	1	1	1	1	1
Substructure	1	1	1	1	1
Superstructure	1	1	1	1	1
Other	1	1	1	1	1
<b>HPC for Durability</b>					
For the structure which used HPC, indicate the range of counts which best reflects the project specified providing the quality of the data.					
Structural Element	Deck	Deck Overlays	Substructure	Superstructure	Other
Number of Responses	1-10	11-20	21-30	31-50	>50
Deck	1	1	1	1	1
Deck Overlays	1	1	1	1	1
Substructure	1	1	1	1	1
Superstructure	1	1	1	1	1
Other	1	1	1	1	1
<b>Other Placed HPC</b>					
For the structure which used HPC, indicate the range of counts which best reflects the project specified providing the quality of the data.					
Structural Element	Deck	Deck Overlays	Substructure	Superstructure	Other
Number of Responses	1-10	11-20	21-30	31-50	>50
Deck	1	1	1	1	1
Deck Overlays	1	1	1	1	1
Substructure	1	1	1	1	1
Superstructure	1	1	1	1	1
Other	1	1	1	1	1

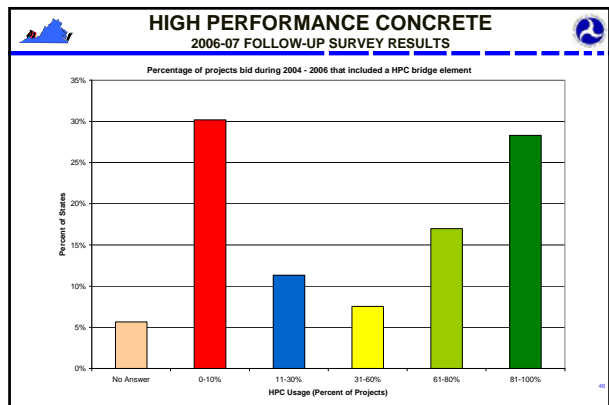
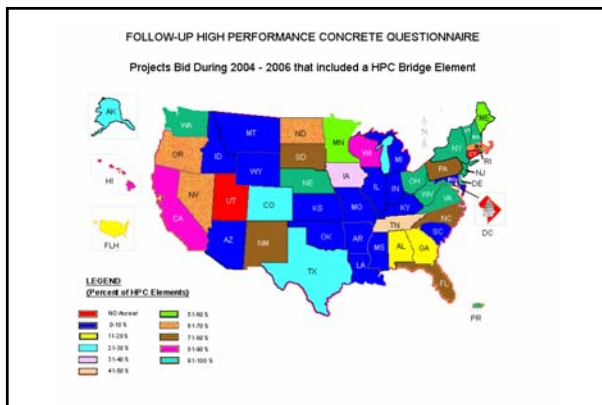
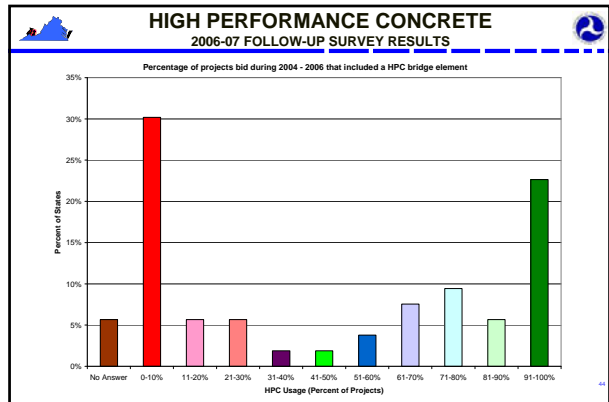
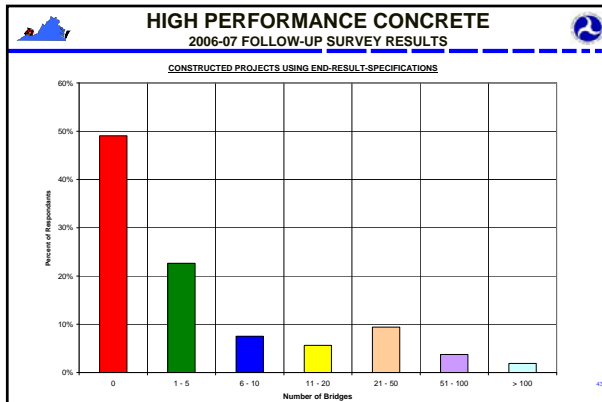












### HIGH PERFORMANCE CONCRETE 2006-07 FOLLOW-UP SURVEY RESULTS

## Conclusions

- **HPC Provides**
  - Extension of service life
  - Reduced Maintenance
  - Lower Life Cycle Cost
- **Significant progress in HPC Implementation in the past 15 years, however, more needs to be done**
- **State DOTs and Industry have taken advantage of strength and durability of HPC**

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## Conclusions (cont)

- **Researchers and academia have provided solutions to design and construction problems**
- **FHWA has supported the research, development, deployment and implementation of HPC through the many programs and initiatives described above**
- **FHWA will continue to ensure that public and private sector partnerships be strengthened for successful implementation of HPC**





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**QUESTIONS?**

THANK YOU

51