NYC Buildings

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Formwork Industry Meeting II

New York City Department of Buildings

March 16, 2010

Outline For Today

Presentation of Proposals

Open Discussion

High-rise Concrete Formwork

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1. General Considerations

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Oversight Proposal

Require Single Designer to Assume Responsibility for Temporary Support of Concrete.

Tasks May include:

•Coordination of all Formwork Designs Present at a Particular Project

•Coordination between EOR and Contractor

The DOB may require declaration of responsible formwork parties on permit applications

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2. Minimum Design Information

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Minimum Formwork Design Information

Shores and Vertical Formwork	Material Grades Nailing Schedules and Connection Details Plan and Elevation Drawings with Adequate Specificity Details of Atypical Conditions Stripping Procedures (slabs allowed to release?) Minimum Concrete Strengths Finished Form Tolerances per ACI-117 Post Placement Tolerances

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Minimum Formwork Design Information (Continued)

Reshores	Numbers of Reshored Floors Installation and Removal Sequences Plan and Elevation Drawings with Adequate Specificity Element Placement Tolerances or Reference

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Minimum Formwork Design Information (Continued)

Lateral Bracing	Material Grades Nailing Schedules and Connection Details Plan and Elevation Drawings with Adequate Specificity Removal Sequences & Minimum Concrete Strengths

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Minimum Formwork Design Information (Continued)

Additional Information	**Special Construction Details (e.g. Stayform Details)** **Allowable Construction Load Key Sheet** **Statement of Design Assumptions** (developed in conjunction with contractor)

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3. Special Design Requirements

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Special Design Requirements Proposal

1. **A qualified professional engineer shall prepare, sign, and seal a set of formwork drawings when adjacent structures are used directly or indirectly (as lateral bracing) to support formwork** (Modification of §1906.3).
2. **Prohibit loading of adjacent structures in cases where capacities cannot be determined** (Modification of §1906.3).
3. **A qualified design professional shall be responsible for stability of adjacent structures throughout all stages of construction.** (Modification of §3309.8)

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4. Observation Requirements

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Observation Requirement Proposal

Formwork observations to be performed...

1. **By the formwork designer or his qualified designate** (e.g. contract with inspection firm)
2. **To ensure general conformance with the design intent**
3. **At intervals that permit observation of *critical items***

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Proposed Critical Observation Items

Formwork and Bracing	Connection Details Post Spacings Waler Spacings Stringer and Rib Configurations Bracing Installation Form Stripping Procedures Knowledge of Concrete Strength

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Proposed Critical Observation Items

Reshores	Reshoring Procedures Number of Shored Floors Post Spacings and Alignment
Special Circumstances	Atypical Configurations Adjacent Structures are Loaded By Formwork

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- **Observations performed by the designer are in addition to, not a substitute for regular contractor inspections.**
- **Formwork violations will continue to be issued to the contractor**

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5. Wind Requirements

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Require formwork to be designed for wind loads:

- **Deck panels to be positively attached, especially at building footprint perimeters.**
- **Provide a continuous load path between decking and concrete floor.**
- **Utilize lateral loading requirements set forth in ASCE 37. Design Velocity factors to reflect continuous citywide construction.**

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Require formwork to be designed for wind loads (Continued):

- **Utilize lateral loading requirements set forth in ASCE 37. Design Velocity factors to reflect continuous citywide construction.**

ASCE 37-02 §6.2.1 Design Wind Velocity Factors

Construction Period	Factor
Less than 6 weeks	0.75
6 weeks to 1 year	0.80
1 to 2 years	0.85
2 to 5 years	0.90