

**Occupational Mortality Among Merchant Seafarers
in the British, Singapore and Hong Kong Fleets
(1981-1995)**

by

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Biography

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Contents	Page
Abstract	5
Introduction	6
Inclusion Criteria	7
Methods	8
A Comparison of Mortality Patterns:	
i An Over-View	10
ii Maritime Disasters and War Casualties	16
iii Occupational Accidents	20
iv Off-duty Accidents and Drownings	25
v Mortality Through Other Causes	28
vi Mortality According to Type of Ship, Rank and Nationality	33
A Comparison of Mortality Rates	40
Discussion	45
References	48

Abstract

While epidemiological studies of occupational mortality among merchant seafarers have been relatively few, Asian crew have been the subject of negligible research. This study was designed as the first reliable study of mortality among Asian seafarers serving in Singapore and Hong Kong-registered merchant ships, in comparison with the British fleet.

The manner and causes of lives lost among seafarers in the three fleets, during the fifteen year-period between 1981 and 1995, were identified from files at the Registrar for Shipping and Seamen, the Marine Accident Investigation Branch, and many Coroners in England and Wales. Notwithstanding some evidence of under-reporting of fatalities in Singapore and Hong Kong vessels, mortality rates for work-related accidents were significantly higher in these two fleets than in British merchant vessels.

Occupational mortality in the British fleet was more often related to lifestyle factors, evident in the circumstances surrounding many of the deaths due to off-duty accidents and drowning, and illnesses including gastro-intestinal disorders. Among the predominantly Asian seafarers in the Singapore and Hong Kong fleets, by contrast, mortality rates were significantly higher for homicides and unexplained disappearances at sea, as well as occupational accidents and maritime disasters.

Introduction

Epidemiological studies of occupational mortality among merchant seafarers have been relatively few. Furthermore those studies conducted have mainly concerned seafarers from, or the merchant fleets of, European countries such as Sweden, Denmark, Britain, Germany, Iceland, Italy, Norway and Poland.¹

Seafarers from Western Europe, in which these studies have predominantly been undertaken, currently constitute a minority of the world's seafaring work-force. According to estimates from a recent study of the supply and demand of seafarers, Western European countries supplied less than fifteen per cent of the 1.2 million crew manning the world's merchant ships in 1995 (BIMCO-ISF, 1995). By contrast, the majority of seafarers world-wide, who are presently recruited from Asian states such as the Philippines, Indonesia, India, China and Myanmar, have been the subject of negligible epidemiological research.²

Moreover most of these Asian seafarers are not employed in their own national fleets but are scattered around the fleets of the major flags of convenience (FOCs), second registers and numerous other national fleets. It would seem clear that this does not represent an ideal framework from which to conduct a representative epidemiological investigation of mortality among active seafarers. Nonetheless, of the flag states employing Asian seafarers on a large-scale, perhaps two of the more reliable in terms of investigating and recording fatalities among their employees relate to Singapore and Hong Kong. Furthermore, since approximately 90% of all deaths occurring in Singapore and Hong vessels in recent years have concerned Asians, studies of these two fleets offer a reliable basis for conducting one of the first large-scale studies of occupational mortality among Asian crew.

The initial aim of this study was to establish the manner and causes of all deaths occurring among seafarers in the merchant fleets of Singapore, Hong Kong and Great Britain between 1981 and 1995.

¹ For example, these include studies of occupational mortality among serving seafarers relating to Sweden (Otterland, 1960; Larsson and Lindquist, 1992), Denmark (Hansen, 1996), Germany (Vrcelj, 1981), Britain (Roberts, 1998b), Iceland (Rafnsson and Gunnarsdottir, 1992) and Poland (Jaremin *et al.*, 1996, Jaremin *et al.*, 1997). Retrospective mortality cohort studies include those relating to Denmark (Hansen and Pedersen, 1996; Brandt *et al.*, 1994), Iceland (Rafnsson and Gunnarsdottir, 1993; Rafnsson and Gunnarsdottir, 1994), Italy (Rapitti *et al.*, 1992) and Norway (Moen, *et al.*, 1994)

² One known Asian study of mortality has recently been conducted for Indian seafarers (Barnes, 1998).

The main aim then was to provide an analysis of the levels and patterns of occupational mortality suffered by the predominantly Asian seafarers employed in the merchant fleets of Singapore and Hong Kong, in comparison with that witnessed among the mainly British seafarers serving in the British merchant fleet. Secondary aims were to assess how particular forms of occupational mortality varied according to factors such as the ranks and nationality of the deceased, and the type of vessel in which they were serving.

Inclusion Criteria

Included in this study were all deaths occurring among seafarers employed in privately-owned British, Singapore or Hong Kong-registered merchant vessels of 100 gross tonnes or more between 1981 and 1995. Also included were merchant seafarers who died while serving in government-owned merchant vessels such as Royal Forces Auxiliary and research ships. Excluded were crew serving on board non-merchant vessels such as fishing trawlers and pleasure craft, as well as those working on board small merchant ships (less than 100 grt). Seafarers who died after being landed ashore, provided that the death occurred within 30 days of being landed ashore and signed off the vessel's articles of agreement, were included.

Non-crew who died aboard merchant ships but were not signed-on the articles of agreement were excluded; these refer to passengers, stowaways, pilots, roughnecks, dock workers, commercial divers, cargo inspectors, oil-rig workers, etc. Merchant seafarers who died within hours of joining a merchant vessel but had not gone through the formalities of signing-on were included. The study period was the fifteen years from 1st January 1981 to 31st December 1995, inclusive.

Methods

The Registrar General for Shipping and Seamen (RGSS) is the official British authority which registers the deaths of British subjects, and foreign seafarers in British-registered ships, which arise at sea. The master of a British-registered vessel is obliged to notify the RGSS of any deaths which occur at sea among the crew who are signed on the ship's articles of agreement. Notification of a death may also come from authorities such as a Department of Transport Marine Office, a HM Coroner, a Procurator Fiscal or, usually where deaths arise in foreign countries or in foreign waters, the British Consulate or Embassy. For the purposes of registering seafarers' deaths, the RGSS has maintained a policy of following-up all cases, while individual files at the RGSS contained all compiled documents relating to each death. It is expected, therefore, that these files would cover virtually all of the deaths which occurred among seafarers in the British merchant fleet.

Under legislation from the Merchant Shipping Act of 1894, the official maritime authorities in Singapore, Hong Kong and other dependent territories have been obliged to notify the RGSS of deaths occurring among seafarers in their merchant fleets. Although, over the years, this legislation has not always been strongly enforced by the British authorities the evidence from this study indicates, for the recent fifteen-year period, that the Singapore and Hong Kong Mercantile Marine Offices (SMMO and HKMMO) have a reasonably reliable record of notifying the RGSS of deaths, providing log book extracts and details of official maritime inquiries conducted.

All files relating to seafarers who died while employed in British, Singapore and Hong Kong-registered merchant vessels between 1981 and 1995 were examined. Mortality files and the data base of the principal British official maritime investigative authority, the Marine Accident Investigative Branch (MAIB) were also inspected. The annual Lloyds Vessels Registers were then consulted to verify that each of the deaths occurred from a merchant vessel of over 100 gross tonnes which was registered in, respectively, a British port, Singapore or Hong Kong at the time of death.

A total of 584 deaths in the British fleet which satisfied the inclusion criteria were identified for the fifteen-year study period. Similarly, a total of 369 deaths were identified for Singapore vessels, and a total of 143 deaths were traced from the files at the RGSS for the smaller Hong Kong fleet. In the case

of Hong Kong the death files at the HKMMO were also reviewed. Although many of the deaths in Hong Kong vessels which had been filed at the RGSS were not apparent at the HKMMO, an additional 21 deaths not filed at the RGSS were identified from the HKMMO. This led to an identified total of 164 deaths, from the RGSS and the HKMMO, among seafarers in the Hong Kong fleet between 1981 and 1995. While it is almost certain that the total figures quoted here for the Singapore and Hong Kong fleets are subject to some under-reporting it would be expected that most of the deaths in these two fleets have been accounted for during the fifteen-year study period.

The study sought to identify the manner and causes of each of the 1,117 deaths identified. The relevant information on the manner and causes of the deaths, together with demographic and employment details of the deceased, was collected primarily from documents held in files at the RGSS and MAIB, and in 21 cases, the HKMMO. For the purposes of establishing the causes of deaths, importantly, the British, Singapore and Hong Kong maritime authorities all had good records of conducting official maritime inquiries and obtaining log book extracts. Reports of post mortem examinations and Coroner's Inquests for seamen who died in the British fleet were provided by many HM Coroners throughout England and Wales, while additional information for some deaths was obtained from Southampton Marine Office and Health and Safety Executive Offices.

A Comparison of Mortality Patterns

i An Over-View

The cause of death for each of the 1,117 seafarers who were identified as having lost their lives while employed in the British, Singapore and Hong Kong merchant fleets is given in Table 1.1. It is clear that a far greater proportion of the deceased who were serving in the British fleet lost their lives through illnesses; 44% of the deceased lost their lives in this manner, compared to 29% in the Singapore fleet and only 22% in the Hong Kong fleet. Occupational accidents, on the other hand, accounted for a greater proportion of the lives lost in the Singapore (20%) and Hong Kong (17%) fleets lost when compared to the British fleet (13%). The same is also true of deaths caused by maritime disasters; the respective figures are 42% (Hong Kong), 18% (Singapore) and 12% (Britain).

Maritime disasters arising through war have been classified under the separate category “war casualties”. Sixteen of the 584 fatalities (3%) in the British fleet between 1981 and 1995 arose through military attack on merchant vessels during the Falklands War in 1982. Thirty-four lives lost in the Singapore fleet (9%) and one life lost in a Hong Kong-registered vessel (1%) resulted from the Iraqi-Iranian war in the mid 1980s.

While greater proportions of the seafarers in the Singapore and Hong Kong fleets died through work-related accidents, seamen in the British fleet lost their lives more frequently through an accident which arose in their off-duty time; 11% of deaths were found to have arisen in this manner, compared to only 5% in the Singapore fleet and 2% in Hong Kong ships. Although roughly equal proportions of deaths among seafarers in the three fleets (around 5% in each case) were determined to have been suicides, seamen serving in Singapore and Hong Kong-registered vessels died more commonly through homicides, while fatalities arising as a direct consequence of drug or alcohol intoxication were most evident among the crew of British vessels.

Table 1.1 Cause of Death Among Merchant Seafarers Who Died in, Respectively, the British, Singapore and Hong Kong Fleets (1981-1995)

Cause of Death	Merchant Fleet:		
	British Number (%)	Singapore Number (%)	Hong Kong Number (%)
Natural Causes:			
All Illnesses	256 (43.8%)	108 (29.3%)	36 (22.0%)
Non-Natural Causes:			
Maritime Disasters	71 (12.2%)	65 (17.6%)	68 (41.5%)
Occupational Accidents	74 (12.7%)	73 (19.7%)	27 (16.5%)
Off-duty Accidents	66 (11.3%)	18 (4.9%)	4 (2.4%)
Homicides	6 (1.0%)	10 (2.7%)	5 (3.0%)
Suicides	27 (4.6%)	15 (4.1%)	8
(4.9%) Drug or Alcohol Intoxication	11 (1.9%)	4 (1.1%)	
War Casualties	16 (2.7%)	34 (9.2%)	1 (0.6%)
Inconclusive Causes:			
Missing at Sea	26 (4.5%)	27 (7.3%)	13 (7.9%)
Found Drowned (dock/river/sea)	26 (4.5%)	7 (1.9%)	
Other	5 (0.9%)	7 (1.9%)	2 (1.2%)
Total	584 (100.0%)	369 (100.0%)	164 (100.0%)

The causes of some deaths, even after the most exhaustive of official investigation, are determined to be inconclusive. These usually refer to crew who disappear without trace from their ships at sea or seafarers who, after being discovered missing, are subsequently found drowned or washed-up in docks, rivers or the sea, while in some cases medical examinations or even autopsies fail to establish a cause of death. A slightly greater proportion of deceased seafarers disappeared at sea in the Hong Kong (8%) and Singapore (7%) fleets than from British merchant ships (5%). However, more deaths in the British fleet were due to inconclusively-determined drownings which often occurred after seafarers had taken shore leave, and had been drinking in public houses, while their vessels were in dock.³

³ In some cases, for example where the deceased is found washed up several weeks or even months after a reported disappearance, due to advanced decomposition, an autopsy or other medical examination is unlikely to determine whether or not the cause of death was drowning. In some cases autopsies recorded that the cause of death was consistent with drowning while in a few other instances, usually due to even longer submersion in the sea, a verdict of "unascertainable" was documented. Hence, it should be noted that category 'inconclusive -found drowned' is defined loosely here since it includes cases where the cause of death was not established together with the confirmed drownings.

The nationalities of the seafarers who died in each of the three fleets are given in Table 1.2. Four hundred and sixty-one of the 584 deceased (79%) in the British fleet were British subjects, while the other 123 seafarers who lost their lives were of 30 different nationalities world-wide. Twenty of the deceased (3%) were from other western European countries, three from Eastern Europe, ten from Africa, six from Australasia and twelve from the Americas. The remaining seventy-five of the deceased (13%) were Asian, most notably from India (twenty-nine), Hong Kong (nineteen), the Philippines and Pakistan (eight each).

The nationalities of the deceased in the Singapore and Hong Kong were also heterogeneously distributed across a wide range of countries; twenty-nine different nationalities for Singapore and fifteen for Hong Kong. However correspondingly fewer of the deceased in the Singapore and Hong Kong fleets were flag state nationals, 20 and 18% respectively, when compared to those who lost their lives in British vessels (79%).

Table 1 .2 Nationality of Deceased Merchant Seafarers Who Died in, Respectively, the British, Singapore and Hong Kong Fleets (1981-1995)

Nationality	Merchant Fleet:		
	British Number (%)	Singapore Number (%)	Hong Kong Number (%)
<u>Western European:</u>			
Austrian	2 (0.3%)		
British	461 (78.9%)	10 (2.7%)	16 (9.8%)
Danish		2 (0.5%)	
German		9 (2.4%)	
Irish	6 (1.0%)		1 (0.6%)
Italian	3 (0.5%)		
Norwegian		2 (0.5%)	
Portuguese	5 (0.9%)	2 (0.5%)	
Spanish	1 (0.2%)		
Swedish		4 (1.1%)	

Table 1.2 Cont'd Nationality of Deceased Merchant Seafarers Who Died in, Respectively, the British, Singapore and Hong Kong Fleets (1981-1995)

Nationality	Merchant Fleet:		
	British Number (%)	Singapore Number (%)	Hong Kong Number (%)
<u>Eastern European:</u>			
Polish	3 (0.5%)	6 (1.6%)	
Turkish		3 (0.8%)	1 (0.6%)
Yugoslav		3 (0.8%)	1 (0.6%)
<u>Asian:</u>			
Bangladeshi	4 (0.7%)	1 (0.3%)	2 (1.2%)
Filipino	8 (1.4%)	79 (21.4%)	16 (9.8%)
HK Chinese	19 (3.3%)	4 (1.1%)	29 (17.7%)
Indian	29 (5.0%)	21 (5.7%)	58 (35.4%)
Indonesian		60 (16.3%)	1 (0.6%)
Japanese		4 (1.1%)	
Korean		25 (6.8%)	1 (0.6%)
Malaysian		10 (2.7%)	
Maldives		1 (0.3%)	
Myanmar		32 (8.6%)	1 (1.2%)
Pakistani	8 (1.4%)	4 (1.1%)	
PRC Chinese		1 (0.3%)	33 (20.1%)
Seychelles	1 (0.2%)		
Singaporean	1 (0.2%)	73 (19.8%)	
Sri Lankan		4 (1.1%)	2 (1.2%)
Thai		1 (0.3%)	
Yemeni	5 (0.9%)		
<u>Australasia:</u>			
Australian	1 (0.2%)		1 (0.6%)
Fijian	2 (0.3%)		
Kiribati	1 (0.2%)	3 (0.8%)	
New Zealander	2 (0.3%)		
Papua New Guinean		1 (0.3%)	
Tuvalu			1 (0.6%)
<u>Africa:</u>			
Cape Verdean	1 (0.2%)		
Ghanaian		1 (0.3%)	
Nigerian	4 (0.7%)		
Sierra Leone	1 (0.2%)		
Somalian	3 (0.5%)		
South African	1 (0.2%)		
Tanzanian		1 (0.3%)	
<u>Americas:</u>			
Barbadian	2 (0.3%)		
Brazilian	2 (0.3%)		
Canadian	2 (0.3%)		
Colombian		1 (0.3%)	
Honduran	1 (0.2%)		
Mexican	1 (0.2%)		
St. Vincentian	2 (0.3%)		
Trinidadian	2 (0.3%)		
Not Known		1 (0.3%)	
Total	584 (100.0%)	369 (100.0%)	170 (100.0%)

Asian seafarers accounted for the large majorities of the deceased in both the Singapore and Hong Kong fleets (87% of all deaths in both fleets). In the case of Singapore the most common nationalities of the deceased were Filipinos (79 lives lost), Singapore (73), Indonesian (60) and Myanmar (32), and for the Hong Kong fleet the main nationalities involved were Indian (58 lives lost), PRC Chinese (33) and HK Chinese (29). It is expected that these would reflect the main supplying nations of seafarers to the respective fleets, at least, during the fifteen year study period 1981 to 1995.

The seafarers who lost their lives in the three different fleets are broadly comparable in terms of their rank (Table 1.3). Nevertheless, and reflecting the relatively large proportion of passenger ferries and cruise ships in the British fleet in recent years, almost one quarter of the deceased (22%) were employed as catering staff or stewards. It is also apparent that a relatively high proportion of the deceased in Singapore registered vessels were nautical officers (15%), compared to 10% and 8% in the Hong Kong and British fleets, respectively. Nonetheless, and as one would expect, large proportions of the deceased were serving as ratings; 46%, 41% and 50% of the lives lost in the British, Singapore and Hong Kong fleets, respectively, concerned deck or engine room-ratings.

Table 1.3 Rank of Deceased Merchant Seafarers Who Died in, Respectively, the British, Singapore and Hong Kong Fleets (1981-1995)

Rank	Merchant Fleet:		
	British Number (%)	Singapore Number (%)	Hong Kong Number (%)
Master	38 (6.5%)	23 (6.2%)	7 (4.3%)
Nautical Officer	47 (8.0%)	55 (14.9%)	16 (9.8%)
Radio Officer	8 (1.4%)	18 (4.9%)	9 (5.5%)
Engineer	68 (11.6%)	70 (19.0%)	20 (12.2%)
Cadet	7 (1.2%)	12 (3.3%)	5 (3.0%)
Deck Rating	196 (33.6%)	104 (28.2%)	53 (32.3%)
Engine Room Rating	72 (12.3%)	48 (13.0%)	27 (16.5%)
Catering /Steward	136 (23.6%)	38 (10.3%)	26 (15.9%)
Other	12 (2.1%)	1 (0.3%)	
Not known			1 (0.6%)
Total	584 (100.0%)	369 (100.0%)	164 (100.0%)

The numbers of deaths occurring in the different types of vessels, for each of the three fleets, are given in Table 1.4. In the British fleet, most deaths occurred in the large British passenger sector (22%), followed by general cargo vessels (16%), tankers (15%), bulk carriers (10%) and the offshore sector (9%).⁴ Relatively large numbers of lives were also lost in the Royal Naval Auxiliary vessels, and also in small coastal vessels such as tugs and dredgers.

The dominance of bulk carriers in the Hong Kong fleet is reflected in Table 1.2, although few lives were lost in the relatively large Hong Kong passenger sector. Throughout the study period, the Singapore fleet has comprised largely of tankers, general cargo vessels and tugs, and to a lesser extent, bulk carriers and container ships; this is also reflected in Table 1.2, although it is notable that a disproportionately large number of lives, almost forty per cent, were lost in Singapore-registered general cargo vessels.

Table 1.4 Type of Merchant Vessel in which Merchant Seafarers Who Died in, Respectively, the British, Singapore and Hong Kong Fleets were Serving in at time of Death (1981-1995)

Type of Cargo	Merchant Fleet:		
	British	Singapore	Hong Kong
	Number (%)	Number (%)	Number (%)
Passenger	126 (21.6%)		4 (2.4%)
Tanker (oil/chemical)	88 (15.1%)	74 (20.1%)	17 (10.4%)
Container	28 (4.8%)	30 (8.1%)	10 (6.1%)
Bulk Carrier	58 (9.9%)	44 (11.9%)	111 (67.7%)
RoRo Cargo	23 (3.9%)	2 (0.5%)	
General Cargo	92 (15.8%)	141 (38.2%)	14 (8.5%)
Liquefied Gas Carrier	10 (1.7%)	6 (1.6%)	1 (0.6%)
Tug	12 (2.2%)	45 (12.2%)	
Offshore	52 (8.7%)	14 (3.8%)	
Royal Forces Auxiliary	43 (7.4%)		
Dredger	20 (3.1%)		
Research Vessel	8 (1.4%)		
Refrigerated Cargo	2 (0.3%)	2 (0.5%)	5 (3.1%)
Vehicles Carrier	1 (0.2%)	8 (2.2%)	
Other	21 (3.8%)	3 (0.8%)	2 (1.2%)
Total	584 (100.0%)	369 (100.0%)	164 (100.0%)

⁴ While the British fleet during the earlier part of the 1981-95 study period comprised of large numbers of tankers, bulk carriers and general cargo vessels, the passenger and offshore sectors constitute much of the residual fleet during the later period of this study.

ii Maritime Disasters and War Casualties

Between 1981 and 1995 a total of 201 seafarers were identified as having lost their lives through maritime disasters involving their British, Singapore or Hong Kong registered merchant vessels. As witnessed earlier, a further fifty-one deaths arose after merchant vessels ships were attacked during military conflict.

Maritime disasters involving loss of life among crew occurred most frequently in the Singapore fleet (Table 2.1). There were fifteen instances (63 lives lost) compared to thirteen disasters (71 lives lost) in the larger British fleet, and five (68 lives lost) in the smaller Hong Kong fleet. Fires and explosions accounted for fifteen of the 33 disasters. Three of these, resulting in the loss of twelve seafaring lives, refer to fires which started in the accommodation areas of British-registered ships. Nine of the twelve fatal explosions or fires, which mostly occurred in engine rooms, arose in oil tankers; four each of these 9 tankers were Singapore and British, and one was registered in Hong Kong.

Collisions accounted for two of the 33 fatal maritime disasters in the three fleets and the loss of 12 crew. The first involved a British passenger ferry in the English Channel (four lives lost) and the second arose after a fire engulfed a Hong Kong-registered tanker which had collided in the Mediterranean Sea. Three further disasters were the consequence of vessels grounding. Two of the three had dragged anchor; the first involving a Hong Kong-registered bulk carrier which then struck a breakwater and foundered during storms off Romania and the second, a small Singapore oil tanker which grounded during storms off Korea. The third fatal grounding arose after a Singapore-registered container ship grounded during a typhoon off Japan.

Aside from the *Herald of Free Enterprise* disaster (38 crew lost), the remaining twelve maritime disasters refer to merchant vessels which foundered or disappeared. Ten of the twelve ships, which were mostly lost during typhoons and storms, were less than 4,000 gross tonnage. The two larger vessels concern a Singapore-registered of 12,522 GRT which went missing during a typhoon in the South China Sea (4 crew lost) and a large Hong Kong bulk carrier which disappeared during severe storms in the south Indian Ocean (26 lives lost) while carrying a heavy cargo of iron ore from Australia

to the Netherlands. The bulk carrier was thought to have suffered catastrophic structural failure at the engine room bulk head amid an estimated swell of 9 to 18 metres.

Table 2.1 Maritime Disasters Involving Loss of Life to Seafarers in, Respectively, the British, Singapore and Hong Kong Fleets (1981-1995).

Type of Vessel	Gross Tonnage	Age of Vessel	No. of Crew Lost	Type of Maritime Disaster
British Fleet:				
Passenger Ferry	7,951	7	38	Capsized off Belgium
Oil Tanker	33,329	5	10	Fire in accommodation area off Panama
Dredger	1,503	21	4	Foundered in heavy seas in English Channel
Passenger Ferry	4,263	7	4	Collision in English Channel
Oil Tanker	140,264	16	3	Fire in engine room, anchorage off Singapore
General Cargo	1,777	30	3	Foundered in rough seas in the Irish Sea
Oil Tanker	2,886	14	2	Explosions in pump room at dock in Britain
Oil Tanker	11,898	19	2	Explosion in engine room at dock in Britain
General Cargo	499	28	1	Fire in accommodation area at dock in Britain
Ore/Bulk/Oil Carrier	91,178	10	1	Fire in accommodation area at dock in Taiwan
Tug	300	9	1	Foundered in English Channel, 10 crew rescued
General Cargo	1,571	24	1	Capsized and foundered, off Isles of Scilly
Oil Tanker	1,584	11	1	Explosion in engine room at dock in Britain
Total			71	
Singapore Fleet				
General Cargo	1,437	29	21	Missing Vessel during typhoon off Vietnam
General Cargo	3,894	14	12	Lost during storms in Bay of Biscay
Oil Tanker ^l	997	17	7	Explosion and fire at dock in Singapore
Oil Tanker	18,177	18	5	Explosion in engine room at dock in Vietnam
General Cargo	12,522	22	4	Foundered during typhoon in South China Sea
Oil Tanker	3,406	21	3	Explosion in engine room in Gulf of Thailand
General Cargo	3,254	15	2	Foundered in rough seas off Taiwan
Deck Cargo Pontoon	1,907	13	2	Foundered during storms in South China Sea
General Cargo	4,795	16	1	Fire in engine room in Caribbean Sea off Jamaica
Oil Tanker	2,956	13	1	Ran anchor and grounded during storms off Korea
Container	4,705	4	1	Grounded during a typhoon off Japan
Tug	103	1	1	Engine caught fire in Straits of Malacca off Indonesia
Tug/Supply Vessel	1,495	11	1	Fire on deck in Malaya Peninsular off Malaysia
Oil Tanker	1,407	15	1	Explosion on deck at anchorage off Singapore
Tug	287	12	1	Listed and foundered when towing in the Gulf of
Aden				
Total			63	
Hong Kong Fleet^{ll}				
Bulk Carrier	15,865	3	27	Ran anchor & struck a breakwater in storms,
Romania				
Bulk Carrier	75,330	9	26	Disappeared during storms in south Indian Ocean
Oil Tanker	78,443	3	8	Collision and fire in Mediterranean Sea off Algeria
Oil Tanker	63,285	11	4	Explosion, off Texas in Gulf of Mexico
General Cargo		3,912	15	3 Foundered in rough seas in Bay of Biscay
Total			68	
Total			201	

Notes

ⁱ According to information provided in the Lloyds Maritime Information Services data base, 13 lives were lost. It is unclear as to whether these satisfy the study inclusion criteria.

ⁱⁱ According to information provided in the Lloyds Maritime Information Services data base, 3 lives were lost when a Hong Kong dredger foundered after grounding on rocks. It is unclear as to whether these satisfy the study inclusion criteria.

Four other British vessels foundered, two small general cargo vessels, a dredger and a tug, respectively, in the Irish Sea, the English Channel (two) and off the Isles of Scilly. Three Singapore-registered general cargo vessels foundered or disappeared in the Bay of Biscay, and off Vietnam and Thailand, respectively. Two other Singapore ships, a deck cargo pontoon in the South China Sea and a tug in the Gulf of Aden, also foundered. Finally, a Hong-Kong-registered general cargo vessel was also lost amid rough seas in the Bay of Biscay.

There were fourteen separate incidents in which seafarers lost their lives as a result of their vessels being attacked during a war (Table 2.2). A total of sixteen lives were lost when three British vessels, two Royal Forces Auxiliary ships and a RoRo cargo/container ship, were struck by exocet missiles during the Falklands conflict of 1982.

A total of thirty-four seafarers in the Singapore fleet and one in the Hong Kong fleet were killed during the Iraqi-Iranian conflict of the mid 1980s. These involved the crew of eleven different vessels, although it should be noted (see Table 2.2) that in three cases the crew of Singapore-registered tugs lost their lives while fire-fighting or engaged in other work in oil tankers which were the subject of military attack.

Table 2.2 War Casualties Involving Loss of Life to Seafarers in, Respectively, the British, Singapore and Hong Kong Fleets (1981-1995).

Type of Vessel	Gross Tonnage	Age of Vessel	No. of Crew Lost	Type of Maritime Disaster
<u>British Fleet</u>				
RoRo Cargo	14,946	12	9	Struck by exocet missile during Falklands war
RFA - RoRo Cargo	4,473	16	5	Struck by exocet missile during Falklands war
RFA - RoRo Cargo	6,824	5	2	Struck by exocet missile during Falklands war
Total			16	
<u>Singapore</u>				
Oil Tanker	1,599	10	12	Missile attack in Persian Gulf during Iraqi-Iranian war
Tug ^I	493	7	5	Missile attack in Persian Gulf during Iraqi-Iranian war
General Cargo	6,759	25	4	Missile attack in Persian Gulf during Iraqi-Iranian war
Tug	742	11	3	Missile attack in Persian Gulf during Iraqi-Iranian war
Tug ^{II}	742	12	3	Missile attack in Persian Gulf during Iraqi-Iranian war
Tug	742	12	2	Missile attack in Persian Gulf during Iraqi-Iranian war
Liquefied Gas Carrier	30,950	10	2	Frigate attack in Persian Gulf during Iraqi-Iranian war
Tug ^{III}	742	11	1	Missile attack in Persian Gulf during Iraqi-Iranian war
Tug ^{III}	493	11	1	Missile attack in Persian Gulf during Iraqi-Iranian war
Tug	699	9	1	Missile attack in Persian Gulf during Iraqi-Iranian war
Total			34	
<u>Hong Kong Fleet</u>				
Ore/Bulk/Oil Carrier	57,462	17	1	Missile attack in Persian Gulf during Iraqi-Iranian war
Total			1	
<hr/>			Total	51

Notes

- ^I The five deceased were attempting to re-float an Iranian tanker which was struck by a missile
^{II} The three deceased were fire-fighting in a tanker which was struck by a missile
^{III} Both deceased were working on board a tanker which was struck by a missile

iii Occupational Accidents

During the fifteen-year study period a total of one hundred and seventy-four of the identified 1,117 deaths in the three fleets (16%) involved seafarers losing their lives as a result of an accident which arose through the course of their employment. Seventy-four of these arose in the British fleet, seventy-three in the Singapore fleet and twenty-seven in Hong Kong vessels. The cause-specific mortality rates for occupational accidents in the Singapore and Hong Kong fleets, as will be reported later, are estimated to be more than twice as high as in the British fleet.

The types of fatal occupational accidents which occurred in the three fleets show some patterns of similarity (Table 3.1). Nonetheless, asphyxiations in cargo holds and tanks and, not surprisingly in view of the large number of Singapore tugs, deaths due to seafarers being struck by towing or mooring ropes were most evident for the Singapore fleet. Hatch covers striking the deceased were also a more common form of fatal occupational accident among seafarers in Singapore and Hong Kong vessels.

By contrast seafarers in the British fleet more often accidentally died through being fatally struck by other moving objects. For example these refer to three crew who were struck by vehicles or trailers on the vehicles decks of RoRo vessels, three who were crushed in hydraulic doors, and three crew in offshore vessels who lost their lives during anchor handling operations. Four other seafarers in the British fleet were electrocuted and two others, both electricians, were crushed by faulty lift shafts which they had been attempting to repair.

Eleven, thirteen and six seafarers in, respectively, the British, Singapore and Hong Kong fleets lost their lives after falling overboard. In seven of these 30 cases, the crew member was known to have been painting the side of the vessel and a further four had been rigging gangways or ladders. Twenty-eight crew died from falls on board; eleven of these were serving in British vessels, twelve in Singapore ships and five in the Hong Kong fleet. In twenty-one of these 29 instances the seafarer fell into or inside a cargo hold or tank. The other eight include falls from cranes, falls down stairs and seafarers who slipped on deck, often when the ship was rolling in heavy seas.

Table 3.1 Types of Fatal Occupational Accidents Suffered by Merchant Seafarers in, Respectively, the British, Singapore and Hong Kong Fleets.

Type of Occupational Accident	Merchant Fleet:		
	British Number	Singapore Number	Hong Kong Number
<u>Asphyxiated:</u>			
In Holds/Tanks	6	5	2
In Engine Room	1	4	
<u>Falls Overboard:</u>			
When Painting Vessel	2	4 (5)	1
When Rigging Ladders/Gangways	3	1	1
Other Falls Overboard	6 (8)	8 (12)	4 (5)
<u>Falls on Board:</u>			
Falls into Holds/Tanks	6	6 (8)	3
Falls inside Holds/Tanks	2	2	1
Falls from Cranes	1	1	
Other Falls on Board	2	3	1
<u>Struck By Heavy Seas:</u>			
Washed Overboard	3	5	1
Fatally Injured on Deck	6	3	1
Struck by Mooring/Towing Ropes	6	11	2
<u>Struck by Other Moving Objects:</u>			
By Cranes/Derricks/Anchor-Handling	7	4	3
By Hatch Covers	1	4	4
By Vehicles/Trailers	3		
By Hydraulic Doors	3		
By Containers on Deck	1	2	
By Faulty Lift Shafts	2		
By Other Moving Objects	5	3	
Electrocuted	4		1
Life Boat Drills	2	2	1
Other Occupational Accidents	2	5	
Insufficient Detail			1
Total	74 (77)	73 (80)	27 (28)

Notes

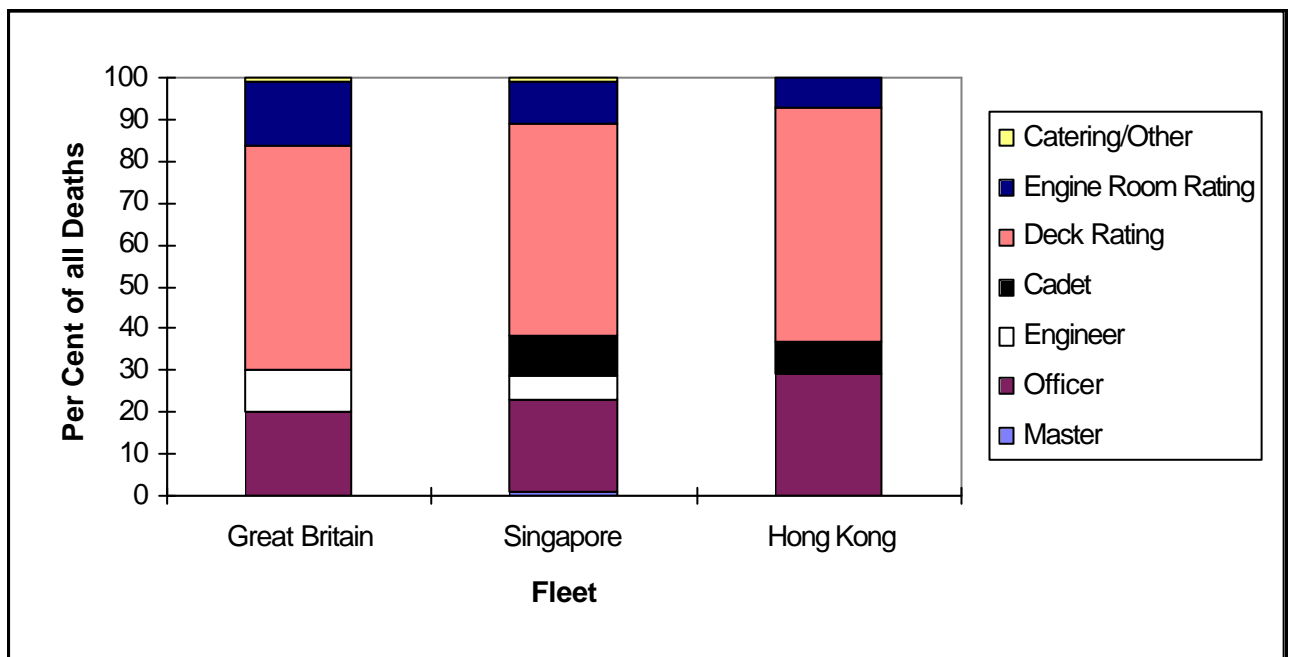
¹ Figures in brackets denote the additional cases of seafarers, for whom the nature of their deaths could not be established conclusively but, who are thought to have died as the result of an occupational accident.⁵

⁵ For example these often refer to crew who disappeared as the ships was sailing in rough seas or were found dead at the bottom of holds with no witnesses to confirm that the death resulted from an accident.

Of the eighteen deaths through asphyxiations, thirteen occurred in cargo holds or tanks and five inside the engine room. Most of the former thirteen, all involving Asian seafarers, arose after the failure to follow safety procedures. Moreover, six of the eighteen asphyxiations occurred after the deceased had entered the tank or pipe tunnel in an attempt to rescue a fellow crew member.

In each of the three fleets a majority of the fatal occupational accidents involved deck ratings (Figure 3.1). Fifty-four per cent in the British and Hong Kong fleets, and 51% in the Singapore fleet, were employed as deck ratings. It is also evident that relatively higher proportions of the deceased in the Hong Kong and Singapore fleets were serving as deck officers and cadets.

Figure 3.1 Rank of Seafarers who Suffered Fatal Occupational Accidents in, Respectively, the British, Singapore and Hong Kong Fleets.



Fatal occupational accidents in the British fleet most frequently occurred in general cargo vessels (fifteen of the 74 lives lost), in the offshore sector (fourteen) and in bulk carriers (ten). Fatal occupational accidents also occurred most frequently in general cargo vessels in the Singapore fleet (twenty-four of the 73 lives lost), followed by tankers and bulk carriers (thirteen each), while in the Hong Kong fleet twenty of the 27 crew lost through occupational accidents were serving in the large bulk carrier sector.

In the British fleet, the masters, officers and cadets who suffered fatal occupational accidents were usually serving in relatively small merchant vessels; seven of the 15 accidents occurred in the offshore sector, in tugs and general cargo ships and a further two in RoRo cargo vessels while, by contrast, only three of the 33 fatal occupational accidents which arose in the typically larger tankers, bulk carriers and passenger vessels occurred among masters, officers and cadets (Table 3.2). In the Singapore and Hong Kong fleets, this differentiation is not apparent; occupational accidents in bulk carriers and tankers were relatively frequent among the higher ranks, while no occupational accidents arose in the passenger sector.

The mean age of the seafarers who died from occupational accidents in the British fleet (39.7 years) is significantly higher ($t=2.91$; $p<0.001$) than the corresponding mean age for the Singapore fleet (34.5 years), but not significantly higher than that for deaths through occupational accidents in Hong Kong vessels (38.9 years). It is notable, in this context, that seven of the fatal occupational accidents in Singapore ships occurred among cadets; no cadets in the British fleet lost their lives in this manner. There is no significant difference between the two mean ages of the deceased in the Singapore and Hong Kong fleets.

Table 3.2 Rank of Seafarers who Suffered Fatal Occupational Accidents in, Respectively, the British and Singapore/Hong Kong Fleets (1981-95).

British Fleet:

Type of Vessel	Rank of Deceased					(Total)
	Master /Deck Officer /Cadet	Engineering Officer	Deck Rating	Engine Room Rating	Catering/Other	
Passenger	1		4	4		(9)
Tanker	2	1	5	1		(9)
Container		2	2	1		(5)
Bulk Carrier	1		7	1	1	(10)
RoRo Cargo	2		2			(4)
General Cargo	3	1	9	2		(15)
Offshore (14)		4	1	8	1	
Tug	2				1	(3)
<u>Other</u>		1	2	2		(5)
Total	15	6	39	12	2	(74)

Singapore /Hong Kong Fleets

Type of Vessel	Rank of Deceased					(Total)
	Master /Deck Officer /Cadet	Engineering Officer	Deck Rating	Engine Room Rating	Catering/Other	
Passenger						
Tanker	5	2	6	1		(14)
Container	2	1	4	1		(8)
Bulk Carrier	15		15	3		(33)
RoRo Cargo						
General Cargo	7		17	3	1	(28)
Offshore (6)		1	1	3	1	
Tug	1	1	3			(5)
<u>Other</u>	2		4			(6)
Total	33	5	52	9	1	(100)

iv Off-Duty Accidents and Drowning

While mortality levels caused by occupational accidents were substantially lower in the British fleet than in Singapore and Hong Kong-registered-vessels, during the fifteen year study period, the opposite is true of mortality caused by off-duty accidents and drowning. Seafarers in the British fleet, who lost their lives, died more frequently through off-duty accidents than their counterparts in Singapore and Hong Kong vessels; there were sixty-six instances in the British fleet compared to only 18 and 4 among the crew of Singapore and Hong Kong vessels respectively (Figure 4.1).

Sixteen of the off-duty accidents in the British fleets were caused by traffic accidents ashore, five seamen died through falling overboard, three fell on board, seven accidentally drowned in swimming pools or from beaches, and four died after launches or pleasure boats capsized (Table 4.1). Twenty-seven of the 30 remaining off-duty accidents resulted from seamen accidentally falling into a dock when returning to a berthed vessel from ashore. In most of these cases, the deceased fell from the gangway or access ladder, or from the quay-side.

There were a further twenty-two seafarers who, after being discovered missing during their off-duty-time, were subsequently found drowned in docks, rivers or the sea. In one of these 22 cases, documentation from an official maritime inquiry revealed that the deceased, who had been suffering from depression, almost certainly jumped overboard. It is most plausible that each of the other twenty-one off-duty drownings, in the absence of evidence of foul play or suicidal tendencies on the part of the deceased, were the result of accidents (these have also been included in Table 4.1 in brackets). The absence of a witness, however, meant that open verdicts were usually returned at the subsequent Coroner's Inquests. In sixteen of these 21 cases seamen were found drowned in docks or rivers, it is known or thought, after returning alone to berthed vessels from ashore.

In thirty of the 43 off-duty accidents or drowning involving seamen returning to berthed vessels, the deceased was known to have been drinking alcohol. These 43 deaths most usually concerned crew members of small general cargo vessels, tugs, Royal Forces Auxiliary ships and supply vessels in the offshore sector, and often occurred in British docks and rivers. Five seafarers in the Singapore fleet,

and three serving in Hong Kong vessels, similarly died after falls into docks in the process of attempting to return to berthed vessels from ashore.

Table 4.1 Types of Fatal Off-Duty Accidents and Off-Duty Drowning (in Brackets) Suffered by Merchant Seafarers in, Respectively, the British, Singapore and Hong Kong Fleets (1981-1995).

Type of Off-Duty Accident	Merchant Fleet:		
	British Number	Singapore Number	Hong Kong Number
<u>Traffic Accidents Ashore:</u>			
Run over by vehicles	4	1	
Falls from vehicles	2		
Struck by trains	2		
Motor accidents	6	2	
Insufficient detail	2		
<u>Swimming /Diving Accidents:</u>			
From beaches	4 (5)		
In swimming pools on board	2	1	
In swimming pools ashore	1		
<u>Boating Disasters:</u>			
Launches/ pleasure boats capsized	3	4	1
<u>Falls into Docks:</u>			
When returning to berthed vessels	27 (43)	5 (7)	3
<u>Falls Overboard:</u>			
From deck /ladders	5 (8)	3 (5)	
<u>Falls on Board:</u>			
From ladders /on deck	3	2	
Other Off-Duty Accidents	5	2	
Other Inconclusive Off-duty Drowning	(1)		
Total	66 (87)	18 (22)	4

Notes

¹ Figures in brackets denote the additional cases of seafarers who were subsequently found drowned, after being discovered missing when off-duty, but for whom the cause of the drowning could not be established conclusively

Of the eighty-seven seafarers in the British fleet who died from an off-duty accident or drowning, thirty-four were employed as deck ratings, and five as engine-room ratings. The remaining forty-eight were serving as the master, ten as deck officers, one radio officer, nine engineer officers, five cadets, twelve cooks or stewards and three as other crew. It is notable that of the seventeen deceased who were employed as masters and nautical officers, fourteen were sailing in small cargo vessels, tugs and offshore supply vessels of less than 2,000 gross tonnage. As for fatal occupational accidents the evidence indicates that the seafarers who were serving in the higher ranks in the British fleet, and who lost their lives through off-duty accidents and drowning, were usually working in small vessels.

The estimated mortality rate for off-duty accidents in the British fleet is 50% higher than in Singapore crew and three times as high as in the Hong Kong fleet, while there were more than five-times as many inconclusively-determined off-duty drownings among seafarers serving in British vessels than in the Singapore and Hong Kong fleets combined. Perhaps the best clue as to why the levels of off-duty accidents and drowning appear to be relatively high in the British fleet is the finding that alcohol was a known factor in at least forty-five of the 87 cases (51%); by contrast alcohol consumption could be identified as a factor in three of the 26 off-duty accidents or drownings (11%) in the Singapore and Hong Kong fleets.⁶

⁶ It should be noted that the true figures are almost certainly higher since in some cases inquiries were not held - or were not reported - into the deaths or the available documentation did not detail whether or not alcohol consumption was a contributory factor in the accident or drowning, although the available documentation for inquiries into deaths in the British fleet was often the most comprehensive.

v Mortality Through Other Causes

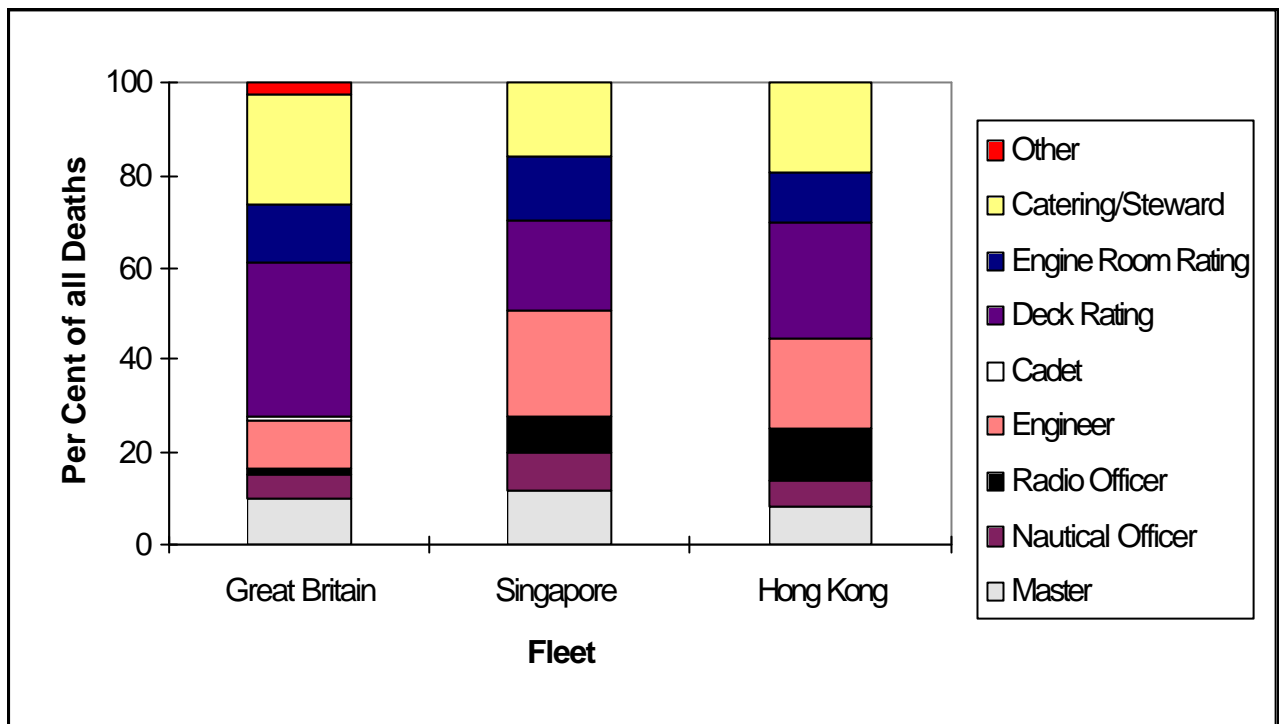
During the fifteen-year study period, a total of 400 of the 1,117 seafaring lives lost (36%) in the three fleets were identified as having resulted from illnesses (see Table 1.1). It is particularly evident however, that the proportion of deaths caused by illness differed greatly across the three fleets. Among seafarers who lost their lives in the British fleet, 257 of the 584 fatalities (44%) resulted from illness. By contrast, only 29% of the 369 identified deaths in the Singapore fleet were lost in this way, while for Hong Kong vessels the figure (22%) is lower still.

It is almost certain that this higher proportion of illness-related mortality is the consequence of an excess of deaths due to cardiovascular diseases among the mainly British seamen serving in the British fleet. Approximately 90% of the deaths from natural causes in the British fleet were attributable to heart-related diseases. Because of inferior medical certification of deaths in the Singapore and Hong Kong fleets it is not possible to give precise corresponding figures. The available evidence, however, indicates that cardiovascular-related deaths were less common among the mainly Asian seafarers employed in these fleets. Similarly, it would appear that gastro-intestinal diseases, typically referring to stomach ulcers, pancreatitis, liver cirrhoses and diabetic comas, together with malignant neoplasms accounted for proportionately more of the deaths through natural causes in the British fleet.⁷ Conversely, cerebrovascular haemorrhages, infectious diseases and, on account of sometimes inadequate medical investigation, natural deaths through unknown causes accounted for proportionately more of the Asian lives lost through natural causes in Singapore and Hong Kong-registered vessels.

Among the seamen who died from natural causes, there are some notable differences between the three fleets according to the rank of the deceased (Table 5.1). In particular, it is evident that a higher proportion of the deceased in the British fleet were employed in the lower ranks; as deck ratings and as stewards while, in particular, fewer were serving as radio officers and engineers.

⁷ In the context of deaths from malignant neoplasms it should be remembered, from the inclusion criteria, that deaths from natural causes are included in this study only if the seafarer died within 30 days of being landed ashore and signed off the vessel's articles of agreement; hence, most seafarers who lose their lives through neoplasms would be omitted from this study. Nonetheless, while it is likely that occupational mortality caused by illnesses after the seafarer was signed-off would represent a potential source of under-reporting in this study, it is notable that all five fatalities attributable to this form of death occurred in the British fleet.

Table 5.1 Rank of Seafarers Who Died From Illnesses in Respectively, the British, Singapore and Hong Kong Fleets (1981-1995).



Between 1981 and 1995, a total of twenty-one seafarers in the three fleets were identified as having been the victims of homicides. Ten of these were serving in the Singapore merchant fleet, five in Hong Kong vessels and six in the British fleet. Fourteen of the 21 were killed by fellow crew members, two were shot by police and another was deliberately run over by a shipyard worker. One seaman was killed by crew from another vessel while the assailants of three others who died ashore are not known.

Notwithstanding the limited number of cases involved, the homicides in the Singapore and Hong Kong fleets appear to be more often linked to problems among the crew. According to the subsequent inquiries twelve of the fifteen deceased, fourteen Asians and one Eastern European, lost their lives after being stabbed by fellow crew members. These often arose after work-related arguments over matters such as food preparation or during disagreements in recreational time, for example, over a game of Mah Yong or who was the better Kung Fu fighter, or amid a brawl among crew at a barbecue on board.

Two of the other three deceased were shot by assailants ashore while the third was beaten to death after being attacked by a number of Filipino crew from another vessel outside a Russian night-club.

Problems, leading to homicidal attacks, among crew in the much larger British fleet were less apparent. There were two incidents identified between 1981 and 1985; one in a Royal Forces Auxiliary Vessels and the second, after an argument between two Indian crew, in an oil tanker. Of the other four homicides in the British fleet, one seaman was stabbed ashore in South Africa while another was purposefully run down by a shipyard security officer in his car after an argument. The third involved a Portuguese rating who, allegedly having taken particular exception to some local youths who on departing a nearby night-club had attempted to release the mooring ropes from his berthed vessel, stabbed a British seaman who had attempted to intervene. The fourth, the master and owner of a berthed general cargo vessel, was shot by plain-clothes Spanish police. On seeing two men whom he had ejected from his cabin - after recovering £80 - the previous evening, return with armed accomplices, he had allegedly retrieved and fired his shotgun in the air.

During the study period it was established that a total of fifty seafarers in the three fleets died through suicides. Twenty-seven of these occurred in the British fleet, 15 in Singapore-registered ships and eight in Hong Kong vessels. From the statements made by fellow crew members during the subsequent official inquiries, many of the suicides would appear to be variously linked to factors such as marital and other family problems, symptoms of depression or more severe mental illness, work-related, financial, drug or alcohol-related and other personal problems. It is, of course, difficult to compare the levels of suicidal deaths with other occupations since merchant seafaring is unique in so far as the crew can be present at the work-place for weeks or even months at a time. Perhaps the nearest equivalent is deep-sea fishing, where employees are often at sea for several days. It is notable that during the six year period 1990-1995 there were no confirmed suicides identified among fishermen in British trawlers (Roberts, 1998a).

These refer only to instances of confirmed suicides. A further sixty-six seafarers disappeared at sea; many of whom, from the evidence submitted through the process of official investigation, also took their own lives by jumping overboard. The mortality rates for these "unexplained disappearances at sea" are

also estimated to be lower in the British fleet than among the crew of Singapore and Hong-Kong registered ships.

Apart from disappearances of seafarers at sea, the second category of inconclusively-determined fatality relates to seafarers who, usually after being discovered missing, are subsequently found drowned in docks, rivers or the sea.⁸ In the British fleet, between 1981 and 1995, there were 26 such instances. Twenty-two of the deceased were off-duty at the time of their disappearance and 21 of these, in the absence of evidence of foul play or suicidal tendencies, most plausibly died as a consequence of accidents; these have been covered in the earlier section under “off-duty accidents and drownings”. In the twenty-second case an official inquiry revealed that the deceased, who disappeared at sea before being found drowned four hours later, had been suffering from depression and most likely jumped overboard. Of the remaining four inconclusive drownings, three seafarers disappeared while on-duty; this information is not known for the fourth. The information obtained from official inquiries indicates that three of the four had probably jumped overboard, while the other had accidentally fallen when welding on the side of a dredger along a British river.

Inconclusively-determined drownings similarly accounted for seven lives lost among the crew of Singapore-registered vessels. Two of the deceased had been off-duty on shore leave, and failed to return to their berthed vessels; they were both subsequently discovered drowned nearby. A further two were found drowned after being reported missing at sea while off-duty; one of the two had drunk the best part of a bottle of spirits and was thought to have fallen overboard. The other three had been on-duty at the time of their initial disappearances and are likely to have accidentally fallen overboard. No seafarers in Hong Kong-registered merchant ships were identified as having died through inconclusively-determined drownings.

A total of eleven seamen in the British fleet were identified as having lost their lives as a direct consequence of drug abuse or alcohol intoxication. The first was found dead on a pavement after an adverse reaction to heroin and a second, a chef on a passenger cruise ship, died through an overdose of opiates while another seaman took a fatal overdose of barbiturates with alcohol. Two others died from

medicinal poisoning, including one seaman who suffered a fatal anaphylactic shock from a penicillin injection. The remaining six all died as a direct result of alcohol intoxication or poisoning.

Four seafarers employed in Singapore-registered vessels similarly died as a direct result of drug or alcohol intoxication. Three of the four, including one British national, suffered alcohol poisoning, while the other suffered heart failure after injecting some drugs in his cabin; neither the documentation from the subsequent post mortem examination nor from the official maritime inquiry specified the nature of these drugs. No fatal drug or alcohol intoxications were evident, at least during the study period, among the crew of Hong Kong merchant ships.

Finally, there were an additional thirteen fatalities in the three fleets for which it was not possible to establish the cause of death. Five of these occurred in the British fleet, and three of the deceased were the subject of post mortem examination. In each case the deceased was found dead; three in their cabins, one in a toilet on board and one while on-duty on the bridge. In the lattermost case, relating to a chief officer who was, apparently, found dead while serving in a small container ship off Italy, the master and ship's crew were initially under suspicion of manslaughter by the Italian authorities. The jury at a British Coroner's Inquest subsequently recorded an open verdict.

There were seven other deaths in Singapore-registered vessels, and two in the Hong Kong fleet, for which it was not possible to establish a cause of death. In the two Hong Kong cases documentation had not been forwarded to the RGSS while insufficient details were available at the Hong Kong Mercantile Marine Office. Regarding the seven other inconclusive cases in the Singapore fleet, three seaman were found dead in their cabins, two were found dead in holds, one collapsed on the bridge and the seventh fatally sustained a fractured skull and contused brain outside a night-club. Although it is, of course, possible to conjecture as to the causes of these fatalities conclusive evidence is lacking.

⁸ It should be recalled from, footnote 3, that the term "drowned" has been used loosely here in so far as it includes deaths for which it was not possible, usually on account of prolonged immersion in the sea, for autopsies and other medical examinations to establish a medical cause of death.

vi Mortality According to Ship Type, Nationality and Rank

The previous sections have identified disparities in patterns of occupational mortality between the three fleets and differences according to factors such as the rank of the deceased and the type of ship. It is evident, for example, that fatal occupational accidents would appear to disproportionately affect deck and engine room ratings in each of three fleets while, at the same time, more commonly occur in vessels such as general cargo vessels, tugs and supply/safety/stand-by ships in the offshore sector. The following section will attempt to shed more light on these disparities by examining the profiles of occupational mortality in particular ship types, and among particular ranks and nationalities.⁹

It is clear from Figure 6.1 that, of the different British ship types presented here, occupational accidents accounted for proportionately most lives lost in the offshore sector between 1981 and 1995.¹⁰ Twenty seven per cent of all deaths in this sector were caused by an occupational accident; this compares with 17% in British-registered bulk carriers, 16% in general cargo vessels, 10% in tankers, and 7% in both Royal Forces Auxiliary ships and the passenger sector. A particularly high proportion of deaths caused by illnesses is also evident in the British offshore sector. Fifty-six per cent of all deaths offshore were caused by illnesses and, indeed each of these deaths was caused by a heart-related disease; a far higher proportion than for any of the other ship types considered here. The fact that 83% of all lives lost in the offshore sector were caused by an occupational accident or a heart attack would clearly support the widespread anecdotal evidence that this is both a particularly stressful and dangerous area of British merchant shipping in which to be employed.¹¹

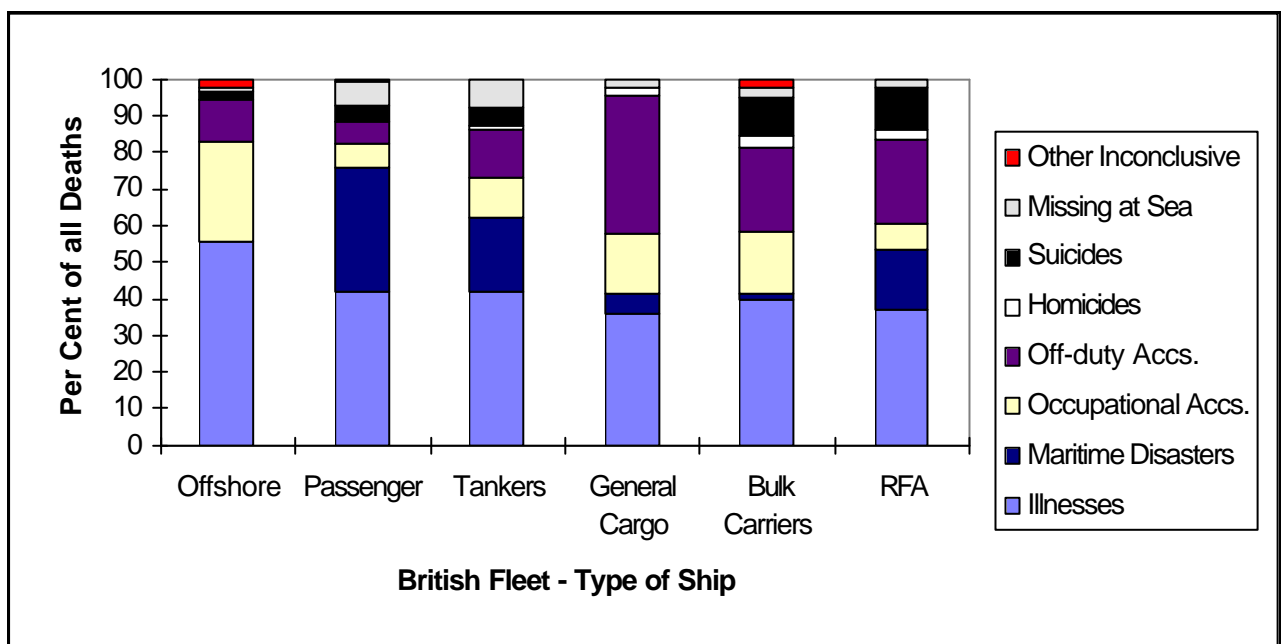
⁹ Of course, such an analysis should ideally involve the calculation of mortality rates for particular ship types, ranks and nationalities. This would require estimates of the numbers employed in the different sub-groups; information which is simply not available from the official maritime authorities.

¹⁰ It should be noted that the analysis presented here refers only to those ship types in which in excess of 40 lives were lost during the fifteen-year study period. Hence, for example, since only twelve lives were lost in British tugs between 1981 and 1995, in the interests of avoiding small sample bias, tugs have been excluded from this analysis.

¹¹ It is perhaps worth mentioning that it would be unsurprising that a higher proportion of seafarers who died from natural causes while employed in the British offshore (and coastal) sectors, when compared with their counterparts in deep-sea trades, suffer sudden cardiovascular deaths as opposed to less acute illnesses such as gastro-intestinal and infectious diseases. The former would be expected to be landed ashore and signed off the vessel's articles of agreement at an earlier stage of the illness.

Seafarers who died while serving in British-registered general cargo vessels would appear to be particularly likely to suffer a fatal off-duty accident. Thirty-five per cent of all occupational mortality in this sector was caused by an off-duty accident or drowning; moreover, the evidence submitted during the investigation of these seven inconclusively-determined drownings indicates that in each case, the death was most plausibly the result of an accident. Since the majority of these deaths were alcohol-related and often involved crew falling into docks and rivers when attempting to access their berthed vessels from ashore, this would raise the issue of safety of access to general cargo and other small vessels. Relatively high proportions of deaths due to off-duty accidents and drownings are also evident among seamen who were serving in RFA vessels and bulk carriers.

Figure 6.1 Percentage Causes of Death in the British Merchant Fleet According to Type of Ship (1981-1995)



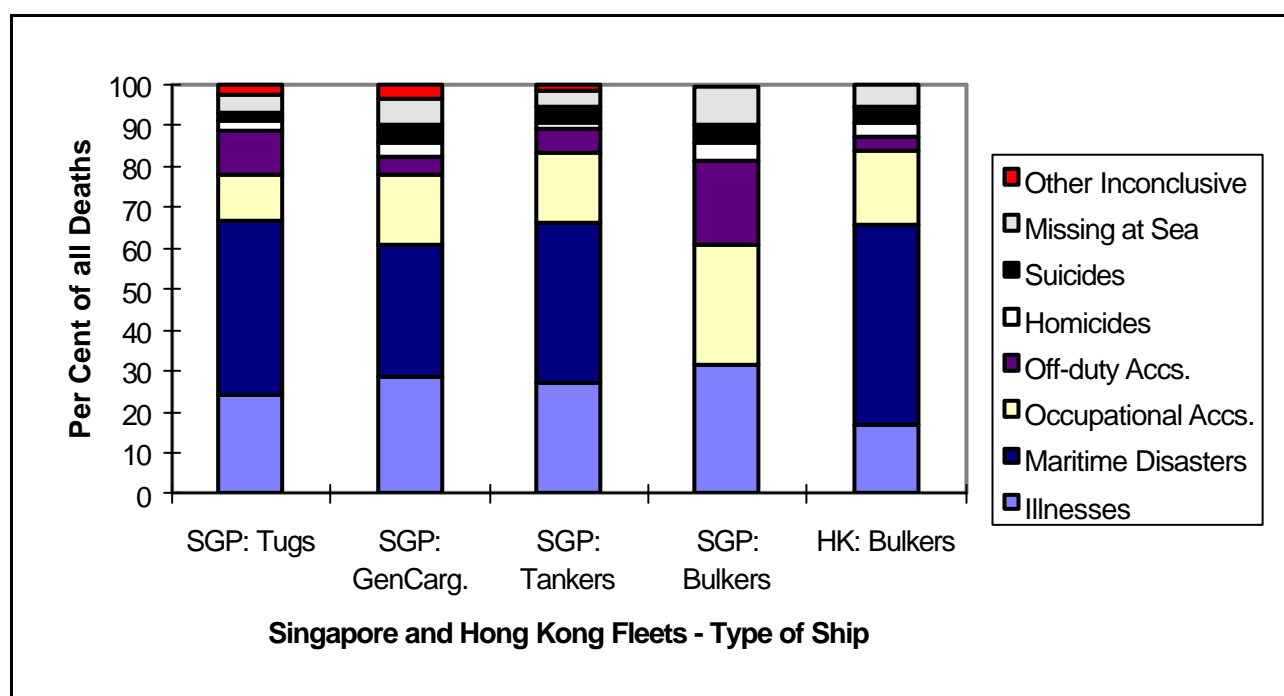
Notes

- I Maritime disasters includes war casualties as well as maritime disasters
- II Off-duty accidents includes off-duty inconclusively-determined off-duty drownings and deaths as a direct result of alcohol and drug intoxication

Suicides and unexplained disappearances at sea, many of which are most plausibly the consequence of seafarers jumping overboard, constitute a high proportion of all deaths in the passenger sector, in RFA vessels and in bulk carriers. It was evident also that both off-duty drownings which occurred among crew from passenger vessels were considered, after official investigation, to have probably been suicides.

Maritime disasters and war casualties accounted for relatively high proportions of all deaths in British passenger ships (33%) and in RFA vessels (16%) - although these are largely due to, respectively, the *Herald of Free Enterprise* disaster in 1987 and the Falklands war of 1982 - and also in British oil and chemical tankers (21%). However, these percentages are much lower than the corresponding figures (Figure 6.2) for Hong Kong-registered bulk carriers (49%), Singapore tugs (42%) and Singapore tankers (39%). High proportions of the mainly Asian seafarers who lost their lives in these vessels also suffered fatal occupational accidents but, when compared with the deceased in the British fleet, less often died from off-duty accidents and drownings.

Figure 6.2 Percentage Causes of Death in the Singapore and Hong Kong Merchant Fleets According to Type of Ship (1981-1995)

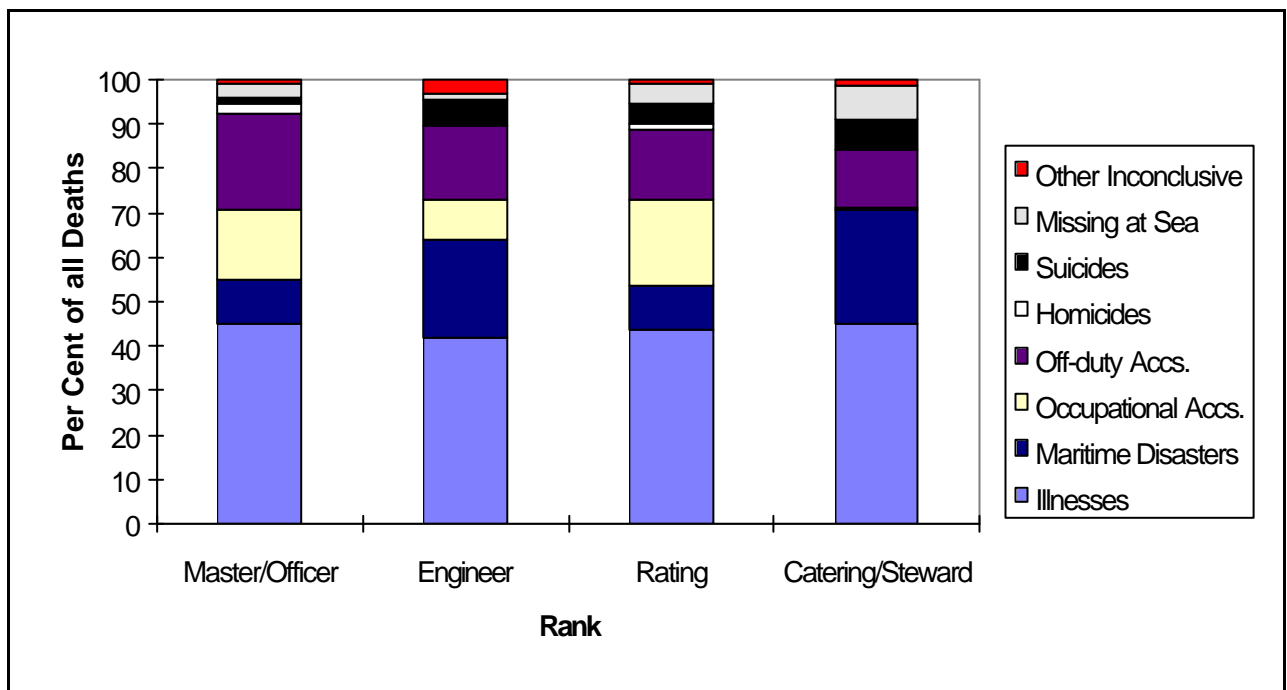


Notes

- I Maritime disasters includes war casualties as well as maritime disasters
- II Off-duty accidents includes off-duty inconclusively-determined off-duty drownings and deaths as a direct result of alcohol and drug intoxication

There is, perhaps surprisingly, little differentiation in occupational mortality profiles in the British fleet according to the rank of the deceased (Figure 6.3). Nonetheless, it is evident that proportionately most of the deceased deck or engine room-ratings suffered fatal occupational accidents (19%). This compares with 16% among the ship's master, deck or radio officers, 9% among engineer officers and 1% among stewards. Six of the fatal fifteen occupational accidents among masters and officers occurred in supply vessels or tugs, and three in general cargo vessels. It is apparent that maritime disasters accounted for a high proportion of deaths among stewards or catering staff (25%), although twenty-nine of these 35 lives were lost in the *Herald of Free Enterprise* disaster. Suicides and unexplained disappearances at sea would also seem to account for a relatively high percentage of deaths among this rank, many of whom were employed in the passenger sector.

Figure 6.3 Percentage Causes of Death in the British Merchant Fleet According to Rank of the Deceased (1981-1995)

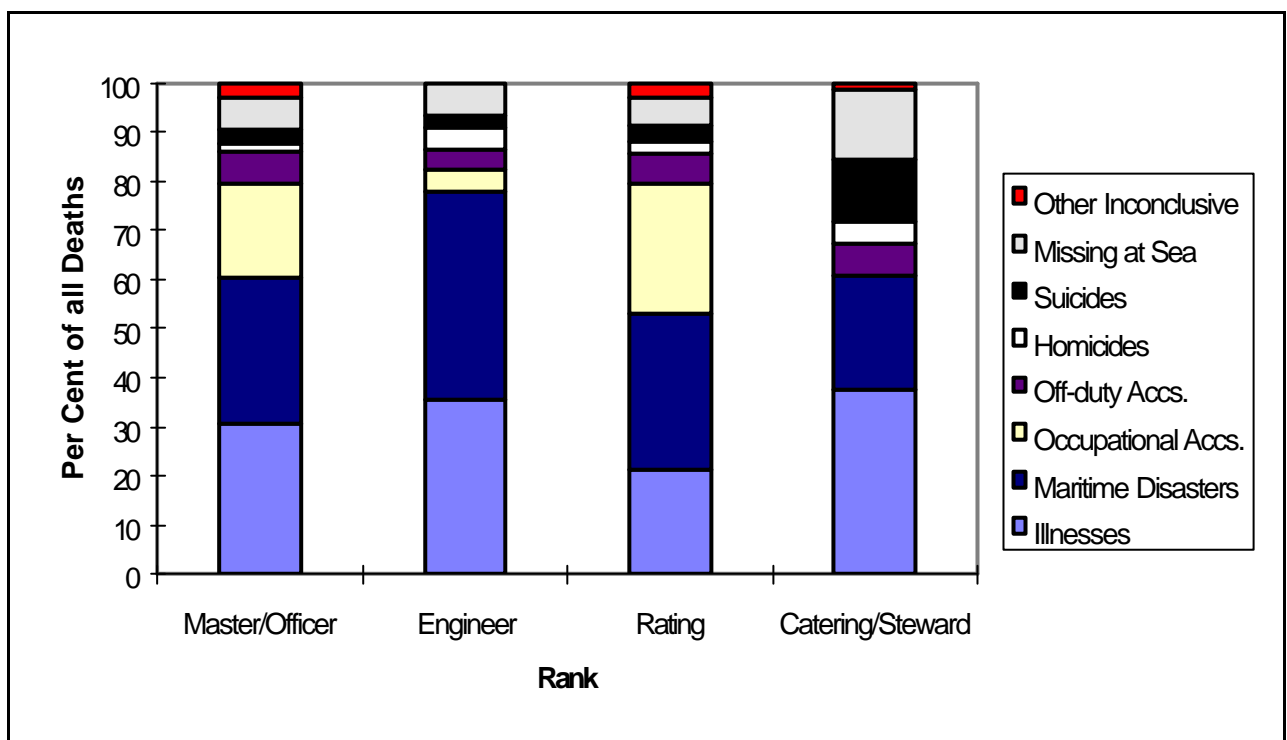


Notes

- I Maritime disasters includes war casualties as well as maritime disasters
- II Off-duty accidents includes off-duty inconclusively-determined off-duty drownings and deaths as a direct result of alcohol and drug intoxication

There are similar disparities in the mortality profiles, according to rank, evident among the largely Asian seafarers in the Singapore and Hong Kong fleets (Figure 6.4). As in the British fleet, suicides and unexplained disappearances account for a particularly high proportion of the deaths among catering staff and stewards; astonishingly, over one quarter (27%) of all lives lost among this rank. Similarly, deceased deck and engine room ratings again appear to be the most likely to suffer an occupational accident (26%), followed by masters and officers (20%)

Figure 6.4 Percentage Causes of Death in the Singapore/Hong Kong Merchant Fleets According to Rank of the Deceased (1981-1995)



Notes

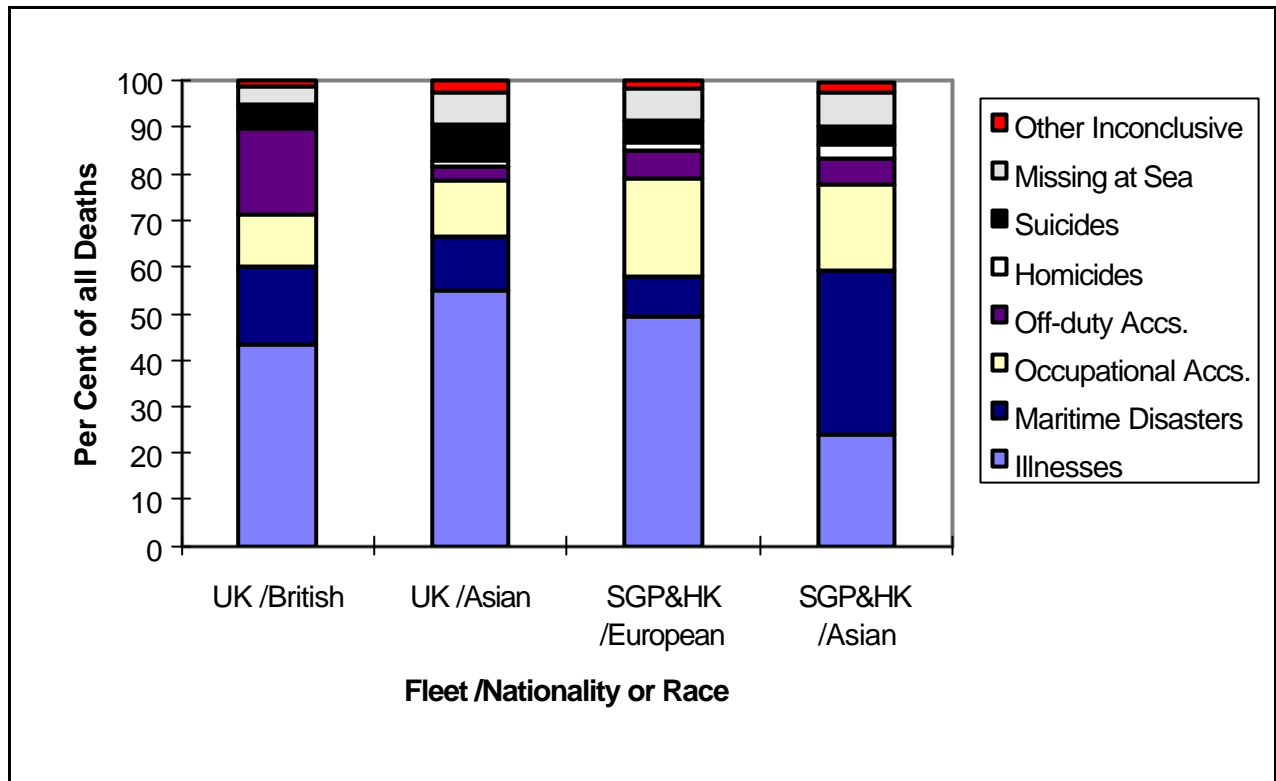
- I Maritime disasters includes war casualties as well as maritime disasters
- II Off-duty accidents includes off-duty inconclusively-determined off-duty drownings and deaths as a direct result of alcohol and drug intoxication

Finally, the mortality profiles of British and Asian seafarers who were serving in the British fleet are illustrated separately in Figure 6.5. It would seem clear that there is a broad similarity among the two groups. Nonetheless, it is perhaps surprising that illnesses, and indeed cardiovascular diseases alone,

accounted for a higher percentage of deaths among the Asians (55%), when compared to British seafarers (42%) in the UK fleet. Interestingly, equal proportions of all deaths among the two groups of seafarers (12%) were caused by occupational accidents, although it is notable that many British seafarers lost their lives through occupational accidents in the North Sea offshore sector. A greater percentage of deaths among the British subjects were caused by off-duty accidents and drowning, while suicides and unexplained disappearances at sea accounted for more of the deaths among the Asians.

Among the identified deaths in the Singapore and Hong Kong fleets, illnesses accounted for roughly one half of all deaths (49%) among European seafarers but only 24% among Asians. The former, however, were far more likely to lose their life through a maritime disaster. For other causes of death there was a broad similarity in the respective proportions of lives lost between the two groups of seafarers.

Figure 6.5 Percentage Causes of Death, Respectively, Among British and Asian Seafarers in the British Merchant Fleet, and among European and Asian Seafarers in the Singapore/Hong Kong Merchant Fleets (1981-1995)



Notes

- I Maritime disasters includes war casualties as well as maritime disasters
- II Off-duty accidents includes off-duty inconclusively-determined off-duty drownings and deaths as a direct result of alcohol and drug intoxication

A Comparison of Mortality Rates

The previous sections of this report have identified evidence of substantial differences in the patterns of mortality suffered by seafarers in the three fleets of Britain, Singapore and Hong Kong. Nonetheless, a more important public health issue concerns whether or not there are differences in the levels or rates of occupational mortality suffered by seafarers in the three fleets.

Mortality rates are most usually calculated in terms of the population of seafarers at risk, the total number of seafarer-years, during the study period. This requires that estimates of the populations of seafarers serving in the three different fleets are available for each year of the study period. In the case of Britain, the numbers of seafarers employed annually were provided by the Surveyor-General Organisation for the period 1981 to 1988 (Department of Transport, 1981-1988) and by the Marine Accident Investigation Branch for the period 1989 to 1995 (Marine Accident Investigation Branch, 1989-1995). Similarly, for the Hong Kong fleet, the numbers of seafarers annually employed between 1981 and 1995 were provided, on request, by the Hong Kong Mercantile Marine Office. The Singapore Mercantile Marine Office was also able to provide similar figures for crew serving in Singapore vessels for the years 1984 to 1995.¹²

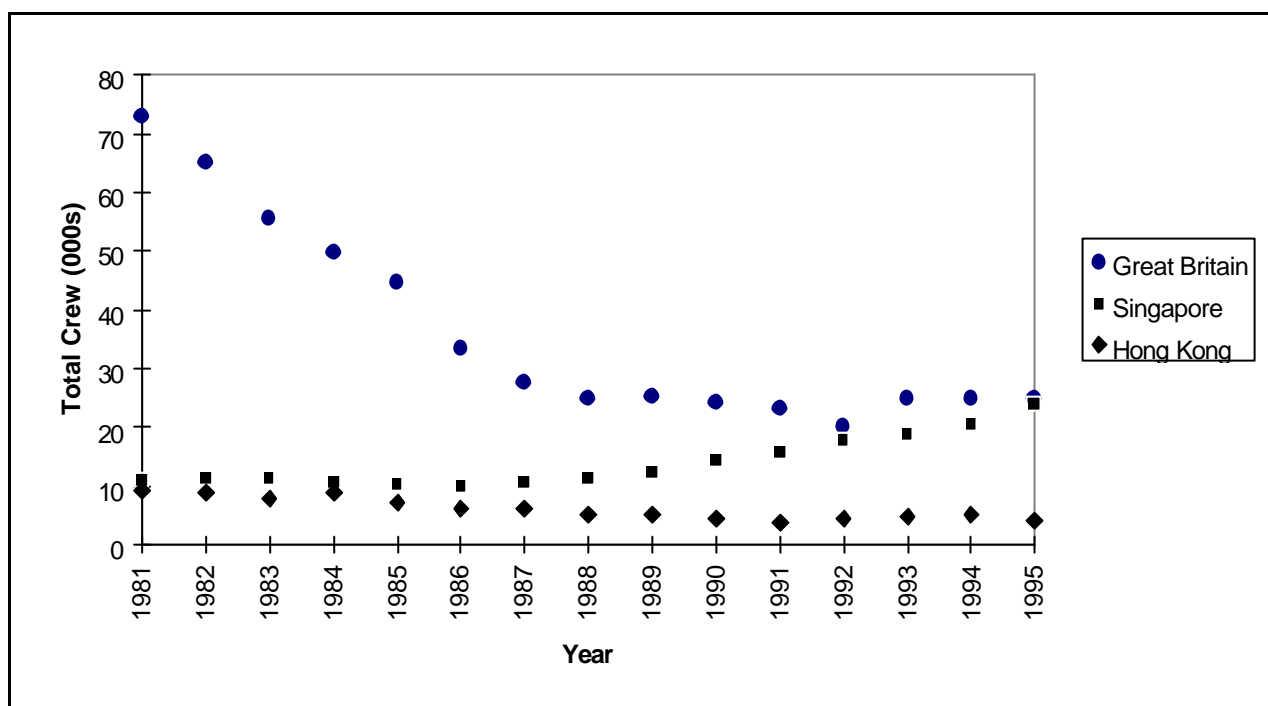
The populations of seafarers serving in the three fleets are illustrated graphically in Figure 7.1, while the number employed in Singapore vessels between 1981 and 1983 has been estimated. The decline in the number of seafarers serving in the British fleet is all too evident.¹³ Employment in the much smaller Hong Kong fleet has also tended to decrease over the course of the fifteen-year study period, although in comparison the reductions in manning have been slight. Employment of seafarers in the Singapore

¹² Figures for the crewing population in the Singapore fleet for the years 1981, 1982 and 1983 were not available from the Singapore Mercantile Marine Office (SMMO). These have been estimated by calculating the mean crewing level per Singapore ship in 1984 (13.40) by dividing the population of seafarers provided by the SMMO for 1984 (10,706) by the quoted number of 805 Singapore ships in 1984 (Lloyds, 1981-1995), and applying this mean crewing level to the number of ships in 1981, 1982 and 1983. Hence, the estimated numbers of seafarers serving in Singapore ships in 1981, 1982 and 1983, are, respectively, 10,908, 11,202 and 11,296.

¹³ It should be noted that the estimated crewing figures provided by the Marine Accident Investigation Branch for the last few years of the study period is of a particularly approximated nature. Nonetheless, an explanation for the very slight increase in employment during the last few years of the study period may lie in the fact that the intensively-manned passenger sector, which now accounts for a large proportion of the employment of seafarers in British-registered ships, has been virtually unaffected by the flagging-out process.

vessels would appear to have remained fairly stable during the 1980s but, coinciding with an expansion of most sectors of the fleet during the 1990s, has increased during the latter part of the study period.

Figure 7.1 The Numbers of Seafarers Employed in the British, Singapore and Hong Kong Merchant Fleets (1981-1995)



Sources:

Britain (1981-1988): Department of Transport (1981-1988).

Britain (1989-1995): Marine Accident Investigation Branch (1989-1995).

Singapore: Information provided, on request, by Singapore Mercantile Marine Office

Hong Kong: Information provided, on request, by Hong Kong Mercantile Marine Office

The aggregated populations at risk during the fifteen-year study period are respectively estimated at 541,919 seafarer-years (Britain), 218,871 seafarer-years (Singapore) and 98,289 seafarer-years (Hong Kong). While seafarers typically spend several months a year on leave it should be noted that each seafarer is conventionally included here as if he had been employed, and at risk, for the entire twelve

months of each calendar year. Using these estimates of the populations at risk during the study period, it is possible to calculate cause-specific mortality rates.

Considering firstly, occupational mortality caused by maritime disasters between 1981 and 1995, the estimated cause-specific mortality rate for seafarers in the British fleet is 1.3 per 10,000 seafarer-years (Table 7.1). For seafarers serving in Singapore-registered vessels, the corresponding mortality rate is over twice as large (3.0 per 10,000 seafarer-years), while for those in the Hong Kong fleet, the relative risk is almost five times as great (6.9 per 10,000 seafarer-years). In other words the relative risk of mortality due to maritime disasters for seafarers in the Singapore fleet, 2.3, is significantly higher than for the British fleet (95% confidence interval = 1.6, 3.2). Similarly the relative risk for crew in Hong Kong registered vessels, when compared to those employed in the British fleet, at 4.8 is also significant (95% confidence interval = 3.4, 6.7).

The mortality rates for occupational accidents were also far greater for the largely Asian seafarers serving in the fleets of Hong Kong (2.8 per 10,000 seafarer-years) and Singapore (3.3), when compared to their seafaring counterparts in the British fleet (1.4). The corresponding relative risk of mortality due to occupational accidents for seafarers in the Singapore fleet, 2.4, is significantly higher than for the British fleet (95% confidence interval = 1.8, 3.4), and for crew in Hong Kong registered vessels, when compared to those employed in the British fleet, 2.0, also significant (95% confidence interval = 1.3, 3.1).

Hence, if one considers mortality due to work-related accidents (maritime disasters plus occupational accidents), the estimated cause-specific mortality rates in the Singapore and Hong Kong fleets, 6.3 and 9.7 per 10,000 seafarer-years respectively, are significantly higher than in the British fleet (2.7).

The cause-specific mortality rate for off-duty accidents, on the other hand, is higher in the British fleet (1.2 per 10,000 seafarer-years) than in the Singapore and Hong Kong fleets (0.8 and 0.4, respectively). Nevertheless, the mortality rate for all accidental deaths (work-related and off-duty accidents) is still much lower in the British fleet (3.9 per 10,000 seafarer-years) than among the mainly Asian crew serving in Singapore (7.1) and Hong Kong-registered ships (10.1).

The mortality rates for suicides are more comparable between the three fleets although if one includes, unexplained disappearances at sea, many of which were most plausibly the result of jumping overboard, together with the suicides, the resultant mortality rate in the British fleet is roughly half that evident among the mainly Asian crew employed in the Singapore and Hong Kong fleets.

Moreover, the mortality rate for homicides is estimated to be over four times as great in the Singapore and Hong Kong fleets combined, than in British vessels. In other words, the predominantly Asian crew in Singapore and Hong Kong-registered vessels were at 4.3 times the risk, significantly more likely to be the victim of a homicidal attack, when compared to their mainly British seafaring counterparts sailing under the British flag (95% confidence interval = 1.7, 11.0). Finally, if one considers all deaths aside from those due to natural causes,¹⁴ the mortality-rates for all non-natural and inconclusive causes among crew employed in Singapore and Hong-Kong ships is, significantly, roughly double that for seafarers in the British fleet.

¹⁴ Deaths through natural causes, particularly those attributable to cardiovascular diseases, are strongly age-related. In the absence of information on the age structures of the crewing populations manning the three fleets it would, therefore, be inappropriate to compare cause-specific mortality rates for deaths due to illnesses.

Table 7.1 Cause-Specific Mortality Rates for Seafarers in, Respectively, the British, Singapore and Hong Kong Fleets (1981-1995).

Cause of Death	Merchant Fleet:		
	British Mortality Rate (per 10,000 Seafarer-Years)	Singapore Mortality Rate (per 10,000 Seafarer-Years)	Hong Kong Mortality Rate (per 10,000 Seafarer-Years)
Maritime Disasters	1.3	3.0	6.9
Occupational Accidents	1.4	3.3	2.8
All Work-Related Accidents ^I	2.7	6.3	9.7
Off-Duty Accidents ^{II}	1.2 (1.6)	0.8 (1.1)	0.4 (0.4)
All Accidents ^{II,III}	3.9 (4.3)	7.1 (7.4)	10.1 (10.1)
Suicides	0.5	0.7	0.8
Suicides and Disappearances at Sea	1.0	1.9	2.1
All Non-Natural and Inconclusive Causes ^{IV}	6.1	11.9	13.0

Notes

^I All work-related accidents refer to maritime disasters and occupational accidents

^{II} Figures in brackets refer to the estimated mortality rate if inconclusively determined off-duty drownings are included with off-duty accidents

^{III} All accidents refer to maritime disasters, occupational accidents and off-duty accidents

^{IV} All non-natural and inconclusive causes refer to maritime disasters, occupational accidents, off-duty accidents, war casualties, suicides, homicides, fatalities as a direct result of drug or alcohol intoxication, disappearances at sea, inconclusively-determined drownings and other inconclusive cases

Discussion

This study set out to undertake one of the first, if not the first, reliable large-scale studies of occupational mortality among Asian seafarers. In doing so, the first aim was to identify all deaths occurring among the mainly Asian seafarers in the merchant fleets of Singapore and Hong Kong between 1981 and 1995. It should be recognised that these two fleets may well be, at least in terms of the flag state administration's role of recording and investigating deaths among employees, at the higher end of the spectrum of countries employing Asian seafarers in large numbers.¹⁵ Hence it may well be that the findings presented here for *Asian* seafarers in these two fleets are flattering, rather than representative, of the actual levels and patterns of occupational mortality suffered by Asian merchant crew world-wide.

It is expected that almost all of the fatalities which occurred in the British fleet have been identified during the course of this study. The same cannot be written with any conviction about the Singapore and Hong Kong fleets. While it is almost certain that the reported figures for these two fleets are the subject of under-reporting it is likely, nonetheless, that most deaths have been covered by this study. The analysis of mortality rates among the mainly Asian seafarers in the Hong Kong and Singapore fleets are liable to under-estimation on this count also.

The levels of occupational mortality as a result of maritime disasters involving the merchant vessels are estimated to be significantly higher under the two Asian flags; over five times as high in the Hong Kong fleet, and more than twice as high in Singapore ships, than in the British fleet. Most of the disasters involving British vessels involved fires in accommodation areas, and fires or explosions in the engine rooms of oil tankers. More of the disasters in the Singapore and Hong Kong fleets, by contrast, were linked to vessels foundering and grounding in rough seas and typhoons. It is, of course, difficult to ascertain whether or not the crew in Singapore and Hong Kong vessels more frequently had to contend with adverse conditions in the Far East than seafarers in the British fleet, more commonly perhaps through rough passages in the North and Irish Seas, the English Channel and the Bay of Biscay. Nonetheless, the particularly high estimate for loss of life through maritime disasters in Hong Kong

¹⁵ It is notable also that while Hong Kong has traditionally been regarded as a British second register and Singapore has recently been classified as a FOC on a ship-by-ship basis (International Transport Federation, 1997) these two flags, unlike those of several of the FOCs and other Asian national flags which employ Asian seafarers on a large-

vessels is put in further context when one considers that it is over three times greater than for the Danish fleet between 1986 and 1993 (Hansen, 1996), and over 17 times in excess of that evident in Swedish merchant shipping between 1984 and 1988 (Larsson and Lindquist, 1992).

The estimated mortality rates for occupational accidents are similarly higher among the crew of Singapore and Hong Kong vessels than in the British fleet, and also in the Danish (Hansen, 1996) and Swedish (Larsson and Linquist, 1993) fleets. While the proportions of deaths attributable to occupational accidents is evidently high among most of the major ship types in the Singapore and Hong Kong fleets, the corresponding mortality rates would appear to vary considerably according to the British trade employed in; occupational accidents account for much greater proportions of lives lost in the offshore sector, and to a lesser extent, general cargo vessels and bulk carriers, when compared to the British passenger sector. In the British offshore sector, since 83% of all fatalities were due to an occupational accident or heart attack, this would support the widespread anecdotal evidence that this is both a particularly hazardous and stressful area of shipping in which to be employed.

Occupational mortality in the British fleet would appear, from the evidence compiled during the course of this study, to exceed that in the Singapore and Hong Kong fleets on four counts. Three of these refer to off-duty accidents, off-duty drowning and, notwithstanding the limited number of cases involved, fatalities as a direct consequence of alcohol or drug intoxication. Many of the off-duty accidents and drowning involved inebriated seafarers returning to their small, berthed, cargo vessels after drinking in public houses ashore. Access to these vessels was sometimes hazardous on account of insecure gangways and ladders lying perilously steep, or even hanging vertically from the sides of vessels, as a result of tidal fluctuations.¹⁶

scale, are not normally regarded as among the worst fleet in terms of quality of shipping and port detentions (NUMAST Telegraph, 1998a).

¹⁶ This issue has been raised elsewhere. See, for example, Hansen (1996), Roberts (1998b) and Numast Telegraph (1998b).

Seafarers in the British fleet also died more frequently as a result of illnesses such as cardiovascular diseases and gastro-intestinal disorders. Documents examined through the course of this study, such as reports of Coroner's Inquests and post mortem examinations, would indicate that factors such as smoking, obesity and, in particular, heavy alcohol consumption were related to many of the fatalities in the British fleet.

Seafarers serving in Singapore and Hong Kong merchant vessel, when compared with those in the employed in the British fleet, more often lost their lives through homicides, suicides and disappearances at sea, as well as maritime disasters and occupational accidents. The evidence would indicate that a great deal of the occupational mortality among the mostly British seafarers who were serving in the UK fleet was related to lifestyle factors. In the Singapore and Hong Kong fleet, by contrast, it would seem clear that work-related accidents, problems and disasters accounted for most of the lives lost among the Asian seafarers.

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