EMECA
SPE USA

SPLICE MANUAL

2021

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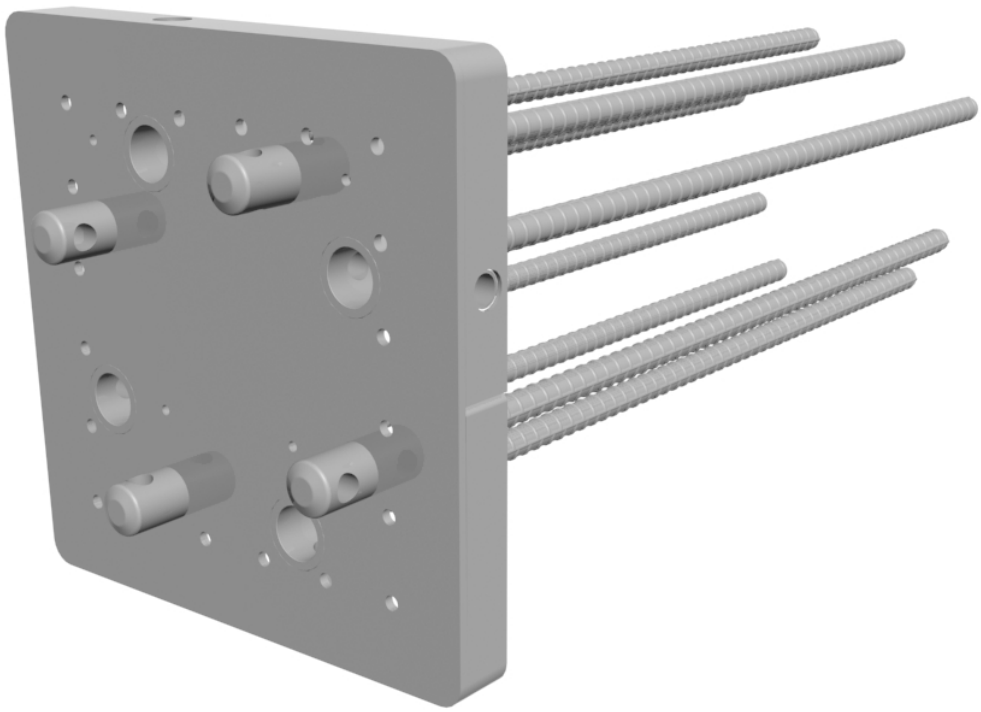
INTRODUCTION

Emeca SPE USA produces pile splices for concrete piles.

Prestressed concrete piles are often jointed when the length of pile exceeds the lenght of the truckable load (~55 ft.). Spliced pile can be easily transported with just one truck without complicated special transportation arrangements. Logistics on the job site is easier and safer when working with shorter piles.

Emeca locking mechanisms ensures a reliable connection at the location of the splice. The splice is locked at all corners by steel pins that draw it into pre-compression. Connection is so strong that you can easily and reliably drive acute angled battered piles.

Installation of Emeca splices do not require welding, therefore logistics and on-site setup is much more efficient. The installation can be done in minutes with our standard Emeca splices thus saving money and time. Lower cost on the piling material could also save up to tens of thousands of dollars or more on each project.



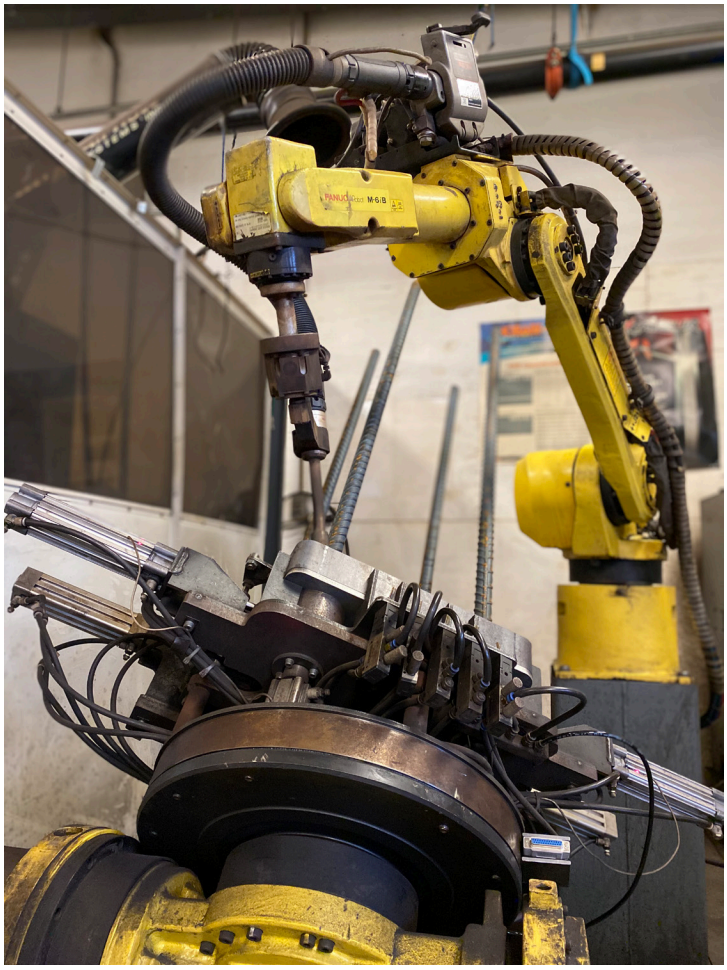
Emeca 24 inch splice

EMECA SPE USA

Emeca SPE USA was founded in 2008 by Michael R. Jahnigen.
Our manufacturing facility is located in Laurel, Delaware.

Emeca SPE USA produces pile splices for concrete piles and offers various other services and products. Our most popular splices are 12”, 14”, 16”, 18” and 24” square pile joints, but we can also customize our splices to specific size, shape and strength needed to meet customer requirements. In addition our product range includes pile shoes, casting guides, locking pins and other accessories that will suit any concrete pile needs.

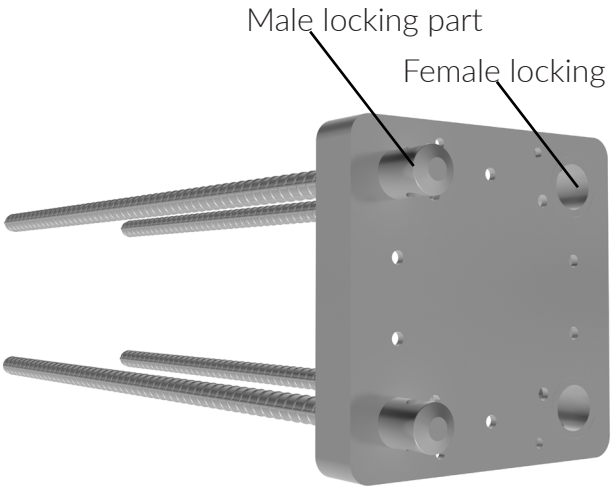
We are always refining our manufacturing processes and now we can proudly state that in our fully automated manufacturing facility all our components and parts are all made in the USA.



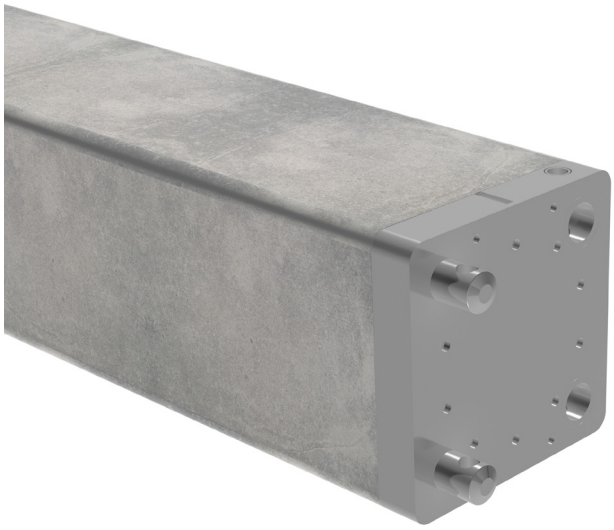
PRINCIPLE OF THE SPLICE

The Emeca pile splice is designed to transmit all loads which are subjected to the pile from one pile section to the other without impairing the capacity of the pile. Function principle of pile is simple and reliable.

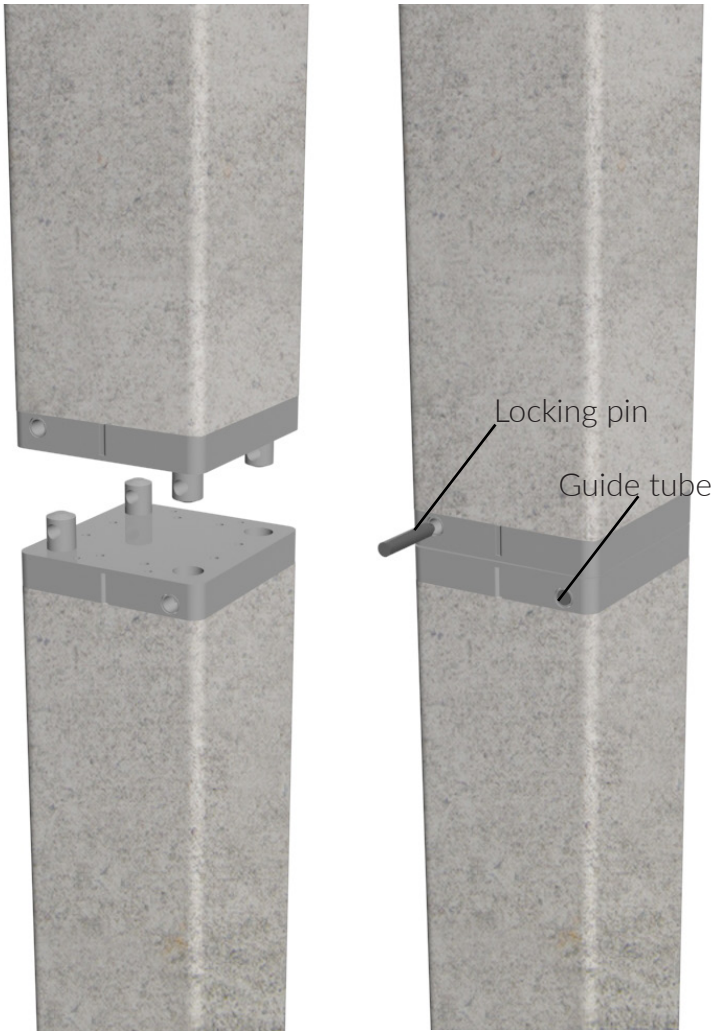
All parts of the pile joint are welded together in our factory in Laurel DE. The pile joints are put in the casting form together with the pile reinforcement. Concrete anchors the pile joint to the reinforcing steel. At the work site, pile sections are joined together by hammering the locking pins in to the guide tubes. This provides simple and easily lockable joint which reliably transfers all force from pile section to another.



Emeca joint



Casted Emeca splice



After driving the first splice, pins are hammered in the guide tubes to lock the joints firmly together

CERTIFICATIONS

Emeca joints conform to the requirements of the International Building Code (IBC) and have received Florida DOT certification for Emeca 18” and 24” splices (APL number 455-000-002) and Texas DOT certification on 18” splice (eval. number 21-3174).

CAPACITY

Our typical splice capacity calculations include tensile capacity, shear capacity, bending moment capacity and allowable tensile driving stresses. All pile splice calculations were performed in general accordance with AISC Specification for Structural Steel Buildings, 2005 and the PCI design book specifications.
The piles allowable stress limit can be found on the project-specific submittal package sent to the contractor.If you can’t have access to the submittal package, please call 302-875-0760 or send an email to info@emeca-speusa.com

If using standard Emeca splices, please refer to the attachments at the end of this manual.Standard splice capacities can also be found from our website:
www.emeca-speusa.com/splice-capacity

MANUFACTURING AND QUALITY CONTROL

Emeca pile joints are manufactured in the highly automated factory in Laurel De.
We only use high quality materials while manufacturing these splices. The materials used are as follows:

Plate material	ASTM A36
Bar stock	A572
Rebar	ASTM A706

The automation helps to maintain the tolerance and the same equal level of quality throughout the production. We continuously test the parts of the splice on our factory. At least 1 % of the parts are subject to quality control.

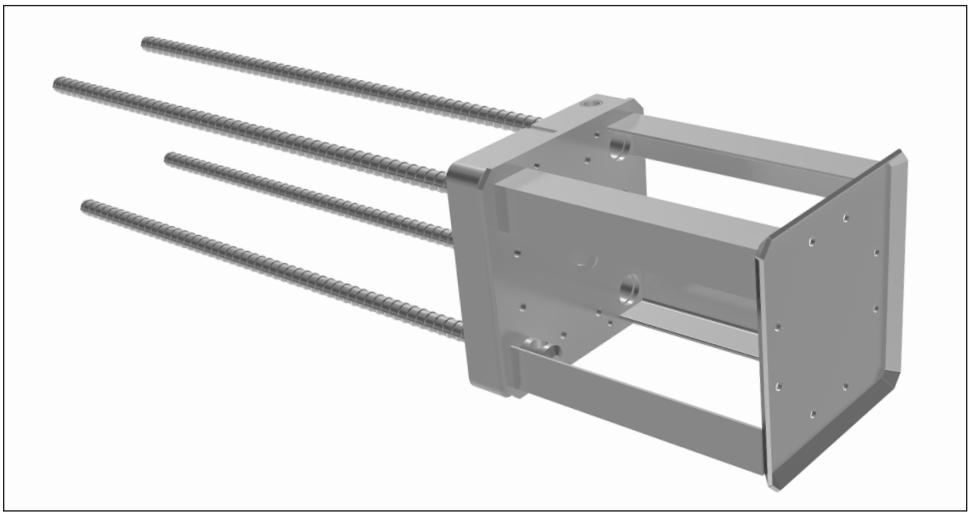
We strongly recommend that a complete drivability analysis be performed by either the pile driving contractor or the design engineer to make sure that the proper driving system is chosen for the specific project conditions.

Sizing of hammer, use of proper hammer stroke, and new pile cushion are some of the important elements to be followed by the pile contractor for the safe and effective installation of piles. It is the responsibility of the pile driving contractor to choose means and methods of installation to make sure that the allowable limits of the pile as stated in this report are not exceeded at any time during installation. In addition, the designer/ owner must verify whether the rated splice capacities meet the project requirements prior to use of these splice for the project.

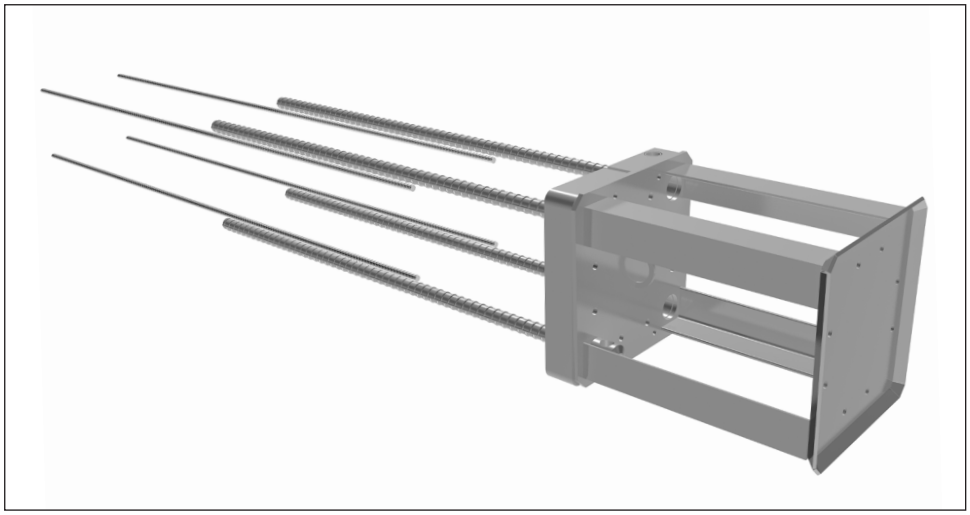
Tensile stresses must be monitored to create a pile driving criteria that does not exceed pile joint tensil capacity. **EXCEEDING RATED TENSIL STRENGTH CAPACITY CAN BREAK OR DAMAGE THE PILE**

PDA test report is required within 15 days of driving the first piles.

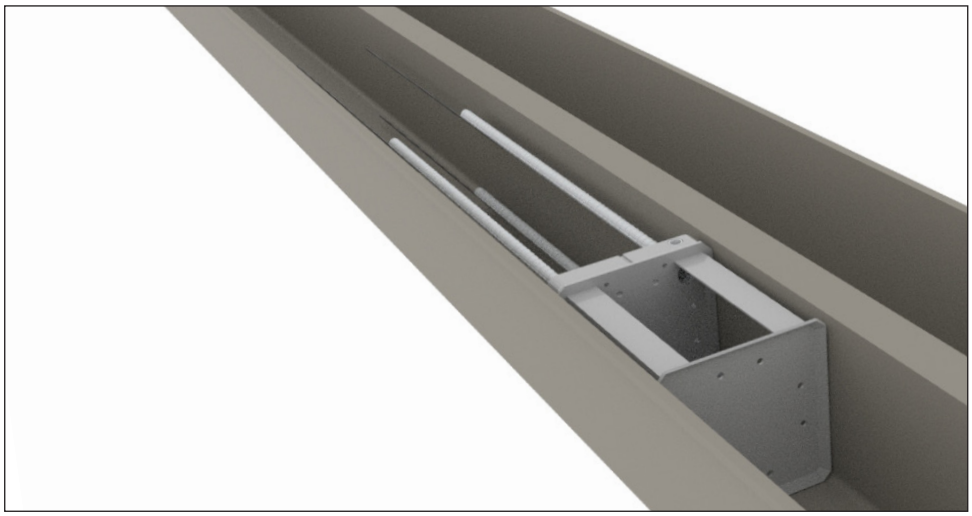
CASTING



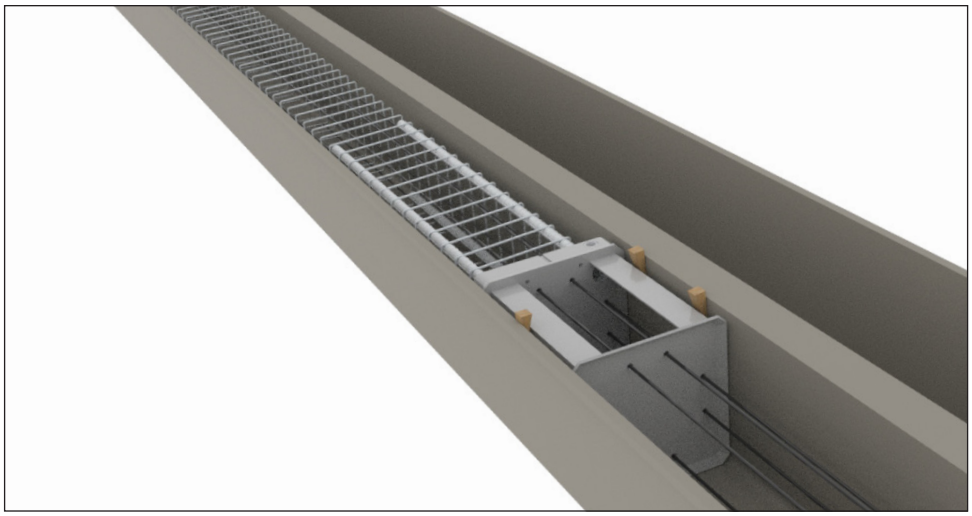
Splice is first secured to the casting guide with 4 3/8 bolts



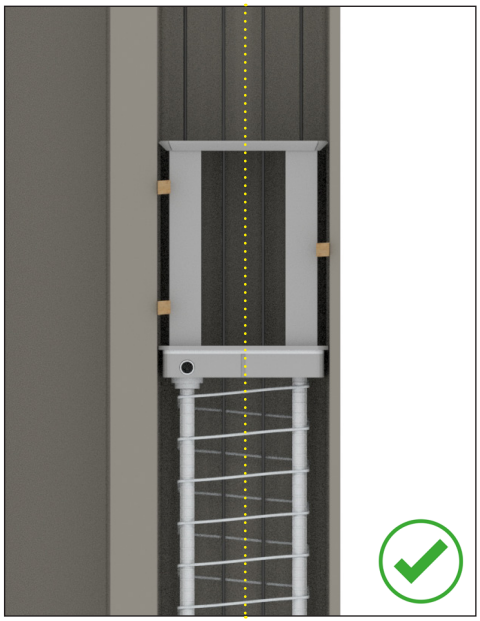
Auxiliary rebars are tied to the splice rebars if required to enhance tensil capacity

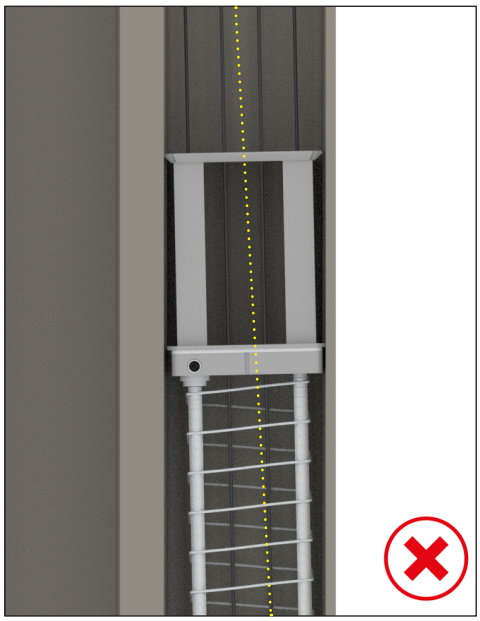


Splice is placed in the casting form.
Use form oil on casting guide surface to prevent concrete sticking on the surface

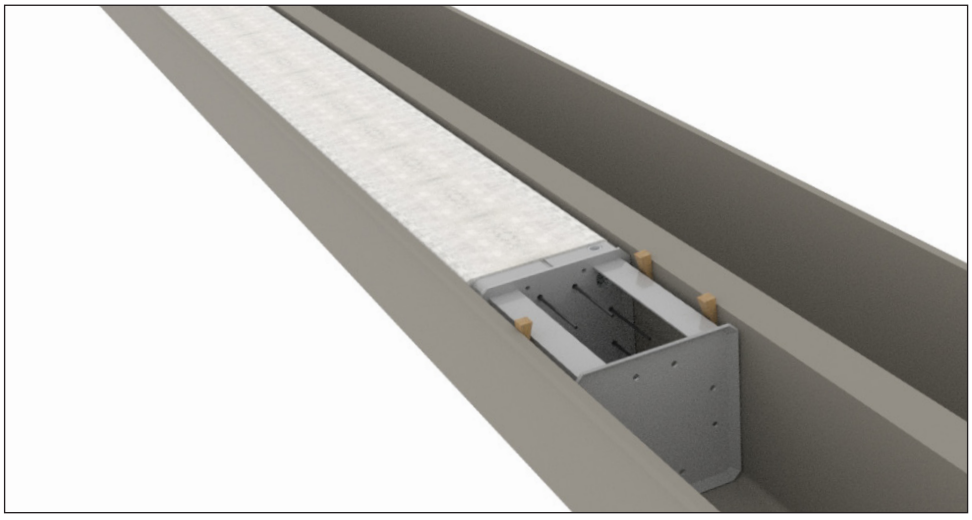


Spirals and long strands are installed in the form. Square spiral is required at least for the splice area





Use wooden wedges to ensure the straightness of the pile

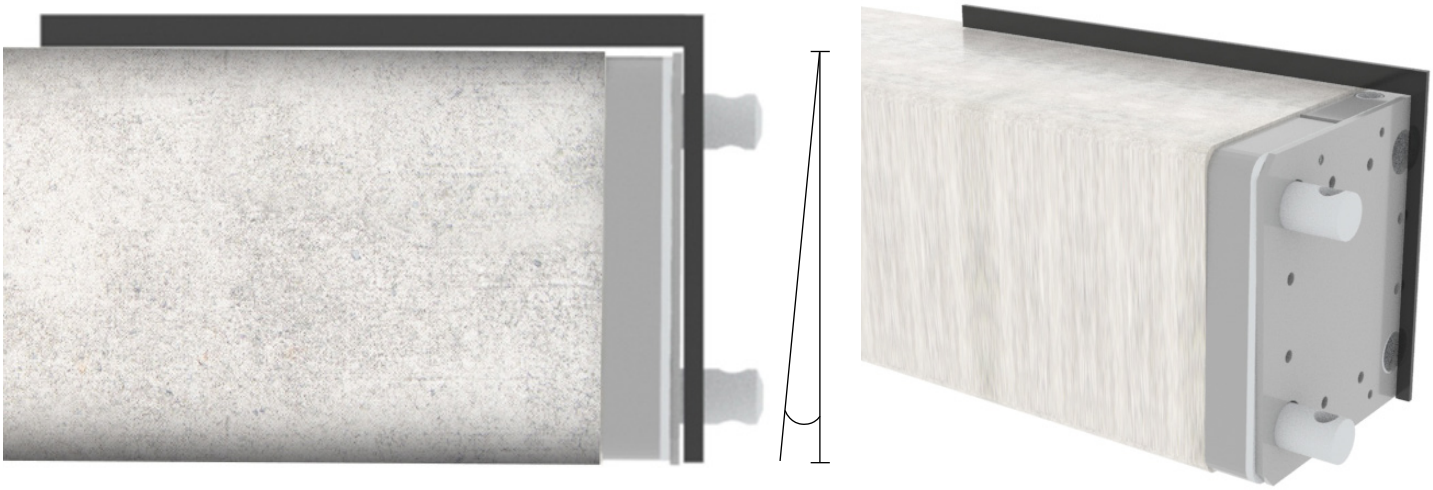


Concrete is poured and the pile is cast.

AFTER CASTING

The strands are cut and the splice is lifted from the form.
Do not hammer the casting guide when taking it off the the splice. You could risk damaging the casting guide surface.

Inspect the splice. The perpendicularly of the pile joint is important for the durability of the pile. Straightness of the faceplate must be within 1:125. Therefore margin of error on the entire length of the faceplate is
12” splice = 3/32”
14” splice = 7/64”
16” splice = 1/8”
18” splice = 9/64”
24” splice = 3/16”



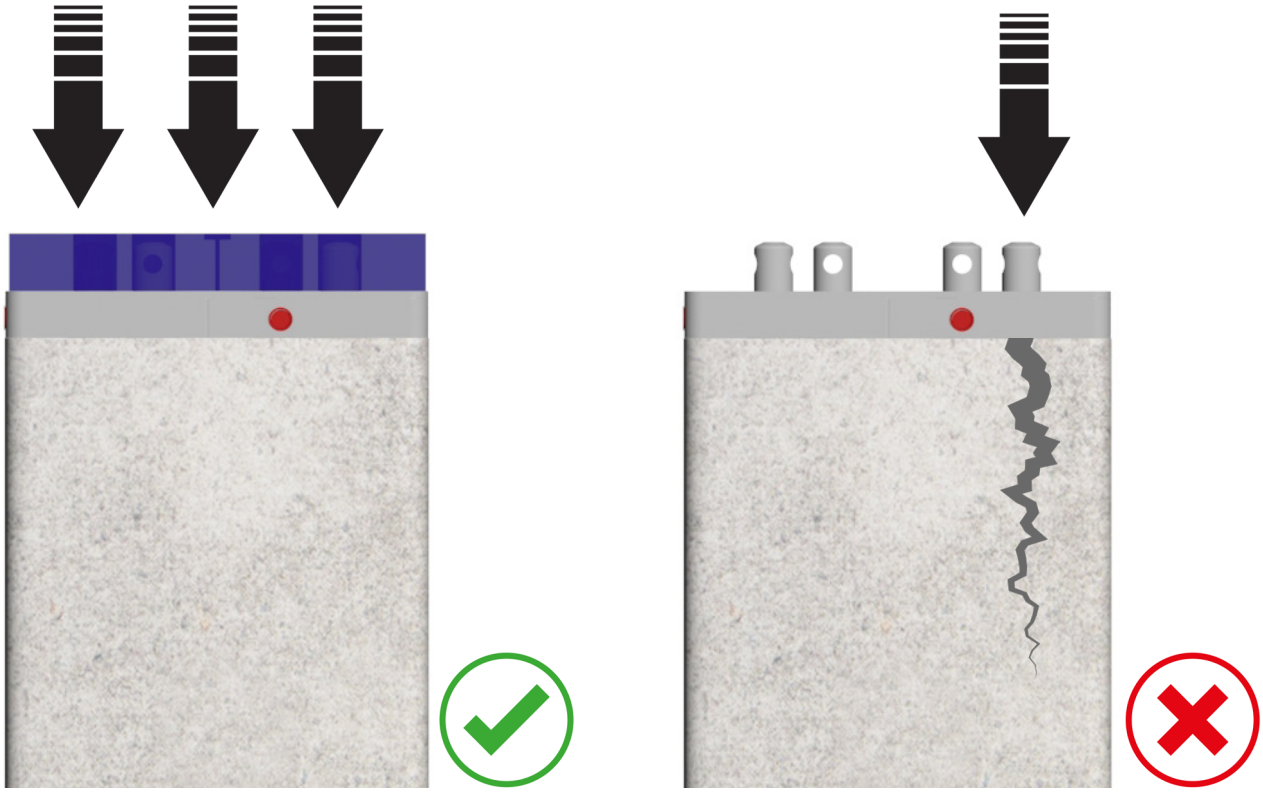
The face plate straightness is measured on the entire length of the face plate as pictured above

STORAGE

Piles need to stored safe from the elements. If the piles are stored outside, we recommend using a tarp to protect the splices from direct exposure to the elements.
If the splices are going to be stored for a long time, we recommend using form oil on the splice parts in order to protect them from rust.

1. USE DRIVING PLATE WHEN DRIVING THE FIRST PILE

Protect the male locking part by using driving plate. The driving plate will divide the energy of the hammer evenly on the pile. Without the driving plate, the energy will be confined directly on the male locking part which will lead to damage.



2. DO NOT DRAG THE PILE

When hoisting the top section, the pile splice can not be dragged on the ground as damage may occur

3. DO NOT STRAIGHTEN THE PILE AFTER DRIVING

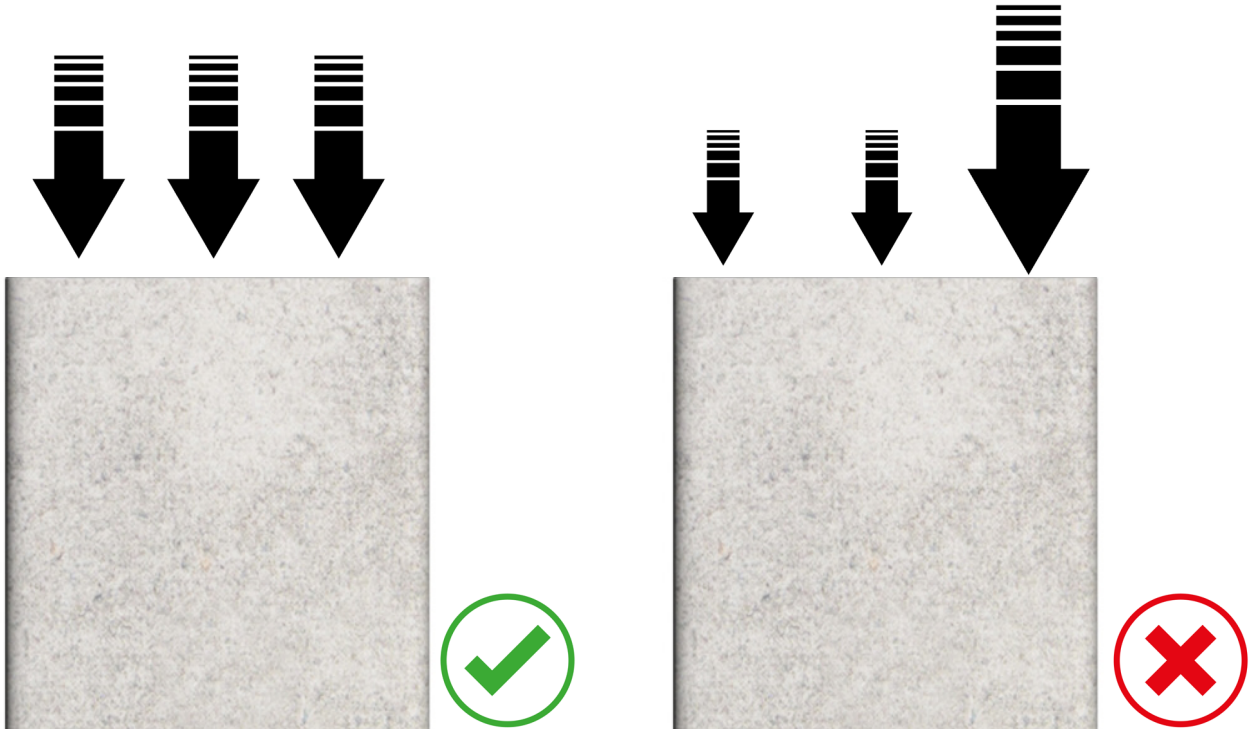
Corrections to alignment need to be done while driving the base pile. The following section will follow the angle established by the base pile. Do not attemp to straighten the top pile after driving the base section.

4. COMPLETE THE DRIVE AFTER SPLICING

Contractor assumes all risk of all freestanding piles. Top section needs to be driven before substancial soil setup has been accumulated in the base section.

5. EVEN LOAD FROM THE PILE HAMMER

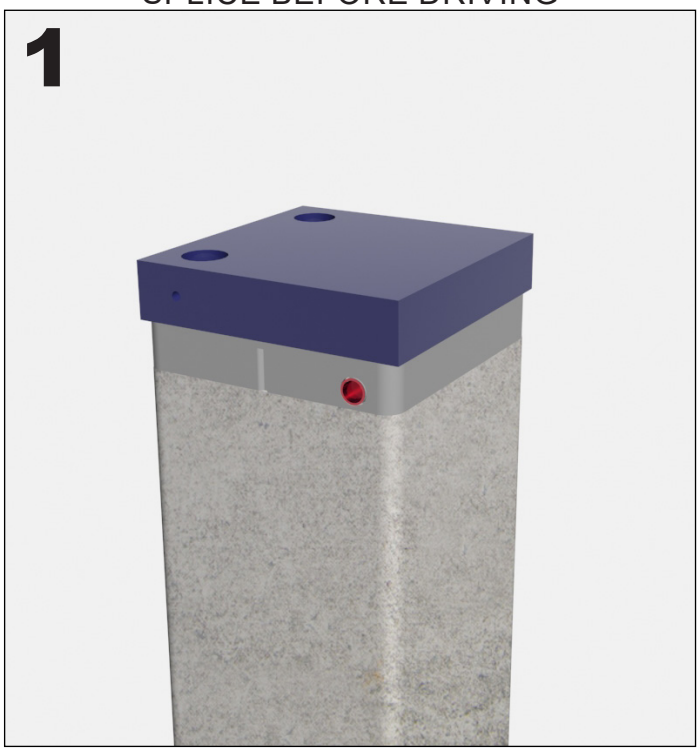
It is the contractors responsibily to ensure that the pile hammer applies an even, non-eccentric, load to the pile while driving.



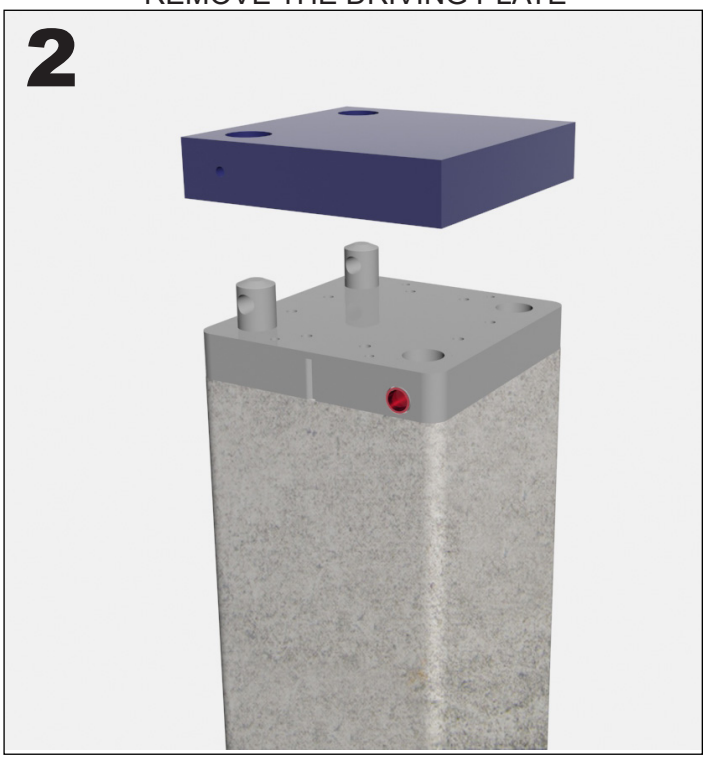
6. INSTALLATION INSPECTION

Third party installation inspection and documentation is required to ensure that the 8 pins are hammered flush with resistance.

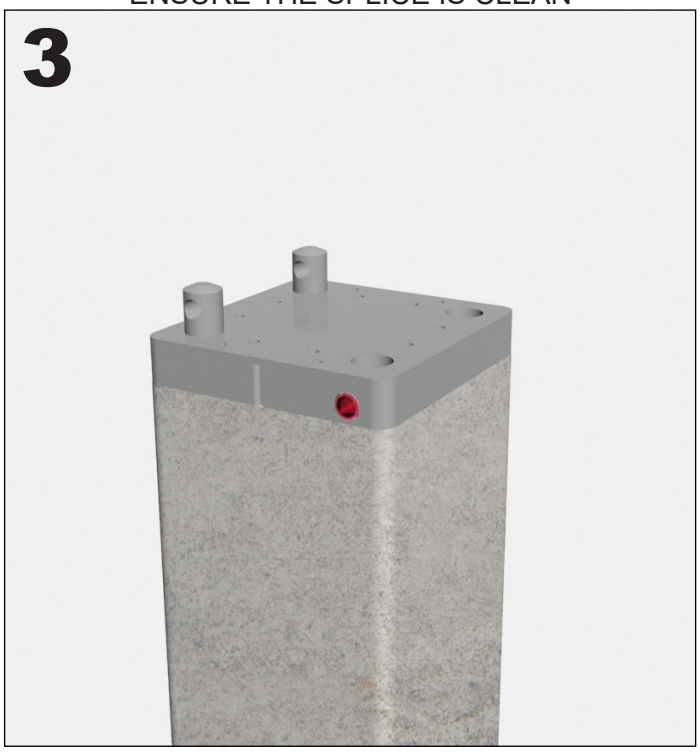
PLACE THE NYLON DRIVING PLATE ON TOP OF THE SPLICE BEFORE DRIVING



AFTER DRIVING THE FIRST PILE, REMOVE THE DRIVING PLATE

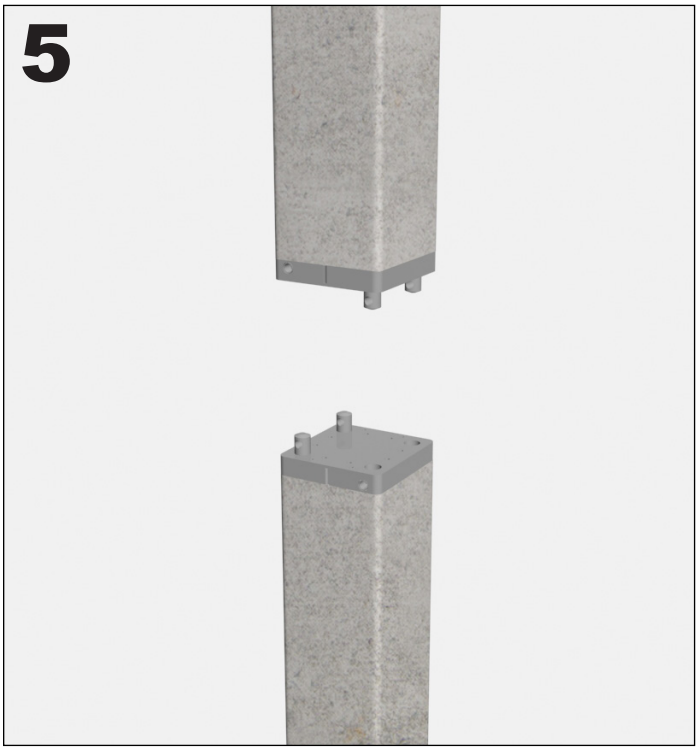


ENSURE THE SPLICE IS CLEAN

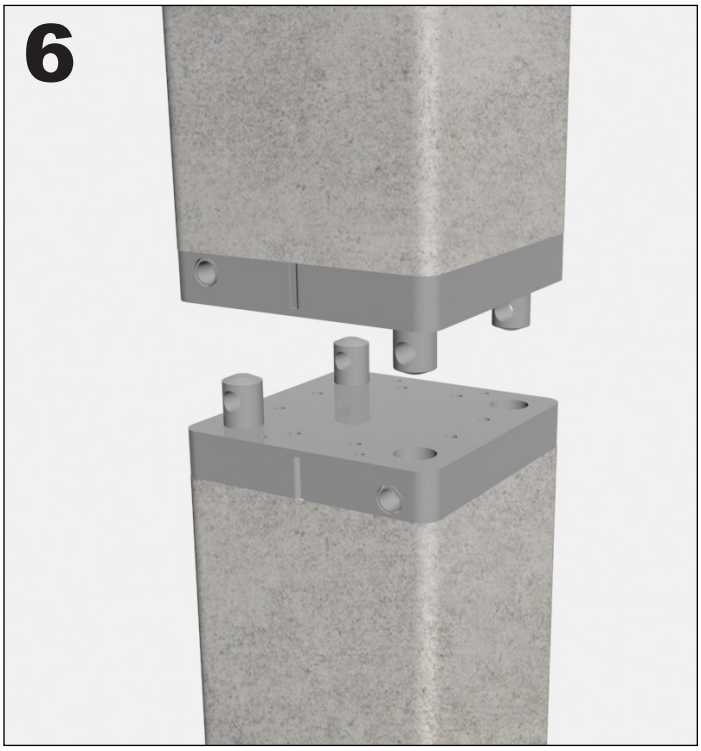


PULL THE OUTER RED PLUGS OUT OF THE SPLICE AND MAKE SURE THE PIN TUBES ARE CLEAR OF ALL DEBRIS

LIFT THE SECOND PILE ABOVE THE FIRST. BE CAREFUL NOT TO DRAG OR ALLOW THE JOINT TO BE DAMAGED DURING HOISTING. MAKE SURE THE PILES ARE ALIGNED



LOWER THE SECOND PILE CAREFULLY DOWN ENSURING THE MALE PARTS ARE DIRECTLY OVER FEMALE



PLACE THE PINS IN THEIR TUBES. USE 10 lb. SLEDGEHAMMER TO SECURE THE PINS

ALL PINS NEED TO BE HAMMERED FLUSH. AFTER HAMMERING ALL THE PINS, CONTINUE DRIVING

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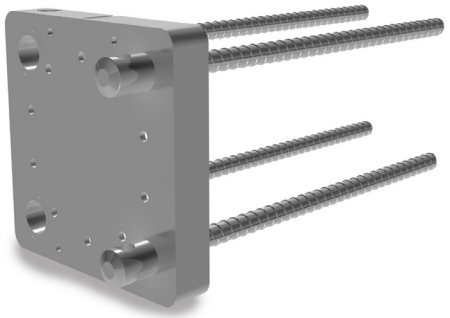
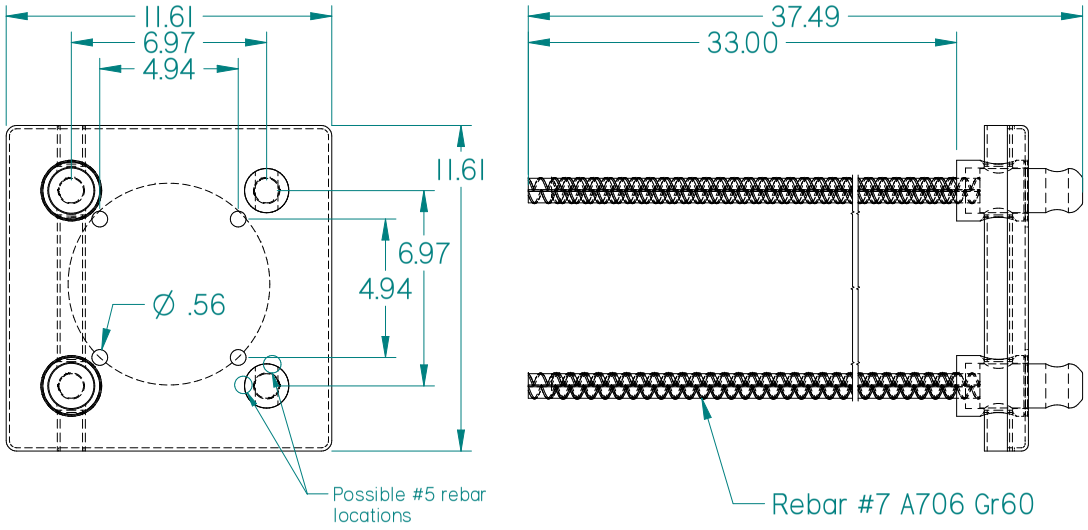
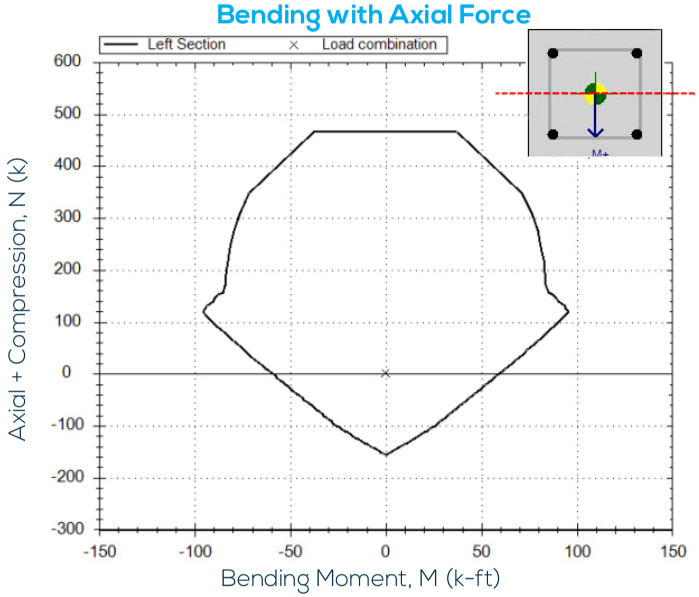
12 " EMECA Pile Joint
Technical Information







Parameter	Allowable Limit
Rated Tensile Capacity for Full Splice (4 bars)	130 kips
Shear Capacity of the Splice Joint	215 kips
Bending Moment Capacity of the Splice Joint	59.4 k-ft. (at 0 Axial load)
Allowable Driving tensile stress limit	982 psi
Recommended Driving Tensile Stress Limit	<982 psi
* Calculations based on 6000 psi concrete	

	12 inch Concrete Allowable Driving Stress Limits (psi)								
Concrete Strength	4000	4500	5000	5500	**6000**	6500	7000	7500	8000
Tensile Stresses	940	951	962	972	**982**	992	1001	1010	1018
Comp. Stresses	3399	3824	4249	4674	**5099**	5524	5949	6374	6799

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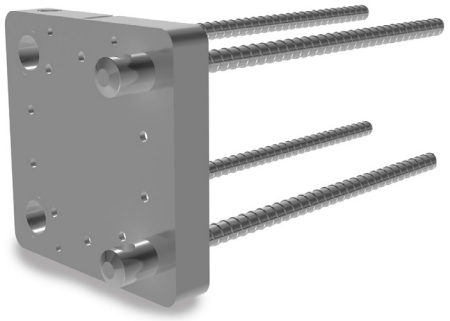
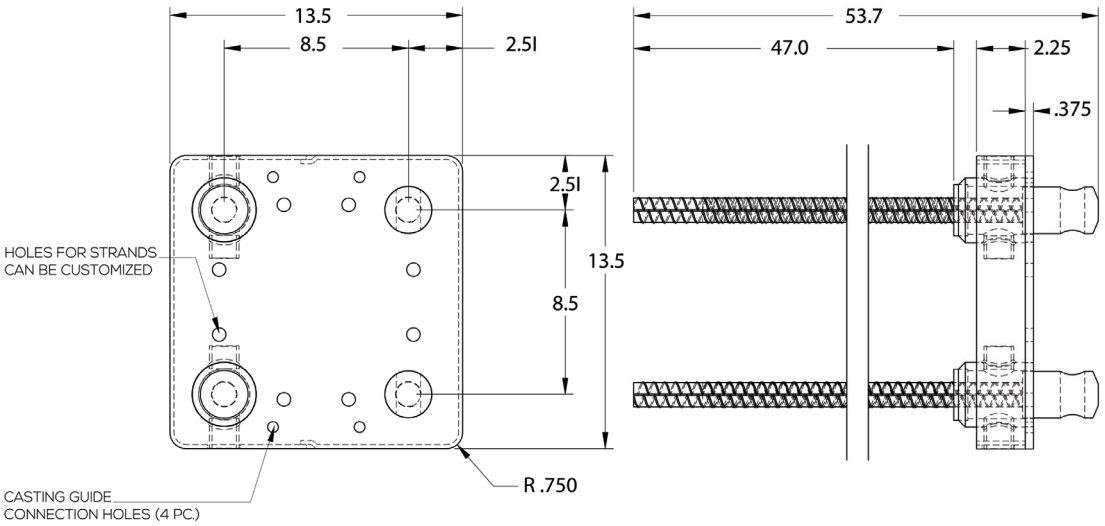
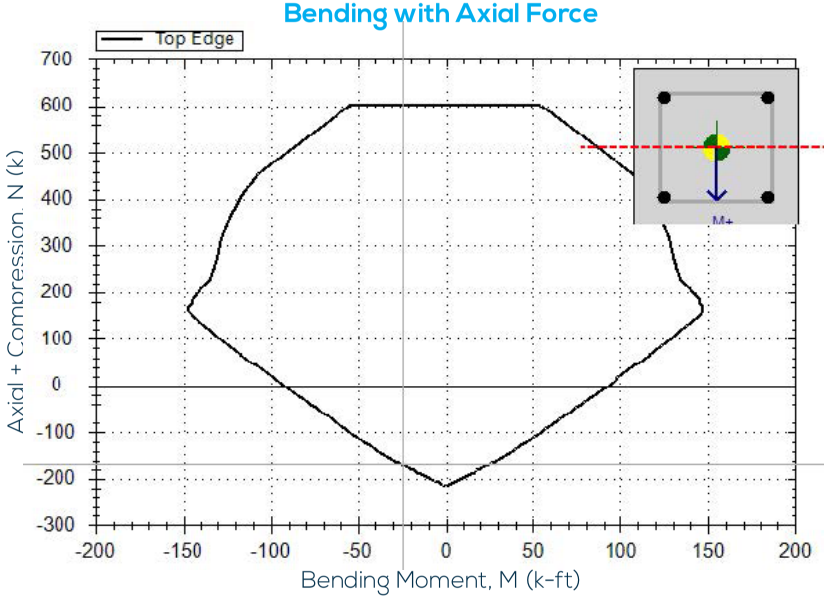
14 " EMECA Pile Joint
Technical Information







Parameter	Allowable Limit
Rated Tensile Capacity for Full Splice (4 bars)	216 kips or 54 kips/bar
Shear Capacity of the Splice Joint	409 kips
Bending Moment Capacity of the Splice Joint	92 k-ft. (at 0 Axial load)
Allowable Driving tensile stress limit	1151 psi
Recommended Driving Tensile Stress Limit	<1151 psi

* Calculations based on 6000 psi concrete

	14 inch Concrete Allowable Driving Stress Limits (psi)								
Concrete Strength	4000	4500	5000	5500	**6000**	6500	7000	7500	8000
Tensile Stresses	1108	1120	1130	1141	**1151**	1160	1169	1178	1187
Comp. Stresses	2482	2907	3332	3757	**4182**	4607	5032	5457	5882

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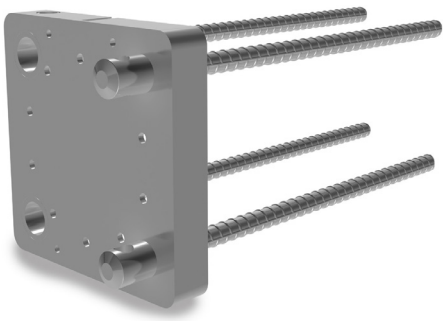
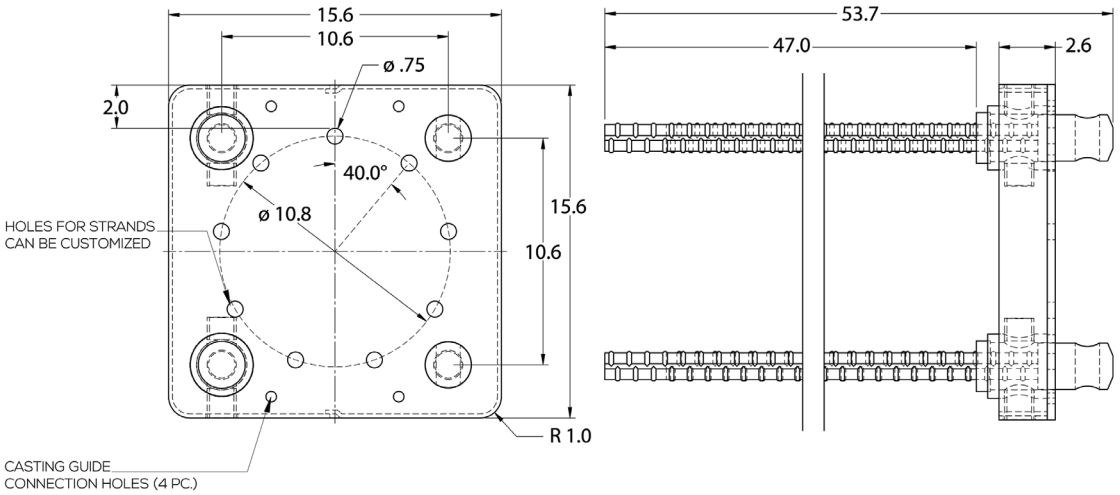
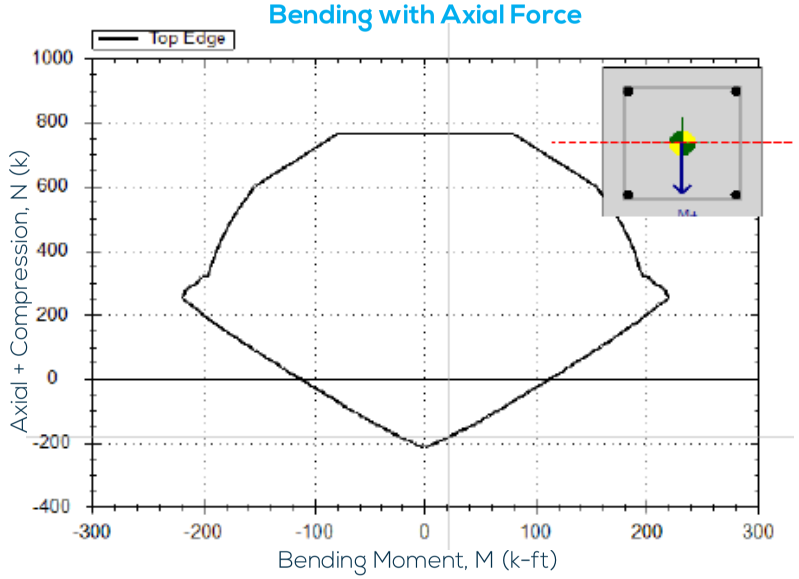
16 " EMECA Pile Joint
Technical Information







Parameter	Allowable Limit
Rated Tensile Capacity for Full Splice (4 bars)	216 kips or 54 kips/bar
Shear Capacity of the Splice Joint	409 kips
Bending Moment Capacity of the Splice Joint	113 k-ft. (at 0 Axial load)
Allowable Driving tensile stress limit	954 psi
Recommended Driving Tensile Stress Limit	<954 psi
* Calculations based on 6000 psi concrete	

	16 inch Concrete Allowable Driving Stress Limits (psi)								
Concrete Strength	4000	4500	5000	5500	**6000**	6500	7000	7500	8000
Tensile Stresses	893	904	915	926	**936**	945	954	963	971
Comp. Stresses	3400	3825	4250	4675	**5100**	5525	5950	6375	6800

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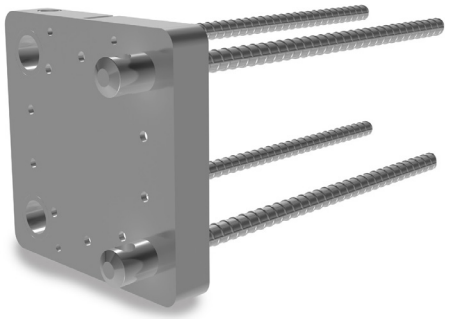
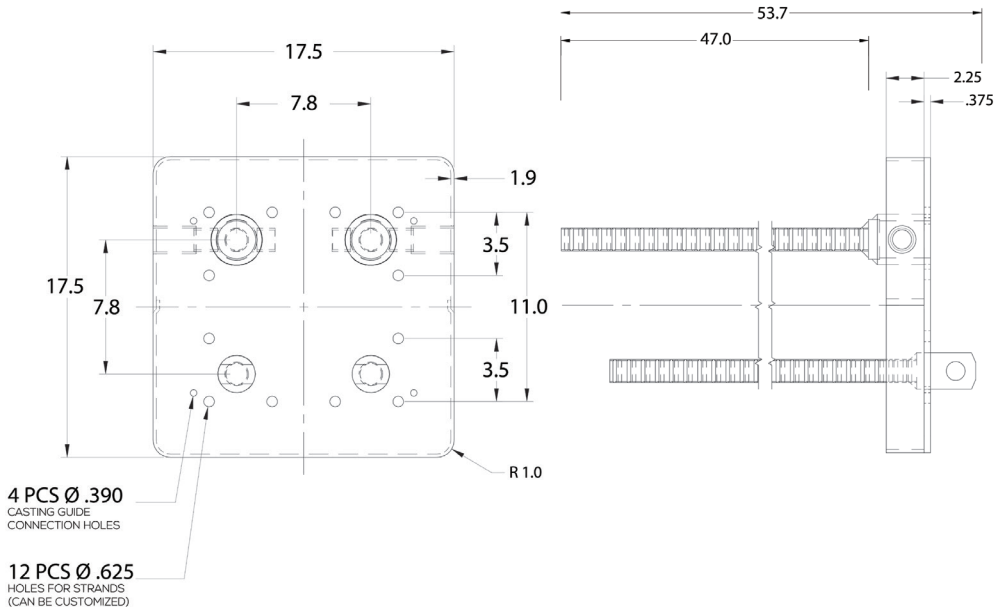
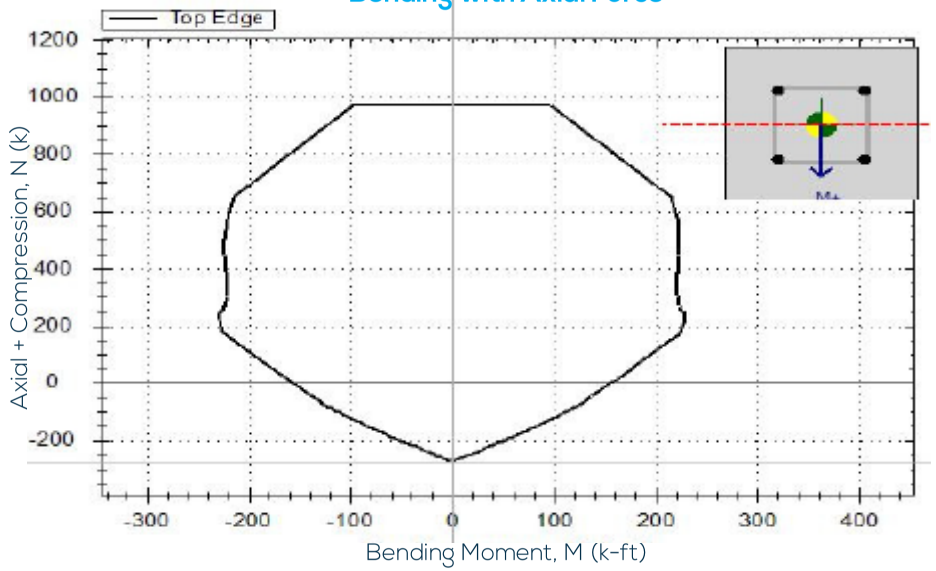
18 " EMECA Pile Joint
Technical Information





Bending with Axial Force



Parameter	Allowable Limit
Rated Tensile Capacity for Full Splice (4 bars)	329 kips or 82.25 kips/bar
Shear Capacity of the Splice Joint	409 kips
Bending Moment Capacity of the Splice Joint	156 k-ft. (at 0 Axial load)
Allowable Driving tensile stress limit	1248 psi
Recommended Driving Tensile Stress Limit	<1200 psi
* Calculations based on 6000 psi concrete	

	18 inch Concrete Allowable Driving Stress Limits (psi)								
Concrete Strength	4000	4500	5000	5500	**6000**	6500	7000	7500	8000
Tensile Stresses	1206	1217	1228	1238	**1248**	1258	1267	1276	1284
Comp. Stresses	3400	3825	4250	4675	**5100**	5525	5950	6375	6800

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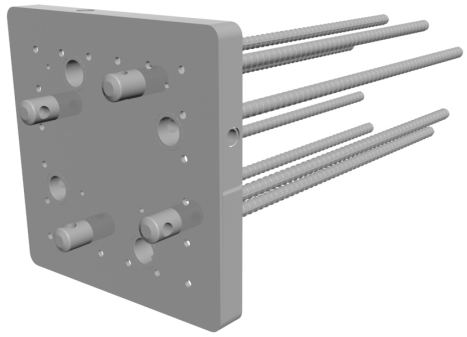
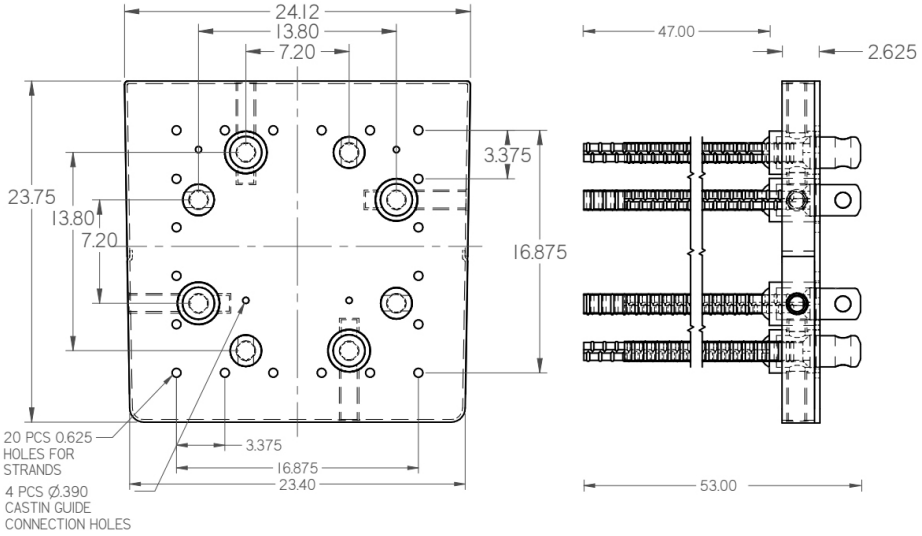
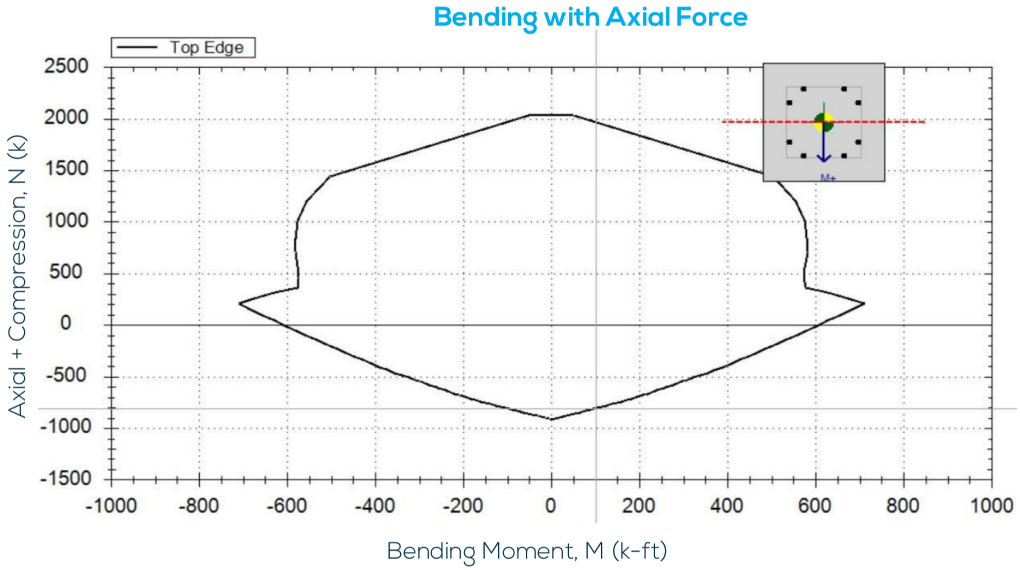
24 " EMECA Pile Joint
Technical Information







Parameter	Allowable Limit
Rated Tensile Capacity for Full Splice (8 bars)	701 kips
Shear Capacity of the Splice Joint	1033 kips
Bending Moment Capacity of the Splice Joint	603 k-ft (at 0 Axial load)
Allowable Driving tensile stress limit	1290 psi
Recommended Driving Tensile Stress Limit	<1200 psi
* Calculations based on 6000 psi concrete	

	24 inch Concrete Allowable Driving Stress Limits (psi)								
Concrete Strength	4000	4500	5000	5500	**6000**	6500	7000	7500	8000
Tensile Stresses	1248	1260	1270	1281	**1291**	1300	1309	1318	1327
Comp. Stresses	3400	3825	4250	4675	**5100**	5525	5950	6375	6800