DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT Housing - Federal Housing Commissioner	STRUCTURAL ENGINEERING BULLETIN NO. 1133 Rev. 1 (Supersedes issue dated May 21, 2003)
TO: DIRECTORS, SINGLE FAMILY HOCs DIRECTORS, MULTIFAMILY HUBs	ISSUE DATE August 1, 2006
	REVIEW DATE August 1, 2009

SUBJECT: 1. **Item Description** SSI Joists

2. **Name and address of Manufacturer** Standard Structures, Inc.
Post Office Box K
Santa Rosa, CA 95402

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 by the Field Office 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 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, FHA Standards, Office of Manufactured Housing Programs, when there is:

a. Evidence of noncompliance with portions 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, State Agency personnel, 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 a written certification stating 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 erected in compliance with the 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

GENERAL:

This bulletin provides for the use of SSI wood I-joists, manufactured by Standard Structures Inc. (SSI) for floor and roof framing.

PRODUCT DESCRIPTION

SSI joists consist of laminated veneer lumber (LVL) or machine stress rated (MSR) lumber flanges and oriented strand board (OSB) webs. The webs are 4-foot long sections of OSB that are glued end to end to form a continuous web using a full thickness joint. The web-to-flange connection is made by gluing the web into a groove in the center of the flange face.

Flange stock used to fabricate SSI joists is LVL or MSR lumber of the grade required by the approved SSI *Joist Procedures And Quality Control Manual.* Webs are structural use panels that comply with Department of Commerce (DOC) Voluntary Product Standard PS-2. Exterior-type adhesives, complying with ASTM D 2559, are used for flange-flange, flange-web, and web-web joints.

Descriptive details for the various joist series are provided in Table 1.

TABLE 1
JOIST DESCRIPTION

JOIST SERIES	JOIST DEPTHS (in.)		FLANGE					WEB	
	Minimum	Maximum	Material	F_t (psi)	E ($x10^6$)	Width (in.)	Depth (in.)	Material	Thickness (in.)
SSI 350M	9¼	30	2400 MSR	1925	2.0	3	2	OSB	3/8"
SSI 350Me	9¼	30	2100 MSR	1575	1.8	3	2	OSB	3/8"
SSI 550M	9¼	30	2400 MSR	1925	2.0	4	2	OSB	3/8"
SSI 550Me	9¼	30	2100 MSR	1575	1.8	4	2	OSB	3/8"

SSI joists are manufactured to meet the requirements of the SS*I Joist Procedures and Quality Control Manual.* SSI joists are identified by a stamp indicating the product designation, the number of this bulletin (HUD 1133) the manufacturer's name (Standard Structures Inc.) or logo, the plant number (1022), production date, and the name or logo of the quality control agency (APA EWS).

Typical SSI Joist Identification Markings:

SSI 350M

SSI JOIST 04-03-01 08:30

ICBO ES PFC 4325 HUD 1133

APA-EWS QA397 MILL 1022

DESIGN:

Design shall be in accordance with HUD MPS, local building codes, allowable design properties provided in Table 2, and the requirements of the Standard Structures Inc. *User's Guide*. The joists shall be installed as single-span joists with a minimum bearing length of 2½" except a minimum bearing length of 1¾" is permitted for SSI 350M and 350Me joists.

TABLE 2
DESIGN PROPERTIES[1]

JOIST DEPTH	JOIST SERIES	EI[2] (x 10^6 lb-in^2)	M[3] (ft-lbs)	V[4] (lbs)	C[5] (10^6 lbs)
9¼	SSI 350M	256	3950	1470	5.26
	SSI 350Me	231	3230	1470	5.26
	SSI 550M	355	5533	1470	5.34
	SSI 550Me	320	4526	1470	5.34
9½	SSI 350M	272	4088	1500	5.39
	SSI 350Me	245	3344	1500	5.39
	SSI 550M	379	5730	1500	5.47
	SSI 550Me	341	4687	1500	5.47
10	SSI 350M	307	4367	1555	5.64
	SSI 350Me	276	3572	1555	5.64
	SSI 550M	426	6126	1555	5.72
	SSI 550Me	384	5010	1555	5.72
11¼	SSI 350M	403	5066	1690	6.28
	SSI 350Me	362	4143	1690	6.28
	SSI 550M	559	7118	1690	6.36
	SSI 550Me	503	5799	1690	6.36
11½	SSI 350M	423	5206	1720	6.41
	SSI 350Me	380	4258	1720	6.41
	SSI 550M	588	7317	1720	6.49
	SSI 550Me	529	5984	1720	6.49
11⅞	SSI 350M	455	5417	1760	6.60
	SSI 350Me	410	4430	1760	6.60
	SSI 550M	633	7616	1760	6.69
	SSI 550Me	569	6229	1760	6.69
12	SSI 350M	466	5487	1775	6.67
	SSI 350Me	420	4488	1775	6.67
	SSI 550M	648	7716	1775	6.75
	SSI 550Me	583	6311	1775	6.75
14	SSI 350M	659	6614	1995	7.71
	SSI 350Me	593	5410	1995	7.71
	SSI 550M	916	9316	1995	7.81
	SSI 550Me	825	7619	1995	7.81
16	SSI 350M	888	7745	2215	8.77
	SSI 350Me	799	6335	2215	8.77
	SSI 550M	1234	10921	2215	8.88
	SSI 550Me	1110	8933	2215	8.88
18	SSI 350M	1152	8879	2440	9.84
	SSI 350Me	1036	7262	2440	9.84
	SSI 550M	1599	12533	2440	9.95
	SSI 550Me	1439	10250	2440	9.95
20	SSI 350M	1452	10015	2660	10.91
	SSI 350Me	1306	8191	2660	10.91
	SSI 550M	2013	14146	2660	11.04
	SSI 550Me	1812	11570	2660	11.04

TABLE 2 (Continued)
DESIGN PROPERTIES[1]

22	SSI 350M	1788	11153	2880	11.99
	SSI 350Me	1609	9122	2880	11.99
	SSI 550M	2478	15761	2880	12.12
	SSI 550Me	2230	12891	2880	12.12
24	SSI 350M	2163	12291	3100	13.06
	SSI 350Me	1946	10052	3100	13.06
	SSI 550M	2992	17378	3100	13.20
	SSI 550Me	2693	14213	3100	13.20
26	SSI 350M	2574	13429	3320	14.14
	SSI 350Me	2317	10984	3320	14.14
	SSI 550M	3558	18997	3320	14.29
	SSI 550Me	3202	15537	3320	14.29
28	SSI 350M	3024	14570	3545	15.21
	SSI 350Me	2721	11917	3545	15.21
	SSI 550M	4175	20616	3545	15.38
	SSI 550Me	3757	16862	3545	15.38
30	SSI 350M	3513	15710	3765	16.29
	SSI 350Me	3162	12849	3765	16.29
	SSI 550M	4844	22236	3765	16.46
	SSI 550Me	4359	18187	3765	16.46

Notes to Table 2:

1. The tabulated values are design values for normal duration of load. All values, except for EI and C may be adjusted for other load duration as permitted by the code.
2. Bending stiffness (EI) of the I-joist.
3. Moment capacity (M) of the I-joist. For repetitive I-joist, the tabulated values may be increased by a factor of 1.07.
4. Shear capacity (V) of the I-joist.
5. Coefficient of shear deflection (C). For calculating uniform load and center point load deflections of an I-joist in a simple-span application, use Equations 1 and 2.

Deflection formula:

Uniform Load: $\delta = (5wl^4/384EI) + (wl^2/C)$(Equation 1)

Center Point Load: $\delta = (Pl^3/48EI) + (2Pl/C)$ (Equation 2)

Where:
δ = calculated deflection (inches)
W = uniform load (pounds per lineal inch)
l = design span (inches)
P = concentrated load (pounds)
EI = bending stiffness of the I-joist (lbs-in^2)
C = coefficient of shear deflection (pounds)

INSTALLATION:

SSI joists shall be limited to protected, dry conditions of use. Joist installation, including cutting to provide access holes for air ducts, plumbing, and wiring, shall be in accordance with HUD MPS, local building codes, and the details provided in the Standard Structures Inc. *User's Guide.*

MANUFACTURING PLANT(S):

Components covered under this Bulletin will be produced in the following plant(s):

Standard Structures Inc.
5900 Pruitt Avenue
Windsor, CA 95492

The appropriate HUD Field Office or Homeownership Center in whose jurisdiction the manufacturing plant is located, or HUD designated representative will inspect this plant in accordance with prescribed procedures.

QUALITY CONTROL:

The appropriate HUD Field Office or Homeownership Center in whose jurisdiction the manufacturing plant is located, or the State Agency (in Category III states) shall review and approve plant fabrication procedures and quality control program, to ensure compliance with approved plans and specifications. The quality control program shall include field erection or supervision by Standard Structures Inc.

SSI Joists are fabricated, inspected and tested per ASTM D-5055 and provisions of a Quality Control and Procedures Manual recognized by ICC ES and APA – The Engineered Wood Association.

The SSI Joist Quality Control program is audited and plant inspected, by American Plywood Association – The Engineered Wood Association (NER QA-397, AA-649). Audits are conducted 12 times per year.

RECORD OF PROPERTIES:

The manufacturer shall provide HUD a list of the first ten 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 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 is 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 SEB shall apply for a renewal or revision 90 days prior to the Review Date printed on this SEB. 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 Seventh Street, SW, Room 9168
Washington, DC 20410-800

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 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 SEB. HUD will notify the manufacturer that the SEB may be canceled 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 canceled. No refund of fees will be made on a canceled document.

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This Structural Engineering Bulletin is issued solely for the captioned firm and is not transferable to any person or successor entity.

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