

Oil & Gas

Offshore



Synergy with Nature

Submar introduced concrete mat technology to the Gulf of Mexico in 1990. Prior to that, pipeline operators in the Gulf used inefficient sand/cement bags for pipeline crossings. Since Submar's mat technology introduction, sand/cement bag pipeline crossings have become virtually obsolete. Submar mats have been used successfully for pipeline separation, stabilization and protection for over two decades. Articulating concrete mat crossings are accepted as the new standard by DOT, MMS Contractors and Pipeline Operators.

The Submar Construction Mat is superior in quality of construction, long-term value and safety.



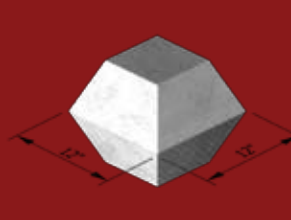
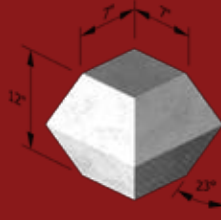
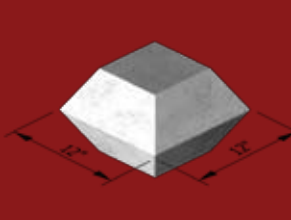
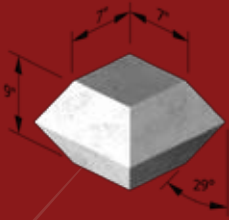
Construction Mats Application

- Pipeline Protection
- Pipeline Stabilization
- Pipeline Separation and Cover
- Pre-Lay Crossings
- Post-Lay Crossings
- Scour and Erosion Protection
- Free Span Correction
- Pipeline Vortex Shedding
- Rig Pads
- Pipeline and Umbilical Anchoring
- Valve Protection
- Pipeline Weight Coating
- Reusable Offshore Foundation
- Pipeline Thermal Expansion

For over two decades Submar has achieved success in the offshore oil and gas market by providing an environmentally and technically superior product. The combination of consistent manufacturing, outstanding technical support and 24-hour customer service is the Nature of Submar.



9" Element



12" Element

Unit		Dimensions			Concrete Density (LBS / cu. ft.)	Mat Weight Air (LBS)	Mat Weight Submerged (LBS)
Size	Style	L	W	H			
9"	Closed	8'	20'	9"	145	10,500	6,000
12"	Closed	8'	16'	12"	145	10,500	6,000
12"	Closed	8'	20'	12"	145	13,125	7,500

*Compressive Strength: 4000 PSI (Minimum)

**5/8" Ultraviolet Stabilized Copolymer Extruded Fiber Rope, Minimum 9,500 LBS Tensile Strength

Patented Non-Shielding / Non-Abrasive Padding

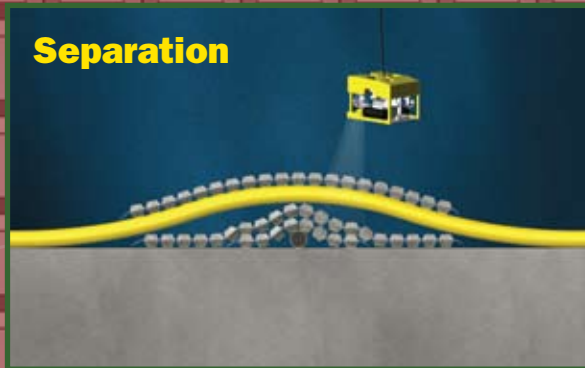
Submar's porous pads will not effect or shield off a Cathodic Protection System.



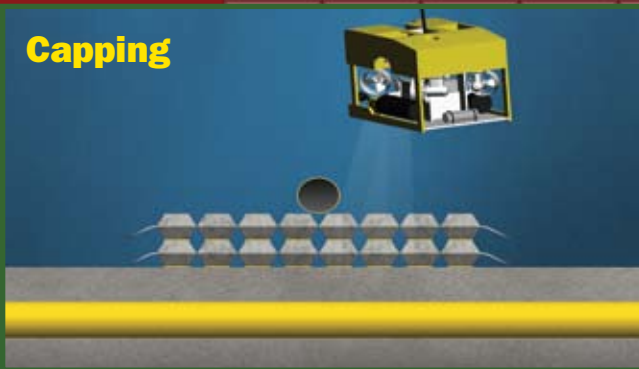
Submar mats can be supplied with patented 'Non-Shielding', 'Non-Abrasive' pads. These pads were developed especially to protect thin filmed epoxy coated pipelines from coming in contact with Submar's concrete mats. The pads are 7-1/2" x 7-1/2" square and are made of heavy duty, 3/8" P.V.C.

Patent Numbers: 5,722,795
5,846,023 & 5,944,44

Separation



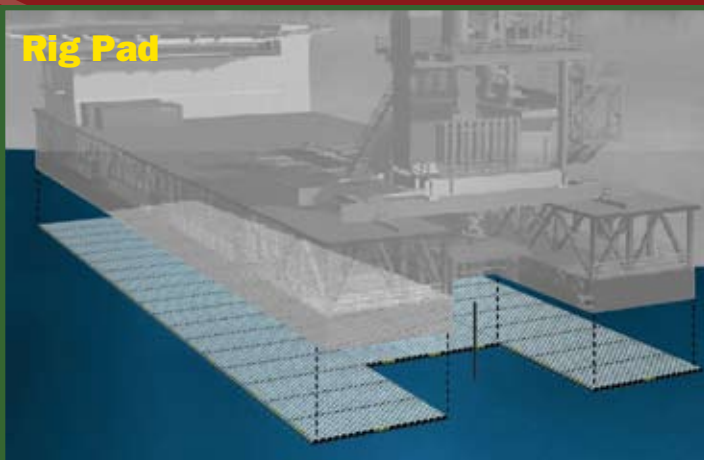
Capping



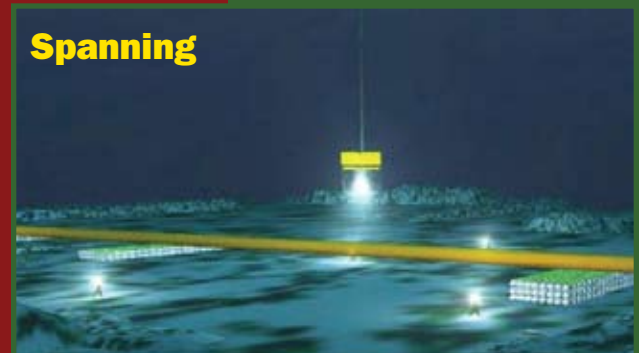
Abandonment



Rig Pad



Spanning



Mechanical Frame Specifications

Frame Style	Dimensions		Maximum Hook Height with Mat (ft)	Empty Frame Weight (tons)	Maximum Number of Mats Per Load	Maximum Loaded Frame Weight (tons)
	L (ft)	W (ft)				
Single	8	20	24	1.75	2	12.25
Dual	8	40	36	4.00	5	30.25
Triple	8	60	42	8.00	7	44.75

Single



Dual



Triple



Submar's Mechanical Mat Deployment Frame Operating Procedure

1. Position Mechanical Deployment Frame on top of mattress ensuring straps are free.
2. Activate the handle until pins are approximately 1" from closed position (1), enabling all 20 straps to be positioned on pins (one strap from each side of mat per pin).
3. Place straps through lifting ropes on mattress making sure they are not twisted. Return strap eyelet through the guide (2) on the handling frame to load pins (3).
4. Activate handle to maximum closed position, taking care not to wedge straps on end of pins. Move safety latch to lock position (4).
5. To release the mattress, the safety latch must be lifted upward and the handle pulled outward to the open position (5).

Patent Numbers: 6,139,220 & 6,106,194

NYLON STRAP

Submar's Patented Installation Frames

- ROV / Diver Friendly
- Safe / Fast Release
- Quick Deployment
- Fail Safe
- Environmentally Safe
- Reduces Bottom Time

Submar's patented mechanical frames promote safety and saves time and money offshore. ROV friendly frames are safer than using divers in deep water and the quick release handle allows mat release time to be cut by hours. The dual and triple frames are capable of installing multiple Submar mats at one time saving hours of redeployment and overall days at sea.



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