Report on the investigation of

the collision between

mt *Saetta* and mt *Conger*

on completion of a ship to ship transfer

9.5 miles south east of Southwold, UK

on 10 August 2009

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Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

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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 purposes is to attribute or apportion liability or blame.

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GLOSSARY OF ABBREVIATIONS, ACRONYMS AND TERMS

AIS	-	Automatic Identification System
BP	-	British Petroleum
BST	-	British Summer Time
EEZ	-	Exclusive Economic Zone
FCM	-	Fender Care Marine
GMDSS	-	Global Maritime Distress Safety System
ICS	-	International Chamber of Shipping
ILO	-	International Labour Organisation
kts	-	knots
kW	-	kilowatt
m	-	metre
MARPOL	-	International Convention for the Prevention of Pollution from Ships
MCA	-	Maritime and Coastguard Agency
MCR	-	Machinery control room
OCIMF	-	Oil Companies International Marine Forum
OOW	-	Officer of the Watch
QMS	-	Quality Management System
rpm	-	revolutions per minute
SBE	-	Stand By Engines
SHA	-	Statutory Harbour Authority
SIRE	-	Ship Inspection and Report Programme
SMS	-	Safety Management System
SOG	-	Speed over ground

STCW	-	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended
STS	-	ship to ship
t	-	tonnes
UTC	-	Universal co-ordinated time
USA	-	United States of America
VDR	-	Voyage data recorder
VHF	-	Very high frequency
VLCC	-	Very Large Crude Carrier
Aframax	-	Term used to describe a tanker between 80,000 and 120,000 tonnes deadweight

Times: All times used in this report are BST (UTC+1) unless otherwise stated

mt *Saetta*

mt *Conger*

SYNOPSIS

On 10 August 2009, the Greek registered tanker *Saetta* and the Marshall Islands' registered tanker *Conger* collided when completing a ship to ship (STS) transfer operation off Southwold, Suffolk. *Saetta*'s starboard lifeboat and davit were damaged. *Conger* was undamaged and there were no injuries and no pollution.

The collision occurred at very slow speed, and resulted from the failure of *Conger's* main engine to start as the vessels separated. Both manoeuvred to try and avoid a collision, but they were very close when the engine failed and the action taken was not effective. The response to the engine failure, and poor communications, were also contributory factors.

The number of STS operations off Southwold had increased considerably in 2009 and this was the third collision between ships involved in transfers in the area within a 6-week period. A further two collisions have occurred since. Although STS operations worldwide are reported to have a good safety record and the accidents off Southwold have been relatively minor, their frequency is cause for concern.

The Oil Companies International Marine Forum (OCIMF) has initiated the development of operational standards for STS service providers and occupational standards for STS superintendents, which will be published by mid 2010. In co-operation with the International Chamber of Shipping, OCIMF also intends to revise the STS Transfer Guide, to include operations between gas and chemical tankers, and advice on risk assessment and manpower requirements. In view of this action and the action taken by Fender Care Marine (FCM) and the operators of *Saetta* and *Conger*, no recommendations are considered necessary.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF VESSELS AND ACCIDENT

Saetta

Registered owner	:	Nautica Shipmanagement S.A.
Technical operator	:	Cardiff Marine Inc
Port of registry	:	Piraeus
Flag	:	Greece
Type	:	Oil carrier, double hull
Built	:	2008 Shanghai, China
IMO number		9384069
Classification society	:	American Bureau of Shipping
Construction	:	Steel, double hull
Length overall	:	243.8m
Gross tonnage	:	58418t
Engine power and type	:	18420kW at 105rpm. B & W
Service speed	:	15.5kts
Persons on board	:	24
Injuries/fatalities	:	None
Damage	:	Impact damage to starboard lifeboat and davit arms

Conger

Registered owner	:	Conger Shipping Inc
Technical operator	:	Prime Marine Management
Port of registry	:	Majuro
Flag	:	Marshall Islands
Type	:	Oil / chemical tanker, double hull
Built	:	1999 Korea
IMO number		9198771
Classification society	:	Lloyd's Register
Construction	:	Steel, double hull
Length overall	:	228.6m
Gross tonnage	:	44067t
Engine power and type	:	16386kW at 99.5rpm. Sulzer 5 cylinder slow speed diesel
Service speed	:	14.5kts
Persons on board	:	23
Injuries/fatalities	:	None
Damage	:	None

Accident

Time and date	:	1241 UTC 10 August 2009
Location of incident	:	52° 12.15'N 001° 51.8'E 9.5miles south east of Southwold

1.2 BACKGROUND

Ship to ship (STS) lightering operations began in the late 1960's as a result of the inability of very large crude carriers (VLCC) to safely navigate the shallow rivers leading to oil terminals in several ports in the Gulf of Mexico. The use of smaller vessels to transfer cargo to local terminals was efficient and cost effective, and the number of operations increased rapidly with the lightering tankers either operated by the oil majors[1] or by dedicated lightering companies.

In 1975, the Oil Companies International Marine Forum (OCIMF) and the International Chamber of Shipping (ICS) published the *Ship to Ship Transfer Guide (Petroleum)* which reflects industry best practice for vessels engaged in STS operations. The guide has been updated periodically and defines an STS operation as:

> '*an operation where crude oil or petroleum products are transferred between seagoing ships moored alongside each other. Such operations may take place when one ship is at anchor or when both are underway. In general, the expression includes approach manoeuvre, berthing, mooring, hose connection, safe procedures for cargo transfer, hose disconnecting, unmooring and departure manoeuvre*.'

The guide also strongly recommends that a superintendent be employed if masters are unfamiliar with STS operations, and defines a superintendent as:

> '*A person who may be designated to assist a ship's master in the mooring and unmooring of the ships, and to co-ordinate and supervise the entire ship to ship transfer operation. He may also be known as the lightering master or mooring master'*.

STS operations now occur worldwide and, in addition to the lightering of crude oil, they are also used to transfer oil products for onward transportation or for storage. The number of transfers conducted off Southwold, UK increased considerably during 2009 prompted by market conditions. At the time of this accident there were approximately 30 Aframax size vessels lying at anchor off Southwold either storing, waiting to transfer, or waiting for orders.

During the STS operation between *Saetta* and *Conger, Conger* was the 'manoeuvring ship[2]' transferring 27,000 cubic meters of jet fuel cargo to *Saetta*, the 'constant heading ship[3]'.

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1 The world's largest oil companies which include: ExxonMobil (XOM), Royal Dutch Shell (RDS), BP (BP), Chevron Corporation (CVX), ConocoPhillips (COP), Total S.A. (TOT)

2 The ship that approaches the constant heading ship.

3 The ship that maintains course and speed to allow the manoeuvring ship to approach and moor alongside.

1.3 NARRATIVE

1.3.1 Events preceding the STS transfer

Fender Care Marine Limited (FCM) was appointed by British Petroleum (BP) Shipping as the STS service provider[4] to co-ordinate and facilitate the STS transfer between *Saetta* and *Conger* off Southwold. The company provided both vessels with information and instructions by e-mail to aid the planning and the execution of the proposed transfer. It also requested that its Checklist 1-Petroleum be completed and returned. On 4 August 2009, completed checklists were received from both vessels and FCM notified the Maritime and Coastguard Agency (MCA) of its intention to conduct the transfer **(Annex A)**. The MCA advised that it would inspect *Conger* prior to the transfer. This was completed on 6 August, shortly after the vessel anchored off Southwold.

On 7 August 2009, checklist number one from the STS Transfer Guide; '*pre fixture information*', was completed by both vessels. The following day, *Saetta* carried out an STS transfer with the tanker *New Challenge* under the advisory control of a superintendent provided by FCM. The transfer was completed the next morning, and the vessels had separated by 1300.

At 1430, *Conger* rendezvoused with the tug *Flying Spindrift* approximately 4.5 miles south south east of Lowestoft **(Figure 1)**. The superintendent, who had been on board *New Challenge,* and the fenders required for the STS operation, were then transferred from the tug to *Conger*. Under the control of the superintendent, the fenders were secured on the vessel's port side. On completion, the superintendent met with the deck officers to discuss the impending transfer. *Conger* then headed to the south-east and rendezvoused with *Saetta*. Communications between the superintendent on board *Conger* and *Saetta* was by VHF radio, channel 73.

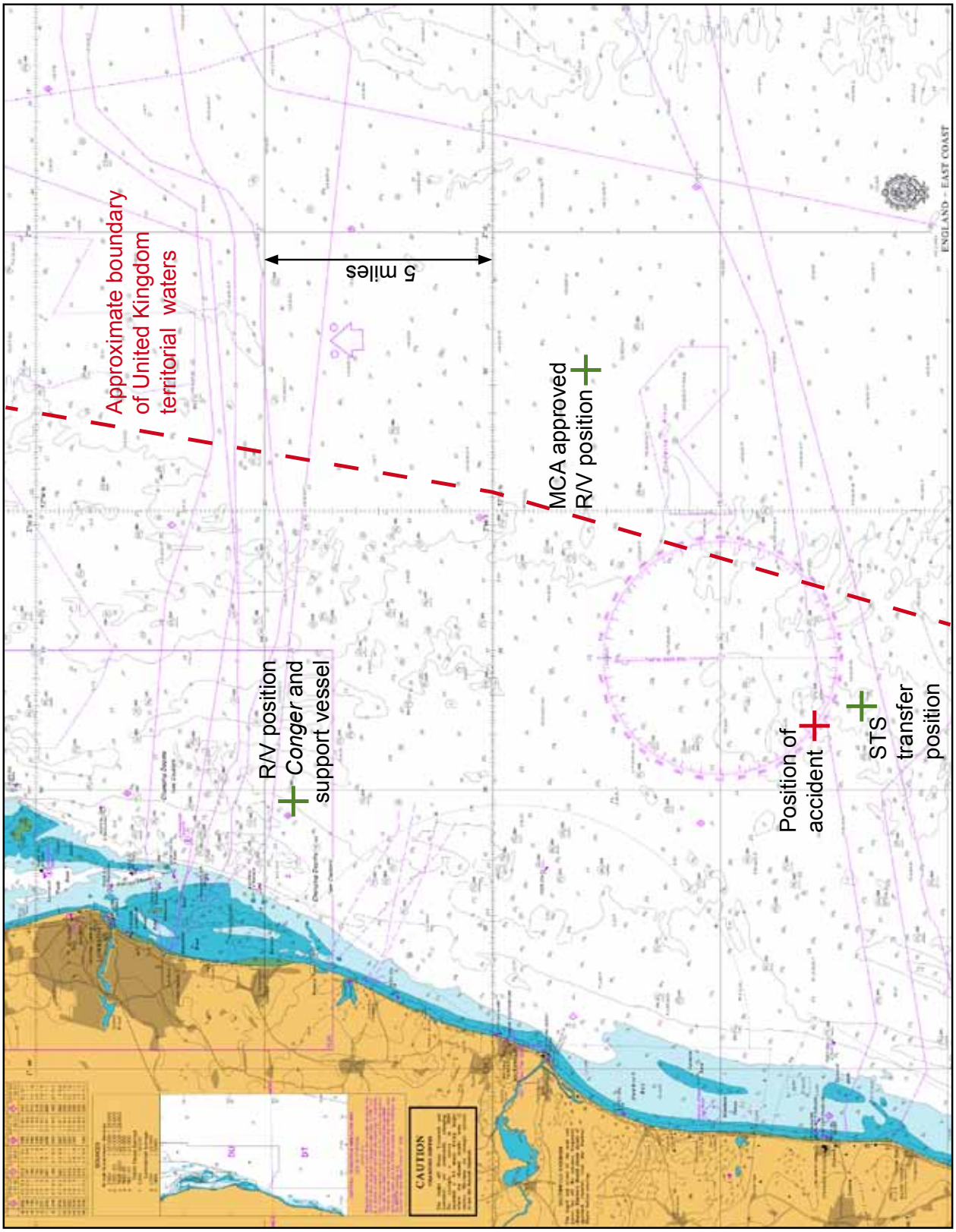
1.3.2 Securing and cargo operations

Both tankers completed checklists 2 and 3 of the transfer guide, '*before operations commence*' and '*before run-in and mooring*' at 1710. *Conger* then closed the starboard side of *Saetta,* which was maintaining a steady course and speed. By 1848, *Conger* had secured to the starboard side of *Saetta* using 6 headlines, two forward springs, two aft springs and four stern lines. As the vessels prepared for the cargo transfer, the superintendent ordered *Saetta* to manoeuvre toward the agreed STS transfer position and anchor 1 mile clear of other shipping. At 1954, *Saetta*'s port anchor was dropped in position 52° 11.8'N 001° 58.0'E **(Figure 1)**, and brought up with 7 shackles on deck. Checklist 4 of the transfer guide, '*before cargo transfer*', was then completed on both vessels. Cargo transfer operations commenced at 2012 and were completed at 0948 the following morning. Following the transfer of the cargo, *Saetta* had a freeboard of 9m, and *Conger* had a freeboard of 14m.

[4] A service provider is a shore-based company employed to facilitate an STS operation

Reproduced from Admiralty Chart BA 1543 by permission of the Controller of HMSO and the UK Hydrographic Office

Figure 1



Extract of chart BA 1543

1.3.3 Preparations for sailing and unmooring

Shortly after cargo operations had finished, the superintendent passed a note to *Saetta*'s master apologising for the poor communications during the transfer with *New Challenge*. The note also explained his intentions for slipping the lines between *Conger* and *Saetta*, which were later reaffirmed during a face to face conversation over the bridge wings.

At 1215, a cargo surveyor on board *Saetta* called the superintendent and confirmed that the cargo operation was finished. Two minutes later, the superintendent advised *Saetta* that *Conger* was preparing her engines and that the unmooring operation would commence when her engines were ready. At 1235, *Saetta* reported that her engine would be on standby in 1 minute, but was requested to wait 15 minutes. The superintendent also advised that he would let the master of *Saetta* know when to send his crew fore and aft to attend the moorings.

At 1243, *Conger*'s main engine was tested ahead from the MCR and dead slow astern using the bridge telegraph. The engine started as intended on both occasions. Shortly afterwards, the superintendent briefed *Conger*'s deck officers on the intended sequence of events for slipping. On completion, *Saetta* commenced heaving in her anchor. This was completed at 1306.

The superintendent's plan was to manoeuvre from the anchorage and head in a north westerly direction, putting the wind on the port beam to help the vessels separate once all lines had been slipped.

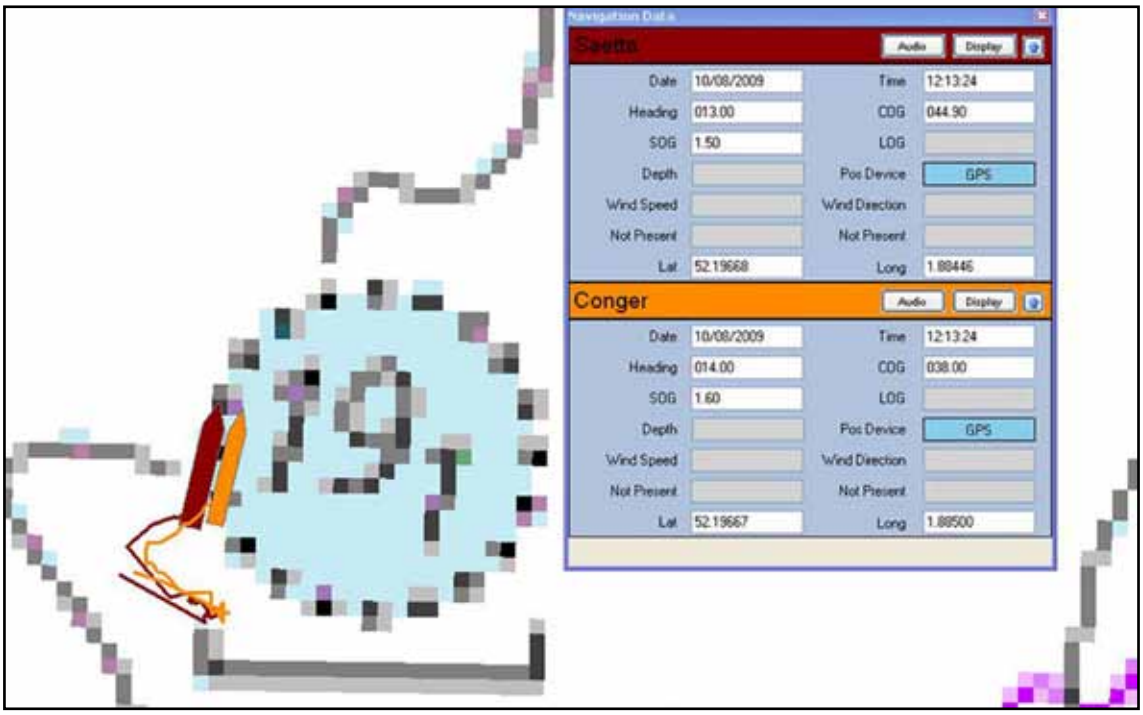
With the vessels now underway on a heading of 031°, the superintendent ordered *Saetta* to put her helm hard to port and her engine to dead slow ahead. He then explained to *Saetta*'s master over the radio that he intended to '*single up as before*' referring to the recent separation from *New Challenge*, and advising that the last lines to be slipped would be two headlines from *Conger* and two stern lines from *Saetta*.

The vessels slowly turned to port, with their headings passing through 012° at 1313 when speed through the water had increased to 2.3 knots **(Figure 2)**. The superintendent called *Saetta* and suggested that the time for completing transfer guide checklist 5 '*before unmooring*' be recorded as 1310. This checklist included '*The method of unberthing and of letting go moorings has been agreed with the other ship*'.

At 1316, *Saetta*'s heading was passing through 341° when the superintendent requested that she steady on a course of 330°. The unmooring operation commenced 2 minutes later.

At 1319, *Saetta*'s engine was stopped and 6 minutes later her master reported that he had lost steerage with the ship's head at 310°. More exchanges between the superintendent and the master of *Saetta* followed concerning which lines to slacken and slip. At 1327, the superintendent ordered *Saetta* 'dead slow ahead' and 'steady'.

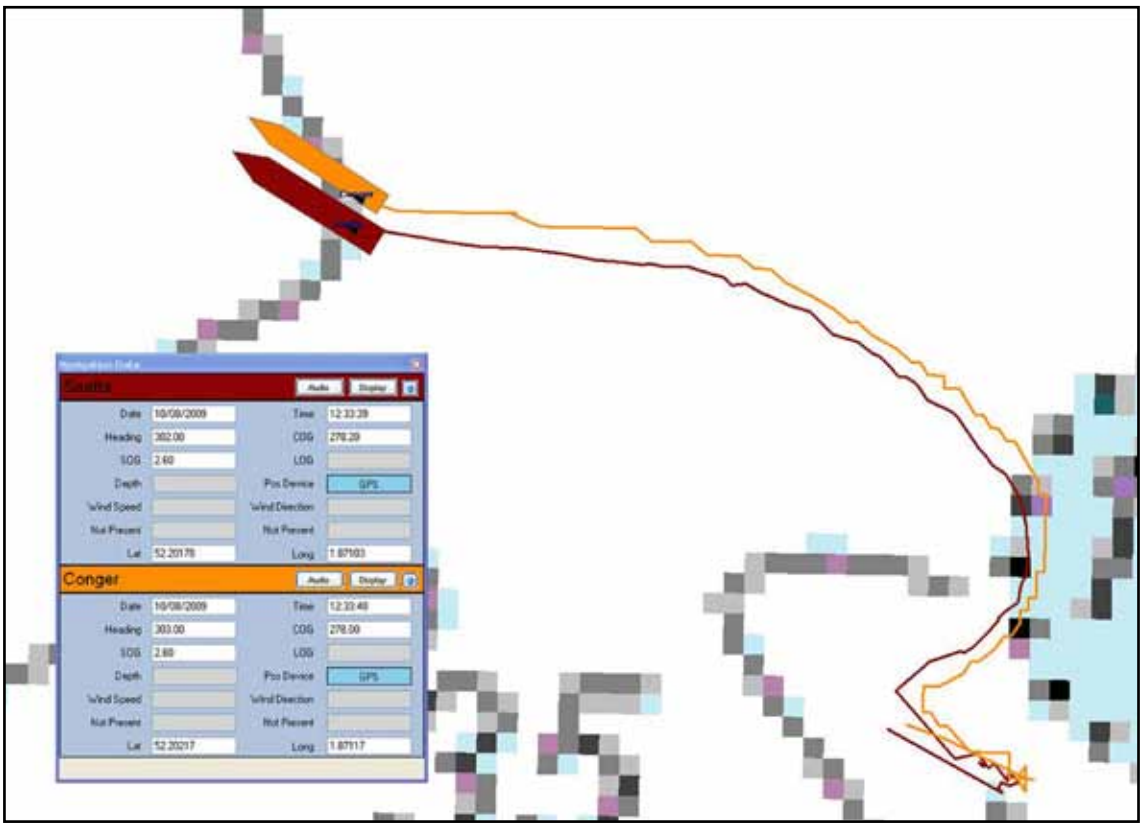
Figure 2



AIS tracks of vessels (underway and manoeuvring)

The number of mooring lines had now been reduced to two headlines and two stern lines and, at 1333, the superintendent ordered *Saetta* to 'stop engines' and 'wheel amidships'. Seconds later he ordered all lines fore and aft to be slipped simultaneously; the ships were on a heading of 303° at a speed of 2.4 knots **(Figure 3)**.

Figure 3



AIS tracks of vessels (as moorings slipped)

1.3.4 The collision

After the last lines had been slipped, the superintendent ordered *Conger* 'starboard 5°' and for the main engine to be put to 'dead slow ahead'. Seconds later the engine was ordered to 'stop' and the helm increased to 'starboard 10°'. *Conger*'s bow started to swing slowly to starboard, causing her stern to close towards *Saetta*.

To check this movement, at 1336 the superintendent ordered the engine to 'dead slow ahead', and the helm to 'amidships', quickly followed by 'port 5°'. The officer of the watch (OOW) placed the telegraph to dead slow ahead, and seconds later saw and heard the main engine alarm. He informed the chief engineer in the machinery control room (MCR) by telephone that the main engine alarm was sounding and that the engine had failed to start. He then shouted to the master on the bridge wing to inform him of the situation. The ship's officers spoke Ukrainian during these exchanges.

The master quickly went inside the bridge and discussed the situation with the OOW. Meanwhile, the superintendent was aware that *Conger* was starting to fall astern of *Saetta,* and ordered 'port 10°' and the main engine to 'slow ahead'. The helmsman applied the helm as ordered, but when the OOW placed the telegraph to slow ahead, the engine again did not start. The master returned to the bridge wing and advised the superintendent that '*the engine not starting*'.

At the chief engineer's request, the OOW put the engine telegraph to 'stop' followed by 'dead slow ahead'. The main engine again failed to start. The telegraph was returned to 'stop' and the master ordered the OOW not to touch it. He also instructed the forward mooring team to leave the forecastle.

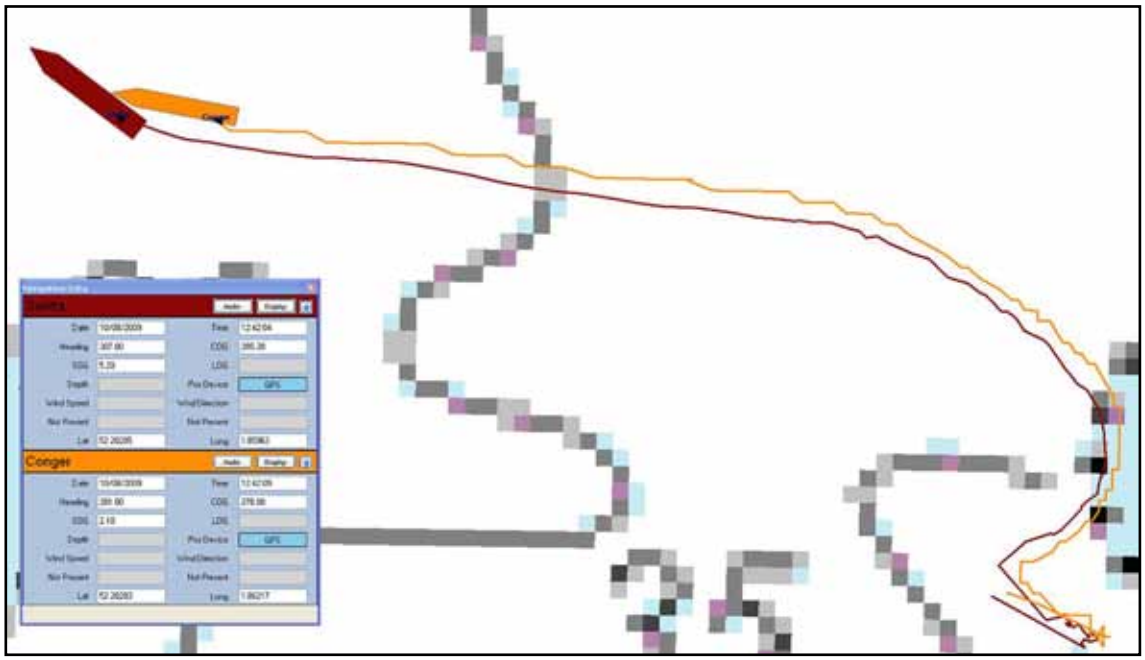
At 1337, the superintendent ordered *Saetta* 'dead slow ahead' and 'easy to starboard' to try and increase the lateral distance between the sterns of the vessels. In response, *Saetta'*s master used varying amounts of helm up to 30°. The superintendent also ordered *Conger*'s helm to 'amidships' to arrest the continuing slow swing to port. Seconds later, the superintendent broadcast on VHF radio '*lost our engines we have lost our engines'*. There were no ship names given before or after the message, and the bridge team on *Saetta* did not hear it. The superintendent then repeated his order for *Saetta* to proceed at 'dead slow ahead' and 'easy starboard'.

At 1338, the master asked the OOW what had happened to the engine. The OOW again telephoned the chief engineer in the MCR and was informed that the problem was being investigated. One minute later, the chief engineer called the bridge and asked for permission to test the engine. This was refused by the master.

Conger's bow continued to swing extremely slowly towards *Saetta* and, at 1340, the superintendent ordered 'dead slow astern'. The engine telegraph was moved as instructed and the engine started. The superintendent immediately

ordered ‘emergency full astern’, quickly followed by ‘stop’ ‘hard to starboard’ and ‘full ahead’. The OOW missed the final order, but immediately advised the superintendent ‘engine stopped’. The superintendent then ordered ‘slow ahead’ ‘full ahead’ ‘hard to starboard’ ‘stop’ and ‘full astern’ in less than 1 minute. Seconds later, at 1342, *Conger*’s port anchor struck the starboard lifeboat of *Saetta*, and her port bulwark hit the lifeboat davit arm. At impact, *Conger*’s heading was 289° and her speed was estimated to be less than 1 knot **(Figure 4)**. The superintendent quickly moved inside *Conger*’s bridge and ordered the main engine to ‘stop’ and the helm to ‘amidships’.

Figure 4



AIS tracks of vessels (collision)

Just prior to the collision, the superintendent had assessed that *Saetta*’s pivot point was forward of *Conger*’s bow, and ordered *Saetta* to ‘full ahead’ and ‘hard to starboard’ in an attempt to manoeuvre her clear. *Saetta*’s master remained unaware of *Conger*’s engine problems and had started to issue his own helm and engine orders to try and avoid a collision, but he had not informed the superintendent of his actions.

1.3.5 Post accident actions

The vessels soon separated and anchored close to the position of the collision. The superintendent reported the collision to Yarmouth coastguard.

Saetta suffered structural damage to her starboard lifeboat **(Figure 5)** and the lifeboat davit arm **(Figure 6)**. *Conger* suffered only scratches to her paintwork **(Figure 7)**.

Figure 5

Damage to *Saetta*'s starboard lifeboat

Figure 6

Damage to *Saetta*'s starboard lifeboat davit arm

Figure 7

Scratches to *Conger*'s paintwork

Conger received approval from the Marshall Islands administration and Lloyd's Register to proceed to her next port, and she departed UK territorial waters at about 1900 on the day of the accident. Following approval from the Greek administration to temporarily use additional liferafts in lieu of the damaged lifeboat, *Saetta* remained off Southwold in readiness for further STS operations.

1.4 ENVIRONMENTAL CONDITIONS

The wind was south westerly 6 to 9 knots. The sea state was smooth and visibility was good. The predicted tidal stream was setting south west at 1.1 knots and there was at least 30m of water under the vessels' keels.

1.5 MAIN ENGINE

Conger was fitted with a five cylinder slow speed reversing engine. Similar to many slow speed diesel engines, the engine had to be stopped before engaging ahead or astern, and was connected to a fixed pitch propeller.

When *Conger* arrived at Piraeus, Greece, 10 days after the accident, an electronic systems engineer inspected the engine control system. The inspection found that the system was functioning correctly.

A Wartsilla service engineer attended the vessel 4 days later in Tutunchiflick, Turkey, and inspected the main engine starting system. The engine started successfully and all valves and indicators showed the system was functioning correctly. However, after air pilot valves mounted on the main air start valves for each cylinder were removed and tested, the valve on number three cylinder was found to be defective. The valve was replaced and a successful main engine function check was carried out both ahead and astern. The maintenance of the pilot valve prior to its failure had been in accordance with the manufacturer's instructions.

1.6 BRIDGE ORGANISATION

1.6.1 *Saetta*

This was the Greek master's second STS transfer in command. His first transfer as master had been with *New Challenge* the previous day, but he had been involved in STS operations as a chief officer. During the vessel's separation, the master stood mainly on the starboard side of the bridge, but occasionally moved to the bridge wing to gauge the distance between the vessels. The master had the con and operated the engine room telegraph when on the bridge. He also carried a hand-held VHF radio to communicate with his crew.

The Filipino OOW had previously participated in STS transfers and was primarily stationed at the port radar display **(Figure 8)** adjacent to a fixed VHF radio. He was responsible for collision avoidance, external VHF communications, and monitoring the application of helm orders. He also operated the engine telegraph when the master was on the bridge wing. The vessel was operating in manual steering, and a Filipino AB was stationed at the helm.

1.6.2 *Conger*

The superintendent had the con and was stationed at the extremity of the port bridge wing **(Figure 9)**. He passed engine and helm orders to *Conger*'s Ukrainian OOW and helmsman verbally, and to *Saetta* via a hand-held VHF radio. The superintendent communicated to both vessels in English.

The Ukrainian master accompanied the superintendent on the bridge wing and carried a hand-held VHF radio to communicate with his mooring teams. The master had carried out approximately 10 previous STS transfers as a master.

The OOW was positioned on the starboard side of the bridge **(Figure 10)**, next to the engine telegraph and close to VHF radios monitoring both the channels in use for internal and external communications. He had previously been involved in a number of STS transfers as an OOW. The vessel was also operating in manual steering, with an AB at the helm.

Figure 8

Saetta's bridge

Figure 9

View from *Conger*'s port bridge wing

Figure 10

Conger's bridge

1.7 STS SUPERINTENDENT

1.7.1 Experience, qualifications and training

The superintendent on board *Conger* was Swedish and had 47 years experience of oil and chemical tanker operations. He had been employed by oil majors throughout his seagoing career, and had been an STS superintendent since the mid 1980's. He was approved by Chevron for all lightering operations and had been involved in over 1500 STS operations worldwide.

The superintendent held an STCW II/2 certificate of competency issued by the Swedish administration, and had completed a number of additional training courses including bridge simulator, and mooring master training. In September 2006, he attended and passed a simulator based ship handling / ship to ship lightering course in Trondheim, Norway. The superintendent did not hold a dangerous goods endorsement.

1.7.2 Employment with FCM

The superintendent was first employed by FCM in May 2007. Up to May 2009 he had carried out 23 STS operations for the company as superintendent and 8 operations as mooring master. None of these transfers were conducted off Southwold. The superintendent had commenced his latest contract with FCM on 22 July 2009, during which he had completed seven consecutive transfers as superintendent off Southwold prior to the accident.

The superintendent's duties and responsibilities were outlined in FCM's operations manual: Standards of Care – STS Superintendent **(Annex B)**, which he had read and understood. The superintendent's performance was not periodically assessed by FCM during his contracts, and no further training had been provided or required by the company.

1.7.3 Hours of rest

The superintendent kept a record of his general movements between vessels and the shore, but did not record his hours of work or rest. He had two periods of rest in a hotel ashore when operating off Southwold. The first lasted for 20 hours and the second, 7 days later, lasted for 29 hours. The superintendent had insisted on the second period, which was completed 56 hours before the accident, because he felt fatigued. He estimated that he had achieved one period of rest lasting between 2.5 and 3 hours each night of the 8 and 9 August. The superintendent reported that he did not feel tired at the time of the accident.

1.8 THE STS SERVICE PROVIDER

1.8.1 General

Fender Care Marine (FCM) was formed in the 1980's with its headquarters in the UK. Since the mid 1990's it has also operated regional bases in Singapore and Nigeria. FCM was sold to James Fisher plc in 2005. The company has ISO 9001:2000 accreditation for its quality system, and ISO 14001 accreditation for its environmental management system.

FCM is one of the five largest global providers of STS services and conducted 2688 operations in 2008. During 2009, it had completed 2260 operations up to 31 August.

Within the UK, the company facilitates STS transfers alongside in Sullom Voe, at anchor in Scapa Flow, and offshore at Southwold, using 25 superintendents on a self-employed basis, most of whom work exclusively for FCM.

1.8.2 Operations manual

FCM had developed a comprehensive operations manual to underpin its STS operations. The manual was revised in March 2009 and was issued to all its superintendents. Its objective was to ensure that '*all STS transfers are co-ordinated in accordance with the ICS / OCIMF STS Transfer Guide (Petroleum)……*'. The manual specified:

- The overall co-ordination of an STS operation should be in the hands of the STS superintendent, who would ensure that both vessels' crews were familiar with all phases of the operation during the pre-planning meeting.
- Masters retained their statutory responsibilities and overall authority for the safety of the vessel and crew. They remained in charge of the berthing operation, and it was normally the role of the superintendent to offer guidance and advice leading to a safe berthing. However, responsibilities were to be agreed at the pre-operation conference.
- Superintendents were required to ensure they took adequate rest periods during their time on board, and comply with STCW Code A-V111.1. In the event of multiple STS transfers, it was the duty of the superintendent, masters of the vessels and the FCM operations co-ordinators to manage the periods of duty in a safe and structured manner, calling for assistance if required.
- The emergency signal of seven or more short blasts on the whistle must be understood by all personnel, and also recognise that emergency situations can arise during mooring and unmooring operations. During such emergencies the master, together with the superintendent, was responsible for deciding the best course of action.

1.8.3 Risk assessment

A risk assessment had been carried out by FCM for its STS operations off Southwold. The assessment identified 25 hazards, the consequences of four of which were collision or ship damage. The assessment is summarised in **Table 1**

Hazard	Consequence	Mitigation	Applicable Regulations	Recommendations	Resultant risk
Experience of STS superinten dent	Risk of collision between vessels, ship damage and pollution, injuries to personnel.	Only use experienced superintendents	Selection criteria in FCM operations manual	Only employ experienced STS superintendents that meet FCM standards. FCM to conduct regular assessments of STS superintendents skills and abilities.	1D Very unlikely Minor Acceptable
Experience of STS vessels crew	Risk of collision between vessels, ship damage, pollution, injuries to personnel	STS superintendent to provide a STS operation plan and communicate to all vessels masters and crew. Superintendent to view vessels risk assessments before operation commences.	COSWOP Vetting information safeguarding against sub standard ships	STS superintendent and masters to carry out pre cargo transfer meeting to agree procedures during STS operations to ensure they are conducted in a safe manner. Any single party deem that conditions are unsafe then operations are to be suspended until conditions are improved.	2D Unlikely Minor Acceptable
Vessels main engine failure	Pollution, ship damage, injuries to personnel from steel to steel contact.	Adequate ship vetting information from traders and tanker owners			2D Unlikely Minor Acceptable
Collision between STS tankers	Injury, ship damage and pollution	Experienced STS superintendent to be appointed. English language to be used during run in and mooring.	Application to port authorities to include communications information and manoeuvring arrangements.	Operation to follow FCM procedures by experienced STS superintendent.	2D Unlikely Minor Acceptable

Table 1: Summary of FCM's risk assessment for its operations off Southwold showing the hazards with consequences resulting in collision

1.8.4 Vetting

FCM has been vetted by each of the oil majors it provided with STS services. The requirements of each of the majors differed to varying degrees, and the information gathered during each vetting process was not shared.

BP Shipping last vetted FCM (UK) on 9 June 2005. The assessment consisted of a desktop review of relevant documentation, interviews and discussions with key personnel. The assessment did not provide any evidence of practices or procedures which precluded FCM from being contracted as an STS service provider to the BP Group.

1.9 VESSEL SAFETY MANAGEMENT

1.9.1 *Saetta*

The vessel's safety management system (SMS) categorised an STS transfer as a critical operation and stated that the recommendations and guidelines laid down in the ICS / OCIMF Ship to Ship Transfer Guide (Petroleum) should be followed, including the completion of the operational checklists contained in the guide.

The SMS advised that a mooring master and an assistant would be assigned by the lightering company, with the mooring master advising the master of the lightering vessel, and the assistant advising the master and deck officers of the ship to be lightened. The master was to comply with all instructions given by the mooring master, and was to ensure that the proposed operation was well understood. In the event that radio communication failed, five short blasts were to be sounded on the ship's aft whistle.

A generic risk assessment for '*Mooring, STS Operations'* was incorporated into the SMS. The assessment covered the period from the production of the pre-arrival checklist, to when both vessels were made fast and the hoses connected. It identified 14 hazards with the potential to result in collision during an STS transfer.

An onboard risk assessment of the proposed transfer was conducted by the vessel's deck officers on 7 August, which highlighted the lack of a company instruction or procedure regarding the use of a common working language. The assessment summary provided a series of generic recommendations to be followed prior to the commencement of the operation, including the study of the procedures provided in the STS guide. The completed onboard risk assessment was signed by the master on completion. No assessment of the risks of unmooring or separating was undertaken.

In accordance with the control measures that had been identified, the master and chief officer had familiarised the deck crew with the equipment and procedures to be used in the operation, and the chief officer and the boatswain had checked the condition of the equipment to be used.

1.9.2 *Conger*

The SMS on board *Conger* stated that: '*The guidance contained in the ICS publication 'Ship to Ship Transfer Guide' is adopted as company procedure'*. It also required the checklists contained in the guide to be used throughout the operation, and for the master to establish several criteria before commencing a transfer operation. These included:

- The characteristics and compatibility of the other vessel.
- The person in overall charge of the operation.
- The common language to be used during the operation, which would normally be English. Any failure to communicate with personnel on the other vessel should result in the operation being suspended.
- Methods of communicating between ships at various stages of the operation.
- Navigation procedures to be adopted during the operation.

A generic risk assessment for an STS transfer operation was incorporated into the company's SMS that identified the hazard of a contact between vessels. Additional control measures to those contained in the company's SMS and the ICS / OCIMF checklists, included:

- Before approaching, satisfactory communication should be agreed externally bridge to bridge, and internally between bridge and fore and aft stations.
- Verification of the correct positioning of the fenders.
- Communicating the mooring plan to the crew involved.
- Adequate training for the crew involved.
- List and trim should be kept to a minimum.
- A responsible officer from both ships to board the other vessel at agreed intervals.

The risk assessment was prepared by the chief officer and signed by the master on 8 August.

1.10 VESSEL VETTING

The Ship Inspection and Report Programme (SIRE) was launched by OCIMF in 1993 to address concerns about sub-standard shipping. The programme is unique to the tanker industry and provides a database of up-to-date information on ships for use by charterers, ship operators, terminal operators and government bodies concerned with ship safety. The information contained on the database is a valuable asset for those engaged in operational risk assessments.

Chapter 8 of the SIRE report '*Cargo and ballast systems – Petroleum'* contains a section titled '*Ship to Ship transfer operations supplement – petroleum'* which lists five questions specific to offshore STS operations:

- 8.86 Are operators' procedures provided for ship to ship operations?
- 8.87 Have senior deck officers had open water ship to ship transfer experience within the last 12 months?
- 8.88 Are sufficient closed fairleads and mooring bitts provided?
- 8.89 Are ship to ship transfer checklists completed?
- 8.90 If an STS operation was in progress during the inspection, was it conducted in accordance with the recommendations of the OCIMF / ICS STS transfer guide?

The last SIRE inspections carried out on both vessels prior to the accident were, coincidentally, conducted by the same surveyor. The answer to questions 8.86 and 8.88 on both reports was 'yes'; the remaining questions were marked not applicable because the vessels were not engaged in an STS operation at the time of the inspection.

1.11 CHARTER REQUIREMENTS

1.11.1 Voyage clearance

Saetta was under charter to BP. The voyage clearance details specified that the vessel would be engaged in STS loading and transfer operations off Southwold.

The clearance required that:

- The operation complied with the requirements of the ICS / OCIMF Ship to Ship Transfer Guide (Petroleum).
- Both vessels had BP shipping vetting approval for STS operations.
- Only a BP shipping approved STS service provider be contracted for the provision of advice, fenders, hoses and associated resources.
- The STS operation complied with applicable local laws and regulations.
- The service provider liaised with the MCA and obtained approval on a case by case basis.
- A transfer would not commence, or would be terminated, when pre-defined weather or sea conditions were experienced.

The clearance explained the need of the service provider to submit a contingency plan and risk assessment for the operation to the MCA and, provided detailed instructions for the BP casualty emergency notification. It also noted that the area off Southwold is exposed to winds from all directions and little protection is afforded by the coastline.

1.11.2 Practical considerations

The suitability of the vessels chosen to undertake STS transfers was based upon satisfactory results obtained from the SIRE report programme and the vessel's ability to safely carry the designated cargo.

The responsibility for ensuring that the two vessels were compatible for STS operations was left to the service provider.

The location of the transfer was driven by the need to use an approved site. There was no instruction for the transfer to be carried out either inside or outside of United Kingdom territorial waters.

1.12 TRAINING REQUIREMENTS

Tanker crews must complete a Tanker Awareness Course, the syllabus of which includes loading and discharge procedures during STS operations. However, there are no STCW requirements for the qualification or training of superintendents engaged in STS operations.

The STS transfer guide advises that the service provider supplies trained and experienced superintendents, taking the following into consideration:

- Possession of an appropriate management level deck licence, including necessary STCW requirements and dangerous cargo endorsement.
- Possession of valid medical certification.
- How much experience as a senior deck officer?
- Has the superintendent completed a suitable number of supervised operations?
- Has the superintendent undergone a supervised apprentice training programme?
- Has the superintendent satisfactorily completed a recognised ship-handling course?
- Has the superintendent had STS operational experience within the preceding 4 months?
- Has he been subject to a performance assessment on an annual basis?

FCM required its superintendents who had not completed a recognised ship-handling course, to attend an STS simulator course and a bridge resource management course at a nautical college in the UK. The simulator course was developed by the college and tailored to meet FCM's requirements.

The training provided by FCM to its superintendents was determined by individual needs and experience, and superintendents were only authorised to carry out operations unsupervised after successfully completing two, formally evaluated transfer operations under the supervision of an authorised superintendent. The company required its superintendents to have a dangerous cargo endorsement and a GMDSS certificate.

1.13 REGULATION

1.13.1 Background

STS transfers have been carried out in UK territorial waters for many years. Lord Donaldson's 1994 report, '*Cleaner Ships, Safer Seas'*, recognised that STS operations should '*take place at recognised safe anchorages and under close supervision*', and that regulations already drafted by the Department of Transport to contain STS operations within SHA limits would achieve this goal. His report recommended that the inshore boundary of the specified transhipment area in Lyme bay should be located at least 9 miles away from land. Lyme bay and Southwold were for some time the preferred areas, but following environmental lobbying over several years Southwold has since been identified by the MCA as the UK's only offshore STS transfer area. No environmental impact assessment has been carried out with respect to STS operations in this area.

1.13.2 Current arrangements

There is currently no regulation controlling STS operations inside UK territorial waters. However, non-voluntary arrangments have been established between the MCA and the STS service providers. Under these arrangements offshore STS transfers are only conducted in an identified area spanning both the UK's territorial waters and Exclusive Economic Zone (EEZ) off Southwold **(Figure 1)**, and the service providers will notify the MCA at least 72 hours in advance of any intended transfer **(Annex A)**.

STS operations in Scapa Flow are conducted inside a Statutory Harbour Authority (SHA) area of responsibility and are regulated by the Orkney Islands Council, Department of Harbours.

1.13.3 Proposed legislation

National

In 2008, the Government issued a public consultation on proposed legislation to regulate STS operations carried out in UK territorial seas. The proposed regulations prohibit STS transfers in UK territorial waters unless conducted within an area controlled by a Statutory Harbour Authority (SHA). SHA's will be required to operate under licence subject to environmental and habitat assessments, and adequate contingency measures being in place. A second consultation on the proposed legislation commenced on 8 February 2010.

International

International regulation for the 'Prevention of Pollution during Transfer of Oil Cargo between Oil Tankers At Sea' will come into force on 1 January 2011 via an amendment to the International Convention for the Prevention of Pollution from Ships (MARPOL) **(Annex C)**. The amendment provides general rules on safety and environmental protection, including the requirement for any oil tanker involved in STS operations to carry on board an STS plan approved by the vessel's administration. The plan is to be developed using industry best practice, which the regulation identifies to be the OCIMF / ICS STS Transfer Guide.

The forthcoming regulation also places responsibility on vessels to notify coastal states when it is intended to carry out a ship to ship transfer within territorial waters, or EEZ at least 48 hours before the operation is scheduled to commence.

1.14 SIMILAR ACCIDENTS

1.14.1 Southwold

The MAIB is aware of four other collisions that occurred off Southwold between 3 July and 1 December 2009:

On 3 July, a bunkering vessel had completed its operation with a tanker, and was unmooring when her starboard quarter struck the port wing ballast tank of the tanker, causing an indentation.

On 25 July, two tankers similar in size to *Saetta* and *Conger* were preparing to come alongside for an STS transfer within UK territorial waters. As the vessels closed, the manoeuvring vessel had difficulty maintaining a parallel heading, and the approach was aborted. During a second approach, the helmsman of the manoeuvring vessel had difficulty in maintaining the ordered heading as the vessels closed; the manoeuvring vessel started to swing towards the constant heading vessel despite the use of full opposite rudder. The superintendent was not made aware of the steering difficulties, but took action to try and avoid a collision, including manoeuvring the constant heading vessel. The vessels collided, with the port bow of the manoeuvring vessel striking and penetrating number 3 starboard ballast tank of the constant heading vessel.

Contributory factors identified included: the master's lack of STS experience, the probable effects of interaction, poor communications on the bridge of the manoeuvring vessel, the lack of a risk assessment, the lack of a pilot card, poor line of sight between the bridge wing gyro repeater and bridge instrumentation, and an inability to secure a forward secondary fender at deck level.

On 27 August, an STS transfer involving a VLCC (constant heading vessel) and an Aframax tanker (manoeuvring vessel) resulted in a collision just outside UK territorial waters during the final stages of the approach. The superintendent ordered the constant heading vessel to reduce to dead slow ahead. Seconds later, the stern of the manoeuvring vessel started to close the stern of the VLCC. The superintendent ordered the helm hard to port and the main engine slow ahead. He was informed that the engine was operating dead slow astern. Before any action could be taken to recover the situation, the vessels collided. The hull of the VLCC suffered a 6m dent on the starboard side, and the hull of the manoeuvring vessel suffered 12 sq m of deck plate buckling, considerable damage to stiffeners below the deck, and damaged railings and davits.

Contributory factors included poor communications, and the inability to secure the aft secondary fender accurately in a position to protect the vessel in line with the guidance provided in the ICS / OCIMF guide. The superintendent in control of the transfer was also in control of the operation conducted on 25 July, and has been recommended for refresher training.

On 1 December 2009, a collision occurred when two vessels were in the final stages of their approach. The helmsman, who had been on the wheel for approximately 1.5 hours, was given an order to apply starboard helm to counter the manoeuvring vessel's swing to port. The vessel continued her swing, and it was only moments before impact that it became apparent that port helm had mistakenly been applied. Contributory factors to the accident were: the operation had been delayed and was conducted in the hours of darkness using a bridge wing rudder indictor that was not visible from the superintendent's conning position; the OOW was not monitoring the helmsman's actions; and the superintendent was too pre-occupied with other aspects of the operation to recognise that his orders had not been complied with.

1.14.2 Accident statistics

Accident data provided by FCM showed that of its 2688 STS operations carried out worldwide in 2008, there were 6 collisions and 5 near misses reported. In 2009, up until the end of August, of its 2260 STS operations carried out worldwide, 6 collisions and 6 near misses were reported. Through its membership of Intertanko, FCM, along with the oil majors, attempted to establish a global database of accidents during STS transfers. However, the database was not populated by other service providers, and was discontinued.

SECTION 2 - ANALYSIS

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 ENGINE FAILURE

The sequence of events leading to the collision between *Conger* and *Saetta* was triggered by the failure of *Conger*'s main engine to start as the vessels separated. Subsequent investigation identified that an air start pilot valve on the engine's number three cylinder was not working correctly.

Following the initial ahead movement used to separate the bows after the vessels had unmoored, it is almost certain that the engine had been stopped in the position in which the number three cylinder was the first cylinder to fire when the engine was next ordered ahead. As a result, when dead slow ahead was ordered, air was unable to pass through the defective pilot valve and the engine did not start.

The engine started when dead slow astern was ordered because in this direction number three cylinder would not have been the first cylinder to fire, and the pilot valves of all other cylinders were functioning correctly. Engine failure had been identified as a hazard by FCM in its risk assessment of STS operations **(Table 1)**, and had relied on the effective vetting of vessels as its control measure. However, as the pilot valves had been maintained in accordance with the manufacturer's instructions, the engine had been tested before unmooring was commenced, and there had been no previous indication of the fault, the defect was difficult to foresee, and had possibly been latent for some time.

However, the actions taken by the OOW, master and chief engineer following the failure did not follow a predefined procedure. This resulted in a 4.5 minute delay in restoring propulsion, which occurred by chance when the superintendent ordered 'slow astern'. It is likely that, had a breakdown procedure been available and followed, the main engine would have been started sooner.

2.3 COMMUNICATIONS

Conger's main engine failed to start when the superintendent was attempting to arrest the movement of the vessel's stern towards *Saetta*. This was a critical time, but prompt and effective action was hindered by two significant breakdowns in communications.

First, although the failure was quickly seen by *Conger*'s OOW, it was reported to the master in Ukrainian and the superintendent was not informed until about 1 minute later.

Second, *Saetta*'s master was never aware of the engine failure prior to the collision because: the superintendent did not follow basic voice procedures when broadcasting his message on VHF radio; *Saetta*'s bridge team did not hear the superintendent's transmission; and no emergency signal was sounded.

Co-ordinating the movements of two vessels underway in very close proximity requires clear and concise communications between all parties, but this accident and the accidents summarised in paragraph 1.14 indicate that this is not always achieved. The need for good communications is particularly relevant when the persons involved are working in a second language. As in this case, the possibility of messages being missed or misunderstood and persons forgetting protocols or reverting to their native language when under pressure is inevitably increased. It is therefore essential that during STS operations, account is taken of the language and communication channels to be used, and the roles of the persons involved, when determining the composition and organisation of bridge teams.

2.4 DECISION-MAKING

The departure manoeuvre had gone as planned, until the engine failure, but by the time the superintendent had been informed of the problem, *Conger* had started to turn very slowly back towards *Saetta*, which was increasing speed and moving ahead. The superintendent was very experienced in STS operations, but with the vessels probably no more than 30m apart, he was placed in a very difficult situation, which he was unable to control.

The very slow turn to port had been initiated by the use of the rudder and was possibly assisted by the wind acting on the vessel's port side accommodation, and by the forces of interaction acting between the vessels. However, although the helm had been ordered to 'amidships' shortly before the engine failure, no counter helm was applied to check the movement towards *Saetta* until the engine had been started.

Once the engine was started, the superintendent issued a series of orders in rapid succession, one of which was missed by the OOW and others which were not given sufficient time to have an effect. This resulted in the vessel continuing to make slow headway. Given *Conger*'s slow speed at impact, it is highly likely that, had *Conger*'s engine been kept running continuously astern since it had restarted, the collision might have been avoided. Although *Saetta*'s master acted independently to try and avoid collision, this action was taken too late to have any effect.

This was the superintendent's eighth and final STS transfer within a 20 day period. Notwithstanding two periods of rest ashore, this had been an arduous period of employment, with rest periods dictated by operational requirements and prevailing weather conditions. This had led to disrupted sleep patterns over

the course of his contract and a lack of sleep during the 48 hours before the collision. However, although the superintendent reported that he did not feel tired, it was inevitable that he was suffering from the effects of fatigue; it is not possible to determine to what extent, if any, this affected his behaviour under pressure, his judgment, or his manoeuvring of the vessels.

2.5 PLANNING AND BRIEFING

In preparation for unmooring, the superintendent briefed *Conger*'s master and OOW in person. His briefing to *Saetta*'s master was by a note indicating that it would be conducted in a similar way to the STS transfer with *New Challenge,* followed up by a face to face conversation over the bridge wings. No information was passed regarding the times to have main engines ready, or weigh anchor, and there were no details provided regarding the intended unmooring and departure manoeuvres. Therefore, given *Saetta*'s master's inexperience in command during STS operations, it was not surprising that the superintendent had to repeat his instructions, or that the master had to request clarification.

The risks involved when two vessels unmoor and separate while underway are potentially the same as when coming together and mooring. Therefore, it is important that both mooring and unmooring operations be planned in detail, and that all aspects of these operations be briefed. However, this does not appear to have been identified in the risk assessments undertaken by the service provider or the vessels. In this case, the superintendent appears to have directed the unmooring operation and departure manoeuvre as events unfolded rather than following a specific plan. In addition, the absence of a comprehensive briefing to both masters indicates that the superintendent was largely content to rely on the completion of checklist 5 –*'before unmooring'* to signify that both vessels were ready. The absence of a comprehensive brief was also an opportunity missed to clarify the actions to be taken in the event of an engine or steering failure on either vessel, including the signal to be sounded on the vessel's whistle.

Although the checklists in the ICS / OCIMF guide are a useful 'aide mémoire' to ships' crews, robust operational risk assessments are also required to determine the depth and detail of the actions required. Moreover, when checklists are used frequently, a 'tick-box' mentality can develop, which seriously undermines their effectiveness. This possibly explains why neither master was aware of the emergency signal to be used, and the master of *Saetta* signed the unmooring checklist as completed, even though he had not been fully briefed.

2.6 THE SERVICE PROVIDER

FCM's operations manual was comprehensive and was largely in accordance with guidance in the STS transfer guide. The company had also been proactive in designing ship-handling simulator training for its superintendents. However, a number of shortcomings identified indicate that its safety management system would benefit from some revision.

In particular, the operations manual placed the onus on its superintendents to ensure they were sufficiently rested; the service provider had not taken any steps to monitor the hours of work and rest of its superintendents as advised in the ICS / OCIMF Guide. The potential for the superintendent to become fatigued would have been considerably decreased had the superintendent's hours of work and rest also been monitored by the service provider in accordance with the guidance in the ICS / OCIMF Guide, and designated rest periods planned into his work schedule.

In addition, the superintendent's performance had not been assessed annually as suggested in the STS transfer guide. Such assessments help to monitor competence and compliance with operational procedures. Importantly, they also help to identify if additional training is required.

FCM had been vetted by the oil majors it provided with STS services. In the absence of any global operational standards for service providers, each oil major vetted the company against its own criteria, and did not share the results of the vetting. Inevitably, this required FCM to meet differing requirements demanded by each oil major. It is almost certain that the provision of operational standards for service providers within the STS guide would not only help to simplify the vetting process for the majors, but it would also provide service providers with a benchmark standard to reach and maintain.

2.7 ROLE OF THE SUPERINTENDENT

The growth of STS operations worldwide, and the diversity of the products transferred, have resulted in the participation of many crews who are not experienced in this activity. In turn, this has led to the reliance on superintendents to assist inexperienced masters. However, although the employment of superintendents in these circumstances is advised in the ICS / OCIMF guide, this does not absolve any master from his responsibility for the safety of his vessel. In this respect, the decision of *Saetta*'s master to take action to try and avoid a collision was appropriate.

It is evident from **Annex B** that the responsibilities of a superintendent in STS operations are wide-ranging, time-consuming, and demanding. With regard to manoeuvring, his role is similar to that of a harbour pilot, particularly when embarked on a tanker approaching or separating from a vessel at anchor. It is even more demanding when neither vessel is at anchor.

When such operations are conducted by two vessels underway, a superintendent is expected to provide direction and advice to the masters of both vessels. Potentially this can be a challenging task which can be influenced by: the experience and training of the superintendent; the opportunities to rest; the experience of the vessels' masters in STS operations; the ability and performance of the bridge teams; and potential language or communications difficulties. In this case it was made far more difficult when one vessel had an emergency which seriously affected her manoeuvrability.

The high workload and the responsibilities placed upon superintendents creates a severe risk that they may become overloaded, a situation made worse when emergency situations are encountered. In some circumstances the risk of overload could be reduced by the provision of a second superintendent or an assistant, as indicated in *Saetta's* SMS, but this precaution is not considered in the ICS / OCIMF.

2.8 OCCUPATIONAL STANDARDS

The ability of a superintendent to meet the demands placed upon him, is largely dependent on his competency, measured by his qualifications, training and performance. In this case, apart from not having a dangerous cargo endorsement which was not contributory to the collision, the superintendent was suitably qualified and trained. Nevertheless, the guidance for the qualifications and training of superintendents provided in the STS transfer guide (paragraph 1.12) is ambiguous and open to a great deal of interpretation by service providers.

Similarly, the guide does not specify the criteria a master should have met before being considered suitable to control an STS transfer. This is significant in view of the training areas suggested for superintendents, even when they are qualified as a master.

2.9 INDUSTRY BEST PRACTICE

It is evident from FCM's operations manual and transfer notification **(Annex A)**, the SMS on board *Saetta* and *Conger*, and the requirements of the charter party, that the ICS / OCIMF Transfer Guide (petroleum) and its checklists is the main reference used by the shipping industry's tanker sector for the conduct of STS operations. However, over the 25 years in which the guide has been developed, STS operations now also include the transfer of gas and chemicals, and have become a global phenomenon which has changed in several ways.

First, transfers are no longer limited to traditional lightering operations; smaller vessels now frequently transfer oil products to larger vessels. Second, many transfer areas are determined by market conditions, and therefore can be short-lived. Third, crews without significant STS experience are being exposed to the operation. Finally, outside the traditional transfer areas, most transfers are facilitated by a service provider and controlled by superintendents.

STS operations have a reputation for being safe, which is testament to the usefulness and effectiveness of the transfer guide to date. However, the collision between *Saetta* and *Conger,* and the accidents and near misses identified in paragraph 1.14.1, although minor, happened in quick succession and are cause for concern. Given the transfer guide's significance to international law from 1 January 2011, it is important that the publication is reviewed and amended to fully reflect the changes to the operation and the lessons learned from these accidents, providing greater detail where appropriate.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION WHICH HAVE BEEN ADDRESSED

1. When *Conger*'s main engine failed to start when ordered ahead, there was no procedure in place for the crew to follow. This possibly led to the engine remaining stopped for about 4.5 minutes. [2.2]

2. Prompt and effective action following the loss of *Conger*'s main engine was hindered by two significant breakdowns in communications. It is essential during STS operations, that account is taken of the language and communication channels to be used and the roles of the persons involved when determining the composition and organisation of bridge teams. [2.3]

3. The unmooring operation and departure manoeuvre was not properly planned or briefed, and there was an over-reliance on checklists. [2.5]

4. The provision of operational standards for service providers would help to simplify the vetting process for the oil majors and would provide service providers with a benchmark. [2.6]

5. The service provider had not taken any steps to monitor the hours of work and rest of its superintendents, or assessed the superintendent's performance annually as suggested in the STS transfer guide. [2.6]

6. The responsibilities of a superintendent in STS operations are wide-ranging, time-consuming, and demanding, and vary according to the type of transfer conducted. The risk of overload could be reduced by the provision of a second superintendent or an assistant. [2.7]

7. There are no occupational standards defined for superintendents or masters in control of STS operations. [2.8]

8. It is important that the ICS / OCIMF STS Transfer Guide (Petroleum) is reviewed and amended to fully reflect current operations worldwide and to take into account the lessons learned from this and other recent accidents. [2.9]

SECTION 4 - ACTION TAKEN

4.1 THE OIL COMPANIES INTERNATIONAL MARINE FORUM AND INTERNATIONAL CHAMBER OF SHIPPING

In early 2009, OCIMF initiated the development of '*A Guide for Service Providers and Assessment of Suitability'*. The publication is expected to be completed by mid 2010 and will provide operating standards for STS service providers, and standards for STS superintendents' qualifications, experience, and workload (including rest periods).

In addition, OCIMF and ICS intend to revise the STS Transfer Guide to include guidance on chemical and gas tanker operations, and advice on risk assessments and manpower requirements. Work on the revision is planned to start during the first quarter of 2010 and is anticipated to be complete by the end of 2011.

4.2 CARDIFF MARINE INC

*Saetta'*s operator carried out an investigation into the accident, the report of which identified poor communications as a contributory factor. The company has revised its STS operations procedures to include the requirement for an additional officer to be present on the bridge. The officer will be in charge of the communications between the bridge team and the superintendent while the vessel is manoeuvring during STS operations.

4.3 PRIME MARINE MANAGEMENT

Conger's operator has reviewed its risk assessment for STS operations. Additional control measures now include:

- Defined STS weather parameters above which the operation should be aborted.
- Ensuring crew and the mooring master (aka superintendent) have adequate rest prior to the mooring and unmooring.
- Mooring master orders must be assessed and evaluated before they are followed by the master.
- Mooring masters' qualifications and physical condition to be verified prior to commencement of the operation.
- Mooring and unmooring operations should be carried out underway if a tug is not available.

A contingency plan for the loss of propulsion during an STS transfer has been forwarded to its fleet. The plan includes the standard actions in the event of an engine failure and the need for good communications arrangements between masters and mooring masters.

Revised STS instructions now prohibit vessels from manoeuvring or berthing operations after sunset, and recognise that tug assistance may be required. A 'lessons learnt' memorandum has been circulated to its fleet.

4.4 FENDER CARE MARINE

FCM has developed and implemented a timesheet for superintendents to record rest periods during STS operations. This information is then entered onto a database that allows a superintendent's rest periods to be monitored. The operations manual has been revised to reflect that it is the superintendent's duty to comply with STCW requirements and to record rest periods on the revised timesheet.

The company's marine department has now been expanded to include:

- An STS manager who is responsible for the regular auditing of all superintendents and global bases to ensure FCM's standards of care are being complied with.
- A marine superintendent to provide marine support to the operations team, including advising on the suitability of vessels to conduct a transfer.

SECTION 5 - RECOMMENDATIONS

In view of the actions taken, no recommendations are considered necessary.

Marine Accident Investigation Branch
March 2010