Report on the investigation of

the collision between

Hyundai Dominion and *Sky Hope*

in the East China Sea

21 June 2004

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Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purpose is to attribute or apportion liability or blame.

The following is a joint investigation report with the Hong Kong Marine Department in which the MAIB has taken the lead role pursuant to the IMO Code for the Investigation of Marine Casualties and Incidents (Resolution A.849(20)).

CONTENTS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AB	-	Able seaman
AIS	-	Automatic identification system
ARPA	-	Automatic radar plotting aid
CCTV	-	Closed circuit television
CEC	-	Certificate of equivalent competency
CoC	-	Certificate of competency
COLREGS	-	International regulations for preventing collisions at sea, 1972, as amended
CPA	-	Closest point of approach
°	-	degrees (of angle)
‘	-	minutes (of angle)
DOC	-	Document of compliance
GMDSS	-	Global maritime distress and safety system
GPS	-	Global positioning system
gt	-	gross tonnes
HKMD	-	Hong Kong Marine Department
ICS	-	International Chamber of Shipping
IMO	-	International Maritime Organization
ISM	-	International management code for the safe operation of ships and for pollution prevention
kW	-	kilowatt
LT	-	local time
m	-	metre
MCA	-	Maritime and Coastguard Agency (UK)
MCR	-	Maximum continuous rating

NCR	-	Normal continuous rating
nm	-	nautical miles
OOW	-	Officer of the watch
rpm	-	revolutions per minute
SMC	-	Safety management certificate
SMS	-	Safety management system
SOLAS	-	Convention for the Safety of Life at Sea 1974
STCW	-	International Convention on Standards of Training, Certification and Watchkeeping for seafarers
UK	-	United Kingdom
UTC	-	Universal co-ordinated time
VDR	-	Voyage data recorder
VHF	-	Very high frequency (radio)
VTS	-	Vessel traffic system

SYNOPSIS

At 0738 local time on 21 June 2004, the 74,373gt UK registered container vessel, *Hyundai Dominion,* and the 6,899gt Hong Kong registered container vessel*, Sky Hope,* collided in the East China Sea. There were no injuries or pollution. Only *Sky Hope* suffered any significant damage. Each vessel was able to continue passage.

As the vessels approached, in good visibility, the officer on watch on *Sky Hope* incorrectly assessed the encounter as one where *Hyundai Dominion* was overtaking his vessel. Action by either vessel was then delayed by discussions on the VHF. Further delay resulted when the OOW on *Hyundai Dominion* requested the other vessel to keep clear using the free text facility on the Automatic Identification System (AIS).

In spite of very late avoiding action taken by both vessels, they collided. The starboard bridge wing, lifeboat davit and a container on *Sky Hope* were damaged. Damage to *Hyundai Dominion* was limited to slight indentation of a breakwater on her port bow, distorted handrails on the forward deck and scratches to paintwork on the port bow.

The accident was investigated by the UK's Marine Accident Investigation Branch (MAIB) and the Hong Kong Marine Department (HKMD) as a joint investigation in accordance with the International Maritime Organization's (IMO's) Code for the investigation of marine casualties and incidents.

The investigation highlighted several causal and contributory factors. These included:

- Neither watchkeeper claimed to be fatigued, however both had worked in excess of the hours permitted under the international convention on Standards of Training, Certification and Watchkeeping for seafarers (STCW) over the previous two days.
- *Sky Hope* had been observing the approach of *Hyundai Dominion.* However, other than VHF communication there was no avoidance action taken until she was within a range of 0.2 nautical mile (nm).
- *Sky Hope* judged *Hyundai Dominion* to be an overtaking vessel which, in accordance with the COLREGS, required him to take no immediate avoiding action.
- *Hyundai Dominion* considered *Sky Hope* was a crossing vessel requiring *Hyundai Dominion* to "stand-on".
- In VHF communications between the vessels leading up to the collision, it is likely that a disagreement took place due to the difference in opinion over the "crossing" or "overtaking" situation.
- The OOW of *Hyundai Dominion* stated that he sent a text message over AIS asking *Sky Hope* to keep clear. The OOW of *Sky Hope* stated that he did not receive this message.
- *Hyundai Dominion* made a sound signal before the collision, using the forward whistle. There was no sound signal given by *Sky Hope* before the collision.

- Neither OOW advised his master prior to the collision.
- Correct emergency procedures were not followed by *Hyundai Dominion* after the collision.
- *Sky Hope* resumed passage some 22 minutes after the collision. It is unlikely that a proper assessment of the vessel's condition could have been completed within this time.
- The bridge watchkeepers of *Hyundai Dominion* lacked a clear understanding of the operation of the engine controls.

Following the collision, the managers of *Hyundai Dominion* have issued the results of a review of company navigational procedures, which began in May 2004. They have also introduced company specific navigational training for junior officers and deck cadets. In addition, they have increased the number of internal and external navigational audits of their vessels.

Recommendations have been made to the managers of both vessels to advise their bridge watchkeepers to call the vessel's master at the early stages of a developing hazardous situation, the importance of ensuring watchkeepers receive adequate rest and the procedures to be followed in the event of a collision. Further recommendations have been made to the managers of *Sky Hope* regarding application of the COLREGS and use of VHF and sound signals in collision avoidance. Recommendations have been made to *Hyundai Dominion'*s managers with respect to familiarisation of bridge watchkeepers with engine controls, the use of AIS text facilities in situations requiring prompt action and the need for OOWs to be able to communicate with other bridge team members.

Similarly, recommendations have been made to the International Chamber of Shipping (ICS) to promulgate to its members the lessons learned from this accident regarding the dangers of using AIS text facilities in situations requiring prompt action. It is also recommended to reinforce the advice contained in the ICS's *Bridge Procedures Guide* covering use of the COLREGS, calling the vessel's master and post collision actions.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *HYUNDAI DOMINION* AND *SKY HOPE* AND ACCIDENT

***Hyundai Dominion* (Figure 1)**

Vessel details

Registered owner	:	Tempo Navigation Ltd
Manager(s)	:	Zodiac Maritime Agencies Ltd Lynton House 7-12 Tavistock Square London WC1H 9TP
Port of registry	:	London
Flag	:	UK
Type	:	Container
Built	:	2001, Hyundai Heavy Industries, Ulsan, Korea
Classification society	:	Lloyd's Register
Construction	:	Steel
Length overall	:	303.83m
Gross tonnage	:	74,373
Engine power and type	:	65930kW. B&W 12K98MC-CX
Service speed	:	26.4knots
Other relevant info	:	Single fixed pitch propeller
Persons on board	:	22
Damage	:	Minor damage to guardrails and breakwater on the port bow.

***Sky Hope* (Figure 2)**

Vessel details

Registered owner	:	Topwave Shipping Ltd
Manager(s)	:	Pagasa Shipmanagement Inc
Port of registry	:	Hong Kong
Flag	:	Hong Kong
Type	:	Container
Built	:	2000, Shin Kurushima Dockyard Co Ltd, Akitsu, Japan
Classification society	:	Nippon Kaiji Kyokai
Construction	:	Steel
Length overall	:	120.84m
Gross tonnage	:	6,899
Engine power and type	:	5,589kW, B&W 8S35MC
Service speed	:	15.6knots
Other relevant info	:	Single fixed pitch propeller
Persons on board	:	18
Damage	:	Significant damage to starboard bridge wing, deck edges and guardrails, freefall lifeboat and davit and one cargo container

Accident details

Time and date	:	0738LT, 21 June
Location of accident	:	30° 59.7'N 125° 45.7'E **(Figure 3)**
Injuries/fatalities	:	None

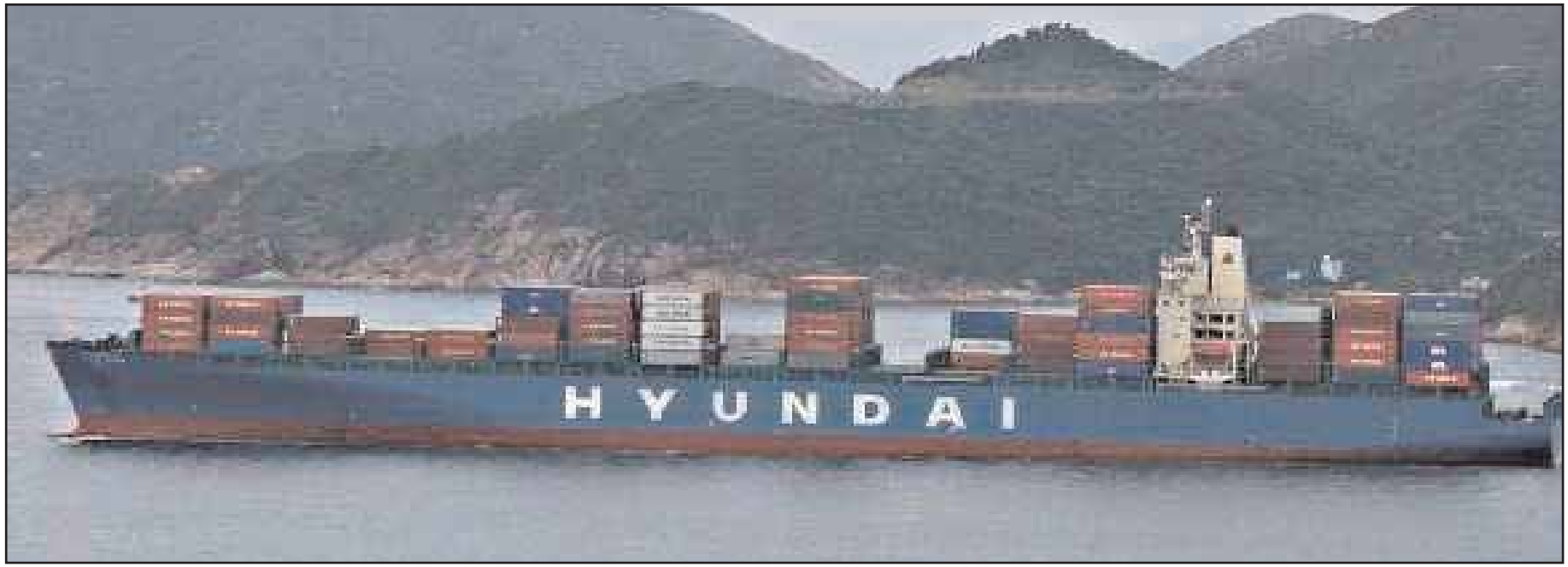
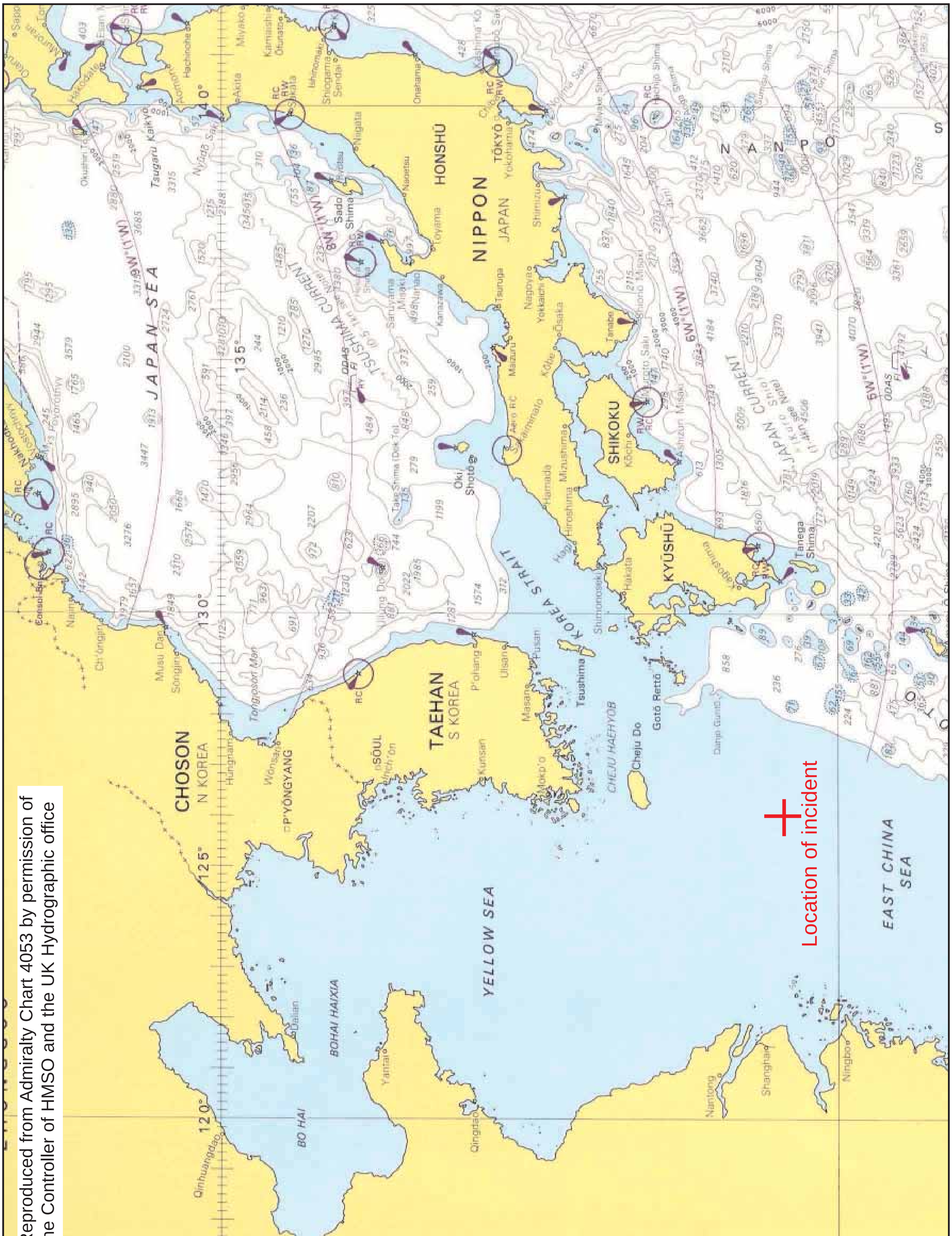


Figure 1 - *Hyundai Dominion*

Figure 2 - *Sky Hope*

Figure 3


Reproduced from Admiralty Chart 4053 by permission of
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Location of incident
JAPAN SEA
YELLOW SEA
EAST CHINA SEA
KOREA STRAIT
BOHAI HAIXIA
BO HAI
CHOSON
N KOREA
TAEHAN
S KOREA
NIPPON
JAPAN
HONSHU
SHIKOKU
KYUSHU
TSUSHIMA CURRENT
JAPAN CURRENT
Shanghai
Ningbo
Qingdao
Yantai
Dalian
Qinhuangdao
Nantong
P'YONGYANG
SOUL
Pusan
Cheju Do
Tsushima
Goto Retto
TOKYO
Niigata
Sado Shima
Oki Shoto
Tanega Shima
Hakodate
120°
125°
130°
135°
140°

1.2 NARRATIVE

All courses are true, all times are local (UTC+9)

1.2.1 Events as seen by *Hyundai Dominion*

Hyundai Dominion sailed from Kaosiung, Taiwan, on 20 June for passage to Pusan, Korea. Between 0710 and 0720 the following day, the officer of the watch (OOW), who was the chief officer, detected a vessel on his port bow at a range in excess of 5nm. The vessel was initially detected by radar but sighted immediately after. *Hyundai Dominion* was on a course of 036° in autopilot, at a speed of 22 knots. An able seaman (AB) was on watch on the bridge with the chief officer, but he temporarily left the bridge at about 0700.

The radar contact was identified as *Sky Hope* using the information displayed by the AIS. The automatic radar plotting aid (ARPA) on the port radar display was the display chiefly used by the OOW and was set to the 12-mile range scale, off-centred to the south-west. The starboard radar display was on the 6-mile range scale, and was also off-centred to the south-west. Both radar displays were north up and operating in true motion. The OOW assessed it to be a crossing situation and expected the other vessel to alter course to starboard in order to keep clear.

Between 0725 and 0730, the range of *Sky Hope* had closed to about 2.5 miles, and the closest point of approach (CPA) of *Sky Hope* was 0.3 mile by ARPA. The OOW switched the port radar display to relative motion, and used the relative vector of *Sky Hope* to determine that she would pass ahead. He was aware that the ARPA information did not take into account the distance between the radar aerial and the bow, and considered 0.3 mile to be too close. The OOW called *Sky Hope* by very high frequency (VHF) radio channel 16, but did not hear a response.

Two to three minutes later, the OOW sent a message to *Sky Hope* via AIS, stating:

PLS KEEP CLEAR

AIS indicated that the message had been successfully transmitted, but no reply was received from *Sky Hope*. About 1.5 to 2 minutes later, the OOW decided to call again via VHF radio channel 16, and on this occasion there was an immediate response. The OOW of *Sky Hope* acknowledged that he had received the AIS message and stated an intention to pass ahead of *Hyundai Dominion* because this was an overtaking situation. The OOW of *Hyundai Dominion* told him not to cross his bows, but to alter course to starboard, as this was a crossing, not an overtaking situation. The OOW of *Sky Hope* agreed to take this action.

By that stage the AB had returned to the bridge and, as a precaution, the OOW of *Hyundai Dominion* switched to manual steering. Moments later, the OOW received a call from *Sky Hope* to say that it was too late to alter course to starboard, and he was altering to port. *Hyundai Dominion*'s OOW replied that he would alter to starboard to help the situation. He ordered the AB to put the helm hard to starboard and checked the rudder angle indicator to ensure this instruction had been carried out correctly. One short blast was also sounded using the forward whistle only. By then, *Sky Hope* was disappearing from view behind the containers on the port bow, and the OOW continued to watch her approach on a closed circuit television (CCTV) monitor on the port side of the bridge, which had a camera on the port bridge wing selected. The rate of turn indicator was showing 30° per minute, and *Hyundai Dominion* was heeling to port.

The two vessels collided at about 0738, with *Hyundai Dominion'*s port bow hitting *Sky Hope*'s starboard quarter. About 10 seconds after the collision, the OOW alerted the master in his cabin using an alarm fitted to the internal telephone system. The master had not felt the ship heel during the turn to starboard, heard the one short blast on the whistle, or felt the impact of the collision.

When the master arrived on the bridge, *Sky Hope* was already between 200 and 300 metres on the port quarter, but he could see that her starboard bridge wing had been damaged. The chief officer had already steadied on a course of 069° but had not altered speed. The master called both the second and third officers in their cabins by telephone, and ordered them to the bridge. On their arrival, the third officer took over the watch and the second officer assisted the master. The master did not sound the general alarm. Information was exchanged with *Sky Hope*. The chief officer checked the contents of the ballast tanks using the control/monitoring system on the bridge, and also ordered the bosun to take soundings. At about 0757, the master ordered the speed to be reduced, and at about 0820, course was altered to about 013° to regain the planned track. He did not consider that there was any need to reverse course.

1.2.2 Events as seen by *Sky Hope*

At about 0715 on 21 June 2004, while underway from Shanghai to Osaka and Kobe, the OOW of *Sky Hope* sighted a large container ship at her starboard quarter, which was later identified as *Hyundai Dominion*. The course and speed of *Sky Hope* was 091° and 15.3 knots.

At 0720, the bearing and range of the container ship was found to be 210° at 6nm. The chief officer, who was the OOW, did not take any avoiding action at that stage as he assessed that this was an overtaking situation and *Hyundai Dominion* should keep clear.

As *Hyundai Dominion* appeared to be taking no action, the OOW shifted to manual steering at 0725. At about 0730, the OOW observed on radar that the bearing of *Hyundai Dominion* had not changed and the distance had decreased to 3nm. The OOW called *Hyundai Dominion* on VHF radio Channel 16 at 0730, 0732, and 0734 and told her to keep clear. However, *Hyundai Dominion* did not appear to have taken any action and continued to approach from the starboard quarter, with no change of bearing.

At 0736, at a distance of about 0.2nm, the OOW altered course to 065° to try and avoid a collision. The collision occurred at about 0738, as the port bow of *Hyundai Dominion* struck the starboard quarter of *Sky Hope* in the region of the lifeboat installation, advancing its impact towards the starboard wing of the navigational bridge and into the container stowage bay area. *Hyundai Dominion* did not appear to have slowed down, and it disengaged from *Sky Hope* after the impact. *Sky Hope*'s OOW called up on the VHF Channel 16 after the collision and exchanged information.

After the collision, *Sky Hope*'s master raised the general alarm. The crew was mustered to emergency stations. After checking there were no casualties, it was found that *Sky Hope*'s starboard quarter had sustained extensive damage during the impact. *Hyundai Dominion* confirmed to *Sky Hope* that there was no serious damage to the vessel or injury to her crew. The master assessed the damage, and confirmed that the ship's hull remained intact.

Sky Hope resumed her voyage to Osaka and Kobe at 0800.

1.3 WEATHER CONDITIONS

Visibility was good, wind was north-west force 5, and the sea state was moderate. Sunrise was at 0533 (local time).

1.4 DAMAGE

1.4.1 *Hyundai Dominion*

The damage to *Hyundai Dominion* was limited to slight indentation of a breakwater on her port bow, distorted handrails on the forward deck, and scratches to the paintwork on her port bow **(Figures 4 and 5)**.

1.4.2 *Sky Hope*

The damage sustained by *Sky Hope* was more extensive and included: the starboard bridge wing crushed inwards; starboard "C" and "D" deck railings crushed or bent and the deck corners badly dented; the davit arm for the freefall lifeboat badly crushed and the lifeboat shell cracked; one liferaft damaged; one cargo container crushed **(Figures 6, 7, 8 and 9)**.

Figure 4

Damaged breakwater - *Hyundai Dominion*

Figure 5

Damaged guardrails - *Hyundai Dominion*

Damaged starboard bridge wing - *Sky Hope*

Figure 8

Damaged container - *Sky Hope*

Figure 9

Damaged lifeboat davit - *Sky Hope*

The following items were dealt with in Kobe:

1. Lifebuoy with smoke light (replaced).
2. Sidelight (temporarily repaired).
3. 20 person liferaft (replaced).

On completion of the unloading of cargo in Kobe the Classification Society instructed *Sky Hope* to sail to a repair yard in Japan where repairs were effected to the following:

1. Quick release for the lifebuoy on the navigation bridge deck (renewed).
2. Sidelight and its housing assembly (renewed).
3. Deformed parts of the freefall davit for the lifeboat (renewed).
4. Fractured sections of the lifeboat starboard side shell were repaired and the acrylic window renewed.
5. Gyro compass repeater stand (renewed).

1.5 AUTOMATIC IDENTIFICATION SYSTEMS (AIS)

An AIS broadcasts information which can be received by a shore station, or any other vessel also equipped with AIS. Transmissions are by marine band VHF, so have a similar range, typically 20 miles, depending on antenna height.

The information transmitted includes:

vessel identification

speed over ground

course over ground

true heading

latitude and longitude

rate of turn

navigation status (under way, at anchor, not under command)

cargo carried

destination

The frequency with which each piece of information is updated depends on whether it is dynamic or voyage related data. Details of a vessel's cargo need to be updated only every 6 minutes. However, rapidly changing data such as speed and heading may, for a ship running above 23 knots and changing course, require an update every 2 seconds.

The intention of AIS is to improve safety of navigation by satisfying three requirements:

1. In a ship-to-ship mode for collision avoidance
2. As a means to obtain information about a ship and her cargo
3. As a vessel traffic system (VTS) tool ie ship-to-shore (traffic management).

Chapter V of the Safety of Life at Sea (SOLAS) Convention 1974, as amended, contains requirements for the introduction of AIS on board seagoing vessels. For ships the size and age of the two vessels involved in this accident, these requirements are:

Hyundai Dominion

In the case of ships, other than passenger ships and tankers, constructed before 1 July 2002 and of 50 000 gross tonnage and upwards, AIS is required to be fitted not later than 1 July 2004.

Hyundai Dominion was fitted with a Nauticast AIS in May 2004, shortly before the equipment became mandatory for a vessel of her size and age.

Sky Hope

In the case of ships, other than passenger ships and tankers, constructed before 1 July 2002, of 300 gross tonnage and upwards but less than 50 000 gross tonnage, not later than the first safety equipment survey after 1 July 2004 or by 31 December 2004, whichever occurs earlier.

The AIS on board *Sky Hope* was a Furuno Model FA-100. The equipment was fitted on 17 November 2003 while the vessel was in Singapore. The equipment has an “inbox” facility for the purpose of storing up to five messages. Older messages are automatically deleted as new ones are received.

Neither of the AIS units gave automatic, audible warnings that a text message had been received, although the unit on *Sky Hope* could be enabled to sound an alarm. Therefore it was necessary for the OOW to periodically scan the text display in order to pick up a message.

1.6 DATA RECORDING

Neither vessel was required to be fitted with VDRs, and neither vessel was equipped with this equipment.

There was no course recorder on board *Sky Hope*. A record of courses and the use of engine was made using the charts, ship’s deck logbook and the engine movement log. *Sky Hope* was using conventional paper charts for navigation and was equipped with a global positioning system (GPS). The record of GPS positions prior to the collision was made manually. Admiralty Chart 2412, showing the East China Sea and coast of Shanghai, was in use for navigation.

A course recorder was carried on board *Hyundai Dominion*. She was also fitted with an engine room data logger, which recorded engine movements, whether initiated by the bridge or the engine room.

The electronic chart system fitted to *Hyundai Dominion* was accompanied by an instruction manual indicating that the system was capable of operating in the storage mode. Although storage files of the system were interrogated a few days after this accident, no data was found. It was apparent that it was not the practice on board this vessel to record voyage navigational data on this system. In the absence of a VDR, there is no statutory requirement to record this data electronically.

1.7 MANNING AND CERTIFICATION

As a UK registered vessel, *Hyundai Dominion* was required to carry a master and crew who held certificates that satisfied UK regulations made in order to comply with STCW.

The master and officers of *Hyundai Dominion* were required to satisfy The Merchant Shipping (Training and Certification) Regulations 1997. In order to ensure their competency, they were required to hold a UK Certificate of Competency (CoC) or a UK Certificate of Equivalent Competency (CEC) issued by the Maritime and Coastguard Agency (MCA).

All the engineers on *Hyundai Dominion* held CECs. The master and navigating officers had each made a recent application for a CEC, which had been acknowledged by the MCA. These acknowledgements were considered acceptable for 3 months, while the applications were considered and processed.

A similar situation applied to the officers and crew of the Hong Kong registered *Sky Hope*. She was required to carry a master and crew holding certificates or licences that satisfied The Merchant Shipping (Seafarers) Certification of Officers Regulations of Hong Kong in order to comply with STCW.

There are no nationality restrictions on crew working on board Hong Kong registered ships. The master, officers and ratings of *Sky Hope* were non-Hong Kong residents; all were of Philippine nationality.

The master and all officers of *Sky Hope* held Hong Kong licences. These were issued by the HKMD on submission of certificates of competency issued by the Philippines Administration, which were recognised by the HKMD.

The chief officer held a valid Philippine Master's certificate. With that qualification he was issued with a Class 1 Hong Kong Licence for him to work on board a Hong Kong registered ship. He joined *Sky Hope* on 17 November 2003. According to his work record, he was promoted to the rank of chief officer in March 1989. Since then, he had worked as chief officer on 11 ships before

joining *Sky Hope*; each tour lasted an average of about 10 months. He had also been working as master on a general cargo ship between May 2002 and February 2003. He held a Hong Kong Global Maritime Distress and Safety System (GMDSS) certificate.

The master of *Sky Hope* held a valid Philippine Master's certificate. With that qualification, he was issued with a Class 1 Hong Kong Licence for him to work on board a Hong Kong registered ship. He joined *Sky Hope* on 3 July 2003. The earliest service record available dates back to 1993. Since 1993, he had worked as master on 10 ships before joining *Sky Hope*, each tour varied from 2 months to 16 months. He also held a General Operator Certificate for operating GMDSS equipment.

1.8 HOURS OF WORK

Before starting his watch at 0400 on 21 June, the chief officer of *Hyundai Dominion* had 8 hours off duty. During the 40 hours before that period of rest, he had a total of 6 hours rest, in 1 period of 3 hours, 1 of 2 hours and a single hour.

Immediately before beginning the watch during which the collision occurred, *Sky Hope'*s chief officer received 8 hours rest. He was on duty during the preceding 24 hours, gaining a 7 hour rest period which was interrupted half way by 30 minutes of duty.

1.9 WORKING LANGUAGES

The master and chief engineer of *Hyundai Dominion* were South Korean nationals, and thus had a common language. The remainder of the crew was a selection of Yugoslavian, Romanian, Bulgarian, Ukrainian and Turkish nationals.

As required by the MCA, the standard of English of the master and officers should be at least above a specified minimum standard. No such requirement applies to the remainder of the crew. At the time of this accident, the chief officer was on watch with a Turkish lookout whose standard of English was poor.

Sky Hope was manned entirely by Philippine nationals, who shared a common language.

1.10 ENGINES AND CONTROLS

Hyundai Dominion is fitted with a 12 cylinder Burmeister and Wain slow speed reversible main engine, coupled to a fixed pitch propeller. The engine was built under licence by Hyundai Heavy Industries. Maximum continuous rating (MCR) of the engine is 65 930kW, at 100.2 revolutions per minute (rpm), corresponding to a ship's speed of 27.4knots. Normal continuous rating (NCR) is 59 400kW, at 96.7rpm and 26.4knots.

The normal method of engine control on *Hyundai Dominion* is by a 'Norcontrol AutoChief 4' single lever control station, on the bridge console. The engine can also be controlled from the engine room using traditional telegraph messaging from the bridge, to indicate desired direction and speed.

In bridge control mode, the movement of the single lever from the 'stop' position initially starts the engine and then causes it to run at the speed corresponding to the lever position. This regime applies while the desired running speed is within the manoeuvring speed range.

Manoeuvring speeds, ahead and astern, are:

Full	-	60rpm
Half	-	50rpm
Slow	-	42rpm
Dead Slow	-	28rpm

Under 'Full Away' conditions, ahead speeds above 60rpm are obtained by moving the control lever beyond the 'Full Ahead' position. However, the engine speed will not immediately accelerate to the desired speed; it will increase at a pre-programmed rate set by the engine control system. This type of load pre-programming is intended to limit the rate of change of mechanical and thermal loading on the engine in order to limit wear and thermal stress.

Reduction of engine speed, in the range above 'Full Ahead' (60rpm), will also follow a pre-programmed rate.

By pressing a 'cancel load programme' button, these pre-programmed speed changes may be overridden, if circumstances dictate. Override may also be achieved, when running above 60rpm, by moving the control lever to a position corresponding to a speed of 60rpm or less; the engine then operates in its 'Stand By' or manoeuvring mode.

Written instruction, on the use of the bridge control station and engine operations, were set out on two sheets of paper in a plastic envelope hanging from the front of the wheelhouse chart table.

Sky Hope is fitted with one single screw Mikita Mitsui Man Burmeister and Wain main engine. The engine was built under licence by Hyundai Heavy Industries. Total engine power is 5589kW, at 170rpm, corresponding to a ship's speed of 16.2 knots.

The normal method of engine control on *Sky Hope* is by a single lever control station on the bridge console. The engine can also be controlled from the engine room using traditional telegraph messaging from the bridge to indicate desired direction and speed.

1.11 FLEET CIRCULARS

The managers of *Hyundai Dominion* issued a Fleet Circular on the use of main engines by watchkeeping officers. This is dated 29 May 2001, and its issue was prompted by a collision involving another managed vessel.

Highlighted by the circular was:

> *a problem which may be common on other vessels, and that is the reluctance of bridge watchkeepers to take control of the engines and reduce speed.*

The circular instructed masters to:

> *make it very clear in their Standing Orders that the engines are available to the watchkeepers and that speed shall be reduced in any case if required.*

It continued:

> *Watchkeepers are to be fully familiar with operating the engine telegraph/bridge control system including any limitations which may apply. Speed shall be reduced in any case where a close quarter situation is developing or the visibility is reduced in a traffic area. It is not necessary to request permission before reduction of speed.*

1.12 EMERGENCY PROCEDURES

Hyundai Dominion

A monthly plan of safety and anti-pollution related drills is maintained on board *Hyundai Dominion.* In addition, a written record of each exercise/drill is maintained.

The plan requires a damage control exercise to be undertaken each month. The damage is assumed to be due to collision, flooding or grounding.

The most recent damage control drills were carried out on 18 April, 15 May and 12 June 2004. Respectively, these were a collision, flooding and grounding.

The records of the collision exercise of 18 April show that this was largely a pollution prevention exercise initiated by the detection of oil leakage.

Emergency procedures contained in the shipboard safety manual include a list of responses that should be followed in the event of collision. The first step is:

> *General Emergency Initial Actions carried out?*

This section of the procedures does not make clear what these ‘initial actions’ are, or who should carry them out. A separate section sets out these ‘initial actions’, which include sounding the general emergency alarm and mustering the crew.

The subsequent steps cover damage assessment, contacting other vessels involved and preservation of records etc.

Sky Hope

In the months before this accident, *Sky Hope* carried out the mandatory lifeboat drills and emergency exercises. The details of these were properly logged and were conducted in accordance with the International Convention for the Safety of Life at Sea 1974 (SOLAS) requirements. During this accident, the crew were mustered to the lifeboat station after the collision. Checks were then made to ensure that nobody was missing or injured, and that the vessel's seaworthiness was not compromised.

1.13 INDUCTION AND TRAINING

After recruitment into the company that manages *Hyundai Dominion*, masters and chief engineers follow an induction programme designed to ensure that they are familiar with all appropriate statutory requirements, company procedures and company organisation. This takes several days, and takes place in the manager's London office.

Other officers are recruited locally in their country of residence, with interviews held in English. As part of the process, they are assessed for their competence in English using a recognised test accepted by the MCA.

Ratings are also recruited locally, and their English language skills are also assessed, but on a less formal basis. After joining their first company vessel, and during everyday work activities, ratings are continuously assessed on their use of English. If their language skills are found wanting, the managers provide English language courses based on practical seamanship activities, which these ratings then follow.

The managers also operate a cadet training scheme. The chief officer on watch at the time of this collision served his cadetship with these managers. He completed this in 1997, following 4 years' training at a maritime college in Montenegro. He had remained continuously in the service of this company since.

1.14 SAFETY MANAGEMENT SYSTEMS

Hyundai Dominion

The managing company of *Hyundai Dominion* had been issued with a Document of Compliance (DOC) under the International Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code). This was issued following an audit of the shore based elements of the company's safety management system by the UK's MCA. A DOC was then issued covering the vessel type operated by the company. DOCs are valid for a maximum of 5 years, and are subject to annual verification.

Separate audits were performed for the ship-based elements of the company's safety management system. A Safety Management Certificate (SMC) was then issued to individual ships.

An ISM Code internal audit of *Hyundai Dominion*'s Safety Management System (SMS) was performed during December 2003. It identified three non-conformities. These concerned the use of uncorrected navigational charts, procedures followed during restricted visibility and procedures for entering enclosed spaces.

The managers of *Hyundai Dominion* also performed 13 internal navigational audits on their vessels during 2003. Four external navigational audits have also been undertaken. These were carried out by auditors from outside the manager's organisation, but none took place on *Hyundai Dominion*.

Sky Hope

The SMC of *Sky Hope* was issued on 4 December 2003 and remains valid until 3 July 2008, subject to periodic verification and the DOC remaining valid. The SMC was issued upon satisfactory audit of the vessel on 4 July 2003 on behalf of the HKMD, by a classification society. The purpose of the audit was to verify that the vessel had complied with the requirements of the ISM Code, following verification that the DOC for the company was applicable to this type of ship.

The DOC for the managing company was issued on 24 October 2003, and is valid until 25 June 2008, subject to satisfactory annual verification of the SMS of the company. The initial DOC audit was conducted on 25 June 2003 jointly by the HKMD and a classification society. The audit covered all the aspects of the ISM Code, and the full term DOC was issued after the satisfactory completion of the audit. Currently, the company is managing six Hong Kong registered vessels.

SECTION 2 - ANALYSIS

Times shown are local time (UTC+9)

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 FATIGUE

Section A VIII/1 of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995 (STCW) with respect to fitness for duty, states:

> *"1. All persons who are assigned duty as officer in charge of a watch or as a rating forming part of a watch shall be provided a minimum of 10 hours of rest in any 24-hour period.*
>
> *2. The hours of rest may be divided into no more than two periods, one of which shall be at least 6 hours in length.*
>
> *3. The requirements for rest periods laid down in paragraphs 1 & 2 need not be maintained in the case of an emergency or drill or in other overriding operational conditions.*
>
> *4. Notwithstanding the provisions of paragraphs 1 & 2, the minimum period of ten hours may be reduced to not less than 6 consecutive hours provided that any such reduction shall not extend beyond two days and not less than 70 hours of rest are provided each seven-day period."*

The watchkeepers on both vessels had 8 hours available for rest before they began their watches on the morning of the collision. However, both had worked in excess of the hours permitted by STCW over the previous 2 days.

Neither watchkeeper claims to have been affected by fatigue; this is not uncommon following an accident. The managers of both vessels should, however, take note of the breach of STCW hours of work. Due to this breach, it is impossible to dismiss fatigue as being a contributory factor to the collision. Both watchkeepers were probably affected to a similar degree. Again, the managers of both vessels should recognise that fatigue is likely to adversely affect the performance of their staff when they are unable to take the hours of rest specified in STCW and should take remedial action.

2.3 RECORDED EVENTS BEFORE COLLISION

Summary of observations from each vessel

Sky Hope was on a course of 091° at a speed of 15.3 knots. Her OOW first saw *Hyundai Dominion* at 0720 at 6nm on a bearing of 210°. He assessed that *Hyundai Dominion* was an overtaking vessel, and that *Sky Hope* was the stand on vessel, and as such, was not required to take any immediate avoiding action. At 0730, the range had closed to 3nm but the bearing remained unchanged. At 0736, the OOW of *Sky Hope* estimated that *Hyundai Dominion* had closed to 0.2nm, and he altered course to port to 065° in an attempt to avoid a collision.

Hyundai Dominion was on a course of 036° at a speed of 22 knots. Her OOW first saw *Sky Hope* between 0710 and 0720 at 45° on his port bow, and at a range in excess of 5nm. He assessed that the ships were in a crossing situation in which *Sky Hope* was the give way vessel, and that *Hyundai Dominion* was the stand on vessel. Between 0725 and 0730, the OOW saw that the range had decreased to 2.5nm but her bearing remained unaltered. He also checked the CPA by ARPA to be 0.3nm ahead. At 0736, the OOW of *Hyundai Dominion* applied the helm hard to starboard in order to avoid colliding with *Sky Hope*. Although the ship started to turn to starboard, the two vessels collided between 0738 and 0740.

Other than VHF communication, neither OOW took any action to avoid a collision until the ships were in very close proximity, because both were under the impression that they were the stand on vessel. As the situation could not involve the ships overtaking and crossing at the same time, there is clearly a conflict between the two accounts.

2.4 CLASSIFICATION OF OVERTAKING OR CROSSING OF TWO VESSELS

In an effort to resolve the conflicting accounts of the OOWs, the recorded speed and course for each vessel has been plotted to find the resultant relative vector.

Figure 10 shows that *Sky Hope* closed *Hyundai Dominion* from a bearing of 353°, and that *Hyundai Dominion* closed *Sky Hope* from a bearing of 173°. The closing speed of the two vessels was about 18 knots.

This relative vector has been transferred through the initial ranges and bearings of the other vessel, as observed by each OOW **(Figures 11 and 12)**.

Figure 11 shows that if *Hyundai Dominion* was first seen by *Sky Hope*'s OOW on a bearing of 210° at 6 miles, she would have passed 3.6nm astern of *Sky Hope.* There would therefore have been no risk of collision.

Figure 12 shows that if *Sky Hope* was first seen by the OOW on board *Hyundai Dominion* 45° on the port bow (351° true), at about 5nm, *Hyundai Dominion* would have passed in the order of 0.5 cable ahead of *Sky Hope.* Given the

smaller CPA produced by this plot, along with the fact that the reported visual bearing (351°) was within 2° of the predicted bearing (353°), it is considered that the account of the OOW on board *Hyundai Dominion* is more accurate with regard to the relative positions of the vessels.

Figure 13 is a representation of Rules 13 and 15 of the International Regulations for Preventing Collisions at Sea 1972 as amended (COLREGS).

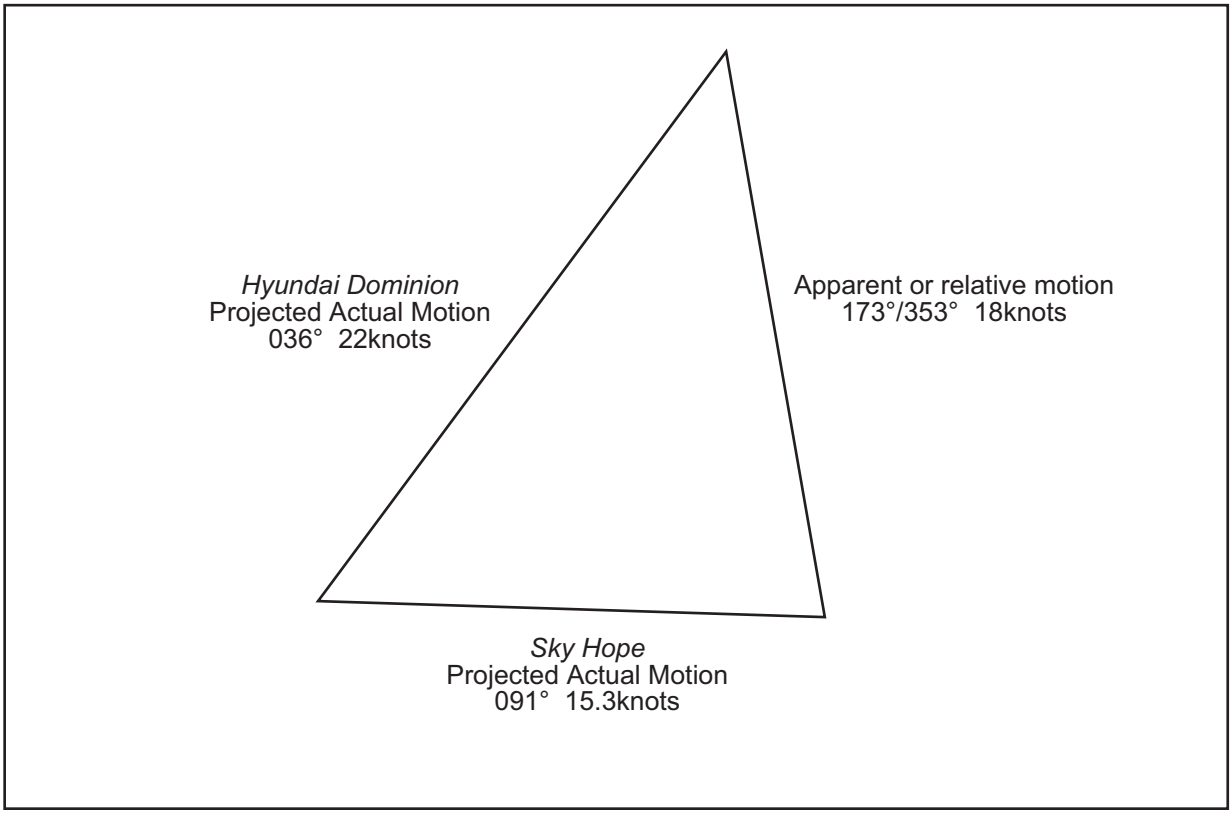
A vessel shall be deemed to be overtaking when approaching another vessel from a direction more than 22.5° abaft her beam. Otherwise, the two vessels shall be crossing.

For *Hyundai Dominion* to have been an overtaking vessel, she needed to approach *Sky Hope* from an angle greater than 22.5° aft of the beam. As *Sky Hope* was on a heading of 091°, *Hyundai Dominion* needed to be approaching at an angle greater than 91°+112.5° (or greater than 203.5°). In other words, if *Hyundai Dominion* was observed at 0720 on a bearing of 210°, it was 7° or 8° behind prescribed limit and, thus, could be regarded as an overtaking vessel.

However, as **Figure 10** shows, *Hyundai Dominion* closed on a bearing of 173°, not 210°.

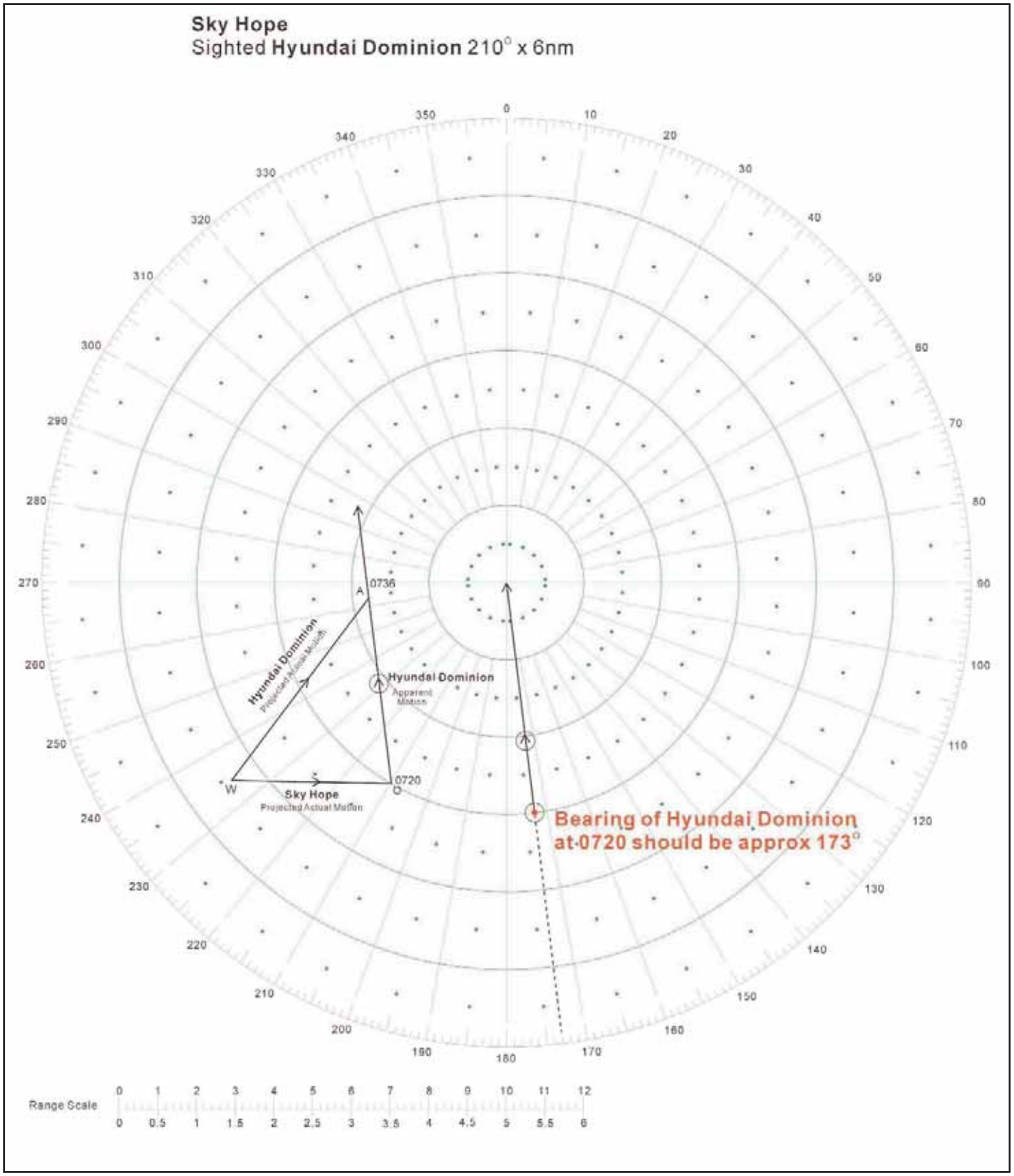
As 173° was forward of the starboard beam of *Sky Hope*, this was a crossing, not an overtaking situation as assessed by *Sky Hope*'s OOW.

Figure 10



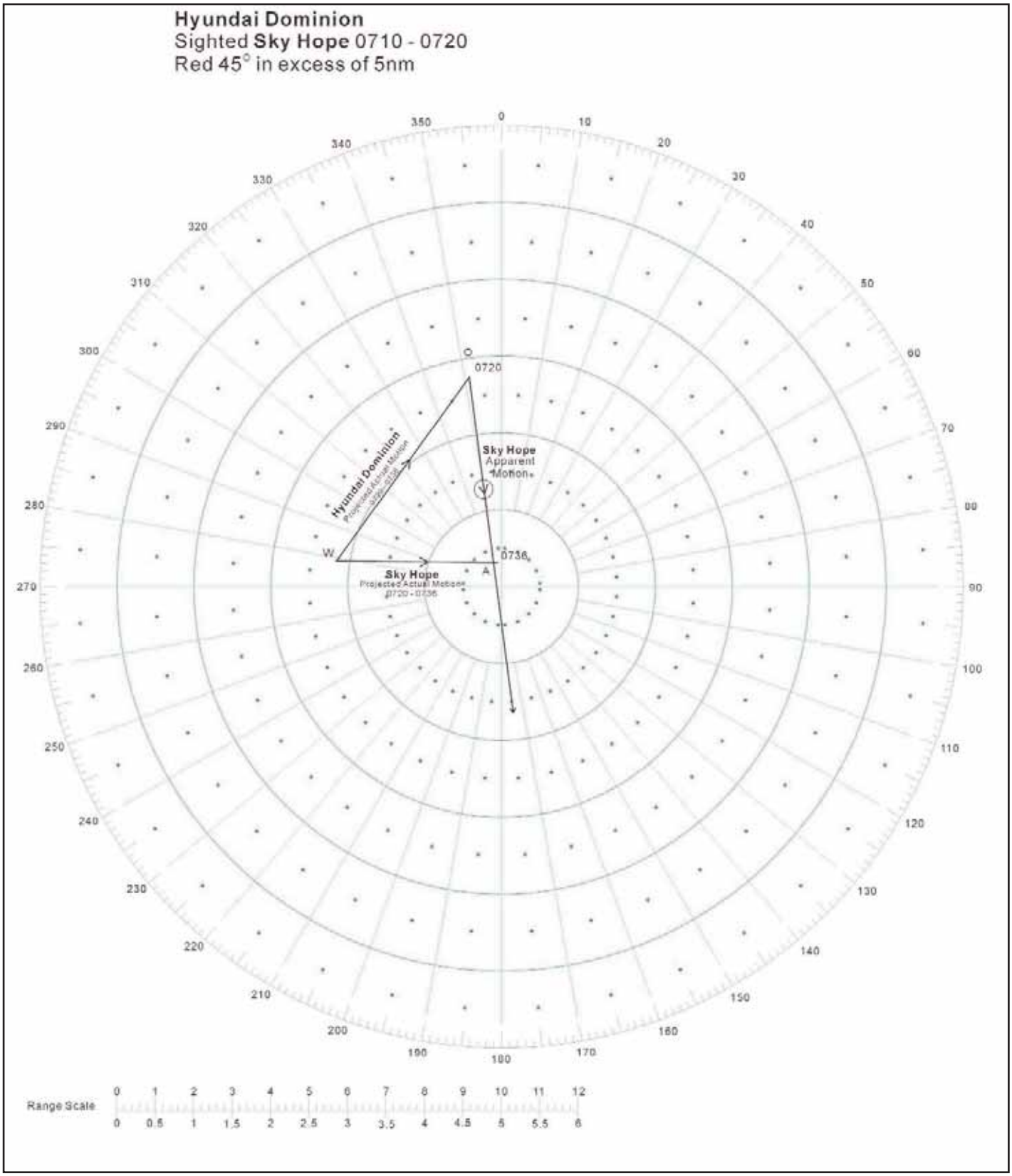
Plot to find relative motion

Figure 11



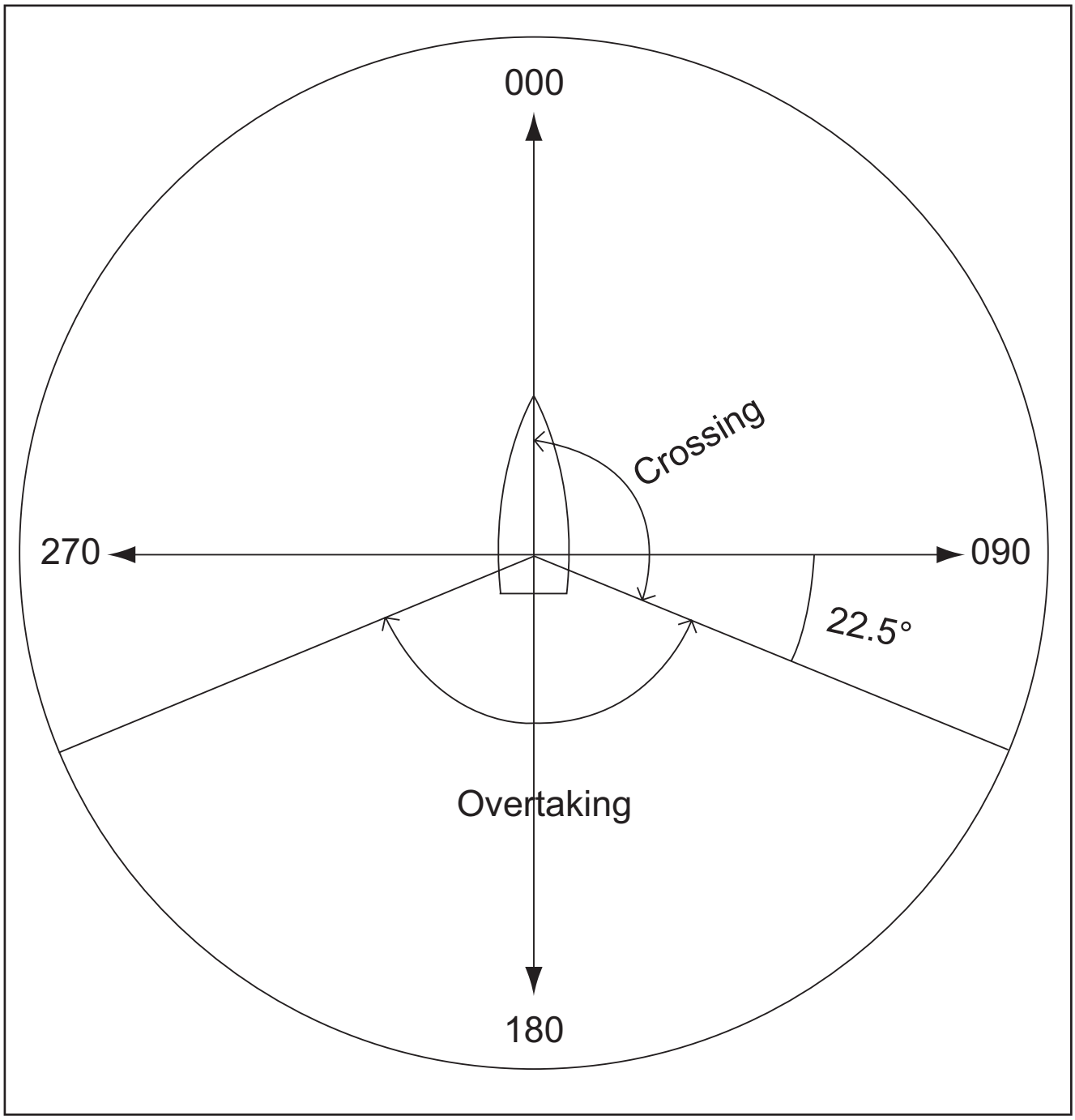
Relative motion vector plotted through position of *Hyundai Dominion* observed from *Sky Hope*

Figure 12



Relative motion vector plotted through position of *Sky Hope* observed from *Hyundai Dominion*

Figure 13



Representation of Rules 13 and 15 (COLREGS)

2.5 THE COLLISION

It has not been possible to establish how the OOW of *Sky Hope* obtained the range and bearing of 6 miles and 210°, but it is apparent this was an inaccurate observation that resulted in him assessing *Hyundai Dominion* as an overtaking vessel. This contributed to the collision. As the crossing vessel, *Sky Hope* was the give way vessel in accordance with Rule 15 of the COLREGS, and under Rule 16 she should have taken early and substantial action to keep out of the way of *Hyundai Dominion* **(see Annex)**.

The OOW of *Hyundai Dominion* considered his own ship was the stand-on vessel, which appears to have been correct. However, this did not prevent him from taking earlier avoiding action in accordance with Rule 17(a)(ii) of the COLREGS **(see Annex)** when he found that *Sky Hope* was not taking the appropriate action. *Hyundai Dominion* did not take action to alter course until 0736, when *Sky Hope* was in such close range that any action taken by the latter vessel would not have prevented the collision. This is considered to be in accordance with Rule 17(b) of the COLREGS.

The avoiding actions taken by the two vessels are considered to have been taken far too late given the size and close proximity of these vessels. Given the open sea room, and the manoeuvring characteristics of the two vessels, there is no reasonable explanation as to why the two OOWs did not take avoiding action earlier. Had substantial avoiding action been taken earlier, by either vessel, the collision would have been avoided.

The decision by both OOWs not to take action until too late might have been influenced by their fatigue.

2.6 SPEED

It is apparent that at no stage did the OOW on *Hyundai Dominion* consider reducing speed in an effort to avoid the collision, although it is accepted that this might not have been the most appropriate action. However, it is of concern that he was so uncertain of the proper use of the engine controls, and the consequences of their movement, that a speed reduction was not on his list of options, either for collision avoidance or as a post collision action.

The other bridge watchkeeping officers on *Hyundai Dominion* shared a similar lack of knowledge of the use of the main engine controls at sea. This problem had previously been identified by the vessel's managers who had issued an explanatory fleet circular on the subject. Clearly, with respect to the bridge watchkeeping officers serving on board *Hyundai Dominion*, this initiative had failed and the issue needs further review by the managers.

The speed of *Sky Hope* was not altered before the collision. Although she altered course at about 0736 in an effort to avert collision, she maintained her speed of 15.3 knots.

The OOW on *Sky Hope* considered that *Hyundai Dominion* was an overtaking vessel, and judged that a speed reduction would worsen the closing situation between the two vessels.

2.7 COMMUNICATIONS

The OOW on *Sky Hope* reported that, during the few minutes before the collision, he called *Hyundai Dominion* on VHF channel 16 and requested her to keep clear. He also claimed that *Hyundai Dominion* disregarded these repeated requests. He reported that he had received no AIS message from *Hyundai Dominion*.

Within the same period, between 0725 and 0730, the OOW of *Hyundai Dominion* reported he called *Sky Hope* on VHF channel 16 but did not receive a response. About 1.5 to 2 minutes later, he called *Sky Hope* again and did receive a response. The reply he received indicated that *Sky Hope* intended passing ahead of *Hyundai Dominion* because it was an overtaking situation. The OOW of *Hyundai Dominion* told *Sky Hope* not to cross his bows, but to alter course to starboard, as he considered the vessels were in a crossing, not an overtaking situation. It was understood that *Sky Hope* agreed to take this action.

Moments later, *Sky Hope* told *Hyundai Dominion* that it was too late to alter course to starboard, and that she would alter course to port. *Hyundai Dominion* replied that he would alter the course to starboard to alleviate the situation.

It is difficult to be certain of what was said to whom during the developing situation as there are no records of the VHF communication. However, it is considered probable that there was a disagreement on VHF about the action to be taken. This stemmed from the difference of opinion as to whether they were faced with a crossing or an overtaking situation. When the OOWs on board each of the vessels involved in this collision realised the other party was unwilling to acquiesce, each should have taken early avoidance action to alleviate the situation, rather than waste further time on the VHF conversation.

2.8 USE OF AIS TEXT MESSAGES

The OOW of *Hyundai Dominion* stated that he sent a text message to *Sky Hope* via the AIS, stating “PLS KEEP CLEAR”. However, *Sky Hope*’s OOW stated that he had not received the message.

AIS systems are not required to have an audible alarm to indicate the arrival of all text messages. It is possible, therefore, that *Sky Hope* received the text message from *Hyundai Dominion*, but the absence of an alert to the arrival of this message meant her OOW did not know this. This feature of AIS clearly makes the system unsuitable for passing urgent safety related messages of the type sent in this case.

The IMO has promulgated guidelines for the operational use of shipborne AIS adopted by Resolution A. 917(22). AIS is intended to enhance: safety of life at sea, the safety and efficiency of navigation and the protection of the marine environment. Therefore, its purpose is to help identify vessels, assist in target

tracking, simplify information exchange and provide additional information to assist situation awareness. The AIS equipment is not to be used as a means of exchanging information via manual input of text messaging between ships at sea. In particular, such a message should not be relied upon in avoiding collision, as the other vessel might or might not read or acknowledge it.

Apart from the unsuitability of AIS text messaging for collision avoidance, the time spent by *Hyundai Dominion*'s OOW in typing and sending this message, was obviously time lost to him for taking more relevant action. His decision to spend time on this task, and time spent on VHF discussions, might have been another symptom of fatigue.

Sky Hope's OOW also expended time on the VHF discussions. Additionally, he had misinterpreted the meeting of the two vessels as an overtaking one. Again, these two misjudgments might have been symptoms of his fatigue.

2.9 SOUND SIGNALS

Hyundai Dominion did make a sound signal before the collision, using the forward whistle. This was not heard by anybody in the accommodation of the vessel. Indeed, this was the objective of using the forward, rather than the aft whistle; the OOW did not wish to disturb anyone on the vessel who might have been resting.

This policy was, no doubt, appreciated by those on board who were trying to sleep. It did, however, mean that nobody was aware of the impending collision, not even the master.

There was no sound signal given by *Sky Hope* before the collision. The OOW considered that *Hyundai Dominion* was the overtaking vessel, but even if *Sky Hope* had been the stand-on vessel in the developing situation, the OOW should have indicated his doubt over the intentions of *Hyundai Dominion* by sounding five or more rapid blasts on the whistle. The sounding of the whistle, besides alerting the OOW of *Hyundai Dominion*, might also have alerted the master of his own vessel so that he had an early warning of the risk of collision and could have proceeded to the bridge at an earlier stage.

There was also no manoeuvring signal given when *Sky Hope* altered to port at 0736. Although the alteration of course to port by *Sky Hope* was too late, the sounding of two short blasts could have alerted the OOW of *Hyundai Dominion* and given an earlier indication of *Sky Hope*'s intention of turning to port.

2.10 CALLING THE MASTER

Chapter VIII of the STCW Code sets out prescribed standards for performing a navigational watch. It specifies that OOWs shall notify the master when in doubt as to what action to take in the interest of safety. Additional assistance on the bridge is also important to safe navigation. In this case, there was no

indication that the OOW of either vessel had notified his respective master before the vessels collided. As a result, neither master was on his bridge at the time of collision.

By failing to inform their respective masters when the OOWs were in doubt of the action to be taken, both officers deprived themselves of the benefit of the greater knowledge, experience, and judgment that can be provided by the vessel's commander.

The managers of both vessels should reiterate to their OOWs the importance of watchkeepers calling the master in times of doubt. As this is largely an issue of navigational safety, the managers of *Hyundai Dominion* could also introduce this as a subject to be considered during navigational audits of their vessels. The managers of *Sky Hope* should address this matter in a way that will achieve the desired result.

2.11 EVENTS ON *HYUNDAI DOMINION* - AFTER COLLISION

Other than the two men on the bridge, nobody on board *Hyundai Dominion* was aware there had been a collision. No impact was felt, no heel was noticed due to the helm being put over, and the single blast on the forward whistle was not heard.

At that stage, it was impossible for those on the bridge to assess the damage to their own vessel, or to *Sky Hope.* The area of impact on their own ship was out of their direct sight, owing to the deck containers, although the general area was seen on the CCTV mounted on the port bridge wing.

Until the consequences of a collision are known, it is prudent to assume that damage and other consequences are significant. Controlling the consequences of damage might need prompt corrective action. Whatever action is required, needs manpower for its execution, and this can only be made available rapidly by alerting the whole crew by using the general alarm.

Immediate use of the general alarm was part of the emergency procedure set out for responding to a collision involving *Hyundai Dominion*. In the event, the master and other officers were alerted by telephone. It is likely that the interval between the collision, and all key personnel being able to respond to instructions, was greater than if the general alarm had been used. Certainly, use of the telephone gave little sense of urgency or a proper indication of the importance of the summons.

Notwithstanding the potential need for rapid damage control on *Hyundai Dominion*, little was immediately known of the damage or injuries suffered on board the other vessel, *Sky Hope.* Clearly, damage had been suffered to the bridge wing area, yet it was not immediately known whether anyone had been injured, or fallen overboard. Immediately activating the general alarm on

Hyundai Dominion, thereby mustering the crew, would have put her in a better position to assist with the recovery of a man overboard from *Sky Hope.* The rescue boat's crew could then have been stood down as soon as reports were received from *Sky Hope* that nobody was missing.

Hyundai Dominion was not in a position to assist in this way, largely because correct emergency procedures had not been followed. The vessel's managers should clarify their instructions to masters on the emergency procedures that should be followed after a collision

2.12 EVENTS ON *SKY HOPE* - AFTER COLLISION

After the collision, *Sky Hope*'s master rang the general alarm. The crew was mustered to emergency stations. Checks and examinations found there were no casualties resulting from the collision, but *Sky Hope*'s starboard quarter had sustained extensive damage. *Hyundai Dominion* confirmed to *Sky Hope* that she had no serious damage or injury to her crew.

After mustering her crew, checking their condition and assessing damage, *Sky Hope* resumed her voyage at 0800, a lapse of only 22 minutes after the collision. In accordance with the ship's SMS, there were a number of checks to be carried out after a collision in order to verify the safety of her crew and that of the vessel, including sounding of all tanks. It is difficult to believe that these tasks were accomplished so quickly. Had there been undetected underwater damage, the resumption of passage in this manner could have caused the damage to deteriorate. *Sky Hope*'s master should have taken time to inspect his vessel more carefully before resuming the voyage.

The owners of *Sky Hope* should clarify their instructions to masters on the precautions to be taken in the event of a collision.

2.13 SAFETY AUDITS

Hyundai Dominion's managers have established a programme of external navigational audits which are conducted in addition to internal navigational audits and the mandatory audit regime required by the ISM code. This is a commendable initiative by the managing company.

The external navigational audits are performed by independent specialists with the objective of both monitoring performance and providing a standard for the company's internal navigational audits. The programme requires the independent auditor to travel on a vessel for several days, observing procedures and discussing operations with the master and his watchkeepers.

A navigational audit of this type had not been performed on *Hyundai Dominion,* but the reports written following audits on similar vessels in the manager's fleet indicate they are thorough, and provide a worthwhile training function for the ship's staff. Unfortunately the number of audits has been limited to about 4 or 5

per year in the managed fleet of 135 vessels. These numbers are unlikely to give the managers a representative assessment of navigational safety on board their vessels.

The manager's present practice of not using electronic chart systems in their record mode, might mean that the maximum value is not being gained from these audits. With accurate and reliable records of passages, an auditor might be able to identify practices that could merit attention and correction. Present arrangements mean he has to rely on observations covering a relatively few days, or even hours.

Navigational audits of the quality presently undertaken, have the potential to ensure high standards of navigational safety are achieved and maintained. However, to ensure these standards are applied across the manager's fleet, the number of audits performed should be increased significantly. Further, to gain maximum benefit from any such programme, the managers should give consideration to keeping voyage navigational records on their electronic chart systems. These records should then be made available to auditors.

2.14 MULTINATIONAL CREWS

Masters, officers and crews drawn from more than one nation have long been common on ships trading internationally.

To a degree, the manning of *Sky Hope* might be seen as rather unusual in being drawn totally from the Philippines. They shared a common working language.

In contrast, *Hyundai Dominion* was manned by a total of six different nationalities: Korean, Yugoslavian, Romanian, Bulgarian, Ukrainian and Turkish. None of these nations has English as an official language.

The master, and each of the officers interviewed on *Hyundai Dominion,* demonstrated a knowledge of English sufficient to conduct the interviews. This level of communication was satisfactory when one party, the interviewer, had English as his mother tongue. Each party was able to make themselves understood.

However, some of those interviewed admitted that they sometimes found the accent of others on board difficult to understand. They further commented that the extra effort required to converse in English, with others on board who are not native English speakers, is often too great to discuss anything other than the minimum necessary to perform their job: just to give or understand instructions.

This effort required to converse, while natural, does explain a reluctance on the part of the three bridge watchkeeping officers to ask for clarification on the matter of using the main engine controls on the bridge. During interview, each officer expressed a different reason for why he would not be inclined to use the main engine controls on the bridge to slow the engine speed at sea. These

reasons were: a perceived need to call the duty engineer first to start extra machinery; a concern that engine temperatures would be upset; uncertainty as to the consequences.

Evidently, their understanding of this situation is incorrect, and the vessel's managers need to ensure that all bridge watchkeepers are clear as to the availability of the engine controls. The problem has been encountered before by the managers, and dealt with using a fleet circular. This has not produced the desired result. Further efforts are therefore required to ensure watchkeepers are fully aware of engine availability. This might be achieved during an induction interview with the chief, or other senior engineer, when a watchkeeper first joins a vessel. Whatever method is chosen, this is an issue that the managers need to address.

The lookout on the bridge of *Hyundai Dominion* at the time of collision was Turkish. His knowledge of English was poor, although he was able to understand helm orders in English. The chief officer, also on the bridge at that time, was Yugoslavian, but his standard of English was good. Thus, these two men had no common language in which they could discuss any complex matter. The lookout also performed the role of watchman and carried out fire rounds. Had he found anything untoward during these rounds, it is uncertain how he could have effectively explained the situation to the chief officer by telephone or portable radio. He would be forced to return to the bridge and explain matters using sign language and his very limited English.

While the competence of the lookout as a seaman is not questioned, and has not been considered here, there is concern at the potential safety problems of using him in such an important safety related role. Watchkeepers must have a means of communication between themselves; to not have this ability invites confusion and misunderstanding, particularly during times of intense workload or stress. The vessel's managers should consider using this or any other seaman as lookout on a vessel, only where, or when, he can communicate effectively with the respective officer on watch.

SECTION 3 - CONCLUSIONS

The following safety issues have been identified by the investigation. They are not listed in any order of priority.

3.1 FINDINGS

1. The failure of both watchkeepers to take early action to avoid a collision was the cause of this accident. However, it must be recognised that both men had worked hours in excess of those prescribed under STCW. Consequently, fatigue is considered to have made some contribution to their poor decision making and judgment, albeit to an uncertain degree. [2.2]

2. *Sky Hope* was, according to the COLREGS, clearly the give way vessel in this encounter. No single clear cause has been found to explain the OOW's misjudgment of his vessel's status. [2.4]

3. Although she was the stand-on vessel, *Hyundai Dominion* still had the opportunity to take action in good time when it was seen that *Sky Hope* had taken no action. Rather than take positive and early action, the OOW wasted time in sending an AIS text message and in VHF discussions with the other vessel. These were unnecessary and time consuming diversions. Guidance has been issued to the industry for the use of AIS at sea, but this accident suggests this needs to be reinforced, particularly as these are systems that are very new to seafarers. [2.8]

4. The OOW on neither vessel called the master before the collision. In view of the almost universal standing instructions given by masters, the requirements of STCW and guidance given during the formal training of navigating officers, this must be a matter of concern. The managers of both vessels should reinforce their requirements on this matter. [2.10]

3.2 OTHER FINDINGS

1. Reducing speed to avoid this collision was probably not appropriate in this case for the OOW on *Hyundai Dominion.* Speed reduction should, however, always be an option that is open to any bridge watchkeeper. Clearly the watchkeeper needs to be competent in operating the engine controls and understand the likely results of doing so. This was not the case for the OOW on *Hyundai Dominion*, or for his two colleagues, all of whom had an uncertain understanding of the controls. In view of this, none considered speed reduction as an option for dealing with a situation at sea. The vessel's managers needed to address this subject following an earlier accident with one of its vessels. The issue needs to be reviewed once more. [2.6]

2. A number of recent investigations undertaken by the MAIB have shown that vessels' general alarms are frequently not sounded during or after an accident. This was so on *Hyundai Dominion*, and might be related to lack of clarity in the

emergency procedures. The absence of an emergency signal could mean that crew are not alerted to an actual or potential emergency, and are not given the necessary sense of urgency to act. The managers of *Hyundai Dominion* should clarify their guidance to masters on their expectations concerning the sounding of the general alarm. [2.11]

3. Although the general alarm was sounded on *Sky Hope,* the vessel resumed her passage only 22 minutes after the collision. It is difficult to believe that all the necessary safety checks could have been performed in this time. Resuming the passage might have aggravated undetected damage. The owners of *Sky Hope* should clarify their instructions to their masters on the precautions to be taken following a collision. [2.12]

4. The managers of *Hyundai Dominion* could usefully enhance their safety management system by making historical navigational data available during navigational audits. The audits presently undertaken appear to be of a good standard, but their value could be significantly enhanced if such data was available to auditors. To do this, the managers would need to arrange for their vessels' electronic chart systems to be set to the record mode. [2.13]

5. Good communications are important in the safe operation of any ship, no more so than between watchkeepers on the same vessel. The chief officer and AB lookout on *Hyundai Dominion* were unable to communicate using a common language. This is a matter of concern, which, under many foreseeable circumstances, could result in the aggravation of difficult and dangerous situations. The policy of using watchkeepers on any vessel who are unable to communicate with each other is a matter for concern that should be addressed. [2.14]

SECTION 4 - ACTION TAKEN

Shortly after this accident, the managers of *Hyundai Dominion* removed the watchkeeping chief officer from the vessel, with the requirement that he undertakes further, but unspecified training before returning.

The managers of *Hyundai Dominion* have also:

a) Introduced a company-specific ‘Navigational Skill for Junior Officers’ course for new junior deck officers and deck cadets before promotion to third officer.

b) Issued the results of a review of company navigational procedures, which began in May 2004.

c) Increased the number of external navigational audits.

d) Increased the number of internal navigational audits.

SECTION 5 - RECOMMENDATIONS

Pagasa Ship Management is recommended to:

2005/178 Clarify its instructions and guidance to its masters and crews on: the use of the collision regulations (rules 8a & 16); the use of VHF communications and sound signals in collision avoidance; and the circumstances when a bridge watchkeeper should call the master.

2005/179 Clarify instructions to its masters regarding the STCW requirements on fitness for duty, particularly with regard to the provision of sufficient rest for the vessel's crew, and the procedures to be followed in the event of a collision.

Zodiac Maritime is recommended to:

2005/180 Enhance induction and training procedures for bridge watchkeepers to ensure that they are: familiar with the use of bridge mounted main engine controls; aware of the dangers of using AIS text message facilities in situations requiring prompt attention and action on the part of the receiving vessel; and aware of the need to call the vessel's master at an early stage in the development of any hazardous situation.

2005/181 Clarify instructions to its masters regarding: the flag state and STCW requirements on fitness for duty, particularly with regard to the provision of sufficient rest for the vessel's crew; the importance of officers and ratings sharing a watch being able to communicate in a common language; and the procedures to be followed in the event of a collision.

The International Chamber of Shipping is recommended to promulgate the following to its member shipping organisations:

2005/182 Advise shipping companies of the potential dangers of using the text facilities of AIS to send messages, between vessels, on matters requiring prompt attention and action on the part of the receiving vessel.

2005/183 Remind shipping companies of the advice contained in the ICS's *Bridge Procedures Guide*, particularly with regard to: taking early avoiding action, in accordance with the COLREGS; the prudence of watchkeepers calling the vessel's master at an early stage in the development of a hazardous situation; and the value of preparing and training for post collision actions necessary to establish the wellbeing of both vessels involved in a collision.

Marine Accident Investigation Branch
August 2005

ANNEX

Extract from the International Regulations for Preventing Collisions at Sea, 1972.

Rule 8

Actions to avoid collision

(a) Any action taken to avoid collision shall be taken in accordance with the Rules of this Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

Rule 13

Overtaking

(a) Notwithstanding anything contained in the Rules of Part B, Sections I and II, any vessel overtaking any other shall keep out of the way of the vessel being overtaken.

(b) A vessel shall be deemed to be overtaking when coming up with another vessel from a direction more than 22.5 degrees abaft her beam, that is, in such a position with reference to the vessel she is overtaking, that at night she would be able to see only the stern light of that vessel but neither of her sidelights.

(c) When a vessel is in any doubt as to whether she is overtaking another, she shall assume that this is the case and act accordingly.

(d) Any subsequent alteration of the bearing between the two vessels shall not make the overtaking vessel a crossing vessel within the meaning of these Rules or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

Rule 15

Crossing situation

When two power-driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her starboard side shall keep out of the way and shall, if circumstances of the case admit, avoid crossing ahead of the other vessel.

Rule 16

Action by give-way vessel

Every vessel which is directed to keep out of the way of the other vessel shall, so far as possible, take early and substantial action to keep well clear.

Rule 17

Action by stand-on vessel

(a)(i) Where one of two vessels is to keep out of the way the other shall keep her course and speed.

(ii) The latter vessel may however take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules.

(b) When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by action of the give-way vessel alone, she shall take such action as will best avoid collision.

(c) A power-driven vessel which takes action in a crossing situation in accordance with sub-paragraph (a)(ii) of this Rule to avoid collision with another power-driven vessel shall, if the circumstances of the case permit, not alter course to port for a vessel on her own port side.

(d) This Rule does not relieve the give-way vessel of her obligation to keep out of the way.