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Initial Approval
June, 2016

Re-Approved

See all **Pei ES** Listings at: www.p-e-i.com

Report Owner
Evolutiondeck Inc.

25 Industrial Court B
Sault Ste Marie, ON, Canada P6B5Z9

Product
SPX Structural Panel

Approved Manufacturing Locations
Approval Pending Initial Inspection

Evaluation Report Information
www.paverdeck.com www.spxwall.com
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General Details

Evolutiondeck Inc. SPX Structural Panel is manufactured in Newmarket, Ontario, Canada. The manufacturing facility has an approved Quality Control Manual used in the manufacturing of this product. Evolutiondeck Inc. has an Evaluation and Follow-up Service Agreement with **Pei Evaluation Service (Pei ES)** / Inspection Agreement with **Progressive Engineering Inc. (Pei)** and is audited periodically by **Pei**.

Product Description

The **SPX Structural Panel** is comprised of a web section and integrated diaphragm section. Axial, bending, combined axial/bending, and lateral (shearwall/diaphragm) loads may be resisted by the structural system. Panels are manufactured as either a field panel or an end panel with an available thickness of 0.043in (18ga) and 0.054 (16ga) as shown in Figure 1. Both the end panels and field panels maintain equivalent load rated performance.

SPX System components are manufactured from sheet steel conforming to ASTM A1003/A1003M with a minimum yield strength of 50ksi and G90 (Z275) galvanized coating weight conforming to ASTM A653/A653M. Panel components are assembled using all-weather #12 x 1" self-drilling screws as described in ICC-ES ESR-1976 (Tek), ESR-3332 (Dril-Flex), ESR-1408 (Pro-Twist), ESR-2618 (Grabber), or equivalent. Powder-actuated mechanical fasteners with an electroplated zinc coating conforming to ASTM B 633, SC 1, Type III, such as Hilti X-U-19 P8, may be used for connections made to hot-rolled steel beams. All SPX to beam connections and alternative fasteners shall be verified by the designer of record or building official on a case-by-case basis.

General Product Use

1. Panels shall be assembled in a nested arrangement where the diaphragm free edge is fastened to the shoulder flange of the preceding panel as indicated in the various Evolutiondeck Installation Guidelines. Refer to the Evolutiondeck Installation Guidelines and Figure 2 for additional requirements/details.
2. Starter c-channel as shown in Figure 3 must be manufactured to SSMA 600S162-054 from cold-formed steel conforming to AISI S100, or equivalent. Steel must conform to ASTM A1003/A1003M with a minimum yield strength of 50ksi and G90 (Z275) galvanized coating weight conforming to ASTM A653/A653M.
3. Joist blocking is optional to increase rigidity and may be installed every other bay joist mid-span for joist spans greater than 10ft. Joist blocking members must be fabricated from cold-formed steel c-channels conforming to AISI S100 and fastened to the panel webs using angle brackets.
4. Beams and ledger may be selected from SSMA galvanized CFS steel, hot-rolled structural steel, or wood beams for exterior applications (with intermediate isolation membrane) to be sized by a qualified designer.
5. SPX Panels may be installed as a component of an exterior deck system meeting the requirements of the International Building Code (IBC) and International Residential Code (IRC) (2009, 2012, & 2015 Editions).
6. SPX Panels may be installed as a component of a floor or roof system supporting vertical loads and in-plane diaphragm shear. The decks comply with the requirements of IBC Section 2210.1 and ANSI/SDI C-2011.
7. SPX Panels may be installed as a component of a wall system supporting vertical loads and in-plane shearwall loading. The walls comply with the requirements of IBC Section 2210.1 and ANSI/SDI C-2011. Wall caps must meet the same steel and thickness specifications as the SPX Panels and starter channel.
8. Bundles labeled in accordance with this PER provide proof of traceability required to conform to Table 1704.3, Item 3 of the 2009 IBC, Table 1705.2.2, Item 1 of the 2012 IBC, and Section 1705.2.2 of the 2015 IBC.
9. Structural walls and decks constructed using SPX Panels must be designed to meet the anchorage requirements or be self-supporting in accordance with IBC Section 1604.8. Anchorage shall be verified by a registered design professional and/or the building official as applicable.
10. Use of SPX Panels should be avoided in exterior oceanfront applications within 300-feet of the shoreline, conditions with onshore winds and unshielded exposure, and any other highly corrosive environment as determined by the Building Official. Where a highly corrosive environment is unavoidable, anode protection, as deemed adequate by the Building Official, may be used.

Code & Standard Compliance

2009 International Building Code		2012 International Building Code		2015 International Building Code	
Section 104.11	Table 1704.3, Item 3	Section 104.11	Table 1705.2.2, Item 1	Section 104.11	Section 1705.2.2
Section 2209.1	Section 2210.1	Section 2210	Section 2211.1	Section 2210	Section 2211.1
Section 2210.4	Section 2210.5	Section 2211.4	Section 2211.5	Section 2211.4	Section 2211.5
Section 2210.6		Section 2211.6		Section 2211.6	
2009 International Residential Code		2012 International Residential Code		2015 International Residential Code	
Section R104.11	Section R505.2.1	Section R104.11	Section R505.2.1	Section R104.11	Section R505.2.1
Section R505.2.2		Section R505.2.2		Section R505.2.4	

Performance Characteristics

Table 1 - Standard Panel Properties^{1,2,3}

Panel Property	SPX 600S1200-043	SPX 600S1200-054
Min. Design Thickness (in)	0.043	0.054
Min. Yield Strength (ksi)	50	50
Moment of Inertia, I_{xx} (in ⁴)	5.15	7.24
Zcg (in)	4.78	4.7
Moment of Inertia, I_{zz} (in ⁴)	15.77	21.5
Allowable Axial Column Strength (kip/ft)	13.87	19.47
Allowable Strength in Out-of-Plane Bending (kip-in)	25.64	33.63
Allowable Strength in In-Plane Bending (kip-in)	29.79	42.31

Notes:

1. Allowable axial column, out-of-plane bending, and in-plane bending strengths based on Direct Strip Method and local-global buckling limits; $\Omega = 2.0$. See Figure 4 for loading details.
2. Panel section properties and capacity based on a minimum design thickness and uniform cross section without consideration of panel stiffening elements.
3. Combined biaxial bending and compression shall be analyzed by an licensed design professional in accordance with AISI S100-07 Section C5.2. It shall be conservative to take $C_m = 1.0$.

Table 2 - SPX 600S1200-054 Span Chart^{2,3,4}

Max. Clear Span b/w Supports (ft)	10	12
Max. Total Uniform Load ¹ (psf)	222	156

Notes:

1. Uniform load shall be compared to ASCE 7 and/or IBC Allowable Strength Design (ASD) Load Combinations.
2. Interpolation is permitted between tabulated clear spans. Spans over 12-ft are not permitted.
3. Structural element may be cantilevered beyond the tabulated clear span a maximum of 3-ft. Non-uniform or concentrated loads at the cantilever shall reviewed by the designer of record or building official on a case-by-case basis.
4. Residential decks (One- and Two-Family Dwellings) shall be limited to a maximum span of 12-ft. All other decks shall be limited to a maximum span of 10-ft.

Table 3a - SPX 600S1200-054 Allowable Diaphragm Loading

Panel Length (ft)	10	12	14
Max. Diaphragm Uniform Loading - Panel Only (plf)	276	192	132
Max. Diaphragm Uniform Loading - Standard Fastener Strength & Spacing ² (plf)	394	394	394
Single Span Support Reaction ³ (lbs)	1380	1152	924

Notes:

1. Diaphragm loading conservatively based upon the lower of the individual panel in-plane bending capacity and the fastener shear capacity between panels. Loading applied to the longitudinal axis of the panel shall be carried to the lateral force resisting system by means of laterally loaded beam elements only. See Figure 5 for more details.
2. Fastener values are based upon a 12-in o.c. spacing of all-weather #12 x 1" self-drilling screws as described in ICC-ES ESR-1976 (Tek), ESR-3332 (Dril-Flex), ESR-1408 (Pro-Twist), ESR-2618 (Grabber), or equivalent.
3. Single span support reaction shall be doubled where two single spans terminate at a single lateral force resisting system support. Connection design at support shall be verified on a case-by-case basis by the designer of record.

Table 3b - SPX 600S1200-043 Allowable Diaphragm Loading

Panel Length (ft)	10	12	14
Max. Diaphragm Uniform Loading - Panel Only (plf)	198	138	102
Max. Diaphragm Uniform Loading - Standard Fastener Strength & Spacing ² (plf)	280	280	280
Single Span Support Reaction ³ (lbs)	990	828	714

Notes:

1. Diaphragm loading conservatively based upon the lower of the individual panel in-plane bending capacity and the fastener shear capacity between panels. Loading applied to the longitudinal axis of the panel shall be carried to the lateral force resisting system by means of laterally loaded beam elements only. See Figure 5 for more details.
2. Fastener values are based upon a 12-in o.c. spacing of all-weather #12 x 1" self-drilling screws as described in ICC-ES ESR-1976 (Tek), ESR-3332 (Dril-Flex), ESR-1408 (Pro-Twist), ESR-2618 (Grabber), or equivalent.
3. Single span support reaction shall be doubled where two single spans terminate at a single lateral force resisting system support. Connection design at support shall be verified on a case-by-case basis by the designer of record.

Table 4a - Allowable Shearwall Strength (plf) for Wind & Seismic (Wood Structural Panel & Steel Sheet)^{1,2,3}

Sheathing Type	Maximum Aspect Ratio	Wind				Seismic			
		Fastener Spacing at Panel Edges (in)				Fastener Spacing at Panel Edges (in)			
		6	4	3	2	6	4	3	2
15/32" Structural 1 (4-ply)	2:1	532.5	--	--	--	356	532	710	876
	4:1	--	--	--	--	156	198	--	--
7/16" Rated OSB	2:1	455	705	867.5	955	330	494	618	824
	4:1	--	256.25	356.25	456.25	165	247	309	412
0.018" Steel Sheet	2:1	242.5	--	--	--	156	--	--	--
0.027" Steel Sheet	4:1	--	500	542.5	585	--	400	434	468

Notes:

1. Wind and seismic shear wall allowable (ASD) capacities are calculated in accordance with AISI S213-07 Section C2 for segmented shear walls. Wind capacities utilize a safety factor of $\Omega=2.0$. Seismic capacities utilize a safety factor of $\Omega=2.5$.
2. All fasteners shall be minimum #8 framing screws in accordance with ASTM C1513. Fasteners shall be located at least 3/8" from panel edges and spaced at 12" o.c. in the field of panel.
3. Values are valid only if panels are installed on the open side of the wall assembly. See Figure 2 and Figure 6 for additional details.

Table 4b - Allowable Shearwall Strength (plf) for Wind & Seismic (Gypsum Board or Fiberboard)^{1,2,3}

Sheathing Type	Maximum Aspect Ratio	Wind							Seismic						
		Fastener Spacing at Panel Edges/Field (in)							Fastener Spacing at Panel Edges/Field (in)						
		8/12	4/12	7/7	4/6	3/6	2/6	4/4	8/13	4/13	7/8	4/7	3/7	2/7	4/5
1/2" Gypsum Board	2:1	115	147.5	145	--	--	--	212.5	92	118	116	--	--	--	170
1/2" Fiberboard	1:1	--	--	--	212.5	307.5	335	--	--	--	--	170	246	268	--

Notes:

1. Wind and seismic shear wall allowable (ASD) capacities are calculated in accordance with AISI S213-07 Section C2 for segmented shear walls. Wind capacities utilize a safety factor of $\Omega=2.0$. Seismic capacities utilize a safety factor of $\Omega=2.5$.
2. All fasteners shall be minimum #8 framing screws in accordance with ASTM C1513. Fasteners shall be located at least 3/8" from panel edges and spaced at 12" o.c. in the field of panel.
3. Values are valid only if panels are installed on the open side of the wall assembly. See Figure 2 and Figure 6 for additional details.

Product Labeling

Each **SPX Structural Panel** shipment bundle, that is covered by this Product Evaluation Report, must have a label attached with at least the following information:

1. Manufacturer's Name and Address
2. Product name
3. Plant identifier & date code
4. This **PER** Number and **Pei Evaluation Service** Logo

Each **SPX Structural Panel** piece, that is covered by this Product Evaluation Report, must also be individually labeled with at least the following information:

1. Manufacturer's Identification
2. Minimum Base Steel Thickness, in (mm)
3. Minimum Coating Designation
4. Minimum Yield Strength, ksi (MPa)

Acceptable Evaluation Marks



Product Documentation

A Quality Assurance Manual - Dated: January 1, 2015.

PAVERDECK Installation Manual

Various Engineering Calculations for Axial Compression, Out-of-Plane Bending, and In-Plane Bending

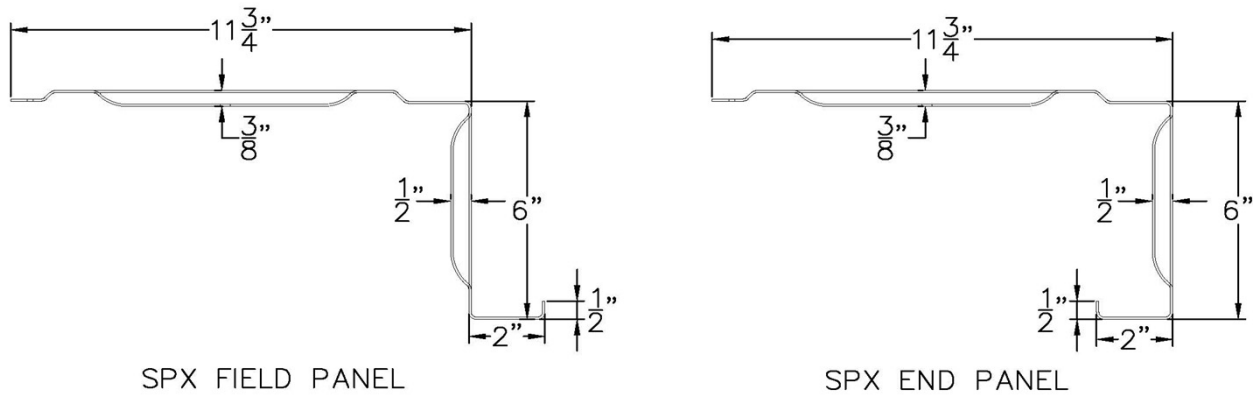


Figure 1 - SPX Structural Panel Cross Sections

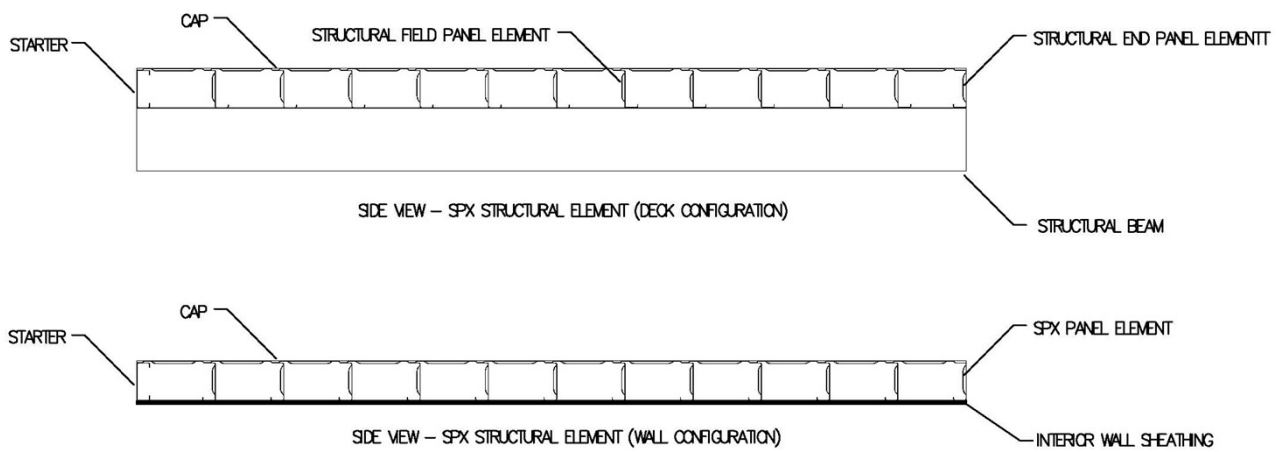


Figure 2 - SPX Structural Panel Assembly Cross Sections

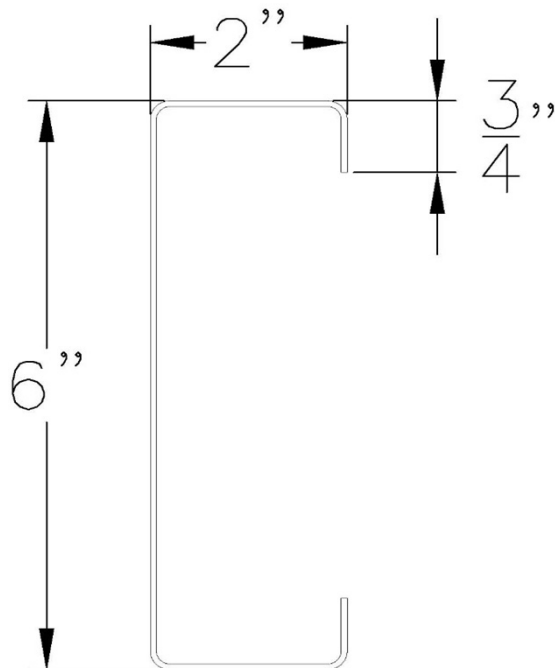


Figure 3 - SPX Starter Channel

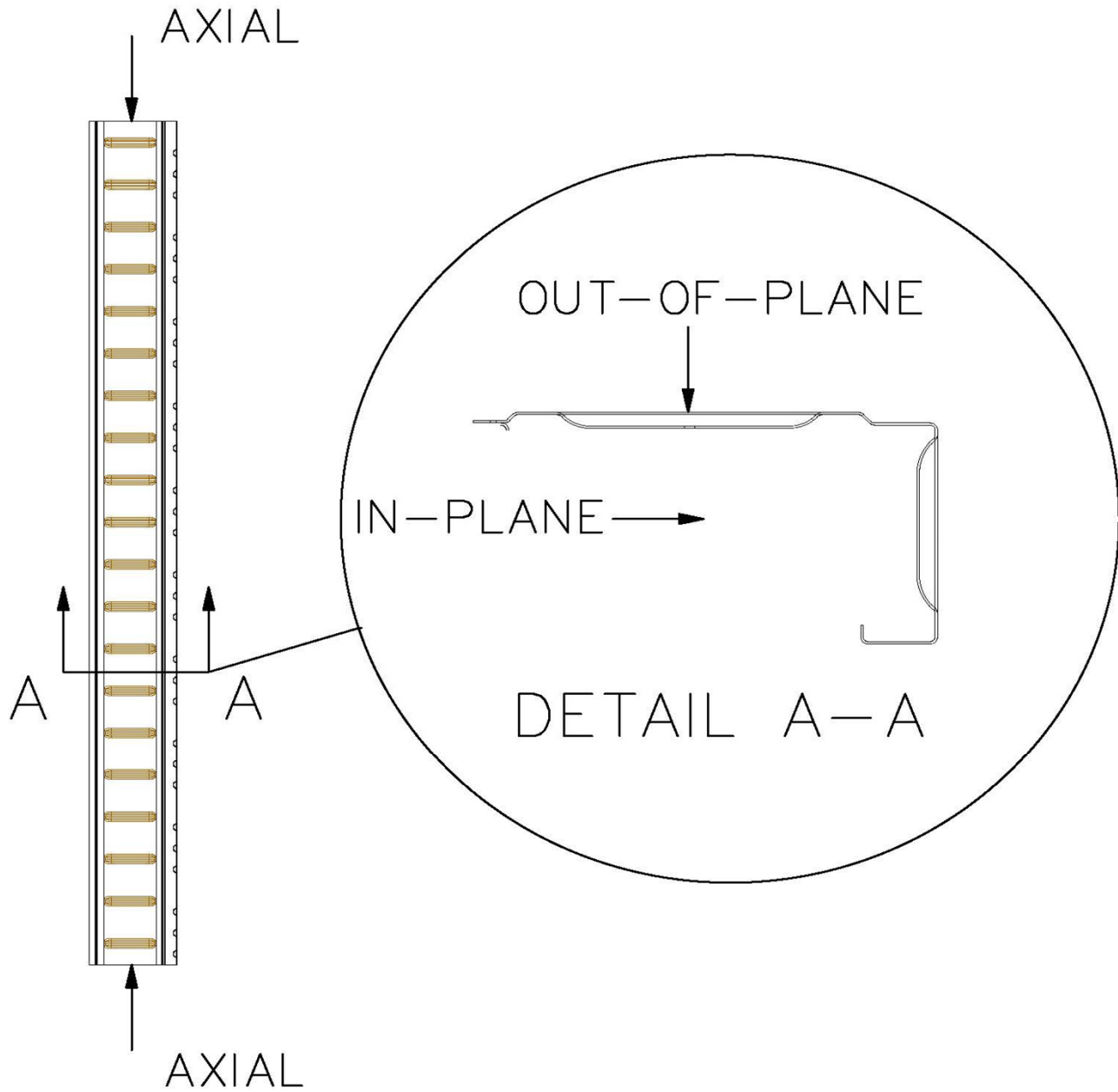


Figure 4 - SPX Structural Panel Loading Directions (Ref. Table 1)

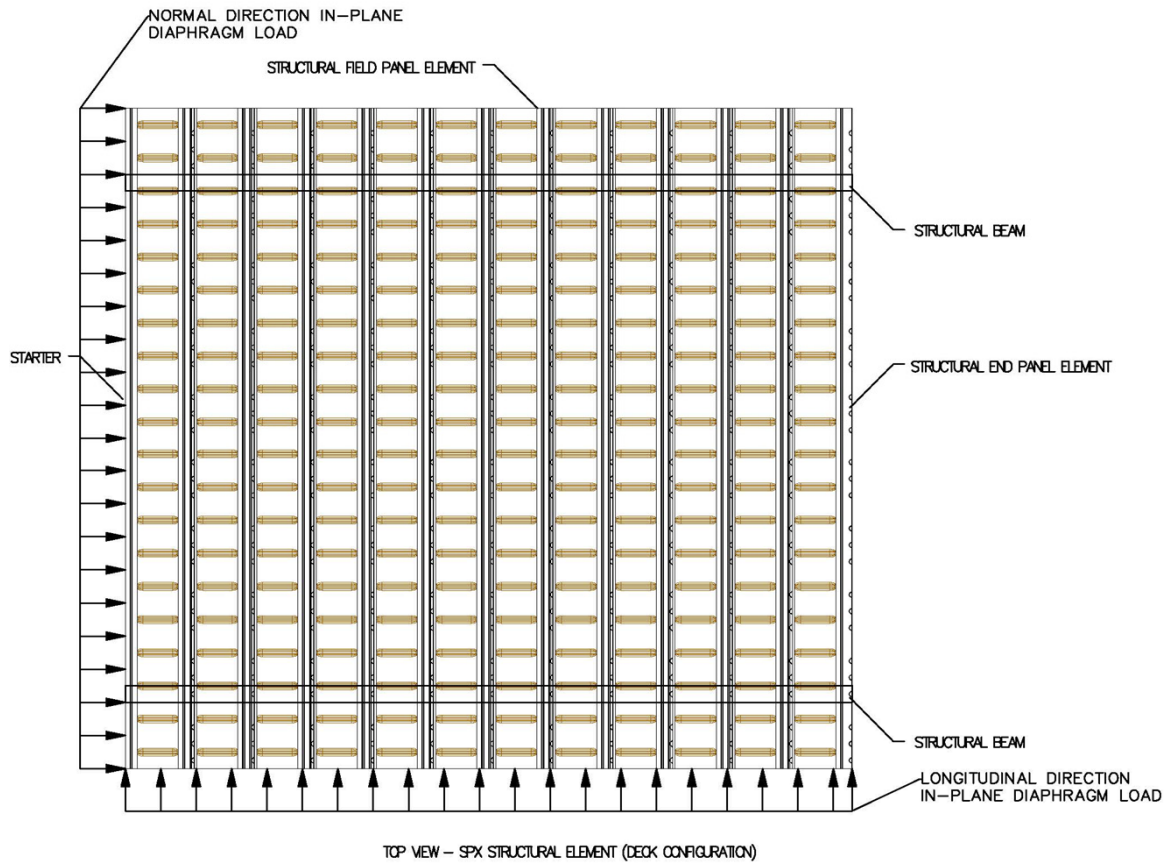


Figure 5 - SPX Structural Panel Deck Configuration & Diaphragm Loading

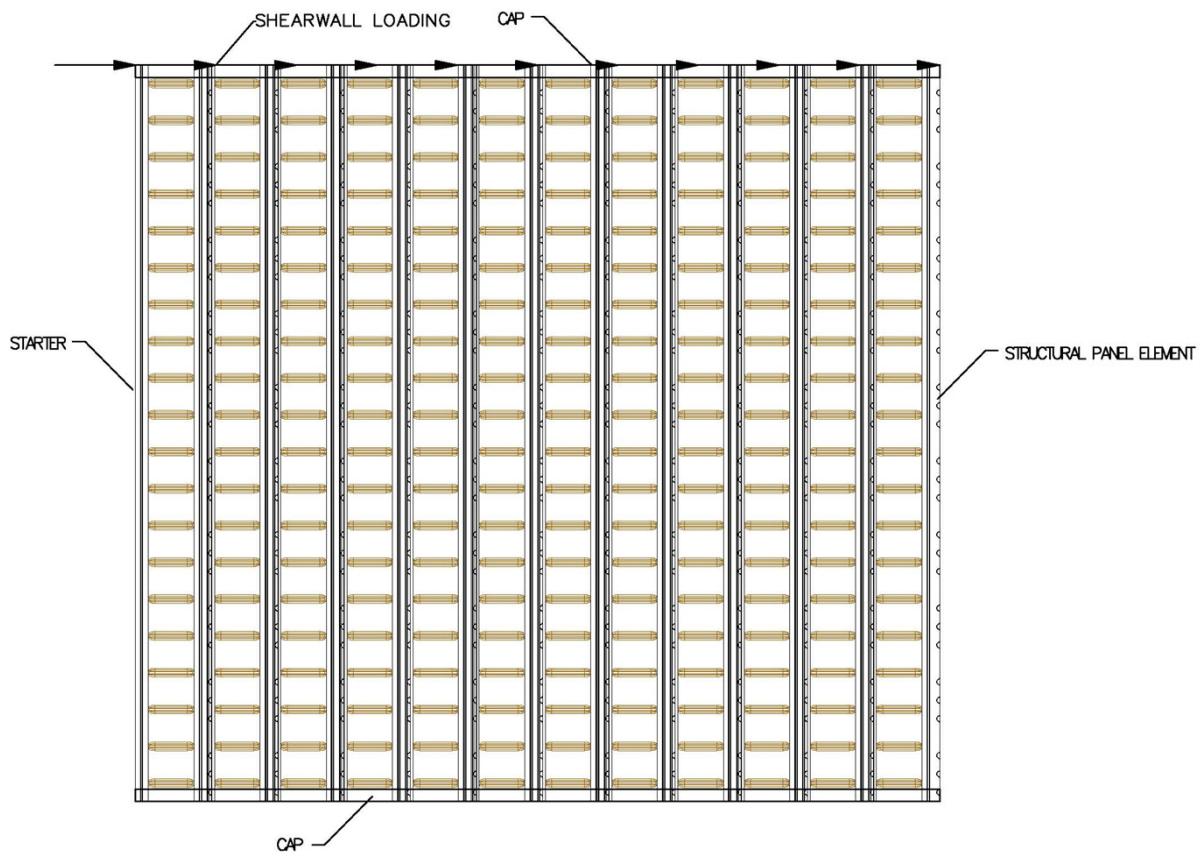


Figure 6 - SPX Structural Panel Wall Configuration & Shearwall Loading