

MARINE ANCHOR SYSTEMS >>>

**MANTA
RAY[®]**
EARTH ANCHOR SYSTEMS



Easy Underwater Anchor Installation

- Installs with Small, Portable Equipment
- Substantial Time & Cost Savings
- Anchors Tested to Exact Holding Capacity



MPS Civil Products Group

FORESIGHT[®]
PRODUCTS

Manta Ray Anchor Performance

REVOLUTIONIZING MARINE ANCHORING TECHNOLOGY

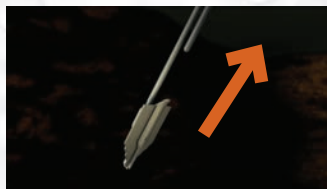
Manta Ray® Anchors are driven into the ground, not augured or torqued. No holes are dug, thus no disturbance or displacement of soil occurs during installation.

The anchors are driven with conventional hydraulic equipment that is readily available worldwide. Once driven to the proper depth, remove the drive steel and pull up on the anchor rod to rotate the anchor into undisturbed soil, like a toggle bolt in dirt.

This is called “anchor locking” the anchor (using the Manta Ray Marine Anchor Locker). The anchor rod is pulled to reach the holding capacity required. Holding capacity is measured by a gauge on the Anchor Locker. Each anchor is immediately load tested to the exact capacity required. Installed capacities are soil dependant. No other system offers this feature. No more guesswork!



Drive Anchor



Remove Drive Steel



Pull Rod to Lock



Load Test

THE TOTAL SYSTEM (Hot Dip Galvanized)



The Swivel Eye allows for 360° anchoring performance when used on standard mooring installations.



The complete anchor system consists of the Manta Ray Anchor, a 7' (2.14m) x 1" (25mm) threaded anchor rod (or equivalent), extension anchor rod pieces if necessary and a swivel eye attached at the terminus.



MR-SR

- 40,000 lbs (178 kN) ultimate tensile strength anchor
- Working loads (2-1 Safety Factor) 20,000 lbs (89 kN)
- Largest of the most commonly used anchors for “Softer” soils
- Hot dip galvanized



MR-1

- 40,000 lbs (178 kN) ultimate tensile strength anchor
- Working loads (2-1 Safety Factor) 20,000 lbs (89 kN)
- Most commonly used anchors for “Normal / Medium” soils
- Hot dip galvanized



MR-2

- 40,000 lbs (178 kN) ultimate tensile strength anchor
- Working loads (2-1 Safety Factor) 20,000 lbs (89 kN)
- Used extensively for “Hard, Dense, Cobble” soils
- Hot dip galvanized



Manta Ray Underwater Installation



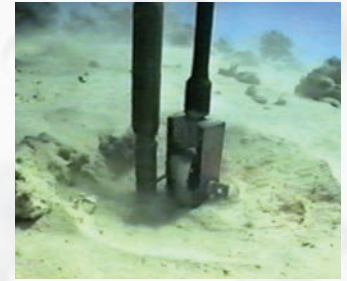
Pre-assemble the anchor rod and eye topside. Thread opposite end of anchor rod into the anchor shackle.



Assemble the drive steel and insert radius tip into the anchor.



Position the anchor at the proper angle and drive with a hydraulic hammer.



Once driven to the required depth, attach the adaptor setting bar and continue driving to countersink the top of the anchor rod.



Pull on the drive steel to remove.



Place the base plate and Anchor Locker over the adaptor setting bar.

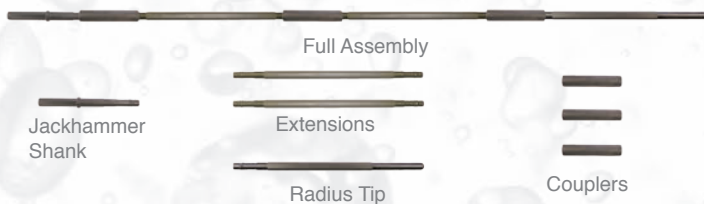


Activate the hydraulic Anchor Locker which pulls upward on the adapter setting bar causing the anchor to rotate underground. Observe the gauge to measure the desired holding capacity.



The anchor is now completely installed and proof tested to your requirements.

Manta Ray Drive Steel



Manufactured from high grade steel, sections of the drive steel are coupled together as needed while the anchor is being driven to allow the driving operation to be accomplished safely from ground level. The drive steel set can drive all anchor models. Full assembly length is 8' (2.4m). Add extensions and couplers to achieve greater depth.

Manta Ray Anchor Locker

The hydraulic powered Manta Ray Anchor Locker pulls up on the anchor rod to set it in the ground at the desired holding capacity. Portable and lightweight, the Anchor Locker consists of a base plate, hydraulic ram, jaws, and adapter setting bar. The Anchor Locker is operated by the same power source as the jackhammer.

The desired holding capacity is measured by the gauge as the anchor is rotated into position.



LL-1M Anchor Locker

Holding Capacities

| Geologic soil Description | Blow Count (N) Per ASTM-D 1586 | MR-2 Ultimate: 40 kips (1,000 lbs) | | MR-1 Ultimate: 40 kips (1,000 lbs) | | MR-SR Ultimate: 40 kips (1,000 lbs) | |
|---|--------------------------------|--|---------|--|---------|---|---------|
| | | | | | | | |
| Very dense/cemented sands; Coarse gravel and cobbles | 60-100+ | 28-40 | 125-178 | - | - | - | - |
| | | (1,3) | | (5) | | (5) | |
| Dense fine compacted sands; Very hard silts or clays | 45-60 | 21-28 | 93-125 | 36-40 | 160-178 | 40 | 178 |
| | | (2,4) | | (1,3,4) | | (1,3) | |
| Dense clays, sands and gravels; Hard silts and clays | 35-50 | 15-22 | 67-98 | 24-36 | 107-160 | 32-40 | 142-178 |
| | | (2,4) | | (2,4) | | (2,3,4) | |
| Medium dense sandy gravel; Stiff to hard silts and clays | 24-40 | 12-18 | 53-80 | 18-20 | 80-89 | 24-34 | 107-151 |
| | | (4) | | (2,4) | | (2,4) | |
| Medium dense coarse sand and sandy gravel; Stiff to very stiff silts and clays | 14-25 | 9-12 | 40-53 | 15-20 | 67-89 | 18-24 | 80-107 |
| | | (4) | | (4) | | (4) | |
| Loose to medium dense fine to coarse sand; Firm to stiff clays and silts | 7-14 | 7-10 | 31-44 | 10-15 | 44-67 | 14-18 | 62-80 |
| | | (4) | | (4) | | (4) | |
| Loose fine sand, alluvium, Soft-clays; Fine saturated silty sand | 4-8 | 5-8 | 22-36 | 8-12 | 36-53 | 9-14 | 40-62 |
| | | (4,6) | | (4,6) | | (4,6) | |
| Peat, organic silts; Inundates silts, fly ash | 0-5 | 2-5 | 9-22 | 3-8 | 13-37 | 4-12 | 18-53 |
| | | (4,6) | | (4,6) | | (4,6) | |

CAUTION:

When installing Manta Ray Anchors, follow all standard safety practices used by every contractor including but not limited to proper clothing. All underground work requires location procedures. Do not install an anchor until you know what is below the substrate/seabed. All anchors must be fully anchor locked before being put into service. Use this chart for estimation only. Actual capacity must be tested with Anchor Locker.

Predicted ultimate holding capacities are based on results of extensive Foresight Products testing and interpretation and are offered as an application guide only. They do not represent a guarantee of holding capacity in any particular soil class. A user must factor in their individual appropriate safety factor.

(1) Drilled hole required to install. (2) Installation may be difficult. Pilot hole may be required. (3) Holding capacity limited by structural limits of anchors. (4) Holding capacity limited by soil failure. (5) Not recommended in these soils. (6) Wide variation in soil properties reduces prediction accuracy. Pre-construction field test recommended.

Unconditional guarantee for free replacement if any Manta Ray Anchor breaks during installation using the manufacturer's recommended equipment and procedures. Foresight Products warrants all its installation equipment: drives steel, and anchor lockers. No other anchoring system offers this complete guarantee and warranty protection. Manta Ray Anchors are made of galvanized ductile iron. When the manufacturer's recommended equipment and procedures are followed, Manta Ray anchors are replacement guaranteed against breakage during installation. In order for the Manta Ray Anchors to be effective, it is imperative to have knowledge of the type of soils the anchors are going to be placed. A simple soil test will give you that information and once known, it is relatively easy to determine which size anchors to choose to meet the holding capacity required.

Underwater Applications

- > Moorings
- > Anchor Buoys
- > Signal Buoys
- > Pipelines
- > Floating Docks
- > Scour Mats
- > Artificial Reefs
- > Intake Nets
- > Pontoons

Topside Applications

- > Sea Walls
- > Sheet Piling
- > Retaining Walls
- > Pipelines
- > Tie Back
- > Erosion Control
- > Gabions
- > Revetment Mats
- > Geogrid

PATENTED WORLDWIDE
Nos. D572,546 - 6,237,289 - 7,534,073 - Other international patents.

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