



Harbor Technologies, LLC

HarborPile Owner's Field Guide



When handling, driving, drilling, and cutting HarborPile, normal safety precautions, typical in marine construction should be adopted. The use of hard hats, eye protection, gloves, personal floatation devices, dust masks and steel-toed boots are recommended as required. Follow all federal and local safety guidelines and regulations.

1. Driving

HarborPiles are supplied hollow. This enables them to be efficiently driven using industry standard driving equipment including diesel, vibratory and drop-end hammers. HarborPiles are not buoyant.

Sample hammers, energies and capacities: HarborPiles have been tested and driven using an MKT 10B3 which had a rated energy of 13,100 resulting in a drive time of 2 minutes and 25 seconds. A Pile Driving Analysis (PDA) by GZA GeoEnvironmental of New York is available upon request. An APE 200 Vibro drove the same pile in 2 minutes and 5 seconds. These piles developed an axial capacity of 60 kips (open ended and 70 kips with a conical steel shoe).

Anvil blocks & cushions: If an impact hammer is used the anvil block should be selected so that it minimizes damage to the top of the pile. A flat bottomed anvil block is well suited for HarborPile. To improve load distribution contractors can attach a plywood cushion to the anvil block. Nails should not be used in cushioning material.

Vibratory hammers: Clamps should be specifically selected to minimize damage to the sides of the pile. The clamping surface should be level and the teeth should not be excessively jagged. If the HarborPile is driven hollow, the clamping force should be controlled to crushing damage to the pile. Sheet pile style clamps which grip the wall of the pile at the top work well with HarborPile and minimize damage.

Cut off length & lifting point: HarborPile can be supplied with extra length (typically between 6" to 2') which can be trimmed after driving. HarborPiles are can also be supplied with a 2" diameter lifting hole upon request.

Template frames: If a steel frame is used as a template during installation, timber blocking or other non abrasive material should be used as a wear surface at the template to avoid unnecessarily marring the surface of piles.



2. Cutting

HarborPiles are tough and require carbide tipped blades for efficient cutting. They can be cut with a variety of readily available tools from a Sawzall type saw, a "Skill" type circular saw, a cut-off wheel type saw, to a concrete chain saw (similar to those illustrated below). All with diamond or carbide grit, or carbide tipped blades.



3. Drilling

To enable their efficient drilling we recommend specialized, but available, drill bits, designed for composites, as detailed below. Regular high speed steel twist bits can be used, but they require very frequent sharpening. Commonly available carbide tipped twist drill bits can also be used and have greater durability, but the carbide dulls relatively quickly and they too must be re-sharpened. HarborTech therefore recommends the following:

Power Drill: Harbor Technologies recommends either an electric or pneumatic drill with a $\frac{3}{4}$ " chuck.

Drill Bits: To drill both the high density poly-ethylene (HDPE) abrasion sleeve and the fiberglass (FRP) strength member Harbor Technologies recommends Carbide Tipped Wood Railroad Tie Auger Bits from Advantage Drills, Inc. (407-478-2487), as illustrated below:

We recommend extended shanks as required, for example, when drilling through the rear wall of the pile, or if drilling through multiple piles, as required when bolting piles together in dolphin clusters.

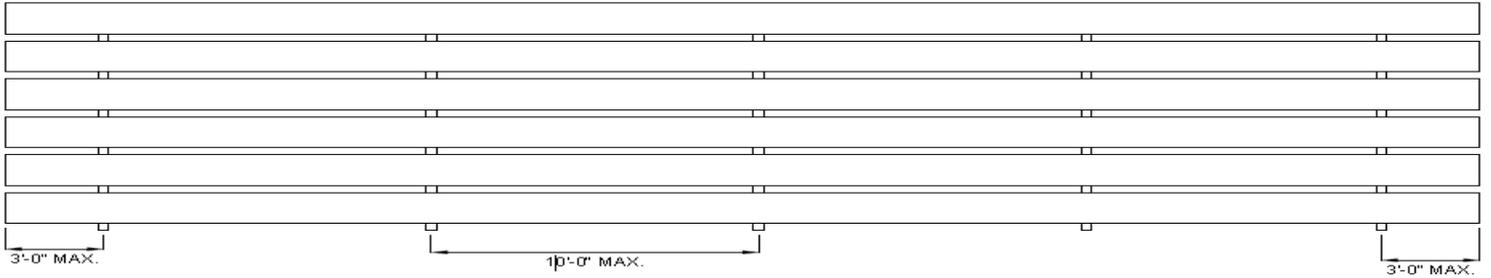


4. Nailing and Stapling

HarborPiles holds staples and nails very well (297 lb nail pull out per ASTM D 1761). HarborTech recommends pilot holes prior to hammering the staples or nails home. This technique is often used when securing wire rope to piles in dolphin clusters (as below).

5. Storage

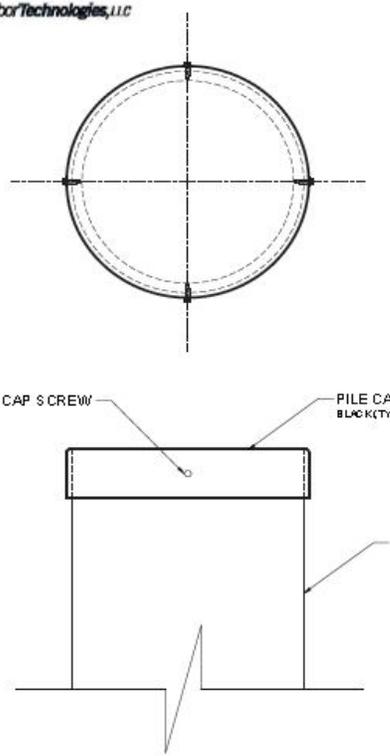
HarborPiles should be stored, horizontally, upon dunnage, to allow easy of pick-up. Dunnage should be placed a maximum intervals of 10'. Stacks should not be more than 6 piles high. Wooden chocks should be nailed into the dunnage on the outside of each row.



HARBORPILE STORAGE

6. Piling Caps

HarborPiles can be supplied with HDPE caps, which are attached after driving by stainless steel lags screws. These are available in a variety of diameters and in both cone and flat shapes and in either black or white.

PILE CAP SCREW

PILE CAP BLACK(TYP.)

HARBORPILE BLACK(TYP.)






Hardware Schedule			
Item	Material	Qty	Qty
Pile Cap	HDPE	1	1
Pile Cap Screw	S.S. Steel	1/4" x 3"	4

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TITLE

HARBORPILE CAP ASSEMBLY

DRAWING NO. HT-1128

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