SURE-BOARD®

NON-COMBUSTIBLE

SURE-BOARD®

SERIES 200S-F/200S-P

FLOOR/ROOF SHEATHING

SURE-BOARD®
...FOR SHEATHING

CEMCO™

Expanding Your Solutions

Improve the quality of your next framing project with *Sure-Board® Series 200S*

Our revolutionary non-combustible sheathing panels will improve the quality and increase the efficiency during the installation on your next residential or midrise load bearing project.

When you incorporate Sure-Board® Series 200S sheathing, the finish product will prevent the need to work over uneven corrugated deck or have to bear the delay of pouring and finishing each level if you have been using a deep pandeck system.

These delays may be eliminated and production increased at no additional cost.

The installation of our series 200S panels do not require any new installation techniques for the field staff. Since the current methods and practices for installation are the same as those used for decades for plywood and OSB panels, we have the huge advantage of eliminating blocking and creating a great non-combustible structure for the future.

The Big One
Scan this QR to view the Seismic Tests Conducted at UCSD's Shake Table

*We put our building to the **"Real Test"** at the world's largest outdoor shake table at UCSD.*

The First Revolutionary 6 Story CFS ShakeTable Test

CEMCO and many industry partners along with H.U.D. and the California Seismic Safety Commission worked together on this program. DCI Engineering and the UCSD Engineering staff performed the first ever shake table test utilizing current code required lateral and diaphragm methods. Sure-Board® sheathing demonstrated amazing resilience with no measurable damage. The test program included 13 pretests of increased magnitude to finally reach the MCE or 150% of the 1994 Northridge 6.7 magnitude seismic event. There was no structural damage and this structure was totally intact and ready for use. Imagine if it were a medical facility or one of our children's schools where the occupants must be kept safe at all costs. ***Sure-Board® is the Best Solution.***

Sure-Board® Series 200S has proven results to make your building better and cost you less.

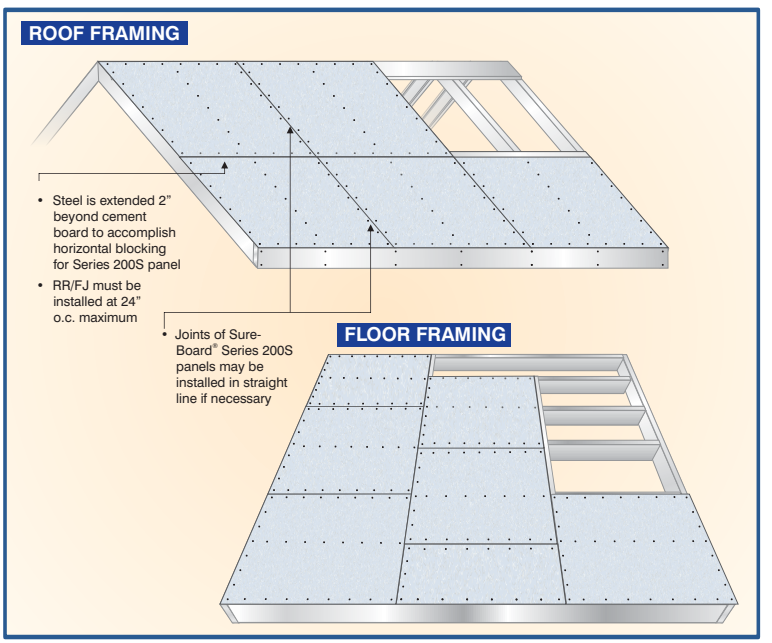
Sure-Board® Series 200S is the non-combustible alternative for any CFS sheathing application both large and small.

Sure-Board® Series 200S is UL approved for all 1 and 2 hour assemblies.

Sure-Board® Series 200S is Approved Nationwide

Sure-Board® Series 200S is certified using all national building codes. That includes the current IBC, IRC, CBC, DSA, GSA, Army Corp of Engineers, City of New York, City of Los Angeles, LARR 26040 to mention a few. IAPMO UES EC-012 and ER-185 Certify our panels performance through our extensive test program, for use on any CFS project Nationwide.

Sure-Board® Series 200S is the best investment in non-combustible sheathing for your building. "OUR STEEL IS THE REAL DEAL."



Sure-Board® Series 200S Floor/Roof Cross Sections

Sure-Board® Series 200S

is available Nationwide through thousands of distributors in all 50 states.

About CEMCO®

California Expanded Metal Products Co. (CEMCO®) is the premier manufacturer of cold-formed steel framing and metal lath products in the Western United States. Its steel-framing product segments include FAS™ head-of-wall products, ProX Header®, Pro X RO-Rough Opening framing system, Sure Span® steel framing floor joist system, Sure-Board® for shear-wall panels, ViperStud® interior stud framing system, metal lath and water management products along with its SFIA Code Certified steel framing products. Founded in 1974, CEMCO is the leader in quality, service, and product development, and offers one of the broadest product lines available in cold-formed steel framing used for both the commercial and residential construction markets.

ALL TABLES INCLUDE ASD DESIGN LOAD CAPACITIES FOR USE WITH ALL ACCEPTED VERSIONS OF THE 2010 AISI LATERAL STANDARDS / 2015 IBC / 2015 IRC / 2013 CBC / AND THE ASCE/SEI 7-10 CODES

SURE-BOARD®
Series 200S Sheathing

IAPMO ES ER-185
LARR #26040
DSA IR A-5

◀STEEL▶
Framing

TABLE 1
NOMINAL DESIGN STRENGTHS FOR SURE-BOARD® SERIES 200S STRUCTURAL PANELS – FLOOR AND ROOF SHEATHING CONTINUOUS OVER TWO OR MORE SPANS

Span Rating, (inches) (o.c.)	Nominal Strength (PSF)	Allowable Strength (ASD) (psf)	Factored Resistance (LRFD) (psf)	Allowable Concentrated Load, LBF
24 maximum	435	215	260	2,000

For **SI:** 1 inch = 25.4 mm, 1 psf = 47.88 Pa, 1 lbf = 4.448 N

[1] Maximum allowable strength for panels supported at 24 inches on center is 100 PSF for a deflection limit of L/360.

[2] Panels are capable of supporting an allowable concentrated load of 2,000 lbs. within the deflection limit of L/360 on properly designed and constructed framing members.

[3] Series 200S panels installed for floors shall include minimum No. 20 gauge (0.033 inch) thick steel sheets. Series 200S panels installed for roofs shall include minimum No. 20 gauge (0.033 inch) thick steel sheets.

SURE-BOARD®
Series 200S Sheathing

IAPMO ES ER-185
LARR #26040
DSA IR A-5

◀STEEL▶
Framing

TABLE 2
NOMINAL SHEAR STRENGTH FOR BLOCKED HORIZONTAL DIAPHRAGMS, LBS/FT SURE-BOARD® SERIES 200S STRUCTURAL PANELS

Screw Spacing, Inches		Nominal	Allowable Strength, (ASD)		Factored Resistance (LRFD)	
Panel Edge	Field	Strength, (Rn)	Seismic	Wind/All Others	Seismic	Wind/All Others
2	6	2,770	1,110	1,380	1,660	1,800
3	6	2,730	1,090	1,360	1,640	1,770
4	6	1,980	790	990	1,190	1,290
6	6	1,320	530	660	790	860

For SI: 1 inch = 25.4 mm, 1 lb/ft = 14.5939 N/mm.

The equation Eq. (1) within the IAPMO Evaluation Report ER-185 shall be used to estimate the mid-span deflection of SURE-BOARD's MgO and fiber-cement simple span diaphragms:

SURE-BOARD®
Series 200S Sheathing

IAPMO ES ER-185
LARR #26040
DSA IR A-5

◀STEEL▶
Framing

TABLE 3
ALLOWABLE WIND UPLIFT LOADS FOR SURE-BOARD® SERIES 200S STRUCTURAL PANELS[1,2]

CFS Specifications				Allowable Wind Uplift, (ASD) (psf)				Allowable Wind Uplift, (ASD) (psf)			
				24 (inch) (o.c.), Joist Spacing				16 (inch) (o.c.), Joist Spacing			
				Screw Size				Screw Size			
Designated Thickness mills	Design Thickness, In.	F_y ksi	F_u ksi	No. 6	No. 8	No. 10	No. 12	No. 6	No. 8	No. 10	No. 12
33	0.0346	33	45	30.5	36.2	41.9	47.6	45.8	54.3	62.9	71.5
43	0.0451	33	45	39.5	47.2	54.6	62.1	59.3	70.7	81.9	93.2
54	0.0566	50	65	63.5	63.5	79.4	79.4	95.3	95.3	119.1	119.1
68	0.0713	50	65	63.5	63.5	79.4	79.4	95.3	95.3	119.1	119.1
97	0.1017	50	65	63.5	63.5	79.4	79.4	95.3	95.3	119.1	119.1
118	0.1242	50	65	63.5	63.5	79.4	79.4	95.3	95.3	119.1	119.1

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psf = 47.88 Pa, 1 psi = 6.89 kPa

[1] Allowable wind uplift based on screw spacings of 6 inches on center maximum at all panel edges and 12 inches on center maximum in the field/interior of the panels.

[2] If field/interior spacing is reduced from 12 inches on center, wind uplift may be proportionally increased.

Sure-Board® Series 200S FLOOR/ROOF Sheathing Information Table

SURE-BOARD® STANDARDS & SPECIFICATIONS:
The Sure-Board® Series 200S Structural Sheathing Panels laminated with water soluble adhesive to 1/2" / 3/4" fiber cement panels listed under ASTM C1325 and others. The steel sheet is 20 gauge (0.033 inch / 0.838 mm) minimum base-metal thickness complying with ASTM A653 CS/GRAD 33 minimum, and ASTM A1003/A1003M. The sheets are provided with a G-40 hot dipped galvanized coating conforming to ASTM A924.

SERIES 200S FLOOR SHEATHING:
3/4" Thick Fiber Cement Sheathing is laminated to 20 gauge (0.033 inch / 0.838 mm) steel sheet for use as typical floor sheathing with framing members at 24" o.c. maximum spacing.

SERIES 200S ROOF SHEATHING:
1/2" Thick Fiber Cement Sheathing is laminated to 20 gauge (0.033 inch / 0.838 mm) steel sheet for use as typical roof sheathing with framing members at 24" o.c. maximum spacing.

Both floor and roof sheathing are manufactured in 48" x 48" panels for easy installation.

FASTENERS SPECIFICATIONS:
Fasteners to attach the Sure-Board® Series 200S panels to CFS members are self drilling/self tapping pilot point bugle head screws, #8 x 1 5/8" long winged driller by grabber super drive LOX drive screws or equal. Screws must have cutting nubs under screw head to seat into fiber cement sheathing properly.

DESIGN OF FLOOR/ROOF SYSTEM:
All floor and roof members and the installation of these members are responsibility of EOR and contractors.

Sure-Board®
IAPMO ES ER-185 Series 200S

CEMCO™
Expanding Your Solutions
www.cemcosteel.com

Visit www.sureboard.com and www.floorsheathing.com

Technical Support:
support@sureboard.com
Toll Free: (866) 469-7432

Denver Manufacturing Facility
490 Osage Street • Denver, CO 80204
(303) 572-3626 • Fax (303) 572-3627

Corporate Offices & Main Production Plant
263 N. Covina Lane • City of Industry, CA 91744
(800) 775-2362 • Fax (626) 330-7598

Northern California Manufacturing Facility
1001-A Pittsburg Antioch Hwy. • Pittsburg, CA 94565
(925) 473-9340 • Fax (925) 473-9341

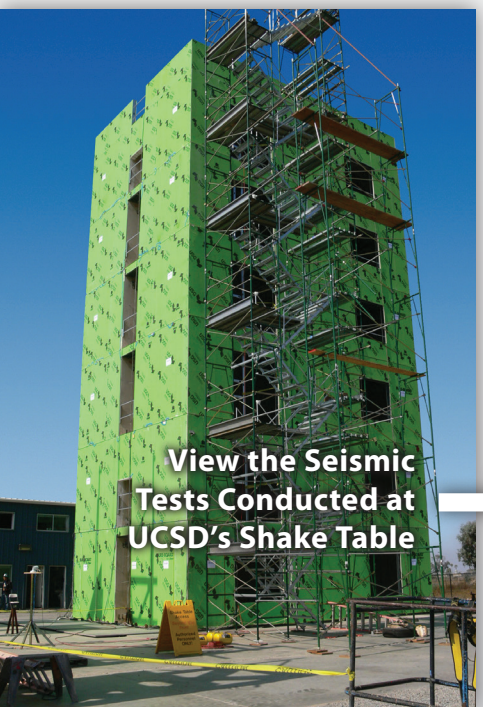
REV. 8/2017

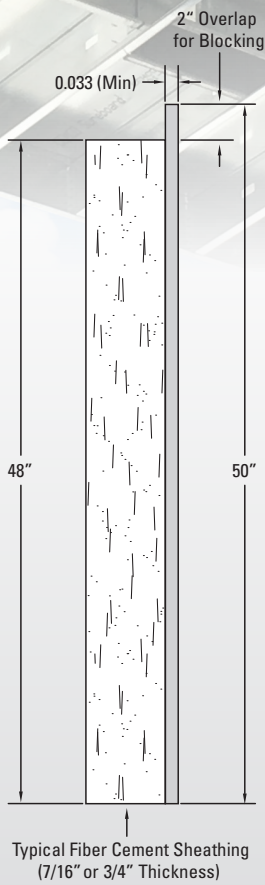
Expanding Your Structural Floor and Roof Sheathing Solutions …

CEMCO™
Expanding Your Solutions

P R E S E N T S

NON-COMBUSTIBLE
SURE-BOARD®
SERIES 200S-F/200S-P
FLOOR/ROOF SHEATHING





CEMCO® introduces our newest innovation, **Sure-Board® Series 200S-F (FLOOR & FLAT-ROOF) and Series 200S-P (PITCHED ROOF)** sheathing products. Series 200S-F/200S-P panels are available as follows:

Series 200S-F (FLOOR & FLAT-ROOF):

- Size: 3/4" x 48" x 48"
- Steel thickness: 33 mil

Series 200S-P (PITCHED ROOF):

- Size: 7/16" x 48"x 48"
- Steel thickness: 33 mil

Benefits of Sure-Board® Series 200S-F/200S-P floor and roof sheathing products include:

- Structural sheathing panels attachment to cold-formed steel framed floor/roof systems by screws.
- Full 2" steel overlap eliminating the need for horizontal blocking at joints.
- 48" x 48" panels require single installer.
- Less expensive to install than other non-combustible sheathing options.
- Meet or exceed 2006, 2009, 2012, & 2015 IBC and IRC requirements—IAPMO ER 185.
- Meet or exceed 2013 California Building and California Residential Codes—IAPMO ER 185.
- DSA Approved IR A-5.
- UL Fire Test for 1 and 2-hour assembly-UL H503.
- Several sound tested assemblies each exceeding an STC of 50.

Project Profile

CEMCO LIGHT GAUGE STEEL FRAMING

Project Name:
UCSD Shake Table Test

Project Location:
University of California at San Diego

Construction Date:
Now

Completion Date:
June 2016

Project Director:
Dr. Tara Hutchinson, P.E., PhD.

Framing Contractors:
SureBoard for Shear
SWS Panels and Truss
DPR Construction
Burch Construction

Distributor:
L & W Supply

Structure:
6 Story CFS.

CEMCO® Participates in UCSD Shake Table Test

CEMCO along with 10 other sponsors, has partnered up with the University of California—San Diego Engineering Department to conduct seismic and thermal tests on a 6-story cold-formed steel (CFS) framed structure at the UCSD Large High Performance Outdoor Shake Table. Their home page can be viewed at http://nheri.ucsd.edu. Other sponsors and contributors include the Department of Housing and Urban Development (HUD), California Seismic Safety Commission, SureBoard® for Shear, USG®, SWS Panels and Truss, DCI Engineering, and DPR Construction. For a full list of contributors, visit http://cfs-research.ucsd.edu/isc.html.

The project is led by Dr. Tara C. Hutchinson, P.E., PhD., Professor at the Department of Structural Engineering at the University of California, San Diego. The purpose of this experimental program is to evaluate earthquake and post-earthquake fire performance of a mid-rise CFS formed building. Dr. Hutchinson and her team of structural engineering faculty, graduate students, and researchers are enthusiastic about the potential of this 6-story CFS framed structure to withstand full-scale earthquakes and live thermal tests that will measure fire-spread between floors. The unique CFS panelized used to construct this building has the potential for providing a cost-effective solution for the ever-increasing demand of multi-story residential housing structures in moderate to high seismic zones.

With the building near completion, seismic testing is slated to begin in early June. The project itself can be viewed via live streaming video on the Network for Earthquake Engineering Simulation (NEES) website at http:// nees.ucsd.edu/video/. For more information about this project or other UCSD projects please contact Ioana Patringenaru—Public Information Officer at the UC San Diego Jacobs School of Engineering at ipatrin@ucsd.edu

About CEMCO®

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Design No. H503
BXUV.H503
Fire-resistance Ratings - ANSI/UL 263

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263
BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

Design No. H503
October 25, 2016
Unrestrained Assembly Rating — 1, 1-1/2, or 2 Hr. (See Items 4, 5, and 6)

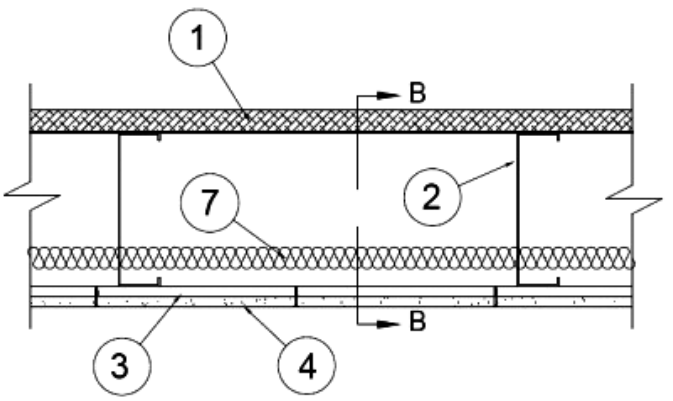
This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7

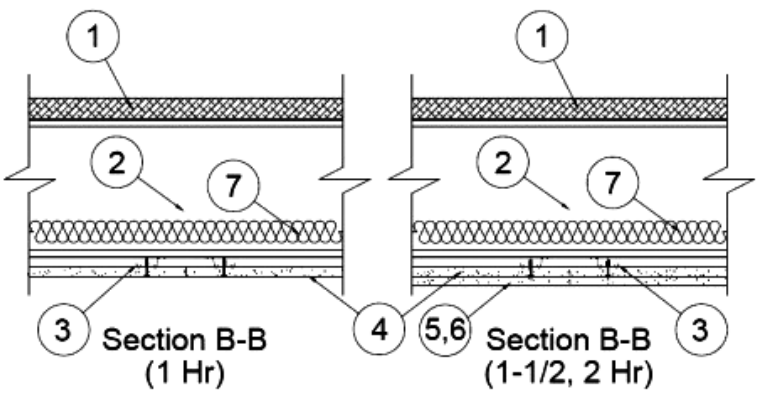
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

1. Units, Partition Panel* — Steel faced floor panels. Panels secured to top chord of steel joists with #8, 1-5/8 in. cement board Grabber screws spaced 6 in. OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Sure-Board® Series 200S

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Sure-Board® Series 200S





2. Steel Joists — C-shaped, galvanized steel sections, 10 in. min depth with 2 in. min. flanges and 5/8 in. min. stiffening flanges. The web of each joist may be provided with maximum 1-1/2 in. high by 3-1/2 in. long knockouts at the joist mid-depth. Knockouts spaced 24 in. OC minimum. The minimum coated steel thickness shall be 0.055 in. Joists spaced max 24 in. OC. At joist rim splices bearing on supports, joists rims are connected using an overlapping section of a 20 in. long splice plate (a joist piece), with four 3/4 in. long self-drilling #10-16 TEK screws to each rim piece. Joists secured to joist rims with three 3/4 in. TEK screws secured through both legs of minimum 2 in. by 2 in. by 6 in. long steel angles.

2A. Bridging — (Not Shown) — For use with Item 2 — Location of lateral bracing to be specified on truss engineering. 10 in. deep section of joist (Item 2) with notches cut for securement to joists (Item 2). Bridging secured with three 3/4 in. TEK screws secured through both legs of minimum 2 in. by 2 in. by 6 in. long steel angles.

2B. Structural Steel Members* — JoistRite channel-shaped joists, min 10. deep with min 2 in. wide flanges and 3/4 in. long stiffening flanges. JoistRite rim track, min 10 in. deep with min 1-1/2 in. top flange and min 2-5/16 in. bottom flange. The joists and rim tracks are fabricated from min 16 MSG galv steel. Joists spaced max 24 in. OC. Floor joists attached to rim track using channel-shaped steel web stiffeners. At rim track splices bearing on supports, rim tracks are connected using an overlapping section of a 12 in. long splice plate, with four 3/4 in. long self-drilling #10 screws to each rim piece.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type JR JoistRite floor joists, Type JT JoistRite rim track

2B1. Blocking & Bridging — Installed before construction loads are applied. The blocking consists of JoistRite solid blocking placed between each joist. Blocking should be installed max. 7 ft. OC along the joist length. Blocking attached to the top and bottom joist flanges with one #10 3/4 in. long self-drilling screw at each end tab of blocking. Blocking is fabricated from min 18 MSG galv steel, min 1-15/16 in. flanges, having the same depth as the joists. In addition, bridging consists of 1/2 in. by 1-1/2 in. cold-rolled channel, min No. 16 GA, attached to the bottom flanges of the joists and blocking. Cold-rolled channel attached to each blocking bottom flange with four #10 3/4 in. long self-drilling screws and to joist bottom flange with two screws.

2B2. Web Stiffeners — Not Shown — JoistRite web stiffeners, min 3-5/8 in. wide with min 9/16 in. flange and min 1-1/4 in. flange, having the same depth as the joists. Fabricated from min 16 MSG galv steel. Secured to each joist and track with #10 3/4 in. long self-drilling screws.
2C. Structural Steel Members* — The proprietary joists are channel-shaped, 10 in. min depth. Joists are fabricated from min No. 16 MSG galv steel. Joists spaced max 24 in. OC. Joists attached to rim joist with three #10 3/4 in. long self-drilling screws at the rim track clip to the outside of the web joist, and a #10 1/2 in. long screw through the top and bottom flange of the joists to the top and bottom flange of the rim track. At rim joist splices bearing on supports, rim joists are connected using an overlapping section of a 12 in. long splice plate (a joist piece), with six 3/4 in. long self-drilling #10 screws to each rim piece.
CALIFORNIA EXPANDED METAL PRODUCTS CO — Type SSCJ floor joists, SSRT rim joists

2D. Joist Bridging — Not Shown — Installed immediately after joists are erected and before construction loads are applied. The structural bridging, Type CEMCO Sure Bridging, consisting of No. 18 MSG galv steel, 2-1/2 in. wide by 25-1/2 in. long with 1-5/16 in. long legs structural bridging staggered between the steel joists and attached to the bottom joist flange with two #10 1/2 in. long self-drilling screws at each end tab of bridging. Solid bridging consisting of cut to length joist sections placed between outer joists and at center joist with 8 ft OC max spacing. Solid bridging is seated in the structural bridging and is screw-attached at joist web using Type CEMCO Sure-Support Clips (1-1/2 in. by 1-1/2 in. by 7 in. long, 16 MSG, min 50 ksi support clip) with three #10 3/4 in. long self-drilling screws per leg on one side and the other side with Type CEMCO Sure-Support Clips (4 in. by 1-1/2 in. by 7 in. long, 16 MSG, min 50 ksi support clip) with three #10 3/4 in. long self-drilling screws per leg.

3. Resilient Channels — 1/2 in. deep, min. 2 in. wide formed of 25 MSG galv steel with a 1/2 in. fastening surface, spaced 12 in. OC perpendicular to joists. Channel splices overlapped 3 in. beneath steel joists. Channels secured to each joist with 1/2 in. Type S-12 pan head screws. Channels oriented opposite at wallboard butt joints (spaced 6 in. OC) as shown in the above illustration.

4. Gypsum Board* — For 1 hour rating and base layer of 2 hour system — Single layer of nom 5/8 in. thick, 48 in. wide gypsum panels installed with long dimension perpendicular to resilient channels and side joints centered between joists. Gypsum panels secured with 1-1/4 in. long Type S bugle-head screws. Screws provided 1-1/2 and 4 in. and from side edges of the board 8 in. OC in the field. Butt joints of adjacent pieces offset minimum 3 ft.
NATIONAL GYPSUM CO — Type FSW-C

5. Gypsum Board* — For 1-1/2 Hour Rating — Two layers of nom 5/8 in. thick, 48 in. wide gypsum panels. Base layer installed per Item 4. Face layer installed with long dimension perpendicular to resilient channels and side joints centered between joists, staggered 24 in. OC from base layer. Gypsum panels secured with 1-5/8 in. long Type S bugle-head screws. Screws provided 1-1/2 and 4 in. and from side edges of the board 8 in. OC in the field. Butt joints of adjacent pieces offset minimum 3 ft.
Any 5/8 in. thick, 4 ft. wide, Gypsum Board UL Classified for Fire Resistance (CKNX) eligible for use in Design Nos. U305 and L501.

6. Gypsum Board* — For 2 Hour Rating — Two layers of nom 5/8 in. thick, 48 in. wide gypsum panels. Base layer installed with long dimension perpendicular to resilient channels and side joints centered between joists. Gypsum panels secured with 1-1/4 in. long Type S bugle-head screws. Screws provided 1-1/2 and 4 in. and from side edges of the board 8 in. OC in the field. Butt joints of adjacent pieces offset minimum 4 ft. Face layer installed with long dimension perpendicular to resilient channels and side joints centered between joists, staggered 24 in. OC from base layer. Gypsum panels secured with 1-5/8 in. long Type S bugle-head screws. Screws provided 1-1/2 and 4 in. and from side edges of the board 8 in. OC in the field. Butt joints of adjacent pieces offset minimum 4 ft. Butt joints of face layer offset minimum 2 ft. from butt joints of base layer.
NATIONAL GYPSUM CO — Type FSW-C

7. Batts and Blankets* — Mineral wool or glass fiber insulation, min 6 in. thick, bearing the UL Classification Marking for Surface Burning Characteristics. Insulation fitted in the concealed space, draped over the resilient channels.

8. Joint System — Not Shown — Vinyl, dry or premixed joint compound, applied in two coats to joints and screw heads; paper tape, 2 in. wide, embedded in first layer of compound over all joints.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

DCI ENGINEERS
www.dci-engineers.com
Seattle
Portland
Spokane
San Diego
Austin
Irvine
San Francisco
Anchorage
Los Angeles

October 26, 2016

Peng Li, S.E. CASp.
Senior Engineer
Department of Planning, Building, and Code Enforcement
City of San Jose, California

Re: UCSD Shake Table Test

Dear Sir:

DCI Engineers recently assisted UCSD with a shake table test for a CFS 6 story building. The test was intended to show how this type of building would perform during a design level seismic event. The following is a description of the building and how it was developed.

The floor plan was developed to represent a typical residential double loaded corridor layout. It was sized to be as large as possible and still fit on the UCSD shake table. The structure was ballooned framed with cold formed steel (CFS) walls and floors. The lateral system consisted of Sure-Board Series 200S diaphragms spanning between Sure-Board series 200 shearwalls. A standard Zone 4 tie-down system was utilized at the ends of each shearwall along with standard CFS compression studs. Standard gypsum board was provided on the non-shear walls. In order to capture all of the mass that would be typical for a building like this, steel mass plates were added to all of the floor levels and the roof. Each of the mass plates was bolted down at only two locations so that their mass could be captured in the shake table test but they would not add additional strength or stiffness to the floor diaphragms. These plates were sized to represent mass that would occur in a typical fully finished building from floor toppings, finishes, exterior stucco, etc. These finishes were not provided on the test building both for ease of construction and to provide better clarity on the behavior of the structural systems.

The final mass of the building and seismic forces were independently checked by UCSD. The mass was also confirmed by reviewing the shipping weight for all of the CFS.

The buildings lateral design was based 2012/2015 CBC design requirements for the materials used and the USGS ground motion for downtown Los Angeles. The Sure-Board series 200 screw attachment and the rod tie-down system were designed to resist this force based on code allowable values. The CFS compression studs and rods at the ends of the shearwalls were designed for omega level forces as required by ASCE 7-10 for an R=6.5.

The building was subjected to multiple shake tests. The test runs were 25%, 50%, 100% and 150% of design level events. A ground motion was selected which would represent an earthquake typically found on a fault in California. The earthquake was scaled to represent the above indicated percentages. The 150% ground motion was the maximum and represented the earthquake that would be the design basis under the current CBC.

After each earthquake the building was inspected for damage. All cracks and permanent wall displacements were noted. The damage for the 150% earthquake was very minor and was much less then what we would be predicted by the current CBC. Damage included some cracking of exterior walls and minor buckling of rim tracks. This is particularly interesting since the building was subjected to multiple lower level earthquakes before being subjected to the design level event.

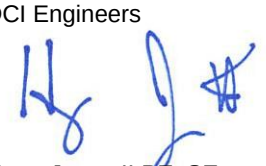
It is DCI's opinion that the high performance was related to the following two key factors:

1. The balloon framing for the walls provides a more direct load path for the building shear to transfer loads down to the ground (shake table).

2. The compression post and rod tie-down systems seems to provide a high degree of seismic resilience, which is not adequately incorporated in the determination of the R-factor of 6.5. This is particularly true because the compression post and rods are designed for omega level forces. While this force amplification is a somewhat arbitrary code requirement and not based on explicit research, it does seems to reduce the level of damage you might see in a typical building at the ends of the shearwalls.

Based on the positive results of the shake table test DCI would have no concerns designing CFS buildings with Sureboard shearwalls up to seven or even eight stories.

Sincerely,
DCI Engineers



Harry Jones II PE, SE
Principal