HAMBRO®

Proven Concrete Floor System

Product Guide Specification

April 2006

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April 2006

Product Guide Specification

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, including *MasterFormat, SectionFormat,* and *PageFormat,* as described in *The Project Resource Manual—CSI Manual of Practice.*

The section must be carefully reviewed and edited by the Engineer to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the Drawings. Delete all "Specifier Notes" when editing this section.

Section numbers are from *MasterFormat* 1995 Edition, with numbers from *MasterFormat* 2004 Edition in parentheses. Delete version not required.

SECTION 05260 (05 21 00)

COMPOSITE FLOOR JOIST SYSTEM

Specifier Notes: This section covers "Hambro® D500™" composite floor joist system. The system combines Hambro steel joists with a cast-in-place concrete slab. Consult Hambro Structural Systems for assistance in editing this section for the specific application.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Composite floor joist system of steel joists with cast-in-place concrete slab.

1.2 RELATED SECTIONS

Specifier Notes: Edit the following list of related sections as required for the project. List other sections with work directly related to this section.

A. Section 03300 (03 30 00) – Cast-in-Place Concrete.

1.3 REFERENCES

Specifier Notes: List standards referenced in this section, complete with designations and titles. This article does not require compliance with standards, but is merely a listing of those used.

A. ACI 301 – Specifications for Structural Concrete.

B. ACI 318 – Building Code Requirements for Structural Concrete.

C. AISC Specification for the Design of Cold-Formed Steel Structural Members.

D. ASTM A 1008 – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

E. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

F. AWS D1.1 – Structural Welding Code-Steel.

G. Steel Joist Institute (SJI).

1.4 DESIGN REQUIREMENTS

A. Design of Composite Floor Joist System:
   1. Flexural Design: Ultimate Strength Method and as described by manufacturer.
   2. Joist Top Chord Member: AISC Specification for the Design of Cold-Formed Steel Structural Members.
   3. Joist Web and Bottom Chord Members: SJI.
   4. Concrete Slab: ACI 318.

B. Design Joists to Resist Combined Weight of:
   1. Wet concrete (specified slab thickness).
   2. Welded wire fabric reinforcement.
   3. Formwork.
   4. Rollbars.
   5. Construction Load: 20 psf maximum.

1.5 SUBMITTALS

A. Comply with Section 01330 (01 33 00) – Submittal Procedures.

B. Product Data: Submit manufacturer's product data for composite floor joist system.

C. Shop Drawings: Submit manufacturer's shop drawings indicating material lists; mark numbers; types, locations, and spacing of joists and accessories; and special conditions requiring top or bottom bracing.
   1. Calculated dimensions on shop drawings shall be used.
   2. Scaling of drawings shall not be permitted.

D. Product Certificates: Submit manufacturer's product certificates signed by manufacturer, certifying materials comply with specified requirements.

E. Welders' Certifications: Submit welders' certifications signed by Contractor certifying welders comply with quality assurance requirements.

1.6 QUALITY ASSURANCE

A. Welding Materials and Methods of Fabrication: Manufacturer's standard shop practice.

B. Welders' Qualifications: Certify that each welder is AWS certified in accordance with AWS D1.1.
   1. Joist Repairs and Modifications in Field: Performed by AWS certified welders in accordance with AWS D1.1.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
   1. Deliver joists to site banded in nested bundles and tagged with identification plate attached at 1 end, at joist shoe.
   2. Indicate on Joist Identification Plates:
      a. Manufacturer.
      b. Country (Plant).
      c. Project number.
      d. Joist mark.

B. Storage:
   1. Store materials in accordance with manufacturer's instructions.
   2. Protect materials from corrosion, deformation, and other damage.
   3. Store joists upright on level surface, off ground.
   4. Do not stack joists.

C. Handling:
   1. Protect joists from damage during unloading, storage, handling, and installation.
   2. Hoist joists by crane in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Hambro Structural Systems, 450 East Hillsboro Blvd., Deerfield Beach, Florida 33441. Phone (800) 546-9008 / (954) 571-3030. Fax (800) 592-4943 / (954) 571-3031. Website www.hambro.ws.

2.2 COMPOSITE FLOOR JOIST SYSTEM

A. Designation: “Hambro D500” composite floor joist system.

B. Joists, Rollbars, and Standard Bearing Shoes: Furnished by manufacturer.

C. Joists:
   1. Joist Depth: As indicated on the Drawings.
   2. Top Chord Member:
      a. Act as a continuous shear connector.

b. ASTM A 1008, Grade 50, cold-rolled steel, 13 gauge minimum.
c. Fy: 50,000 psi minimum.

3. Bottom Cord Member:
   a. Hot-rolled or cold-rolled steel angles.
   b. Fy: 50,000 psi minimum.
4. Web Members:
   a. Hot-rolled steel bars, 7/16-inch diameter minimum, some continuous.
   b. Bent at top chord joist locations.
   c. Fy: 44,000 psi minimum.
5. Shop Painting: Rust-inhibitive primer.

D. Rollbars:
1. Steel.
2. Removable.
3. Design to support the following, until formwork is removed after concrete has reached a minimum compressive strength of 500 psi, as determined by testing concrete cylinders in accordance with ASTM C 39.
   a. Plywood forms.
   b. Slab dead weight.
   c. Welded wire fabric weight.
   d. Construction Load: 40 psf.
4. Act as temporary bridging and spacers for joists.

E. Standard Bearing Shoes:
1. Angle Shape: Steel, 4 inches by 1-3/4 inches by 1/4 inch, 4-3/4 inches wide, unless indicated otherwise on the Drawings.
2. Shop Painting: Rust-inhibitive primer.

F. Forms: Plywood.
1. Sheets: 4 feet by 8 feet typical.
2. Thickness: 3/8 inch, 1/2 inch, 5/8 inch, or 3/4 inch.

Specifier Notes: Coordinate Section 03300 (03 30 00) – Cast-in-Place Concrete with the requirements for concrete and welded wire fabric in this section.

G. Concrete:
1. Minimum Ultimate Compressive Strength, f'c: 3,000 psi at 28 days.
2. Standard Weight: 145 pcf.
3. Maximum Aggregate Size: 3/4 inch.
4. As specified in Section 03300 (03 30 00), unless specified otherwise in this section.

H. Concrete Reinforcement: Welded wire fabric.
1. Size: As indicated on the Drawings.
2. Fy: 60,000 psi minimum.
3. Flat sheets. Do not use rolls.
4. As specified in Section 03300 (03 30 00), unless specified otherwise in this section.

2.3 FABRICATION

A. Fabrication: Manufacturer's standard shop practice.

B. Joist Top Chord: Fabricate joist top chord to allow for 1-1/2-inch embedment into concrete slab.

C. Joist Cambers: Camber is optional; but when provided, approximate camber shall be as follows:
   1. Joist Span 15 Feet to 20 Feet: 1/2-inch to 3/4-inch prefabricated camber.
   2. Joist Span 20 Feet to 25 Feet: 3/4-inch to 7/8-inch prefabricated camber.
   3. Joist Span 25 Feet to 30 Feet: 7/8-inch to 1-1/16-inch prefabricated camber.
   4. Joist Span 30 Feet to 40 Feet: 1-1/16-inch to 1-1/2-inch prefabricated camber.

2.4 SOURCE QUALITY CONTROL

A. Joists:
   1. Manufacturer's facility having continuous quality control program and subjected to plant inspections by approved independent agency.
   2. Inspection shall include checking:
      a. Size.
      b. Span.
      c. Assembly.
      d. Welds.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive composite floor joist system.

B. Notify Engineer of conditions that would adversely affect installation.

C. Do not start installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install composite floor joist system in accordance with the following:
   1. Manufacturer's installation manual.
   2. Approved erection drawings.
   3. Amendments issued by manufacturer.

B. Construction Loads:
   1. Do not exceed load carrying capacity of composite floor joist system with construction loads.
   2. Concentrated Construction Loads: Do not place concentrated construction loads; such as bundles of plywood, sheetrock, or rollbars; exceeding design load of slab on composite floor joist system; but rather on supporting walls or beams.
   3. Concentrated Construction Loads Exceeding Design Load Capacity: Concentrated construction loads exceeding design load capacity of composite floor joist system shall be fully supported and shored to grade.

C. Erect joists level, plumb, and to proper locations and elevations.

D. Perform shimming as required with metal shim material, ensuring total shoe contact.

E. Indicate on erection drawings prepared by manufacturer, standard conditions for bottom chord bridging.

F. Indicate on erection drawings prepared by manufacturer, special conditions requiring top and/or bottom bracing.

G. End Anchorage: Anchor or embed joist shoes as indicated on the Drawings.

H. Joist Sweep: After installation, allowable joist sweep shall be 1 inch in 20 feet.

I. Minimum Joist Bearing:
   1. Steel Supports: 2-1/2 inches.
   2. Masonry and Concrete Supports: 3-1/2 inches.
   3. Bearing Capacity of Supporting Units: Comply with applied shoe end reaction, based on minimum supplied bearing area as follows:
      a. Bearing on Structural Steel: 11.8 square inches.
      b. Other Bearing Conditions: 16.6 square inches.

J. Damaged Joists:
   1. Do not install damaged joists.
   2. Repair or replace damaged joists before installation.
   3. Do not make field repairs to damaged joists without written approval from manufacturer and Engineer.
   4. Make repairs to damaged joists in accordance with repair details from manufacturer.
   5. Receive written approval from Engineer of joist repair before installation.

3.3 CONCRETE PLACEMENT

Specifier Notes: Coordinate the requirements for concrete in this section with Section 03300 (03 30 00) – Cast-in-Place Concrete.

A. Concrete:
   1. In accordance with ACI 301.
   2. As specified in Section 03300 (03 30 00), unless specified otherwise in this section.

B. Welded Wire Fabric:
   1. Laps: In accordance with ACI 318.
   2. As specified in Section 03300 (03 30 00), unless specified otherwise in this section.

C. Place concrete to slab thickness as indicated on the Drawings. Do not place concrete in excess of thickness indicated on the Drawings.

D. Maintain minimum depth of concrete cover above joist top chord in accordance with manufacturer's instructions.

E. Construction Loads: Do not drop bucket loads of concrete in concentrated areas over joists.

F. Vibrate concrete lightly but thoroughly. Ensure full encasement of joist top chord in concrete.

G. Construction Joints:
   1. Parallel to Joists:

a. Locate construction joints midway between joists.
b. Do not locate construction joints closer than 6 inches from top chord.

2. Perpendicular to Joists:
   a. Locate construction joints over supporting wall or beam.

H. Formwork Removal: Remove formwork after concrete has reached a minimum compressive strength of 500 psi, as determined by testing concrete cylinders in accordance with ASTM C 39.

3.4 PROTECTION

A. Protect concrete from foot traffic until concrete has reached a minimum compressive strength of 1,000 psi, as determined by testing concrete cylinders in accordance with ASTM C 39.

END OF SECTION