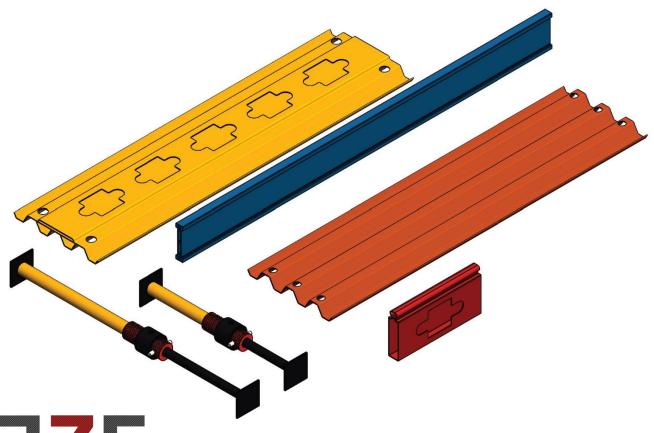


EZE SHORING SYSTEM

TABULATED DATA Effective July 12th, 2024



37E SHORING

Pacific S-ORING

Quality Driven, Lead Time Focused

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS

1325 COLLEGE AVE., SANTA ROSA, CA 95404 (707) 528-4503 FAX (707) 528-4505



Signed 7/12/2024

JMT#: 17801-1



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Description

EZE Shoring is a lightweight and easy to assemble system that uses composite struts where necessary to make it 100% non-conductive. The versatile, high performance composite shoring system is the safest, easiest, and lightest trench lining product available. Steel struts can also be utilized in the system as an alternative option if conductivity is not a critical factor.

EZE Shoring's light weight, versatility, and nonconductive nature make it the ideal solution for both:

- The installation of underground utilities such as gas, water, and electricity.
- Applications in Trench Rescue where speed of installation is critical.

EZE Shoring offers simplicity, with no pins, clips, slings, pumps, or hydraulics to worry about. Each component weighs less than 25 kg and can be easily identified. Easily fitting into a 'transit van' or the back of a "pickup truck" for rapid deployment if required,

The system is very flexible in accommodating different depths and trench lengths and can be used in multisided configurations.

EZE Shoring can be utilized in excavations 2520 mm deep and in widths up to 1741 mm wide and up to 2500 mm wide with metallic props if required.

EZE Shoring is patent and design protected in the UK and Internationally.



General Information for use of EZE Shoring Systems

1. The EZE Shoring System tabulated here is based on requirements of Federal OSHA 29CFR, Part 1926, Subpart P-Excavations, and Trenches.

1926.652(c)(2)-Option (2) - Designs Using Manufacturer's Tabulated Data. 1926.652(c)(2)(i) -Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

All provisions of Subpart P apply when utilizing this tabulated data. The contractor's competent person shall use this data to select allowable trench depth, box wall, and strut configuration. The competent person utilizing this tabulated data shall be experienced and knowledgeable of all requirements of Subpart P, and trained in the use and safety procedures for shoring applications.

- 2. EZE Shoring Systems comply with the following standards,
 - **BS EN 13706:** Reinforced Plastic Composites: Specifications for Pultruded Composites
 - **ISO 14125:1998:** Fiber-reinforced plastic composites Determination of flexural properties.
 - **ISO 14130:1997:** Fiber-reinforced plastic composites Determination of apparent interlaminar shear strength by short-beam method.
 - BS EN 13331:2002: Trench Lining Systems
 - **BS4074:2000:** Specification for steel trench struts
 - **BS EN 5975:** Code of Practice for temporary works procedures and permissible stress design
 - **BS EN 16269:** Statistical interpretation of data: Part 6: Determination of statistical tolerance intervals.
- 3. Use of this tabulated data is dependent on first classifying the soil in accordance with OSHA Appendix A. Soil classification shall be determined just prior to installing the EZE Shoring System application. Soil conditions may change at a later date and require revaluation of the strength and allowable depth.
- 4. Surcharge loads and equipment setback limits have not been included in the outlined allowable depth ratings. Surcharge loads occur due to heavy equipment, vibrations, or soil piles adjacent to the trench where adjacent is defined as within a distance equal to the depth of the trench. The competent person shall determine if any surcharge load is present and determine an appropriate setback limit. The allowable depth rating must be reduced to account for any surcharge loading that may influence the EZE Shoring System applications outlined below, otherwise site-specific engineering is required.
- 5. The depth and spacings given in **Tables 6-1 & 9-8** govern the use of the EZE Shoring Systems and not tabulations given by other manufacturers.



- 6. Any alterations to the components or variance from this tabulated data shall be indicated in a site-specific plan prepared and approved by a registered professional engineer. Any applications that exceed the allowed parameters will void this tabulated data.
- 7. The faces of excavations shall be cut vertical and the EZE Shoring panel walls shall be in direct contact with the excavation walls when the system is used in a static configuration. fill all voids between panel walls and excavation to ensure soil arching occurs.
- 8. The competent person shall continually monitor the shored excavation for changed conditions such as water seepage, soil movement cracks at the surface, sloughing or raveling, and that proper surcharge loading and setback limits are maintained.
- 9. The competent person must ensure that the groundwater level on all sides of the shoring application is maintained below the base of the excavation at all times, otherwise this certification is invalid.
- 10. Workers shall always enter, exit, and work inside the shored area of the excavation.
- 11. Only the 1.38 m Deep EZE Shoring System applications may be set a maximum of 610 mm from the bottom of the excavation. Provided there is no sloughing or raveling. The excavation depth is considered to be the full distance from the top to the bottom of the excavation.
- 12. An adequate separately designed shoring system shall be used leading up to within 610 mm of the EZE Shoring application. Systems such as other EZE Shoring configurations, Hydraulic Vertical Shores, End Shores, Modular Aluminum Panel Systems, and designs by a registered engineer may be used in conjunction with the EZE Shoring Systems.
- 13. Always inspect the components for accidental damage prior to use. Always ensure all struts are correctly inserted prior to use. Do not overload the EZE Struts beyond their stated safe working range.
- 14. Before entering any excavation ensure that there are two supported hub pile board assemblies installed no more than 508 mm apart, this will be your means of access to continue building the desired configured assembly.
- 15. Only access and work in the trench between supported "Hub Pile Assemblies". **Never enter via ends/faces of an unsupported excavation.**
- 16. Always work from a position of safety. Avoid, working above on an unsupported edge, an unprotected edge or under a suspended load. Do not allow personnel within the trench whilst the excavator is digging. Ensure all personnel are well clear of its operation.
- 17. Always ensure personnel are safely out of the excavation before removal of units.



Classification of Soil Types

- 1. Soil classification shall be in accordance with OSHA Appendix A and classified just prior to installing EZE Shoring Systems. Soil conditions may change at a later date and require the competent person to check soil conditions periodically and adjust accordingly.
- 2. The equivalent weight of OSHA soil types* is assumed to be as follows:

•	OSHA Type "A" Soil	3.9 kPa/m
•	OSHA Type "B" Soil	7.1 kPa/m
•	Type "C-60" Soil	9.4 kPa/m **
•	OSHA Type "C" Soil	12.6 kPa/m

* These equivalent weights were adapted from OSHA 1926 Subpart P App C, Timber Shoring for Trenches, Tables C-1.1, C-1.2, and C-1.3

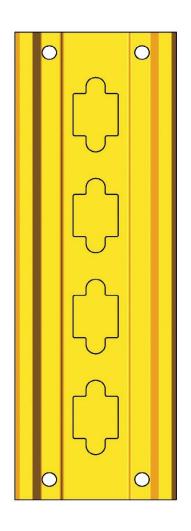
- 3. Type "C-60" soil is soil that does not qualify as OSHA Type "A", or Type "B", can be cut with vertical walls and will stand up long enough to safely insert and pressurize the system.
- 4. EZE Shoring Systems may "NOT" be used in "C-80" soil.

^{**} Type "C-60" soil is not identified or classified in OSHA Appendix A.



Geometric Properties for Engineering Design

"EZE Hub Pile"



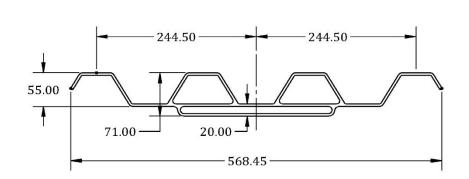
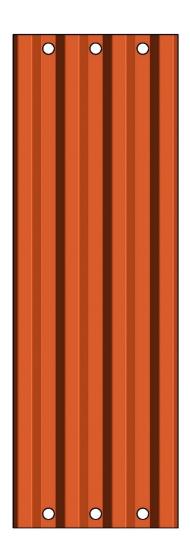


Table 1-1. EZE Hub Pile Engineering Properties			
Material	Composite		
Allowable Bending Moment	5.49 kNm		
Section Modulus	75544 mm ³		
Section Young's Modulus	17.99 Gpa		
Section Area	5006 mm ²		

Table 1-2. EZE Hub Pile Properties					
Description Code Length (mm) Weight (kg)					
EZE Hub Pile 1380mm	EZEH 1380	1380	11.7		
EZE Hub Pile 1760mm					
EZE Hub Pile 2140mm	EZEH 2140	2140	18.1		
EZE Hub Pile 2520mm	EZEH 2520	2520	21.4		



"EZE Infill Pile"



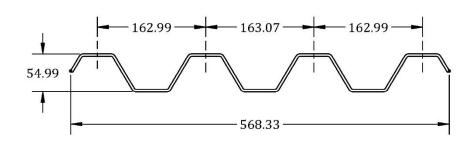
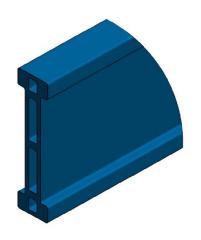


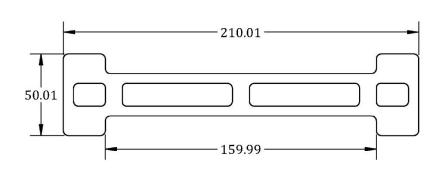
Table 2-1. EZE Infill Pile Engineering Properties		
Material	Composite	
Allowable Bending Moment	5.19 kNm	
Section Modulus	43261 mm ³	
Section Young's Modulus	17.99 Gpa	
Section Area	3038 mm ²	

Table 2-2. EZE Infill Pile Properties					
Description Code Length (mm) Weight (kg)					
EZE Infill Pile 1380mm	EZEI 1380	1380	7.0		
EZE Infill Pile 1760mm	EZEI 1760	1760	9.0		
EZE Infill Pile 2140mm	EZEI 2140	2140	11.0		
EZE Infill Pile 2520mm	EZEI 2520	2520	13.0		



"EZE Waler"





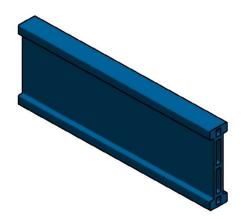
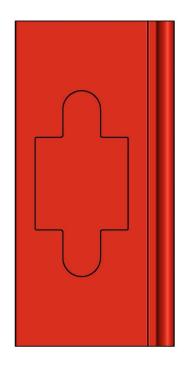


Table 3-1. EZE Waler Engineering Properties			
Material	Composite		
Allowable Bending Moment	6 kNm		
Section Modulus	28349 mm ³		
Section Young's Modulus	34 Gpa		
Section Area	4329 mm ²		

Table 3-2. EZE Waler Properties					
Description Code Length (mm) Weight (kg)					
EZE Waler 1500mm	EZEW 1500	1500	13.0		
EZE Waler 2000mm	EZEW 2000	2000	17.0		
EZE Waler 2500mm	EZEW 2500	2500	21.0		
EZE Waler 3000mm	EZEW 3000	3000	25.0		



"EZE Slider"



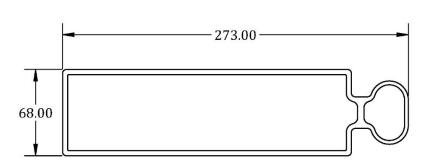
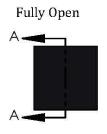


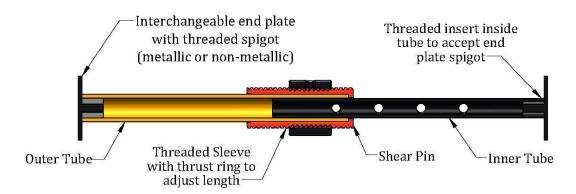
Table 4-1. EZE Slider Engineering Properties			
Material	Composite		
Allowable Bending Moment	N/A		
Section Modulus	61451 mm ³		
Section Young's Modulus	23 Gpa		
Section Area	2722 mm ²		

Table 4-2. EZE Slider Properties					
Description Code Length (mm) Weight (kg)					
EZE Slider 560mm EZES 560 560 2.6					

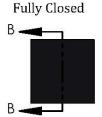


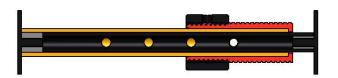
"EZE Strut"





Section A-A





Section B-B

Table 5-1. EZE Strut Ranges			
Range (mm)			
511 - 711			
705 – 1107			
1041 - 1741			
1615 – 2500			

Note:

For standard use the system takes a metallic prop with a 150 mm base plate on each end.

Table 5-2. EZE Strut Properties					
Description Code Max Load (SWL) Max Tension (SWL) Weight (kg					
EZE Strut Type 1 - Composite	EZEC ST1	30	2	6.0	
EZE Strut Type 2 - Composite	EZEC ST2	30	2	6.9	
EZE Strut Type 3 - Composite	EZEC ST3	30	2	8.0	
EZE Strut Type 1 - Steel	EZEC ST4	30	2	7.5	
EZE Strut Type 2 - Steel	EZEC ST5	30	2	8.9	
EZE Strut Type 3 - Steel	EZEC ST6	30	2	11.7	
EZE Strut Type 4 - Steel	EZEC ST7	30	2	18.0	



Dimension Schemes: 1.38m Excavation Depth Configuration A

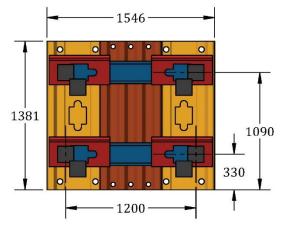
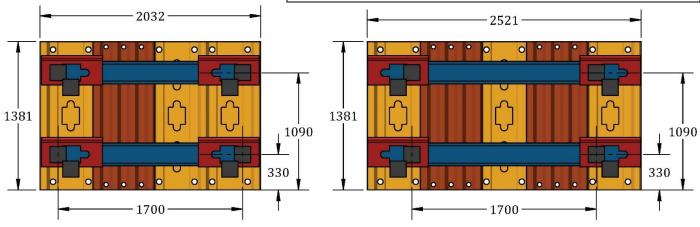
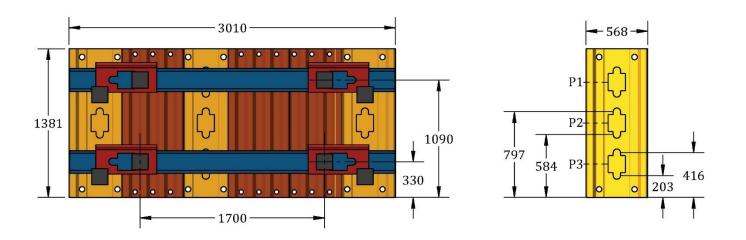


Table 6-1: 1.38m (Configuration A)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	1991 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	Yes
·	

- This table is applicable for all configurations on this page.
- All infill piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.







Dimension Schemes: 1.38m Excavation Depth Configuration B

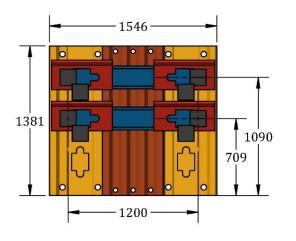
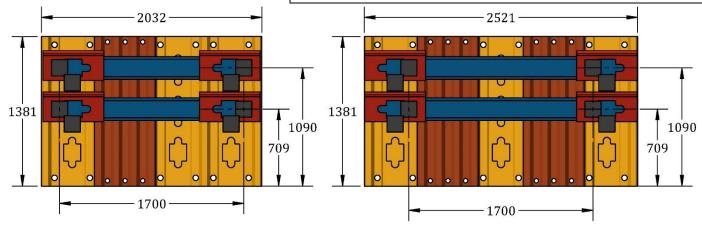
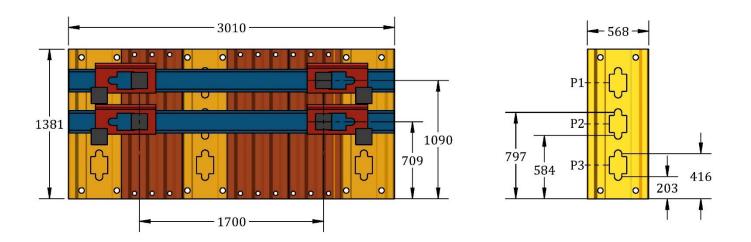


Table 6-2: 1.38m (Configuration B)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	1991 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	Yes

- This table is applicable for all configurations on this page.
- All infill piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.







Dimension Schemes: 1.76m Excavation Depth Configuration A

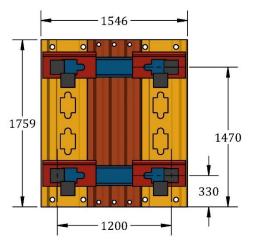
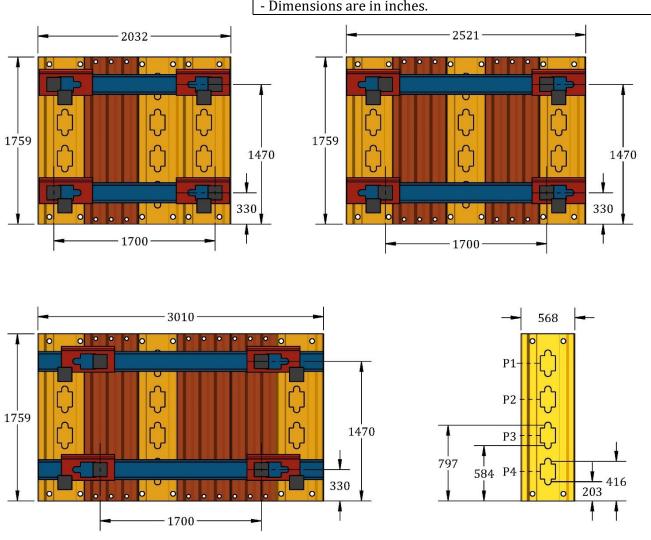


Table 7-1: 1.76m (Configuration A)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	1759 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No

- This table is applicable for all configurations on this page.
- All infill piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.



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Dimension Schemes: 1.76m Excavation Depth Configuration B

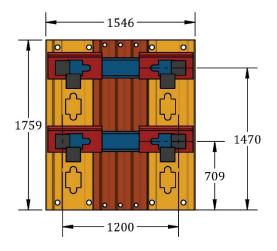
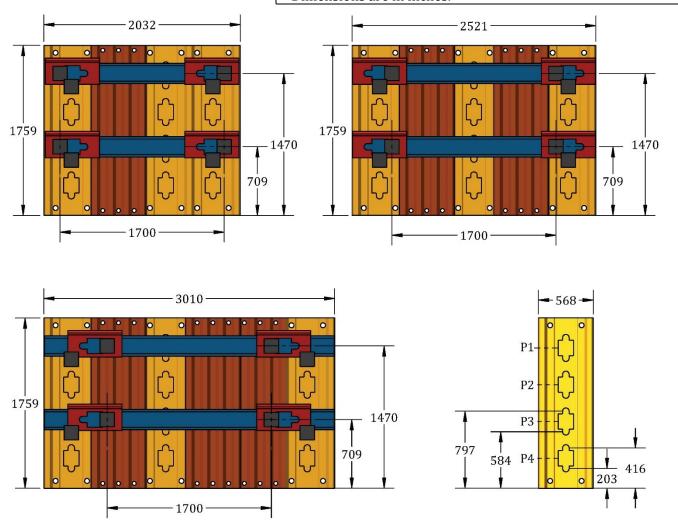


Table 7-2: 1.76m (Configuration B)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	1759 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No
NT	·

- This table is applicable for all configurations on this page.
- All infill piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.





Dimension Schemes: 2.14m Excavation Depth Configuration A

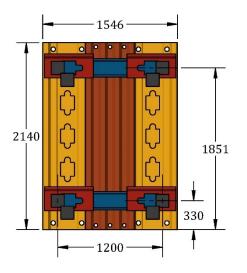
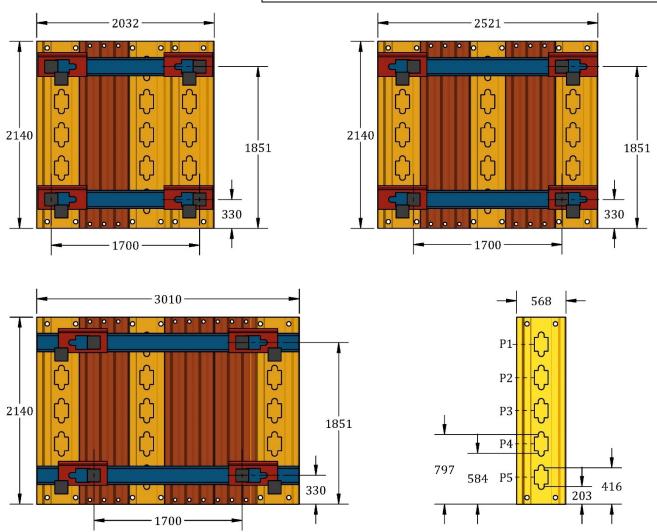


Table 8-1: 2.14m (Configuration A)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	2140 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No
Maximum Width (Steel Struts) Surcharge Pressure (PSF) Endloadable	0 Yes

Note

- This table is applicable for all configurations on this page.
- All infill piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.



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Dimension Schemes: 2.14m Excavation Depth Configuration B

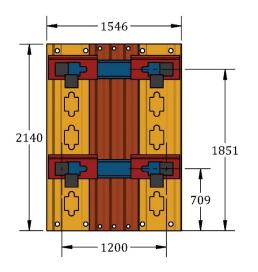
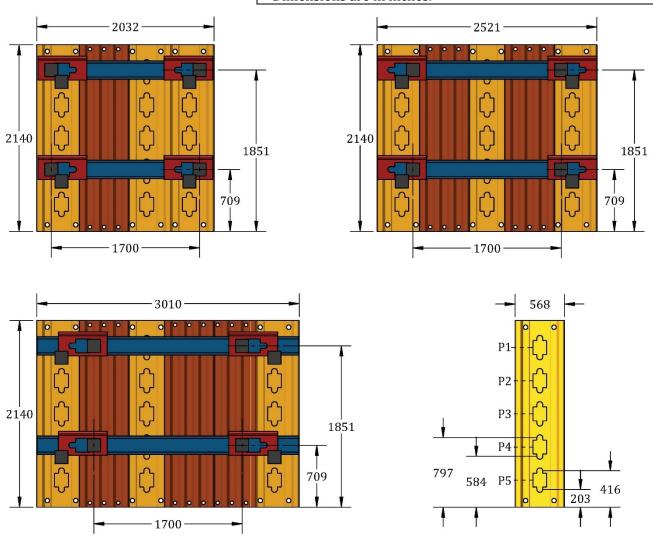


Table 8-2: 2.14m (Configuration B)	
A-25, B-45, or C-60	
2140 mm	
1741 mm	
2500 mm	
0	
Yes	
No	

Note

- This table is applicable for all configurations on this page.
- All infill piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.



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Dimension Schemes: 2.14m Excavation Depth Configuration C

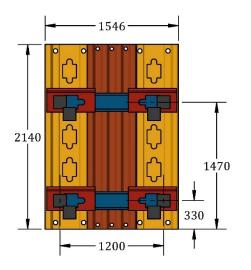
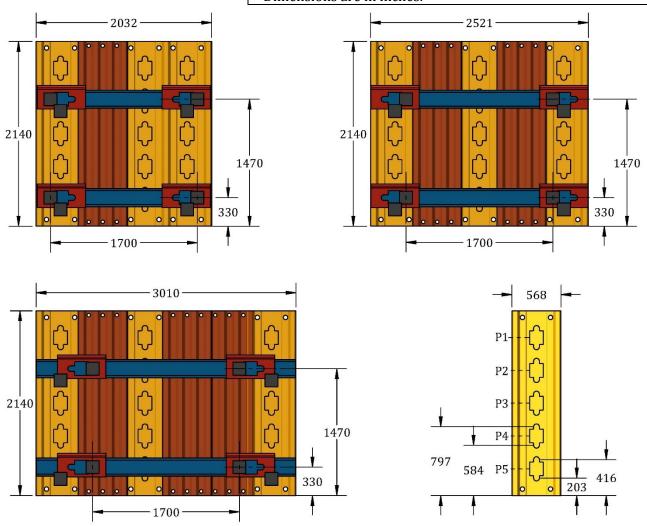


Table 8-3: 2.14m (Configuration C)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	2140 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No

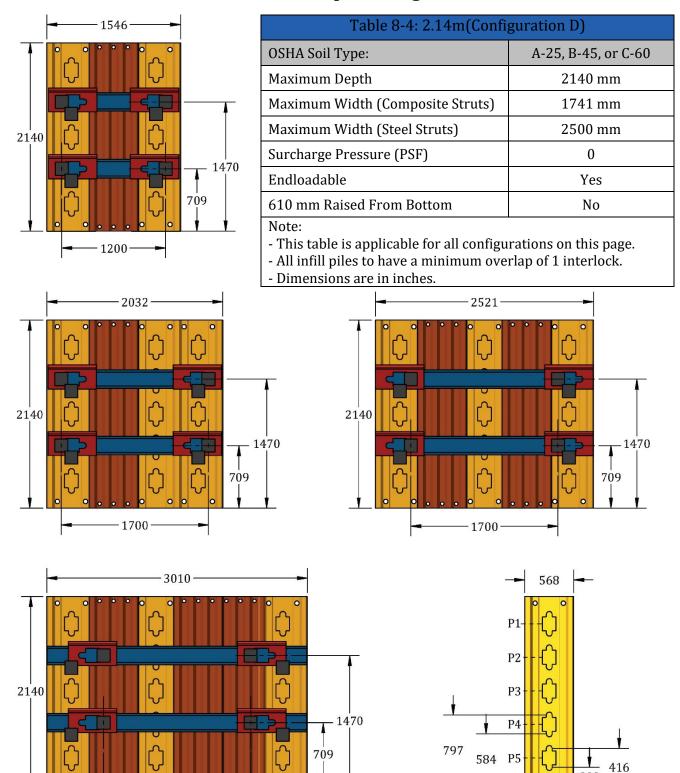
- This table is applicable for all configurations on this page.
- All infill piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.



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Dimension Schemes: 2.14m Excavation Depth Configuration D





Dimension Schemes: 2.52m Excavation Depth Configuration A

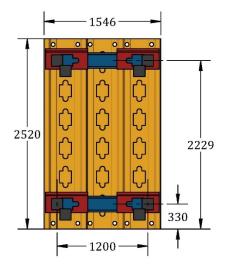
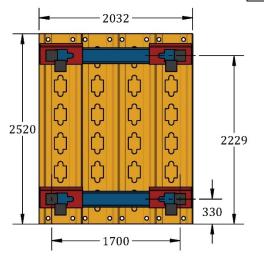
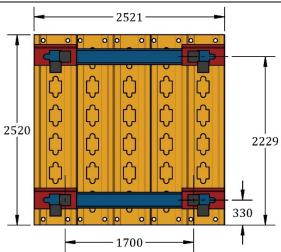


Table 9-1: 2.52m (Configuration A)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	2520 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No
1	

- This table applies to 1546, 2032, & 2521 mm long configurations.
- All piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.





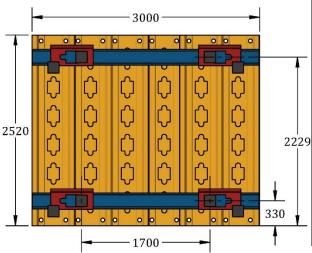


Table 9-2: (Configuration A – 3000 mm Long Span)	
OSHA Soil Type:	A-25 & B-45
Maximum Depth	2520 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No
Note:	

- All piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.



Dimension Schemes: 2.52m Excavation Depth Configuration B

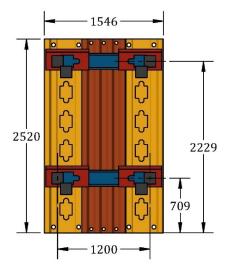
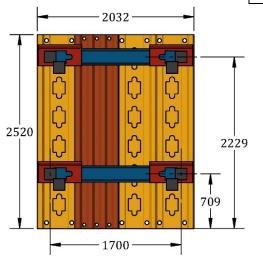
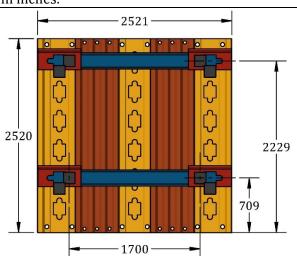


Table 9-3: 2.52m (Configuration B)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	2520 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No
NT	

- This table applies to 1546, 2032, & 2521 mm long configurations.
- All piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.





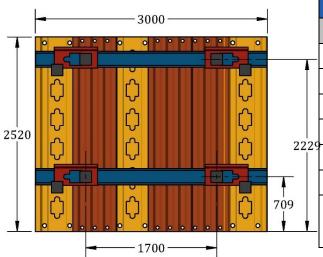


Table 9-4: (Configuration B – 3000 mm Long Span)	
OSHA Soil Type:	A-25 & B-45
- Maximum Depth	2520 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No
Note:	

- All piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.



Dimension Schemes: 2.52m Excavation Depth Configuration C

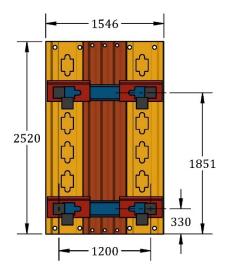
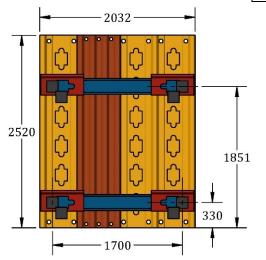
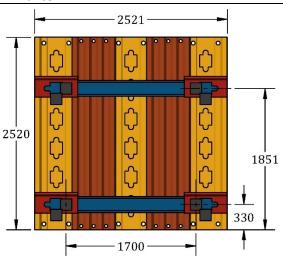


Table 9-5: 2.52m (Configuration C)	
OSHA Soil Type:	A-25, B-45, or C-60
Maximum Depth	2520 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No

- This table applies to 1546, 2032, & 2521 mm long configurations.
- All piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.





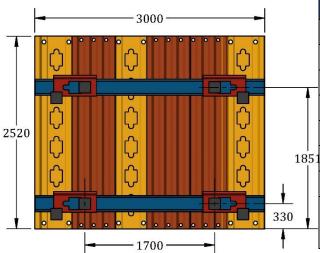


Table 9-6: (Configuration C - 3000 mm Long Span)	
OSHA Soil Type:	A-25 & B-45
Maximum Depth	2520 mm
Maximum Width (Composite Struts)	1741 mm
Maximum Width (Steel Struts)	2500 mm
Surcharge Pressure (PSF)	0
Endloadable	Yes
610 mm Raised From Bottom	No
Note:	

- All piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.



Dimension Schemes: 2.52m Excavation Depth Configuration D

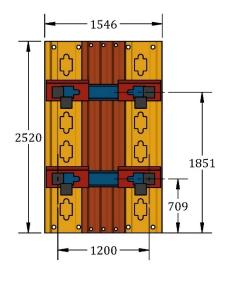
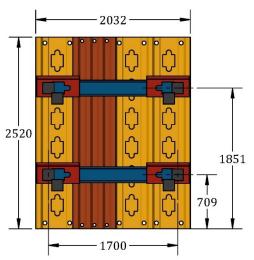
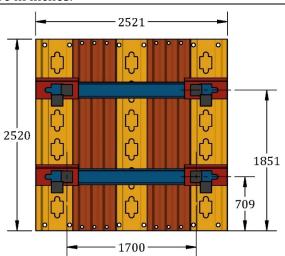


Table 9-7: 2.52m (Configuration D)		
A-25, B-45, or C-60		
2520 mm		
1741 mm		
2500 mm		
0		
Yes		
No		

- This table applies to 1546, 2032, & 2521 mm long configurations.
- All piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.





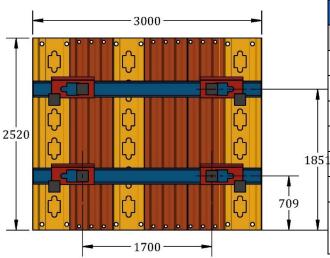
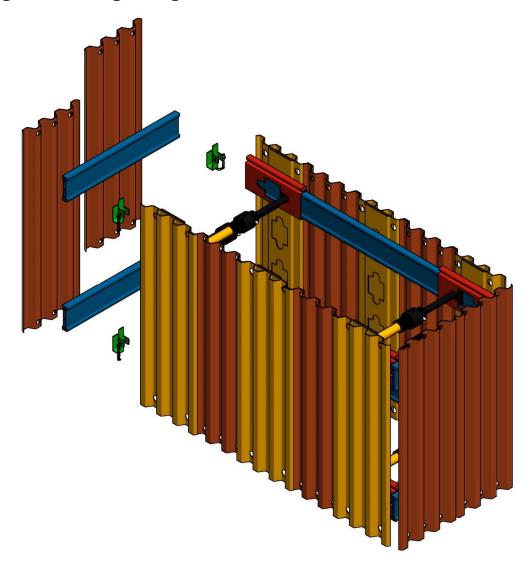


Table 9-8: (Configuration D - 3000 mm Long Span)		
OSHA Soil Type:	A-25 & B-45	
Maximum Depth	2520 mm	
Maximum Width (Composite Struts)	1741 mm	
Maximum Width (Steel Struts)	2500 mm	
Surcharge Pressure (PSF)	0	
· Endloadable	Yes	
610 mm Raised From Bottom	No	
Note:		

- All piles to have a minimum overlap of 1 interlock.
- Dimensions are in inches.



EZE Shoring End Loading Configurations



End Loading Configuration Notes

- 1. EZE Walers must be installed the width of the trench and supported by hanging brackets.
- 2. The EZE Infill Piles can rest against or can hang over the EZE Walers that are supported by the hanging brackets.
- 3. When sheeting is used, it must extend to the top of the excavation.
- 4. When the sheeting is placed directly above a crossing utility, the sheeting must be secured over the crossing utility.
- 5. If the soil face is greater than 152 mm backfill the void at least 2/3 of its height with excavated soil or crushed rock securing the sheeting in place.
- 6. Sheeting may be skipped a maximum of 152 mm provided the soil does not slough or ravel.
 - a. If sloughing or raveling occurs reduce or close the gap until it is prevented.



EZE Shoring System Installation and Removal



Figure 1: EZE Hub Pile



Figure 2: Hub Board – sub assembly

Adjust the EZE Struts to the approximate required width of the trench. Stand up two EZE HUB piles. Insert both ends of the strut

into the EZE HUB pile recess with the corner

of the strut base plate upright.



Rotate the EZE Strut through 45° to locate and lock inside the EZE Hub pile.



Figure 4
Slide the EZE Strut down into position at the bottom of the slot.

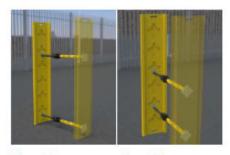


Figure 5 Figure 5A

For each EZE Hub pile sub assembly repeat for the lower strut. If the excavation is to be longer than 1.5m, the second pair of hub piles should have the struts placed as per figure 5A.

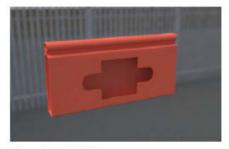


Figure 6: EZE Slider



Figure 7: EZE Waler

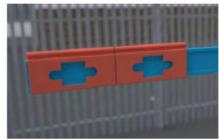
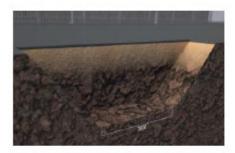


Figure 8
Position two EZE Sliders onto the end of each EZE Waler.



Excavate the trench to the required depth and width. Excavate the ends and batter to a safe angle. Ensure the trench excavation is of suitable length for the 'to be installed' system.



Installation (Continued)

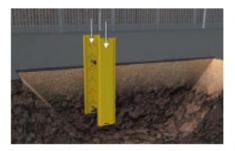


Figure 10

Lift the EZE Hub pile sub assembly and position at the top of the battered end of the excavation – 2 persons required. With one person either side of the excavation, lower the sub assembly into position.

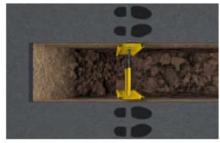


Figure 11

Operators should be a safe distance from excavation edge, ensure operatives are always in line with the assembly.

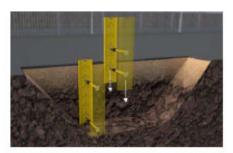


Figure 12

Lift the second EZE Hub pile assembly and place at a distance 500mm apart from the first. Position 2 is approx. 1100mm from the bottom of the battered end.

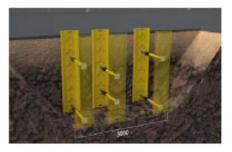


Figure 13

Repeat for the 3rd EZE Hub pile assembly, installation is from the opposite end of the excavation.



Figure 14

Ensure a distance of 3000mm is maintained between the outside of the EZE Hub pile sub-assemblies. Lower the access ladder into the excavation. Secure the ladder to the EZE Hub pile. Once everything is secured, enter the excavation via the ladder. Lightly tighten the EZE Hub pile struts in the 1st two pairs of boards.



Figure 15: EZE Infill Pile

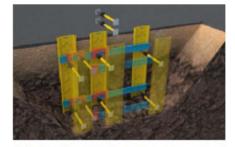


Figure 16

Lower the EZE Waler assembly down to the operative in the excavation, these rest on the top of the EZE Hub assembly. Insert struts into the EZE Sliders and move the slider over the second pair of EZE Hub piles.

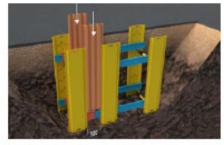


Figure 17

Insert the EZE Infill pile behind the waler on both sides. Remove EZE Struts from 2nd pair of EZE Hub piles to give maximum open working area – Fig 16.

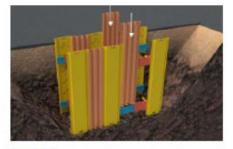


Figure 18

Move the sliders approximately a further 600mm to allow the next pair of EZE Infill piles to be inserted. Note sequence may vary slightly depending upon the installed length of the system.



Installation (Continued)

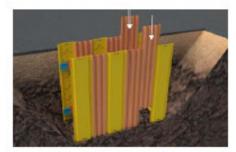


Figure 19
Move slider to the next position (dependant upon system length) and insert the next EZE Infill piles.

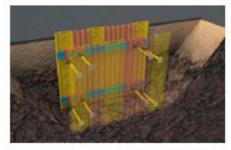


Figure 20
Repeat until all GRP sheets are installed.
Tighten the water struts in their final position, ensuring that the maximum spacing between the water struts does not exceed 1700mm. Tighten the EZE Hub pile struts to secure the excavation.



Disassembly
Disassemble in reverse order from figure
20. Never enter an unsupported trench,
backfilling must be done from ground level.