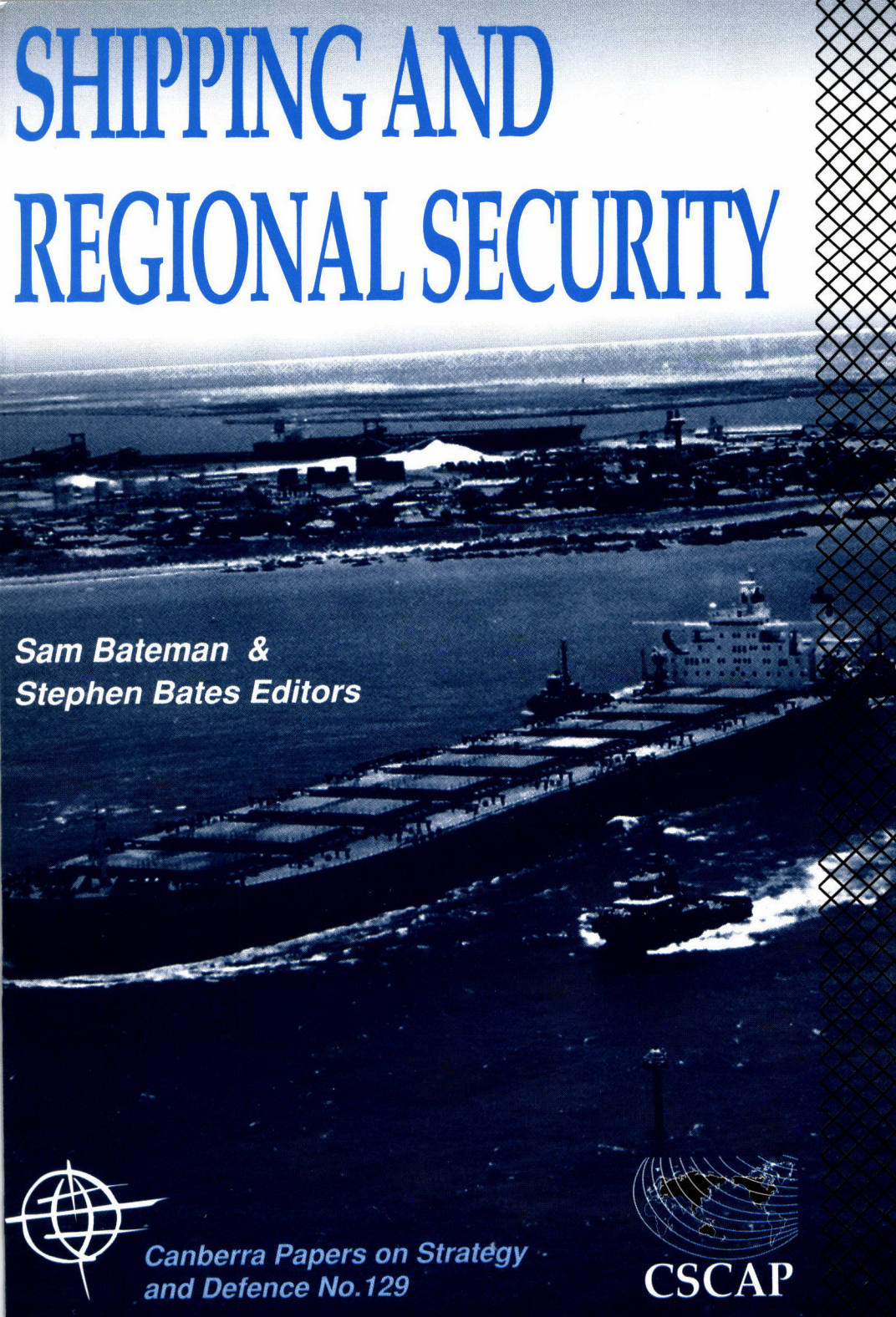
SHIPPING AND REGIONAL SECURITY



Sam Bateman &
Stephen Bates Editors

Canberra Papers on Strategy and Defence No.129

CSCAP

CANBERRA PAPERS ON STRATEGY AND DEFENCE NO.129

SHIPPING AND REGIONAL SECURITY

Edited by

Sam Bateman and Stephen Bates

Published by
Strategic and Defence Studies Centre
Research School of Pacific and Asian Studies
The Australian National University
Canberra, Australia
1998

Printed and Published in Australia
at the Australian National University 1998

National Library of Australia
Cataloguing-in-Publication entry

Shipping and Regional Security.

Bibliography.
ISBN 0 7315 2747 X.

1. Shipping - Security measures - Asia, Southeastern. 2. Shipping - Asia, Southeastern - Safety measures. 3. Ships - Cargo - Security measures - Asia, Southeastern. 4. Ships - Cargo - Asia, Southeastern - Safety measures. I. Bateman, W.S.G. (Walter Samuel Grono), 1938- . II. Bates, Stephen, 1952. III. Australian National University. Strategic and Defence Studies Centre. IV. CSCAP Maritime Cooperation Working Group. Meeting. (4th: 1997 : Tokyo). (Series : Canberra papers on strategy and defence ; no. 129).

387. 50959

Series Editor Helen Hookey
Word processing by Elza Sullivan
Cover design and cartography by Neville Minch, Cartography Unit, RSPAS
Printed by CPN Publications Pty Ltd
Published and distributed by:
Strategic and Defence Studies Centre
Research School of Pacific and Asian Studies
The Australian National University
Canberra ACT 0200
Australia

Telephone (02) 62438555
Fax (02) 62480816

Cover photograph: Australian Flag Bulk Carrier *Iron Pacific* leaving Port Hedland with a full cargo of iron ore for Japan. Photo courtesy of *Australasian Ships & Ports*.

ABSTRACT

This monograph is the fourth in the series to be published by the Strategic and Defence Studies Centre on behalf of the CSCAP Maritime Cooperation Working Group. It includes the discussion papers presented at the fourth meeting of the working group held in Tokyo on 19 November 1997.

The first group of chapters in the monograph looks at the security aspects of shipping and seaborne trade from global, regional and national perspectives, and in the particular context of the South China Sea. Subsequent chapters examine the concerns of regional countries with the carriage by sea of strategic cargoes such as oil, gas and other raw materials essential for their economic well-being. Other chapters focus more on specific environmental and navigational safety issues arising from the transport by sea of hazardous or dangerous cargoes, particularly in confined areas such as the Malacca and Singapore straits. There is general agreement by the different contributors that because these concerns are shared by most regional countries, they provide considerable scope for security cooperation and dialogue.

Canberra Papers on Strategy and Defence are a series of monograph publications that arise out of the work of the Strategic and Defence Studies Centre at the Australian National University. Previous Canberra Papers have covered topics such as the relationship of the superpowers, arms control at both the superpower and Southeast Asian regional level, regional strategic relationships and major aspects of Australian defence policy. For a list of New Series Canberra Papers please refer to the last pages of this volume.

Unless otherwise stated, publications of the centre are presented without endorsement as contributions to the public record and debate. Authors are responsible for their own analysis and conclusions.

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ACRONYMS AND ABBREVIATIONS

AMETIAP	Association of Marine Education and Training Institutions in the Asia-Pacific
ARF	ASEAN Regional Forum
ASBO	average ship berth output
ASEAN	Association of Southeast Asian Nations
ASEAN CPTP	ASEAN Cooperation Plan on Transboundary Pollution
ASTA	average ship turnaround
bcm	billion cubic metres
CSCAP	Council for Security Cooperation in the Asia Pacific
DWT	deadweight tonne
ECDIS	Electronic Chart Display and Information System
EEZ	exclusive economic zone
ENC	electronic navigational chart
GDP	gross domestic product
GEM	Group of Experts Meeting
GMDSS	Global Maritime Distress and Safety System
GRT	gross registered tonnage
HLH	Hong Kong-Luzon-Hainan Island
IAEA	International Atomic Energy Agency
IMB	International Maritime Bureau
IMCO	Intergovernmental Maritime Consultative Organisation
IMF	International Monetary Fund
IMO	International Maritime Organisation
INMARSAT	International Maritime Satellite
IOC	International Oceanographic Commission
IOC-WESTPAC	IOC Group of Experts on Ocean Mapping of the Western Pacific
ISM	International Safety Management (Code)
JIIA	Japan Institute of International Affairs
kgoe	kilogram of oil equivalent
kWh	kilowatt hours
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MARPOL	Convention for the Prevention of Pollution from Ships

MEPC	Marine Environment Protection Committee (IMO)
MMTs	million metric tons
MPA	Maritime Port Authority (of Singapore)
MSC	Maritime Safety Committee ((IMO)
MTT	Maritime Technology and Transportation (department)
NEACD	Northeast Asia Cooperation Dialogue
NIE	newly industrialised economy
NMA	National Maritime Academy (Singapore)
OPRC	Convention on Oil Pollution Preparedness, Response and Cooperation
POL	petroleum, oil and other lubricants
PPP	purchasing power party
PRC	People's Republic of China
PSC	port state control
PSE	public-sector enterprise
ROK	Republic of Korea (South Korea)
RSN	Republic of Singapore Navy
SAR	search and rescue
SEANWFZ	Southeast Asia Nuclear Weapons Free Zone
SLAR	side-looking airborne radar
SLOC	sea line of communication
SOLAS	Safety of Life at Sea Convention
SOM	Senior Officials' Meeting
STCW	Convention on Standards of Training, Certification and Watchkeeping for Seafarers
TEU	twenty-foot equivalent unit
TSS	traffic separation scheme
TTEG	Tripartite Technical Expert Group (on Safety of Navigation in the Strait of Malacca and the Strait of Singapore)
TWG	Technical Working Group
UAE	United Arab Emirates
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	UN Environment Programme
US	United States
VTIS	Vessel Traffic Information System

VTS	vessel traffic system
WPNS	Western Pacific Naval Symposium

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PREFACE

This monograph is the fourth in the series to be published by the Strategic and Defence Studies Centre for the Maritime Cooperation Working Group of the Council for Security Cooperation in the Asia Pacific (CSCAP). It includes the discussion papers presented at the fourth meeting of the working group held in Tokyo 19 November 1997. The papers are published under the auspices of the Australian Committee for CSCAP (AUS-CSCAP).

AUS-CSCAP and CSCAP Indonesia have primary responsibility for the Working Group on Maritime Cooperation, which is co-chaired by Commodore (retd) Sam Bateman of Australia and Rear-Admiral (retd) R.M. Sunardi of Indonesia. The objectives of the working group are to:

- foster maritime cooperation and dialogue among the states of the Asia Pacific and enhance their ability to manage and use the maritime environment without prejudicing the interests of each other;
- develop an understanding of regional maritime issues and the scope they provide for cooperation and dialogue;
- contribute to a stable maritime regime in the Asia Pacific which will reduce the risk of regional conflict;
- undertake policy-oriented studies on specific regional maritime security problems;
- promote particular maritime confidence- and security-building measures (MCSBMs); and
- promote adherence in the region to the principles of the 1982 UN Convention on the Law of the Sea (UNCLOS).

The working group has now met four times, with representatives of most member-CSCAPs participating in each of the meetings. These meetings were held in Kuala Lumpur in June 1995, in Kuala Lumpur again in April 1996, in Bangkok in June 1997 and in Tokyo in November 1997. In addition, a sub-committee of the group met in Jakarta in December 1996 to develop the Guidelines for

Regional Maritime Cooperation, which have now been published as CSCAP Memorandum No.4.

The proceedings of the first three meetings of the Working Group were published as: *Calming the Waters: Initiatives for Asia Pacific Maritime Cooperation* (1996); *The Seas Unite: Maritime Cooperation in the Asia Pacific Region* (1996); and *Regional Maritime Management and Security* (1998), all edited by Sam Bateman and Stephen Bates and published by the Strategic and Defence Studies Centre, Australian National University. Readers of this monograph who are not familiar with the processes of maritime cooperation in the Asia Pacific are referred to these earlier volumes as a record of developments with regional maritime cooperation in recent years and the implications for regional security.

A major conclusion emerging from the activities of the working group to date is the extent to which regional security is compromised by the lack of agreed maritime jurisdiction over some regional seas. This has contributed to a situation where widespread problems exist of uncontrolled marine pollution, unregulated over-fishing, marine environmental degradation, widespread illegal activities at sea (such as piracy and drug smuggling), and relatively few agreed maritime boundaries. These problems will continue, with consequent risks to national security, unless new approaches to managing regional seas and oceans are found that are based more on cooperation than on sovereignty, unilateral rights to resources, and agreed maritime boundaries.

Another major conclusion of the working group is the importance of promoting maritime awareness and the links between different institutions and forums concerned with the management of maritime affairs. This should occur at all levels, from institutional through national and regional to international. There is a training and educational task involved in developing an environment conducive to regional maritime cooperation. People in single disciplines talk with one another both at the national and regional levels, but there is great benefit in activities which bring together people from different disciplines and backgrounds to share experiences and values. As demonstrated by the papers in this volume, meetings of the CSCAP Maritime Cooperation Working Group constitute examples of these activities.

This monograph focuses on maritime transportation in the region. It examines in detail Asia-Pacific regional security concerns with shipping and seaborne trade and the potential for security cooperation and dialogue. The importance of these issues arises from economic and geostrategic factors. Except for high value cargoes carried by air, all intra-regional trade goes by sea, and many regional nations lack self-sufficiency in energy, foodstuffs, and critical raw materials. Security concerns include the vulnerability of shipping to disruption, the consequences of maritime territorial disputes, and the threats of piracy, oil spillage and marine pollution.

A particular feature of the growth in regional seaborne trade has been the increased carriage of hazardous or dangerous cargoes. Rapid economic and industrial growth drives an increasing demand for energy and complex materials (including hazardous chemicals) which can only be shipped by sea. As economic growth continues, the carriage of these cargoes will increase with a consequent higher risk of damage or pollution as a result of collision, explosion, fire, grounding or other accident involving ships carrying dangerous cargoes. The human factor has been identified as a major factor in shipping casualties.

The first group of chapters in the monograph looks at the security aspects of shipping and seaborne trade from global, regional and national perspectives, and in the particular context of the South China Sea. Subsequent chapters examine the concerns of regional countries with the carriage by sea of strategic cargoes such as oil, gas and other raw materials essential for their economic well-being. Other chapters focus more on specific environmental and navigational safety issues arising from the transport by sea of hazardous or dangerous cargoes, particularly in confined areas such as the Malacca and Singapore straits. There is general agreement by the different contributors that because these concerns are shared by most regional countries, they provide considerable scope for security cooperation and dialogue.

We would like to thank the Japan Institute of International Affairs (JIIA) for its support in making arrangements for the meeting of the working group in Tokyo and for providing the venue at the JIIA. We are also grateful to Helen Hookey and Elza Sullivan of the Strategic and Defence Studies Centre at the Australian National

University for their assistance with preparing these papers for publication.

The Editors

CHAPTER 1

THE SECURITY OF SHIPPING: THE GLOBAL PERSPECTIVE

Eric Grove

Shipping remains vital to the world economy. Although it is more than a decade since Admiral Sir James Eberle noted that international financial flows rather than trade flows now dominate the international economy, the significance of international trade to the general economic well-being of states and peoples has never been greater.[1] Exports and imports form a very significant part of the economies of a large number of nations. Nations which might be said to depend particularly on international trade include, in no particular order, the United Kingdom, Japan, Israel, the Netherlands, New Zealand, Norway, Nigeria, Sweden, Venezuela, Argentina, Australia, Canada, Chile, Egypt, France, Germany, Iran, Italy, Saudi Arabia, South Africa, Singapore, Taiwan and the Republic of Korea (ROK).[2] Even countries that are less dependent on international trade as a proportion of GDP, such as the United States, still have a considerable interest in the free flow of shipping in order to import certain vital commodities at acceptable prices and to maintain a healthy export market. As Stan Weeks has put it in relation to shipping in this region: 'Clearly the US has a growing economic interest in the security of the SLOCs in this region [Northeast Asia], particularly in view of the impact of their disruption on US trading partners'.[3]

Water is by far the most efficient transport medium for the carriage of fuel, raw materials and all but the highest value-to-weight-ratio finished products. The fact that the rather misnamed planet 'Earth' is two-thirds covered by water means that almost all countries have access to a sea port. Indeed, the historic dominance of water

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1 Sir James made these points in an address at the Sealink Conference at Annapolis in 1986. See E.J. Grove, *The Future of Sea Power* (Routledge, London, 1990), p.179.

2 ibid., p.172.

3 S.B. Weeks, Sea Lanes of Communication - Security and Access, paper prepared for the NEACD Workshop on Maritime Trade and Transportation, Arden House, New York, 4 April 1997, p.4.

transport means that the world's population is also placed close to water. Over 80 per cent of international trade by value goes by sea and 95 per cent of all trade that crosses frontiers is waterborne. Despite the ready availability of cargo aircraft, over 99.5 per cent by weight of all transoceanic freight is carried in ships.

The efficiency of sea transport can be gauged by the fact that it costs as much to transport a tonne of coal from Australia to the United Kingdom as it does to transport it a hundred and fifty kilometres or so by rail in the United Kingdom itself.[4] Not for nothing do the coal trains now run inland from Britain's ports to its power stations, whose proximity to the coast is now probably more important than their proximity to the coalfields on which they were built.

The oil trade is an especial feature of global dependence on shipping. Crude oil exports increased from almost 800 million tonnes in 1991 to almost 900 million in 1995. They may well total over 950 million by 2000. Of the 1995 total, 325 million went to the United States and Canada, 220 million to Japan and over 325 million to Europe, north and south.[5] Of the above, it is estimated that only Europe will not significantly increase its imports of crude by the year 2000. The United States and Canada may be importing almost 370 million tonnes by 2000, Japan almost 240 million. For petroleum products, the total slumped from almost 230 million to 205 million tonnes in 1995 but it may be set to increase to 260 million by 2000. Of that figure, almost half would go to North America and about 30 million tonnes each to Europe and Japan.[6]

The next most important category of bulk cargo is coal and coke, used for steel making as well as an energy source which seems now to have overtaken iron ore as the next most significant sea cargo by weight.[7] Almost 295 million tonnes were exported by sea in 1991 and over 330 million tonnes in 1995. Predictions for 2000 are almost 450 million with Japan taking 150 million tonnes (half from

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4 Figures often used by Sir James Eberle.

5 Jang Hyun Choi, Projections of Shipping Patterns in East Asia, paper prepared for the NEACD Workshop on Maritime Trade and Transportation, Arden House, New York, 4 April 1997, p.17.

6 ibid., p.18.

7 I predicted that coal would be an increasingly important cargo in *The Future of Sea Power* (see p.177).

Australasia), and Europe over 140 million (including 40 million tonnes from North America and over 30 million tonnes from Australasia).[8]

As for iron ore, there was a slight drop in quantities carried by sea between 1991 and 1995 (from 300 million to 283 million in 1995), but this is expected to rise to over 335 million by 2000. Of that figure, about 120 million tonnes each would go to Japan and Europe, and over 70 million to the rest of East and Southeast Asia (compared to less than 30 million in 1991). Australasia is by far the biggest producer of iron ore, with almost 150 million tonnes expected to be exported by sea in 2000, over two-thirds of it to East and Southeast Asia. It is worth saying, however, that Australia imports ores also, as cargo in ships which might otherwise be arriving in Australian ports in ballast. This is a good indication of the need for a free flow of shipping if industries and companies are to operate at maximum efficiency. The export of finished steel is also now crucial to the supply structure of modern manufacturing, given the closure of plants in high-cost areas of the world such as North Europe.[9]

Substantial quantities of grain are also carried at sea. The slump in Eastern European trade reduced the total from 175 million tonnes in 1991 to 155 million in 1995, but a rise in the Middle Eastern market is expected to bring the total to almost 180 million tonnes in 2000. Of that total, more than half (96 million tonnes) would be provided by the United States, a recovery to 1991 levels from the slump to 78 million of 1995.[10]

High-value cargoes are now very largely carried in containers with the standard twenty-foot equivalent unit (TEU) container containing 1280 cubic feet of space and with a maximum capacity of about 18.5 tonnes. Annual growth in the world container trade has fluctuated in the 1990s, but at its lowest point has never been less than 4.6 per cent (1993) and in some years it was over 11 per cent (1995). In 1994 some 14 million TEU were handled in European ports, 12 million in the United States, 6 million in Japan and 10 million in the rest of East and Southeast Asia. Given an expected global growth rate of around

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8 Choi, Projections of Shipping Patterns in East Asia, p.14.
9 ibid, p.15.
10 ibid., p.16.

Table 1.1: World Merchant Fleets, 1997

	Nos	GRT
Algeria	151	980,492
Argentina	471	594,883
Australia	627	2,853,061
Azerbaijan	296	654,912
Bahamas	1,176	23,602,812
Bahrain	88	165,795
Bangladesh	279	379,073
Barbados	64	291,940
Belgium	206	239,779
Belize	454	516,523
Bermuda	96	3,139,736
Brazil	551	5,076,695
Brunei	65	366,296
Bulgaria	202	1,166,091
Burma	131	710,679
Canada	886	2,401,047
Chile	446	760,980
PRC	2,948	16,943,220
Croatia	210	332,762
Cuba	355	410,015
Cyprus	1,674	24,652,547
Denmark	1,008	5,747,233
Ecuador	136	168,084
Egypt	385	1,268,825
Estonia	235	597,656
Finland	274	1,518,690
France	739	1,820,403
Georgia	85	281,692
Germany	1,146	5,626,178
Greece	1,863	29,434,695
Honduras	1,409	1,205,989
Hong Kong	418	7,300,664
Iceland	362	208,577
India	916	7,126,850
Indonesia	2,196	2,770,513

	Nos	GRT
Iran	424	2,902,431
Iraq	114	857,772
Ireland	163	213,364
Israel	55	598,714
Italy	1,397	6,699,484
Japan	9,438	19,913,211
North Korea	143	715,323
South Korea	2,246	6,972,148
Kuwait	213	2,057,044
Latvia	249	798,144
Lebanon	128	284,969
Liberia	1,666	59,800,742
Libya	153	732,841
Lithuania	242	610,212
Malaysia	685	3,282,878
Malta	1,164	17,678,303
Marshall Islands	95	3,098,574
Mauritius	48	238,319
Mexico	630	1,129,178
Morocco	475	382,620
Netherlands	1,059	3,409,241
New Zealand	164	307,262
Nigeria	291	478,661
Norway	1,515	2,648,000
Pakistan	61	397,864
Panama	5,777	71,921,698
Peru	671	340,647
Philippines	1,524	8,743,769
Poland	516	2,358,043
Portugal	304	266,181
Qatar	55	482,474
Romania	421	2,536,421
Russia	5,261	15,273,450
Saudi Arabia	280	1,186,844
Singapore	1,344	13,610,818
South Africa	171	340,293

	Nos	GRT
Spain	1,724	1,294,634
Sri Lanka	56	226,924
Sweden	621	2,955,425
Switzerland	20	380,990
Syria	190	351,670
Taiwan	683	6,104,294
Thailand	501	1,743,382
Tunisia	75	159,741
Turkey	1,075	6,267,629
Tuvalu	15	64,250
Ukraine	1,142	4,613,003
UAE	299	960,652
UK	1,454	4,412,683
US	5,292	12,760,810
Uruguay	89	124,369
Venezuela	239	787,128
Vietnam	447	700,103

Source: *Jane's Fighting Ships 1996-1997*

7-7.5 per cent since 1996 and for the rest of the decade, this should mean container trade volumes of 20 million TEU for Europe, 18 million for the United States, 9 million for Japan and 18 million for the rest of the Far East.[11] The People's Republic of China's involvement in the world container trade is also increasing steadily.

As shown by the data in Table 1.1, the ships that carry these massive trade flows have never been more internationalised. Most carry the flags of the major open-register countries, with Panama and Liberia still in the lead with 60-70 million gross registered tonnage (GRT) of ships in Lloyd's register. Next comes Greece with about 30 million GRT and the Bahamas and Cyprus each with about 25 million. The People's Republic of China (PRC) has 17 million GRT under its own flag plus 7 million under Hong Kong's flags. Japan has about 20

11 ibid., pp.12-13.

million GRT under its flag, Malta 18 million and Russia 15 million. Singapore and the United States each have about 13 million GRT. These are the major players in the registration stakes, although beneficial ownership is a different matter.

The number of ships under the national flag is another matter for consideration, begging the question of whether number of ships or total flag tonnage is the best indicator of the national stake in shipping. Japan, for example, has the largest national flag fleet (9,438 ships) followed by Panama (5,777 ships), the United States (5,292 ships) and Russia (5,261 ships). The average size of vessel under the national flag is relevant here. The average size of vessel under the Liberian flag, for example, is about 38,000 GRT, while for Japan the figure is about 2,100 GRT. Describing the precise nationality of a merchant ship has also become very tricky. As Admiral Eberle memorably put it:

> If you sink a ship owned in Britain, financed in the Europe market, registered in the Bahamas, crewed from Hong Kong, insured in London, carrying Japanese cars whose engines are assembled in Germany, whose interests are you mainly damaging?[12]

This certainly blurs the focus of any attempt to interfere with the free operation of the highly internationalised industry that is modern shipping, but this should not lead us to underrate the impact of modern attempts at maritime interdiction. My answer ten years ago to the admiral's question was: 'many peoples most of whom will expect someone, but not necessarily themselves, to sort the situation out'.[13]

Events in the Gulf in the 1980s are sometimes held to have demonstrated the problems inherent in interdicting shipping. Much damage was inflicted and some ships sunk or damaged beyond repair, but the price of oil was largely unaffected. Maybe - but all this occurred at a time when the price of oil was being kept low by the United States as a decisive Cold War tactic. The capabilities brought to bear in the Gulf were limited in power, the merchantmen were increasingly effectively defended by warships, and in the end a really serious threat to Iran's vital sea communications posed by the United

12 Quoted in Grove, *The Future of Sea Power* , p.179.
13 ibid.

States Navy did indeed help bring Iran to the conference table. Maritime pressure had worked, with the United States 'threatening Iran's very economic survival'.[14]

Merchant shipping might well suffer attack either because of its direct involvement in local conflict or because it happens to have to pass through an area of conflict on its route. Nations may well use the threat to shipping as an effective means of bringing pressure to bear upon nations with which they are in dispute. This can take various forms - attack by missile or torpedo from a variety of maritime platforms, or, perhaps more cost-effectively, mining. The threat of ballistic missile bombardment may also be used in an intimidatory way to deter the free passage of shipping. The best way of avoiding such threats is to use other routes. These are often available, but sometimes there may be no alternative and naval protection of some kind may well be required. This could be problematical to organise given the mismatch of flags between warships and modern merchantmen, but the tendency has been to interpret association between the two in the liberal manner dictated by the economically liberal maritime environment.

The threat may not be a fully official one. Piracy remains a problem, particularly in the East Asian region. In 1994, of 87 recorded cases of piracy, 71 took place in the Asia Pacific.[15] There is much scope for cooperative measures to help deal with this problem, as has been done with some success in recent years. International action is often a *sine qua non*, as piratical attacks often take place in sovereign coastal waters.[16]

Another problem is the tendency for littoral states to interpret the law of the sea in an overly nationalistic manner. The tendency for 'creeping jurisdiction' to interfere with the free passage of merchant ships (and, for that matter, of warships) remains a real problem, with many nations - some who should know better - adopting an overly aggressive attitude. It needs to be stressed that all with an interest in the free passage of shipping - and that includes, as we have seen, most people on planet 'Oceania' - have an interest in maintaining traditional

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14 ibid., p.218.
15 Weeks, Sea Lanes of Communication - Security and Access, p.71.
16 For an excellent discussion of this problem, see ibid.

notions of freedom of the seas. Only if merchant ships continue to be able to pass on the seas on their lawful occasions will the global economy be able to operate at maximum efficiency.

The final point this chapter wishes to make is to stress the requirement for cooperation at all levels to maintain freedom of navigation. The breakdown of the mercantilistic 'Mahanian' paradigm of national sea power reflecting national navy plus national merchant fleet is clear evidence of the inappropriateness of unilateral national solutions to solving shipping problems. An international problem can only be solved internationally, through cooperation at various levels and in various configurations.

CHAPTER 2

SHIPPING AND REGIONAL TRADE: REGIONAL SECURITY INTERESTS

Sumihiko Kawamura

Historically, the expected functions for sea lanes were the exchange of people and commodities, the rapid deployment of military forces, and the creation of an information and communications network. As a result of the great strides that have been made in the fields of electronics and aviation technology, it could be argued that the significance of sea lanes as an information and communication network and for the exchange of people has started to wane. Yet with the boom in economic activities across the seas, it is clear that in the future sea lanes will become even more important for the exchange of commodities.

The importance placed on sea lanes for the rapid deployment of military forces is still as great as it has been in the past. Countries have equipped themselves with naval power and worked hard to preserve the balance of power and, in so doing, have contributed to the maintenance of regional peace and stability, and to the stable use of the sea lanes. Even today, naval power remains the basis for preserving the stability and safety of sea lanes. But we have entered a new era, in which naval power is no longer the province of one country or one power but has become a matter of multinational management based on trust among countries.

Even though Southeast Asia has been recently rocked by widespread currency depreciations and dramatic falls in the value of the stock market, market confidence is likely to return eventually and the value of the region's currencies will rebound before too long through the cooperative efforts of the countries concerned. In any case, the heavy dependence of the countries in the region on sea lanes for their well-being and prosperity will remain unchanged.

This chapter describes the region's major commodity flows, shipping routes and merchant fleets, and explores their vulnerabilities.

Major Commodity Flows

Table 2.1 shows the changes in the volume of major sea-trade commodities in the world between 1989 and 1995. Every year, the total volume of shipments has increased. In 1995, it reached some 4.7 billion tonnes. More recent data are not yet available, but judging from the changes seen to date, one can infer that the figure has grown even further.

Table 2.2 shows the increases in the volume of major sea-trade commodities in the Asia-Pacific region. While it is difficult to obtain an accurate total figure for shipments of petroleum products and other commodities in the Asia-Pacific region, it is possible to identify a change in the general trend for the region as a whole. In 1995, shipments in the Asia-Pacific region surpassed 1.5 billion tonnes, comprising over one-third of the world's maritime trade volume.

Table 2.3 shows changes in the global freight volume by sea and air. Yet even with better aircraft, and an increase in shipment volumes, shipments by air are still only between 0.2 and 0.3 per cent of those by sea. Even though the numbers for all of the Asia-Pacific region are not available, the rates for Japan and the United States are about the same. It can therefore be assumed that the rates for the region as a whole will be basically similar to those for the United States and Japan.

Data show that transport by air of high-end, lightweight commodities, including computers, semiconductors, precision instruments, medical products, diamond products, and gourmet/perishable food products, accounts for over 25 per cent in terms of value of Japan's total trade. However, in order to boost the flow of such high-end products vital to the economic survival of regional countries, mass transportation at sea must be ensured and the strategic stability of the region must be maintained.

Table 2.1: Major Sea Trade Commodities in the World, 1989-95 (million tonnes)

Year	Crude Oil	Petroleum Products	Iron Ore	Coal	Bauxite	Phosphate Ore	Grain	Others	Total
1989	1,120	340	362	321	49	41	192	1,435	3,860
1990	1,190	336	347	342	52	35	192	1,483	3,977
1991	1,247	326	358	369	50	31	200	1,529	4,110
1992	1,307	335	334	371	48	29	208	1,583	4,215
1993	1,356	358	354	367	51	27	194	1,632	4,339
1994	1,403	375	383	383	49	29	184	1,707	4,513
1995	1,415	380	402	423	52	30	196	1,780	4,678

Sources: Fearnley's 'Review' and Fearnley's 'World Bulk Trades'

Table 2.2: Major Sea Trade Commodities in the Asia-Pacific Region, 1989-95 (million tonnes)

Year	Crude Oil	Petroleum Products	Iron Ore	Coal	Bauxite	Phosphate Ore	Grain	Others	Total
1989	210	55	206	192	15	4	76	449	1,207
1990	219	51	202	198	17	3	77	456	1,223
1991	233	47	217	215	16	2	84	482	1,296
1992	237	55	209	222	14	3	78	493	1,311
1993	242	63	224	231	15	3	79	516	1,373
1994	260	69	234	240	16	3	83	550	1,455
1995	261	70	248	262	16	3	91	585	1,536

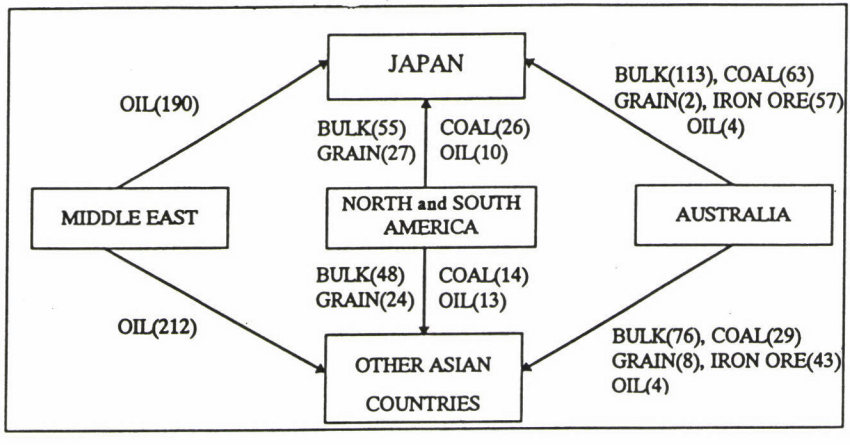
Sources: Fearnley's 'World Bulk Trades' and estimation by the author

Table 2.3: Global Freight by Sea and Air, 1990-94

	Sea Freight	Air Freight	
Year	Total (million tonnes)	Total (million tonnes)	Share of Sea Freight (%)
1990	3,997	8.9	0.2
1991	4,110	8.5	0.2
1992	4,215	9.1	0.2
1993	4,339	10.0	0.2
1994	4,513	11.7	0.2

Sources: Fearnley's 'World Bulk Trades' and Ministry of Transport, Japan

Figure 2.1: Major Commodities Flowing into Asia, 1995 (million tonnes)



Source: Fearnley's 'World Bulk Trades'

Figure 2.1 shows that the major commodities brought to Asia by sea include oil from the Middle East as well as dry bulk goods, grain, coal and iron ore from North and South America and Australia.

Outgoing shipments from Asia consist primarily of industrial products, and are much smaller in terms of volume. If China is excluded, oil is the dominant source of energy for countries in the Asia-Pacific region and these countries will become increasingly dependent on imported oil from the Middle East. Thus the East West Center in Hawaii has projected that the Asia-Pacific region, which imported 56 per cent of its total oil consumption from the Middle East in 1995, will import 63 per cent in the year 2000. The US Pacific Command's *Asia Pacific Economic Update* provides an interesting insight into the nature of the trade flow in the South China Sea and straits in Southeast Asia:

> Generally, crude oil is the biggest single cargo in terms of volume through the sea lanes of Southeast Asia, while industrial products are the dominating cargo in terms of value. The overall pattern of shipping is that large tonnages of low-value commodities are shipped to industrial economies (Japan and the Four NIEs), which then 'add value' via manufacturing processes. The industrial economies then ship out relatively smaller tonnages of high-value goods. Figure 7-C identifies the volume (in million metric tons, or MMTs) and the value of trade moving through the SLOCs of Southeast Asia in 1993.

Figure 7-C: Trade Flows through Southeast Asian SLOCs

SLOC	Tonnage (MMTs)	Value ($Billion)
South China Sea	580	470
Malacca	525	390
Sunda	15	5
Lombok	140	40

Source: Center for Naval Analyses

> About 15% of the total value of world trade transits the Southeast Asian SLOCs. The value of two-way trade transiting these SLOCs is high not only for Japan ($256B in 1993), but also for Europe ($269B), the NIEs of Hong Kong, Taiwan, and South Korea ($163B), the United States ($43B), and China ($30B). The economies of Southeast Asia, Japan, and Australia are highly dependent on these straits for their trade. The SLOCs of Southeast Asia handle 54% of the total two-way trade of Southeast Asian countries, 42% of Japan's trade and 46% of Australia's trade'.[1]

Major Shipping Routes

Major shipping routes in the Asia-Pacific region are constricted at key straits such as Malacca, Sunda, Lombok and Makassar straits as shown in Figure 2.2.

The Strait of Malacca is 600 miles long, and is the main corridor between the Indian Ocean and the South China Sea. More than 60,000 ships passed through the strait in both directions in 1995 and it is anticipated that by the year 2000 there will be approximately 100,000 transits annually.

About 26 tankers, including three fully loaded supertankers heading for Asian ports, pass through the strait daily. Because the strait is relatively shallow - it is only 21.8 metres deep at some points - the maximum draught recommended by the International Maritime Organisation for passing ships is 19.8 metres. The navigable channel at its narrowest point is only 1.5 miles wide. The Lombok Strait is wider, deeper and less congested than the Strait of Malacca - minimum passage width is 11.5 miles and depths are greater than 150 metres. It is therefore considered the safest route for supertankers and these eastbound ships sometimes transit this channel. Most ships transiting Lombok also pass through the Makassar Strait, which has an available width of 11 miles and a length of 600 miles.

The Sunda Strait is 50 miles long and is another alternative to the Malacca Strait. Its northeastern entrance is 15 miles wide, but because of its strong currents and limited depth, deep-draftships of

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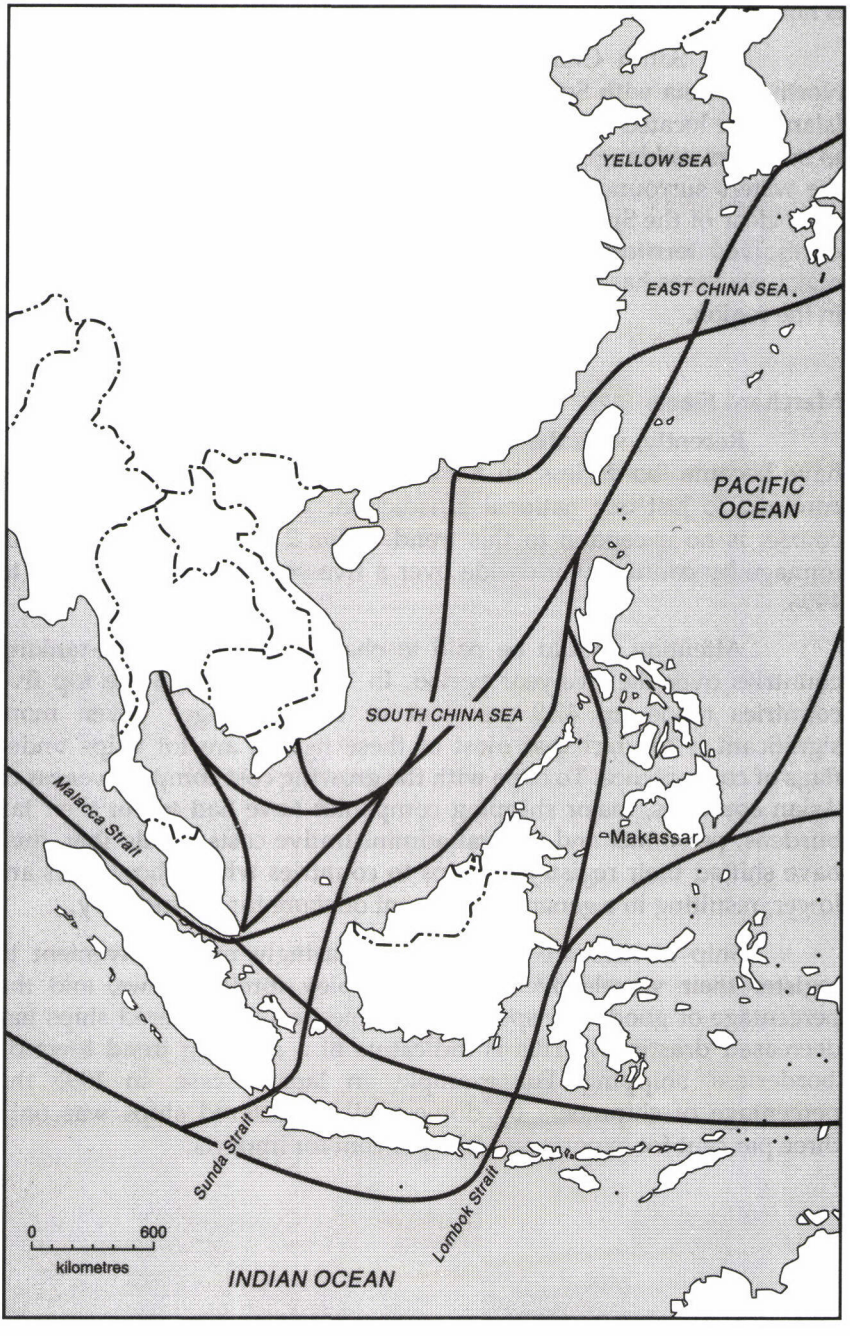
1 US Pacific Command, *Asia-Pacific Economic Update*, Summer 1996.

Figure 2.2: Major East Asian Shipping Routes



over 100,000 deadweight tonnes (DWT) do not transit the strait and it is not heavily used.

The South China Sea provides shipping routes connecting Northeast Asia with Southeast Asia and the Middle East. The Spratly Islands are located in the southeast quadrant of the sea, an area known to seafarers as 'dangerous ground' due to the extreme shallowness of the waters surrounding the islands. As a result, most merchant ships steer clear of the Spratlys. It should be also noted that the existence of unresolved territorial disputes over islands and reefs located along major sea lanes has been and will continue to be a destabilising factor in the region.

Merchant Fleets

Recently, with the expansion of capital investment, companies have become 'borderless' in nature - their operations are no longer confined to just one national jurisdiction. The shipping industry, of course, is no exception to this trend. Table 2.4 shows the change in tonnage by country worldwide over a five-year period, from 1991 to 1996.

Attention should be paid to changes in the top-five-ranking countries over the five-year period. In 1996, tonnage of the top five countries made up 42.9 per cent of total tonnage. Even more significant is the fact that most of these figures are for ships under flags of convenience. To cope with the growing cost competitiveness of Asian countries, major shipping companies have had to cut their tax burdens, personnel and general administrative costs. To do that, they have shifted their registry of ships to countries where those costs are lower, resulting in a general movement offshore for the industry.

Ship owners are finding it increasingly more convenient to register their vessels overseas and employ foreign crews, and the percentage of goods transported by domestically registered ships has decreased drastically. This is indicative of a growing trend towards 'borderless' shipping. For example, in Japan's case, in 1995 the percentage of shipments by domestically registered ships was only three per cent for exports and 20.2 per cent for imports.

Table 2.4: Merchant Fleet Tonnage by Country, 1991 and 1996 (in thousand tons)

As of 30 June 1991			As of 31 December 1996		
Origin	Tonnage	Share (%)	Share (%)	Tonnage	Origin
World Total	436,027	100.00	100.0	507,873	World Total
Liberia	52,427	12.0	16.2	82,131	Panama
Panama	44,949	10.3	11.8	59,959	Liberia
Japan	26,407	6.1	5.4	27,507	Greece
Former USSR	26,405	6.1	4.8	24,408	Bahamas
Norway	23,586	5.4	4.7	23,788	Cyprus
Greece	22,753	5.2	4.3	21,806	Norway
Cyprus	22,298	4.7	3.8	19,479	Malta
USA	20,291	4.7	3.8	19,201	Japan
Bahamas	17,541	4.0	3.3	16,893	PRC
PRC	14,299	3.3	3.2	16,449	Singapore

Source: *Lloyd's Register of Ships* (steel ships larger than 100 tons)

In order to guarantee national security in an emergency situation, some countries have sought to maintain a proportion of domestically registered vessels through the adoption of measures such as reductions in social insurance, reductions and exemptions in income tax, and assistance for crew training. But it is difficult to escape the growing trend towards 'borderless' regional shipping.

Shipping operations are also becoming more multinational. A typical example of a multinational shipping operation is an ore/coal freighter owned by a Japanese shipping company. The parent company is Japanese, the record of ownership and registry of the ship are Panamanian, the insurer is British, the crew is Indian, Filipino and Chinese, the cargo owners are Australian and Japanese, and the service routes are to and from Japan, Australia, Europe and Brazil. This is a typical operation and one which will be seen increasingly in the future.

As companies become more 'borderless', the routes used to transport goods by sea are also becoming increasingly complicated. No longer are shipments taking simple routes where raw materials are transported from producing countries to manufacturing countries and then exported to consumers as manufactured products. Now it is common for parts made in different plants in various countries to be transported to assembly plants in other countries and then, as final products, to be shipped to consumers in still other countries.

Vulnerabilities

Sea lanes can function rather easily as a huge, widespread transportation network for shipping, so long as terminals and vital international sea routes are maintained. But these sea lanes are very vulnerable, and prone to external obstructions.

The principal obstructions to the free flow of ships through sea lanes are:

- obstruction due to maritime accidents or disasters;
- damage by piracy;
- unilateral declarations restricting the use of specific waters;
- obstruction due to regional conflicts;

- intentional obstruction of shipping; and
- unintentional obstruction of the maritime transport system.

Maritime accidents and disasters can directly or indirectly affect the use of sea lanes. Sea lanes will be seriously damaged for a long period when these accidents occur in congested waters or at terminals, and reconstruction runs into difficulties. The effect on sea-lane use can be considerable, as well as long term.

Every year in the vicinity of Japan there are several thousand maritime accidents. Ships may be wrecked due to stormy weather, ship collisions and groundings because of poor visibility, and harbour closures as a result of natural disasters. Maritime accidents, such as fires, collisons, and the grounding of ships, may also be caused by human agency.

As a result of scientific and technological advances, the seas are now able to be used in many different ways. But the ocean simply cannot be controlled in accordance with a person's or country's wishes. One of the important tasks of the future, therefore, is to come up with measures to minimise the basic vulnerability of sea lanes to the hazards of nature.

There are several problems, mostly the result of man-made causes, whose damaging effects on the seas cannot be taken lightly. These effects may take the form of unilateral declarations restricting the use of specific maritime areas. Examples of such declarations are the unilateral establishment of a restricted area for military exercises, and the restriction of free passage in fisheries or economic zones. Or they may arise as a result of military conflict. Conflict in a region will greatly affect transportation in the surrounding seas. If mines are used - as they were in the Persian Gulf during the Gulf War - then even after the war has ended, the sea lanes will be greatly obstructed for a lengthy period. When such obstructions occur in congested waters, the damage to the sea lanes will be even more serious.

Unilateral action to obstruct the sea lanes by a particular country may result in even more serious secondary disorders, such as the refusal of crews to board particular ships. These disorders could have extremely grave effects worldwide.

Various countermeasures should be undertaken to minimise the disruption to sea transportation that might result from the obstruction of sea lanes. These include the rescue of damaged ships, applying for various types of insurance, and casualty guarantees for crew members.

Conclusion

For too long the world has taken for granted the benefits of secure and stable sea lanes that underpin the very existence and prosperity of countries, regarding them in a similar way to air and water as a gift from heaven. We must get rid of such an optimistic view and look at things more rationally and objectively. If something goes awry, then the vulnerability of the sea lanes will become immediately apparent.

In any case, the importance of sea lanes to the survival and prosperity of countries in the Asia-Pacific region can only increase in the twenty-first century. An era has begun where sea lanes are not the sole possession of any one country or power. They will have to be used jointly by countries in a safe and stable manner for mutual development. The countries in the Asia-Pacific region will need to respect the fundamental principle of freedom of navigation, undertake to resolve their differences peacefully, and endorse the use of international law, especially the United Nations Convention on the Law of the Sea.

It is significant that countries in the Asia-Pacific region have begun to share some common objectives and perceptions and are beginning to see that such cooperation is in their national interests.

CHAPTER 3

MANAGING POTENTIAL CONFLICTS ARISING FROM THE SAFETY OF SHIPPING, NAVIGATION AND COMMUNICATION IN THE SOUTH CHINA SEA

Ian Townsend-Gault and William G. Stormont

The Indonesian-Canadian initiative on fostering cooperation and confidence in the South China Sea to date has sponsored more twenty-four meetings of maritime experts, and many of these have dealt - wholly but more often in part - with the issue of safety of shipping, navigation and communication. The topic has its own Technical Working Group, which is pursuing various avenues for cooperation in the region. Safety of navigation and related issues are discussed at other forums as well. Taking the agendas and results of these meetings as a whole, it is hard to escape the conclusion that there are unresolved problems in this sector in the South China Sea that demand more attention than they may be receiving. Given the established and continually growing importance of the South China Sea as a shipping route, these problems deserve greater priority than they currently receive.

Safety of navigation and communication, like almost everything else in the South China Sea, has been eclipsed in importance - first, by the disputes over islands and ocean space; and second, by the perception that the ultimate prize is access to vast resources of oil and gas. This is unfortunate and unnecessary. It has been argued, first, that maritime jurisdictional disputes need not (and in many parts of the world do not) and should not constitute an obstacle to the discussion of regional cooperation in areas where this is required; and second, that, given the state of knowledge on the resource potential of the area, the focus on hydrocarbons to the exclusion of everything else is unjustified.[1] Jurisdictional issues

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1 These issues are dealt with more fully in the following articles: Ian Townsend-Gault, 'Preventative Diplomacy and Pro-Activity in the South China Sea', *Contemporary Southeast Asia*, Vol.20, No.2, August 1998; and Hasjim Djalal and Ian

beyond the limits of the territorial seas have limited application to ships, which will continue to traverse these waters, boundaries or no boundaries. As regards hydrocarbons, there may or may not be significant accumulations of such resources in the subsoil of the central South China Sea, but there is no current verifiable evidence that these resources exist. Significant discoveries *might* be made some time in the future, but issues involving shipping are neither hypothetical nor theoretical, but very much 'here and now'.[2]

Problem Areas

The inadequacy of aids to shipping and navigation in the South China Sea is well known to all mariners who transit these waters: many of the features which dot the South China Sea are named for the wrecks of ships that have fallen victim to the unpredictable weather patterns of the region, inadequate maps, or ill-trained crews. The presence of these fatefully named reefs and shoals bears mute testimony to the need for improved monitoring systems, better charts and navigational aids and a higher standard of training for mariners, who are responsible for the cargoes they carry. This situation, coupled with extremely high traffic densities, makes for extremely hazardous conditions. Even where channels are well marked and weather conditions favourable, calamity may arise due to the poor standard of training of many of the region's mariners. Failure to address these and other issues has in the past, and will again in the future, resulted in loss of life and damage to the environment of the region.

Other problems facing mariners in the region include piracy and the lack of a coordinated search and rescue (SAR) programme capable of making a coordinated response to vessels in distress anywhere in the South China Sea. The former topic is difficult to address as it is often the case that those who are supposed to be protecting shipping - the armed forces and coast guards of the region -

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Townsend-Gault, 'Managing Potential Conflicts in the South China Sea: Informal Diplomacy as Process', to appear in a collection of papers on informal diplomacy and mediation edited by Chester Crocker *et al.*, to be published by the US Institute of Peace, Washington DC, in 1999.

2 Precisely the same point can be made with respect to living resources and marine environmental protection; less glamorous issues, but of infinitely greater importance than petroleum as regards the political economy of the region.

are the predators, boarding and redirecting vessels to 'safe' ports, confiscating cargoes and even murdering crews. Poorly paid crews and the failure of their political masters to control these forces are often cited as reasons for piracy incidents. The latter instance is complicated by the overlapping jurisdictional claims in the region. Search and rescue patrols are often compromised by the fact that sending patrols to disputed zones or on coordinated exercises may be interpreted as recognising sovereign rights of one state over another. Similar arguments undermine attempts to implement joint development arrangements in the South China Sea. Moreover, the fact that SAR operations are largely the preserve of military units further complicates the situation, since the task then becomes one of trying to coordinate the activities of different (and sometimes rival) navies.

These issues are important because of the unmistakable importance of the South China Sea as a shipping route. According to a briefing note issued in August 1998 by the United States Energy Information Administration,[3] '(m)ore than half of the world's annual merchant fleet tonnage passes through the straits of Malacca, Sunda and Lombok, with the majority continuing on into the South China Sea'.[4] The same source suggests that most of the increased demand for hydrocarbons from the South China Sea region - much of it generated by China - will be met by additional imports from Africa and the Middle East, and will also be shipped through the Strait of Malacca.[5]

Practical problems such as those described above are exacerbated by the complex political context in which they exist. Though all parties to the South China Sea dispute pay lip-service to the need to cooperate, few have demonstrated the political will necessary to transform words into deeds. In fact, while the countries of the region voice ASEAN solidarity at meetings such as the ASEAN Regional Forum (ARF) and Senior Officials' Meetings (SOMs), ignorant navies clash by night as gunboats and fishing vessels wage sharp and vicious 'turf battles' in an attempt to assert dominance over blurry lines at sea.

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3 United States Energy Information Administration, 'South China Sea Region' available at <http://www.eia.doe.gov/emeu/cabs/schina.html>, 5 August 1998.

4 ibid., pp.4-5.

5 ibid., pp.2-3.

In spite of these uncomfortable facts, cooperation is not just a good idea - it is the law. More specifically, the law as embodied in the United Nations Convention on the Law of the Sea (UNCLOS) of 1982.[6] The importance of the convention - now ratified by all the littoral states except Cambodia and Thailand - is that it seeks to break down the 'old' thinking, based on unimpeded exercise of sovereign rights, and replace it with the 'new' thinking based on a sophisticated appreciation of the demands of functionalism in ocean management. This change cannot be brought about overnight. It requires a radical readjustment of thinking on the part of governments and their advisers. Some are quicker to appreciate and act upon the convention than others. To some extent, the South China Sea initiative works at the cutting edge of policy development - not always an easy or comfortable place to be.

The rights and duties enunciated in the Law of the Sea Convention must be seen against the background of other conventions, especially those drafted under the aegis of the International Maritime Organisation (IMO), and customary international law. However, the convention sets forth the main principles regarding the correlative rights and duties of states in the oceans. The shipping provisions of the convention codify and develop the law with respect to transit rights, innocent passage, and the like. However, Part IX (Regime of Enclosed or Semi-enclosed Seas) calls for close cooperation with respect to pollution preparedness in semi-enclosed sea areas (such as the South China Sea). By extension, one can argue that other shipping-related issues could be seen in this light, encouraging, for example, a cooperative response to maritime emergencies where pollution and search and rescue may be involved. This, however, may require some form of demarcation of areas of response responsibility, and this the littoral states seem unwilling to contemplate, at least for the moment.

The Contribution of the South China Sea Initiative

The goal of the project Managing Potential Conflicts in the South China Sea is to identify, develop and promote maritime cooperation between the states of the South China Sea region not only

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6 United Nations Convention on the Law of the Sea, Montego Bay, 12 December 1982, in force November 1995.

as a confidence-building measure but also to contribute to better ocean governance by advancing the development of ocean law, policy and management.[7] The 'shipping sector' is one where the potential for cooperation would seem to be enormous.

To date there have been four meetings on the safety of shipping, navigation and communication in the South China Sea.[8] The Technical Working Group on the Safety of Shipping, Navigation and Communication has met twice, once at Jakarta in 1995 and again at Bandar Seri Begawan in 1996. These initial meetings streamlined the process and led to two further meetings at the Group of Experts level. These were the First Group of Experts Meeting (GEM) on the Training and Education of Mariners, held in Singapore during May 1997, and the First Group of Experts Meeting on Hydrographic Data and Information Exchange in the South China Sea convened in Kuching, Malaysia in June 1997. The two GEMs resulted in some promising proposals which warrant further attention.

The premise of the GEM on Training of Mariners was that the wide variation in the standards followed at regional training

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7 Project meetings are attended by maritime experts from Brunei Darussalam, Cambodia, China (including Taiwan), Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. Participants have been drawn from the ranks of government officials, academia, researchers, the armed forces and the private sector, but everyone attends in his or her personal capacity. Participants are not in any sense representatives or delegates - the meetings are unofficial and this is a 'track-two' initiative. Project meetings are attended by resources persons from Canada, regional countries and, in the area of safety of shipping and navigation, from Australia and Japan as well.

8 Technical Working Group (TWG) meetings are also held in the others areas of project concentration, namely: Marine Environmental Protection, Marine Scientific Research (MSR), Resource Assessment and Ways of Development, and Legal Matters (LM). Some of these TWGs are more fully developed than others. For example the TWG-MSR has held five meetings while the TWG-LM has only met twice. This disparity is a reflection of the political sensitivity of the topic rather than a value judgement of relative importance. Until recently, participants regarded the TWG-LM as necessarily leading to the jurisdictional question while the TWG-MSR was considered the least contentious subject to address. The thinking was that, since all major international organisations concerned with the environment have a marine science component, some of which, such as the IMO East Asian Seas project, have a South China Sea focus, we could study, the issue without creating controversy. In contrast, it was not until the legal matters meeting was shown to be relevant to project implementation and a vital part of any study, rather than being solely concerned with jurisdictional issues, that this component was admitted.

establishments called into question the professional qualifications of personnel on vessels sailing the South China Sea. This, it was thought, could only contribute to further marine causalities as the density of shipping increases. Suggestions arising at the Singapore meeting included an initial study of each country's training and education programmes for mariners, the harmonisation of regional standards and legislation as set forth in the Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1995 (STCW 95), the establishment of exchange programmes and visits between mariner training academies in the region and a 'Training for Trainers' programme.

The Kuching GEM, attended by most of the senior hydrographers of the region, explored possible approaches to rectifying deficiencies with marine charts in the South China Sea in the interests of contributing to the prevention of marine causalities in this '"hydrographically neglected" region'.[9] Participants devised a draft proposal concerned with joint hydrographic surveys in the South China Sea. The main objective of the proposed project is to survey and chart to modern standards certain priority areas in the South China Sea, to ensure safety and efficiency of navigation. This would be a cooperative undertaking, which would also train technical personnel from each participating country in the latest technology in surveying and charting. Suffice it to state that the project will further enhance the existing working relationships among the hydrographic offices involved.

Recent events and advances in technology offer greater flexibility in terms of surveying and charting the project area. Previously, airborne laser bathymetry for shallow areas and conventional ship hydrography for the remaining portions were considered as modes of data acquisition. In a resolution passed by the East Asia Hydrographic Commission in 1995, the UK Hydrographic Organisation was requested to make an inventory of existing

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9 See Hal Olson, 'Marine Traffic in the South China Sea' in Elisabeth Mann Borgese, Norton Ginsburg and Joseph Morgan (eds), *Ocean Yearbook*, Vol.12 (University of Chicago Press, Chicago, 1996), p. 153. This paper offers an excellent précis of the current situation with respect to navigational safety issues in the South China Sea, as well as some predictions for future problem areas if the region does not come to terms with and rectify the deficiencies identified here and in meetings taking place as part of the workshop process.

bathymetric data held by commercial companies. The use of existing data is expected to substantially reduce the high costs of airborne and shipborne surveys.

The Second Technical Working Group on the Safety of Shipping Navigation and Communication in the South China Sea, held in Brunei in 1996, also considered contingency plans for pollution control and unlawful activities at sea as well as search and rescue as potential areas for cooperation. With respect to the former matter, the TWG agreed on the following:

- That steps should be taken to coordinate efforts in the area of oil pollution response and control. It was suggested that the first task is to collect and disseminate information with respect to the areas in the South China Sea recognised as being most at risk from pollution and dangerous both in terms of accidents and by reason of navigational hazards.
- It was also agreed that participants would undertake to identify what contingency plans exist in the above areas for dealing with prospective shipping accidents and oil pollution.
- It was further agreed to identify the steps the authorities of the region were taking to implement the guidelines of the International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC), and other relevant conventions.
- Consideration should be given to the exchange of technology, know-how, expertise, and information in order to prepare for oil pollution contingencies. Contact points should be identified and alerting procedures agreed as part of contingency arrangements.

Unlawful activities at sea and search and rescue were also discussed at the Brunei meeting. Participants concluded that:

- Unilateral efforts should be continued and strengthened where both unlawful acts and SAR are concerned.
- Bilateral cooperation should be continued and enhanced.

- Ideally, the recommendation would be to convene meetings to address regional arrangements on both SAR and unlawful activities at sea.
- The Working Group discussed the possibility of holding a regional forum on SAR. This effort would have to be with the support of the appropriate authorities.

As stated earlier in this chapter, two of the identified areas for cooperation - training of mariners and hydrographic survey - have already been addressed in the course of two GEMs. The high level of meeting activity, the incapacity of participants to attend four GEMs, and financial constraints mitigated against holding GEMs on these other two subjects during 1997.

The Eighth Workshop on Managing Potential Conflicts in the South China Sea accepted the reports from the two GEMs, and requested the project directors to arrange for further meetings on the safety of navigation and communication in 1998. The Third Meeting of the TWG will take place in Singapore in October 1998, preceded by the Second Meeting of the GEM on Exchange of Hydrographic Information. The TWG will consider issues left on the table at the Second TWG meeting, and the results of the work of the GEMs. It was decided not to convene a second meeting of the GEM on Training of Mariners in 1998, but to await developments in other forums; this issue will be revisited at the Ninth Workshop, scheduled for Jakarta in early December 1998. It is possible that the Third Meeting of the TWG may wish to pursue issues such as interdiction of illegal acts at sea and SAR. If this transpires, the Ninth Workshop will be forced to establish some priorities, since not all issues can be pursued simultaneously (for the practical reasons given above). In any case, the project directors will urge the workshop to pursue only those ideas which have a demonstrable functional utility; will make some contribution to regional maritime cooperation; and are feasible or achievable.

Conclusions

All commentators are agreed that maritime traffic in the South China Sea, already of impressive volume, will increase in coming years. The workshop process remains the only forum with at least some degree of permanence that is dedicated solely to South China Sea

issues. A start has been made in identifying priority issues that require regional cooperation. The extent to which this start can be built on depends, as always, on the political will of those involved.

At the beginning of this chapter we pointed out that perceptions of the issues in the South China Sea are not always defensible. It should not be forgotten that shipping and navigation is one of many topics not only under consideration under the aegis of the workshop process, but also on regional and national agendas. Progress in this sector might encourage progress in others. Conversely, problems in other sectors may retard progress in this one. Any track-two process must balance the extraordinary freedom it has to do more or less as it pleases with the constraints imposed by what is, or is not, acceptable at the end of the day. The workshop process has always sought to work within the limits of feasibility, while regarding itself as free to pursue any avenue within those limits.

The work of other forums is also highly relevant. The workshop process does not seek to duplicate, but rather to complement, or, in areas of special difficulty, to explore. A number of formal frameworks in the general area of safety of navigation and communication have been established through the Law of the Sea convention, ASEAN (especially the Science and Technology Committee), the STCW 95, the IMO, the International Hydrographic Office, and the Group of Experts on Ocean Mapping in the Western Pacific of the International Oceanographic Commission (IOC/WESTPAC). This suggests that the avoidance of duplication may indeed be something of a challenge, but it should be remembered that the participants at the Kuching GEM saw opportunities to pursue through the informal channel provided by the workshop process, and that the participants were of such seniority and experience that they would be well aware of any potential for needless overlap.

With these considerations in mind, the continued economic importance of the safety of shipping, navigation and communication to the countries of the South China Sea region will ensure the continued prominence of the topic for the workshop initiative.

CHAPTER 4

SEA LINES OF COMMUNICATION SECURITY AND ACCESS

Stanley B. Weeks

Security and access to sea lines of communication (SLOCs) is of increasing importance, as these sea lines are the maritime highways for vast trade flows critical to the rapidly growing prosperity not only of the Northeast Asian region, but also for the entire Asia-Pacific area. Threats to the security of and access to SLOCs include both military concerns (conflicts between regional countries as well as sea mines) and non-military concerns (natural disasters and accidents, piracy, and particularly 'creeping jurisdiction' of regional states). The United States, with both trade and security interests in East Asian SLOCs, has three times in the past eighteen months re-emphasised its commitment to uphold the traditional principles of freedom of navigation in regional SLOCs - a commitment which logically should be shared by the other East Asian states.

SLOCs and Critical Straits in the East Asian Region

Figure 4.1 indicates major sea lanes and critical straits in the ASEAN and East Asian region, notably the South China Sea and the straits of Malacca (including for simplicity the Phillip Channel and the Strait of Singapore), Sunda and Lombok.[1] Over half the world's merchant fleet capacity sails through these straits and the South China Sea, much of it going to or coming from Northeast Asia. The Strait of Malacca, through which more than 200 ships a day pass, is the main passage between the Indian Ocean and the South China Sea, although relatively shallow in places (International Maritime Organisation

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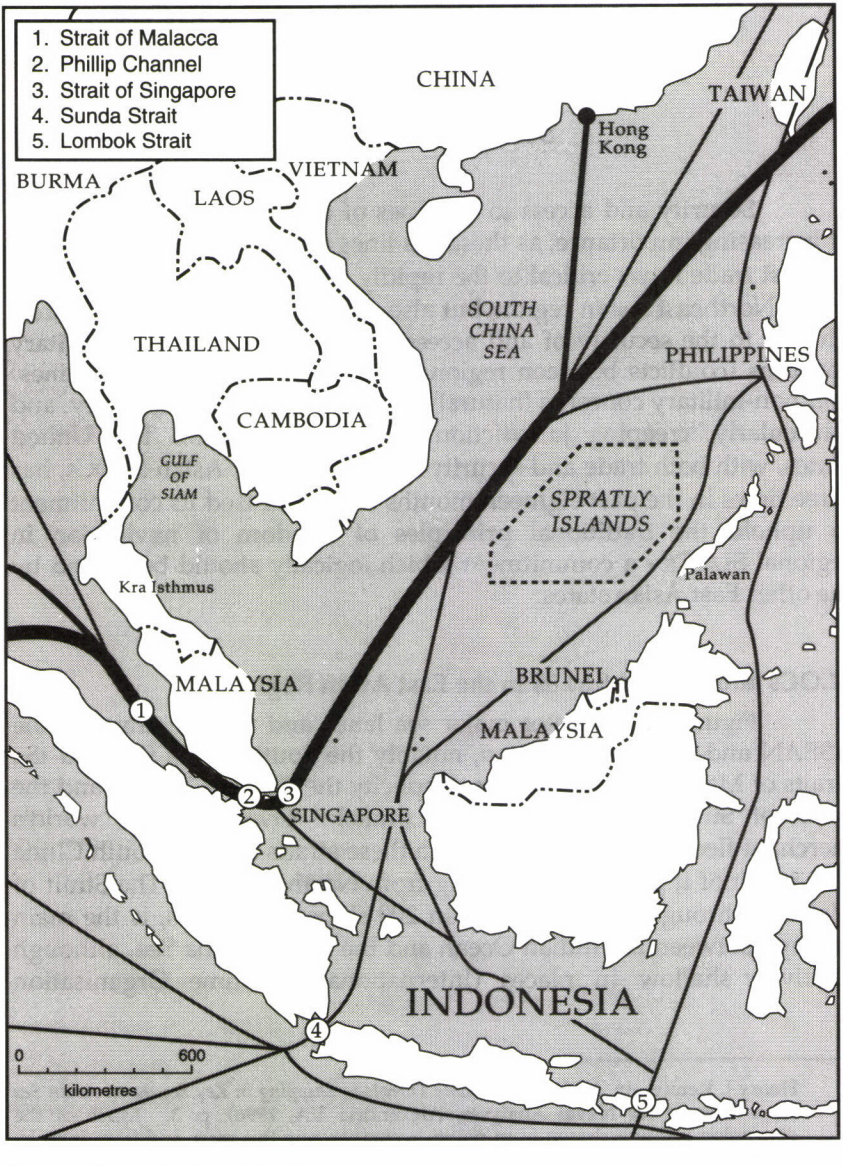
1 Henry J. Kenny, *An Analysis of Possible Threats to Shipping in Key Southeast Asian Sea Lanes* (Center for Naval Analyses, Alexandria VA, 1996), p. 3. Much of the discussion below is drawn from points accompanying this map, and from John H. Noer and David Gregory, *Chokepoints: Maritime Economic Concerns in Southeast Asia* (National Defense University Press, Washington DC, 1996).

Figure 4.1: Principal International Sea Lanes through Southeast Asia



Source: Center for Naval Analyses

Figure 4.2: Interregional Maritime Crude Oil Shipments, 1993

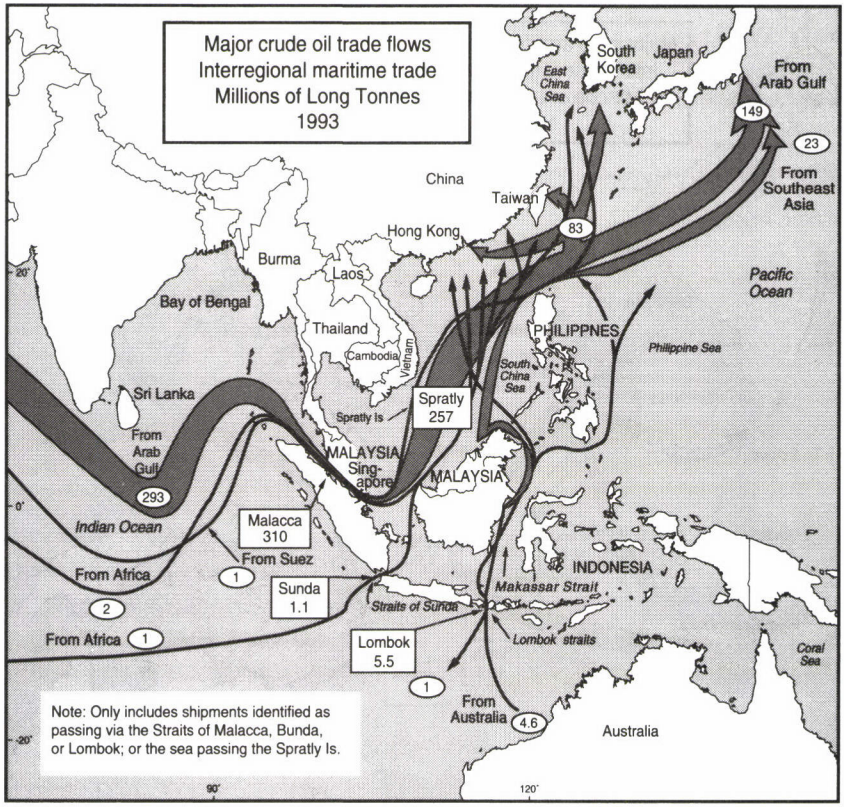


Figure 4.3: Interregional Coke and Coal Movements, 1993

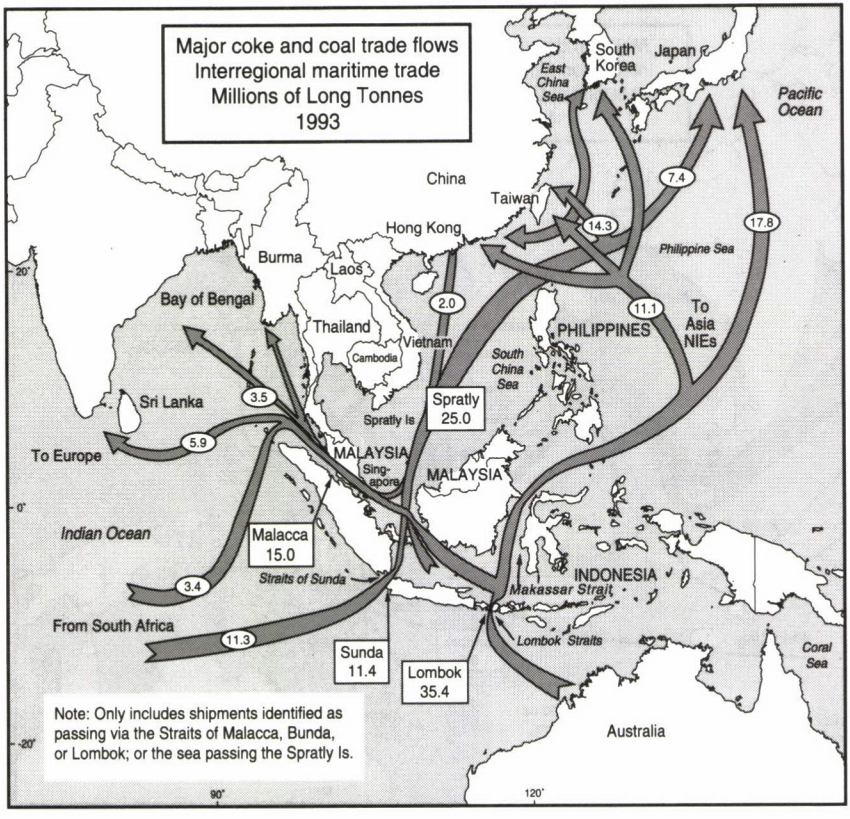
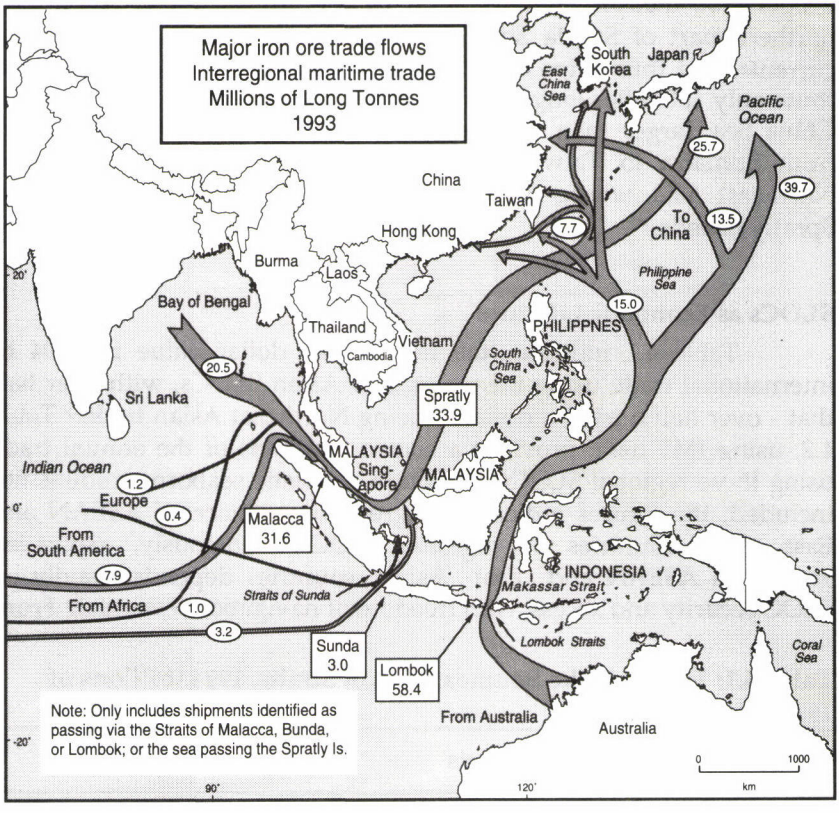


Figure 4.4: Interregional Iron Ore Movements, 1993



(IMO) recommended maximum draught of 19.8 metres) and as narrow as 1.5 miles at its eastern end, leading to the preferred use of the deeper (150 metres) Lombok Strait by the largest tanker ships. The northern part of Sunda Strait is relatively shallow with dangerous currents, and thus ships over 100,000 DWT use the Lombok Strait (a route only 150 miles longer, which is not draught-limited).[2] The South China Sea, larger than the Mediterranean, extends over 1,800 miles from Sumatra to Taiwan, with SLOCs connecting Southeast and Northeast Asia, whose major routes pass well west of the disputed Spratly Islands.

SLOCs as Economic Lifelines

Table 4.1 indicates the near-trillion-dollar value in 1994 of international trade using the major East Asian SLOCs, with over half that - over half a trillion dollars - being Northeast Asian trade.[3] Table 4.2, using IMF data, provides a country analysis of the annual trade using these regional SLOCs. Although domestic seaborne trade is not included, the figures indicate the great dependence of ASEAN and East Asian countries on regional SLOCs.[4] Obviously, export-led growth in ASEAN and East Asian countries depends heavily on SLOC security and access, with freedom of navigation essential. From

Table 4.1: Trade via the Southeast Asian Straits, 1994 (billions of 1994 US dollars)

Nation or Group	Exports	Imports	Total Trade
Japan	139.0	121.4	260.4
South Korea	26.3	35.4	61.7
China	30.7	34.9	65.6
Hong Kong	38.3	37.3	75.6
Taiwan	25.3	29.3	54.6
ASEAN	204.1	227.5	431.6
Total	463.7	485.8	949.5

Source: Center for Naval Analyses

2 Kenny, *An Analysis of Possible Threats to Shipping ...*, p. 4.
3 ibid., p. 5.
4 ibid., p. 17.

Table 4.2: Value of Trade for Select Asian Countries Passing Through Major Southeast Asian Sea Lanes, 1994 ($US billions)[a]

Country	Exports via SEA sea lanes	Imports via SEA sea lanes	Total trade via SEA sea lanes	Percentage of trade via SEA sea lanes	Percentage of GDP
Brunei	2.0	3.0	5.0	95	94
Indonesia	35.7	28.2	63.9	94	41
Malaysia	55.8	56.6	112.4	95	161
Philippines	4.0	8.5	12.5	35	20
Thailand	39.3	51.5	90.8	95	69
Singapore	91.6	97.1	188.7	95	311
Vietnam	4.4	8.1	12.5	93	65
Japan	139.0	121.4	260.4	39	6
PRC	30.7	34.9	65.6	27	16

a. All figures are estimates; n.b.: the combined total does not equal the totals in Table 4.1 because trade in this table includes trade by each nation with each other nation, including those in the table, whereas Table 4.1 excludes such trade for purposes of eliminating double-counting in estimating total trade via the straits. Percentage of 1994 GDP is based on GDP reported by the International Institute for Strategic Studies, *The Military Balance 1995-96*, Ooctober 1995. The Southeast Asian sea lanes considered here include the straits of Malacca, Sunda, and Lonbok, and that portion of the South China Sea to the east and west of the Spratlys.

Source: Center for Naval Analyses

another perspective, trade using these regional SLOCs, as a percentage of GDP, is over 21 per cent for South Korea, Hong Kong, and Taiwan, 10 per cent for Japan, and 12 per cent for Australia.[5] Figures 4.2, 4.3, and 4.4 show the heavy volume on northbound East Asian SLOCs of bulk crude oil, coal, and iron ore destined to fuel Northeast Asian industry. Southbound traffic on the East Asian SLOCs then consists primarily of manufactured goods bound for Southeast Asia and Europe. Table 4.1 does not include figures on US trade with the region, which also relies in part on Southeast Asian SLOCs (for around four per cent of imports and exports), but relies much more on trans-Pacific SLOCs from the West Coast to Northeast Asia. In fact, in 1995 US

5 Noer and Gregory, *Chokepoints*, p.25.

exports to Asia grew 25.8 per cent, the highest among all regions, and at $193 billion exceeded US exports to Europe by $50 billion, and accounted for 3.8 million US jobs.[6] Clearly, the United States also has a growing economic interest in the security of SLOCs in this region, particularly in view of the impact of their disruption on US trading partners.

The proposed *Guidelines for Regional Maritime Cooperation*, developed by the Maritime Cooperation Working Group of the Council for Security Cooperation in the Asia Pacific, have as one of their explicit purposes to 'help promote a *stable maritime regime* in the region with the free and uninterrupted flow of seaborne trade'.[7]

Military Concerns

Logically, the critical economic importance of the SLOCs in the region to the nations of ASEAN - as well as to major regional powers such as the United States, China (whose dependence is growing with its trade), South Korea, Russia, and Japan (which imports over 80 per cent of its oil on these SLOCs) - suggests that neither the ASEAN nations nor other major regional powers would have any interest in posing military threats to regional SLOCs. Yet conflicts usually develop with scant regard for economic logic. Of several potential conflict scenarios, perhaps the least likely would be the involvement of ASEAN regional states in conflicts among themselves and/or attacks on ships in the regional sea lanes. A greater concern, particularly among ASEAN nations, is the disruption of SLOCs by conflicts involving actions by China or others to enforce claims to Taiwan or the Spratly Islands, or to oil fields disputed with Vietnam. A Chinese Foreign Ministry statement in April 1995 denied any threat to freedom of navigation, stating:

> While safeguarding its sovereignty over the Nansha [Spratly] Islands and its maritime rights and interests, China will fulfil its duty of guaranteeing freedom of navigation for foreign

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6 John T. Dori, *Trade with Asia Means Jobs for America*, FYI No.19 (The Heritage Foundation, Washington DC, 16 September 1996).

7 CSCAP Memorandum No.4, *Guidelines for Regional Maritime Cooperation*, Council for Security Cooperation in the Asia Pacific, December 1997, p.2. The Guidelines can also be viewed on the world-wide web at <http://coombs.anu.edu.au/Depts/RSPAS/AUSCSCAP/memo4.html>.

ships and air routes through and over the international passage of the South China Sea according to international law.[8]

However, PRC missile firings to areas off Taiwan's seaports in early 1996 again heightened concern. Conflict potential in the Taiwan Strait and the Spratlys remains a real concern, but it is worth noting that, even in this worst case, there are some natural limits to disruption of SLOCs given the fact that major sea lanes run well to the west of the Spratlys and to the east of Taiwan (see Figure 4.1). A final threat scenario would involve the mining of critical SLOCs or, especially, straits in the ASEAN region. Given the economic interests of all regional states, it is hard to imagine a scenario where any state would openly mine these waters, and even harder to identify a rationale for clandestine mining, like that in the Red Sea in 1984. Such mining would be a major threat to coastal areas of ASEAN, and to the confined and relatively shallow Strait of Malacca, but the currents and depth of Sunda and Lombok straits would minimise mine effectiveness there.[9]

In summary, there are real concerns regarding potential military disruptions to SLOCs in the ASEAN and East Asian region, but both the probability of such disruptions, and their direct effects on shipping, may be somewhat less than sometimes assumed. Of greater concern, of course, would be the indirect costs of military disruption (or even the threat of such disruption) of SLOCs in terms of higher costs for insurance and of diverting shipping to longer, more expensive, routes.

Non-Military Concerns

Non-military concerns for SLOC security and access include natural disasters and accidents, piracy, and 'creeping jurisdiction' of regional states. Natural disasters for the East Asian region particularly include the average of nine typhoons that strike part of the South China Sea each year, although most of these strike well north of the

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8 PRC Ministry of Foreign Affairs, *Beijing Review*, 8-14 May, 1995, p. 22, quoted in Kenny, *An Analysis of Possible Threats to Shipping ...*, p.31.

9 Kenny, *An Analysis of Possible Threats to Shipping ...*, p.23.

critical straits.[10] Unlike natural disasters, accidents such as collisions and groundings can be reduced with more careful seamanship as well as measures such as the traffic separation lanes in the Strait of Malacca. Nonetheless, dangers of pollution from major oil spills will remain a significant concern in the heavily trafficked SLOCs of this region.

Piracy poses real dangers in the SLOCs of the ASEAN region - not only to the lives of crew, but also to other ships in heavily travelled areas. Figure 4.5 indicates the geographic 'hot spots' for piracy in the Asia-Pacific region. As the International Maritime Bureau (IMB) statistics on piracy in Table 4.3 indicate, in 1992 and 1993 over two-thirds of the world's piracy incidents occurred in the Asia-Pacific region. As Table 4.4 indicates, 71 of 87 global pirate attacks in 1994 took place in the Asia-Pacific region. Figure 4.6 indicates the specific geographic distribution of piracy attacks in 1994, but cannot show the interesting trends in location of attacks in recent years. After a surge in 1990-92, new cooperative initiatives (discussed below) in the straits of Malacca and Singapore area reduced piracy incidents significantly in that area.

But in the period from 1992 to early 1994 there was a significant shift of the focus of piracy to the Hong Kong-Luzon-Hainan Island (HLH) area and the South China and East China seas. Piracy in these areas was on a more overt, quasi-military scale, with the attackers frequently being Chinese, in uniform and in patrol boats, firing shots in many cases. Beijing eventually claimed that rogue elements of the Chinese Customs and Public Security Bureaus (not military units) were responsible.[11] (This may have reflected both the pressure of the PRC 'anti-smuggling' initiative, and the fact that local officials could keep half of the 'contraband' seized.)

Other nations in Asia were concerned that these 'piracy' incidents might be a deliberate PRC exercise of extra-territorial sovereignty and (particularly in the South China Sea and East China Sea and Senkaku Island area) an unofficial exertion of expansive PRC maritime claims. If so, the PRC has either rethought this tactic or gained better control of local 'rogue' officials. International pressure clearly played a role in this. After having seen 17 of 20 piracy incidents

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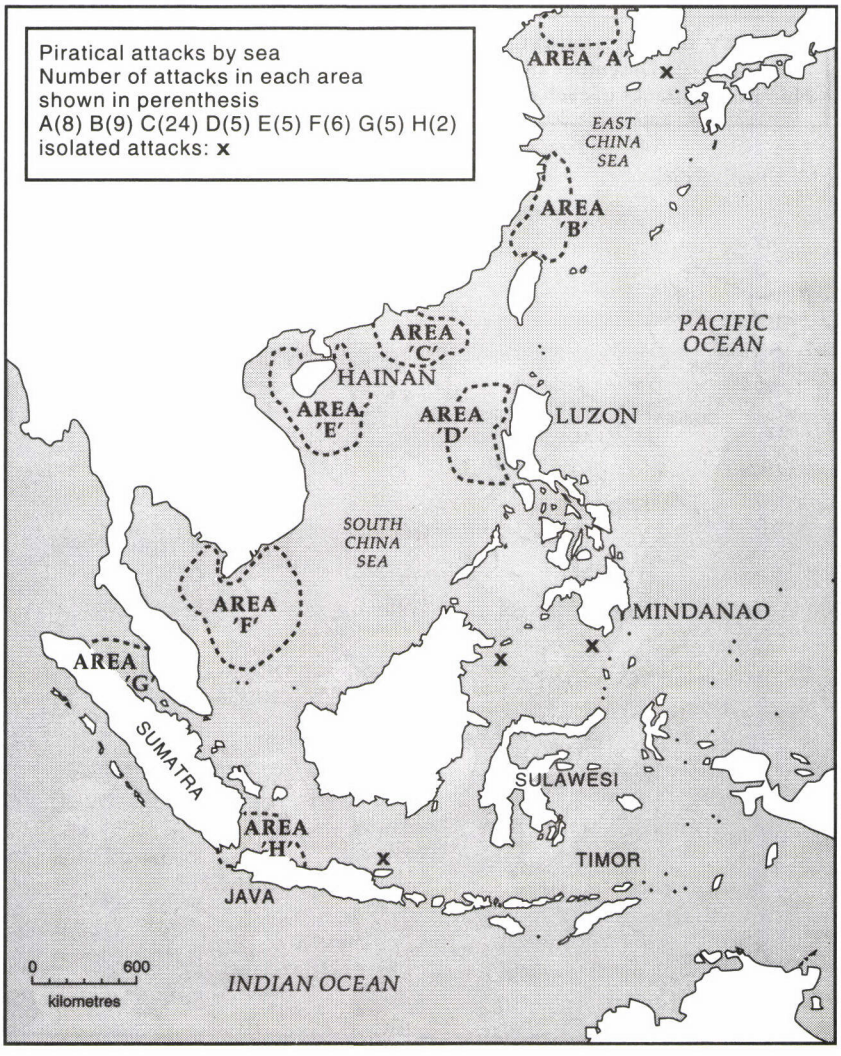
10 ibid., p. 14.

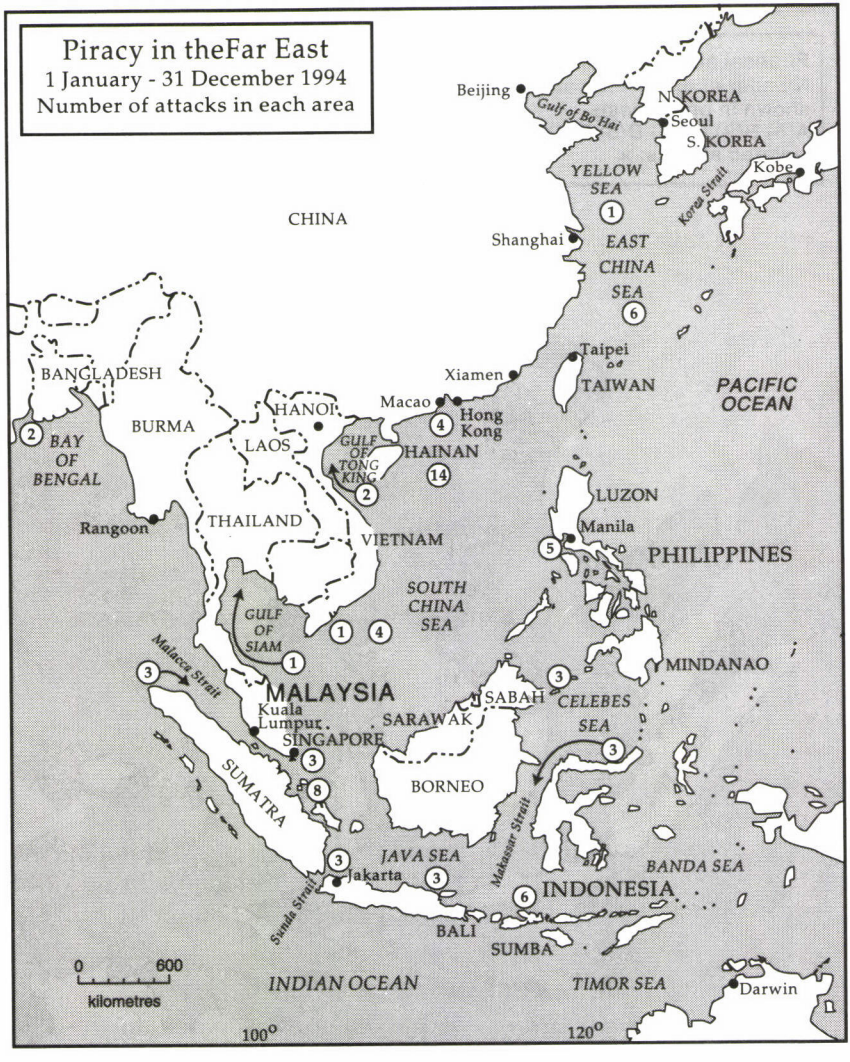
11 Far Eastern Economic Review, *Asia Handbook 1995*, pp.62-3.

Figure 4.5: Piracy 'Hot Spots' in East and Southeast Asia, 1993



Source: *IBRU Maritime Briefing, 1994*, based on figures from the Regional Piracy Centre, Kuala Lumpur (to end of August 1993)

Figure 4.6: Piracy in the Far East, 1994



Source: *IMB Piracy Report*

Table 4.3: Comparison of Worldwide Piracy Statistics Reported to the IMB in 1992 and 1993

Are	1992	1993	Variance
Africa	16	9	-7
South Asia	9	5	-4
Southeast Asia	65	8	-57
Far East	9	68	+59
South America	10	5	-5
Middle East	1	0	-1
Europe	1	0	-1
Latin America	1	0	-1
Unclear coordinates	3	0	-3
Robbery in port	0	7	+7
Unknown area	0	1	+1
Total	115	103	-12

Of the 103 incidents reported for 1993, the major 'hot spot' is the Hong Kong-Luzon-Hainan area. In fact, there wered 33 reported cases for this area in 1993, 11 for the South China Sea, and 20 for the East China Sea. There were only four reported incidents for the straits of Malacca and Singapore. A dramatic decrease from the previous two years. The IMB have also categorised attacks on vessels for 1993, thus:

25 attempted boardings repelled by would-be victim vessels,
28 actual boardings,
19 reports of vessels trailed by suspicious craft,
16 reports of vessels being stalked and fired upon by pirate craft,
7 vessels detained over varying periods of time,
8 robberies at port/anchorage.

Source: *IBRU Maritime Briefing, 1994*

aimed directly against Russian ships in the East China Sea in late 1992 and early 1993, Russia deployed naval ships to the area in mid-1993 with orders to attack any threats to shipping - whereupon such attacks promptly ceased.

Japan, another focus of the 78 cases in 1991-93 where foreign vessels were boarded or shot at by Chinese, proposed to the PRC foreign minister during his February 1993 visit to Tokyo that officials from the two countries' coastguard authorities meet to discuss East China Sea shipping problems. The PRC agreed to an 'informal' June

Table 4.4: Pirate Attacks in Asia and the Rest of the World, 1994*

Waters	Number of attacks
Indonesia; Papua New Guinea	23
Hong Kong-Luzon-Hainan Triangle; Hong Kong	16
Strait of Malacca-Indonesia; Singapore Straits; Malaysia	10
South China Sea	6
East China Sea	6
Philippines	5
Vietnam; Cambodia	4
Bangladesh; Sri Lanka	3
Yellow Sea	1
Rest of the world	16

* Attacks are attempted boardings, theft and hijacking of vessels. Water regions overlap.

Source: International Maritime Bureau

1993 meeting, which arranged the establishment of a hotline to the Japanese Maritime Safety Agency - and incidents over the next year were reduced to only one.[12] Elsewhere, an embarrassing Chinese attempt in May 1994 to seize a vessel inside Hong Kong's territorial waters even led to a PRC apology and promise to avoid such incidents in the future. As Table 4.5 indicates, however, there were still numerous incidents in 1994 in the HLH region, although half the 1993 number - and a significant increase (double those in 1993) in piracy incidents in Indonesian waters in 1994 and, more recently, in 1996. These trends in regional piracy suggest that such acts may, in some cases, have broader implications for regional security.

However, it is also clear that discussions and cooperation between Asia-Pacific nations can help ensure crackdowns on piracy. In the Malacca and Singapore straits area, international cooperation and specific cooperative measures between neighbouring states have significantly reduced piracy incidents in recent years. 1992 was the key year. In October 1992, the International Maritime Bureau of the International Chamber of Commerce - with support from the shipping

12 See 'China's New Law of the Sea', cover story in *Far Eastern Economic Review*, 16 June 1994, pp. 22-8.

Table 4.5: Number of Attacks, January-December 1996, by Location

Location	1991	1992	1993	1994	1995	1996
Southeast Asia						
Indonesia	55	49	10	22	33	53
Thailand					4	13
Malaysia	1	2		4	5	5
Philippines		5		5	7	7
Malacca Strait	32	7	5	3	2	3
Cambodia			1	1	1	1
Burma						1
Singapore Straits				3	2	2
Far East						
China/Hong Kong/ Macau			1	4	31	9
'HLH' Area			27	12	7	4
South China Sea	14	6	31	6	3	2
Vietnam				2	4	
Taiwan					2	
East China Sea		1	10	6		1
Gulf of Tonkin				1		
Yellow Sea				1		
Indian Sub-Continent						
Sri Lanka			2	1	5	8
India		5	1		8	9
Bangladesh				2	2	4
Arab Sea/Persian Gulf					8	1
Americas						
Brazil			4	7	17	16
Peru					1	2
Ecuador				3		3
Caribbean				1		
Colombia			1		1	3
Dominican Republic						1
Jamaica						1
Salvador						1
Panama					1	

Location	1991	1992	1993	1994	1995	1996
Nicaragua					1	
Uruguay						1
Africa						
Somalia/Djibouti				1	14	3
Tanzania			2	1	2	3
Algeria				1	1	
Ivory Coast				1		2
Senegal						2
Guinea				1	1	2
Nigeria			2		1	2
Angola			3			
Egypt				1		
Guyana			1			1
Gabon					1	
Ghana					1	2
Sierra Leone						2
Rest of World						
Turkey					1	1
Denmark					1	
Yemen						1
Greece						1
Russia					1	
Italy					1	2
Location Not Available						
	5	31	2			
Total at Year End						
	107	106	103	90	170	175

Source: International Maritime Bureau

and related industries, the UN International Maritime Organisation, and law-enforcement agencies - established a Regional Piracy Centre in Kuala Lumpur. This Regional Piracy Centre was designed to cover all the countries east of Sri Lanka to Southeast Asia and the Far East, to serve as an information and reporting centre, and to liaise with

regional law enforcement authorities (the centre has no enforcement capabilities of its own).[13]

Earlier, in the summer of 1992, Singapore and Indonesia had agreed to establish direct communications links between their navies, and agreed to provide coordinated patrols of their navies to protect Singapore Strait shipping lanes against piracy, including provisions for coordinating pursuit across territorial boundaries. Later, in December 1992, Indonesia and Malaysia, using the longstanding Joint Border Committee mechanism for maritime cooperation (which already included joint naval and police exercises and operations in the Strait of Malacca, and procedures for regular rendezvous at sea to exchange information), agreed to form a joint Maritime Operation Planning Team to conduct coordinated patrols along the common borders in the Malacca Strait. (In mid-1993, these two countries conducted a ten-day joint patrol exercise in the Strait of Malacca.)

As a result of these cooperative measures (as well as significant unilateral anti-piracy measures by Singapore, Malaysia, and Indonesia), the piracy problem in the Malacca and Singapore straits diminished significantly after 1992.

There is still considerable scope for further cooperation in combating piracy in the Asia-Pacific region. In the Malacca and Singapore straits area, one suggestion has been that Singapore, Malaysia and Indonesia agree to establish 'joint patrol areas', where more than the territorial state would have the right to patrol, arrest, and punish for acts of piracy.

In the South China Sea area, a paper prepared for the Indonesian-sponsored Fifth Workshop on Managing Potential Conflicts in the South China Sea included a proposal for 'coordination and cooperation between the navies and authorities of the region' in combating piracy and illicit drug traffic. The Third South China Sea Workshop in 1992 had reported that some participants 'suggested that piracy could be most effectively dealt with at the national level, while others considered that a regional approach to the problem would be preferable'.

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13 *IBRU Maritime Briefing 1994* (International Boundaries Research Unit, University of Durham, 1994), p.18.

In the East China Sea area, a continuation of the dialogue between the coastguard authorities of the PRC and Japan, as well as inclusion of this problem on the agenda of the PRC-Taiwan 'informal' discussions on cross-strait issues would be useful. The Regional Piracy Centre in Kuala Lumpur should continue to develop, and could act as a spur to the inclusion of the piracy problem on the future regional maritime cooperation agenda. The new proposed CSCAP *Guidelines for Regional Maritime Cooperation* explicitly recognise 'the importance of cooperation in the maintenance and enforcement of law and order at sea, including the prevention of piracy, drug smuggling, and other crimes at sea ...'.[14]

Perhaps the greatest threat over the longer term to SLOC security and access in the East Asian region (and globally) comes from the 'creeping jurisdiction' of states in the region taking actions that restrict traditional freedom of the seas. Proposed constraints often have good motives, such as safety and combatting pollution, but cumulatively would restrict SLOC access in ways potentially quite harmful to regional states themselves, given their great dependence on SLOC shipping for economic growth.

First, there have been various proposals by regional straits states to go beyond the IMO safety regulations and traffic-lane demarcations and to impose additional restrictions on passing ships, including even tolls for the use of these recognised international straits. Such proposals have to date been fiercely resisted by other regional states as well as major powers.

The UN Law of the Sea convention, which took effect in November 1994, has also given rise to some increased attempts to impose navigation restrictions in newly declared (and often overlapping) exclusive economic zones, and has resulted in a major dispute between Indonesia and many other states. The dispute arose when Indonesia, in declaring her new archipelagic sea lanes, proposed to limit passage to only three north-south sea lanes.[15]

Finally, there is the issue, discussed below, of the concern of the United States and other major powers over freedom of the seas

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14 CSCAP Memorandum No.4, *Guidelines for Regional Maritime Cooperation*, Paragraph 16, p.9.

15 John McBeth, 'Water of Strife', *Far Eastern Economic Review*, 29 February 1996, p. 30.

restrictions raised by the unfortunate wording of the Southeast Asia Nuclear Weapons Free Zone (SEANWFZ) treaty signed by the ASEAN countries at their 15 December 1995 Bangkok summit.

US Concerns on SLOC Security and Access

The United States has on three occasions in the past eighteen months re-emphasised its commitment to uphold the traditional principles of freedom of navigation in regional SLOCs. The US State Department policy statement on the Spratlys dispute in May 1995 identified freedom of navigation as 'a fundamental interest' of the United States.[16] The Secretary of Defense's February 1995 *United States Security Strategy for the East Asia-Pacific Region* said:

> Our strategic interest in maintaining the lines of communications linking Southeast Asia, Northeast Asia and the Indian Ocean makes it essential that we resist any maritime claims beyond those permitted by the Law of the Sea Convention.[17]

Finally, the United States, in December 1995, issued a statement explaining its displeasure (shared by other major powers) with the wording of the SEANWFZ treaty signed by ASEAN countries. This treaty includes a protocol open to signature by the five declared nuclear weapons states. The United States on 20 October 1995 had already joined with France and the United Kingdom in pledging to sign the protocols of the earlier South Pacific Nuclear Free Zone (SPNFZ) Treaty in the first half of 1996, and had been 'prepared to consider positively' a SEANWFZ treaty that met US security concerns. However, US concern for basic principles of freedom of the seas in the end resulted in the following official US statement:

> One of the most significant issues preventing us from supporting the treaty at this point is the inclusion of exclusive economic zones (EEZs) and continental shelves in the zone, which we believe is inconsistent with internationally recognized high seas freedoms of navigation and overflight.

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16 US Department of State, 'United States Policy on the Spratlys and the South China Sea', 10 May 1995.

17 *United States Security Strategy for the East Asia-Pacific Region* (Office of International Security Affairs, Department of Defense, Washington DC, February 1995).

> We feel that, to the extent that the SEANWFZ Treaty imposes security obligations on non-treaty parties without their consent in areas where high seas freedoms exist, the treaty is inconsistent with the U.N. Law of the Sea Convention and sets an unfortunate precedent. Moreover, extending the treaty zone to the EEZ and continental shelf could be a source of conflict due to uncertainty over competing territorial claims in the region ... The inclusion of EEZs and continental shelves in the treaty zone is inconsistent with high seas freedom of navigation and overflight in and over these areas. These rights, which may be exercised worldwide beyond foreign territorial seas, permit all military ships and aircraft to undertake activities such as task force maneuvering, flight operations, and training exercises, provided these activities are conducted with due regard for the rights of other nations and the safe conduct and operations of other ships and aircraft. Military ships and aircraft need not be in transit to conduct these activities, which may involve operations in a fixed geographic area. Therefore, the treaty's protection of transit rights does not directly address these necessary activities of multi-mission military vessels. The current treaty language does not appear to impose restrictions on the exercise of other navigational rights, such as the right of innocent passage through territorial and archipelagic waters, the right of transit passage through international straits, and the rights of archipelagic sea lanes passage through archipelagic waters. However, as indicated previously, we are concerned with the impact of the treaty on high seas freedoms of navigation.[18]

Conclusion

The increasing importance of SLOC security and access for states in the East Asia region will result in their increased attention to both military and non-military concerns regarding freedom of navigation. The United States, which shares the interests of the East

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18 US Department of State, 'U.S. Position on Southeast Asia Nuclear Weapons Free Zone', 15 December 1995. It should be noted that the chairman's closing statement on 15 December 1995 at the Bangkok ASEAN summit pledged that 'the protocol to the [SEANWFZ] treaty will be further reviewed'.

Asian states in regional SLOC security and access, would undoubtedly welcome increased cooperation, understanding and support of regional states in upholding traditional principles of freedom of the seas so vital to seaborne trade.

CHAPTER 5

COASTAL MANAGEMENT IN AN ENCLOSED SEA ENVIRONMENT: A CASE STUDY ON THE MALACCA STRAIT

Johanes Sarsito

The traditional uses of the sea by humans - as a means of transportation, as a source of natural wealth, and as a medium for national defence - have become increasingly complex. The rapid advancement of technology, the population explosion, and the economic opportunities provided by the sea have all resulted in a sharp increase in the rate of depletion of marine resources, both renewable and non-renewable, all over the world. Although modern technology and technological products have met our every need, we cannot ignore their negative impact, particularly on the marine environment.

As an archipelagic state, Indonesia has some straits that are used by many countries in the world. These include the straits of Malacca, Lombok, Sunda, Macassar and Wetar. The best known of these is the Strait of Malacca, which is the main passage between the Indian Ocean and the South China Sea. Given that over 200 ships pass through this strait per day, the choice of the Malacca Strait as the subject of a case study of coastal management in an enclosed sea is an obvious one. This choice is made even more compelling by the damage and pollution caused in the strait by dangerous cargoes such as industrial waste, pesticides, oil spills, chemical solvents, and explosives. In the absence of immediate remedies to these problems both economic collapse and human catastrophe are likely.

The Strait of Malacca

Since time immemorial, the Strait of Malacca has been an important factor in the strategic calculations of countries in Southeast Asia and its surrounding subregions, largely on account of the determining role played by the maritime traffic that passes through the

strait in both economic growth and power projection. As the economies of the littoral states of Southeast and East Asia have grown, so has the intensity of traffic through the straits of Malacca and Singapore. As a result, the three littoral states bordering on the Strait of Malacca, (Indonesia, Malaysia, and Singapore) have felt the need for certain arrangements concerning the prevention of accidents and the safety of navigation through the strait. Through the common efforts of these three states and with the approval of the International Maritime Organisation (IMO), in the early 1980s a traffic separation scheme (TSS) was instituted at the southern end of the Strait of Malacca, then considered as the most crucial area for navigation.

Because of the physical conditions in the Strait of Malacca and the Strait of Singapore, any accident at sea, and particularly one involving a tanker, would have a serious impact on the ecosystem of both sides of the straits. The disposal of waste by passing ships, contrary to existing regulations, would have a similar impact. Therefore, efforts to maintain navigational safety in the Strait of Malacca should be integrated with those aimed at the prevention and control of pollution.

From the point of view of environmental conservation, the physical conditions of the Strait of Malacca are similar to those of an enclosed sea environment, which generally has a much lower capacity to dissolve pollutants than an open sea environment. It is urgent, therefore, that pollution prevention and control in the Strait of Malacca should be included in the agenda for multilateral cooperation, with a view not only to prevent any recurrence of the *Showa Maru* incident, but also to reduce the level of pollution in the Strait of Malacca.

Oceanological and Ecological Condition of the Straits

In principle, given good physical and environmental conditions, seawater has a large capacity to dissolve pollutants. This capacity is determined by several factors. Some of the most important[1] are:

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1 See H. Weidemann and H. Seander in Mario Ruivo (ed.), *Marine Pollution and Sea Life* (Fishing News [Books] Ltd, London, 1972), p.115.

- *Salinity.* The lower the level of salinity in the seawater, the lower its capacity to dissolve pollutants will be. In addition to the capacity to dissolve pollutants, many other characteristics of seawater are also determined by its level of salinity. It is therefore no exaggeration to say that salinity is regarded as the most important characteristic of seawater.

  The level of salinity will be lowest around estuaries, where river water empties out into the sea. In eastern Indonesia, for instance, the level of seawater salinity is very high because of the small number of rivers, much higher than that of the western part of the country. This was an important consideration in the decision by the Indonesian Navy to limit the deployment of warships in the eastern part of Indonesia so as to arrest the rate of corrosion on the hulls. As a result of the many estuaries on both sides of the Strait of Malacca, the level of salinity in the strait is quite low. Because of the narrowness and length of the strait, its water column is not as great as the inflow of fresh water from the rivers. But given the high concentration of industries and settlement areas on both sides of the strait, the river water that empties into it is of very poor quality and the level of pollution in the Strait of Malacca is therefore quite high. Thus any additional ship- or sea-borne pollution will have an adverse impact on the ecosystem of both sides of the strait, not only because of the low level of salinity in the seawater in the strait, but also because of pollution brought from the hinterland in river water.

- *Sea currents.* Another factor that determines the capacity of seawater to dissolve pollutants is the strength and nature of the sea currents. There are two types of current: horizontal and vertical (diffusion current). Horizontal currents are caused mainly by differences in air pressure and the rise and fall of the tides. By spreading pollution to wider areas and thus diluting it in a larger mass of water, they reduce the existing level of pollution in any one area. Because the horizontal currents are weaker and the water column is much smaller in an enclosed sea than in the open sea, the reduction in the level of pollution and its eventual dissolution occur more slowly. As conditions in the Strait of Malacca are closer to those of an

enclosed sea, any pollution, whether ship/sea-borne or hinterland-borne, in the strait will be dissolved very slowly by the seawater and the balance of the ecosystem will be disturbed for a much longer period.

The impact of vertical currents or diffusion currents on the reduction and dissolution of pollution is also substantial. Diffusion currents are brought about by temperature differences between the water on the surface and the water underneath. As the diffusion current moves downwards from the surface to a deeper level, all the pollutants blend with a larger body of water, and thus become less concentrated or more liquid, so that they are more easily absorbed by the seawater. The contrary movement of a diffusion current upward towards the surface brings from below seawater with a high level of salinity, and thus may increase or improve the level of salinity of the seawater on the surface. The deeper the water is, the greater the difference in temperature and the stronger the diffusion current. For a deep sea, such as the Banda Sea or the waters of the eastern part of Indonesia in general, the diffusion currents are stronger than they are in shallower waters such as the Strait of Malacca, and the level of salinity is much higher. As a result, the assimilative capacity of a deep sea is higher than that of a shallow sea such as the Strait of Malacca. Thus given its weaker diffusion the seawater in the Strait of Malacca has a lower assimilative capacity and its capacity to dissolve pollutants is not very high.

- *Photosynthesis.* The capacity of seawater to dissolve pollutants is very much determined by the amount of available oxygen and sunlight, because the dissolution of pollutants takes place through the process of photosynthesis. In tropical regions, sunlight is generally available in sufficient quantities, but the amount of sunlight that can penetrate a water column will depend on the clearness of the seawater. Moreover, the clearness of the seawater will also determine the amount of oxygen available. In the an enclosed sea environment, such as that of the Strait of Malacca, the clearness of the seawater is very much influenced by the quantity of sediment coming from the numerous rivers that flow into it. Sedimentation

occurs primarily in estuaries, and it is also here that there are constraints on the process of photosynthesis. The sediment flow that comes from both sides of the Strait of Malacca results in the muddying of the water, not only around the estuaries but also to a lesser degree in the middle of the strait. This affects the capacity of the seawater in the strait to dissolve pollutants. The seawater in the Strait of Malacca would become clearer much more quickly, if the vertical or horizontal currents were stronger. However, as we have seen, the physical conditions of the strait make this impossible.

- *The nature and density of pollutants.* In principle, it is possible to distinguish two categories of pollutants: insoluble substances and soluble substances. It can be safely assumed that the former - the most important of which are hydrocarbon and heavy metal pollutants - disturb the ecological balance more than the latter. Hydrocarbon pollutants are mostly seaborne, coming either from ships or from exploitation activities offshore, mainly in the form of oil spills.[2]

  By contrast, the heavy metal pollutant content of the seawater is determined by the intensity of industrial activities in the coastal zones and the hinterland. Thus, given the existence of many industries on both sides of the Strait of Malacca, there are likely to be many landborne pollutants in the area.

  Oil pollutants have very damaging effects. First, they impede the process of photosynthesis and therefore lessen the capacity of seawater to dissolve other pollutants. Second, by reducing the amount of available oxygen, they have an adverse effect on marine biotics. Third, when they reach the coastal zone, they disturb the coastal and coral reef ecosystems.

  As the traffic through the Strait of Malacca increases in intensity, the probability of shipborne pollution will be higher, unless tight control is exercised along the straits in pursuance of the International Convention for the Prevention of Pollution from Ships (MARPOL) 1973/78 and on the International

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2 Max Blumer in Ruivo (ed.), *Marine Pollution and Sea Life*, p.476. See also E Alausson in ibid., p.159.

> Convention on the Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

Given the conditions outlined above, one can easily imagine the damage and financial loss that can be caused by accidents involving ships carrying dangerous cargoes, not only in the Strait of Malacca but also in other straits in Indonesia and elsewhere. We need a beautiful, unscarred sea that gives us everything we require and that people are eager to keep clean.

Special Area

Because the oceanological and ecological condition of the Strait of Malacca is similar to that of an enclosed sea with a high density of through-traffic, the strait should be designated by the IMO as a 'special area' in conformity with MARPOL 1973/78. International cooperation will be required if such a designation is to be achieved, since the control and prevention of shipborne pollution in the Strait of Malacca can no longer be separated from the issue of navigational safety. Every year the Indonesian government has to repair or replace around 9-10 per cent of the 35 navigational aids of various kinds that it has positioned along the strait because of collision with passing ships.[3] This number is a statistically significant indicator of the level of proficiency of the seafarers using the Strait of Malacca. Accordingly, compliance with the STCW convention should be supervised jointly and not only by the three littoral states of the Strait of Malacca.

> MARPOL 73/78 defines a 'special area' as:
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> (a) sea area where for recognised technical reasons in relation to its oceanographical and ecological condition and the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by oil is required.[4]

Some of the areas that have been designated as special areas are the Mediterranean Sea, the Baltic Sea, the Black Sea, the Red Sea, the

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3 Directorate General of Sea Communications, Indonesia, Annual Report 1994, unpublished.

4 International Maritime Organisation (IMO), *MARPOL 73/78*, Consolidated Edition: Annex 1, Regulation 1 (10).

Persian Gulf, the Gulf of Aden, and the Antarctic area. All these special areas are either enclosed sea areas or ecologically fragile areas. From the preceding discussion of the Strait of Malacca, one may conclude that the Strait of Malacca clearly meets the conditions laid down by MARPOL 73/78 for designation as a 'special area'.

Navigational Safety in the Strait of Malacca

The concern of the three littoral states of Indonesia, Malaysia and Singapore with navigational safety in the Strait of Malacca has been a longstanding one, and has grown as traffic through the strait has increased. A Joint Statement on the safety of navigation in the Strait of Malacca and the Strait of Singapore was issued by the three states on 16 November 1971.[5] Essentially, the three states hold themselves responsible for the safety of navigation in those two straits. In order to carry out that responsibility, at the ASEAN Senior Officials' Meeting on 23 February 1977, they agreed to take certain steps to promote the safety of navigation in the two straits. One of these was the formation of the Technical Expert Group on Safety of Navigation in the Strait of Malacca and the Strait of Singapore, later known as the Tripartite Technical Expert Group (TTEG).[6] Thus even before the United Nations Convention on the Law of the Sea (UNCLOS) had officially come into force, these three littoral states had engaged in trilateral cooperation to ensure the safety of navigation in the straits of Malacca and Singapore.

Pollution Prevention and Control in the Straits of Malacca and Singapore

In keeping with their commitment to navigational safety in the straits of Malacca and Singapore, the three littoral states have given serious attention to efforts aimed at controlling and preventing pollution in the straits. This is clearly embodied in Annex D to the Agreement of 1977, where the TTEG is asked to 'formulate a joint policy to deal with marine pollution, especially by coordinating their

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5 Directorate General of Sea Communications, Indonesia, The Traffic Separation Schemes in the Straits of Malacca and Singapore, 1995, unpublished, Annex C.

6 ibid., Annex B.

resources, manpower and technology' and to 'study the need and possibility of creating a revolving fund for anti-pollution activities'.[7]

These two tasks clearly demonstrate a desire on the part of the signatories to foster regional and international cooperation. Given the limited capability of the three littoral states to handle a serious accident, wider international cooperation is clearly needed. Since pollution in the Strait of Malacca and the Strait of Singapore would have an impact on more than one country, the issue of transboundary pollution was raised in the Kuala Lumpur Accord on Environment and Development of 1990, and was recognised as a concern for all ASEAN members at the Singapore Summit of 1992. ASEAN adopted the Bandar Seri Begawan Resolution on Environment and Development in 1994 and the ASEAN Cooperation Plan on Transboundary Pollution (CPTP) in Kuala Lumpur in 1995. The ASEAN CPTP has three main concerns: atmospheric pollution, the transboundary movement of hazardous water, and transboundary shipborne pollution.[8]

The ASEAN CPTP demonstrates that the ASEAN members are sincere in their intention to implement MARPOL 73/78, particularly with regard to shipborne pollution. In view of the ecological and oceanological condition of the straits of Malacca and Singapore, the best strategy for promoting regional and international cooperation would be to have the straits designated as a 'special area' under the provisions of MARPOL 73/78. If this could be done with the cooperation of the IMO and the Marine Environment Protection Committee (MEPC), those using the straits of Malacca and Singapore would have to implement all the MARPOL provisions. Because the effects of pollution from hydrocarbon and heavy metal substances are by far the worst, measures to control these two kinds of pollution should be strengthened and particular attention should be given to pollution prevention.

The three littoral states need hardware, software and manpower to assist them with pollution prevention. The early detection of pollution from passing ships requires remote sensing by

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7 ibid.

8 ASEAN Secretariat, *ASEAN Cooperation Plan on Transboundary Pollution* (CV Indah Grafika, Jakarta, 1995), p.7.

satellite and aircraft fitted with the side-looking airborne radar (SLAR). This equipment would enable the littoral states to implement all the provisions of MARPOL 73/78. Regional programmes in the fields of education, training, research and development, joint operation and joint funding are also necessary. ASEAN already has several such programmes:

- the ASEAN-Australian cooperative programmes on marine science, for both regional ocean dynamics and/or live coastal resources;
- the ASEAN-Japan network for environmental management;
- the ASEAN-US environmental improvement project; and
- the ASEAN-Canada cooperative programmes on marine science and on the establishment of environmental criteria for the development of live resources and human health protection.

The Way Forward

Article 43 of UNCLOS consists of two paragraphs, one dealing with the safety of navigation and the other with the prevention, reduction and control of pollution.[9] Given the very unfavourable ecological and oceanological conditions and high traffic density in the straits of Malacca and Singapore, the two paragraphs should be read, treated and understood as an inseparable whole for the two straits. While implementation of the first paragraph should begin with the establishment of a TSS equipped with adequate navigational aids, implementation of the second paragraph should commence with efforts towards having the straits designated as a 'special area' in accordance with MARPOL 73/78.

In view of the strategic importance of the two straits, both in terms of geostrategy and subregional, regional and international economic interest, international cooperation is needed to ensure both navigational safety and the preservation of the environment. As the Second Conference on Habitat last year clearly demonstrated, there is

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9 United Nations Convention on the Law of the Sea, 10 December 1982, UN Doc.A/Conf.62/121, reprinted in *International Legal Materials*, No.21, 1982.

now global awareness of the need for the preservation of the environment. The preservation of the environment in the straits of Malacca and Singapore should form part of this global awareness.

Nevertheless, in view of the complex nature of the problems affecting those two straits, one form of cooperation would not suffice. Rather, there should be various forms of cooperation that are mutually complementary and interlocking, beginning with bilateral arrangements between littoral states. The following forms of cooperation may be considered:

- *Exchange of information.* At the subregional level, particularly between the three littoral states, the most important thing will be the exchange of operational information relating to both navigational safety and pollution. At the TTEG forum, for instance, the IMO discussed cooperation in the installation of a vessel traffic system (VTS) for the entire lenght of the Strait of Malacca in anticipation of an agreement on TSS for both straits. VTS is an important vehicle for the exchange of information and, through integration with the existing VTS owned by Singapore, the cooperation may become tripartite. The benefits of VTS along the Strait of Malacca would be enjoyed by all those who use the straits. VTS would in turn afford them an opportunity to participate. However, in order to detect oil pollution, especially that originating from ships, aircraft equipped with SLAR are needed as a supplement to satellite sensing. Data collected from air detection could be communicated to a national pollution control centre by the country in possession of the aircraft and then distributed to other national centres.

- *Research and development.* Norms and procedures for both the safety of navigation and the prevention, reduction and control of pollution in the two straits need to be continuously evaluated. This would clearly involve both the MSC and the MEPC. Coordination at subregional and regional levels would make such efforts more efficient and prevent duplication. In order to improve conditions in the two straits, the TTEG should also draft policy recommendations on these two matters and submit these to the governments of the littoral

states. This technical expertise should be developed further to eventually become ASEAN-wide.

- *Education and training.* Compliance with norms and procedures will ultimately depend on the quality of training and education for the experts as well as the practitioners. Compliance with the STCW, for example, has emphasised the need for training and certification of proficiency on the Global Maritime Distress and Safety System (GMDSS) and radar. An improvement in the general qualifications for seafarers is also needed along with a strengthening of maritime educational institutions in all the ASEAN member-states. This should be accompanied by a more thorough control of the qualifications of seafarers using the Strait of Malacca.

- *Promoting a broader awareness of the issues.* The activities of the institutes of strategic studies, the ASEAN Regional Forum (ARF) and the Western Pacific Naval Symposium (WPNS) should be used to convince others of the need to safeguard the straits from damage and pollution.

Conclusion

The problem posed by coastal management in the enclosed sea environment of a strait is a complex one. Any solution to this problem requires the adoption of a comprehensive perspective not only by government officials and the private sector, but also the whole society. International cooperation is also necessary to ensure that the enclosed sea environment is preserved and that the threat posed by dangerous cargoes is reduced or removed.

CHAPTER 6

ENERGY, MARITIME SAFETY AND POLLUTION PREVENTION: A CHINESE PERSPECTIVE

Xu Guangjian

This chapter aims to give a Chinese perspective on three issues that are of concern not only to China but to the region as a whole: energy security, maritime safety and pollution prevention.

Energy

Since the beginnings of economic opening and reform in 1978, China's economy has grown rapidly and the standard of living has continued to rise. As a result, China's energy needs have increased dramatically and its energy industry has undergone tremendous development. So much so that China is now one of the largest producers and consumers of energy in the world.

To ensure the continued development of the national economy into the next century, China will have to increase energy production and use its energy resources more efficiently. It is expected that by 2000 coal production in China will exceed 1.4 billion tonnes, oil production 0.155 billion tonnes, natural gas production 25 billion metric metres, and electricity generation 1400 billion kilowatt-hours (kWh). Over the past 10 years, with the rapid growth of the national economy, oil consumption in China has been increasing every year. National oil production has not been able to meet the domestic demand and oil has had to be imported. It is estimated that by 2000 China will still not be self-sufficient in oil and oil imports will have to be increased. However, Chinese oil imports account for only a small percentage of the global oil market.

Based on the forecasts of an annual GDP increase of seven per cent contained in the general plan of national economy and social development, it is estimated that primary energy demand may reach two billion tonnes of standard coal by 2010. By that time, the supply of

primary energy in China may approach total demand, with oil production predicted to reach 0.2 billion tonnes and gas production 80 billion metric metres.

In order to realise the goals it has set for energy development in 2000 and 2010, China will have to capitalise on its natural endowment in rich coal resources and promote the development of its coal industry. In accordance with the principles of 'dominant domestically, supplementary abroad' and of 'holding both oil and gas, broadening up open-up', China will hasten the exploitation of oil and gas, continue to develop coal-fired electricity production, accelerate the exploitation of hydro-electric energy resources, and develop its nuclear energy industry. Energy efficiency should be enforced by legal, economic and administrative means to ensure the smooth realisation of the goal of energy development and the rapid and sustainable development of the Chinese economy.

In recent years, as the Chinese economy has become more open, the oil industry in China has achieved greater stability through the expansion of national oil exploitation. It has continued to open up and is gradually implementing a development strategy of internationalised management. Foreign enterprises are welcomed and encouraged to participate with China in oil exploitation, both on land and at sea. At the same time, China is actively seeking and pursuing oil exploration and exploitation opportunities outside China, and is engaging in international exchange and cooperation.

The success of China's programme of modernisation will depend on the maintenance over the longer term of a favourable international environment. For this reason China seeks to preserve international peace and stability and to promote the development of friendly trade relationships in the region, so as to maintain maritime shipping and traffic safety and the smooth flow of traffic through international sea lanes. China shares with the other countries in the region a commitment to regional prosperity and development.

Maritime Safety and Marine Pollution Prevention

Maritime Safety

The Maritime Traffic Safety Law of China was adopted in 1983. The law itself applies to all ships, installations and persons navigating, berthing or carrying out operations in the coastal waters of China (Art.2). Under the law, ships engaged on international voyages entering or leaving the ports of China shall be subject to inspections by the competent authorities (Art.12). In certain circumstances, the competent authorities may prohibit a ship or an installation from leaving port, or cause the suspension of its voyage, a change in its routing, and the stoppage of its operations (Art.19).

Survey and Registration of Ships

The Ordinance Governing the Survey of Ships and Sea Installations of China was adopted in 1993. Its 34 articles set out requirements relating to the survey and control of ships, sea installations and containers.

Control of Foreign Flag Ships

The Regulation Governing the Control of Foreign Flag Ships of China was promulgated in 1979 for the purposes of safeguarding national sovereignty, enforcing law and order in ports and coastal waters, ensuring navigational safety, and preventing marine pollution from ships. The regulation lays down rules for foreign flag ships in Chinese ports and coastal waters on matters such as entering and leaving ports, navigation and berthing signals and communication, the carriage of dangerous goods, pollution prevention, and emergency response.

Marine Pollution Prevention

The Ordinance on the Prevention of Marine Pollution from Ships of China was adopted in 1983. The ordinance applies to all Chinese and foreign ships, as well as to shipowners and other individuals, within the sea areas and the sea ports under Chinese jurisdiction (Art.2). Its regulations cover matters such as the

availability of pollution prevention documents and equipment on ships, oil operations and the discharge of oily water from ships, the carriage of dangerous goods on ships, the discharge of dirty water from ships, the dumping of garbage and waste by ships, and compensation for damage caused by pollution from ships.

International Conventions Ratified or Accepted by China

To date, the Chinese government has accepted all the major international conventions related to maritime safety and pollution prevention:

- Safety of Life at Sea (SOLAS) Convention of 1974
- Load Lines Convention of 1966
- Tonnage Measurement of Ships Convention of 1969
- Regulations for Preventing Collisions at Sea Convention of 1972
- Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) of 1978
- Search and Rescue (SAR) Convention of 1979
- Intervention on the High Sea in Cases of Oil Pollution Casualties Convention of 1969
- Convention for the Prevention of Pollution from Ships (MARPOL), 1973/78

In addition, preparations for the implementation of the International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC) 1990 have recently been completed and the Chinese government will formally ratify the convention shortly.

CHAPTER 7

ENERGY: AN INDIAN PERSPECTIVE

Rahul Roy-Chaudhury

India is on the move! Sustained reforms in the past six years have resulted in a liberalised Indian economy increasingly becoming integrated with the major economies of the world. Changes in the government in New Delhi have not affected the nature of reforms, although their pace has been influenced somewhat. Nonetheless, the gross domestic product (GDP) growth rate of the Indian 'elephant' in the past five years (1992-97) has averaged 6.5 per cent and is expected to increase in the future. According to the World Bank, the Big 5 developing and transition economies (including India) are likely to emerge as key players in the world economy over the next quarter century.[1] Another World Bank study has projected India as the fourth largest economy in the world (after China, the United States and Japan) by the year 2020, in terms of purchasing power parity (PPP).[2]

The critical requirement for achieving higher growth rates is the supply of sufficient amounts of energy resources. However, not only will India continue to remain deficient in energy, but the gap between demand and domestic production is expected to grow considerably in the near future. This will necessitate increasing dependence on the import of energy resources aboard ships, and possibly through pipelines. The inability to meet this demand, or the disruption of energy supplies, would severely destabilise the Indian economy, and give rise to social unrest and instability within the country. In this respect, regional cooperation in accessing energy resources and ensuring security of supply is an important aspect of

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1 The World Bank, *Global Economic Prospects and the Developing Countries* (World Bank, Washington DC, 1997), p.1. The other four countries are China, Indonesia, Brazil and Russia.

2 See Ashley Tellis, *Stability in South Asia* (RAND, Santa Monica CA, 1997), pp.37 and 75. The other Asia-Pacific countries amongst the top 15 economies in the world in the year 2020 are projected to be Indonesia (5), South Korea (7), Thailand (8), and Taiwan (10).

Indian foreign policy. It is not surprising, therefore, that a parliamentary Standing Committee on Energy (March 1994) noted that 'energy is security'.[3]

In India, the energy sector is not the purview of a single governmental ministry or department of energy. Indeed, a multiplicity of such organisations exist. These include the Ministry of Petroleum and Natural Gas (crude oil and natural gas); the Ministry of Coal (coal and lignite reserves); the Ministry of Power (electrical energy); the Ministry of Non-conventional Energy Sources (new and renewable sources of energy); the Ministry of Environment and Forests (environmental and forestry programmes); the Ministry of Steel (import of coal for the manufacture of steel); and the Department of Atomic Energy (nuclear power); along with a host of public sector enterprises (PSEs). The Ministry of Surface Transport is also responsible for the transportation of energy imports aboard ships of the government-owned Shipping Corporation of India (SCI). The Parliamentary Committee on Energy, the Energy Policy Division of the Planning Commission, and the Hydrocarbon Board are also involved in various aspects of energy policy. In addition, a Hydrocarbons Regulatory and Development Authority (HDRA) is being set up through an Act of Parliament.

Rising Demand

The pattern of India's energy consumption has switched over the years, from the dominance of traditional to commercial energy fuels. In 1996-97, these fuels (primarily coal, crude oil, natural gas, and hydro and nuclear power) constituted some 60 per cent of the total energy consumed in the country. Of these, coal easily constituted the largest share (54.2 per cent), followed by oil (31.1 per cent) and natural gas (10.8 per cent); with hydro-power (2.8 per cent) and nuclear power (1.2 per cent) lagging far behind.[4]

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3 'Energy for 90s and Beyond: Prospects, Reality and Challenges', Third Report, Standing Committee on Energy (1993-94), Tenth Lok Sabha, March 1994, p.ix.

4 A. Bhattacharyya, Liquid Fuel Availability and Associated Risk Assessment for IPPs (Independent Power Producers) in India, unpublished paper presented at a conference on Mitigating Risks in Power Projects in India, New Delhi, 17-18 July 1997.

India is fast emerging as a major global market for petroleum products. During 1991-96, consumption of petroleum products rose at approximately six per cent annually, increasing from 57 million tonnes in 1991-92 to 78 million tonnes in 1996-97. This is expected to increase even further, to some seven to eight per cent in the future. As a result, the demand for petroleum products is estimated to increase to 115 million tonnes in 2001-02, 155 million tonnes in 2006-07, and as much as 200 million tonnes in 2010-11 (when it is expected to constitute a slightly lower share of primary energy consumption).[5] Despite such rates of growth, per capita energy consumption in India is projected to continue to remain low - at present it is approximately 87 kilograms of oil equivalent (kgoe) in comparison to the world average of 900 kgoe.

Amongst petroleum products, middle distillates account for the largest share of consumption - just over 60 per cent. This is followed by the heavy ends (just over 20 per cent) and the light distillates (just under 20 per cent). In view of the growing importance of the transportation sector in the Indian economy, high-speed diesel oil accounts for the single largest petroleum product - over 40 per cent from 1992-93, followed by kerosene and furnace oil.[6] High-aromatic naphtha (HAN) is the only petroleum product that the country does not import.

Insufficient Production: Offshore Resources, Crude Oil and Natural Gas

The discovery of crude oil and natural gas off the west coast in the Arabian Sea in 1974 dramatically changed the pattern of domestic production. By 1979-80, offshore oil constituted over a third of total production, over half by 1982-83, and over two-thirds in 1986-87.[7] Since then, offshore oil has stabilised to just under two-thirds of total production. In 1996-97 it accounted for 21.15 million tonnes, some 64 per cent of total domestic production of 32.89 million tonnes. The reduction in offshore oil for most of the 1990s has been due largely to

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5 ibid., and *TERI Energy Data Directory Yearbook 1997/98* (Tata Energy Research Institute, Jorbagh, New Delhi, 1997), p.2.

6 *TERI Energy Data Directory Yearbook 1996/97* (Tata Energy Research Institute, Jorbagh, New Delhi, 1996), p.71.

7 Rahul Roy-Chaudhury, *Sea Power and Indian Security* (Brassey's, London, 1995), p.89.

the mismanagement of reserves through overproduction and unscientific methods of exploitation.[8] Meanwhile, since 1987-88 offshore natural gas has constituted over 70 per cent of total production. In 1996-97 it accounted for 16.72 billion cubic metres (bcm), approximately 73 per cent of the total gross production of 22.90 bcm.

The most important offshore oil and natural gas area is located in the Arabian Sea, some 110-200 km north-west of Mumbai (Bombay). This comprises the fields of Bombay High, Heera, Panna and South Bassein; and three new fields, Neelam, Bombay L-II and Bombay L-III, that began production only in mid-1994. Crude oil and natural gas from these fields are extracted by 173 platforms and transported to shore through 49 submarine pipelines, the longest of which runs for a distance of 203 km. At present, only two offshore oil and natural gas areas are located in the Bay of Bengal, off the east coast. These are the Ravva field in the Krishna-Godavari basin, south-west of Vishakapatnam; and the PY-1, PY-3 and KH-3 fields in the Kaveri basin, south of Chennai (Madras). These two areas, however, constitute a minuscule proportion (less than five per cent) of total offshore production. The area off the Andaman and Nicobar islands in the Bay of Bengal may also possess the largest reserves of coal-bed methane (cbm) in the country and a government agency is presently testing the seabed 900 metres below the sea.[9]

Growing Imports: Crude Oil

India's dependence on primary energy imports at present is limited to coal and crude oil. As only minimal amounts of superior-grade coal are imported into the country (from Australia and New Zealand), concern rests on the import of crude oil. This has been increasing over the past few years in relation to domestic production. Imports of crude oil exceeded domestic production for the first time in 1992-93, when they constituted 52 per cent of total demand. This occurred again in 1993-94 and in 1996-97, when imports constituted just over 50 per cent of total demand.

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8 Shebonti Ray-Dadwal, 'India's Energy Situation', *Strategic Analysis*, June 1997, pp.376 and 380.

9 *The Pioneer*, 12 September 1997.

In order to meet its requirements in petroleum products by the year 2010-11, India would require recoverable oil reserves of approximately 2.3-3 billion tonnes. Currently, its proven recoverable reserves of crude oil are only 0.76 billion tonnes. The reforms in the hydrocarbons sector therefore attempt to encourage private-sector (Indian and foreign) participation in upstream and downstream activities, in order to overcome internal financial limitations and enhance domestic production. However, the majority of the prognosticated reserves of 21 billion tonnes are perceived to be of low prospectivity. Moreover, in order to enhance reserves to the required level, exploration and production activities would necessitate investments in the range of Rs540,000 crores (US$150 billion) in the next 15 years. In view of this exorbitant figure, it has been estimated that by the year 2010-11, as much as 73 per cent of India's annual demand for oil and gas will be met by imports.[10]

New Imports: Natural Gas

Natural gas is seen as an increasingly important source of energy for the country. Not only is it *economical* and *clean* (absence of sulphur dioxide, and reduction of nitrogen oxide and carbon dioxide), it is also critical to the power, fertiliser and petrochemical industries. Although India has never imported natural gas before, it is expected that it will begin doing so early in the next decade. It will be transported aboard ships (in the form of liquefied natural gas or LNG) in the short term, and via pipelines (a mix of submarine and onshore) in the long term. This is also an attempt to achieve energy security by diversifying the sources and nature of supply.

In 1996-97, domestic production of natural gas was nearly 23 billion cubic metres, whereas demand was estimated at 30 bcm. It is estimated that by 2000-01, the growth in demand will have reached 55 bcm, whereas supply will be only 28 bcm. By 2005, demand is expected to increase further to nearly 75 bcm.[11]

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10 Website of Bharat Petroleum, a major Indian PSE, on the internet at <http://www.bharatpetroleum.com>, 15 November 1997.

11 Special Correspondent, 'Natural Gas: Imports to Meet Supply Gap', *The Hindu Survey of Indian Industry, 1997* (S. Rangarajan, Madras, 1997), p.161.

In order to import LNG, four terminals are to be set up near ports - three in the province of Gujarat on the west coast (Pipavav, Hazira and Dahej), and one in the province of Tamilnadu on the east coast (Ennore). International consortiums, including oil majors, have bid for the construction of these terminals, and storage and re-gasification facilities. However, the implementation of these plans will take a minimum of five years, and will necessitate an estimated investment of Rs36,000 crores (US$10 billion) for two terminals alone.[12] Meanwhile, 17 proposals have been received from oil multinationals to supply LNG, including four from Japan - Marubeni, Mitsubishi, Mitsui and Nisshoiwai.

The import of natural gas from Oman and Iran through submarine and on-shore pipelines is being considered at present, although both proposals have run into problems. These pipelines are projected to supply 20 bcm and 27 bcm of natural gas respectively. Technical problems (laying pipelines at a depth of 3.5 km) and financial problems (project costs rising to over US$7 billion) have stymied progress on the India-Oman project. Meanwhile, the Iran-India project, with pipelines routed either on the seabed or overland via Pakistan, is uncertain, in view of Pakistan's refusal to grant unambiguous access to its territory (both maritime and land). The extension of such a pipeline across India to the states of Southeast Asia has also been proposed.[13] An overland pipeline project closer to home, linking Myanmar, Bangladesh and India, is also being explored. Meanwhile, the 'great game' is once again being played in Central Asia - this time over access to energy and transit facilities. The laying of a pipeline overland from Turkmenistan to India, through Afghanistan and Pakistan, has been proposed by the American oil company, Unocol. The Taliban militants of Afghanistan have apparently agreed to this project. At the same time, Iran is also competing to provide the critical communication link between the Central Asian states and the Indian Ocean.

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12 ibid.

13 Aurangzeb Z. Khan, 'India and Pakistan: Bilateral Cooperation in the Energy Sector', Stimson Center Report, 1997, p.93.

Financial Implications

Increasing dependence on the imports of crude oil and natural gas in the near future will clearly have a major impact on the fiscal balance of the country, especially in the event of any sudden or steep rise in prices. During the Gulf War (1990-91), for example, the net value of the import of oil rose by 50 per cent, and that of petroleum products by as much as 72 per cent, to Rs11,000 crores (US$3.5 billion). The latter increase accounted for as much as a third of India's total export earnings for the year. Moreover, in 1995-96, the import of crude oil and petroleum products was valued at Rs24,000 crores (US$6.6 billion). In 1996-97, this figure rose to over Rs34,000 crores (US$9.4 billion). In 1997-98, this is expected to further increase to nearly Rs40,000 crores (US$11 billion).[14]

Shipping

At present, India is wholly dependent on shipping for the transportation of energy resources from abroad. This is not surprising, since over 97 per cent of the country's external trade by volume is carried aboard merchant ships, both Indian and foreign. In 1996-97, this accounted for over 33 million tonnes of crude oil. As crude oil is imported primarily from West Asia, considerable attention remains focused on the sea lines of communication in the Persian Gulf and the Arabian Sea. The security of shipping, from both military and non-military threats, is critical for the economic growth and political stability of the country.

This is especially important as the coastline of Pakistan, a country with which India has adversarial relations, and has fought three wars, lies astride the major sea lines of communication from West Asia to the western part of India. Moreover, India's dependence on West Asia for its energy resources is expected to grow in the future, in view of the vast reserves of crude oil and natural gas present in the region.

Notwithstanding India's dependence on shipping for its external trade, and especially for its imports of crude oil, the Indian

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14 Rahul Roy-Chaudhury, 'Energy Security and Sea Lanes' in Jasjit Singh (ed.), *Bridges across the Indian Ocean* (Institute for Defence Studies and Analyses, New Delhi, 1997), pp.156, 158-9.

shipping industry is beset with problems. The strength of India's merchant marine fleet in January 1997 was only 484 ships (for both coastal and overseas trade), with a total of just over seven million gross registered tonnes (GRT).[15] In effect, it has taken two decades for Indian shipping to expand by two million GRT to cross the seven million GRT mark for the first time. This is less than 1.5 per cent of total world tonnage. In order to alleviate this situation, fiscal incentives are desperately required, as is increased investment. The ninth five-year plan of the country (1997-2002) has fixed a target of nine million GRT for Indian shipping by 2002. This will require a minimum investment of at least Rs15,000 crores (US$4.2 billion) in the next five years. The new shipping policy, to be unveiled shortly, is not expected to bring about a radical change in the fortunes of the shipping industry.

It is not surprising, therefore, that the share of external trade carried on Indian ships is low. During 1994-95, Indian vessels carried only 29 per cent of the country's total seaborne cargo, a substantial drop from 36 per cent two years previously. This comprised 17 per cent of bulk carrier and nine per cent of liner traffic. In terms of petroleum, oil and other lubricants (POL), however, the figure was higher, for obvious security reasons, but still not at a comfortable level. This comprised some 54 per cent of total POL imports annually.[16] To date, India does not possess any LNG tankers. The plan to import LNG aboard ships, therefore, will be wholly dependent on foreign shipping for the first few years.

Notwithstanding proposals to import natural gas through pipelines in the long term, the dominance of shipping in India's external trade is expected to continue. The share of energy supplies carried aboard ships may be affected in the long term, if the projects are finally implemented, and natural gas flows unhampered. At the moment, this does not seem possible in the short or medium term, for technical, financial and political reasons. In any case, this will not affect dependence on imports of crude oil aboard oil tankers, although the extent of the imports may vary somewhat.

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15 Rear-Admiral (Retd) Krishan Dev, 'Indian Shipping in the Global Context', *Journal of Indian Ocean Studies*, July 1997, p.212.

16 Government of India, *Economic Survey 1996-97* (Government of India Press, New Delhi, 1997), p.175.

The existing port structure in India is also insufficient to handle effectively annual increases in shipborne trade. Most of India's 11 major ports are in dire need of expansion, and require considerable financial investment. The average ship turnaround (ASTA) period remains high, at 8.5 days in 1995-96. Meanwhile, the average ship berth output (ASBO) increased slightly to just over 4000 tonnes the same year.[17]

Potential for Cooperation

There is considerable scope for cooperation in the energy sector in the Asia-Pacific region, with regard to the Indian Ocean. India will continue to remain deficient in energy resources over the years, with increasing dependence on the sea lines of communication in the Indian Ocean, in terms of shipping and, possibly at a later stage, submarine pipelines as well. Its strategic interest in keeping open these sea lanes, and maintaining the safety and security of shipping in the area, along with its favourable location in proximity to West Asia (in relation to other Asia-Pacific countries), is of considerable importance to countries dependent on oil and natural gas shipments from West Asia. At the same time, substantially increased foreign investment in the Indian hydrocarbons sector would enable India to exploit its vast reserves for itself, as well as meeting the growing demand for energy from potential investor countries. Energy will clearly be a critical issue for cooperation in the next century.

17 ibid., p.177.

CHAPTER 8

CRITICAL NON-ENERGY IMPORT DEPENDENCIES IN NORTHEAST ASIA

Joonsoo Jon

The East Asian region has been noted for its rapid economic growth, much of which can be ascribed to the incredible growth in the economies of China and Japan. Countries in the region such as Japan, Korea and, more recently, China have not only distinguished themselves by their remarkable economic achievements but are also emerging as the leaders of the world economy.

However, there are deep-rooted structural weaknesses. Japan, one of the world's economic leaders, and Korea and Taiwan, the leading newly industrialised economies, are deficient in natural resources. Although China has abundant manpower and substantial agricultural and manufacturing industries, it is limited by ideology and lacks experience in managing a market economy.

The purpose of this study is to explore the structural weaknesses of the Northeast Asian region, particularly with regard to the supply of strategically important raw materials such as iron ore and grain, and to discuss how to assure a stable supply of these materials.

Supply and Demand in Iron Ore and Grain in Northeast Asia

Iron Ore

World iron ore production has grown steadily from 240 million tonnes in 1950 to over 900 million tonnes in 1994. While, in 1974, iron ore production was 898 million tonnes and steel production was 735 million tonnes, by 1989 iron ore production had increased to 998 million tonnes and steel production to 786 million. Recently, world iron ore production has exceeded total demand. This reduction in demand is largely due to the social changes that have taken place in

Table 8.1: World Imports of Iron Ore (million tonnes)

Region and Country	1985	1989	1992	1993	1994	1995
West Europe	135.6	150.2	132.5	126.4	142.3	145.4
East Europe	58.8	55.7	32.8	33.1	32.7	36.8
Africa and Middle East	2.1	5.7	8.2	10.5	11.8	12.3
South and North America	24.6	30.0	21.6	24.5	28.5	30.2
Japan	124.5	127.7	127.2	114.5	116.1	120.4
South Korea	13.2	22.0	28.9	35.5	34.3	35.0
China	10.0	12.6	18.6	33.0	37.3	41.3
Taiwan	4.9	8.4	8.4	9.0	8.3	9.2

Source: UNCTAD Trust Fund Statistics

the Soviet Union and Eastern Europe since 1990 and the economic disorder that these changes has produced.

With iron ore making up 5.8 per cent of the earth's crust, there would appear to be no shortage of iron ore deposits. But because these deposits are not evenly distributed, iron mines are found in only a few countries, and usually not in the largest producers of iron and steel. Thus the world's biggest producers of iron and steel - Japan, West Germany and Italy - are wholly dependent on imported raw materials. Korea, the world's sixth-largest producer of steel, also has to import most of the raw materials. At the same time, Australia and Brazil possess enough iron ore to supply the whole world for the next 30 years.

As Table 8.1 shows, the four Northeast Asian countries account for 46 per cent of the world's iron ore imports. Japan is the largest iron and steel producer in the region, and production in China is expected to grow as fast in the 1990s as it did in the 1980s. Iron and steel industries in Korea and Taiwan also grew rapidly in the 1980s and this expansion will continue, albeit at a slower pace.

Japan, the world's second-largest producer of iron and steel, has to import 99.8 per cent of its requirements in iron ore. In 1995, its imports of iron totalled 120.43 million tonnes, of which 58.72 million tonnes were imported from Australia, 27.62 million tonnes from Brazil and 18.32 million tonnes from India. Because these three countries supply 86.9 per cent of Japan's total iron ore imports, Japan has acquired vested rights in mines in Australia and is involved in mining operations in India and Brazil.

In 1995 Korea imported over 35.04 million tonnes of iron ore, of which 18.99 million tonnes were imported from Australia, 8.48 million tonnes from Brazil, 3.22 million tonnes from India and the rest from Peru and Canada.

Of the world's iron- and steel-producing countries, China has experienced the fastest growth. In 1994 China imported 37.34 million tonnes of iron ore, of which 15.26 million tonnes were imported from Australia, 6.48 million tonnes from Brazil, 4.92 million tonnes from South Africa and 4.07 million tonnes from India. However, unlike Japan and Korea, China possesses enormous deposits of iron ore, though these are of poor quality. There have been unconfirmed reports

of Chinese plans to open up high-quality iron ore mines. But even if China decides to carry out these plans, problems to do with financing the operations and improving the quality of the mineral will still have to be overcome. Because Taiwan also has no iron ore deposits, it has to import iron to produce pig iron, which is then converted into basic oxygen furnace (BOF) steel. In 1995 it imported 91.9 million tonnes - 51.6 million tonnes from Australia, 30.6 million tonnes from Brazil and 4.4 million tonnes from India.

Most of the iron ore trade is carried out by sea. In 1983, 80 per cent of iron ore imports were transported by sea. By 1990 this had risen to 90 per cent and the rate is increasing. Annual trade in iron ore is now about 400 million tonnes, and this is expected to grow due to increasing demand from the Northeast Asian countries.

China's demand for iron ore is expected to increase considerably. As the social infrastructure is improved and new port facilities are constructed, China may prefer to obtain its imports of iron ore from Brazil rather than Australia. In order to guarantee stability of supply, China is seriously examining the possibility of participating in a mining project in Australia and of purchasing the Hierro Peru mine, which has a production capacity of 10 millions tonnes a year.

When the Pohang Steel Corporation commenced operations in 1973, Korea became the third-largest importer of iron ore after Germany. However, given the massive size of its iron ore imports, Korea may find it difficult to guarantee stability of supply unless it diversifies its sources of supply and varies its contractual arrangements.

In order to guarantee a stable supply of iron ore, Japan's six steel companies and trading houses have been expanding their interests in iron ore mines abroad since the 1960s. Consequently, the supply of iron ore secured for Japanese production now exceeds domestic demand. As long as the benefits of mining operations are assured, Japanese corporations will continue to participate in high-quality iron mining operations with the help of government support.

Grain[1]

North America, Western Europe, and Australia are traditionally classified as surplus-grain-exporting regions. Countries other than these rely mostly on imported grain. Recently the world grain market has faced a turning point with the emergence of new trade patterns due to successive structural changes. The main causes of these structural changes are a decrease in the demand for grain in Russia, a steady decrease in the grain surplus in the European Union, and the rapid growth in demand for imported grain in China.

Northeast Asia is traditionally a grain-importing region. Moreover, rapid economic and population growth in China and the other East Asian countries, the region where the demand for grain is increasing, is having an impact on the maritime transport trade, the demand for sea transportation, and vessel size. These trends are the result of the growing preference for flour-made dishes in Japan and China, where previously rice had been the main staple. Futhermore, governments in this region have been encouraging the consumption of wheat to overcome the heavy dependence on rice.

From 1986 to 1995, grain imports in Northeast Asia have increased by 47 per cent and those of China have doubled. Even though Japan is still the world's largest importer of grain, China will soon overtake Japan in demand for wheat and fodder. During the same period, there has been a 73 per cent increase in Korea's grain imports and in its demand for both wheat and miscellaneous cereals. As Table 8.2 shows, grain exports by the United States, Canada, Australia and the European Union amount to 80.3 per cent of the total world exports, and over 55 per cent of total grain exports are from the United States, Canada and Australia. Table 8.3 shows that Northeast Asian countries are heavily dependent on the United States, Canada and Australia for their grain imports.

There have been far-reaching shifts in the structure of demand for grain imports since 1980. At the beginning of the 1980s, seaborne trade centred on the transatlantic and transpacific trades from North America to Europe and Japan respectively. During the early 1980s, the operation of the European Community's Common Agriculture Policy

1 'Grain' includes here wheat and miscellaneous cereals such as corn, barley, sugar cane, rye, and bean, but not rice.

Table 8.2: World Grain Exports (million tonnes)

Export Country	1992/1993	1993/1994	1994/1995	1995/1996	1996/1997	Percentage
USA	90.3	72.5	89.8	99.8	78.5	42.9
Canada	24.9	23.8	26.0	21.2	23.2	12.7
Australia	12.5	17.4	10.1	15.8	22.2	12.1
EU12 countries	32.0	27.5	23.9	16.0	23.5	12.8
The others	34.4	32.8	32.8	28.8	35.3	19.3
World total export	194.1	174.0	182.6	181.6	182.7	-

Source: International Grains Council

Table 8.3: Grain Imports by Sea in Northeast Asia (thousand tonnes)

Country	1991	1992	1993	1994	1995
USA	34,148.9	32,950.0	32,877.1	31,496.9	52,977.3
Canada	10,190.2	10,373.9	9,134.1	10,568.3	9,249.0
Australia	6,810.5	5,831.1	5,079.3	8,506.0	5,211.1
Argentina	2,740.0	1,947.5	1,587.1	1,627.0	2,337.5
South Africa	409.7	158.0	536.7	1,619.8	1,247.2
China	5,870.1	7,853.9	8,604.9	5,973.4	1,157.9
EU	3,041.2	1,292.4	856.1	670.9	866.8
Saudi Arabia	945.1	1,124.8	1,028.9	852.6	460.9

Sources: US Agency for International Development, UN Food and Agriculture Organisation, Argentinean Ministry of Agriculture, Ocean Shipping Consultants Ltd

Table 8.4: Main Seaborne-Grain Trade Routes, between the five biggest exporting countries* and the main importing countries (thousand tonnes)

Region	1991	1992	1993	1994	1995
Far East Asia	56,930.8	52,394.9	49,533.7	52,869.1	70,641.7
USA	19,420.4	22,121.6	23,830.8	27,146.7	27,645.3
Africa	18,265.8	24,427.5	25,498.6	22,701.8	19,768.2
Western Europe	19,577.3	18,930.6	16,938.1	17,994.5	18,557.7
Middle East	15,582.9	14,881.0	16,555.5	18,335.6	17,163.4
South Asia	3,233.4	6,153.1	4,998.0	4,296.9	4,271.0
Former Soviet Union/ Eastern Europe	32,771.9	31,838.9	21,040.8	4,843.0	2,964.0
Australia/Oceania	377.8	409.9	468.4	805.1	610.8

Source: Ocean Shipping Consultants Ltd

* 'Big five' exporting countries: USA, EU, Canada, Argentina, Australia

(CAP) increased production and gradually transformed the European Community from a grain importer into a grain exporter. The stabilisation of seaborne grain trade in the late 1980s did not last very long and was followed by a precipitous decline in imports by the former Comecon countries in the wake of the break-up of the Soviet Union. The contraction of these markets has curtailed the development of trade in the first half of the 1990s, despite the strong growth in the Northeast Asian market.

As a result, the grain trade has become increasingly directed towards meeting the growing requirements of the Chinese and other Northeast Asian markets. Rapid economic development and population growth in China have already upset the delicate balance between domestic supply and demand which had prevailed until recently, resulting in a growing demand for imported grain.

In the so-called newly industrialised and tiger economies of East Asia, demand has also increased rapidly both for wheat and for feed grains. Table 8.4 sets out the development of the global seaborne trade in grain since 1980, reflecting the long-term trends and year-on-year fluctuations caused by short-term factors affecting supply and demand.

Future Prospects

Because the iron and steel industry is widely recognised as a measure of national industrial growth and as a symbol of national power, many countries promote it intensively. According to current estimates there is an abundance of iron deposits but these deposits are concentrated in a few regions. With production now exceeding demand, iron stocks are increasing every year and there is downward pressure on prices. But some Australian iron ore operations are expanding their production capacity and infrastructure to prepare for an expected increase in demand in the late 1990s. Major importing countries of iron ore, such as Japan, South Korea and China, are implementing diverse policies to secure their supplies of iron. At the same time, demand will continue to rise. As part of its ambitious economic development, China intends to increase crude steel

production to approximately one hundred million tonnes by the year 2000 as a part of its ambitious economic development plan.

In the case of grain imports and exports, if current trends continue then developments in Northeast Asia will have a significant impact on the world grain trade. According to one estimate, Northeast Asian grain imports as a proportion of total world grain imports will increase from 42.1 per cent in 1995 to 48.8 per cent in 2010.

Although our case study has been limited to iron and grain, one cannot overlook the importance and strategic gravity of these commodities in the economies of Northeast Asia. Indeed the very survival of these economies depends on the ability of Northeast Asian nations to secure stable import sources of raw materials and to negotiate more skilfully and efficiently with the major exporting countries.

There are two main trends in the world today - globalisation and the formation of regional economic blocs. With the establishment of the World Trade Organisation (WTO), the world is moving rapidly towards a situation of ever-increasing competitiveness in which all countries are subject to the same regulations. Yet paradoxically this centralisation of the world economy is being paralleled by a movement towards decentralisation. The formation of economic blocs such as the European Union, the North American Free Trade Area (NAFTA), and the Asia Pacific Economic Cooperation (APEC) forum is well advanced and is already having a considerable impact.

In conclusion, each Northeast Asian country must make every effort to foster communal understanding, prosperity and stability. Given that all these strategic materials are transported by sea, the safety of the sea lanes is of vital interest to all Northeast Asian countries and they should endeavour to secure stable marine routes and establish a regular forum to discuss common interests. Northeast Asian countries, and Japan and Korea in particular, should seek to develop a partnership, but more fundamentally, they should participate in overseas investment and development activities to secure stable sources of raw materials. China has abundant resources and labour as well as a strong commitment to economic development. If China were to seek economic cooperation with countries that have complimentary resources - capital and technology - such as Japan and

Korea, this could pave the way for Northeast Asian regional prosperity.

CHAPTER 9

RETURN SHIPMENTS OF RADIOACTIVE WASTES FROM EUROPE TO JAPAN

Grant Hewison

The transport of radioactive wastes from Europe to Japan through the Asia-Pacific region has raised a number of security concerns among the peoples and nations of the region. Several shipments of radioactive waste have taken place to date, with an expectation of continued shipments in the future. Many coastal states along the routes taken by the shipments have expressed concern, with some states banning the shipments from their exclusive economic zones (EEZs) and territorial waters.

A number of concerns have been raised in relation to the shipments, including:

- the non-notification to coastal states of the route the shipments will take, including the security implications of any shipment (for example, piracy);
- the safety of the waste shipments;
- the legal issues relating to the shipment of nuclear wastes through certain ocean areas such as EEZs, territorial seas and straits;
- the possibility of excluding shipments from particularly sensitive sea areas; and
- the liability of the states involved in the shipments should there be an accident.

While those states involved in the shipments (France, the United Kingdom and Japan) have provided information responding to these concerns, those states worried about the shipments have asked for further consultation on the issues and the provision of further information.

Recently, the issue of the shipments was discussed at the fourth ASEAN Regional Forum, in July 1997. It was noted in the Chairman's Statement that the ministers examined the transboundary movement of nuclear waste in the region and 'emphasised that such transfer of nuclear waste should conform to ... existing international safety standards and norms ...'.[1]

The Shipments

In November 1992, the *Akatsuki Maru* carried the first return shipment of radioactive waste from France to Japan. It was escorted by the armed vessel *Shikishima*, of the Japanese Maritime Safety Agency. The *Akatsuki Maru* took a route from Cherbourg, France, via the Cape of Good Hope, south of Australia, through the Tasman Sea and on through the southwest Pacific to Japan.

In February 1995, the *Pacific Pintail* set sail from Cherbourg for the port of Mutsu-Ogawara, in northern Japan. This time the ship sailed around Cape Horn, on past the tip of South America and up through the Pacific.

The latest shipment, that of the *Pacific Teal*, departed from Cherbourg on 13 January 1997, again bound for Mutsu-Ogawara port in Japan. The vessel took a similar route to that of the *Akatsuki Maru* - it travelled via the Cape of Good Hope, south of Australia, through the Tasman Sea and on through the southwest Pacific, passing through Australia's EEZ and close to New Caledonia and the Solomon Islands.

It is expected that the shipments will continue for 10 years or more with a frequency of one or two shipments per year.[2]

It is reported that the transport vessels used for the shipments are especially designed for the transport of radioactive materials, have a number of safety measures to ensure against accidents and conform to the requirements of the International Maritime Organisation.[3]

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1 Chairman's Statement, Fourth ASEAN Regional Forum, Malaysia, 27 July 1997.

2 Hayashi Akira, 'The Safety of Sea Transport for Radioactive Materials', *Japan Echo*, Vol.XXII, No.4, 1995, p.75.

3 See Return Transport of Vitrified Residue From Europe to Japan, ORC, AB COGEMA and BNFL, 1995. See also Akira, 'The Safety of Sea Transport for Radioactive Materials'.

Concerns Voiced by States

The transport of radioactive wastes from Europe to Japan through the Asia-Pacific region has raised a number of security concerns among states of the region. It was reported, for instance, that during the voyage of the *Pacific Pintail*, 'more than 30 states tried to ban [the vessel] from their territorial waters or exclusive economic zones'.[4]

Caribbean Community

The outward-bound shipments of plutonium from Japan to France for reprocessing have traditionally travelled through the Panama Canal, and have been the subject of opposition from the Caribbean Community (CARICOM).[5]

In addition, Puerto Rico and the Dominican Republic have raised objections to the shipments' passage through the Canal de la Mona Strait in the Caribbean Sea.[6]

Chile, Argentina, Brazil and Uruguay

The government of Chile - who sent out a warship to prevent the *Pacific Pintail* from entering its territorial waters - issued a joint statement with the governments of Argentina, Brazil and Uruguay opposing the shipments, stating that they 'reiterate their preoccupation with the risks - due to the intrinsic danger of the cargo - that this transport represents to the health of the region'.[7] It is reported that Chile, Argentina and Brazil have banned these shipments from entering their territorial waters.[8] The four nations also declared the need for:

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4 'Hot Cargo - Tokyo plays down alarm over nuclear shipments', *Far Eastern Economic Review*, 25 May 1995, p.28. See also AFP story, 23 February 1995.

5 Greenpeace Press Release, dated 21 January 1997.

6 UPI wire story, 22 February 1995.

7 Greenpeace Press Release, dated 21 January 1997. See also International Atomic Energy Agency (IAEA), INFCIRC/533, 14 March 1997.

8 Greenpeace Fact Sheet, 'The Pacific Nuclear Highway', dated April 1997. It is reported that the Argentine Foreign Ministry informed Japan it would not allow the ship to pass through its waters after learning that the route around Cape Horn was being considered. UPI wire story, 22 February 1995. It has also been reported that Brazil banned the vessel from its waters, stating that '(t)he Brazilian government considers undesirable, in any circumstances, the entry of this cargo in

warranty about no contamination of the marine environment, information about the routes, the obligation to inform coastal countries about the emergency plans in case of accidents, the commitment to rescue the radioactive waste in case of accidents with the ship and payment of reimbursements in case of injuries and damages.[9]

Spain and Portugal

In January 1997, Spain and Portugal sent out naval vessels to guarantee that the *Pacific Teal* did not enter their waters. These actions were significant in that they were the first taken by European Union member-states against shipments originating from a fellow-EU country using EU-registered ships.[10]

South Africa and Mauritius

The South African government also sent out a naval vessel, forcing the *Pacific Teal* to leave South Africa's EEZ, which it had entered in spite of a South African ban and an earlier assurance that the ship would stay out of South Africa's waters.[11] deputy environment minister P.R. Mokaba announced the South African government's 'opposition to the Pacific Teal with its cargo of nuclear waste from entering our EEZ'.[12]

Mauritius also opposed the shipment and demanded that it not enter its EEZ.[13]

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areas that come under Brazilian jurisdiction'. Reuters, 25 February 1995. Chile has opposed the shipments, not only by specifically banning the vessel from its 200-mile EEZ, but also by sending ships and aircraft to enforce the ban. Reuters, 17 March 1995. On 16 March 1995 the Chilean government adopted a resolution forbidding the *Pacific Pintail* to sail in its territorial and jurisdictional waters. See Resolution 12600/67 of March 16th, by the Chilean Maritime Authority, General Directory for the Maritime Territory and Merchant Marine (DIRECTEMAR).

9 Greenpeace Press Release, dated 21 January 1997.

10 ibid.

11 Greenpeace Press Release, dated 2 February 1997.

12 Statement by Deputy Minister of Environmental Affairs and Tourism, P.R. Mokaba, dated 31 January 1997. See also Greenpeace Press Releases, dated 1 and 2 February 1997.

13 Greenpeace Fact Sheet, 'The Pacific Nuclear Highway', dated April 1997.

New Zealand

The New Zealand government has made repeated diplomatic protests to the governments of France, Japan and the United Kingdom over the shipments of radioactive waste. In a statement issued on 15 January 1997, the NZ foreign minister stated that:

> (w)e made it clear to Japan, and to the other countries involved in the shipment, that New Zealand did not want it to come anywhere near us. Despite our representations, and those of other South Pacific countries, the vessel will be passing through our region ... We need more information on the route and I would again call for the ship not to pass through New Zealand's EEZ ... We plan to hold consultations on safety issues with the countries involved in the shipment. We want to satisfy ourselves that any risks to the marine environment around New Zealand are minimised.[14]

Although New Zealand has sought assurances that the waste shipments would not enter New Zealand's exclusive economic zone, 'it has to date received none'.[15] The New Zealand government has also registered its concerns with various international organisations, including the International Atomic Energy Agency (IAEA), the International Maritime Organisation (IMO) and at the nuclear non-proliferation treaty discussions.[16]

Australia

The Australian government has not made protests against the shipments. It appears that the Australian federal government is satisfied with the shipping arrangements and safety standards. Australian environment minister Robert Hill has stated in an address

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14 Office of the Minister of Foreign Affairs and Trade, 'Shipment of Nuclear Waste', 15 January 1997. The foreign minister also stated that: '(m)ore generally, this shipment shows the importance of keeping up the pressure in the appropriate international organisations on this issue. New Zealand has been at the forefront of efforts to make the current standards mandatory, and has called for the routing of ships to be treated in a transparent manner. We will continue our efforts in this regard, and in related fields, such as the development of a liability regime which would cover the effects of nuclear accidents'.

15 Reuters News Service, New Zealand: 'NZ Calls in Envoys over Japan Nuclear Shipment', 26 February 1997.

16 'Many Nuclear Waste Ships May Pass New Zealand', *Dominion*, 19 May 1995.

to the Senate in February 1997: 'We do not feel, as a nation, threatened by the potential of an accident'.[17]

Malaysia, Indonesia and the Philippines

Malaysia has condemned the shipments and has demanded that the vessels not enter Malaysia's territorial waters. The Philippines have also registered their opposition with the Japanese government. In 1992, the Indonesian foreign minister declared: 'We cannot close international sea lanes, but we have called on Japan, even pressed Japan, not to use Indonesian waters'.[18]

In addition, states littoral to the Malacca Strait have raised concerns regarding the possibility of the shipments having to pass through the strait, where there have been frequent shipping accidents as well as incidents of piracy.[19] The issue of restricting the passage through the strait of vessels carrying nuclear or other hazardous cargoes has been raised. Among the suggestions being made are 'the provision of advance notice of the impending passage, and the diversion of these vessels to avoid the Straits altogether'. It has been observed that such measures could conceivably be implemented through the auspices of the IMO in the form of regulations.[20]

The South Pacific Forum

In their communiqué of September 1996, the South Pacific Forum agreed that the shipments of plutonium and radioactive wastes through the region 'posed a continuing concern'. The forum called for the shipments to be 'carried out in accordance with the highest international safety and security standards, in a manner which satisfactorily addressed all possible contingencies, and in full

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17 'No Salvage Plan for Nuclear Waste at Sea', Reuters Business Briefing, 18 February 1997.

18 See Matin Zuberi, 'The Voyage of Akatsuki Maru and the Hazards of Nuclear Shipments', *The Indian Ocean News and Views*, 1993-94, pp. 11-14.

19 ibid.

20 Alan Khee-Jin Tan, 'Protection of the Marine Environment in the Straits of Malacca and Singapore: The 1996 IPS-IMO International Conference on Navigational Safety and Control of Pollution in the Straits of Malacca and Singapore', *Asia Pacific Journal of Environmental Law*, Vol.2, 1997, p.92A.

consultation with Forum countries'. [21] The forum also noted, with regard to its desire for consultation, that 'it appreciated the cooperation of Japan in responding to forum concerns by provision of information on, and consultation about, its shipments'.[22]

In its 1997 communiqué the forum expressed similar 'continuing concerns' and also noted its expectations that such shipments would be carried out in a manner which addressed the concerns of relevant countries and that the shipping states would 'provide compensation for any industries harmed ... in the event of an accident'. The forum also 'noted the efforts of Japan, France and the United Kingdom in providing information about the recent shipment of high level wastes and expressed the hope that this would be continued'.[23]

Of the forum states, Kiribati has banned the vessels from its EEZ and Fiji has requested of Japan that the shipments keep out of its territorial waters.[24]

ASEAN Regional Forum

Recently, the issue of the shipments was discussed at the fourth ASEAN Regional Forum. It was noted in the Chairman's Statement that the ministers examined the transboundary movement of nuclear waste in the region and 'emphasised that such transfer of nuclear waste should conform to ... existing international safety standards and norms ...'.[25]

Concerns Raised by the Shipments

A number of concerns have been raised in relation to the shipments, including:

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21 Forum Communiqué, Twenty-Seventh South Pacific Forum , September 1996, Clause 24.
22 ibid.
23 Forum Communiqué, Twenty-Eighth South Pacific Forum , September 1997, Clauses 32-34.
24 Reuters, 22 March 1995.
25 Chairman's Statement, Fourth ASEAN Regional Forum, Malaysia, 27 July 1997.

1. The non-notification to coastal states of the route the shipments will take

Coastal states have raised concerns with those states involved in the waste shipments that they have not in the past been notified about the routes that the shipments would take. The shipping nations have in the past noted that the reasons for keeping information about the shipments confidential, including transportation routes, was 'in consideration of physical protection, that is, to avoid giving any data to terrorists so as to prevent nuclear material from being unlawfully taken and used'.[26] Piracy has also been raised as a reason for not releasing route movements prior to shipment.

This issue is currently being considered by the International Maritime Organisation (IMO). Proposals for mandatory prior notification and consultation with coastal states when cargoes of radioactive waste are being shipped are currently before the Marine Environment Protection Committee (MEPC). 'Member States [of the IMO] in favour of prior notification say that coastal States, through whose waters such cargoes will pass, have a legitimate "need to know" so that preparations can be made to render assistance in the event of it being needed'.[27]

2. The safety of the waste shipments

There has been considerable debate among those involved in the shipments and those concerned about the shipments as to their safety. Several reports have been commissioned and published by both parties.[28] They centre on the adequacy of the voluntary IMO Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships, 1993 (INF Code) and on whether the characteristics of the shipments conform to the requirements of the code. The code is currently being reviewed by the MEPC and Maritime Safety Committee (MSC) of the IMO in

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26 Akira, 'The Safety of Sea Transport for Radioactive Materials', p.75.

27 Marine Environment Protection Committee, 40th Session, 18-25 September 1997, *IMO Briefing*, at <http://www.imo.org/imo/briefing/1997/fax1297.htm>.

28 See Edwin S. Lyman, *Safety Issues in the Sea Transport of High-Level Radioactive Wastes from France to Japan* (Center for Energy and Environmental Studies, Princeton University, December 1994); Edwin S. Lyman, 'The Sea Transport of Vitrified High-Level Radioactive Wastes: Unresolved Safety Issues', Nuclear Control Institute Discussion Draft, 21 November 1996. See also Akira, 'The Safety of Sea Transport for Radioactive Materials'.

cooperation with the International Atomic Energy Agency and the United Nations Environment Programme (UNEP). 'The aim is to improve the Code to deal with all issues related to the transport by sea of materials resulting from the generation of nuclear energy ...'.[29] Of particular interest are the proposals that the code become mandatory, and that the code require prior notification of the details of shipments and shipboard emergency plans be made available to coastal states.[30]

3. The legal issues relating to the shipment of nuclear wastes through certain ocean areas such as EEZs, territorial seas and straits

The shipments of nuclear waste have also raised legal issues relating to the legitimacy of the passage of these vessels through various ocean sea lanes. Those nations supporting the shipments assert that the shipments are free to navigate through any part of the ocean under the traditional doctrines of innocent passage, transit passage, and freedom of the high seas. Many of those nations concerned about the shipments argue instead that the environmental provisions in the 1982 United Nations Law of the Sea Convention and the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal require nations shipping these wastes to prepare environmental assessments and then to provide notification to and seek authorisation of affected nations before passing through their territorial seas and exclusive economic zones.[31]

4. The possibility of excluding shipments from particularly sensitive sea areas

States littoral to the Malacca Strait have raised concerns regarding the passage of these shipments through the strait.[32] The

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29 Marine Environment Protection Committee, 40th Session, 18-25 September 1997, *IMO Briefing*, at <http://www.imo.org/meetings/mepc/mepc404.htm>.

30 ibid.

31 See Jon M. Van Dyke, 'Sea Shipment of Japanese Plutonium under International Law', *Ocean Development & International Law*, Vol.24, 1993, p.399; Jon M. Van Dyke, 'Applying the Precautionary Principle to Ocean Shipments of Radioactive Materials', *Ocean Development & International Law*, Vol.27, 1996, p.279. See also Jon M. Van Dyke, 'The Legitimacy of Unilateral Actions to Protest the Ocean Shipment of Ultrahazardous Radioactive Materials', at <http:www.igc.apc.org/nci/ib121396.htm>.

32 See Zuberi, 'The Voyage of Akatsuki Maru and the Hazards of Nuclear Shipments'.

issue of restricting the passage of vessels carrying nuclear or other hazardous cargoes through the strait has often been raised in the past. Among the suggestions being made regarding these nuclear waste shipments are 'the provision of advance notice of the impending passage, and the diversion of these vessels to avoid the Straits altogether'.[33] This issue has been canvassed before the IMO in its review of the INF Code.[34]

5. The liability of the states involved in the shipments

Coastal states along the route of the shipments have been concerned that the present international regimes covering liability for accidents are inadequate. The existing provisions are, however, now being re-examined. Provisions for compensation and liability were considered at an IMO conference in May 1997 within a new convention on hazardous and noxious substances. The IAEA is also examining this issue as part of its review of the Vienna Convention on Civil Liability for Nuclear Damage of 1963 and the Paris Convention on Third Party Liability in the Field of Nuclear Energy of 1960.[35]

Recommendation

It is recommended that the CSCAP Maritime Cooperation Working Group prepare a short paper for CSCAP that builds on the statement of the ministers of the ASEAN Regional Forum. It might be noted that the ministers of the ARF, at their fourth meeting, 'emphasised that such transfer of nuclear waste should conform to ... existing international safety standards and norms ...'.[36]

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33 Tan, 'Protection of the Marine Environment in the Straits of Malacca and Singapore', p.92A.

34 Marine Environment Protection Committee, 'Three-day meeting on nuclear materials transport ends', *IMO Briefing*, at <http://www.imo.org/briefing/1996/396.htm>.

35 ibid.

36 Chairman's Statement , Fourth ASEAN Regional Forum, Malaysia, 27 July 1997.

CHAPTER 10

IMPACTS ON THE MARINE ENVIRONMENT FROM SHIPPING OPERATIONS

Sam Bateman

Shipping and seaborne trade are major and increasing components of economic activity in the Asia-Pacific region. The downside of this activity is that shipping and its ancillary services have the potential to cause significant damage to the coastal and marine environments of the region. Oil and chemical spills, collisions and groundings, the discharge of ballast water, anti-fouling paints, waste disposal, port construction, port dredging and port operations can all have a major impact on water quality, marine habitats and ecosystems.

This chapter focuses on issues associated with the impact of maritime transportation on the marine environment and the opportunities that exist for regional cooperation and dialogue to reduce that impact. As the constraints on cooperation at present are mainly political, particularly in Northeast Asia,[1] the potential benefits of cooperation are both:

- direct in terms of enhanced regional environmental security with 'safer ships and cleaner seas' in the region; and
- indirect as a consequence of the 'building block' provided for security cooperation and dialogue through regional consideration of measures to reduce the impact of shipping on the marine environment.

The environmental risks of maritime transport attract attention at both the national and international levels. The general consequence of these concerns is greater national and international regulation of maritime transportation with a major impact in the last ten or twenty years on

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1 Edgar Gold, 'Safer Ships and Cleaner Seas in Northeast Asia: Marine Environment, Sustainable Development and Maritime Safety Cooperation' in Dalchoong Kim *et al.* (eds), *Exploring Maritime Cooperation in Northeast Asia: Possibility and Prospects* (Institute of East West Studies, Yonsei University, Seoul), p.139.

the size and shape of the world shipping industry. In the Asia-Pacific region so far, the main effect of increased regulation appears to have been on the ships themselves and their crews, rather than upon their operating environment or in terms of actions to reduce the impact of shipping on the marine environment (for example, the monitoring and control of operational pollution from ships). Considerable scope exists for regional cooperation.

The increasing age of the world merchant fleet and the pressure on shipowners to cut costs to a minimum have led to an increase in the number of substandard merchant ships at sea, which may be unseaworthy and operated by poorly trained and inexperienced crews. Such ships are a risk to both their crews and the marine environment generally. As a consequence of the relatively low value of the cargoes carried and the low technological sophistication of ship systems, bulk carriers are particularly vulnerable to cost-cutting and criticisms of being unsafe. While 'substandard' ships attract most attention in the popular press, particularly when accidents occur, and they are the target of most international regulation, it is nonetheless true that routine shipping operations by well-maintained and -operated vessels also involve risks to the marine environment.

Incidents such as the grounding of the *Exxon Valdez* in Alaska, the foundering of the Greek *Aegean Sea* off the northwest coast of Spain, the breaking up of the Liberian *Braer* off the Shetland Islands, the burning of the Danish-owned *Maersk Navigator* near the northern entrance to the Malacca Strait and the recent sinking of the *Nakhodka* off Japan, have highlighted the risks to the marine environment posed by the carriage of dangerous or hazardous cargoes at sea. It is paradoxical, however, that these ships may not have been judged to be unsafe by international standards. Nevertheless, the catastrophes that befell them have drawn attention to the problems of unsafe ships at sea and have led to tighter international controls over shipping, as well as providing an incentive for regional cooperation to achieve the objective of 'safer ships and cleaner seas'.

High-profile maritime accidents such as those that befell the *Exxon Valdez, Braer, Maersk Navigator* and *Nakhodka* attract considerable publicity, but they need to be kept in perspective as a source of marine pollution. Marine accidents account for only about 30-40 per cent of ship-generated oil pollution of the oceans, with intentional activities

(for example, bilge pumping and tank cleaning) accounting for the remainder.[2] In turn, it is usually recognised that ship operations are responsible for only about 30 per cent of marine pollution, with the remainder due to land-based sources, natural seepage and offshore production.

Shipping Regulatory Regimes

The International Maritime Organisation (IMO) is the UN agency tasked with providing 'safer ships and cleaner seas'. The IMO has achieved a lot over its 35 years of existence, mainly though the formulation of an extensive range of international conventions dealing with the construction and operation of ships, the training and certification of seafarers, marine safety and the prevention of pollution, and through the fostering of international training programmes. The 'other side of the coin' is that a gap appears to exist between the achievements of the IMO itself and the reality of the implementation of those achievements. Many nations, including countries in the Asia-Pacific region, have not ratified key IMO conventions, and even those which have ratified them are often slow to implement them. As one commentator noted:

> When the member states of the IMO put on their rule-making hats they are at their most benign and most constructive. It is when they go home to exercise their 'national sovereignty' by applying these international regulations that the feet of clay appear. This failure to carry out their pledges and their obligations can be excused as 'sovereign independence' or 'self-government' but it ought to be described bluntly as incompetence, idleness, greed, or indifference to the consequences of inaction.[3]

The current level of ratification in the Asia-Pacific region of key IMO conventions dealing with international regulation of shipping is shown in Table 10.1. It will be noted that, except for MARPOL and

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2 Ronald Mitchell, 'Intentional Oil Pollution of the Oceans' in Peter M. Haas, Robert O. Keohane and Marc A. Levy (eds), *Institutions for the Earth: Sources of Effective Environmental Protection* (MIT Press, Cambridge MA, 1993), p.189.

3 Keith Hindell, 'Strengthening the Ship Regulating Regime', *Maritime Policy and Management*, Vol.23, No.4, 1996, p.371.

Table 10.1: Status of Conventions

Country	Convention						
	London	MARPOL	STCW	Basel	OPRC	Intervention	SAR
Cambodia							
China	X	X	X	X		X	X
Indonesia		X	X				
Japan	X	X	X			X	X
Korea, North		X	X				
Korea, South		X	X				X
Laos							
Malaysia			X				
Myanmar		X	X				
Philippines	X		X				
Singapore		X	X				
Thailand							
Vietnam		X	X				
Russia	X	X	X	X		X	X

Note: X signifies country has ratified the particular convention
Sources: *IMO News*, No.2, 1994, pp.10-12; *World Resources 1994-95*, Tables 24.1 and 24.2

the Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), the level of ratification is not high in the region. Some background on each of these key IMO conventions is shown in the annex to this chapter.

Developments in the regime of port state control (PSC) are another important element in international efforts to manage the problem of substandard ships. This regime involves the inspection by the officers of a national maritime authority of foreign vessels visiting the country's ports to ensure compliance with international maritime safety and marine pollution conventions. It is based on the rule of international law, according to which a state exercises full jurisdictional powers within its internal waters and has the right to deny access to such waters.[4] It supplements the primary responsibility of the flag state for ensuring the compliance of ships flying its flag with the relevant international conventions.

While responsibility for safety standards on board ship primarily rests with the flag state and standards should be maintained by shipowners, classification societies and insurers, casualty rates have indicated that these 'checks and balances' are not working. Hence PSC emerged as the 'last safety net' to eradicate substandard ships. Port states control the condition of visiting ships to ensure conformity with recognised international standards prescribed by the IMO. A regional approach, rather than an individual country or global approach, has been favoured as the most effective and manageable means of achieving the necessary coordination between participating countries.[5]

An Asia-Pacific Memorandum of Understanding (MOU) on PSC was opened for signature on 2 December 1993 and has now been signed by seventeen countries (Australia, Canada, China, Fiji, Indonesia, Japan, Republic of Korea, Malaysia, New Zealand, Papua New Guinea, Philippines, Russian Federation, Singapore, Thailand, Vanuatu and Vietnam). This is based on the Paris MOU on PSC adopted in 1982 as an international agreement between the maritime

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4 For a comprehensive description of the port state regime, see G.C. Kasoulides, *Port State Control and Jurisdiction: Evolution of the Port State Regime* (Martinus Nijhoff Publishers, Dordrecht, 1993).

5 For a recent description of developments with port state control, see Fernando Plaza, 'Port State Control: Towards Global Standardisation', *IMO News*, No.1, 1994, pp. 13-20.

authorities of fifteen European countries aimed at the establishment of a harmonised system of PSC and an effective data exchange system on PSC inspections. Similarly, the Asia-Pacific MOU provides for regional cooperation on ship inspections with a regional database and agreement on target inspection rates for foreign ships visiting the ports of participating countries. With an effective system of PSC now covering East Asian waters, unsafe or substandard ships will find it very difficult to trade in the region. The effectiveness of PSC in the Asia-Pacific region is already causing a widening difference between the quality of large dry bulk carriers operating in the Pacific and those sailing in the Atlantic.[6]

Shipping in the Asia-Pacific Region

Shipping has been the 'engine of growth' in the Asia-Pacific region, with seaborne trade growing at a faster rate than regional economies. The phenomenon is explained by economic and geostrategic factors. First, the 'archipelagic' nature of the region and the lack of any significant land transport infrastructure in East Asia, other than in China, mean that all intraregional trade is carried by sea, except for the very high-value cargoes carried by air. Second, economic growth in East Asia is increasingly fuelled by trade and investment between regional economies rather than between Asia-Pacific economies and North American or European ones.[7] Third, regional nations generally lack self-sufficiency and are variously dependent on imports by sea of energy, foodstuffs, raw materials, and particular manufactured goods.

A particular feature of the growth in seaborne trade in East Asia has been the increased carriage of hazardous or dangerous cargoes. Rapid economic and industrial growth in Southeast and Northeast Asia drives an increasing demand for energy and complex materials which can only be shipped by sea. Furthermore, developments in technology now allow the movement by sea of a

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6 'Poor tonnage "is heading north"', *Lloyd's List Australian Weekly*, 13 May 1996, p.11.

7 For example, between 1989 and 1993, trade between ASEAN countries grew from 16.2 per cent to 18.5 per cent of total ASEAN trade and growth was also evident in ASEAN trade with Japan (from 23.7 per cent of ASEAN trade in 1989 to 24.6 per cent in 1993). See Table 2.2, in Department of Foreign Affairs and Trade (DFAT), *The APEC Region Trade and Investment* (DFAT, Canberra, November 1994), p.27.

Table 10.2: Movements of Selected Ship Types with Dangerous Cargoes in ASEAN Ports, May 1993-April 1994

	LNG Carriers	LPG Carriers	LNP Carriers	Chemical Tankers	Oil Tankers	Total
Brunei	173	0	0	2	170	345
Indonesia	412	867	94	925	10324	12622
Malaysia	147	685	7	1004	4494	6337
Philippines	12	533	2	205	495	1247
Singapore	25	894	27	1231	7846	10023
Thailand	2	127	0	228	979	1336
Total	771	3106	130	3595	24308	31910

Notes: 1. Includes domestic voyages
2. An LNP carrier is an unspecified gas carrier
Source: Strategic Maritime Information System (SMIS)

greater range of mineral and chemical compounds and in greater quantities than was previously the case. Table 10.2 shows the movement of selected ship types with dangerous cargoes in ASEAN ports in a twelve-month period in 1993-94. As economic growth continues in the Asia-Pacific region, the carriage of hazardous and dangerous cargoes in the region will increase significantly. Consequently, there is a higher risk of damage or pollution as a result of collision, explosion, fire, grounding or other accident involving the ships carrying these dangerous cargoes. In the same way that national and regional contingency plans are required to clean up oil spills, national and regional chemical spill response plans may also become necessary.

Japan, South Korea and Taiwan are the principal destinations for loaded tankers in the region with, for example, 1,118 ship movements to ports in those countries from the Middle East in the twelve-month period from May 1993 to April 1994.[8] Estimates have been made that the route through the Malacca-Singapore straits is used by about 72 per cent of the eastbound loaded tankers, while the alternative route through the Lombok and Makassar straits,[9] more suitable for the large, deep-draught vessels, accounts for the remaining 28 per cent - although in terms of deadweight tonnage and volume of oil carried, the share is about even.[10] About 26 tankers per day are estimated to pass through the Malacca Strait.[11] In terms of volume, crude oil accounted for about 58 per cent of interregional cargo

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8 Based on data from the Strategic Maritime Information System (SMIS) developed by the Information Technology Division of the Australian Defence Science and Technology Organisation (DSTO). This is a database of open-source maritime information covering Southeast Asian and Australian waters, including map depictions, port details, data on some 32,000 merchant ships over 1,000 GRT which operate in the region, major routes and shipping movements.

9 For a comparison of the commonly used shipping routes passing through Southeast Asian waters, see R. Swinnerton, 'A Description of Regional Shipping Routes: Navigational and Operational Considerations', *Maritime Studies*, No.87, March-April 1996, pp.10-22.

10 Chia Lin Sien, The Strait of Malacca as a Tanker Pipeline: Some Considerations for Northeast Asian Users, paper prepared at an international conference on The Strait of Malacca: Some Considerations for Northeast Asian Users, Malaysian Institute of Maritime Affairs, Kuala Lumpur, 14-15 June 1994, p.9.

11 ibid.

tonnage passing through the Strait of Malacca in 1993.[12] Kent Calder has noted with regard to regional energy projections that:

> Should this projected pattern indeed materialize, a growing fleet of heavily laden supertankers will plow east across the Arabian Sea and the Indian Ocean in coming decades, headed for Singapore, Hong Kong, Shanghai, Pusan, and Yokohama. East Asian oil imports from the Middle East could well triple in the next fifteen years alone, to a very substantial share of total world oil consumption.[13]

Needless to say, these ships, having passed through straits in Southeast Asia, then have to sail on through the enclosed and semi-enclosed seas of East Asia, where shipping traffic is high and the marine environment is relatively sensitive. The management of the environmental threat to these seas posed by shipping and its ancillary services is a major consideration of this paper.

Shipping and the Environment

There are three potential types of environmental hazards associated with shipping operations:[14]

- operational pollution - leakages, spillages and discharges of oil, sewage, garbage and other substances, as well as air and noise pollution, and the impact of anti-fouling paints and alien organisms, occurring during day-to-day shipping and maritime cargo-handling activities;
- accidental pollution - pollution caused by spillages of oil or other noxious substances as a result of collisions or other accidents; and
- physical damage of habitats - resulting from collisions, for example with reefs, or smothering of habitats.

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12 John H. Noer and David Gregory, *Chokepoints: Maritime Economic Concerns in Southeast Asia* (National Defense University Press, Washington DC, 1996), p.58.

13 Kent E. Calder, *Asia's Deadly Triangle - How Arms, Energy and Growth Threaten to Destabilize Asia Pacific* (Nicholas Brealey Publishing, London, 1996), p.59.

14 IMO, *Guidelines for the designation of special areas and the identification of particularly sensitive sea areas*, Resolution A.720(17), November 1991, Table 1, p.331.

The reduction of intentional ship pollution of the oceans is an objective of various IMO conventions, particularly MARPOL 73/78, but concerns exist regarding the effectiveness of the IMO in this regard:

> ... the institution has a mixed record at increasing the capacity of states to address oil pollution. IMO and developed states concerned about the problem have done little to increase the capacity of developing states to address intentional oil pollution. The failure of many governments to comply with the requirement to ensure provision of adequate reception facilities has provided tanker operations with an excuse for discharging oil at sea.[15]

Routine shipping and port operations can cause damage to marine habitats and ecosystems in a variety of ways. Possible priority areas for action in the Asia-Pacific region to reduce this impact are as follows:

- *Oil pollution and oil spills.* Oil spills are the most tangible evidence of maritime pollution from shipping activities. They may occur as a result of human or mechanical error during cargo-handling, pumping, refuelling, tank-cleaning or ballasting operations, as well as through collisions or groundings. A study by the International Joint Group of Experts on the Scientific Aspects of Marine Pollution (GSAMP) concluded that oil pollution from shipping operations has decreased during the past three decades.[16] However, the risks remain significant, particularly in areas of high shipping-traffic density, and progress is threatened by the growing number of shipping fleets with poor accident records and the ageing of the world fleet. Regional cooperation could include modelling (for example, the development of coastal atlases and current/tidal models to project the trajectory of oil spilled in particular areas) and contingency planning (oil spill response plans) for the clean-up of transnational oil spills. These response plans already exist within ASEAN but not, so far, in Northeast Asia or the South China Sea.

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15 Mitchell, 'Intentional Oil Pollution of the Oceans', p.244.

- *Monitoring operational pollution from ships.* Operational pollution from ships arises as a result of ballasting to maintain the stability of a tanker after it has discharged its cargo, and from cargo tank washing to prepare tanks for a new and possibly different type of cargo or prior to maintenance. Both these operations can result in the discharge of oily sludge into the sea in contravention of MARPOL 73/78. MARPOL 73/78 requires all parties to cooperate in detecting ship violations, but most violators are not caught because, first, countries generally do not have the resources to patrol the seas properly, and second, once an oil slick is discovered, it is difficult to build sufficient evidence to link it to a particular ship. Regional cooperation, particularly in the enclosed and semi-enclosed seas of East Asia, could cover a monitoring and surveillance regime to build up a regional picture of the incidence of operational ship pollution, as well as the processing of evidence to obtain a successful prosecution.

- *Development of advisory procedures for environmentally sensitive sea areas.* Environmentally sensitive sea areas exist throughout the Asia-Pacific region and include coral reefs, banks, sea mounts, seagrass meadows and mangroves. Most declared marine protected areas are located close to shore within territorial waters or even in internal waters and may include land areas as well. Ships constitute a hazard to these areas through operational pollution, accidental pollution or physical damage to marine habitats or organisms. The designation of marine protected areas may involve different types of national jurisdiction (that is, internal waters, territorial seas and exclusive economic zones) and in many cases, especially with respect to shipping, protective measures cannot be taken unilaterally. The IMO has identified a pressing need for local arrangements to provide additional protection to specific areas from the hazards of maritime accidents.[17] Ships' routeing measures such as traffic separation schemes, recommended

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16 IMO/FAO/UNESCO/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Pollution, *Impact of Oil and Related Chemicals and Wastes on the Marine Environment* (IMO, London, 1993).

17 IMO, *Guidelines for the designation of special areas and the identification of particularly sensitive sea areas*, p.337.

routes or tracks, or deep-water routes can be introduced to reduce the risk of collisions in intensively used shipping areas, to reduce the risk of collisions between ships and maritime installations, to keep ships a certain distance from ecologically important areas, or to reduce the risk of groundings in areas where water depths are uncertain or critical.

- *Ballast water and marine pests.* The introduction of exotic species, marine pests and diseases through the discharge of ballast water from ships poses a serious threat to the coastal environment and indigenous animal and plant life. This issue has attracted considerable attention in Australia in recent years and the guidelines adopted in Australia for the management of ballast water arriving from overseas ports provided the basis of the voluntary international guidelines adopted by the IMO.[18] Ports and areas at risk are mainly those where ships discharge ballast water prior to loading bulk cargoes. To assess the risk of transferring unwanted organisms from one port to another, baseline studies need to be completed and updated on the existence of such organisms in ports where the ballast water is taken onboard. Generally very few of these studies have been undertaken so far.

- *Port waste reception facilities.* Port waste reception facilities for garbage, sewage, oil and oily wastes are required as an important means of reducing marine pollution and marine debris. The provision of such facilities is required by several international conventions but most ports do not have adequate waste disposal facilities. Appropriate pricing regimes are required based on quantity of waste and the difficulty of disposal (that is, relative toxicity). If waste reception facilities are not reasonably priced, then their availability could have the unintentional effect of increasing the illegal dumping of wastes at sea and even in ports. Identifying the source of waste can be very difficult and ship crews can be very adept at

18 Department of the Environment, Sport and Territories (DEST), *Living on the Coast* (DEST, Canberra, 1995), p.34. The *International Guidelines for Preventing the Introduction of Unwanted Aquatic Organisms and Pathogens from Ships' Ballast Water and Sediment Discharges* were adopted by IMO Resolution MEPC.50(31) on 4 July 1991.

covertly dumping waste and disguising its origins. Ports should offer incentives to encourage vessels to use waste facilities, but the provision of these is an additional burden on the port authorities which will eventually flow through to the shipper and the shipowner.

- *Dredging operations.* Dredging is an integral part of the operations of many ports to maintain depths in approach channels, swinging basins and alongside wharves and jetties ('maintenance dredging'). New ports and port facilities invariably require an element of 'capital dredging', involving the removal of large quantities of sediments, silt, sand, gravel and rock to obtain the required depths for ship operations. In the past, the spoil from the dredging operations was usually dumped at sea, unless it could be used for reclamation works or to fill land for port development. This sea dumping can have both a chemical and physical impact, with elevated concentrations of trace metals in particular areas, the loss of water quality and altered scouring processes; and a biological impact, leading to possibly significant reductions in marine biodiversity and changes in the community structure of marine species. It is also recognised that environmental repercussions may arise from the placement of dredged materials on land. Most of the sediment removed by maintenance dredging originates from erosion and land degradation within the watershed area and from sediment recirculation. Integrated catchment management to reduce processes of erosion and run-off and to control the introduction of sediments and contaminants into waterways is thus part of the overall strategy to minimise dredging requirements. Dredging should be strictly controlled by legislation, regulations and protocols which require environmental effects to be taken into account.

The Scope for Cooperation

It is clear from this brief survey that there is considerable scope for regional cooperation to reduce the impact of shipping operations on the marine environment. Possible priority measures include oil spill contingency planning, the development of advisory

procedures for sensitive sea areas, cooperative surveillance and monitoring of operational ship pollution, actions to control the spread of marine pests, and the development of regional guidelines for marine waste reception and dredging operations. The urgency of these measures is dictated by the increased shipping traffic in the region, including the movement of hazardous and dangerous cargoes, the pace of port development, and the environmental sensitivity of particular marine areas. Of particular concern is the level of regional participation in important international maritime conventions. Additionally, some countries which have ratified these conventions may not in fact be giving full effect to them.

The CSCAP Maritime Cooperation Working Group can contribute usefully to promoting the importance of regional maritime cooperation to reduce the impact of shipping operations on the marine environment. This cooperation is particularly important in the enclosed and semi-enclosed seas of East Asia where the risks are highest. Creating a comprehensive maritime safety regime in these waters to reduce the risk of maritime accidents is well overdue.

ANNEX

NOTES ON MAJOR MARITIME CONVENTIONS

International Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention) 1972 - with consideration of the 1996 Protocol

The main objective of the London Convention is to discourage the dumping of wastes or matters which might adversely affect the marine environment. In an effort to promote the effective control of all sources of marine pollution, measures are set out to discourage the dumping of waste into the sea and for parties to take all practicable steps to prevent pollution of the sea by such activities. However, the convention does give some leeway to contracting parties by linking the implementation of the measures to the scientific, technical and economic capabilities of the state, and those contracting states that enjoy a high level of scientific, technical and economic capability (in most instances, industrialised countries) are encouraged to render assistance to the less capable parties (developing countries) in promoting the spirit of the convention.

Disposal of Waste

The London Convention sets out a general prohibition against the dumping of any wastes or other matter in whatever form or condition. An absolute ban is only applied to wastes and other matter listed in the 'Black List' of Annex I of the convention. Other identified material set out in the 'Grey List' in Annex II of the convention may be dumped into the sea only in accordance with a special permit (licence) granted by the appropriate authority. Wastes not listed in either Annex (I or II) may be dumped under a general permit. Despite that, the dumping of waste is still subject to assessment in accordance with Annex III, which establishes the criteria governing the issue of permits for the dumping of waste and other matter at sea.

Enforcement by the Contracting Party

The convention is enforceable on all vessels and aircraft registered in the territory of the contracting party or flying its flag, and on all vessels and aircraft loading in its territory matter to be dumped at sea (except those with the right of sovereign immunity). Additionally, the contracting party can enforce the convention on all vessels, aircraft or offshore platforms under its jurisdiction that are believed to be engaged in dumping. This means that enforcement extends into the territorial seas and, possibly, into the EEZ and the continental shelf of that state.

The 1996 Protocol to the London Convention, 1972

In 1993, the Sixteenth Consultative Meeting of Contracting Parties to the London Convention 1972 adopted resolution LC.48(16) initiating an overall and thorough review of the existing provisions of the convention and its amendments. It agreed that a special meeting or conference be convened no later than 1996 with a view to amending the convention through a single instrument.

The adoption of the 1996 Protocol recognised the achievements of the London Convention with respect to the prevention and elimination of marine pollution arising from dumping at sea. In addition, the acceptance of more stringent marine pollution measures than are otherwise provided for in international conventions appeared timely in light of the oncoming new millennium. This was especially so given the new approaches that have come into currency since the convention was originally drawn up in 1972, such as those based on the principles of 'precaution' and 'prevention' for the protection of the marine environment, along with the promotion of the sustainable use and conservation of marine resources.

Relationship between the 1996 Protocol and the 1972 Convention

The 1996 Protocol retains the objective of the convention and has captured essential measures propounded by the convention to prohibit dumping at sea. However, it does so while taking into account developments in technology for waste management that have occurred over the years, along with those anticipated for the future. The 1996

Protocol is in itself a new international treaty on the prevention of dumping of wastes and other matter into the sea. There is no provision for a state ratifying the protocol to denounce the London Convention. Ratification of the protocol, therefore, does not equate to a denunciation of the convention, but the 1996 Protocol supersedes the London Convention for a contracting party to the protocol that is also party to the convention (Article 23). However, once the protocol comes into force, there will be an indefinite parallel application of the London Convention 1972 and the 1996 Protocol regime by those states which are parties to either regime respectively.

Unlike other protocols, which are normally subsidiary instruments to conventions, the 1996 Protocol is a freestanding instrument. States which are not a party to the London Convention may thus become party to the 1996 Protocol without first becoming party to the London Convention 1972. There is no requirement for non-party states to the convention to ratify the protocol rather than the convention.

New Philosophy Enshrined in the 1996 Protocol

The protocol discourages as far as possible any dumping at sea. Incineration at sea for the deliberate disposal of waste or other matter via thermal destruction is prohibited. Environmentally preferable land-based alternatives are largely encouraged in order to avoid unwanted disposal of wastes or other matter at sea. However, the protocol recognises that current technology does not permit the disposal of certain categories of waste or other matter on land, and that certain small island-states lack the landmass for land disposal facilities. In this respect, dumping may be allowed, but before such a decision is made, candidate waste or other matter must first undergo a thorough assessment, including evaluation of a waste-prevention audit, waste-management options and identification of waste characteristics. The identified dump-site should also allow field monitoring to ensure that permit conditions are met. All assessments and evaluation should include screening for potential effects that the candidate waste might have on human health and the marine environment. A lengthy, detailed description of the assessment procedures for wastes or other matter that may be considered for dumping is provided in Annex 2 of the protocol.

International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78)

MARPOL 73/78 is a combination of two treaties adopted in 1973 and 1978 respectively. The Protocol of 1978 provides that the parties undertake to give effect to the provisions of the 1973 Convention as modified by the Protocol (Article 1[1][b]) and the full name of the instrument reflects its historical development. The main purpose of the 1978 Protocol was to defer the application of Annex II of the 1973 Convention 'until certain technical problems have been satisfactorily resolved' (Preamble).

The MARPOL 73/78 Convention is a dynamic, comprehensive instrument. However, some provisions have been found to be ambiguous or difficult to implement and, in order to provide consistency of interpretation, the Marine Environment Protection Committee (MEPC) of the International Maritime Organisation (IMO) has developed unified interpretations of MARPOL provisions. The MEPC has also amended the convention often and introduced new regulations to tighten the regime for control of operational and accidental ship-sourced marine pollution. The most significant recent amendment was the adoption in September 1997 of a new annex concerning air pollution.

The purpose of the instrument is to 'prevent the pollution of the marine environment by the discharge of harmful substances or effluents containing such substances in contravention of the Convention', where 'discharge' means 'in relation to harmful substances, ... any release howsoever caused from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying' (Article 1). Although the convention defines a 'ship' broadly as 'a vessel of any type whatsoever' and specifically includes 'fixed or floating platforms', the word 'discharge' is defined to exclude the 'release of harmful substances directly arising from the exploration, exploitation and associated offshore processing of sea-bed mineral resources', along with releases for the purpose of scientific research into pollution control and sea dumping (as defined in the London Convention 1972, Article 1). Regulations for the various forms of ship-sourced pollution are detailed in five annexes to the convention.

MARPOL 73/78 emphasises enforcement of its provisions and requires that violations of the requirements of the convention be prohibited and sanctions established under the law of the flag state of the ship concerned wherever the violation occurs. Furthermore, violations of the requirements of MARPOL 73/78 within the jurisdiction of any party to the convention shall also be prohibited and sanctions established under the law of that party (Article 4). Thus, the instrument provides for application through both flag-state regulation and port-state control. Provisions for port-state inspections, detention of ships and rectification of deficiencies is made in some detail in Article 5 of the convention, which also requires that '(w)ith respect to the ship of non-Parties to the Convention, Parties shall apply the requirements of the present Convention as may be necessary to ensure that no more favourable treatment is given to such ships'. This provision provides an important foundation for the operation of regional port-state control memoranda of understanding.

Parties are also enjoined to cooperate in the detection of violations and in enforcement. MARPOL 73/78 provides for the inspection of a ship subject to the convention at any port or offshore terminal for the purpose of verifying whether the ship has made an unlawful discharge (Article 6), but the convention stresses that ships are not to be delayed unduly (Article 7). In the event that an incident involving harmful substances does occur, the convention requires that the details of the incident be reported in accordance with procedures set out in Article 8 and Protocol I of the convention. The parties are also encouraged to assist states which request help with the training of scientific or technical personnel, the supply of equipment, the prevention or mitigation of ship-sourced pollution, and the encouragement of research (Article 17).

Detailed regulations to prevent ship-sourced pollution of the marine environment are laid down in the annexes to MARPOL 73/78. Annexes I and II are mandatory for parties to the convention. Annex I, concerning the prevention of pollution by oil, is extensive. It prohibits the discharge of oil or oily mixtures except when certain conditions are satisfied (Annex I, Regulation 9). It also provides for recognition of 'special areas', including the Mediterranean Sea, Baltic Sea, Black Sea area, Red Sea area, (Persian) Gulf area, Gulf of Aden area, and Antarctic area (south of latitude 60°S) (Annex I, Regulation 10). Oil

tankers, and ships of 400 tons gross tonnage and above, are prohibited from discharging oil in special areas, and in the case of the Antarctic, all ships are prohibited from doing so. The convention makes allowance for discharges that are necessary to secure the safety of the ship or to save lives, or that result from damage to the ship (Annex I, Regulation 11). MARPOL 73/78 also specifies that, at certain ports, waste reception facilities for oil residues and oily mixtures must be established that are adequate to meet the needs of the ships using them without causing undue delay (Annex I, Regulation 12). Regulations for the use of segregated ballast tanks, cargo tank cleaning systems using crude oil washing, oil-discharge monitoring and control systems, slop and sludge tanks, and piping and pumping arrangements are also detailed in Annex I. New oil tankers are required to meet certain construction standards to improve their chances of surviving intact in the event of a collision or stranding (Regulations 13 to 25). Certain ships are also required to keep an oil record book and to have a shipboard oil pollution emergency plan (Annex I, Regulations 20 and 26).

Annex II provides regulations for the control of pollution by noxious liquid substances carried in bulk, and operates similarly to Annex I. The substances concerned are separated into four categories: category 'A' is for those which, if discharged into the sea from tank-cleaning or deballasting operations, would, *inter alia*, present a 'major hazard' and which justify 'stringent anti-pollution measures' - discharge is strictly prohibited; category 'B' substances would pose a 'hazard' and warrant 'special anti-pollution measures'; category 'C' equates to those substances which would pose a 'minor hazard' and which require 'special operating conditions'; and category 'D' are those which would pose a 'recognizable hazard' and require 'some attention in operational conditions' (Annex II, Regulation 3). The noxious liquid substances of the various categories are listed in the 'Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk' (adopted by MEPC.19[22]) (Annex II, Appendix II). In no case may noxious liquid substances be discharged within 12 nautical miles from land (Annex II, Regulation 5).

The remaining annexes are optional. Australia is a party to Annexes III and V. Annex III provides regulations for the prevention of pollution by harmful substances carried by sea in packaged form.

For the purposes of the annex, 'harmful substances' are those identified as marine pollutants in the 'International Maritime Dangerous Goods Code' (IMDG Code adopted by IMO in resolution A.716[17]) (Annex III, Regulation 1). Annex III prohibits the carriage of harmful substances except in accordance with the provisions of the annex (Regulation 1), and requires that '(p)ackages shall be adequate to minimize the hazard to the marine environment' (Regulation 2). Standards are also provided for marking and labelling, documentation, stowage, and quantity limitations (Annex III, Regulations 4 to 6).

Annex V provides regulations for prevention of pollution by garbage from all ships. The annex details rules for the discharge of different types of waste - excluding fresh fish and parts thereof - generated during the normal operation of the ship (Regulation 1), and specifies the distances from land and methods by which it may be disposed of into the sea (Regulations 3 to 6). Vessels of 12 metres or more in length must post placards which notify the crew and passengers of garbage disposal rules. Ships of 400 tons gross tonnage and above, or which carry 15 or more people, must also carry and implement a garbage management plan and carry a 'Garbage Record Book' (Annex V, Regulation 9).

Annex IV provides regulations for the prevention of pollution by sewage from ships, and a new Annex VI provides for prevention of air pollution from ships. Neither of these two annexes have entered into force.

International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 1978

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 1978 was promulgated with the mission to promote safety of life and property at sea, and the protection of the marine environment through the establishment of commonly agreed international standards of training, certification and watchkeeping for seafarers. Parties undertake to give effect to necessary laws, orders and regulations in ensuring that safety of life and property at sea, and protection of the marine environment,

are maintained and that seafarers on board ships are qualified and fit for their duties (Article I(2)).

The convention applies to seafarers serving on board ships entitled to fly the flag of a state party to the convention with the exception of warships, naval auxiliaries or other non-commercial government vessels, fishing vessels, pleasure yachts not engaged in trade, and wooden ships of primitive build. Article VI provides that the responsible administration of the state party has a duty to certify any masters, officers or ratings who meet the requirements for service, age, medical fitness, training, qualification and examinations in accordance with the appropriate provisions as set out in the annex to the convention. The certificate issued should be prescribed as in Regulation I/2 of the annex.

The 1978 Convention establishes general provisions in relation to the masterdeck department, engine department, and radio department, along with special requirements for tankers and for proficiency levels in survival craft. STCW 1978 has undergone several amendments since it was first adopted:

- *The 1991 amendments.* These introduce additional requirements made necessary by the implementation of the Global Maritime Distress and Safety System (GMDSS). The phasing-in period is from 1 February 1992 to 1 February 1999.
- *The 1994 amendments.* Chapter V, which deals with special training for crews on tankers, is amended in the 1994 amendment.
- *The 1995 amendments.* STCW 1995 is an attempt to revise the convention, particularly with the adoption of a new STCW Code which provides technical regulations relating to the convention. STCW 1995 attempts to ensure that uniform standards are applied as far as practicable. Contracting states are required to deposit with the IMO detailed information concerning administrative measures taken to ensure compliance with the convention. This step ensures that the government concerned will need to establish national administrative, training and certification resources necessary to implement the convention - this was not a requirement in the 1978 Convention.

Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) 1989

The Basel Convention is a global instrument intended to minimise and control international trade in transboundary waste, where the term 'waste' is understood to be 'substances or objects which are disposed of, or are intended to be disposed of, or are required to be disposed of, by the provisions of national law' (Article 2[1]). Hazardous wastes are those that belong to the categories listed in Annex I to the convention, or those that are considered as hazardous by the domestic legislation of the party of either export, import or transit (Article 1[1]). The convention places a shared responsibility on exporting and importing states for environmentally sound management and disposal of such wastes. The term 'environmentally sound management' is defined to mean 'taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes' (Article 2[8]).

Article 4 of the Basel Convention outlines the general obligations of contracting parties. It provides, *inter alia*, that parties must not export wastes to another party which has declared a prohibition on the import of such waste; they must keep the generation of hazardous and other wastes to a minimum and ensure that they have adequate disposal facilities to cater for their wastes; and they must provide information (in accordance with Annex V of the convention) to the states concerned of the effects of any proposed movement on human health and the environment. Parties are also prohibited from exporting wastes to a non-party (Article 4[5]). Where waste is to be transported, the waste must be packaged and labelled in accordance with generally accepted and recognised international standards, must be accompanied by a movement document (Article 4[7]), and written notification from the export state must be given to the designated authority of the import state and any transit states in accordance with Annex V A of the convention (Article 6[1 and 4]). The importing state and transit states must also give written permission before the movement can occur (Article 6[2 and 4]). However, transit states may waive their right to require their written permission (Articles 6[4] and 13).

The three occasions on which the transboundary movement of wastes is allowed are when:

- the state of export does not have the technical capacity and the necessary facilities, capacity or suitable disposal sites in order to dispose of the wastes in question in an environmentally sound and efficient manner; or
- the wastes in question are required as a raw material for recycling or recovery industries in the state of import; or
- the transboundary movement in question is in accordance with other criteria to be decided by the parties, provided that those criteria do not differ from the objectives of this convention (Article 9[a-c]).

Parties to the Basel Convention hold that the 'illegal traffic in hazardous wastes or other wastes is criminal' (Articles 4[3] and 9). The Parties are also required to cooperate 'in order to improve and achieve environmentally sound management of hazardous wastes and other wastes' (Article 10).

International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC) 1990

The purpose of the OPRC Convention was to establish a global framework for international cooperation in response to pollution of marine areas by oil. State parties are required to establish measures at either the national level or international level for dealing with oil pollution incidents. Ships must carry an oil pollution emergency plan in accordance with IMO guidelines. Offshore installations must also have an oil pollution emergency plan, which must be coordinated with national systems for responding promptly and effectively to incidents of oil pollution.

In the event of an oil spill from a ship, the vessel concerned must report the incident to the relevant coastal authorities and response action must be taken in accordance with the provisions of the OPRC Convention. State parties are to provide for stockpiles of oil-spill-combating equipment, and are to exercise their ability to respond to an oil spill. States are also to develop detailed plans for responding to oil pollution incidents. Parties are required to assist other parties in

their response to an oil pollution emergency, and the convention provides a mechanism for reimbursement of any costs incurred. The OPRC Convention recognises an important coordinating role for the IMO.

International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties 1969 (Intervention Convention) and Protocol Relating to Marine Pollution other than Oil 1973

The purpose of this convention is to provide powers to intervene on the high seas in respect of marine casualties resulting in or likely to result in major environmental damage, except for warships.

The Intervention Convention, along with the CLC Convention 1969 and Fund Convention 1971, came into being largely in response to increased concern over oil pollution damage that resulted from the grounding of the 118,000 ton, Liberian-registered oil tanker *Torrey Canyon* in international waters near England on 18 March 1967.[1] The Intervention Convention provides for states parties to 'take such measures on the high seas as may be necessary to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interests from pollution or threat of pollution of the sea by oil, following upon a maritime casualty or acts related to such casualty, which may reasonably be expected to result in major harmful consequences' (Article I). A state may intervene in the event of a collision of ships, a stranding, or any other navigational incident which results in material damage or the imminent threat of such damage to a ship or its cargo (Article II). Thus, states are empowered to take action to prevent pollution damage to their interests against ships for which they are not the flag state while the ships are outside the jurisdiction of the coastal state on the high seas. Except in the case of extreme urgency, states are required to notify the shipowner and other states that might be affected by any proposed action, and to establish liaison with the IMCO (IMO)[2] and other experts before taking action (Article III). If a state takes action that exceeds that which was necessary, compensation may have to be paid (Article VI). Disputes over the justification for actions taken by a state and questions of compensation

1 Michael W.D. White, *Marine Pollution Laws of the Australasian Region* (Federation Press, Leichhardt, 1994), pp.58-9.

are to be resolved through conciliation or arbitration (Article VIII and Annex A).

In 1973, a protocol to the Intervention Convention extended most of the provisions of the convention to cover substances other than oil (Article II). Article 1 provides that, for the purposes of the protocol, 'substances other than oil' shall be those substances listed in an annex to the protocol and 'those other substances which are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea'. In the event that a party wishes to take action with regard to substances that are not listed in the annex to the protocol, the state concerned must prove that 'under the circumstances present at the time of the intervention' the substances concerned 'could reasonably pose a grave and imminent danger analogous to that posed by any of the substances enumerated in the list' (Article I[3]).

Convention on Maritime Search and Rescue (SAR) 1979

The 1979 SAR Convention encourages cooperation between states parties and search and rescue (SAR) organisations around the world with regard to search and rescue operations at sea. Search and rescue regions are established by the concerned parties. The convention obliges state parties to provide adequate SAR services for persons in distress around their coasts. States are required to forward to the IMO relevant information relating to SAR administration in their respective countries. Such information should include details about the national maritime SAR services; the location of rescue coordination centres, along with their telephone/fax numbers and areas of responsibility; and the principal available rescue units at their disposal. The IMO then forwards this information to other member states.

Within the structure of an amendment to the Safety of Life at Sea Convention or SOLAS (The 1988 [GMDSS] Amendments), the International Maritime Organisation has provided for the staged introduction between 1993 and 1999 of the Global Maritime Distress and Safety System (GMDSS). The purpose of the system is to alert search and rescue authorities ashore rapidly in the event of an

2 IMCO (the Intergovernmental Maritime Consultative Organisation) was renamed the International Maritime Organisation in 1982.

emergency. The GMDSS will rely mainly on satellite communications provided by the International Maritime Satellite Organisation (INMARSAT), but will also use terrestrial radio. Apart from distress communications, the GMDSS will also allow dissemination of general maritime safety information such as navigational and weather warnings.

CHAPTER 11

THE HUMAN FACTOR IN SHIPPING CASUALTIES: SCOPE FOR REGIONAL COOPERATION IN THE TRAINING AND EDUCATION OF SEAFARERS

Ronnie Tay

Shipping safety has always been a principal concern among seafarers. This is all the more so in today's increasingly interdependent regional and global economy, where the world's waterways are used to support seaborne commerce. Any accidents involving ships at sea, such as collisions and grounding, would not only disrupt the movement of sea trade, but also threaten lives, property and the environment. Examples of such accidents occurring in the Singapore and Malacca straits include the grounding of the supertanker *Showa Maru* near Pulau Bukom in Singapore in 1975, which spilt 2,300 tonnes of crude oil, and the collision between two supertankers, *Asian Energy* and *Century Dawn*, in 1988.

It has been widely stated that a large number of maritime accidents (some 80 per cent) are caused by human error. Investigations into accidents involving Singapore-registered ships indicate that more than 90 per cent of the accidents are due to human error. Human errors which have led to accidents at sea are various, and include the failure to take appropriate action to avoid collision, negligence in navigation, and the ineffective use of navigational aids. Human error was cited as a probable cause of the collision between the supertankers *Orapin Global* and *Evoikos* in the Singapore Strait, that resulted in Singapore's biggest-ever oil spill of 25,000 tonnes. At least one of the vessels was reported to have been travelling in the wrong lane of the traffic separation scheme.

To help minimise the occurrences or mitigate against the effects of human error, innovative systems of management and modern technology have been put in place or are being considered. For

example, the Maritime Port Authority (MPA) of Singapore operates a Vessel Traffic Information System (VTIS) to assist in the safe and efficient movement of vessels. The VTIS uses a sophisticated radar network to provide comprehensive marine traffic surveillance of the Strait of Singapore and port waters. On numerous occasions, the information provided by the VTIS has prevented accidents from occurring.

The MPA has also embarked on the development of electronic navigational charts (ENCs) in 1996. It aims to promote the use of ENCs in conjunction with the Electronic Chart Display and Information System (ECDIS), which is a primary shipbridge navigation system that could be linked to a ship's radar, in which all other vessels in the vicinity of the ship can be displayed. The system also has inbuilt safety functions that warn the ship's officers when a vessel is heading for a collision or grounding.

The littoral states bordering the Malacca and Singapore straits, namely Indonesia, Malaysia and Singapore, have also cooperated in projects designed to enhance navigational safety. These include hydrographic surveying, common data charts, tidal and current studies, as well as the establishment of traffic-routeing systems through various portions of the straits.

Management systems and modern technology are useful aids in improving the safety of shipping. However, the proper training and education of seafarers is probably the most fundamental and significant factor in shipping safety. By ensuring that personnel on our ships are able to carry out their duties knowledgeably, competently and carefully, we can be more confident that accidents at sea are less likely to occur.

The Training and Education of Seafarers

Having discussed the importance of the human factor in shipping casualties, I would now like to highlight some of the features of the training of seafarers in Singapore, mention some of the efforts undertaken by the international maritime community to foster high standards of safety in the operation and management of ships, and then discuss some ways in which the training and education of seafarers provide opportunities for regional cooperation.

Singapore

In Singapore, training of ship-based personnel in the maritime industry is undertaken by two agencies. One of these is the National Maritime Academy (NMA), which is the training arm of the Maritime and Port Authority of Singapore. The NMA is responsible for providing training for members of the mercantile marine. One of the principal courses conducted by the NMA is the Diploma in Maritime Studies (Marine Power Plant) that trains marine engineers; it is a three-year course comprising two years of academic studies at the academy with one year of on-the-job training at sea. The NMA also conducts a wide range of other courses, such as tanker safety, survival and fire-fighting. The teaching staff of the academy are experienced ex-seagoing officers holding various classes of certificates of competency appropriate to their ranks. The NMA has modern training equipment and facilities which are continually upgraded to meet international standards.

Besides the NMA, the Singapore Polytechnic's Department of Maritime Technology and Transportation (MTT) also provides training for ship-based personnel. While the NMA specialises in short safety and engineer/deck officer preparatory courses, the MTT conducts diploma and advanced diploma courses for seafarers - such as those in marine engineering, maritime transportation and nautical studies, as well as short courses - such as navigation control and the ship's captain medical certificate.

Within the Republic of Singapore Navy (RSN), the training of officers is rigorous and takes place in a few stages. Upon joining the service, the midshipmen undergo three stages of training over a total period of 10 months: Basic Naval Term, Midshipman Sea Training Deployment and Advanced Naval Term. The Basic Naval Term serves to give midshipmen a basic knowledge of navigation and seamanship. The midshipmen then put to sea for the six-week Midshipman Sea Training Deployment, where they practise the skills they have acquired in the Basic Naval Term. During the Advanced Naval Term, the midshipmen are taught more advanced navigational skills such as pilotage, fire-fighting and damage control.

Following the midshipman course, the officers join the fleet to undergo further training on board RSN ships. The officers-under-

training, or 'OUTs' as they are called, spend about a year working towards attaining their Certificate of Competence and Bridge Watchkeeping Certificate, which permits them to keep watch at sea. Once they have achieved these qualifications, they proceed for further specialised training in navigation and communications in the three-month Naval Junior Officers' Course. After graduating from this course, the officers are appointed navigating officers, from which they progress to other shipboard appointments and ultimately, for some, become commanding officers of ships.

Initiatives of the International Maritime Organisation (IMO)

The International Maritime Organisation has been at the forefront of efforts to improve the safety of shipping. In this respect, it recently adopted two key measures. The first is the development of the International Safety Management (ISM) Code, and the other the revised Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Convention.

The ISM Code, which was added to the Safety of Life at Sea (SOLAS) Convention in May 1994, will become mandatory from 1 July 1998. The code requires shipping companies to establish a safety management system to ensure that all mandatory regulations are complied with and that the codes, guidelines and standards recommended by the IMO and other regulatory bodies are taken into account. It also requires companies to prepare plans and instructions for key shipboard operations, to make preparations for dealing with possible emergencies, and to see to it that regular inspections are carried out. Singapore is committed to the implementation and enforcement of the ISM Code by the respective scheduled deadlines. To this end, the MPA, in conjunction with the IMO, has conducted a seminar for countries in the region. It has also organised a workshop on the requirements of the ISM Code for the shipping community in Singapore.

The second initiative, the revision of the STCW Convention, deals with officer and crew standards. The revised STCW Convention, which entered into force on 1 February 1997, is intended to raise the quality of the seafarers as well as improve their efficiency and enhance their safety. Parties to the convention are required to submit to the

IMO details of their administrative, educational and certification procedures for consideration by the Maritime Safety Committee, IMO's senior technical body. Those who pass this scrutiny will be able to prove that the seafarers who hold their certificates meet international standards.

One of the requirements of the revised STCW Convention is the need for all administration and training institutes to have in place a quality system that is periodically audited. The two maritime training bodies in Singapore, the Singapore Polytechnic and the National Maritime Academy, have already obtained ISO 9002-1994 certification for the various maritime courses that they conduct. In addition, the syllabuses of the maritime courses conducted by the two local maritime training bodies fully meet the provisions of the revised STCW Convention. In the National Maritime Academy, emphasis is placed on ensuring that course syllabuses, and especially for safety courses, are continuously reviewed and upgraded to ensure the relevance of training.

Scope for Regional Cooperation

The effective training and education of seafarers contributes to shipping safety. In addition to the unilateral efforts of maritime training institutions in each country to enhance the quality of their respective training programmes, there is also scope in this area for regional cooperation. Maritime organisations could consider sharing resources or ideas to improve their training programmes, or even to develop new joint courses. Some possible areas for regional cooperation in the training of seafarers are as follows:

- *Sharing of ideas on training methods.* Institutions could come together and share ideas on training methods, and therefore improve the quality of their respective courses. This could be done through cooperative relationships between specific institutions, or in a larger forum. One initiative in this direction is the establishment of the Association of Maritime Education and Training Institutions in the Asia-Pacific (AMETIAP), which held its inaugural meeting in Hong Kong last year. AMETIAP aims to promote, develop and support, in the spirit of cooperation, the common interests of its member-

institutions in all matters concerning the development and quality of maritime education.

- *Sharing of training facilities.* Organisations could also enhance the training they provide through the cooperative use of one another's training facilities, thereby contributing to the optimisation of the resources invested in them. These facilities could be machine workshops, electronic laboratories, fire-fighting training smokehouses or seamanship training rigs. The Republic of Singapore Navy makes use of a facility available in one of the local maritime training institutes. It regularly sends its officers-under-training to the Singapore Port Institute to train in its full-mission shiphandling simulator, which provides valuable and realistic training for officers working towards their bridge-watchkeeping certificates.

- *Subscription in courses.* Countries could also encourage their seafarers to attend courses conducted by institutions in other countries. These seafarers would not only benefit from the training gained, they would also broaden their perspectives by undergoing training in a different environment and culture. Training institutes could facilitate information flow and encourage cooperation by publishing a directory of training courses, which would describe their schedules and curricula. The armed forces of the world are most active in sending their personnel to one another's courses. For example, our naval officers have the opportunity to attend foreign military courses at various levels, and we also have foreign participation in our own courses. One of these courses is Singapore's Naval Junior Officers' Course, which was mentioned earlier. Since 1995 naval officers from countries such as Malaysia, Brunei, Sweden and the United Kingdom have taken part in the course, which is conducted twice a year. Apart from learning the job of the navigating officer, the junior officers also get to know one another well and develop lasting ties of friendship and understanding with one another.

- *Attachments of instructors.* Instructors could share their knowledge and expertise with their foreign counterparts through attachments to overseas training institutions. At the

same time, they would benefit from the experience gained through their interactions with colleagues from other countries. These attachments could be in the form of short week-long visits, or longer term attachments where the attached instructors undertake the teaching of some of the course modules.

- *Joint conduct of courses and certification.* Training institutions could also consider the joint conduct of courses. For example, part of one course could be conducted in an institution in one country, and the remainder in another organisation in a second country. This would allow the training institutions to pool and economise their resources, and to capitalise on their strengths in certain areas of training. Currently, some training institutions in Singapore and India jointly conduct a diploma course in marine engineering. Under this 'twinning' arrangement, the trainees spend a year in India doing academic studies, followed by a year of training at sea before completing the remaining year of academic studies in Singapore. The candidates will then sit for the Certificate of Competency examinations in Singapore after they have acquired the necessary sea service.

Conclusion

The human factor is a critical one in the safeguarding of our seas. Because human error is a major cause of accidents at sea, the training and education of seafarers and hence the maritime training institutions themselves play a major role in ensuring the safety of shipping. The recent measures adopted by the IMO, namely the ISM Code and revised STCW Convention, are also a key to maintaining high standards of safety and effectiveness in the shipping community. The training institutions in different countries could also improve the quality of their training programmes through enhanced cooperation with one another, and thus the training and education of seafarers is an area that provides considerable scope for regional cooperation.

CHAPTER 12

REPORT OF THE FOURTH MEETING OF THE CSCAP MARITIME COOPERATION WORKING GROUP

Sam Bateman

The fouth meeting of the CSCAP Maritime Cooperation Working Group was held at the Japan Institute of International Affairs in Tokyo on 19 November 1997. 21 participants from 13 member CSCAPs attended this meeting, as well as one participant from Taiwan and several observers from overseas missions and other institutions in Tokyo. The meeting was co-chaired by Commodore Sam Bateman from CSCAP Australia and Colonel Johanes Sarsito from CSCAP Indonesia (on behalf of Rear Admiral Sunardi).

The objectives of the meeting were to:

- review progress with working group initiatives;
- identify possible issues with shipping and seaborne trade which offer potential for security cooperation and dialogue; and
- discuss comprehensive security concerns which arise from the growth in regional shipping traffic and the increased vulnerability of regional countries to any disruption of shipping.

Working Group Initiatives

The co-chairs advised the meeting that the CSCAP co-chairs had approved the publication of CSCAP Memorandum No.4, which includes the *Guidelines on Regional Maritime Cooperation*, provided that no CSCAP member committees were opposed to this action.[1] Advice

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1 There are currently fifteen CSCAP member committees: CSCAP Australia, CSCAP China, CSCAP Indonesia, CSCAP Japan, CSCAP DPR Korea, CSCAP Korea, CSCAP Malaysia, CSCAP Mongolia, CSCAP New Zealand, CSCAP Philippines, CSCAP Russia, CSCAP Singapore, CSCAP Thailand, US CSCAP, and CSCAP

from the representative of CSCAP China during the meeting was that CSCAP China could only agree to the document being published if a note was included to the effect that not all CSCAP member committees supported all of the guidelines. This note was subsequently included and the memorandum was published in time for distribution at the CSCAP Steering Committee meeting held in Tokyo in December 1997.

There has been no success so far with obtaining funding for the annual Asia Pacific Workshops on Regional Maritime Cooperation. The concept of these workshops was endorsed by the CSCAP Steering Committee in June 1996. They would be a very useful means of promoting awareness and coordination of maritime issues in the region and it is a great pity that funding has not yet been forthcoming. Efforts to find sponsorship will continue.

Shipping and Regional Security

This meeting was the first time that the Working Group has looked in detail at regional security concerns with shipping and seaborne trade and the potential for security cooperation and dialogue. The importance of these issues arises from economic and geostrategic factors. Except for high-value cargoes carried by air, all intraregional trade goes by sea, and many regional nations lack self-sufficiency in energy, foodstuffs, and critical raw materials. Security concerns include the vulnerability of shipping to disruption, the consequences of maritime territorial disputes, and the threats of piracy, oil spillage and marine pollution.

A particular feature of the growth in regional seaborne trade has been the increased carriage of hazardous or dangerous cargoes. Rapid economic and industrial growth drives an increasing demand for energy and complex materials (including hazardous chemicals) which can only be shipped by sea. As economic growth continues, the carriage of these cargoes will increase, with a consequent higher risk of damage or pollution as a result of collision, explosion, fire, grounding or other accident involving ships carrying dangerous cargoes. The

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Vietnam; and two associate member committees: European CSCAP and CSCAP India. For further information regarding CSCAP, see the AUSCSCAP Home Page at <http://coombs.anu.edu.au/Depts/RSPAS/AUSCSCAP/Auscscap.html>.

human factor has been identified as a major factor in shipping casualties.

The first group of papers at the meeting considered security aspects of shipping and seaborne trade from global, regional and national perspectives, and in the particular context of the South China Sea. The meeting was also briefed on outcomes from the Eleventh International Conference on SLOC Studies which had been held in Tokyo on the two days prior to the CSCAP meeting. The SLOC meeting had done much to promote mutual understanding of sea-lanes issues, including the scope for regional cooperation. The next international SLOC meeting will be held in Seoul in April 1999, with the following meeting in Australia towards the end of the year 2000.

Some discussion focused on the relative size of national flag shipping fleets, the growth of particular fleets, and the different perspectives that are gained depending on whether total tonnage or number of ships are used as the measure of fleet size. It was thought that, from a security perspective, the number of ships above a certain tonnage under the national flag was more significant than total tonnage as an indicator of the 'national stake' or 'national interest' in shipping.

The paper by US CSCAP described the extent of US interest in security aspects of regional shipping and seaborne trade. The first factor was the tremendous growth in the relative importance of US trade in the Asia-Pacific region compared with that with Europe. The former was now twice as great as the latter. A second factor was the possible secondary effects on the US economy of any disruption to Asian economies, while a third factor was the current status of SLOC protection operations in US naval strategy. While US naval strategy was now orientated towards littoral operations and open-ocean sea command was assumed, SLOC protection in coastal and sub-oceanic waters, in East Asian seas for example, was an integral part of littoral operations in the region. Naval cooperation would be the essential means of providing that protection.

Strategic Cargoes

The second group of papers covered concerns of regional countries with particular cargoes carried by sea. CSCAPs China and

India presented their perspective of energy issues and the increasing carriage of oil and gas by sea, while CSCAP ROK gave a paper on 'Critical Import Dependencies in Northeast Asia'. Patterns of seaborne trade are changing rapidly with, for example, the rapid growth of trade in liquefied natural gas (LNG) and liquefied petroleum gas (LPG) and the possible advent of gas pipelines. It is a complex area which requires new approaches and cannot rely on the conventional wisdoms of the security significance of shipping and seaborne trade.

China and India may both be described as energy-deficient countries. Growing energy dependence is a fact of life for both countries and underpins their fundamental interest in energy imports and the importance of investment in shipping and ports. It was clear from the Chinese and Indian papers that both countries attach great importance to the security of shipping and the safety of navigation, and are prepared to cooperate to maintain stability at sea in the region. For these reasons, China, in particular, had acceded to most international conventions dealing with the safety of shipping.

The issue of trans-Asia pipelines was raised in discussion, including consideration of their potential effect on regional security. However, the meeting was of the opinion that, even if these pipelines were built, they would have little impact on the fundamental dependence of the region on the carriage of oil and gas by sea. Liquified natural gas and liquified petroleum gas were highly volatile cargoes, but the safety record with gas carriers was high and crews were highly trained.

Environmental and Navigational Safety Issues

The papers at the meeting dealing with environmental and navigational safety issues were important aspects of the meeting. The paper by CSCAP Australia focused on issues associated with the impact of maritime transportation on the marine environment (such as operational and accidental pollution, ballast water and marine pests, the dumping of waste at sea, and marine debris) and the opportunities that exist for regional cooperation and dialogue to reduce that impact. It highlighted in particular the 'gaps' that are apparent in the ability (or preparedness) of the region to deal with some of these issues, including the level of regional participation in major International

Maritime Organisation (IMO) conventions. The paper by CSCAP Singapore went on to consider the human factor in shipping casualties and the scope for regional cooperation in the training and education of seafarers.

The paper by CSCAP Canada addressed shipping and navigational issues in the South China Sea. In view of the density of shipping traffic in the area, the incidence of marine hazards (including natural hazards and the large numbers of poorly lit fishing vessels), and the poor quality of hydrographic surveys in some areas, navigational safety was an important consideration in the South China Sea Workshop process. A particular problem arose because hydrographic data came from different sources without a common set of data. However, it is difficult to resolve these issues because hydrographic data is sensitive and related to both national security and the determination of maritime claims.

The fact that search and rescue (SAR) is primarily a responsibility of regional military forces made SAR cooperation in the South China Sea a problematic issue. Training and education, including cooperative activities, were important issues. The training of the Vietnamese Coastguard by Canada could be cited as a good example of technical cooperation and capacity building, involving assistance from a developed country.

The paper from CSCAP Indonesia made a case study of the Malacca Strait from the perspective of an archipelagic state with a need to maintain navigational safety in an enclosed sea environment. Oceanological and ecological conditions in the strait included numerous sensitive coastal and marine areas and the relatively low ability of its waters to absorb pollutants. The efforts to maintain the safety of navigation had to be integrated with pollution prevention and control. The paper concluded that the Strait of Malacca met the definition in MARPOL 73/78 of a 'special area'. Recognition of this status would assist in achieving the high level of international cooperation required to maintain the safety of navigation and the protection of the marine environment of the strait. Some discussion then focused on whether this recognition would lead to mandatory obligations by user states and the conceptual issue of the Malacca Strait being both a strait used for international navigation and an enclosed or semi-enclosed sea.

A paper from CSCAP New Zealand considered the transport of radioactive wastes from Europe to Japan through the Asia-Pacific region. It raised concerns about the safety of waste shipments, freedom of navigation, non-notification of shipments, and liability. It concluded with a recommendation that the Maritime Cooperation Working Group should develop a short paper building on previous statements on the issue that have come out of the ASEAN Regional Forum.

This paper led into discussion of the very important issue of the impact of shipping operations on the marine environment and the prospect of tighter controls over shipping for reasons of environmental protection. While shipping is the 'major engine' of trade, it is also a major source of pollution. Further restrictions on shipping would present serious problems for the maritime states, and the meeting noted that it was important to sustain the balance of interests reflected in the 1982 UN Convention on the Law of the Sea (UNCLOS). In its consideration of these issues, the meeting had before it the paper on the 'Freedom of Navigation' in the Sea Lanes of Pacific Asia prepared for the ARF Track II Working Group meeting on Preventive Diplomacy held in Singapore in September 1997.[2] That paper had recommended a regional declaration on freedoms of navigation.

The Way Ahead

The meeting was extremely productive in terms of identifying security issues with shipping and seaborne trade which offer potential for cooperation and dialogue, and could usefully be pursued by the working group. The topics considered for further study during the last session of the Tokyo meeting were as follows:

- A study of the security implications for the Asia-Pacific region of the multinational nature of the modern international shipping industry. Several nations may be interested in a particular ship through its registration, ownership, insurance, ownership of cargo or nationality of crew. Some regional

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2 Ramses Amer and Leonard Sebastian, 'Freedom of Navigation' in the Sea Lanes of Pacific Asia, paper prepared for the ARF Track II Working Group on Preventive Diplomacy hosted by the International Institute for Strategic Studies (United Kingdom) and the Institute of Defence and Strategic Studies (Singapore), Singapore, 9-11 September 1997.

countries also have extensive shipowning interests, while others are major providers of crews to international shipping. These issues could be security strengths or weaknesses, as well as catalysts for cooperation, but the developments were relatively recent and their implications not well established.

- A paper on the carriage of radioactive wastes along the lines proposed by CSCAP New Zealand. However, the meeting thought that this would be best undertaken as part of a wider consideration of the broader issue of the increasing carriage of hazardous and dangerous cargoes in the region. To achieve a balance of interests, CSCAP Korea and/or CSCAP Japan should be involved in the development of this paper.

- An investigation of the level of compliance in the region with key international conventions and security issues. With a comprehensive view of security, it is necessary to understand reasons for the relatively low level of accession in the region to important international conventions. The IMO might have an international perspective of these issues and there was a possibility that regional discussions could reveal different considerations. This work could be progressed through a group of interested CSCAP member committees with the cooperation of all CSCAP member committees reporting on their national position with regard to reasons for non-accession. Some work in this regard has already been undertaken by SEAPOL, but the working group may be able to build on that work by virtue of its wider membership. Nevertheless, it was undesirable to pin-point certain countries and the review should be kept as general as possible. It could be a key element in developing a comprehensive maritime safety and security regime in the region.

- A study of regional interpretations of navigational rights and freedoms as established under UNCLOS and customary international law. While this had been the subject of the ARF Track II paper distributed at the meeting, the need for such a study had also been highlighted by the CSCAP Indonesia paper on the Malacca Strait.

- A workshop on the training of seafarers, given the extensive interest in the Asia-Pacific region in this particular topic. However, in view of work underway in other forums, including the South China Sea Workshop process, it was decided not to pursue work in this area for the time being.

- The exploration of ideas with regard to the development of a comprehensive regional maritime safety regime applying particularly in the enclosed and semi-enclosed seas, where both the density of shipping traffic and the risks of marine pollution are high. This could include the development of procedures to monitor operational ship pollution (as distinct from accidental pollution arising from collisions, groundings, or other accidents causing oil spills).

Much of the subsequent discussion of this possible further work concerned the relationship between freedoms of navigation and environmental protection. Some delegates were concerned about the sensitivities of revisiting the UNCLOS provisions, which reflected a delicate balance between the maritime powers and coastal states. However, the meeting was also mindful that, on the one hand, shipping was essential to the regional economy but on the other, shipping was a major source of pollution. Regional cooperation and coordination were essential to manage the issue, and disagreement was apparent in the region on a number of issues related to the interpretation of navigational regimes under UNCLOS. Thus there was scope to develop some thinking without going as far as a declaration on navigational rights suggested by the ARF Track II paper.

In the light of this discussion, the following topics were selected as priority ones for consideration by the working group (the involvement of the CSCAP member committees indicated is subject to confirmation of preparedness to be involved):

1. 'Freedom of Navigation Issues' - to identify areas of regional disagreement and scope for further action. To be led by European CSCAP with involvement of CSCAP Indonesia and CSCAP Malaysia.

2. 'A Survey of International Instruments Related to the Safety of Shipping and the Protection of the Marine Environment to Determine Reasons for Non-Ratification in Asia Pacific'. To be

led by CSCAP New Zealand with CSCAP Japan (CSCAP Thailand also to be invited to participate).

3. 'A Study of the Implications of Shipment of Hazardous and Dangerous Cargoes (including radio-active wastes)'. To be led by CSCAP New Zealand with the involvement of CSCAP Japan, CSCAP Korea and European CSCAP.

4. 'A Report on the Scope for Cooperation to Monitor Operational Pollution from Ships'. To be led by CSCAP India with the support of CSCAP Singapore and CSCAP China.

Concluding Comments

The fourth meeting of the CSCAP Maritime Cooperation Working Group was very productive. The excellent papers at the meeting stimulated discussion on a wide range of critical issues to do with regional shipping and seaborne trade which have security implications and offer potential for security cooperation and dialogue. Numerous comprehensive security concerns arise from the growth in regional shipping traffic, the nature of the cargoes carried, environmental and safety concerns, and the vulnerability of regional countries to any disruption of shipping.

A track-two forum, such as the CSCAP Maritime Cooperation Working Group, incorporating the full scope of relevant skills and interests from different countries, is well placed to study the potentially contentious maritime issues, including with shipping and seaborne trade, that could have some impact on regional security. In many ways the group is a unique forum because of the diverse skills and interests represented at each of its meetings. The advantages of such a group have been shown by its successful development of the *Guidelines for Regional Maritime Cooperation*, which are now helpful in providing a charter for further work by the group.

The first 1998 meeting (fifth meeting) of the working group will return to the theme of the management of regional seas and associated issues of security cooperation. It will be held in Kuala Lumpur in mid-November 1998. To maintain the momentum on shipping and seaborne trade issues established at the fourth meeting, these issues will also be included, as appropriate, in the fifth meeting.

The working group much appreciated the support of the Japan Institute of International Affairs (JIIA) in holding the meeting. The JIIA made all arrangements for the meeting in Tokyo, including accommodation, and provided the venue and administrative support during the meeting, as well as hosting participants to lunch.

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The first group of chapters in the monograph looks at the security aspects of shipping and seaborne trade from global, regional and national perspectives, and in the particular context of the South China Sea. Subsequent chapters examine the concerns of regional countries with the carriage by sea of strategic cargoes such as oil, gas and other raw materials essential for their economic well-being. Other chapters focus more on specific environmental and navigational safety issues arising from the transport by sea of hazardous or dangerous cargoes, particularly in confined areas such as the Malacca and Singapore straits. There is general agreement by the different contributors that because these concerns are shared by most regional countries, they provide considerable scope for security cooperation and dialogue.