Maritime Piracy and the Supply Chain

Jon S. Helmick

Abstract The scourge of modern maritime piracy is expensive for the international community, ocean carriers, insurance companies, and other entities that participate in and benefit from global trade. This chapter surveys the nature and scope of modern maritime piracy, summarizes the key impacts and costs of piracy for global supply chain operations, and discusses strategies that can be employed to evade, deter, and mitigate this threat. Implications of piracy and armed robbery for supply chain partners include seafarer abuse, injury, or death; the need for premium crew compensation; the payment of hostage ransoms; elevated insurance premiums; delayed cargo delivery; reduced cargo value; higher fuel costs; security equipment expenses; and the need for embarked security teams. Strategies that can be used to address the threat of piracy that are discussed include the implementation of Best Management Practices; enhanced training, drills, and exercises; naval intervention; the use of transit corridors and group transits; and supply chain reconfiguration.

Keywords Piracy • Maritime • Security • Supply chain

> 29.04.2014: 1931 UTC: Posn [Position]: 04:56N – 004:49E, Around 35 nm [nautical miles] West of Bayelsa Province Coast, Nigeria.
>
> Two armed pirates boarded a product tanker underway. As the crew retreated into the citadel the on board armed team fired at the pirates. Most of the crew including the guards managed to retreat into the citadel. Head count in the citadel indicated two crew missing. When the guards and crew emerged from the citadel they found the C/E [Chief Engineer] had been killed and the 3/O [Third Officer] with injuries. The vessel headed towards Lagos.
>
> (IMB 2014a)

The opinions expressed in this chapter are those of the author alone and do not necessarily represent the views of the US Department of Transportation, the Maritime Administration, or the US Merchant Marine Academy.

J.S. Helmick, USMS., Ph.D. (✉)
Maritime Logistics and Security Program, United States Merchant Marine Academy,
300 Steamboat Road, Kings Point, NY 11024-1699, USA
e-mail: helmickj@usmma.edu

A.R. Thomas, S. Vaduva (eds.), *Global Supply Chain Security*,
DOI 10.1007/978-1-4939-2178-2_2

Introduction

Global supply chains involving ocean shipping generally provide low-cost, efficient, and reliable long-distance transportation of commodities and merchandise. The movement by sea of high-value goods today usually accounts for less than two or three percent of sale price. In contrast to the days of sail, when vessels might take months to make an ocean crossing in unfavorable weather and arrival time was highly variable, cargo carriage by modern steam or diesel-powered ships is fast and quite predictable. Satellite-based navigation systems, electronic chart displays, computerized cargo stowage planning, software-based weather routing, automated engine room operations, and a long list of similar technological innovations characterize the operation of today's merchant ships.

It is ironic that this sophisticated maritime freight delivery system can be disrupted by a few armed men in small boats who board and rob or hijack merchant ships and hold them, their crews, and cargoes for ransom. Modern maritime piracy imposes significant costs and delays on those global supply chains that have the misfortune to become entangled in its depredations. It also represents an important economic burden for the international economy.

This chapter discusses the nature and scope of modern maritime piracy, summarizes the major impacts and costs of piracy for global supply chains, and discusses strategies that can be employed to evade, deter, and mitigate this threat.

Dimensions and Scope of Modern Piracy

Definitions

"Piracy" is defined in article 101 of the 1982 United Nations Convention on the Law of the Sea (UNCLOS) as follows:

Piracy consists of any of the following acts:

(a) Any illegal acts of violence or detention, or any act of depredation, committed for private ends by the crew or the passengers of a private ship or a private aircraft, and directed:

  (i) On the high seas, against another ship or aircraft, or against persons or property on board such ship or aircraft;
  (ii) Against a ship, aircraft, persons or property in a place outside the jurisdiction of any State;

(b) Any act of voluntary participation in the operation of a ship or of an aircraft with knowledge of facts making it a pirate ship or aircraft;
(c) Any act inciting or of intentionally facilitating an act described in sub-paragraph (a) or (b).

The term "high seas" in international and maritime law generally refers to areas outside the national jurisdiction of coastal states. For littoral countries that claim an exclusive economic zone (EEZ), limited national jurisdiction may extend up to 200 miles off the coastline. However, the provisions of UNCLOS concerning piracy are held to include the EEZ beyond a state's territorial waters (IMO 2011).

An attack on a merchant ship that takes place inside the territorial or internal waters of a coastal state may thus be termed "armed robbery" or "maritime crime," rather than "piracy," depending on the entity that is compiling or reporting statistics on such incidents.

The International Maritime Organization (IMO) defines armed robbery as follows:

"Armed robbery against ships" means any of the following acts:

1. Any illegal act of violence or detention or any act of depredation, or threat thereof, other than an act of piracy, committed for private ends and directed against a ship or against persons or property on board such a ship, within a State's internal waters, archipelagic waters and territorial sea;
2. Any act of inciting or of intentionally facilitating an act described above.

This distinction between piracy and armed robbery based on the location of the activity complicates both the reporting and the prosecution of maritime piracy. However, because most attack statistics do not distinguish piracy from armed robbery based on the definitions above, this chapter conjoins these acts for purposes of discussion.

Incident Statistics

According to the International Maritime Bureau of the International Chamber of Commerce, there were 264 pirate attacks reported worldwide in 2013. This figure represents a decrease of 40 % relative to 2011. In 2013, the geographic area in which the greatest number of attacks took place was Indonesia. Attacks in this location totaled 106, representing a dramatic increase over the 15 such incidents reported in 2009. However, most of these incidents are termed "opportunistic theft" and must be distinguished from the much more serious type of hijacking that characterizes piracy off the African coasts (IMB 2014b).

So-called Somali piracy, involving attacks on vessels transiting the Gulf of Aden, Red Sea, Arabian Sea, off Oman, and in the Western Indian Ocean, has captured the attention of the maritime industry in recent years. The brazen and aggressive hijacking of merchant ships and the holding of their crews for ransom reached a peak in late 2010, when almost 700 mariners were being held off the coast of Somalia aboard 30 merchant ships. The phenomenon of Somali piracy was highlighted for the general public with the 2013 release of the film "Captain Phillips," which portrayed the story of the *MV Maersk Alabama* hijacking.

As a result of the combined effect of interventions discussed later in this chapter, Somali piracy has now dramatically declined. In 2013, there were a reported 23 attacks on commercial vessels, none of which were successful. At the same time, there has been a surge in the number of attempted and completed piracy attacks on vessels along the West African coast. There were an estimated 100 such incidents in 2013. Attacks in the West African region are generally more violent than those undertaken by Somali pirates (Madsen et al. 2014).

During the first quarter of 2014, maritime piracy incident statistics indicate that there were 22 attacks in the Gulf of Guinea/West Africa region, 15 attacks in the Horn of Africa/Western Indian Ocean region, and 31 such events in the waters off Southeast Asia (MAREX 2014).

There are several concerns regarding the accuracy of the statistics cited. Vessel owners and ship masters may be reluctant to report attacks to authorities. The ensuing investigation may delay the ship, which is highly undesirable from a commercial standpoint. Also, publicity concerning pirate attacks is generally considered detrimental by ocean carriers. It is variously estimated that 50–70 % of pirate attacks may go unreported.

Conversely, there are documented instances in which approaching fishing boats have been mistakenly identified as pirate craft. At the least, these occurrences result in inflation of the numbers of attempted attacks reported. Such cases of mistaken identity can have much more serious consequences. In February 2012, about 20 miles off the coast of Kerala, India, Italian marines shot and killed two unarmed Indian fisherman in a small boat as it approached the tanker *Enrica Lexie* (Banerji and Jose 2013).

Types of Vessels Targeted

Data for 2013 show that the type of ship most frequently attacked by pirates was the chemical/product tanker. There were 82 attacks reported involving this kind of vessel. The second most frequently targeted vessel type was the bulk carrier, with a total of 53 attacks. Tankers were the third most often vessel type victimized, with 39 reported attacks. Container ships were the subject of 30 reported attacks by pirates worldwide in 2013 (IMB 2014b).

Operating and design characteristics that predispose ships to being targeted by pirates include their freeboard (height of the deck above the waterline) and speed. Ships with low freeboard make it relatively easy for pirates to gain access to the deck. Similarly, vessels that steam at less than 15 knots (about 17 miles per hour) provide much less challenge for pirate boardings than do faster ships. These two factors combine to make a ship particularly vulnerable to piracy and armed robbery. In the industry, such vessels are termed “low and slow.”

Pirates have been known to make use of the internationally mandated Automatic Identification System (AIS) carried aboard most merchant ships to select and track

their targets. Other factors that contribute to ship vulnerability include substandard vessel maintenance and management, reduced crew size, and lay-ups in high-risk anchorages (Bateman 2010).

Although commercial vessels are generally the focus of modern maritime piracy, cruising yachts have also been captured. In 2011, the 58-ft sailing vessel *Quest* was taken by pirates off the coast of Somalia. Ultimately, in spite of intervention by US Navy Special Forces, the four Americans who made up *Quest's* crew were killed by their captors (Nagourney and Gettleman 2011).

Objectives and Motives

The goals and underlying incentives for modern maritime piracy are largely financial in nature. Although this is a matter of some debate, there is little evidence of political motivation and, in particular, terroristic involvement in current piracy endeavors.

Armed Robbery

Acts of this type are common in Southeast Asia, among other locations. In areas such as those along the coast of the Indian subcontinent, attacks are characterized by the boarding of ships to steal cash, valuables, and in some cases items of cargo. A typical example of this kind of incident is summarized here:

> 05.05.2014: 2155 LT: Posn: 22:08N – 091:46E, Chittagong Roads, Bangladesh.
>
> 30 robbers in a boat armed with long knives approached an anchored chemical tanker. Four robbers boarded the tanker and cut off the aft mooring rope. Alarm raised, crew mustered in the accommodation and Coast Guard informed. Upon hearing the alarm, the robbers stole a lifebuoy and escaped. A patrol boat came to the location and made a search.
>
> (IMB 2014a)

Hijacking and Ransom

Somali piracy is focused on the hijacking of ships and the securing of ransom for their release. An example typical of this type of pirate attack involved the Bahamian-flagged *MV CEC Future*, which was hijacked in November 2008. The pirates were armed with AK-47s, a rocket-propelled grenade launcher, and handguns when they attacked and seized the vessel, which was owned by Clipper Group, a Danish company. The pirates forced the crew to anchor off the Somalia coast and held the vessel, cargo, and 13 crew members captive for 71 days until the owners delivered $1.7 million in ransom to the pirates. One of the two leaders of the pirate group was shot dead in a battle over the ransom as soon as he arrived ashore (Walker 2009).

Ship and Cargo Theft

In some cases, vessels have been hijacked with the intent to sell them or to rename them and use them for illicit purposes or for legitimate service under an illegal owner. In 1998, the Hong Kong-flagged bulk carrier *Cheung Son* was boarded off Taiwan by what appeared to be Chinese customs officers. After boarding the ship, the armed and uniformed pirates held the crew hostage for 10 days, after which all 23 Chinese crew members were beaten to death and thrown over the side. The hijackers then sold the ship to a Chinese buyer for a reported $36,000 (Liss 2003).

In other cases, acquisition of the cargo is the principal focus of maritime criminals. In the span of a single week during April 2014, pirates hijacked two product tankers off Malaysia and stole part of their cargo, in the first instance transferring approximately three million liters of diesel fuel to other vessels. Cargo theft is often the motive for piracy in the Gulf of Guinea.

Methods of Operation

A typical Somali pirate attack involves small, fast, outboard-powered skiffs (often two), which approach merchant ships from dead astern (directly behind the vessel) or on each quarter. An approach from dead astern takes advantage of the radar blind spot in that sector that is typical of the equipment installation aboard many ships.

The skiffs ordinarily approach the ship's side or stern, at which time ladders or grappling hooks are put up over the rail. If this is successful, the pirates are then able to board the vessel. If the ship is steaming too fast for the pirates to achieve their goal of coming alongside and boarding over the rail, they may fire on the ship with automatic weapons such as AK-47s or rocket-propelled grenade (RPG) launchers in an attempt to get the vessel to slow or stop.

Once on board the ship, the pirates typically proceed to the bridge, where they take control of the vessel and her navigation by intimidation of the officers and crew at gunpoint. Off the Horn of Africa, ships that have been thus hijacked are routinely forced to steam into coastal waters, where they are anchored, and negotiations for ransom and the release of the crew, ship, and cargo commence.

While in years past most maritime piracy took place within fairly close proximity to the coastline, pirates in the Western Indian Ocean have evolved a system that employs pirate support vessels, or "mother ships," which are often captured fishing dhows, tugs, or cargo ships that can maintain station far offshore for long periods of time. These mother ships often tow pirate skiffs astern or carry them on deck. Through this tactic, pirates are able to attack ships 1,500 or more miles at sea. This development has introduced very significant challenges for naval patrol and intervention efforts in this region.

Supply Chain Impacts and Costs

Taking a macro view of the situation, it has been estimated that the total annual monetary cost of piracy to the international community is somewhere between $4.9 and $8.3 billion (Geopolicity 2011). Costs and impacts that derive from modern maritime piracy can be grouped into those borne by supply chain partners such as shippers, vessel personnel, and insurers and those that are the responsibility of nations, intergovernmental organizations, military entities, etc. This section discusses the former category.

Mariner Welfare

The effects of hijackings and hostage-takings on vessel personnel are too often overlooked in policy deliberations and analyses of the implications of modern piracy. The crews of merchant ships taken by pirates often endure long, miserable months in captivity, during which time they suffer physical deprivation and psychological trauma. In 2012, there were 349 mariners taken hostage and held by Somali pirates for an average of 11 months; 206 seafarers were captured by West African pirates and held for a mean interval of 4 days (Hurlburt 2013).

The level of violence directed against crew members varies by region and over time. Somali pirates in 2012 reportedly subjected 100 % of their hostages to repeated threats of violence, psychological abuse, and confinement. Fifty percent of Somali pirate hostages experienced direct physical abuse by their captors, and 15 % suffered extreme physical abuse that is best characterized as torture, such as being tied up in the sun for hours, locked in freezers, and having their fingernails pulled out with pliers (Hurlburt 2013). Between 2009 and 2013, 197 seafarers were reportedly injured as a result of maritime piracy worldwide; 33 mariners were killed during the same interval (IMB 2014b).

Crew Compensation

For seafarers aboard ships that transit high-risk areas, hazard pay is often available as a result of agreements with organizations such as the International Transport Federation (ITF) or the national administrations of countries that register ships or provide their crews. In addition, if a ship is hijacked, crew members are often entitled to captivity pay.

The entry into force in 2013 of the International Labour Organization (ILO) Maritime Labour Convention, 2006 (MLC 2006), helped to reinforce the rights of mariners to hazard pay and compensation for periods of captivity. Under the MLC 2006, every seafarer has the right to a safe and secure workplace that complies with

safety standards; fair terms of employment; decent working and living conditions on board the ship; and health protection, medical care, welfare measures, and other forms of social protection (ILO 2013).

One estimate for the total cost of hazard pay and captivity pay for mariners in the Gulf of Aden/ Horn of Africa high-risk area in 2013 is $462.1 million. Seafarers in the Gulf of Guinea high-risk area were paid an estimated $9.2 million in premium compensation (Madsen et al. 2014).

Ransom Payments

Where piracy off the Horn of Africa is concerned, one estimate suggests that in 2011, 31 separate ransoms were paid for the release of ships, crews, and cargoes, amounting to a total of $159.62 million with an average ransom of $4.97 million (Bowden and Basnet 2012). Eight ransoms totaling approximately $32 million were paid to Somali pirates in 2012. The average ransom paid in 2012 was estimated at $3.96 million (Bellish 2013). By the end of 2013, ransoms paid to Somali pirates had further declined to an estimated total of $21.6 million, which amount consists of only three ransoms at an average cost of $7.2 million (Madsen et al. 2014). Costs such as ransom delivery, negotiator and attorney fees, vessel damage, and other items associated with ransom payments may double the cost of ransoms.

While military invention has, in some cases, resulted in the interruption of attacks in progress and the dramatic rescue of hostages from ships that have been hijacked and held for ransom, the challenges inherent in positioning military assets to accomplish these feats are daunting. Figure 1 depicts military personnel training for such missions.

Insurance

There are four basic types of ocean marine insurance (King 2008):

- Hull and machinery (H&M) insurance that covers physical risk to the ship, like grounding or damage from heavy seas, collision, sinking, capsizing, being stranded, fire, piracy, and jettisoning cargo to save other property.
- Cargo insurance that covers the goods transported in the ship.
- Hull war risk insurance (including automatic termination and cancellation provisions in the event of war).
- Protection and indemnity (P&I) which covers liability involving the crew, docks, and piers. Ship owners can purchase separate kidnap and ransom (K&R) insurance for crew members.

The terms of marine insurance policies vary depending on the insurer and the specific conditions of the vessel, the voyage, and perceived and declared risks.

Fig. 1 Commandos engage in an antipiracy exercise aboard the US Merchant Marine Academy Training Vessel *Kings Pointer* (Source: Jon S. Helmick)

Many insurers have delineated the geographic zones in which there is a higher risk of piracy as "war risk" or "additional premium" areas. This designation means that the owners or operators of vessels transiting these waters must pay a surcharge and must also usually notify the underwriter before entering the high-risk zone.

While most ships will be covered for the risk of piracy under either hull and machinery marine risks or war risks policies, K&R coverage will generally be the source of ransom payments. The premiums charged for this coverage depend on such factors as the route and date of the voyage (for individual voyages) or the anticipated number of voyages through high-risk waters (for annual coverage); the name, speed, size, type, and freeboard of the ship; the cargo to be carried; crew particulars; and details of the security measures in place. Reductions in premiums of up to 25 % for a four-man unarmed embarked security team, or up to 50 % if the security team is armed, are possible (Marsh 2011).

The estimated cost of war risk insurance against Somali piracy has dropped by 69 % or $252.2 million from 2012 levels to a total estimated cost of $113.3 million in 2013. The estimated total cost of K&R insurance to protect against Somali pirates was $72,416,124 for 2013, representing a 66 % decrease, or $144,568,547 relative to 2012. These two cost components, taken together, total $185,703,266. The total cost of war risk insurance for West Africa in 2013 was estimated to be $25.2 million, while the total cost of K&R insurance in this area was estimated $14.9 million. Piracy-related insurance premiums in West Africa in 2013 thus totaled an estimated $40 million (Madsen et al. 2014).

Fast Steaming

The surge in Somali piracy coincided with a steep decline in the global economy and very difficult market conditions for the shipping industry. Because fuel is one of the largest operating costs for merchant vessels, in many cases amounting to 25 % of the total, many carriers adopted a strategy of "super-slow-steaming" to minimize fuel consumption. While a given ship might have a top speed of over 20 knots (one knot = 1.15 nautical miles per hour), that same ship might operate most economically at a speed of 12–13 knots (Hooper 2012).

Ships underway are less likely to be targeted and boarded by pirates as their speed increases. The collective recommendations of several industry associations suggest that, thus far, there have been no reported attacks in which pirates boarded a ship that has been steaming at over 18 knots. The recommendations advise ships to proceed at full sea speed, or at least 18 knots if they are capable of greater speed, for the duration of their transit of the high-risk area (this refers to the Gulf of Aden/Horn of Africa region) (BMP4 2011).

The additional fuel costs associated with such "fast steaming" are very significant for carriers. One analysis suggests that vessel owners and operators spent $1.53 billion on increased speeds in 2012. To put this in perspective, it is estimated that one very large crude carrier (VLCC) steaming at 17.9 knots (5.1 knots above the ideal speed of 12.8 knots) incurs $88,681.74 in additional costs per day (Bellish 2013).

Delayed Cargo

Considering the case of Somali piracy alone, it has been noted that trade valued at approximately $463 billion transits the high-risk area off the Horn of Africa each year. If pirate attacks disrupt 2 % of the traffic that passes through the Suez Canal, some $7.4 billion worth of cargo is affected. This is more than the individual GDPs of 75 economies worldwide, including those of Montenegro, Aruba, Liechtenstein, and Somalia (Sullivan 2010).

Piracy interrupts or delays the flow of cargo along the trade lanes where it is a problem. If a ship is hijacked and held for any period of time, the owner or charterer may have to deal with lost revenue and higher charter expenses. Cargo that is delivered late may lose value, if it can be delivered at all. Perishables and commodities such as crude oil—the value of which fluctuates on a daily basis—are particularly problematic. Cargoes in the high-value, time-sensitive sector, such as repair parts, pharmaceuticals, and luxury cars, incur especially substantial additional in-transit inventory carrying costs for their owners.

To address such losses derived from piracy-related delays, some London insurance brokers have created specialized products. Aon developed a policy designed to cover the "financial impact of business interruption or loss of earnings" incurred by charterers, ship owners, and cargo owners. This coverage is triggered from the beginning of a pirate attack, has no deductible, and is a standalone policy intended to complement existing hull, war, cargo, and P&I policies (Siemens et al. n.d.).

Security Equipment and Personnel

Lethal and nonlethal items of security equipment and systems are available to be deployed against pirates.

Equipment that can aid in detection of pirate attacks includes human lookouts, radar, closed-circuit TV (CCTV), search lights, and deck lighting. Physical barriers that can prevent or delay boarding by pirates include razor wire, barbed wire, electric fencing, slippery foam, fire hoses, and water cannons. Examples of crew protective measures include Kevlar jackets, helmets, security glass, and the "citadel," a retreat on board the vessel into which the crew can proceed in the event of an attack and which is ideally stocked with food, water, communications equipment, and, in some cases, means to control the ship.

Defensive equipment includes such devices as the Long Range Acoustic Device (LRAD), which is a hailing device that can emit a pain-inducing tone that is unbearable for the recipient, even at distances of 100 m or more. The LRAD became well-known in the industry in 2005 when the cruise ship Seabourn Pride used one to help repel pirates attempting to board the ship off the coast of Somalia.

The use of firearms by vessel personnel is a hotly debated topic. The IMO and many flag states have strongly opposed the carriage of lethal weapons by ship's crews, arguing that merchant mariners generally lack the training necessary to effectively deploy firearms to repel pirate attacks and that the presence of such weapons may escalate conflicts in a boarding situation, leading to injury or fatalities.

The practice of placing security teams aboard vessels transiting high-risk waters has become increasingly common. The use of qualified and properly managed privately contracted armed security personnel (PCASP) has proven to be generally highly effective in deterring pirate attacks. Ordinarily comprised of former military or ex-law enforcement personnel, embarked security teams typically board the ship prior to the beginning of the passage through areas of pirate activity, disembarking at the first port of call after the high-risk transit. In recognition of the fact that the commercial providers of armed security teams vary widely in the extent to which they vet their personnel and ensure that they are properly trained, the IMO has issued guidance on many of the key issues associated with the use of such teams. Concerns addressed include such matters as command and control, firearms management, applicable law, use of force, insurance, and related matters (IMO 2012). There are also complex questions of liability and weapon carriage associated with the use of embarked security teams.

Efforts to establish professional standards for maritime security teams and the companies that provide them have been undertaken by BIMCO and the Security Association for the Maritime Industry (SAMI). These association-based certification programs provide ocean carriers and shipmasters with some degree of assurance regarding the competence, background, and reliability of the security providers they choose to retain (Yanchunas 2014).

In 2013, expenditures for shipboard antipiracy equipment were estimated to be $247–299 million. Expenses associated with the use of privately contracted armed security personnel amounted to an estimated $767–876 million. Adding in costs of PCASP accreditation and certification, total costs for security equipment and armed guards in 2013 totaled an estimated $1.02–1.18 billion (Madsen et al. 2014).

Risk Management and Resiliency Strategies

Best Management Practices

The *Best Management Practices for Protection Against Somalia Based Piracy* (*BMP4*) is a guide developed by a number of global maritime industry organizations as a means to address the problem of piracy involving merchant ships in the Indian Ocean off the Horn of Africa. The purpose of the BMP—now in its fourth iteration—is to provide specific recommendations on strategies and tactics that can be used to avoid, deter, or delay piracy attacks in the geographic region of concern. The document describes pirate activity, discusses risk assessment, provides guidance on appropriate planning, identifies self-protection measures, delineates possible responses in the event of a pending or actual attack, defines correct action in the case of military intervention, and surveys post-incident reporting practices.

To help address the situation in the Gulf of Guinea, *Interim Guidelines for Owners*, *Operators and Masters for Protection against Piracy* have been developed by BIMCO, ICS, INTERCARGO, and INTERTANKO. These guidelines, which are based on the BMP4, are supported by NATO Shipping Centre (Bimco et al. 2012).

Training, Drills, and Exercises

Appropriate training of vessel personnel in antipiracy tactics and contingency responses is crucially important in the effort to contain and mitigate the threat of maritime piracy.

International requirements for the maritime security training of merchant mariners are delineated in the International Ship and Port Facility (ISPS) Code, which was concluded by the International Maritime Organization (IMO) in London in December 2002. The Code is a "comprehensive set of measures to enhance the security of ships and port facilities, developed in response to the perceived threats to ships and port facilities in the wake of the 9/11 attacks in the United States" (International Maritime Organization). Where antipiracy matters are concerned, the ISPS Code addresses the threat generically, stating the requirements for training of vessel security personnel under such headings as "Recognition of characteristics and behavioral patterns of persons who are likely to threaten security," "Knowledge of current security threats and patterns," "Techniques used to circumvent security measures," and the like. The ISPS Code entered into force on 1 July 2004.

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978, as amended, was established by IMO member nations as a global framework for the development and enhancement of merchant mariner competence. The 2010 Amendments ("Manila Amendments") to the IMO STCW Convention and Code included new requirements for antipiracy training.

The Manila Amendments were the result of a comprehensive review of STCW that was begun in 2006 by the IMO Standards of Training and Watchkeeping (STW) Subcommittee and culminated in a June 2010 Diplomatic Conference in Manila. The Manila Amendments entered into force on 1 January 2012.

The IMO publishes a series of "model courses" that set forth the learning objectives and content for the training of vessel personnel in maritime security and antipiracy subjects. In early 2011, on behalf of the United States, the US Merchant Marine Academy reviewed the mandates contained in the 2010 Manila Amendments and revised the IMO maritime security curriculum to provide (among other enhancements) increased antipiracy competences for merchant vessel personnel worldwide. Of the five courses involved, those that are focused on vessel personnel and that address piracy topics include (1) Ship Security Officer, (2) Security Training for Seafarers with Designated Security Duties, and (3) Security Awareness Training for All Seafarers. The training of merchant marine officers in antipiracy strategies and tactics may also be conducted as part of Bridge Resource Management training, as depicted in Fig. 2.

Of critical importance in the detection, deterrence, and mitigation of piracy and armed robbery are regular drills and exercises aboard ship. The scope and frequency of security drills and exercises are specified in IMO conventions and national laws. A well-planned and thoroughly practiced response to the contingency of an attempted boarding by pirates or robbers can be highly effective in preventing a successful attack or at least minimizing its negative consequences.

Fig. 2 Route planning, evasive maneuvers, and contingency planning are important elements of antipiracy training that can be included in Bridge Resource Management training for merchant marine officers (Source: US Merchant Marine Academy)

Military Intervention

Recognizing the increasing threat to strategically and commercially important global supply chains, ocean carriers, and their personnel, the international community began to deploy naval assets to deter pirates and protect merchant shipping in the Gulf of Aden/Horn of Africa high-risk area.

UN Security Council Resolutions 1814, 1816, 1838, 1846, 1851, and 1897 permit and actively encourage international naval forces to "enter the territorial waters of Somalia" (1816) and to operate ashore "in Somalia for the purpose of suppressing acts of piracy and armed robbery at sea" (1851). Counter-piracy naval operations in the Gulf of Aden/Horn of Africa region include the multinational "Combined Task Force 151 (CTF-151)" led by the United States, "Operation Atalanta" spearheaded by the European Union Naval Force (EUNAVFOR), and "Operation Ocean Shield" under NATO. At various times, a number of countries including China, Japan, Iran, India, and Russia have deployed naval vessels in the area to fight piracy outside the framework of these missions. An estimated 40 naval vessels are typically engaged in counter-piracy missions in the Western Indian Ocean, Gulf of Aden, and off the Horn of Africa (Stockbruegger 2010).

A major problem with the naval solution to piracy is the vastness of the ocean in which pirates operate. As a matter of practicality, there is simply no way to position naval vessels in close enough proximity to all of the merchant ships passing through the Gulf of Aden/Horn of Africa/Western Indian Ocean to provide effective deterrence or the possibility of rescue.

Corridors and Group Transits

As a means of enhancing security for vessels transiting waters at high risk for piracy in the Gulf of Aden, an Internationally Recommended Transit Corridor (IRTC) has been established. The corridor is 492 miles long and has an eastbound lane and a westbound lane. Each lane is 5 miles wide with a 2-mile separation zone between the lanes. Warships are strategically deployed in and around the IRTC to deter attacks and provide support if vessels are approached or boarded. The IMO provides guidance on procedures and protocols for use of the IRTC through SN.1/Circ.28 "Information on Internationally Recommended Transit Corridor (IRTC) for Ships Transiting the Gulf of Aden" (IMO 2009). The location and configuration of the IRTC are shown in Fig. 3.

Merchant ships are encouraged to transit the IRTC in groups. The timing of these group transits is defined by the Maritime Security Center Horn of Africa (MSCHOA) operated by EUNAVFOR. The key objectives are to group vessels according to their speed, time their transit through the highest-risk areas to avoid hours of peak attack incidence, and position vulnerable merchant ships so that they can be best protected by available naval assets.

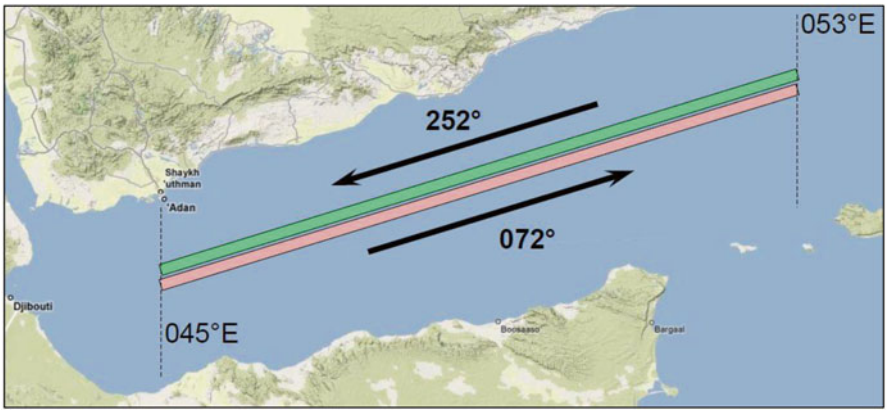

Fig. 3 Internationally Recommended Transit Corridor, Gulf of Aden (Source: NATO Shipping Centre)

Rerouting and Supply Chain Reconfiguration

A seemingly obvious means of dealing with the threat of piracy and armed robbery is avoidance of the trade lanes and port zones where it is known to occur. Rerouting of ships to avoid piracy-prone areas is one option, but one that often involves considerable complexity in the calculation of cost-benefit ratios.

Deviation from established shipping lanes generally involves longer voyages and higher crew costs, fuel costs, other operating costs, and in-transit inventory costs. Rerouting may make the most sense for ships carrying lower value, bulk cargoes. However, for high-value consumer goods or items needed for just-in-time manufacturing, the added delay may be unacceptable to the shipper. In addition, such cargoes are usually carried in container ships capable of higher speeds, which are less likely to be attacked while underway than tankers and bulk carriers.

As an example, rerouting a tanker from Saudi Arabia to the United States around the Cape of Good Hope instead of through the Suez Canal and Gulf of Aden adds approximately 2,700 miles to the voyage. This longer distance reduces the number of voyages the ship can make in a year (from about six to five—a drop of 26 %). This, in turn, reduces the capacity of the particular supply chain of which that vessel is a part. Routing via the Cape of Good Hope in this example incurs additional costs of about $3.5 million annually (MARAD 2010).

With the dramatic decline in piracy in the Gulf of Aden/Horn of Africa region, available evidence suggests that significant route deviation is no longer taking place. Costs associated with vessel rerouting to avoid piracy are estimated at $0 for 2013, down from $290.5 million in 2012 (Madsen et al. 2014).

Avoidance of particular ports and harbors where armed robbery is problematic is typically not a feasible option. Ships, especially tankers and bulk carriers, are dependent in most cases on specific infrastructure and cargo locations for which alternatives are not readily available.

A more permanent and radical approach to the problem of maritime piracy is shifting production or processing to a location that reduces or eliminates exposure to piracy-prone areas. For example, relocation from China to Mexico of a manufacturing plant for electronic devices destined for the Canadian market essentially eliminates the risk of piracy. The difficulties with this type of "nearshoring" strategy include the facts that it may be very expensive to implement and that for many commodities such as petroleum, the site of production is fixed. In addition, areas that are at high risk for piracy and armed robbery may shift over time, possibly obviating the enhanced security achieved by supply chain reconfiguration.

Conclusion

Andrew J. Shapiro, then-Assistant Secretary of the US State Department Bureau of Political-Military Affairs, summarized the broader ramifications of Somali piracy as follows (2011, 30 Mar):

> …the modern day implications of piracy are now global in scope. In today's globalized age the problem of piracy is one that affects not just individual countries or shipping companies but potentially the entire global economy. We live in an era of complex and integrated global supply chains where people in countries around the world depend on safe and reliable shipping lanes for their goods, their energy, their medicine, and basic consumer goods. By threatening one of the world's busiest shipping lanes, piracy off the Horn of Africa threatens not just specific ships, but has broader strategic implications.

This statement underscores the critical importance of refusing to allow the criminal opportunists that are modern-day pirates to impede the flow of global commerce. In addition, protection of the world's seafarers from the scourge of maritime piracy must be considered a top priority.

For the moment, it appears that the threat of Somali piracy has been largely contained. The debate will no doubt rage over which factors are responsible for this success, but some combination of the deployment of embarked security teams, the application of Best Management Practices, and combined naval patrols and intervention is likely responsible.

Piracy and armed robbery in other parts of the world continue unabated and, in some locations such as the Gulf of Guinea, are increasing in frequency. Some of the same countermeasures that have been employed in the fight against Somali piracy may have application elsewhere, but there are limitations. For example, the use of PCASP is prohibited in the territorial waters of Nigeria, Togo, and Benin, where guards must be obtained from local military forces (International Group 2013).

Ultimately, the solution to piracy may involve shoreside law enforcement capacity building, enhanced governmental stability, and the development of viable and attractive economic alternatives for those who engage in piracy. Failing this kind of evolution, the maritime industry and affected national administrations will be obligated to continue to work toward the creation of effective short-term strategies and tactics to detect, deter, and defend against maritime piracy.

References

Banerji A, Jose D (2013) Murder trial of Italian marines in India navigates murky waters. Reuters. http://in.reuters.com/article/2013/06/10/india-italy-marines-idINDEE95900B20130610. Accessed 1 May 2014

Bateman S (2010) Maritime piracy in the Indo-Pacific region—ship vulnerability issues. Marit Policy Manag 37(7):737–751

Bellish J (2013) The economic cost of Somali piracy 2012. Oceans Beyond Piracy. http://oceans-beyondpiracy.org/sites/default/files/attachments/View%20Full%20Report_1.pdf. Accessed 4 Feb 2014

BIMCO et al (2012) Interim Guidelines for Owners, Operators and Masters for protection against piracy in the Gulf of Guinea region. https://www.bimco.org/~/media/Security/Piracy/Gulf_of_Guinea/2012-12-20_RT_agreed_GoG_anti-piracy_guidance.ashx. Accessed 13 Mar 2014

BMP4 (2011) Best management practices for protection against Somalia based piracy. Witherby, Edinburgh

Bowden A, Basnet S (2012) The economic cost of Somali piracy 2011. Oceans Beyond Piracy. http://oceansbeyondpiracy.org/sites/default/files/economic_cost_of_piracy_2011.pdf. Accessed 6 Feb 2014

Geopolicity (2011) The economics of piracy. http://www.geopolicity.com/upload/content/pub_1305229189_regular.pdf. Accessed 14 May 2014

Hooper E (2012) The shipping industry and the spiraling costs of maritime piracy. http://www.counterpiracy.ae/upload/Briefing/Eirik%20Hooper-Essay-Eng-2.pdf. Accessed 7 May 2014

Hurlburt K (2013) The human cost of maritime piracy 2012. Oceans Beyond Piracy. http://oceans-beyondpiracy.org/sites/default/files/attachments/View%20Full%20Report.pdf. Accessed 7 Feb 2014

International Group (2013) Piracy—FAQs. http://www.ukpandi.com/fileadmin/uploads/uk-pi/Documents/Piracy/Piracy_FAQs_RevisedAug2013_web.pdf. Accessed 6 May 2014

International Labour Organization (ILO) (2013) Basic facts on the Maritime Labour Convention 2006. http://www.ilo.org/global/standards/maritime-labour-convention/what-it-does/WCMS_219665/lan--n/index.htm. Accessed 14 Apr 2014

International Maritime Bureau (IMB) (2014a) Live piracy & armed robbery report 2014. http://www.icc-ccs.org/piracy-reporting-centre/live-piracy-report. Accessed 24 May 2014

International Maritime Bureau (IMB) (2014b) Piracy & armed robbery against ships—2013 annual report

International Maritime Organization (IMO) (2009) SN.1/Circ.281. Information on Internationally Recommended Transit Corridor (IRTC) for ships transiting the Gulf of Aden. http://www.imo.org/OurWork/Security/PiracyArmedRobbery/Guidance/Documents/SN.1-Circ.281.pdf. Accessed 21 May 2014

International Maritime Organization (IMO) (2011) Circular letter No. 3180. Circular letter concerning information and guidance on elements of international law relating to piracy. http://www.un.org/depts/los/piracy/circular_letter_3180.pdf. Accessed 12 Jan 2014

International Maritime Organization (IMO) (2012) MSC.1/Circ.1443. Interim guidance to private maritime security companies providing privately contracted armed security personnel on board ships in the high risk area. http://www.imo.org/OurWork/Security/SecDocs/Documents/Piracy/MSC.1-Circ.1443.pdf. Accessed 22 May 2014

King RO (2008) Ocean piracy and its impact on insurance. Congressional Research Service. http://fpc.state.gov/documents/organization/115925.pdf. Accessed 14 May 2014

Liss C (2003) Maritime piracy in Southeast Asia. Southeast Asian Aff 2003:52–68

MAREX (2014) 70 pirate attacks in 2014 so far–Dryad. The Maritime Executive. http://www.maritime-executive.com/article/70-Pirate-Attacks-in-2014-So-Fa--ryad-2014-04-09/. Accessed 9 Apr 2014

Madsen JV et al (2014) The state of maritime piracy 2013. Oceans Beyond Piracy. http://oceans-beyondpiracy.org/sites/default/files/attachments/SoP2013-Digital_0.pdf. Accessed 6 May 2014

Maritime Administration (MARAD) (2010) Economic impact of piracy in the Gulf of Aden on global trade. http://www.marad.dot.gov/documents/Economic_Impact_of_Piracy_2010.pdf. Accessed 27 May 2014

Marsh (2011) Piracy--The insurance implications. http://www.igpandi.org/downloadables/piracy/news/Marsh%20Piracy%20implications.pdf. Accessed 12 May 2014

Nagourney A, Gettleman J (2011) Pirates brutally end yachting dream. New York Times. http://www.nytimes.com/2011/02/23/world/africa/23pirates.html?pagewanted=all&_r=0. Accessed 22 Feb 2014

NATO Shipping Centre. http://www.shipping.nato.int/operations/OS/Pages/GroupTransit.aspx. Accessed 15 May 2014

Shapiro A (2011) Approaches to counter-piracy. Remarks to International Institute for Strategic Studies. http://m.state.gov/md159419.htm. Accessed 3 Apr 2014

Siemens RL et al (n.d.) Piracy's impact on insurance. Risk Management Magazine. http://cf.rims.org/Magazine/PrintTemplate.cfm?AID=3959. Accessed 20 May 2014

Stockbruegger J (2010) Somali piracy and the international response: trends in 2009 and prospects for 2010. Piracy Studies: Research Portal for Maritime Security. http://piracy-studies.org/2010/somali-piracy-and-the-international-response-trends-in-2009-and-prospects-for-2010/. Accessed 28 May 2014

Sullivan AK (2010) Piracy in the Horn of Africa and its effects on the global supply chain. J Transp Secur 3:231–243. doi:10.1007/s12198-010-0049-9

Walker R (2009) Inside story of a Somali pirate attack. BBC News. http://news.bbc.co.uk/2/hi/8080098.stm. Accessed 16 Apr 2014

Yanchunas D (2014) Masters, shipowners face liability risk from armed guards' mistakes. Prof Mariner :41–44