DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT Housing - Federal Housing Commissioner	STRUCTURAL ENGINEERING BULLETIN NO. 1091 Rev. 5 (Supersedes issue dated September 6, 2001)
TO: DIRECTORS, SINGLE FAMILY HOCs DIRECTORS, MULTIFAMILY HUBs	ISSUE DATE October 26, 2004
	REVIEW DATE October 26, 2007

SUBJECT: 1. **Item Description** LPI I-Joist

2. **Name and address of Manufacturer** Louisiana-Pacific Corporation
2706 Highway 421 North
Wilmington, NC 20401

This Structural Engineering Bulletin (SEB) should be filed with other SEBs and related Bulletins on materials or products as required by prescribed procedures.

The technical description, requirements and limitations expressed herein do not constitute an endorsement or approval by the Department of Housing and Urban Development (HUD) of the subject matter, and any statement or representation, however made, indicating approval or endorsement by HUD is unauthorized and false, and will be considered a violation of the United States Criminal Code, 18 U.S.C. 709.

NOTICE: THIS BULLETIN APPLIES TO DWELLING UNITS BUILT UNDER HUD HOUSING PROGRAMS. NON-HUD-INSURED UNITS MAY OR MAY NOT BE IN CONFORMINTY WITH THE REQUIREMENTS OF THE HUD MINIMUM PROPERTY STANDARDS.

Any reproduction of this Bulletin must be in its entirety and any use of all or any part of this Bulletin in sales promotion or advertising is prohibited.

1. General:

This Bulletin sets forth specific requirements under the Technical Suitability of Products Program for determining the eligibility of housing to be constructed under HUD mortgage insurance, or other HUD housing programs.

2. Scope:

This Bulletin applies only to the structural features of this method of construction. Final determination of eligibility is made by the appropriate HUD Field Office. Other factors considered will be valuation, location, architectural planning and appeal, mechanical equipment, thermal characteristics, and market acceptance. Consideration is also necessary to determine whether a specific property will qualify under the specific HUD program, when constructed according to the method outlined in this Bulletin, and where the structure is to be located.

3. Minimum Property Standards (MPS):

Compliance with HUD MPS will be determined by the HUD Field Office or Homeownership Center on the same basis as the submissions involving conventional construction, except for the special features described in this bulletin.

4. Inspection:

Field compliance inspections covering conventional items of construction and any special features covered in this bulletin shall be made in accordance with prescribed procedures.

The appropriate HUD Field Office or Homeownership Center shall furnish a copy of a HUD field inspection report to Headquarters, Office of Manufactured Housing Programs, when there is:

a. Evidence of non-compliance with any portion of the system of construction described in this bulletin.
b. Faulty shop fabrication, including significant surface defects.
c. Damage to shop fabricated items or materials due to improper transportation, storage, handling, or assembly.
d. Unsatisfactory field workmanship or performance of the product or system.
e. Any significant degradation or deterioration of the product or evidence of lack of durability or performance.

Periodic plant inspections will be made by HUD Field Office, Homeownership Center, or a HUD designated representative in accordance with their prescribed procedures. Factory inspection reports shall be submitted to HUD Headquarters, upon request.

5. Certification:

The manufacturer named in this bulletin shall furnish the builder with written certification that the product has been manufactured in compliance with the HUD Minimum Property Standards (MPS), except as modified by this bulletin. The builder shall endorse the certification with a statement that the product has been installed in compliance with HUD MPS, except as modified by this bulletin, and that the manufacturer's certification does not relieve the builder, in any way, of responsibility under the terms of the Builder's Warranty required by the National Housing Act, or under any provisions applicable to any other housing program. This certification shall be furnished to the HUD Field Office upon completion of the property.

OUTLINE DESCRIPTION, CATEGORY II CONSTRUCTION

Use:

LPI Series Wood I-Joists are used in residential and light commercial construction as floor joists, roof joists, blocking panels and rim joists.

DESCRIPTION:

General:

LPI Series I-Joists have structural composite lumber (SCL) flanges and a single web as specified in the quality control manual that contains the manufacturing standards. The top and bottom flanges are parallel, creating constant-depth joists. Web sections are end-jointed together to form a continuous web. Web end joints shall be of the types specified in the quality control manual. The web-to-flange connection is a proprietary grooved connection, also conforming to the quality control manual. The I-Joists are available in various lengths.

The I-Joist series and depths are given in Tables 1 and 2 in Attachment "A".

MATERIAL SPECIFICATIONS:

Flanges:

The flange material is SCL that meets the requirements noted in the quality control manual.

Webs:

Web panels for all series, except for the LPI 56A and LPI 550 Series I-Joists, are a minimum of 3/8-inch (9.5 mm) thick. Web panels for the LPI 56A and LPI 550 Series I-Joists are a minimum of 7/16 inch (11.1 mm) thick. All web panels comply with U.S. Voluntary Product Standard PS 2-92 and the quality control manual.

Adhesive:

Adhesives are exterior wet-use types complying with ASTM D 2559 and shall be of the types specified in the quality control manual.

MANUFACTURING PROCESS FOR LPI I-JOIST:

The LPI I-Joists are manufactured in a continuous process with the following steps:

1. Web sections are glued and end-jointed to form a continuous web.

2. SCL flange material is grooved for the web joint.

3. While applying a constant uniform flow of glue to the joint, the flanges and web are brought together through a series of vertical and horizontal rollers, which apply continuous pressure to form the I-Joist.

Finished I-Joists are bundled and wrapped with weatherproof material and stored in such a manner as to prevent excessive weathering, glue line breakdown or deterioration of the wood components.

DESIGN AND INSTALLATION:

Allowable Structural Capacity:

Allowable moments, reactions, vertical shear capacity, and I-Joist stiffness (EI) are specified in Tables 1 and 2 in Attachment "A". Maximum allowable reactions are based on a minimum bearing length of 1 ¾ inches (44 mm) for simple spans, and 3 ½ inches (89 mm) at intermediate support points for continuous spans.

Web Stiffeners:

The material, size, and attachment of web reinforcement shall be as illustrated and described in Figure 1 and Table 3 in Attachment "A".

Holes in I-Joist Web:

Size and location of allowable web holes are noted in Tables 5 to 8 in Attachment "A" for LPI I-Joists. Web hole equations are noted in Table 4 in Attachment "A" for LPI joists. Figure 2 in Attachment "A" shows the web hole drawings for the LPI I-Joists. As an analytical approach for the location and size of web holes, the LP design software can be used in lieu of the web hole chart tables or web hole equations noted in this report, provided the web hole calculations are reviewed and approved by a registered design professional. If the registered design professional uses the LP design software for web hole design, the registered design professional shall provide proper reference to the software.

Deflection:

Total I-Joist deflection shall be calculated by using the formula for deflection due to bending and shear as follows:

For example, for uniformly distributed loads,

$$\Delta = \frac{22.5wL^4}{EI} + \frac{wL^2}{K}$$

And for a simple span with a concentrated load at mid-span,

$$\Delta = \frac{36PL^3}{EI} + \frac{2PL}{K}$$

Where:

W = Uniform load (pounds per linear foot).

L = Clear span (feet).

EI = Product of the moment of inertia and modulus of elasticity, as provided in Tables 1 and 2 in Attachment "A" for LPI I-Joists.

P = Concentrated load (pounds).

K = Shear deflection factor as provided in Tables 1 and 2 in Attachment "A" for LPI I-Joists.

Δ = Deflection (inches).

LOAD TABLES:

Tables showing allowable design values of LPI I-Joists for strength, presented for size of I-Joist and deflection limitations are as a function of span. Load tables are available from Louisiana-Pacific Corporation upon request.

MANUFACTURING PLANTS:

Components covered under this Bulletin will be produced in the following plants:

Louisiana-Pacific Corporation
2706 Highway 421 North
Wilmington, NC 28401
Phone # 800-777-9105

Louisiana-Pacific Corporation
11500 Reading & Tyler Road
Red Bluff, CA 96080
Phone # 800-527-1411

The appropriate HUD Field Office or Homeownership Center in whose jurisdiction the manufacturing plants are located, or HUD designated representatives will inspect these plants in accordance with prescribed procedures.

QUALITY CONTROL:

The appropriate HUD field Office or Homeownership Center in whose jurisdiction the manufacturing plants are located, or the State Agency (in Category III states) shall review and approve plants fabrication procedures and quality control program, to ensure compliance with approved plans and specifications.

RECORD OF PROPERTIES:

Upon request, the manufacturer shall provide HUD a list of representative properties in which the component or system described in this bulletin is used. The list shall include the complete address, or description of location, and the approximate date of installation or erection. Failure of the manufacturer to provide HUD with the above information may result in cancellation of this bulletin.

NOTICE OF CHANGES:

The manufacturer shall inform HUD in advance of changes in production facilities, transportation, field erection procedures, design, or materials used in this product. Further, the manufacturer must inform HUD of any revision to corporate structure, change of address or change in name or affiliation of the prime manufacturer. Failure of the manufacturer to notify HUD of any of the above changes may result in cancellation of this bulletin.

EVALUATION:

This SEB shall be valid for a period of three years from the date of initial issuance or most recent renewal or revision, whichever is later. The holder of this bulletin shall apply for renewal or revision 90 days prior to the review date printed on this bulletin. Submittals for renewal or revision shall be sent to:

U. S. Department of Housing and Urban Development
FHA Standards, Office of Manufactured Housing Programs
451 7th Street, SW, Room 9168
Washington, DC 20410-8000

Appropriate User Fee shall be sent to:

U. S. Department of Housing and Urban Development
Miscellaneous Income - Technical Suitability of Products Fees
Bank of America
P. O. Box 198762
Atlanta, GA 30384-8762

The holder of this SEB may apply for revision at any time prior to the review date. Minor revisions may be in the form of a supplement.

If the Department determines that a proposed renewal or supplement constitutes a revision, the appropriate User Fee for a revision will need to be submitted in accordance with Code of Federal Regulations 24 CFR 200.934, "User Fee System for the Technical Suitability of Products Program," and current User Fee Schedule.

CANCELLATION:

Failure to apply for a renewal or revision shall constitute a basis for cancellation of the bulletin. HUD will notify the manufacturer that the bulletin may be cancelled when:

1. conditions under which the document was issued have changed so as to affect production of, or to compromise the integrity of the accepted material, product, or system,

2. the manufacturer has changed its organizational form without notifying HUD, or

3. the manufacturer has not complied with responsibilities it assumed as a condition of HUD's acceptance.

However, before cancellation, HUD will give the manufacturer a written notice of the specific reasons for cancellation, and the opportunity to present views on why the SEB should not be cancelled. No refund of fees will be made on a canceled document.

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This bulletin is issued solely for the captioned firm, and is not transferable to any person or successor entity.
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