Fixed Barrier - **FSB™ Fixed Security Barrier System**


The FSB™ stops a boat’s progress in milliseconds, yet remains fully capable of stopping a second or even a third swarm attack.

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**The FSB™ barrier is designed to be permanent and installed in place to stop:**

- Fast Inshore Attack Crafts (FIAC)
- Boat-Borne Improvised Explosive Devices (BBIED)
- Multiple boat attacks
- Intruders at full power before, during and after impact
- Slow speed, heavy tonnage vessels
- High speed, lower tonnage vessels
- Underwater penetration

**FSB™ Barrier System**

- Ultimate stopping energy 3.7M ft lbf/5.01 MJ
- Working stopping energy 1.25M ft lbf/1.69 MJ

**Constructed System**

- Piling length determined by seafloor conditions, net height requirements and water depth to maximum of 80 ft (24.38 m)
- **Example:** A 60 ft (18.29 m) deep system would require 102 foot-long (31.09 m) pilings as follows depending, of course, on site conditions.

<table>
<thead>
<tr>
<th>Embed in seafloor</th>
<th>30 ft (9.14 m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seafloor to surface</td>
<td>60 ft (18.29 m)</td>
</tr>
<tr>
<td>Extension above surface</td>
<td>12 ft (3.66 m)</td>
</tr>
</tbody>
</table>

- Pilings are generally spaced no more than 100 ft (30.48 m) apart.
- Net depth and elevation designed according to risk assessment of site conditions, water depth and above water stopping requirements generally beginning at a height of 8 ft (2.44 m).
- Galvanized or stainless steel mesh nets.
- Subject to design, there is no practical limit to the amount of energy the system can withstand under varying wind and current conditions.

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**Performance**

- Low-maintenance – Corrosion resistance proven over nearly 10 yrs. of “real-world” operations
- Attack resistance – Best resistance to high-energy boat impacts at 3.7M ft lbf/5.01 MJ
- Sustainability – Ten-year proven resistance to marine environment permanent stress including weather, sea swells, sea waves, chafing, marine fouling and sea life.

**Expertise and Service**

- Expert installation – teams include divers and marine constructors with over 30 years experience working with each other.
- Fosters local partnerships – local sub-contractors join the team when qualified, gaining work skills and technology training.
- Life-cycle value – team experts provide life-cycle cost estimates to be used in formulating investment and insurance calculations and in selecting the system that meets the customer’s need.
Harbor Offshore Barriers at a Glance

MISSION STATEMENT:
Our mission is to meet every customer's unique needs, from project conception to completion. We offer you a full services package to assess, design, engineer, fabricate, install, and maintain your waterside perimeter barrier system with an experience foundation not offered by others.

COMPANY:
Harbor Offshore Barriers, Inc., founded 2004

AFFILIATION:
Marine security specialty company of Harbor Offshore, Inc. founded 1997

HEADQUARTERS:
4411 Dupont Court, Suite 130, Ventura, California 93003 USA

MANAGEMENT:
Jeff Terai, President
dhutchinson@harboroffshorebarriers.com
Cliff Center, Director of Marine Operations
ccenter@harboroffshorebarriers.com

PRODUCTS:

<table>
<thead>
<tr>
<th>Characteristic Benefit</th>
<th>Fixed Security Barrier FSB™ (Patent #7,744,313 B2)</th>
<th>Floating Barrier PSB 600™</th>
<th>Floating Barrier PSB 5500™</th>
<th>Floating PSB-T US Navy Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td>Underwater Fixed Barrier</td>
<td>Global Standard</td>
<td>Heavy-Duty</td>
<td>Military Installations</td>
</tr>
<tr>
<td></td>
<td>Netting in intertidal zone and above water attached to steel pilings</td>
<td>Continuous net capture system supported on pontoon structure</td>
<td>Continuous net capture system supported on pontoon structure</td>
<td>Floating barrier on pontoon structure</td>
</tr>
<tr>
<td>Ultimate Stopping Energy</td>
<td>3.70M ft lbf/5.01 MJ</td>
<td>5.90M ft lbf/7.99 MJ</td>
<td>9.09M ft lbf/12.32 MJ</td>
<td>5.90M ft lbf/7.99 MJ</td>
</tr>
<tr>
<td>Working Stopping Energy</td>
<td>1.25M ft lbf/1.69 MJ</td>
<td>2.49M ft lbf/3.37 MJ</td>
<td>5.49M ft lbf/7.44 MJ</td>
<td>3.70M ft lbf/5.01 MJ</td>
</tr>
<tr>
<td>Unit Length*</td>
<td>Pilings spaced up to 100 ft (30.48 m) apart</td>
<td>50 ft (15.24 m) / 40 ft (12.2 m) available</td>
<td>50 ft (15.24 m) / 40 ft (12.2 m) available</td>
<td>40 ft (12.2 m) / 50 ft (15.24 m)</td>
</tr>
<tr>
<td>Netting Material *</td>
<td>Galvanized or stainless steel</td>
<td>Nylon or metal mesh</td>
<td>Nylon or metal mesh</td>
<td>Nylon</td>
</tr>
<tr>
<td>Netting Attachment</td>
<td>Steel pilings</td>
<td>Galvanized steel beam running from pontoon-to-pontoon</td>
<td>Galvanized steel beam running from pontoon-to-pontoon</td>
<td>Galvanized steel beam running from pontoon-to-pontoon</td>
</tr>
<tr>
<td>Usual Netting Height*</td>
<td>Height 8 ft (2.44 m) / Depth to 80 ft (24.38 m)</td>
<td>8 ft (2.44 m)</td>
<td>9 ft (2.74 m)</td>
<td>7 ft (2.13 m)</td>
</tr>
<tr>
<td>HDPE Pontoon Dimensions*</td>
<td>Not Applicable</td>
<td>1.25 in (3.17 cm) thick 30 in (76.2 cm) diameter Length engineered for site conditions</td>
<td>1.75 in (4.45 cm) thick 42 in (106.68 cm) diameter Length engineered for site conditions</td>
<td>1.25 in (3.17 cm) thick 30 in (76.2 cm) diameter Length engineered for site conditions</td>
</tr>
</tbody>
</table>

*Exact dimensions may vary; all specifications depend upon conditions, customer requirements and other factors.

EXPERIENCE:
- Since 2004, over 50,000 linear ft (15 240 m) fabricated, assembled, installed worldwide from Japan to Iraq to guard naval and infrastructure facilities.
- Multiple US Department of the Interior Bureau of Reclamation dam projects – PSB 600™ model certified for Bureau of Reclamation work.
- On-going US Navy inspection and maintenance services.
- Extensive testing of the FSB™, PSB 600™ and PSB 5500™ with independent US Navy and academic observers.