Report on the investigation of

a sea cadet's fatal accident on board

the sail training ship

TS *Royalist*

Stokes Bay in The Solent

2 May 2010

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AALA	-	Adventure Activities Licensing Authority
ASTO	-	Association of Sail Training Organisations
CPR	-	Cardio Pulmonary Resuscitation
FOSNNI	-	Flag Officer Scotland, Northern England and Northern Ireland
GAFIRS	-	Gosport and Fareham Inshore Rescue Service
HSE	-	Health and Safety Executive
JSP	-	Joint Service Publication
kN	-	kilonewton
kts	-	knots
kW	-	kilowatt
LR	-	Lloyd's Register
MARS	-	Mariners' Alerting and Reporting Scheme
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MOD	-	Ministry of Defence
MOU	-	Memorandum of Understanding
MSN	-	Merchant Shipping Notice
MSSC	-	The Marine Society & Sea Cadets
PPE	-	Personal Protective Equipment
PUWER	-	Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006
RN	-	Royal Navy
RYA	-	Royal Yachting Association
SC	-	Sea Cadet

SCC	-	Sea Cadet Corps
SCR	-	Sea Cadet Regulations
SEPA	-	Safety, Environmental Protection Advisor
SMS	-	Safety Management System
STCW	-	International Convention on Standards of Training, Certification and Watchkeeping
STI	-	Sail Training International
TARS	-	Naval Cadet Forces Training Afloat Regulations and Safety
TS	-	Training Ship
UK	-	United Kingdom
UTC	-	Universal Co-ordinated Time
VHF	-	Very High Frequency
WL	-	Watch Leader

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

SYNOPSIS

On Sunday 2 May 2010, Jonathan Martin, a 14 year old sea cadet, fell from a yard on the fore mast of the sail training ship TS *Royalist* when the vessel was at anchor. The sea cadet was assisting other cadets to stow the fore course sail when he fell backwards and struck the starboard gunwale 8m below, before falling into the sea. He was quickly recovered from the water by the vessel's sea boat and transferred to a coastguard helicopter which flew him to hospital. Sadly, the cadet died as a result of the severe injuries he had sustained.

This was the first fatality on board TS *Royalist* in her 39 years of service. The sea cadet fell to the deck because he unclipped his belt harness from the wire jackstay provided on the fore course yard, contrary to his training and onboard procedures for work at that position. However, the MAIB investigation has highlighted concerns regarding the supervision of the cadets when aloft on the vessel's masts and rigging, and the suitability of the belt harnesses provided. Unlike many adventurous training activities, sail training is self-regulating and is exempt from much of the health and safety at work regulation applicable elsewhere.

Recommendations have been made to the Marine Society & Sea Cadets and the Royal Navy aimed at improving the safety of cadets by addressing the safety issues identified and, through the development of assurance procedures, to ensure that the risks to cadets participating in this challenging, but potentially dangerous activity, are reduced to and kept as low as reasonably practicable.

TS *Royalist*

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF TS *ROYALIST* AND ACCIDENT

Vessel details

Registered owner	:	The Marine Society & Sea Cadets
Manager	:	Sea Cadets Offshore Office
Port of registry	:	Portsmouth
Flag	:	UK
Type	:	Sail training vessel
Built	:	1971, Isle of Wight
Classification society	:	Lloyd's Register
Construction	:	Steel
Length overall	:	29.56m (including after davits and bowsprit)
Length of hull	:	23.32m
Gross tonnage	:	83.09
Engine power and type	:	2 Perkins diesel engines each producing 101kW
Other relevant info	:	Twin Screw

Accident details

Time and date	:	About 2030, 2 May 2010
Location of incident	:	50º 46.5 N, 001º 09.7 W, Stokes Bay, The Solent, UK
Persons on board	:	29
Injuries/fatalities	:	One fatality – Jonathan Martin
Damage	:	none

1.2 NARRATIVE

1.2.1 The fall

At about 1600 on Sunday 2 May 2010, the sail training brig[1] TS *Royalist* slipped from Gunwharf Quays, Portsmouth after participating in the celebrations marking the 150th anniversary of the cadet movement. On board were 7 crew, 19 sea cadets (aged between 14 and 17 years old), and 3 watch officers (volunteer adult supervisors). The cadets were divided into four watches (port forward, port aft, starboard forward and starboard aft), each having a watch leader.

The vessel departed Portsmouth under power but her engines were stopped as she crossed the Swashway **(Figure 1)**. The bosun and two yardsmen, one of whom was Jonathan Martin, climbed up the fore mast and released the fore course sail from the fore course yard[2]. TS *Royalist* then sailed in the eastern part of the Solent. The manoeuvres did not require the crew or the cadets to work aloft to tend the vessel's sails.

The engines were re-started at 1940 and TS *Royalist* anchored in Stokes Bay at 2005. To minimise the vessel's movement and the possibility of dragging her anchor in the blustery wind, the master ordered the main course, fore course and fore topsails **(Figures 2 and 3)** to be furled to a harbour stow[3].

In preparation, the mast and deck lights were switched on and portable floodlights were made ready. The port forward watch leader (WL1) was nominated as the leader on the fore mast, and the port aft watch leader (WL2) was nominated as the leader on the main mast. The bosun explained to the watch leaders how the sails were to be furled. The watch leaders then mustered their respective watches and decided who would go where on the yards **(Figures 2 and 3)** and in which order.

Sixteen of the cadets were split into two groups: six male cadets climbed the main mast to furl the main course, and ten cadets climbed the fore mast to furl the fore course and fore topsail. The masts were accessed via the ratlines and the futtock shrouds **(Figures 3 and 4)**. The remaining cadets tended the lines on deck, furled the jib and main staysail, and prepared to lower the ensign from the main mast at sunset. The cadets were wearing red oil skin jackets and trousers, and soft soled shoes. The sailing master[4] and the bosun supervised the cadets from the deck; the sailing master monitored the cadets on the main mast and the bosun monitored the cadets on the fore mast.

The main course was quickly furled and several cadets were sent from the main mast to assist the cadets working on the fore mast. The sailing master also went forward but remained aft of the bosun on the vessel's starboard side **(Figure 5)**.

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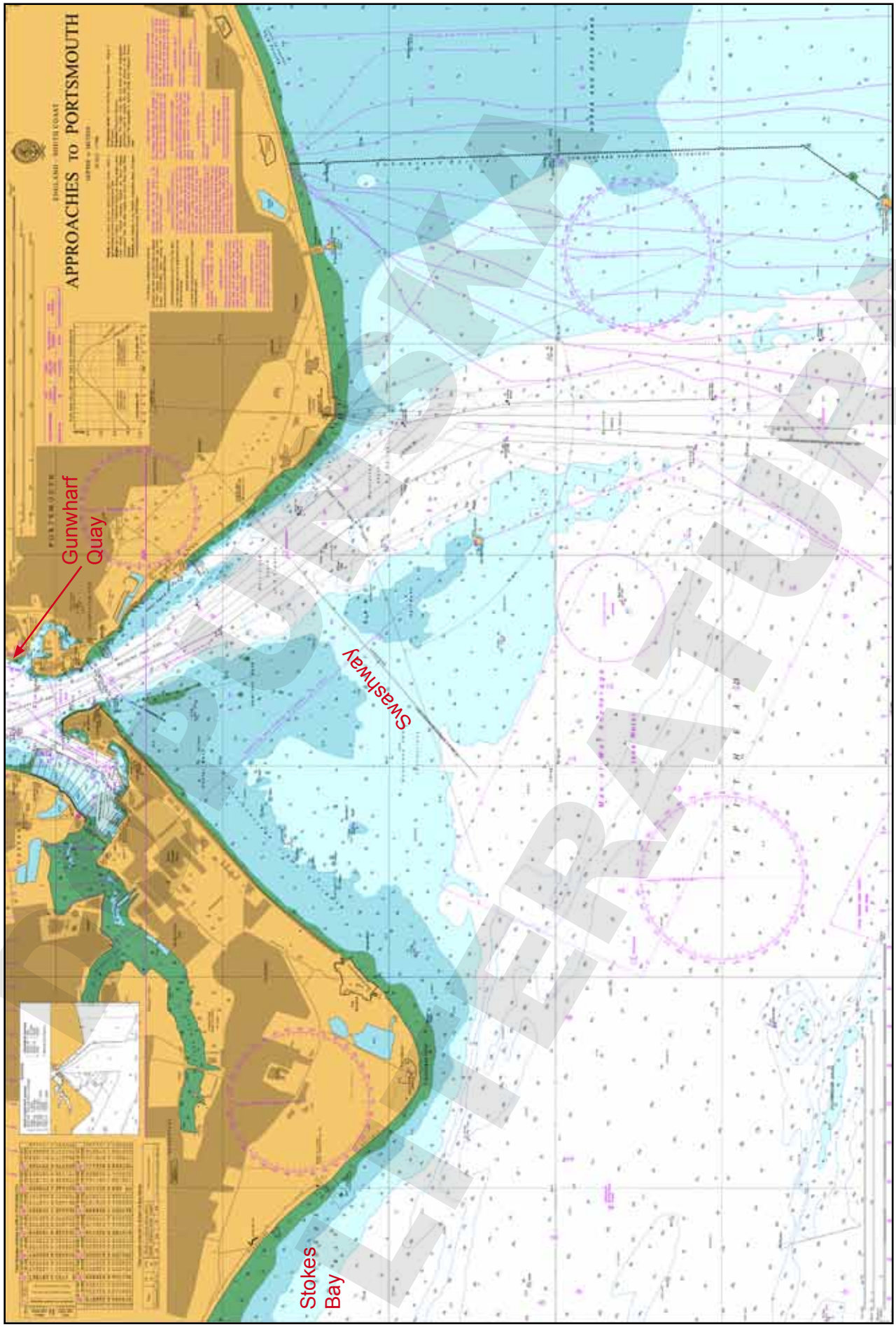
1 A brig is a two-masted square-rigged ship.

2 The main and fore masts on board TS *Royalist* each had spars known as yards that were perpendicular to the masts. The three yards were known as the course yard (the lowest), the topsail yard (middle) and the topgallant yard (highest). The outer ends of the yards are referred to as yard arms.

3 Furl - To furl the sail is to stow it on a yard, stay or bowsprit; and harbour stow is a term used to describe putting a neater stow than is usual in the sails before entering harbour.

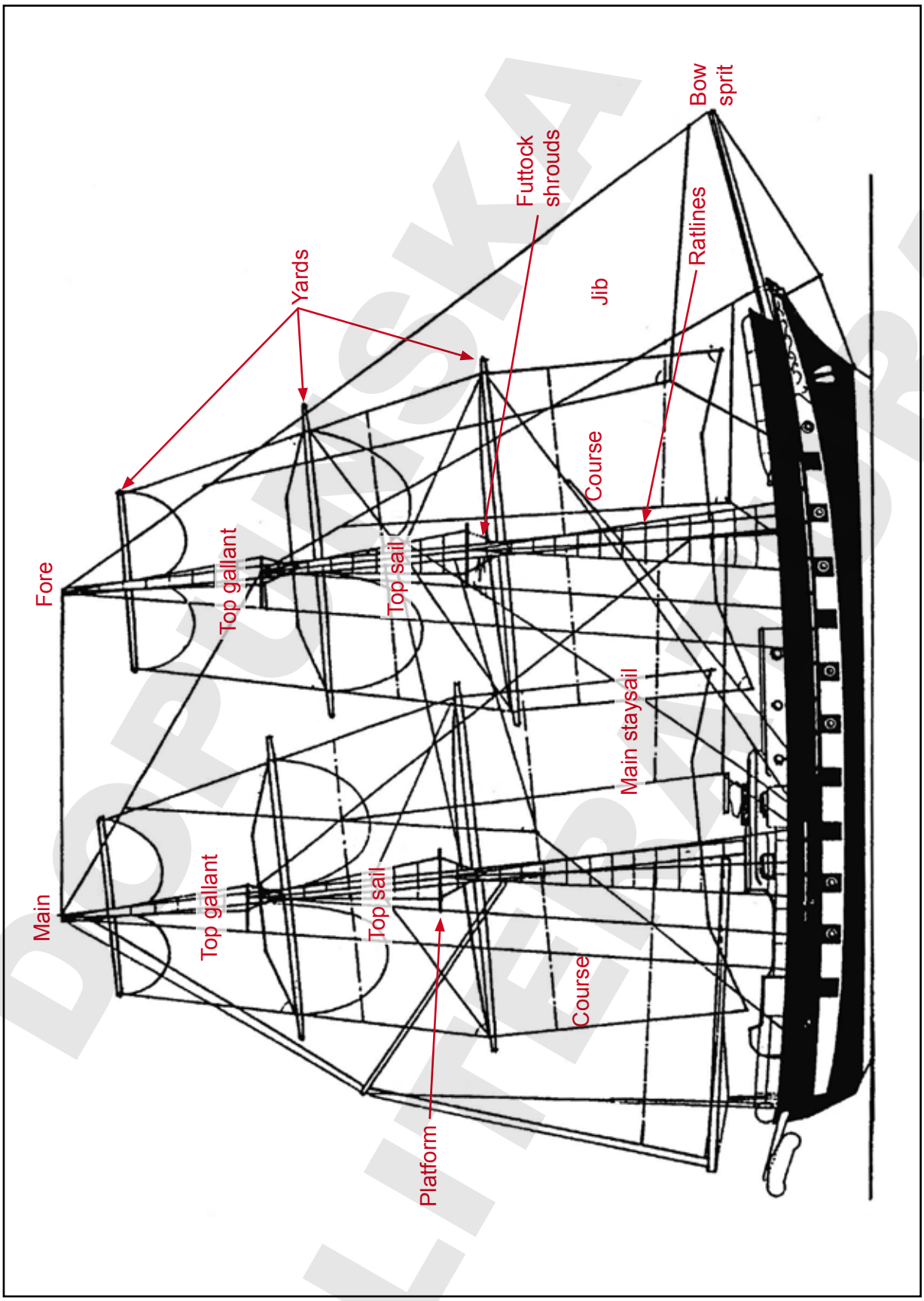
4 The sailing master was the second in command.

Figure 1



Approaches to Portsmouth Harbour

Figure 2



TS *Royalist* Sail Plan

Figure 3

TS *Royalist* masts, yards and key rigging

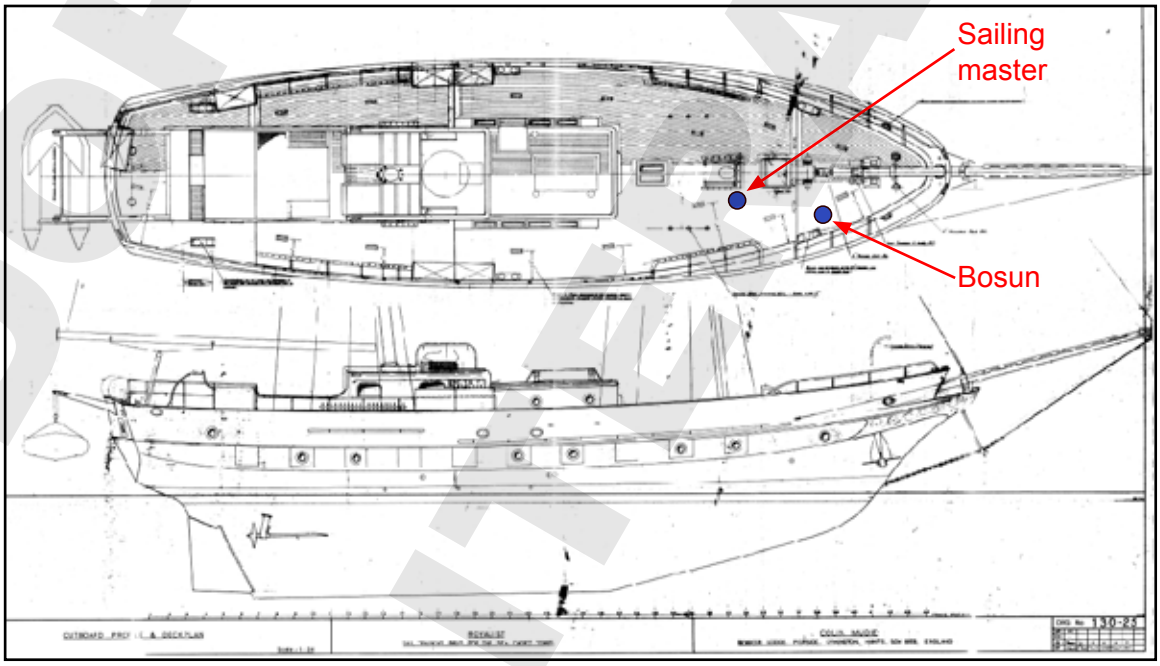
Photograph courtesy of MSSC

Figure 4

Fore mast, platform and futtock shrouds

Plan courtesy of MSSC

Figure 5

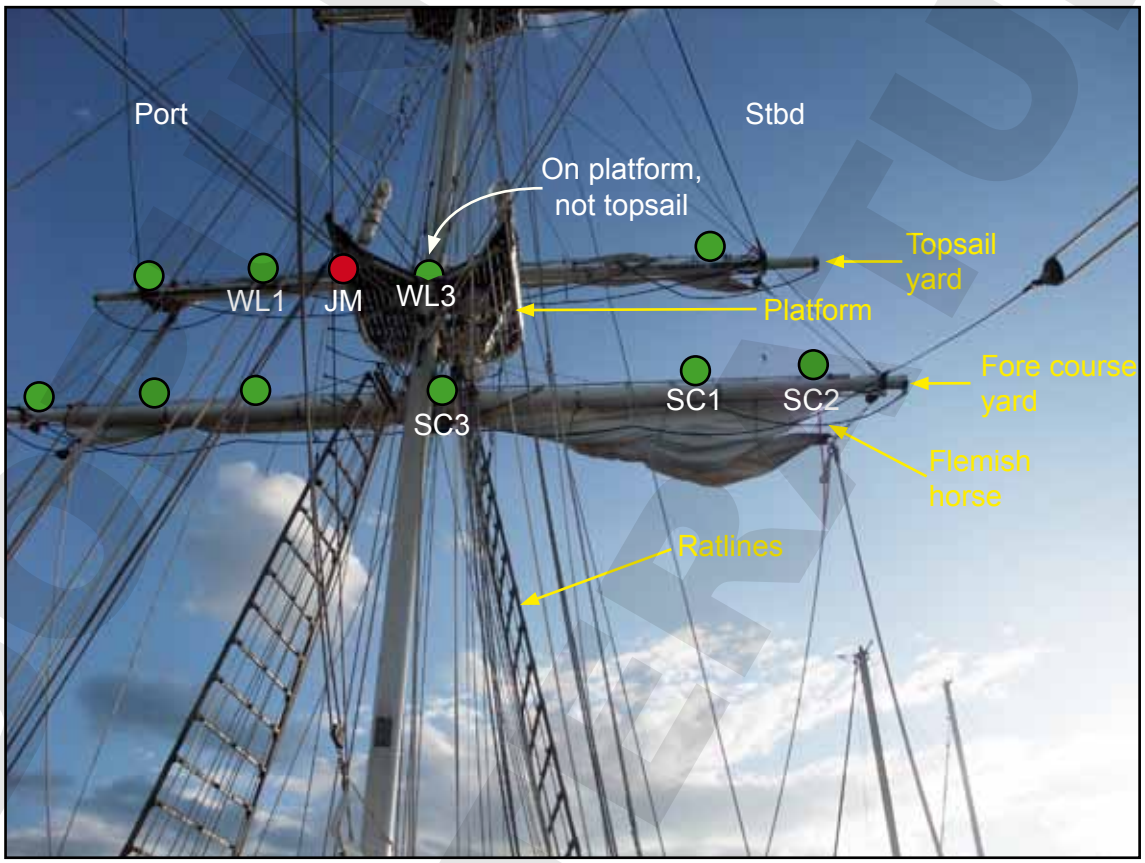


Approximate locations of sailing master and bosun

On the fore mast, four cadets were furling the fore topsail. One cadet was on the starboard yard and three cadets were on the port yard **(Figure 6)**. Jonathan helped WL1 to stow the sail on the port yard while guiding a less experienced cadet on the port course yard below. WL1 was having difficulty in managing the task she had been set and, although not told to do so, Jonathan moved across to the starboard topsail yard to assist the lone cadet.

Six cadets were nominated to furl the fore course sail. Three cadets were on the port yard and two cadets (SC1 and SC2) were on the starboard yard; SC1 was about midway along the yard and SC2 was standing in the Flemish horse at the yard arm **(Figure 6)**. SC2 was having difficulty in leaning over the yard to furl and secure the sail, and did not feel comfortable. The sixth cadet, the starboard forward watch leader (WL3), also felt uncomfortable aloft and remained on the platform or 'top' around the mast between the fore course and topsail yards.

Figure 6



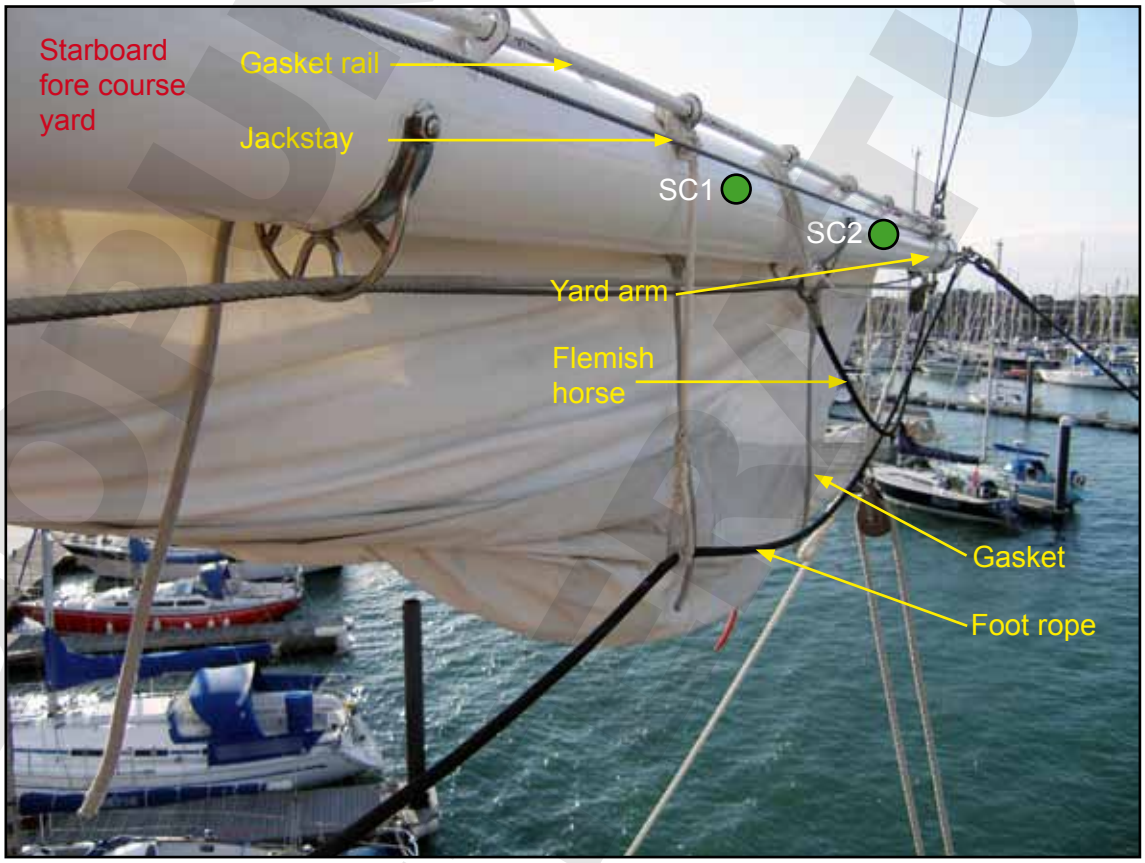
Position of the cadets on the fore mast

The bosun saw that SC2 was struggling. As her exit from the yard was blocked by SC1, he told SC2 to try harder and instructed Jonathan and one of the cadets who had been working up the main mast (SC3) to help. SC3 quickly climbed from the deck to the starboard fore course yard while Jonathan made his way along the starboard topsail yard to join WL3 on the platform.

Jonathan asked WL3 why he wasn't helping his watch. The watch leader replied that he did not like heights. A short altercation ensued in which the two cadets exchanged offensive comments. The WL3 then started to make his way back to the deck.

Jonathan climbed down from the platform via the futtock shrouds; it is not known if he clipped onto the vertical safety line available during this descent. He then stepped on the course yard foot rope between SC3, who was standing close to the mast, and SC1. Jonathan then clipped his belt harness lanyard on to the wire jackstay **(Figure 7)**.

Figure 7



Starboard fore course yard

Jonathan started to help SC1 furl the sail. He then told her that he wanted to pass her so that he could assist SC2. SC1 told him not to; she would help the other cadet. Without further discussion, Jonathan unclipped his belt harness lanyard and tried to step around SC1, leading with his right arm and his right foot. SC1 immediately shouted to Jonathan to stop and to re-attach his belt harness. This instruction was heard by a cadet on the deck below. Jonathan managed to grab the metal gasket rail between the female cadets, but when his right foot stood on the foot rope between the girls, the foot rope swung forward causing Jonathan to lean backwards. Jonathan was unable to hold on and, although SC1 tried to grab his arm, she was unable to prevent him from falling towards the deck.

Jonathan landed face-down on the starboard gunwale and a green wheelie bin **(Figure 8)**. He then fell in to the sea. Jonathan quickly surfaced face-up; his arms were outstretched and he showed no signs of movement. Although both the sailing master and the bosun caught sight of Jonathan as he fell, neither knew which yard he had fallen from.

Figure 8

View of deck from starboard fore course yard

1.2.2 Response

The sailing master immediately threw a lifebuoy into the water, and this landed close to Jonathan. He then ordered the bosun and the understudy sailing master to man the sea boat. The master helped to launch the sea boat and then informed Solent coastguard of the accident via very high frequency (VHF) radio, channel 16. The coastguard immediately tasked a search and rescue helicopter (CG104), the Gosport and Fareham Inshore Rescue Service (GAFIRS) and the Ministry of Defence (MOD) launch, *Endeavour*, to assist.

Jonathan was recovered into the sea boat at about 2033. The sea boat then returned alongside TS *Royalist,* where Jonathan's belt harness was removed. Jonathan remained motionless and the understudy sailing master and the bosun commenced cardio-pulmonary resuscitation (CPR). Jonathan was transferred to the GAFIRS rescue boat at 2046, where CPR was continued and a defibrillator was used by the vessel's paramedic. At 2050 Jonathan was winched on board CG104 and taken to the Queen Alexandra hospital in Cosham, where he was pronounced dead at 2155.

Immediately following Jonathan's fall, WL3 was unable to move from his position just below the platform on the fore mast and had to be helped down by a watch officer. A number of other cadets were also visibly traumatised.

A postmortem examination conducted on 5 May 2010 concluded that Jonathan had died from severe chest injuries consistent with a fall from height.

1.3 ENVIRONMENTAL CONDITIONS

The wind was north-easterly at 11kts, gusting to about 16kts. It was cloudy, but visibility was good. The sea was calm, the tidal stream was setting to the east at about 1kt, and the water temperature was 12°C. Sunset was at 2027 and evening civil twilight was at 2106.

1.4 THE CADETS

1.4.1 Status and supervision

TS *Royalist* accommodated up to 24 sea cadets, both male and female, and over 30000 cadets had been trained on board since the vessel entered service in 1971. The cadets were categorised as trainee crew, rather than employees or passengers.

TS *Royalist* was run on naval lines in order to instil a sense of respect and orderliness among the cadets. This approach was supported by the watch structure, the use of watch leaders, participation in communal activities such as cleaning, and the strict control of the use of mobile phones and other personal electronic devices. The volunteer adult watch officers were embarked to help ensure the wellbeing of the cadets.

1.4.2 Induction training

The 19 cadets joined TS *Royalist* in Gosport on Friday 30 April. On arrival, they were shown their bunks, and provided with red Musto waterproof jackets and over trousers (oil skins), and belt harnesses. The cadets were required to wear belt harnesses whenever they were on deck or aloft, and each of the cadet's harnesses was checked on issue by either the coxswain or the bosun to ensure it fitted correctly. The cadets' next-of-kin and medical details were also verified.

The master addressed the cadets and volunteer adult watch officers and stressed key aspects of safety and the importance of obeying orders given by the crew. He told the cadets that he hoped that, weather permitting, they would sail to France on Monday 3 May.

The sailing master briefed the cadets on the location and use of lifejackets and liferafts, actions to be taken in the event of a man overboard and fire, shipboard alarms, emergency stations and bracing stations[5].

The bosun showed the cadets how to adjust and wear their belt harnesses, and emphasised the do's and don'ts of climbing the rigging. These included the importance of maintaining at least three points of contact, the need to be clipped on at all times, the procedure for changing clipping points from one safety line or wire to another, and challenging or reporting a cadet who was doing something wrong or dangerous. He also showed the cadets the different knots in use around the vessel. Additional information about the ship was provided by the engineer and coxswain.

Following the briefings, during which the crew sought positive assurances from the cadets and volunteers that they understood the instructions given, the cadets assembled at the base of the fore mast wearing their belt harnesses. They then completed "up and over" training which involved climbing up the starboard ratlines and the futtock shrouds onto and over the first platform before descending via the futtock shrouds and port ratlines.

The cadets were assisted and supervised on the futtock shrouds and platform by the sailing master, bosun, and two watch officers who made informal assessments of the cadets' abilities and confidence when aloft. In accordance with onboard requirements, the cadets clipped their belt harness lanyards to safety lines when on the futtock shrouds and platform. All of the cadets climbed the starboard ratlines but WL3 was too nervous to climb the futtock shrouds to the platform and returned to the deck via the starboard ratlines. Other than during 'up and over' training, it was common practice for the vessel's crew to supervise cadets aloft from the deck. However, cadets were also supervised from aloft at the discretion of the sailing master depending on the circumstances.

[5] Positions allocated to cadets when trimming the sail

Due to the late arrival of one of the cadets, which had delayed the induction training, a planned evening sail was cancelled. Instead, TS *Royalist* motored across the harbour and moored alongside at Gunwharf Quays in preparation for the weekend celebrations.

1.4.3 Allocation of roles

Watch leaders were selected from the older and more experienced cadets to develop their leadership skills. Often they would have had previous experience of TS *Royalist*, but this was not a prerequisite for the role. Of those cadets selected on 30 April, three were 17 years old and the fourth was 16 years old. WL3 had not previously been on board TS *Royalist* but had spent a training period on board the yacht TS *Vigilant,* and had been a sea cadet since the age of 10. One cadet in each watch was selected as a yardsman. The role of the yardsman was to release gaskets and stow sails on the higher yards and yard arms, and therefore selection was based upon a cadet's confidence and ability to work aloft. Jonathan was the yardsman for the port forward watch **(Figure 9)**.

Figure 9

Cadet watch bill

1.4.4 Weekend activities

On Saturday 1 May, the cadets were woken at 0630. After breakfast they practised dressing[6] the ship and manning the masts in preparation for the celebration ceremonies. This involved climbing the masts and the yards in a specific order to reach their allocated positions. Two dress rehearsals were followed by displays at 1200 and 1815 in which Jonathan took his place on the fore topgallant port side.

During the evening, the cadets were allowed ashore to eat at a local fast food outlet, before attending an organised disco. They returned to the vessel at about 2200, but several continued talking until the early hours of the morning before getting to sleep.

The following day, another dress rehearsal was followed by a display at 1200. Poor weather conditions necessitated the sea cadets to wear oil skins aloft and the cancellation of a further display. Several cadets saw Jonathan unclip his belt harness lanyard while aloft on the fore topgallant during the weekend celebrations, but they did not report his actions to the crew.

At 1545, the four yardsmen went aloft and released the gaskets on the main and fore topsails, in readiness for sailing.

1.4.5 Jonathan Martin

Jonathan was 14 years old and had been a member of the Ashford sea cadet unit for about 2 years. He was a confident and helpful teenager who had a strong personality and liked to lead.

Jonathan had attended a boarding school, where he had been successful in his studies and fully participated in a range of activities including rugby and hockey. He was also interested in music, playing the guitar and the piano. Following an altercation with another pupil, Jonathan had attended anger management classes in 2009 to which he had responded positively.

This was Jonathan's second period on board TS *Royalist,* having previously sailed on the vessel in September 2009. He was very self-assured when working aloft. His other sailing experiences included helping to crew a vessel in a small ships race between Greenock and Belfast.

1.5 VESSEL CERTIFICATION

TS *Royalist* was owned by the Marine Society & Sea Cadets (MSSC) and operated under a Small Commercial Vessel Certificate issued by Lloyd's Register (LR) under the authority of the Maritime and Coastguard Agency (MCA). The vessel had been examined and found to comply with the requirements of the Code of Practice for the Construction, Machinery,

[6] Dressing ship is to decorate a ship, usually with signal flags

Equipment, Stability, Operation and Examination of Sailing Vessels, of up to 24 metres Load Line length, in commercial use and which do not carry cargo or more than 12 passengers (The Blue Code).

Marine Guidance Note (MGN) 280(M) Small Vessels in Commercial Use for Sport or Pleasure, Workboats and Pilot Boats – Alternative Construction Standards, otherwise referred to as the Harmonised Code, is intended to provide an alternative to the Blue Code and other coloured codes in use. It defines a sail training vessel as a sailing vessel which is used:

> *to provide instruction in the principles of responsibility, resourcefulness, loyalty and team endeavour and to advance education in the art of seamanship;*

Neither the Blue Code nor the Harmonised Code requires vessels to which they apply to be operated in accordance with a safety management system (SMS).

1.6 THE CREW

1.6.1 Complement

TS *Royalist*'s crew comprised the master, sailing master, trainee sailing master, engineer, cook, coxswain and bosun. All of the crew were employed by the MSSC and were managed through its offshore office.

1.6.2 Master

The master had served in the Royal Navy (RN) for over 36 years, the last eight of which he was in charge of the London area sea cadets. He retired from the RN in 2003 but remained involved with the sea cadets, initially as a relief sailing master but more recently as a relief master on both sail and power-driven vessels. The master held a commercially endorsed Royal Yachting Association (RYA) Yachtmaster (Ocean) certificate and was also a Yachtmaster (Ocean) examiner. He had sailed on board TS *Royalist* many times in several roles, including sailing master. He had been a relief master since about 2005 and served about 100 days on board the vessel in this capacity. The master had joined the vessel on 30 April 2010.

1.6.3 Sailing master

The sailing master was second-in-command and was the ship's training officer. He had worked on board sail training vessels since 1988, progressing from trainee to master. He first worked on board TS *Royalist* as an understudy sailing master in November 2009, and then worked as sailing master between 15 March and 16 April 2010. He held an RYA Yachtmaster (Ocean) certificate and an STCW II/2 certificate of competency, allowing him to be the master of yachts which were less than 3000t. He had re-joined the vessel after leave on 24 April 2010.

1.6.4 Bosun

The bosun was responsible for the maintenance of most of the sailing rigging and equipment on board TS *Royalist*, and he instructed embarked cadets in the effective operation of the vessel's sails. He held an RYA Yachtmaster (Ocean) certificate and first served on board TS *Royalist* in January 2009. The bosun had re-joined the vessel after leave on 24 April 2010.

1.7 FALL PROTECTION EQUIPMENT

1.7.1 Code of practice and standards

Guidance on best practice for fall protection equipment is detailed in British Standard (BS) 8437:2005 (code of practice for selection, use and maintenance of personal fall protection systems and equipment for use in the workplace). Fall protection equipment is commonly classified as either fall restraint or fall arrest.

A restraint device is intended to prevent a person from reaching a position from which they could fall, such as the edge of a flat roof, and typically comprises a belt, lanyard and a connector. The recognised standard for belts used for fall restraint is BS EN358:2000 (personal protective equipment for work positioning and prevention of falls from height – belts for work positioning and restraint and work positioning lanyards).

A personal fall arrest system is a fall protection system that typically uses a full body harness complying with BS EN361:2002, connected to a reliable anchor point to arrest and restrict a fall and prevent the wearer from hitting the ground. It is designed to limit the forces acting on a person by the fitting of an energy absorbing device. The maximum arrest force permitted is 6kN.

Key elements of the standards applicable to fall protection equipment include:

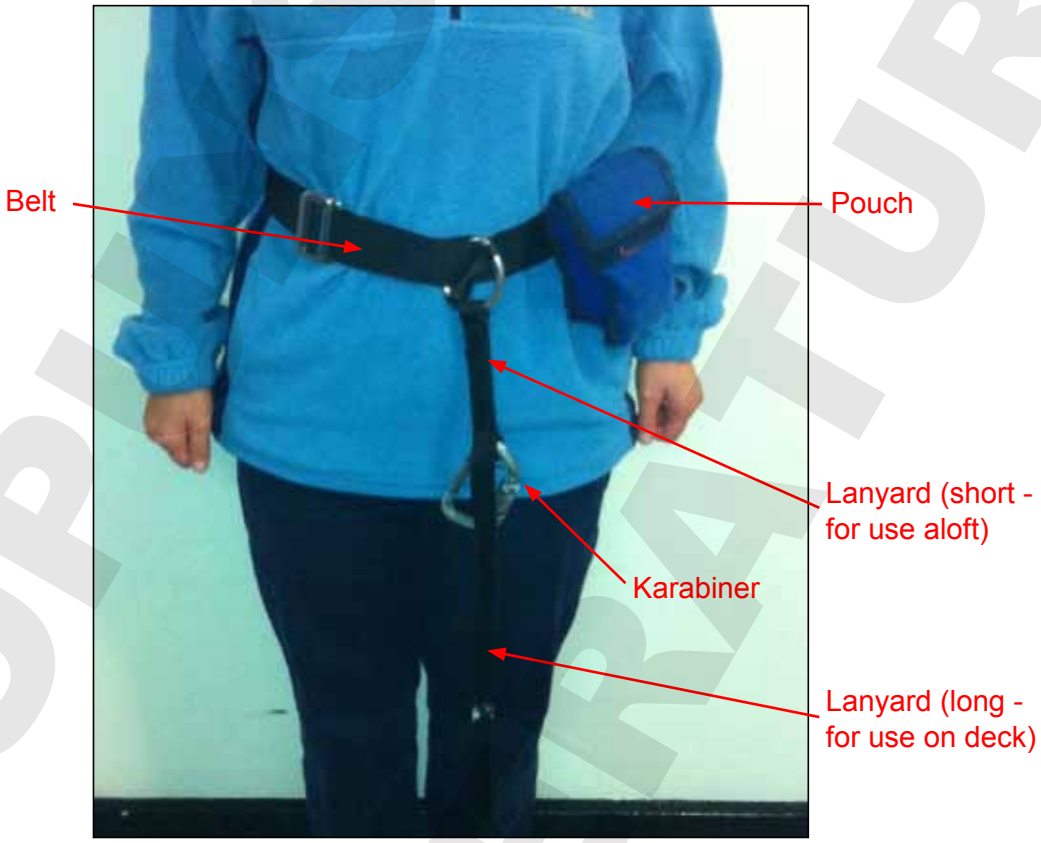
- Under no circumstances should a waist belt be used on its own for fall arrest purposes.
- A restraint belt and associated equipment are required to have a CE marking indicating that the equipment has been assessed against a recognised standard.
- The material used in the manufacture of a work positioning lanyard is required to have a minimum breaking force of 22kN and withstand a static force of 15kN for 3 minutes.
- A waist belt is required to withstand a static force of 15kN for 3 minutes and pass a dynamic strength test (1m freefall of a 100kg mass).
- A lanyard should never be used on its own for fall arrest purposes without any means of energy absorption.
- Harnesses and associated equipment are classed as personal protective equipment (PPE) and as Category III devices (equipment for protection against mortal danger).

- All components should be marked for traceability to relevant test certificates, certificates of conformity, and matched to the record of their use to facilitate proper care.
- All components used in a fall protection system require adequate static and dynamic strength to withstand any loads or forces that they might be subjected to, plus an adequate margin of safety.

1.7.2 Onboard equipment

The harnesses used by the crew and cadets on board TS *Royalist* were interwoven polyester webbing belts fitted with a single lanyard **(Figure 10)**.

Figure 10



Belt harness

The waist belt was 50mm wide and was fitted with a metal joining buckle. The lanyard was also made from polyester webbing and was 72cm long and 25mm wide, with a loop in the end. A self-closing karabiner[7] was fitted on the lanyard[8], 13cm from the waist belt, which could be operated with one hand. It also locked automatically when closed. A pouch on the side of the harness was used to store the lanyard and karabiner when not in use.

[7] A karabiner or carabiner is a metal loop with a sprung or screwed gate.

[8] The remaining length of the lanyard was intended to be looped around fittings on deck, as necessary.

The belts and lanyards were made by a manufacturer of marine covers in Gosport. The manufacturer had made about 50 belts fitted with lanyards for the MSSC since about 2004. The belts and lanyards were based on the design of a harness used on board TS *Royalist* for over 30 years. The breaking loads of the belt and the lanyard were 15.44kN and 19.6kN respectively. The belts and lanyards were not tested, manufactured or marked to meet the applicable European standards. The karabiner was manufactured by AluDesign to EN362[9] with a load capability of 23kN. None of the harnesses used on board were marked to enable each belt to be identified and traced. The belts and lanyards were inspected each week by the crew and surveyed annually by the manufacturer. A number of the belts had been returned to the manufacturer for replacement or repair. Other than invoices from the manufacturer, no records of inspection were maintained.

When working aloft, the karabiner was required to be clipped to the vertical safety lines when climbing the futtock shrouds and when on the platforms, and to the horizontal wire jackstays when standing on the yards. No safety lines or wires were available when climbing the ratlines, although it was possible to clip on to the course yard safety jackstay when standing at the top of the lower ratlines after climbing from the deck. When traversing from the platforms to the yards, or from the futtock shrouds to the yards, it was necessary to move the karabiner from one safety line or jackstay, to another.

MSSC has conducted several reviews to assess the advantages and disadvantages of both single and double lanyard harnesses. These included a review started in December 2009 which was ongoing at the time of the accident. The completed reviews had concluded that the belt harness with a short single lanyard allowed greater mobility and was less of a snagging and trip hazard. It was also simple to use and was capable of fitting a range of cadet sizes. During the reviews, body harnesses had been trialled on board TS *Royalist* by her crew, but the harnesses tested were considered to be unsuitable for several reasons. These included their complexity, the limited space available on the rigging, and the position of the lanyard attachment at the chest area of the harness, which made it difficult to tend the sails when standing on the foot ropes below the yards. It was also considered impractical for the cadets to wear full body harnesses when working on deck.

1.8 THE MARINE SOCIETY & SEA CADETS

1.8.1 Organisation and objectives

The MSSC is a registered charity which was established in 2004 following the merger between The Marine Society and the Sea Cadet Association. Day to day control of the charity is delegated to its chief executive.

[9] EN standard: Personal protective equipment against falls from a height- Connectors.

The objectives of the MSSC are *inter alia* to:

> *Promote the development of young people in achieving their physical, intellectual and social potential as individuals and as responsible citizens by the provision of education and leisure time activities using a nautical theme.*

The Sea Cadet Corps (SCC) is a national voluntary youth organisation comprising independent units responsible for the funding of their own accommodation and facilities. The units are affiliated to the MSSC, which acts as their parent and governing charity. A stated aim of the SCC is:

> *to help young people towards responsible adulthood by encouraging valuable personal attributes and high standards of conduct, using a nautical theme based on the customs of the Royal Navy.*

MSSC manages the SCC through the Captain Sea Cadets and Director of Operations, a serving RN officer, and provides guidance on the conduct of the SCC through its Sea Cadet Regulations (SCR).

In addition to TS *Royalist*, the MSSC also operates three yachts and two power-driven vessels that are administered through its Sea Cadets Offshore Office based in Fort Blockhouse, Gosport. The office is headed by the Offshore Commander, who is responsible for the operational readiness, use and safety of the vessels, and who has authority over MSSC permanent and relief offshore staff.

1.8.2 Sponsorship

The Ministry of Defence (MOD) sponsors the work of the MSSC in the operation of the SCC via a grant in aid towards part of the operating costs together with the loan of equipment and facilities, and a small number of serving RN and Royal Marine personnel. The MOD also indemnifies the MSSC and SCC units against liabilities and claims resulting from authorised activities. The principles of co-operation between the MOD and the MSSC in support of the SCC are detailed in a memorandum of understanding (MOU), which was signed in March 2007.

The MOU states that the:

> *MOD and the MSSC recognise that ensuring that high standards of safety are maintained for cadets and volunteers is central to this MOU.*

And that:

> *The MSSC intends to ensure that all Authorised Activities are supervised by qualified instructors, are risk assessed and are carried out in accordance with best practice guidelines and training regulations issued by MOD*

And also,

> *It is understood that ensuring high standards of health and safety for the Cadets and any other person associated with the Units and the Corps is central to the relationship between the Participants. The Participants intend to work together as is necessary to ensure that the required levels of health and safety are achieved in accordance with all applicable laws, regulations and procedures.*

1.9 TRAINING AND SAFETY MANAGEMENT

1.9.1 Guidance

In addition to the SCR, guidance on the conduct of cadet forces' training is provided in several MOD and RN publications. These include: Joint Service Publication (JSP) 814 - Policy and Regulations for MOD Sponsored Cadet Organisations, JSP 535 - Cadet Training Safety Precautions (2008), and Naval Cadet Forces Training Afloat Regulations and Safety (TARS).

With regard to safety, SCRs state:

> *The overriding consideration to be applied to all Sea Cadet activities and Sea Cadet facilities is ensuring that the levels of risk involved in the activities being undertaken are reduced to as low a level as is reasonably practicable for cadets, adult volunteers within the SCC and the general public. This also applies to any other individuals who may become involved with the SCC* [sic].

And

> *All Sea Cadet activities are to be the subject of a suitable and sufficient risk assessment addressing the significant risks of the activity. The significant risks should be documented and the control measures identified.*

TARS provide general direction on safety relating to a variety of waterborne activities, ranging from dinghy sailing to offshore operations. It incorporates the standards established by recognised national organisations including the MCA and RYA. It also provides guidance on how regulations should be applied in practice and how to complete a risk assessment **(Annex A)**.

1.9.2 Risk assessment

Risk assessments for the activities conducted on board TS *Royalist* had been undertaken by the MSSC's offshore office and the vessel's masters. Extracts of the assessments, including those for going and working aloft, are at **Annex B**.

1.9.3 Advice and audit

MSSC, including its offshore office, was advised on health and safety issues by its Safety, Environmental Protection Advisor (SEPA). The RN, under the Flag Officer Regional Forces, employed an MOD civil servant as its Youth Health and

Safety Officer who advised all RN recognised naval cadet forces on health and safety issues. His responsibilities included ensuring that all authorised activities were conducted in a safe environment, and that cadet health and safety policies met the requirements of national statutes, regulations and approved codes of practice. The RN health and safety officer's role also included assisting with the implementation of safety management systems (SMS) across all activities. Both the SEPA and the RN health and safety officer attended MSSC's periodic Health and Safety Working Group Meetings.

The SEPA and the RN health and safety officer conducted audits of the sea cadet units, but the remit of the health and safety officer did not extend to the activities undertaken by the MSSC offshore office. The offshore office had not been subjected to an external safety audit during the 4 years the Offshore Commander had been in post.

1.9.4 Post accident internal review

Following Jonathan's fall, the MCA inspected TS *Royalist* and on 5 May 2010 cleared the vessel to re-commence operations. Concurrently, MSSC reviewed its policy and procedures for cadets working aloft on board TS *Royalist*. The review **(Annex C)** was undertaken by the Offshore Commander, Captain Sea Cadets, and the regular master of the vessel. On completion of the review, and with the support of the RN, MSSC approved the vessel to resume normal aloft activities on 17 May 2010, subject to:

- progress of the ongoing harness review
- progress of the drafting of an SMS
- further review as soon as the findings of the MAIB investigation report were published.

Neither the SEPA nor the RN health and safety advisor was involved in the review, although both were later shown the resulting draft report, and their comments on the report were discussed at a Health and Safety Working Group meeting on 26 May 2010. The RN advisor raised concerns regarding the review's methodology. He also subsequently raised more detailed concerns in writing on 15 September 2010 soon after sighting the onboard risk assessment for activities. These included:

- the lack of reference to codes, regulations, standards, guidance and reference reports;
- the failure to engage a safety expert or climbing/working at height expert, and;
- the suitability and sufficiency of the onboard risk assessments for aloft activities.

1.10 WORKING AT HEIGHT

1.10.1 Regulation

Guidance to UK vessels with paid crew is provided in MGN 410 (M+F) (The Merchant Shipping and Fishing Vessels (Health and Safety at Work) (Work at Height) Regulations 2010), published on 16 March 2010, in which Regulation 3 (Meaning of "worker") states:

> *3.1 …. The provisions of the Work at Height Regulations 2010 do not apply to persons who are training on a vessel which is being used to provide instruction in the principles of responsibility, resourcefulness, loyalty and team endeavour and to advance education in the art of seamanship or in the provision of instruction in navigation or seamanship for yachtsmen eg trainees on sail training vessels. The rationale for this exemption is that such persons are not workers for the purposes of the Directive as they are not employed and do not receive a wage for the time spent on the vessel. Notwithstanding this exemption regulation 5(1) of the General Duties Regulations places a general obligation on employers to ensure the health and safety of all persons on board, so far as is reasonably practicable, irrespective of whether or not they are workers.*

This exemption for trainees resulted from discussions between the MCA and the sail training industry. It was acknowledged that application of the regulations on board sail training vessels would make sail training activities unworkable and that self-regulation was the best means of ensuring the safety of trainees.

Persons attending training courses on sail training vessels are also excluded from the provisions of the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 (MGN 20), and the Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006. However, these regulations, and the Work at Height Regulations, are still applicable to the crews of UK registered sail training vessels.

1.10.2 Guidelines and practice

The sail training industry offers varying types of sail training to individuals and groups of all ages and abilities, and the safety precautions taken for persons working aloft differ between operators and vessels.

In 2005, Sail Training International (STI), the international body for sail training of which the UK's Association of Sail Training Organisations (ASTO) is a member, produced its Safety Aloft Guidelines which acknowledge that:

> *Short of loss of a vessel, the most catastrophic event any sail training programme might experience is a fall from the rig leading to serious injury or death… Prevention of falls from the rig is one of the hallmarks of any sailing safety culture*

The guidelines, which have not received industry-wide support, recommend that full body harnesses, certified to national standards and fitted with double lanyards, are worn when working aloft, and that all personnel, including trainees receive formal training on the proper procedures and techniques to be used before climbing for the first time. The guidelines also advise that:

> *All equipment designed to prevent falls should take into account the specific rig of the vessel. Such equipment should comply with all relevant legislation and operators should be guided by regulations.*

1.11 ASSOCIATION OF SAIL TRAINING ORGANISATIONS

ASTO's objectives include the promotion of sail training and support of the UK sail training industry. It works closely with bodies such as the MCA and the RYA to ensure appropriate levels of training and regulation exist within the sail training industry. ASTO also acts as a forum for its member organisations to promote the sharing of best practice. The association monitors compliance with the conditions of membership, which includes policies and procedures in addition to those required by UK regulation.

In addition to TS *Royalist*, three other UK registered square-rigged sail training vessels are operated by ASTO members. These vessels are larger than TS *Royalist* and provide full body harnesses with double lanyards for their crew and trainees when aloft. The vessels' crews also supervise trainees working aloft from the platforms and yards as well as from the deck.

1.12 ADVENTUROUS TRAINING

Specified adventurous activities ashore, and some watersports, provided to persons under 18 years of age in return for payment, are licensed by the Adventure Activities Licensing Authority (AALA). The aim of the AALA is to:

> *Provide assurances to the public about the safety of those activity providers who have been granted a licence. In this way it is expected that young people will be able to continue to enjoy exciting and stimulating activities outdoors without being exposed to avoidable risks of death or disabling injury.*

The scheme is aimed at those who sell adventure activities to schools and to the public. It does not cover activities offered by voluntary associations to their members, to schools providing activities for their own pupils, or young people undertaking activities when accompanied by their parents or legal guardians. The scheme also does not apply to larger sailing vessels that go to sea and are subject to Merchant Shipping Act certification, which include the Blue and Harmonised Codes. The Health and Safety Executive (HSE) is currently designated as the AALA.

The AALA requires all providers of adventurous activities at height, such as climbing through trees and sliding along zip wires, to use fall arrest equipment.

1.13 PREVIOUS ACCIDENTS

The MAIB is aware of two falls from the fore mast on board TS *Royalist* in the 1980's. In the first, a cadet fell overboard during an 'up and over' drill, resulting in various fractures and the subsequent removal of the spleen. In the second, a bosun fell from the fore mast shrouds and landed on a concrete jetty. Fortunately, he was not seriously injured and the incident was attributed to over-confidence and exuberance.

Also in the 1980's, the bosun's mate on board TS *Astrid* fell overboard from aloft while at sea at night. He was recovered after approximately 15 minutes in the water, and suffered a broken arm and cheekbone.

In July 1994 a trainee on board TS *Malcolm Miller* slipped while attempting to re-hook his safety harness when standing on the bowsprit. He fell overboard and, although the vessel immediately reversed course, the trainee was not found until 2 months later. Following the accident, the MAIB recommended that additional jackstays be fitted to make it unnecessary for crew and trainees to unclip their harnesses when working on the bowsprit.

In August 2004, a passenger was fatally injured on board the commercial sailing vessel *Albatros* after climbing aloft and falling from the main mast ratlines. The passenger appeared to 'freeze' when he was about 8m above the deck. He then fell backwards and landed on the port gunwale before falling over board. Contributory factors identified in the MAIB investigation (Report 7/2005) included:

- The lack of a safety management procedure.
- Inadequate briefing and supervision.
- The use of a restraint belt rather than an approved safety harness.

In 2007, the Nautical Institute's Mariners' Alerting and Reporting Scheme (MARS) reported the fall of a trainee on board a sail training vessel. When at the masthead the trainee clipped his harness tether to a backstay instead of a fixed strong point. The trainee lost his footing and slid 20m down the backstay, striking the main topsail with a glancing blow before landing on the cap rail and sustaining a number of fractures.

Contributory factors identified included:

1. *Failure to clip safety line to appropriate fitting*
2. *Lack of adequate training and supervision*
3. *Unsafe practice of permitting trainee to proceed without being accompanied*

In April 2009, TS *Royalist* went aground at Chapman's Pool, Dorset. The MAIB investigation (Report 26/2009) highlighted the lack of an SMS which, although not required for the vessel, could have helped prevent the accident. Following the accident, the MCA and ASTO set up a joint working group to consider the management of safety and establish best practice guidelines for the UK sail training industry.

A draft generic SMS for small sail training vessels remains under development by ASTO through MSSC. Once finalised and approved by ASTO, it is intended that the SMS will be adapted to form a specific SMS for TS *Royalist* which will be trialled on board the vessel during the 2011 season.

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 THE FALL AND RESPONSE

Jonathan Martin fell from the starboard fore course yard as a result of losing his balance and grip as he stepped around another cadet. His lanyard was not clipped on to the wire jackstay and, therefore, there was nothing to prevent him from continuing to fall to the gunwale below. Although the crew's reactions to recover and assist Jonathan, and to alert the emergency services, were immediate, his injuries were too severe to be treated successfully.

2.3 RISK-TAKING

This was Jonathan's second period on board TS *Royalist* and he was undoubtedly aware of the vessel's rules to maintain at least three points of contact, and to be 'clipped on' at all times when on the yards. It is not known what prompted Jonathan to disregard these rules. There is no evidence to suggest that he took risks for thrills or was vulnerable to peer pressure. Furthermore, although Jonathan had previously experienced difficulty in controlling his temper, he 'walked away' from the altercation with WL3 just before his fall. Therefore, it is unlikely that this exchange of words adversely influenced his subsequent actions. However, it is possible that Jonathan's behaviour was influenced by two factors.

First, although the cadets were expected to 'clip on' whenever they were on the yards, platforms and futtock shrouds, they had to unclip to climb the ratlines, which was a 'free climb'. All other unclipping was intended to be momentary when changing the point of clipping to enable safe movement between platforms, yards and futtock shrouds, and was undertaken when stationary and holding on. Nonetheless, this made unclipping a routine occurrence, albeit in specified situations, and it is possible that Jonathan felt able to be unclipped in other situations, such as when traversing an obstacle. This attitude would have been a natural response to his repeated exposure to situations in which no adverse consequences were experienced and, combined with his confidence aloft, might have led to a degree of risk-taking and his divergence from onboard procedures.

Second, given Jonathan's confidence, enthusiasm and leadership when aloft, it is likely that he unclipped his belt harness lanyard and attempted to step around SC1 because he was pre-occupied with assisting the female cadets; a task he probably relished. Unfortunately, Jonathan did not foresee the potential consequences of his actions.

Elevated risk-taking among adolescents is well documented. Therefore, in a sail training environment populated by adolescents, a degree of risk-taking is predictable, and must be taken into account when determining the safety training, level of supervision, and safety equipment that needs to be provided.

2.4 SUPERVISION

The close supervision of the cadets working aloft was paramount to their safety, particularly as the furling of the sails in Stokes Bay was the first occasion the majority of them had been sent aloft to work. For some, it was also their first time at sea. Although the cadets had received the required induction training on joining, and had trained for and manned the masts for the weekend displays, the crew's knowledge of their abilities, or strengths and weaknesses was not comprehensive.

The watch leaders were nominally in charge of furling the sails, but they too were cadets, and therefore were not qualified to be responsible for the safety of others. In addition, although the cadets were encouraged to challenge and report the potentially dangerous actions of others, which possibly led to SC1 challenging Jonathan just before his fall, it is evident from Jonathan's response to SC1's challenge and the failure of other cadets to report he had unclipped his harness while aloft during the weekend displays, that this measure was not always effective. The responsibility for the supervision fell to the sailing master and bosun who, as was common practice, monitored the actions of the cadets from the deck.

When the cadets were aloft, the bosun had seen that SC2 was having difficulty furling the sail, but the following situations, events and rule breaches were either not seen or heard, or not acted upon:

- The difficulty experienced by WL1 in managing the cadets leading to Jonathan's unprompted movement from the port to the starboard topsail yard.
- The reluctance of WL3 to go out on the starboard fore course yard.
- The altercation between Jonathan and WL3.
- Jonathan unclipping and attempting to step around SC1.
- SC1 telling Jonathan to re-clip.

Although the sailing master and bosun were only about 8m below the cadets, it is highly likely that the effectiveness of their supervision was reduced by several factors. First, the view of some of the cadets aloft from the deck would have been partially obstructed by the fixed rigging. Second, it would have been extremely difficult to differentiate between the cadets and to monitor the actions of individuals because all the cadets were wearing red oil skins and were

moving around. Finally, the supervision of the cadets working on the deck would have required the sailing master and bosun to occasionally take their eyes off the cadets working aloft. This probably explains why neither the sailing master nor the bosun knew which yard Jonathan had fallen from.

It is of concern that Jonathan's 'unclipping' during the weekend displays, and the occurrences on the fore mast immediately prior to his fall, were not detected by the supervisors from the deck. At the time of Jonathan's fall, the cadets were working on only one mast and were being monitored by two experienced crew. Therefore, there is a compelling need to review the vessel's arrangements for the supervision of cadets aloft, taking into account several factors. These include: the optimum positions for the supervisors; the potentially limited time available in which to take action to prevent an accident from occurring; the experience, abilities and potential risk-taking of the cadets; the difficulty of the task in relation to the number of cadets available; the ratio of supervisors to cadets; and, the practices on board other square-rigged sail training vessels.

2.5 PERSONAL PROTECTIVE EQUIPMENT

The belt harnesses with a single lanyard used on board TS *Royalist* were intended to prevent the cadets from falling when aloft. However, this type of harness is a fall restraint device, which is intended to prevent the wearer from getting to a position from where it is possible to fall. It is not suitable as a fall arrest device because the belt only supports the wearer by the waist, although the risk of injury is mitigated to some extent by the lanyard's short length, which thus restricts the distance a person can drop. However, the potential for injury remains. Furthermore, given the material breaking load of the lanyards and the absence of markings on the harnesses to indicate that they met the relevant EC standards (paragraph 1.7.1), their ability to withstand the shock loading of a person falling is questionable.

The provision of only one lanyard also necessitates the wearer to 'unclip' while moving around when aloft due to the arrangement of vertical safety lines and horizontal wire jackstays. During the periods a cadet is 'unclipped', the risk of falling is significantly increased.

STI guidelines advise that sail training vessels use a full body harness fitted with two lanyards. This is a fall arrest device, intended to be used in situations when a fall is likely, and designed to minimise the risk of injury to the wearer, suspend them in an upright position and maximise the chance of their safe recovery or rescue, if required. The provision of two lanyards also enables the wearer to 'clip' on to the next line or wire before 'unclipping' from the line or wire in use. Although two lanyards present twice the snagging hazard of a single lanyard (and a degree of synchronisation, discipline and practice is required), the increased protection from falling is clear.

However, the STI guidelines also state that account must be taken of the specific rig of a vessel. In this case, it is evident that MSSC preferred the waist belt with one lanyard to the recommended full body harness with two lanyards, which it had trialled and which is used by other operators, on the basis that it was simpler to use, less cumbersome, and suitable for use on deck as well as aloft provided the cadets were properly trained in their use. These were important considerations given the age range and mixed abilities of the embarked cadets and the limited space on the masts and associated rigging on board TS *Royalist*. Nonetheless, not only were the belt harnesses and lanyards unsuitable for fall arrest, they were neither manufactured nor tested to comply with current standards. In addition, despite the frequent on board inspections conducted, no records of these inspections were maintained. Consequently, despite their good safety record, the belt harnesses cannot be considered to have been fit for purpose.

Jonathan's belt harness and lanyard did not fail, and there was no record of a belt harness failing on board. However, despite MSSC's reviews of the harnesses, the continued use of the belt harnesses with single lanyards, and the maintenance regime followed, indicate that MSSC had not adopted best practice found elsewhere in the sail training sector of the marine industry. They also indicate that MSSC had not complied with the spirit of the regulatory standards for PPE applicable to the merchant marine industry and to adventurous training activities ashore.

Furthermore, although the work at height regulations did not apply to the cadets because they were trainees, the regulations did apply to the vessel's crew as they were paid employees. Therefore, when working aloft, the crew were required to use a fall arrest device, marked to show its conformity with the relevant European standards such as EN 361:2002. The use of the belt harnesses on board TS *Royalist* by the crew was therefore not compliant with regulation.

2.6 SAFETY ADVICE AND AUDIT

It is evident from the variance between the practices and the equipment used on board TS *Royalist* and industry best practice and regulation, that the safety management of MSSC's offshore office was disadvantaged by not fully utilising the SEPA and the RN health and safety advisor in the oversight and audit of its activities. The logical but scant nature of its risk assessments for going and working aloft **(Annexes A and B)** also indicates a lack of health and safety expertise.

It is recognised that sail training is an extremely specialist activity, and that the staff of MSSC's offshore office and the crew of TS *Royalist* were experts and experienced in this sector. However, although the health and safety advisors had little knowledge of sail training, their involvement either through audit or consultation would have provided a more rigorous scrutiny of the risk assessment process, as well as a fresh view on the validity of the onboard procedures.

The involvement of the RN advisor in the post-accident internal review would have increased the likelihood of a more critical approach. In particular, given the advisor's concerns regarding the review's methodology, it is more likely that industry requirements for the provision, use and maintenance of PPE, the practices of other sail training operators, independent expert advice, industry guidelines, and the general duties of an employer would have been taken into account.

2.7 ASSURANCE

The sail training provided on board TS *Royalist* is a very challenging and largely enjoyable activity which is intended to push the personal boundaries of the embarked cadets to enable them to understand their strengths and limitations. However, the training requires the cadets to work at height; which is not without risk. Indeed, a degree of risk is required to achieve some of the stated training objectives.

Unlike commercially operated sail training operations and adventurous activities within the UK, such as climbing, caving, and certain watersports, which are licensed by the AALA, the onus for ensuring that the sail training on board TS *Royalist* is conducted without exposing the cadets to avoidable risk of death or disabling injury, rests solely with the MSSC. In achieving this stimulating but safe environment, the MSSC is not constrained by compliance with the requirements of the Safety at Height Regulations (MGN 410 M & F), the specific requirements of the Health and Safety at Work Regulations (MGN 20 M & F) or by PUWER, which do not apply to the cadets.

In view of the age of the cadets, such freedom from regulation and oversight puts the MSSC in a privileged and very responsible position. To meet the expectations of the cadets' parents, and of the MOD, and to fulfil its obligations towards all persons on board its vessel, the MSSC must ensure that the risks to the cadets have been reduced to as low as is reasonably practicable.

Over the 39 years TS *Royalist* has been in service there have been few falls from height recorded, which indicates that the risks of working aloft have been considered and well managed; Jonathan Martin fell because he did not follow basic instructions, despite having the intellectual and physical capacity to do so. However, the ineffectiveness of the supervision of cadets on this occasion, and the unsuitability of the safety harnesses provided, strongly indicate that there is scope to improve the safety of cadets when aloft. Therefore, a critical review and continuing assessment of the procedures and control measures adopted on board TS *Royalist* is warranted to provide assurance that the risks to cadets when aloft are indeed reduced to, and kept, as low as is reasonably practicable.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT WHICH HAVE RESULTED IN RECOMMENDATIONS

1. Jonathan probably unclipped his harness lanyard and attempted to step around SC1 because he was pre-occupied with assisting the female cadets, and did not foresee the potential consequences of his actions. [2.3]

2. The repeated need for Jonathan to 'unclip' from the safety lines and wires, along with his confidence when aloft, might have resulted in a degree of risk-taking and divergence from onboard procedures when moving about the rigging. [2.3]

3. In a sail training environment populated by adolescents, a degree of risk-taking is predictable, and must be taken into account when determining the safety training, level of supervision, and safety equipment that needs to be provided. [2.3]

4. Given that Jonathan's unsanctioned 'unclipping' during the weekend displays, and a number of events on the fore mast immediately prior to his fall, were not detected by the supervisors, the need to review the vessel's arrangements for the supervision of cadets when aloft is compelling. [2.4]

5. Sail training is an extremely specialist activity, but the under-utilisation of health and safety advisors from the oversight and audit of the MSSC's offshore activities was detrimental to the safety management of TS *Royalist*. [2.6]

6. The ineffectiveness of the supervision of cadets on this occasion, and the unsuitability of the belt harnesses provided, strongly indicate that there is scope to improve the safety of cadets when aloft. Therefore, a critical review and the continued assessment of onboard procedures are warranted. [2.7]

3.2 OTHER SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION ALSO LEADING TO RECOMMENDATIONS

1. When changing clipping points to move about the rigging, the risk of falling was significantly increased by the provision of only one lanyard on the belt harnesses. [2.5]

2 The belt harnesses used on board were not fit for purpose. They were unsuitable for fall arrest, and were neither tested nor manufactured to comply with current standards, and no records of their inspection were maintained. [2.5]

3. The use of the belt harnesses on board TS *Royalist* by the crew was not compliant with the Work at Height Regulations. [2.5]

SECTION 4 - ACTION TAKEN

4.1 THE MARINE SOCIETY & SEA CADETS

Following discussions with the RN, MSSC withdrew TS *Royalist* from service in September 2010 for refit, and pending a review of the equipment and procedures used by cadets when aloft. It has also continued to investigate the provision of a suitable replacement harness and is progressing the development of an SMS for its offshore operations.

SECTION 5 - RECOMMENDATIONS

The **Marine Society & Sea Cadets** is recommended to:

2011/103 Critically review and then revise the precautions taken to reduce the risk to cadets and crew when aloft on board TS *Royalist*, taking into consideration:

- The need to provide a safety harness that is fit for purpose.
- The need for cadets to be 'clipped on' when moving about the rigging.
- The positioning of supervisors and the ratio of supervisors to cadets.
- The need to raise the safety awareness of cadets (with respect to the consequences of their actions).
- The benefits of utilising the health and safety expertise available.
- The need to comply with the work at height, and health and safety regulations with regard to the activities of its crew.

The **Royal Navy** is recommended to:

2011/104 Review and continue to develop its assurance processes of the MSSC's safety management arrangements for activities undertaken by cadets, which are indemnified by the Ministry of Defence.

Marine Accident Investigation Branch
March 2011