DREDGING & MARINE CONTRACTORS

The purpose of this paper is to educate Hull and Marine Liability Underwriters about the nature and exposures associated with this unique segment of the maritime industry.

Prepared By:
American Institute of Marine Underwriters
Technical Services Committee

May, 2006
AIMU Technical Services Committee
Dredging & Marine Contractors
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Subject</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Introduction</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>General Discussion</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Beach Replenishment &amp; Restoration</td>
<td>2-3</td>
</tr>
<tr>
<td></td>
<td>Maintenance of Ports &amp; Waterways</td>
<td>3-4</td>
</tr>
<tr>
<td></td>
<td>Appropriations &amp; Contracting Process</td>
<td>4-5</td>
</tr>
<tr>
<td></td>
<td>Areas of Operation</td>
<td>5</td>
</tr>
<tr>
<td>Types of Equipment:</td>
<td></td>
<td>5-10</td>
</tr>
<tr>
<td></td>
<td>Clamshell Dredge</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Backhoe Dredge</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Bucket Ladder Dredge</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Dipper Dredge</td>
<td>7-8</td>
</tr>
<tr>
<td></td>
<td>Hydraulic Dredging</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Cutter Suction</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Dustpan Dredge</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Water Injection Dredge</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Ocean Self Propelled Dredges</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Pontoon Dredges</td>
<td>10</td>
</tr>
<tr>
<td>Exposures:</td>
<td></td>
<td>11-13</td>
</tr>
<tr>
<td></td>
<td>Fire</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Heavy Weather</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Towing</td>
<td>12-13</td>
</tr>
<tr>
<td></td>
<td>Mechanical Damage</td>
<td>13</td>
</tr>
<tr>
<td>P&amp;I and Marine Liability</td>
<td></td>
<td>14-17</td>
</tr>
<tr>
<td></td>
<td>P&amp;I Exposures</td>
<td>14-15</td>
</tr>
<tr>
<td></td>
<td>Third Party Injury &amp; Property</td>
<td>15-16</td>
</tr>
<tr>
<td></td>
<td>Environmental Damages</td>
<td>16-17</td>
</tr>
<tr>
<td>Valuation Issues</td>
<td></td>
<td>17-18</td>
</tr>
<tr>
<td></td>
<td>Insurance Appraisals – Market Value</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>General Valuation Issues</td>
<td>18</td>
</tr>
<tr>
<td>Conclusion</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>References</td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>
Dredging and related Marine Contracting are active segments of the domestic maritime industry, which present some unique challenges for marine underwriters. The purpose of this paper is to educate Hull and Marine Liability underwriters about the nature and exposures associated with this unique segment of the maritime industry. This paper will provide a discussion of the different types of activities and equipment utilized, as well as discuss the exposures both from a hull, crew, P&I and marine liabilities perspective.

**General Discussion**

Dredging is important to the conduct of maritime commerce throughout the U.S. Dredging activities occur on inland waterways, within ports and harbors, on coastal areas, as well as in support of new construction projects. Maintenance of navigable waterways depths is a continuous process in many ports and harbors, whose bottom contours are constantly changing due to silting near the mouth of rivers. And, as ship’s become larger and draft requirements (depth of the ship’s hull below the waterline) increase, ports may need to deepen their channels to allow for deeper draft ships, in order to remain competitive with other ports. In short, dredging is essentially the underwater removal of sand, soil or silt and its movement from one place to another, for purposes of deepening a channel or navigable waterway. Dredging often makes use of the removed material, for beach replenishment, land reclamation, or for fill in commercial or industrial projects.

**Beach Replenishment & Restoration**

Beach restoration is an on-going aspect of dredging, as many coastal communities and sanctuaries are eroded over time, due to natural current flows and storm activities. This is particularly problematic along the East Coast of the U.S. with the Gulf Stream and the periodic pounding by hurricanes. Barrier islands along the U.S. Gulf Coast have also had their configuration changed by erosion and the effects of hurricanes and often these shorelines need to be restored.

The Eastern and Gulf seaboards of the United States are an immensely rich coastal resource of thousands of miles in extent. Much of this coastline is developed, with beachfront residences, state and national parks or resort properties. The East Coast faces the Atlantic Ocean, and is unprotected from the ravages of winter storms; both the East and Gulf coasts are situated within the world’s most active hurricane corridor. The West Coast has far fewer beaches to protect, but is subject to winter storms and is also a significant part of the beach replenishment market.

On average, eight to eleven tropical storms or nor’easters strike Eastern beaches each year, causing dramatic beach erosion and property damage. Exacerbating the erosion caused by storms are jetties and breakwaters that redirect the natural flow of sand away from the shore, thus depriving beaches of natural sources of nourishment. Confronted with such erosion, property owners and local, state and federal governments face a choice. They can allow the erosion to proceed unchecked or they can opt to restore the
beaches to protect their potentially enormous capital investment. Since the first beach nourishment project, coastal engineers have had to seek and identify sources of sand to be used to restore eroded beaches. Their task is to balance economics with the safety of such environmental resources as reefs, hard bottoms, and the other habitats of aquatic animals and plants. Adding to that continually growing list of factors is the safety of threatened or endangered species themselves: whales, manatees, turtles, and various types of birds and fish. Consideration of all these factors has resulted in modifying the methods of dredging and limiting construction to periods when the work can be accomplished with minimal environmental impact.

**Maintenance of Ports and Waterways**

Over the years, dredging has made a significant contribution to the development of many world economies. Construction and maintenance of harbors, canals, and waterways have all directly benefited from the dredging industry. Additionally, dredging is key in coastal protection, land reclamation, and environmental restoration projects.

In addition, there are many other applications to which dredging is key. In many places, agriculture depends on irrigation and drainage with the use of canals. Dredging is often used for infrastructure projects such as road construction. Trenches for pipelines and cables and more, are often aided with the assistance of dredging as well.

In the Northeastern U.S. alone, some of the recent dredging projects that have been completed or are currently underway and/or planned include:

- Baltimore harbor dredging project, which features the creation of an artificial island that will be filled with spoils from the dredging activities.
- Deepening of the channel for the port of NY/NJ, which required drilling and blasting of bedrock that had been deposited during the Ice Age.
- Deepening of the channel (Delaware River) for the Port of Philadelphia
- Dredging to remove hazardous material (PCB’s) from the Hudson river
- The Chesapeake Bay Bridge tunnel project required extensive dredging for the laying of the tunnel sections.
- Boston Harbor tunnel (The Big Dig).

During marine construction, dredging is often required in support of construction of piers, bridges and tunnels. Many dredging companies have diversified into Marine Contracting for pile driving, pier construction, fender building and other marine construction. Marine Contracting tends to provide a more continuous source of projects for owners/operators than does dredging, due to the heavily regulated nature of dredging activities.
**Appropriations and Contracting Process:**

The U.S. Army Corps of Engineers (USACE) is responsible for the maintenance of waterways and ports/harbors within the U.S. Consequently, they control and award all dredging projects on U.S. waters. Before any dredging project can begin, there must be a type of cost benefit analysis performed by the USACE called Net Economic Development Benefits (NED). The NED attempts to determine if the project would be in the government’s interest to undertake. This can often lead to competition between neighboring ports. For example, is it in the public’s best interest to pursue the deepening of the channel for the Port of Philadelphia, or to commit our limited resources to the deepening of the Port of New York/ New Jersey? Although not necessarily mutually exclusive, sometimes the answer may mean that one port will grow, while the other will decline.

Once the USACE has decided the NED issue, the next step is to define the scope of work and solicit competitive bids from marine contractors. The successful bidder is usually required to post a performance bond.

The next challenge is to find possible sponsors to fund the project. The government provides funding for the USACE under the Water Resources Development Act (WRDA), but often additional funding is needed. The USACE will look to state and local governments, as well as concerned industry associations. The point for underwriters is that dredging can be a cyclical business, with the viability of companies sometimes tied to funding issues for projects.

The other major hurdle in the permit process is to perform an environmental impact study. This can be a time intensive and onerous process, in which Federal (EPA), State and Local Authorities must review and approve the dredging plans and disposal of spoils. Among the environmental factors considered are the impact to the environment and marine life in the area affected by the dredging, as well as the disposal of the dredging spoils. Many river bottoms contain potentially toxic chemicals and contaminants that have accumulated over the years, due to industry activity and previous dumping, such as residual PCBs in the Hudson River, due to production of Agent Orange and other toxic chemicals in the past.

In addition to any state or local agency requirements, the Environmental Impact Study must satisfy the requirements of the following Federal Acts:

- Rivers & Harbor Act of 1899
- National Environmental Policy Act
- Clean Water Act
- Ocean Dumping Act
- Coastal Zone Management Act
- Endangered Species Act
- Magnuson-Stevens Fishery Conservation & Management Act
- Fish & Wildlife Coordination Act
Once the environmental impact study has been completed, the USACE can pursue competitive bids for the dredging project. Once the successful bidder has been identified and the project awarded, the next step is to find a sponsor and arrange for funding of the dredging project. Funding is often provided by a combination of private and federal funds.

Once the scope of work has been defined, a contractor selected, funding arranged and the environmental impact study completed, the USACE will issue a Permit to the successful bidder. It should be noted, however, that USACE has procedures that can allow for a no bid award to a contractor for an emergency project.

The point for underwriters is that the approval process can take years and have an uncertain outcome. The uncertainty of this process and its potential business ramifications can have a significant effect on the financial operations of dredging contractors, including whether funds remain available for maintenance of equipment.

**Areas of Operation**

The areas of operation can define some of the unique exposures for dredging and marine contracting. It is critical that underwriters gain a full understanding of the project and the scope of work. The primary types of dredging are listed below with a brief description:

- Private ponds and waterways
- Inland waters and rivers
- Ports and Harbors
- Coastal, including bays, inlets and sounds
- Foreign/Domestic

The area of operation dictates the type of dredge utilized. For the underwriter, the significance is that the area and type of dredge affect the insurance exposures. Underwriters need to develop an understanding of the project undertaken and the scope of work.

**Types of Equipment**

- Portable
- Pontoon dredges
- Cutter head dredges
- Hydraulic dredges
- Dipper/bucket dredges
- Shovel dredges
- Drill barges (blasting)
- Self-propelled dredges
- Crane barges
- Scows and dump scows
- Material barges
Note that dredgers and marine contractors will often charter barges or equipment for specific projects. There has been little new construction activity within the past 25 years, so most barges are older hulls. Prior to a barge going on charter, an On Charter (On Hire) inspection should be done, by an independent Marine Surveyor. This will document the vessel’s condition and when later compared to an Off Charter (Off Hire) survey, will define what damages, if any, were incurred during the charter period. Although the cost of these surveys is typically split between the vessel owner and charterer, the underwriter should ensure that this practice is followed; otherwise, their insured could end up being responsible for costly repairs for damages that pre-existed to the vessel's being taken on charter.

The primary purpose of dredging is to excavate underwater material for the purpose of deepening one area, or rebuilding another. The two main categories of dredging are mechanical excavation and hydraulic excavation. Mechanical excavation dredges are slower but provide a more controlled excavation and so are useful in tight areas such as a channel running between a set of piers. The following types of mechanical dredges can be found in common usage.

**Clamshell Dredge** – This is simply a dragline crane with a clamshell bucket mounted on a barge. It discharges into an attached scow. This type of dredge is useful where the bottom is sand or mud or broken material. The amount discharged with each lift is dependent upon the size of the bucket and lifting capacity of the crane. The material is loaded into a hopper barge, called a scow, and the barge is towed away for the spoils to be dumped, in an approved area.
**Backhoe Dredges** – This type of dredge can take a “bite” out of rock face. It is useful for widening channels. These dredges are all hydraulic, but in this case hydraulic refers to the hydraulic system, which operates the hoe and spuds. The spuds are arms, which hold the barge in place, but can be configured as “walking” spuds for movement.

![Backhoe Dredge](image)

**Bucket Ladder Dredge** – This type of dredge uses continuously rotating buckets to scoop material from the bottom. The material exits through a chute to a barge (dump scow). This type of dredge is most commonly used in mining operations.

![Bucket Ladder Dredge](image)

**Dipper Dredge** - This type of dredge is now generally used commercially only in the mining industry. There is also a dipper dredge with a walking spud mounted on the stern, also called a dragline crane. This type of dredge removes loose spoils and provides an even level of excavation.
Hydraulic Dredging – These types of dredges are ideal for moving large quantities of material. They are commonly found in beach reclamation projects or in large projects in unrestricted waters. The following dredge types are considered hydraulic dredges.

Cutter Suction – This dredge has a large rotating cutting head, which is capable of grinding hard material into small pieces. Water is mixed with the spoils to create liquid slurry, which is then pumped through a floating pipeline or spoil line, and deposited in a spoil barge (scow) or pumped ashore to a landfill.
Dustpan Dredge – This is used for shallow water dredging and operates like a large vacuum cleaner. The suction head, which is approximately the width of the barge, is lowered to the face of the material to be moved. High velocity water jets loosen the material, which is then drawn by a pump as slurry through the dredge pipe and floating pipeline where the material is deposited outside the navigation channel. This type of dredge is often used in beach reclamation and can pump up to 100,000 cubic yards per day.

Water Injection Dredge – Pumps high-pressure water into the mud or sand bottom and stirs it into slurry, which is then carried away by the natural current.

Dredges can also be relatively large, self-propelled ships that are capable of operating in ocean or coastal locations. These types of equipment are typically classed and provided with a load line certificate. Non-self propelled offshore dredges, capable of ocean tows, may also be classed and have load line certificates.
Pontoon dredges are smaller dredges, which can be either hydraulic or mechanical. This pontoon dredge is used to operate a hydraulic cutter head. The dredge is provided with wire cable mooring lines, which are attached to shore side deadmen, and the dredge moves about by hauling the wire cables. These typically operate in ponds and quarries and can readily be disassembled and transported by truck, from one location to the next.

Spoils from the bottom are pumped, via a pipeline supported on pontoons (also called a spoil line), to the shore. This dredge operates in a private sand pit, providing sand for cement production.
EXPOSURES

Fire

Fire is one of the most common sources of severe losses aboard a dredge. Equipment often is operated 24 hours per day, with many hydraulic and fuel lines under high pressure, in hot, dirty environments. Once a fire starts, it can quickly spread, due to the design of the vessel and lack of fire fighting training of the crew. Among the causes of fires are:

- Accumulation of debris, such as oil soaked cleaning rags, dry combustible stores and bilge/waste oil accumulations.
- Inadequate maintenance of machinery or equipment.
- Inadequate or poorly maintained shielding and protection of exposed hot exhaust piping.
- Over heating electrical motors and equipment.
- Improper hot work controls for welding or torch cutting.
- Inadequate observation of and response to audible and visual alarm signals and/or lack of proper alarms systems for unmanned engine spaces.
- Improperly maintained or inadequate fixed or portable fire fighting equipment, and lack of knowledge of their proper use.

Critical Loss Control issues are:

- Fire fighting and training of the crew for use of portable fire extinguishers, as well as the operation of any fixed fire extinguishing systems for the machinery spaces.
- A self-inspection program should be in place, wherein machinery spaces and other hazardous areas are regularly inspected in an attempt to identify and correct potential sources of fire, such as those listed above.
- A Hot Work policy should be established for controlling any hot work, such as arc welding or torch cutting. This policy should identifying and confirm:
  - What types of activity is considered hot work.
  - Who has the authority to authorize hot work.
  - What procedures must be followed before hot work can be authorized, such as obtaining a Marine Chemist’s certificate.
  - Any controls that must be in place during hot work, such as ventilation or fire watch.
Heavy Weather

Grounding or being blown ashore, due to failure and/or loss of mooring gear, may result in severe hull damage or partial flooding of machinery spaces. Also, crewmembers may be injured or lost due to having to abandon the vessel, or they may be evacuated by rescue helicopter.

Collision may result if the dredge, spoil line, mooring buoy or other equipment is blown off location and becoming a hazard to navigation. This also can give rise to a liability claim for damages to other vessel or injuries.

Sinking may result from lack of proper preparation of the dredge for the potential weather event.

Loss of the dredge may result due to sinking as the result of a failure to heed the Forecast warnings and move to a safe haven.

One critical loss control issue is a review of the dredging company’s heavy weather contingency plans. These plans should be defined with progressive levels of preparedness within specific time frames of a storm’s approach. Also, the plans should be specific to the job site where the equipment is working, not just generic plans and/or statements of policy, with assigned responsibilities for completion of specific tasks.

Towing

One of the problematic issues unique to dredging and marine contracting is that the equipment is generally built for service on inland waters, lakes, bays and sounds and, as such, is often awkward to tow. However, dredging equipment must be moved from one location to the next, as one project is completed and new ones arise, and the equipment, therefore has to be towed between locations. Examples of common losses from towing include:

- Failure of towing hawsers or towing gear, due to unsuitable towing gear.
- Unsuitable tug or towing arrangement, resulting in the loss of control of the tow.
- Allision with bridges, submerged objects, pipelines, cables, etc.
- Collisions of other vessels with the towed spoil lines, which remained attached to the dredge during tow.
- Striking of bridges, overhead power lines, or other objects, by cranes or other rigging, due to high air draft (distance from the waterline to the highest point) of the towed dredge or crane barge.
- Damage to mooring spuds, crane booms, ladders and other structures, due to improper stow and/or inadequate securing for an ocean voyage.
▪ Dredge sinking or capsizing during the tow, due to lack of proper preparations for an ocean voyage.

▪ Crane or other deck machinery/equipment lost overboard, due to inadequate sea fastenings or securing on tows. This can also occur on inland tows, due to unexpected events, such as grounding, collision, etc.

▪ Much of the spoil line or pipe is usually towed by floating behind a tug or utility boat that accompanies the dredge. The major concerns are the day signals and nightlights, when moving the pipe. In many cases depending upon the size of the pipe, there is a main tug at the front and a small utility boat in the rear behind the pipe. Different pipe floats can be used and the appropriateness of the float is important, as well as capping the pipe

Critical Loss Control issues also include reviews of towing criteria and procedures, with respect to tug selection and single versus multiple barge tows. Also, underwriters should generally have each major tow inspected and approved by a competent marine surveyor. The underwriter should appoint the surveyor but if appointed by the insured, the surveyor should be mutually agreed upon.

**Mechanical Damage**

Mechanical or fatigue failure of machinery, may result from the following:

▪ Wear and tear and/or lack of maintenance.

▪ Overloading of crane boom beyond the safe working load for the radius of operation, when making a heavy lift.

▪ Improper ballasting of a crane barge or dredge during a heavy lift.

▪ Overstressing of motors and pumps and bursting of high-pressure lube oil and hydraulic lines, resulting in machinery failure and possible flash fire.

▪ Lack of limit switches or other limiting devices on cranes, for disabling of equipment.

▪ Inadequate maintenance records that allow equipment to be in service beyond its operational life, or not rebuilding/overhauling machinery and equipment, at intervals recommended by the manufacturer.

Critical Loss Control issues are:

Safety and training programs – Type and frequency of safety meetings? Are records kept of the safety meetings, including topics discussed, attendance & actionable items? How are safety and training topics developed and planned?

Internal qualification of crane and heavy equipment operators – Even if the operators are provided by the local unions, are the operators certified for the equipment? Does the
company have any type of internal testing or evaluation of operators before they are assigned?

Maintenance program for machinery and equipment - Are preventive maintenance procedures defined to ensure that critical systems are serviced, as per manufacturers recommendations? Are maintenance records kept and tracked? Are the operators aware of their responsibility for inspection and maintenance of their equipment?

**P&I and Marine Liability**

This category breaks down into two separate areas of exposures. The first includes injuries to crewmembers and the second includes damages to third party property or injuries to third parties. Both constitute liability claims against the dredging company.

**P&I Exposures**

The P&I risks associated with dredging and marine contracting are extensive. Dredging operators and marine contractors are subject to Jones Act legislation and are required to utilize US registered, and documented vessels, for any domestic activity. Dredging is hard, dirty work that is often conducted around the clock, often under adverse and exposed weather conditions. Crew work often occurs in an environment that is heavily dependent on heavy machinery, high pressure hydraulics, high volume pumping, extensive vessel maneuvering, anchoring, fleeting, pipe handling, and crane work. The equipment is worked hard and equipment maintenance may be sporadic and minimal. Slips and falls, back injuries, hand/foot injuries, burns and eye injuries are all examples of common injuries to crewmen. Basic Personal Protective Equipment (PPE) for dredging employees should consist of the following safety gear.

- Hard Hats
- Life Jacket/Work Vest
- Foot Protection
- Hand Protection
- Eye Protection
- Hearing Protection
- Respiratory Protection
- Fall Prevention Equipment
- Safety Vests
- Type 1 Life Jacket

The exposures and risks are partly dependent upon the type of operation being conducted and/or scope of services provided. Generally speaking, the following outline briefly describes the typical P&I issues and risks associated with dredging and marine contracting.

**Crew Injuries:** Most dredging companies utilize uninspected vessels (not inspected by the US Coast Guard). The operations of these vessels are therefore largely unregulated; However, they are required to meet certain minimum construction, crew training and crewing standards as defined in the U.S. Code of Federal Regulations. The vessels are also subject to OSHA jurisdiction. It may be difficult to determine if the USCG, a state agency or OSHA will have paramount governing authority, and this is often determined on a case by case basis. However, generally the US Coast Guard is given jurisdiction over life saving, fire fighting and pollution control, if the equipment is operating on a navigable waterway, and OSHA is considered to have jurisdiction over
work place safety issues. The USACE retains control over the environmental exposures and waterway maintenance issues.

Crew Injuries are subject to Jones Act (federal), LS&HW Act, or state workers compensation act, depending on the circumstances of the individual’s employment and responsibilities. Tests for whether or not an employee is granted seaman status are often dependent upon whether or not the individual is employed on a vessel that is capable of navigation, whether or not there is a substantial attachment to the vessel and if the individual contributes to the mission or function of the vessel. Many courts have been liberal in defining seaman status and the term “vessel” has been greatly expanded and debated, in recent years. It is important for underwriters to have a clear understanding, as to what their potential P&I exposure may be, as it relates to Jones Act seamen.

Crewmembers are often brought in from areas that are geographically distant from the location of the job site. Shore side crews often have to travel some distance for their beginning and end of their “hitch.” Many companies will provide transportation in company vehicles or vans, which may create additional P&I exposures for the underwriter.

Deaths can also occur to crewmembers and workers. This can occur not only in the course of normal activities, but can also occur when workers have to be left aboard an anchored vessel, during heavy weather, or when riding aboard towed dredges or equipment (collision). Pipe breaking (spill line disassembly) is another activity that is unique to dredging and can be particularly dangerous.

Third Party Injuries: The P&I protection for the insured will also apply to inspectors and third party contractors, working on site. These are not considered Jones Act Seamen and are subject to general maritime law.

Third Party Property Damage: There is also significant exposure for third party property damage. This is not only for environmental damages (discussed below) but for a wide variety of third party property damage, some examples of which are:

a. Allision and Collision by other vessels.

i. Dredging vessels, marine equipment, barges, moorings, anchors and pipelines must be properly marked and have adequate lighting, which should be maintained. Dredges often operate in narrow channels, inlets and waterways that have commercial and recreational vessel traffic. Examples of this include a recreational vessel striking an unlighted pipeline or anchor marker buoy. Dredges themselves are engaged in special operations and have limited maneuverability. They are required to maintain proper day shapes and lights, to assist other vessels in properly identifying and navigating around them. Even so, dredges and other moored equipment may be exposed to being run over by passing traffic and if improper
day shapes or lights are not maintained, this could lead to liability on the part of the dredge.

b. Other examples of third Party property damage include:

i. Damage to submerged cables, telephone lines, tunnels and pipelines.

ii. Landing damages: Operations often obtain a dock or beachhead to shift equipment and supplies.

iii. Leaving obstructions on bottom, such as sections of anchors, pipelines, spuds or other lost equipment and debris. One recent loss in the Port of Philadelphia involved a loaded oil tanker tearing open its hull, resulting in a major oil spill. The cause was determined to be a section of pipe and spool piece on the bottom of the Delaware River, possibly left by a dredge or marine contractor. Area should be wire dragged or sonar searched upon completion. All lost equipment must be accounted for and removed.

iv. Dredging or marine construction in waterways with rocky bottoms may involve underwater demolition (placed by drill barges). This can damage adjacent marine structures. Also, tight security needs to be maintained over the storage of explosives.

Critical Loss Control issues are the company’s safety and training programs, and claims handling procedures for third party claimants. The background and experience of the Dredging Company’s Safety Manager or Site Safety Officers is also important information for the underwriter to consider.

Environmental Damages

The potential for environmental damage from dredging operations is a significant exposure for dredging and marine contractors. This may be covered under the Marine Liability or P&I portion of a marine cover. Examples of environmental damages are:

- Pollution of the marine environment from improper disposal of spoils, from dredging operations.
- Damage to marine fauna, beaches, commercial shellfish areas, sea grass, buried communications lines, power transmission lines, and tunnels, due to dredging off-course or beyond prescribed boundaries or construction, such as pile driving, in non-approved areas.
- Fire, explosions and oil spills can also occur from damages to buried oil or natural gas pipelines from dredging operations.

Critical Loss Control issues are adherence to the dredging permit requirements, which include dredging only in prescribed (approved) areas and proper disposal of spoils by designated means and within approved areas. Dredges today are often equipped with
detailed GPS tracking & recording equipment, with details of activity submitted daily to the agency having jurisdiction. For marine contractors, pilings should only be driven in prescribed areas to the approved depths, as detailed in the permit or contract governing the construction.

Valuation Issues

Unlike other segments of the maritime industry, dredging is a segment that typically has few new buildings, equipment rarely changes hands (few actual sales) and the “Fair Market Value” of equipment can rise and fall, depending on the dredging contracts that the owner holds and the overall state of dredging activity. Therefore, dredges and allied marine equipment appraisals must be given special considerations, such as –

- Niche (limited) market
- Usually closed to “general public” and/ or barriers to market entry
- Capacity (in cubic yards)
- Availability
- Distance to operating area
- Condition of equipment
- Maintenance
- Age
- Obsolescence (physical, functional, technological and economic)
- Highest and best use (if working usually in it)

If the appraiser/surveyor is guided by Uniform Standards of Professional Appraisal Practice (USPAP) the following items should be addressed:

1. The intended use of the report
2. Describe information sufficient to identify the vessel(s) including the physical and economic property characteristics relevant to the assignment
3. State the purpose of the appraisal and include the type and definition of value and its source
4. State the identity of the client and any intended users (of the report)
5. State the effective date of the appraisal
6. Describe sufficient information to disclose to the client and any intended users of the appraisal the scope of work used to develop the appraisal
7. State all assumptions, hypothetical conditions, and limiting conditions that affected the analyses, opinions and conclusions
8. Describe the information analyzed, the appraisal procedures followed and the reasoning that supports the analysis, opinions and conclusions
9. State the use of the vessel existing as of the date of value, and when the purpose of the assignment is market value, describe the report and rationale for the appraiser's opinion of the highest and best use
10. State and explain and departures Standard 1 of USPAP
Insurance Appraisals (Loss Settlement/Fair Market Value)

The determination of insurable value is a common purpose for which appraisals are required. Insurance appraisals are required to establish a value for insurance coverage to indemnify the insured against loss. The insurance value is of concern to owners, lessors, lessees, insurers, agents and brokers. Of particular interest to the underwriter is the age of the hull and machinery and equipment, for rating and deductible setting purposes, as marine hull policies are traditionally written on a [new for old basis] (explain?).

The agreed insured value may be equivalent to replacement cost new, if the insurance coverage is provided on a replacement basis. More often, however, the insured value will be predicated on replacement cost new, less depreciation or a used cost of like kind, quality, condition, plus appropriate freight, taxes and installation. This is often referred to as actual cost (?) value. In certain instances, an owner may elect to insure the vessel for an increased value, above its fair market value, for which additional premiums may be charged.

An appraisal done for an insurance loss settlement has a very special and limited purpose: to verify that asset values are in compliance with insurance policy requirements. The values determined are the same as for an insurance appraisal. The only real difference is that for loss settlement the appraisal is done after the loss has occurred. (Appraising Machinery and Equipment – 2000-ASA)

General Valuation Issues

As can be surmised from the foregoing discussion, appraisals that conform to the USPAP are rarely done in the dredging industry. This is due to the fact that the required information is not readily available, sales are confidential and influenced by supply and demand, and/or other market factors.

New dredge pricing guidelines, and for that matter pricing for used equipment, is not routinely published. However MARCON lists approximately 14 U.S. flag dredges for sale ranging in value from $90,000. - $2,100,000. Specifics are general and surprisingly, the oldest one (built 1947) is the most expensive. Dredging equipment can have much higher values, however.

Another industry publication available for perusing is Boats & Harbors, but neither of these sources do not reveal selling price. So the use of the market approach is tenuous, at best. Information that can be researched is basically unverifiable and second hand.

Underwriters are cautioned about over insuring vessels, as this can create a moral risk, should market conditions or business fortunes change. Also, in the event a vessel is lost due to the negligence of a third party (such as a working dredge being run over by a ship), the third party may be legally liable only for the “fair Market” value of the dredge, not necessarily the insured value.
Conclusion
Although dredging and marine contracting present some unique risks and challenges for underwriters, one of the industry’s safety initiatives is the Dredging Safety Management Program (DSMP). The DSMP is a voluntary trial program designed by the U.S. Army Corps of Engineers (USACE) and the Dredging Contractors of America (DCA), the trade association that represents both large and small dredging contractors. The DSMP provides an alternate approach to dredge site safety.

This voluntary safety management system evolved from the format of other national and international quality, safety and environmental standards such as ISO 9000 and 14000, OSHAS 18001 and the International Code for the Safe Operation of Ships and Prevention of Pollution (ISM Code). For some dredges, compliance with the ISM Code is mandatory. The DSMP allows dredging contractors to develop one Safety Management System that will meet the requirements of both the USACE and other international management systems. Marine contractors may also follow a safety management system.

The DSMP has requirements for procedures that describe: Document Control, Internal Audit, Corrective and Preventive Action, Training, Occupational Safety and Health, Dredging Operations, Planned Maintenance, Emergency Response, Management Review, watch keeping, fuel and passenger transfers, passage planning during vessel movements, and the connection of floating pipeline sections. Again, this is a voluntary program, but when underwriters are considering a dredging or marine contractor risk, an important factor should be whether or not the company operates a formal safety management system. While smaller operators may not, the larger ones should be embracing this industry safety initiative, or a similar safety management system regime.

Given the ongoing needs for maintenance and improvements in our nation’s ports, waterways and shorelines, as well as urban redevelopment along the waterfront, it is certain that dredging and marine contracting will remain a vibrant and important segment of the North American maritime industry. The expertise of these contractors is also being utilized internationally, particularly in Central and South America. We trust that this paper will give underwriters a better understanding of the nature of this business, as well as the associated risks.

References:
- US Army Corps of Engineers website www.hq.usace.army.mil
- Dredging Contractors of America www.dredgingcontractors.org
- Dredging Safety Management Program www.dredgingcontractors.org/safety.htm
- Great Lakes Dredge & Dock Company www.gldd.com
- Manson Construction www.mansonconstruction.com
- Weeks Marine www.weeksmarine.com