Installation Guidelines

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Digital Installation Guidelines

Description

PileJax™ is The Pile Repair System used for the rehabilitation and reinforcement of port infrastructure, bridges, loading terminals, and any other structures utilizing piles. PileJax™ can be used to remediate any type of pile, including concrete, steel or wood. In any profile.

PileJax™ is manufactured from high-spec fiber reinforced composite. Providing a lightweight, high strength, high durability jacket. The jacket incorporates an internationally patented locking system. Used in conjunction with a range of proven grouts and epoxy resins. The PileJax™ jacket remains in place to become an integral component of the repair.

Applications

- Concrete piles displaying cracking, popout, delamination, spalling, honeycombing, abrasion, impact damage or any other form of material loss.
- Steel piles displaying any form of oxidation or any evidence of an active corrosion cell resulting in loss of parent metal.
- Wood piles displaying serious weathering or any form of biological attack.
- Protection of any type of pile in any profile.

Features & Benefits

- Patented mechanical locking system enables rapid installation without nuts, bolts, wraps or other fasteners.
- PileJax™ is modular in design, allowing for a tailored solution to unique site requirements.
- Light weight, high strength construction makes handling safer and easier.
- Fast installation provides reduced labour and dive times. Substantially reducing cost.
- High quality, marine and UV resistant materials providing outstanding durability.
- High hoop stress, flexural and axial load capacities.
- Compatible for use with or without cathodic protection systems.
- Full composite construction – no metallic components.

Jacket Dimensions

PileJax™ jackets are available in any lengths from 1m to 12m, in diameters from 0.5m to 2m. Wall thicknesses are between 3mm to 6mm, depending on application. However the PileJax™ system is modular, and therefore scalable. Custom sizes and configurations are available. Please contact PileJax™ for a custom solution beyond 12m.

Pile Preparation

Piles to be remediated must be thoroughly cleaned using a high pressure water jet or appropriate mechanical tools. The exact pressure of the water jet will need to be determined, around 3500 psi to 4000 psi (240-275 bar). Some slight abrasion of the concrete surface is preferable, but only in areas to be covered by the PileJax™ repair. This will help the repair key into the existing concrete. Do not cut into or remove viable concrete, start at a lower pressure and increase the pressure if required. Ensure all marine growth, oxidation, spalling, rot and any other loose material is removed. For a sea/river bed installation excavate around the pile about 300mm deep removing any rocks or debris. once all surfaces are cleaned, line the excavation with Geo-textile. Qualified inspection of the pile should be carried out at this time. Suitable pile preparation must be confirmed before the installation of the PileJax™ system. The project engineer should co-sign approvals to proceed.

General Installation Steps

- All personnel must be suitably trained. They must hold the appropriate qualifications and certifications to be involved in diving operations. These requirements are determined by the government of the country in which the installation is going to take place. Topside only support crew should be familiar with the precautions required when working in proximity to an active dive operation. Please scan the QR code at the top of this document to insure you have the latest version.

- Ensure that all personnel involved in the handling and installation of the PileJax™ systems are fully aware of the procedures to be followed prior to any work commencing, as detailed in the project Safe Working Method Statement (SWMS). Work is to be conducted in accordance with International Risk Management and Safety Standards ISO 31000 and ISO 45001.

1. If annular spacers are called for, follow the pattern shown in the GA Drawing. GA Drawings will be supplied in the PileJax™ system load-out. Annular spacers are epoxied (using epoxy gel) onto the inside surface of the jacket in a well ventilated area.

Fit any pumping ports specified in the GA Drawings. If specified in the GA drawings, ports will be included in the system load-out. These steps are best performed on land, prior to moving the jacket into position for deployment.

2. The most common method for deploying the jacket is from a barge or other stable work platform. Lay the jacket as flat as possible on the barge, jacket opening facing up and the bottom of the jacket pointed at the pile (the top of the jacket has the PileJax™ logo and jacket ident). This is the correct position to present the jacket to the pile.

Whenever possible deploy jackets at slack tide. When the current is running deploy the jacket on the upstream side of the pile. Water flow will help to close the jacket around the pile rather than push it away. The Dive Supervisor must make a judgment on environmental conditions and when to deploy the jacket. Small to medium jackets can be manoeuvred into position by hand, large jackets are best supported from above with lifting gear or an appropriate deployment rig. When the correct orientation is confirmed, and the jacket is sufficiently supported, the jacket can be slipped off the barge to the divers.

The divers then guide the jacket into position around the pile. Continue to support the jacket from above as the locking system is closed. All jackets must be clear of the sea/river bed when closed. This prevents debris being scooped up by the bottom of the jacket. If the jacket is resting on the sea/river bed, debris may make it difficult to close the jacket and prevent the keys from being tapped into place. When the jacket is supported from above and closed clear of the sea/river bed, the jacket and locking system will self-align. The keys can now be tapped in with the correct application of force.

3. The divers, working from the bottom of jacket to the top, can start to lock the PileJax™ system together. The bottom key is unique, and must be tapped into place in the bottom position first. Once the bottom key is tapped home correctly all other keys will index from it. Fit the bottom locking key first by inserting it laterally into the key passage one pitch height above the bottom of the jacket. Use a lump hammer to strike the PileJax™ key insertion tool, rather than the key itself. Tap the key down until the stops are reached. At this point the jacket can be lowered into its final position. Fit all other keys the same way, tapping them down until they touch the key below. The locking sequence is finalized by inserting the small yellow locking pin into the top key. Apply epoxy gel to the yellow locking pin before tapping it in. The PileJax™ jacket is now ready to be filled.

General Installation Steps Continued

4. For a mid-pile / mid water only installation, a PileJax™ bottom seal is required. There are two types. A single use profiled foam seal that wraps around the pile, and a reusable seal that is comprised of a metal clamp, that bolts to the pile, and a foam sealing gasket.

The single use seal is held in place with a strap. The jacket is then closed around this seal. The sealing face compresses as the jacket is closed, producing a water tight interface. This type of seal does not support the jacket on the pile. With the single use seal the jacket must be supported from above.

For large jobs with multiple piles, the reusable type is recommended. The reusable seal is comprised of a metal clamp that bolts to the pile, and a flat foam seal. The jacket is made water tight by the interface with the seal and supported by the clamp. Straps are used to pull the jacket down onto the clamp. The clamp provides temporary support for the jacket during the filling operation. Once the repair has cured to a sufficient hardness, the clamps can be removed and used on the next repair location. For large jobs we recommend using several clamps in a leapfrog fashion.

5. When the jacket is fully locked together and in its final position (on the sea/river bed or supported mid water) the jacket is ready to be filled. Start by using the bottom pumping port to pour a 500mm plug. In the rare occasion that the GA Drawings do not specify pumping ports, tremie the 500mm plug from the top of the jacket. Allow this plug to cure. When the plug has cured, the remediation pour can be continued all the way to the top of the jacket.

PileJax™ recommends a grout pumping rate that fills the jacket at approximately 1m per hour. Various methods can be used to achieve this fill rate. Pumping ports, bottom up, or tremie hose inserted from the top of the jacket down. Regardless of the selected method, the grout must not be allowed to "fall through the water" at any point. Always fill from the bottom up.

Depending on the pour height above the waterline it may be necessary to apply 2500kg ratchet straps as temporary support for the jacket. As each installation is different you will be supplied with a temporary strapping regime in the PileJax™ load-out if it is required.

Finish the installation using epoxy grout to seal the jacket to the soffit or batter to existing pile at a 45 degree angle to allow water runoff and prevent bird nesting. Finally clean any excess grout off the outside of the jacket for best presentation.

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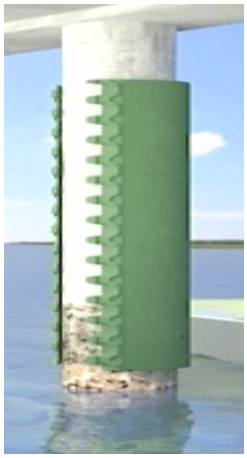
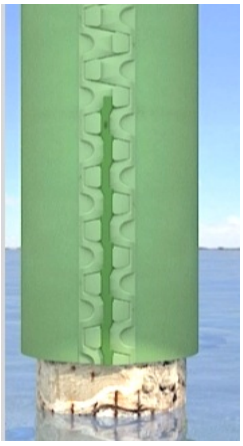
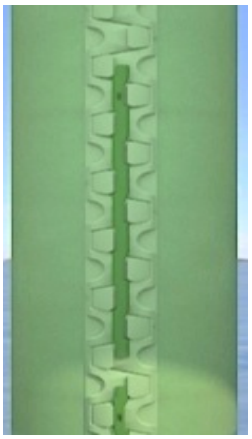
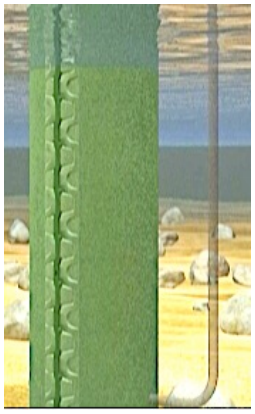
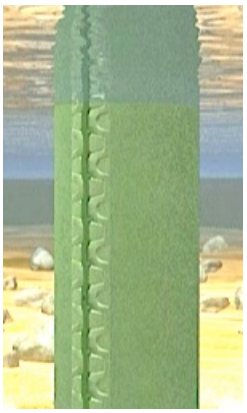
Basic Visual Steps

 Step: 1 Place PileJax™ around pile	 Step: 2 Insert 1st locking key and tap it down one pitch until the key reaches the stop
 Step: 3 Insert 2nd key same as the 1st and continue procedure until all keys are fitted.	 Step: 4 Connect hose and pump 500mm plug, let the plug cure
 Step 5: completely fill annulus inside PileJax™	 Step 6: Job is complete