Her Majesty's Fireship

Firebrand

Shipwreck Recording Project

Project Report

Kevin Camidge

With contributions by

Peter Holt
Phil Rees
Brendon Rowe
Janet Witheridge

Sponsors of the *Firebrand* Shipwreck Recording Project

Ambient Pressure Diving

Kerrier Developments

The *Firebrand* project is funded entirely by sponsorship and donations. If you are interested in supporting this project please contact:

Kevin Camidge

Email secretary@cismas.org.uk
Web www.cismas.org.uk
Telephone 01736 365429

Cornwall and Isles of Scilly Maritime Archaeology Society (CISMAS)

Title	Firebrand (1707) Project Report 2006-2009
Reference	FB09-PR
Authors	Kevin Camidge Peter Holt Phil Rees Brendon Rowe Janet Witheridge
Derivation	Firebrand Project Design 2009
Origination date	22.XII.2009
Revisers	KC, PRH, KM, SA, BR & JW
Date of last revision	12.VII.2011
Version	2.4
Status	FINAL
Summary of Changes	PRH, JW, PR and slate
Circulation	Sharon Austin, Alison James, Peter Holt, Kim Monk Bren Rowe, Phil Rees, Janet Witheridge
File Name Location	D:KC/documents/Firebrand/Report/ Firebrand Project Report 2010

Acknowledgements

I would like to acknowledge the generous financial support given to this project by Sonardyne International Ltd, without whose support this project would not have been possible. I would also like to thank Bristol University, the Isles of Scilly Steamship Company, 3H Consulting, Ambient Pressure Diving and Kerrier Developments – all of whom contributed money or services to the project.

I would also like to extend thanks and gratitude to David McBride, Jim Heslin, Sean Lewis, Brigit and Richard Larn, Mark Groves and Tania Weller, who all assisted the project in various ways.

Last but not least, I would like to thank all those from CISMAS and Bristol University who worked so hard to make this project possible. A full list of participants appears in fig 20 on page 30.

This report has taken a long time to complete (almost two years). I would like to offer my apologies for this unpardonable delay – my only excuse being that every time I started work on the report, something more pressing would require attention.

Kevin Camidge 12.IV.2011

Contents

Cover photograph – Survey in progress using a Sonardyne Homer-Pro electronic tape measure.

Project Name

Firebrand shipwreck recording project

Summary

HMS Firebrand was a purpose built fireship launched in 1694 and wrecked on the Isles of Scilly along with three other ships of Sir Cloudesley Shovell's fleet in 1707. The wreck was rediscovered by a team of divers in 1981 off the island of St Agnes. The wreck lies in some 25m of water and consists of eight small iron guns, six anchors and some iron and timber fragments.

A survey of the surviving wreckage was begun in 2006 and completed in 2009 by a joint team from Bristol University and CISMAS. All visible elements of the wreck were surveyed, along with the topography on and around the wreck. Documentary research on the *Firebrand* was undertaken as well as research into the specialised fittings which go to make up a fireship of the period.

Background

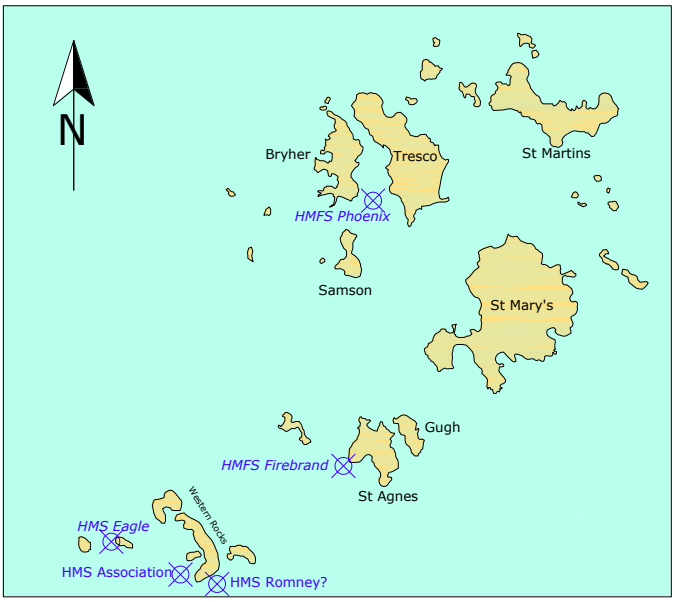


Fig 1 The locations of Sir Cloudesley Shovell's ships lost or damaged in 1707 (Gostelo, c.1711)

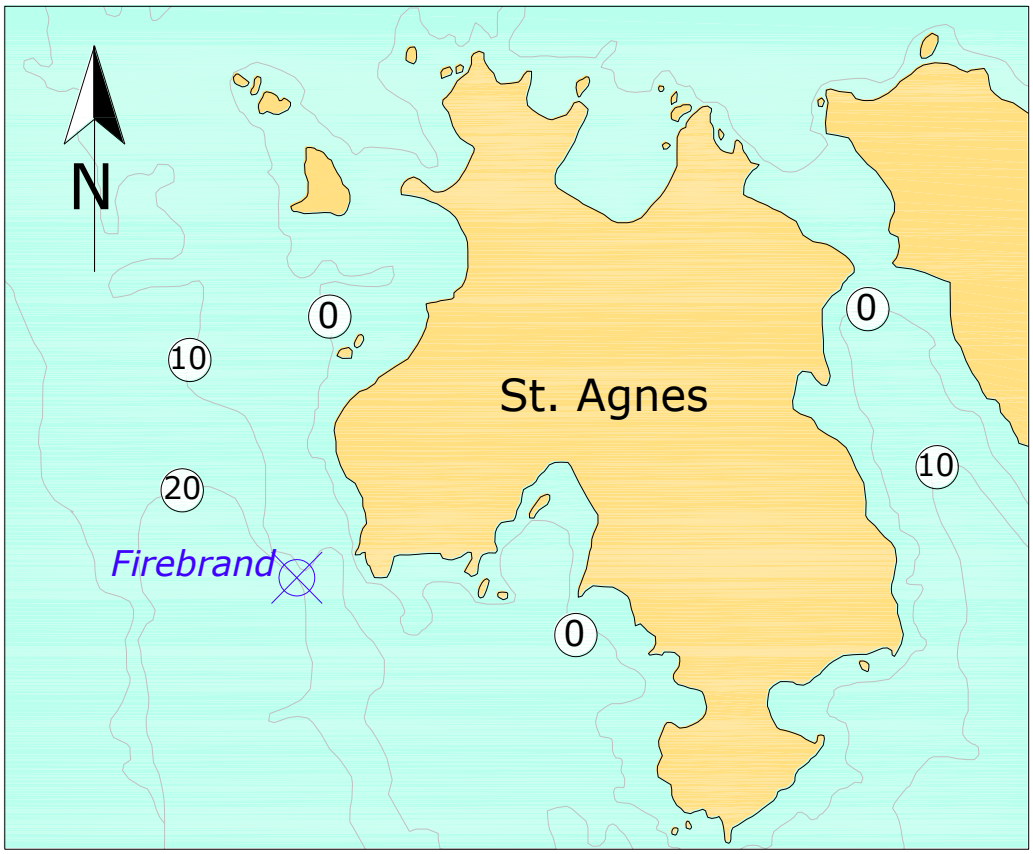


Fig 2 Location of the wreck of HMS Firebrand

The Ship

Firebrand, a purpose-built fireship, was launched at Limehouse on the River Thames in 1694. During her 13-year career she saw service in Newfoundland, the English Channel, the Mediterranean and the West Indies. In 1707 Firebrand was part of Sir Cloudesley Shovell's fleet in the Mediterranean at the siege of Toulon. As winter approached, Sir Cloudesley left a squadron blockading Toulon and set off for England with the rest of his fleet. This consisted of 21 ships including four fireships: *Firebrand*, *Griffin*, *Phoenix* and *Vulcan* (Cooke, 1883). Having miscalculated their position, the fleet ran into the Western Rocks off Scilly on the night of 22nd October 1707. Three ships, *Eagle*, *Romney* and Sir Cloudesley's flagship *Association*, were lost with only a single survivor between them (Larn, 1971). The fireship *Phoenix* struck a rock and eventually grounded between Samson and Bryher. Refloated and beached at New Grimsby (Tresco), she took three and a half months to repair (Johns et al., 2004). *Firebrand* also struck the rocks but managed to get off again. Leaking badly, she made for the beacon of St Agnes lighthouse. *Firebrand* foundered in Smith Sound close to the island of St Agnes. Of *Firebrand*'s 45 crew members, 25 - including Captain Percy - managed to reach the safety of St Agnes. Over 1500 men perished in this incident, making it one of the worst disasters in British naval history (Larn, 2006).

Firebrand vital statistics	
Length	92' 3" (28.1m)
Beam	25' 5" (7.7m)
Draught	9' 7" (2.9m)
Tonnage	268
Guns	6 minions (c.4lb) 2 falconets (c.1.5lb)
Crew	45
Built	At Limehouse by John Haydon
Ordered	13th December 1693
Launched	31st March 1694
Wrecked	22nd October 1707

Fig 3 Firebrand vital statistics (Lyon, 1993)

Site Description

The wreck lies on a gently sloping seabed at a depth of 25 to 30m. The seabed consists of silty sand lying over coarse crystalline granite bedrock. The visible wreckage consists of several areas of exposed timber (oak), four large bower anchors, two smaller anchors (kedge and stream) and eight iron guns. There are also considerable amounts of concreted iron work as well as a number of exposed small artefacts. The wreckage is flanked to the east and west by low-lying granite reefs. A short description of the site geology by Phil Rees appears below.

Fig 4
One of the Firebrand's four bower anchors – note the missing upper fluke.

Most of the wreckage appears to be *in situ*. A striking exception is the gun and bower anchor standing propped against each other at the northern end of the site (fig 41). This gun and anchor are not shown in this position on the 1981 Morris sketch (fig 40) – they may have been moved there and used as a mooring by the Morris team.

The *Firebrand* is not a designated wreck under the Protection of Wrecks Act 1973. This is partly due to the unusual local arrangements concerning access to the *Firebrand* site. One of the reasons that this site has survived so well, especially in an area where wrecks are often exploited for their commercial value, is the unique informal guardianship of the site. Mark Groves, one of the original team which found the wreck, has managed to deter local exploitation of the wreck. Mark was very keen for our team to begin survey of the wreck in 2006 and he continues to be supportive of our work. However, he has been very eager to avoid publicity as he believes that this will only encourage irresponsible exploitation of the wreck.

Geology of the Site (Phil Rees)

The geology of the site, which lies in Smith Sound to the west of the island of St. Agnes, is composed of coarse-grained granite with large crystals of feldspar. The present landforms above and below sea level have been largely influenced by the jointing in the granites which has resulted in preferential weathering along the joint planes. The predominant alignment

of the joints is in a NNW/SSE direction which in this instance has been eroded to form the channel known as Smith Sound.

The wreck site itself lies directly offshore adjacent to a line of tors some 20–25 metres high which extend along the shoreline in the form of an imposing arrangement of carns. At or just below sea level, the massive granite has been broken up along the joint planes to form large individual blocks up to several metres across. From the shoreline towards the wreck site some 100 metres offshore, there is a tendency for the granite blocks to become progressively smaller as the water depth increases.

Although the channel has some protection from an area of rocks to the west known as "Hellweathers", Smith Sound represents a very high energy environment where the seabed is subject to a combination of wave-induced current and strong tidal stream currents. As a result the the wreck site itself is characterised by an assortment of angular blocks of granite up to one metre across interspersed with areas of coarse gravelly sand.

Fireships

A fireship was a vessel designed to be deliberately set on fire in order to destroy enemy ships by fire. They were used from at least classical times; in 413 BCE fireships were deployed by the Syracusans against stranded Athenian vessels (Kirsch, 2009). Fireships have been used in a number of actions including those by the Spanish against Drake at Ulna 1572 and Cadiz "singeing the King of Spain's beard" in 1587; by Drake against the Spanish in 1588; Tromp, again against the Spanish, in 1639; Holmes against the Dutch "Holmes' bonfire" in 1666; Ruyter against the English fleet in 1672 and by Shovell against the French at La Hougue in 1692 (Roger, 2004). The last use of fireships by the Royal Navy was in 1800 when four fireships were expended against a French squadron in Dunkirk, but they did little damage (Coggeshall, 1997, p.18).

Until the late seventeenth century fireships were created by converting an existing vessel. Because of the intended fate of the vessel these were often old and worn out ships of relatively low value, most frequently old merchant vessels, although old warships were occasionally used (Coggeshall, 1997). By the middle of the seventeenth century the fireships had become an encumbrance to the Royal Navy's fleets due to their slow and unweatherly sailing qualities.

The first Royal Navy purpose-built fireships were ordered by the Navy Board in 1689. Twelve were ordered and eleven delivered by 1690 (Coggeshall, 1997). A further eight were launched in 1691 and four more in 1694. *Firebrand* was one of this last batch, being launched at John Haydon's yard at Limehouse (on the Thames) in 1694, the first of eleven Royal Navy ships to bear the name *Firebrand*. The design of these fireships was similar to

that of a small fifth or sixth rate of the period. This is demonstrated by the *Roebuck*, laid down as one of the first batch of fireships ordered in 1689, but converted to a 5th rate of 26 guns in 1695 and lost off Ascension in 1701 while employed on Dampier's voyage of discovery (Colledge & Warlow, 2006) (McCarthy, 2004). Another example worth noting is the *Seahorse* (24), a conventional sixth rate built at the same yard in the same year as *Firebrand* and of very similar size (Lyon, 1993).

	Firebrand	**Seahorse**
Rated	Fireship	Sixth
Launched	1694	1694
Guns	8	24
Length	28.12m (92' 3")	28.60m (93' 10")
Beam	7.75m (25' 5")	7.54m (24' 9")
Tonnage	268	256
Crew	45	115

Fig 5
Comparison of the Firebrand and Seahorse, a conventional six rate of similar size built in the same yard as Firebrand

Armament

All the purpose-built fireships constructed between 1680 and 1694 (23 ships) were equipped with eight small guns. *Firebrand*'s armament, which was typical of the group, consisted of six minions, taking shot of roughly 4lb, and two falconets, which fired 1.5lb shot (Caruana, 1994, p.166). In contrast, a small fifth or sixth rate would typically have twenty 6lb guns and four 3lb guns. Thus it is clear that the fireships were comparatively lightly armed, having a single broadside shot weight of only 13.5lb compared to the equivalent fifth rates broadside of 66lb. The fireships would have been lighter and thus faster sailing, but must have been easy prey in single ship actions.

Complement

The purpose built fireships all had a complement of 45 men, compared to the small fifth rate complement, in the late seventeenth century, of about 125 men, or about 115 for a sixth rate. This larger number would have been essential to ensure enough manpower to operate the greater number of guns. The smaller crew would have resulted in a lower weight of food, water and equipment which needed to be carried, again making the purpose built fireships lighter, and presumably faster-sailing than the equivalent normal vessel.

Fire-room

The fire-room was situated under the upper deck, and the fireship's guns were housed on the upper deck. The fire-room extended from the bows to a bulkhead situated just behind the main mast. The fire-room contained a grid of wooden troughs, filled with combustible material. Above this grid fire-curtains soaked with combustible substances were hung from the deck beams. The function of the fire-room was to spread the flames as quickly as possible to all parts of the vessel.

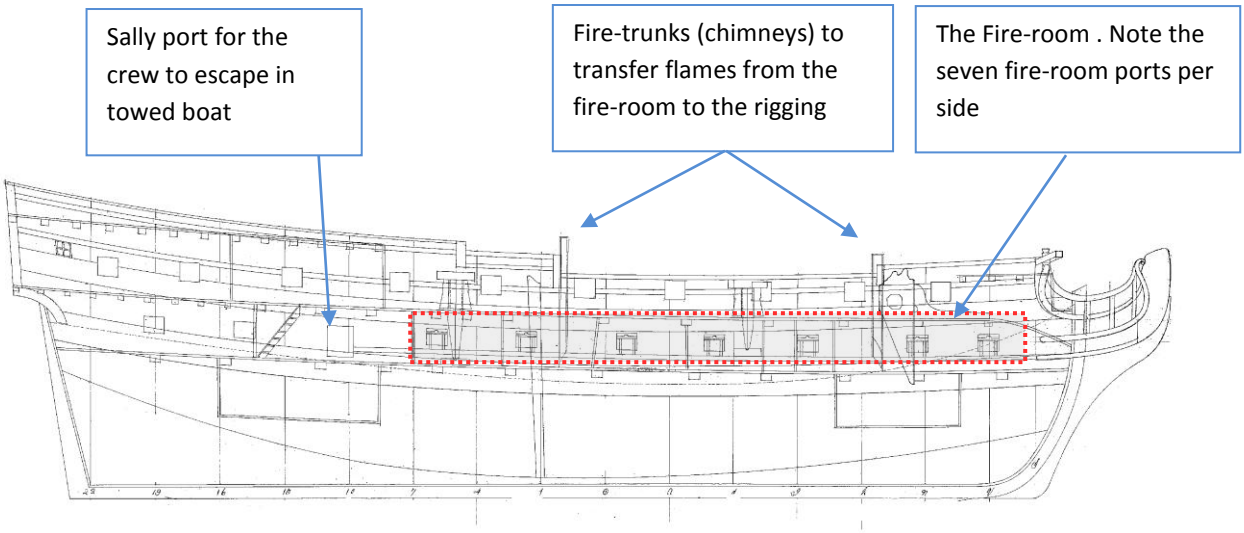


Fig. 6 – Sheer plan of the purpose-built fireship Griffin, launched in 1690.

Fig 7
The fire-room viewed from above – note the fire-troughs containing reeds.

Model of the fireship Firebrand (1777) at the National Maritime Museum. NB this is a later Firebrand – the fourth RN ship to bear the name.

Feature	Dimensions & composition	Source
Fire-port chambers	10” long x 3.5” diameter (0.25 x 0.09m) Iron	(Falconer, 1780)
Fire-trunks (chimneys)	18” square section (0.45m) Extending from fire barrels in the fire-room to the shrouds Wood, copper or brass (iron?)	(Coggeshall, 1997)
Fire-barrels	Inside diameter at least 21” (0.53m) Height at least 30” (0.76m)	(Falconer, 1780)

Fig. 8 Table showing known dimensions and composition of fire-room features

Fire-room ports

The fire-room was ventilated by a number of fire-room ports (fourteen on the Griffin – see fig 6 above). These resembled gun ports in appearance, but were slightly larger and hinged at the bottom rather than the top (so that the fire-room ports opened downwards whereas the gun ports opened upwards). The fire-room ports had iron cylinders filled with gunpowder secured behind them which, when fired, would open or blow away the fire-room ports (Falconer, 1780). Many sources claim that the gun ports of fireships were hinged at the bottom, but in fact it was only the fire-room ports which were hinged this way. The gun ports were designed to be opened in the conventional manner; that is, hinged at the top. The fire-room ports would be kept caulked shut during routine service. Their function was to provide proper ventilation for the fire-room once it was ignited (Falconer, 1780).

Fire-trunks or chimneys

Stout barrels containing combustible material (fire-barrels) were situated at the outer edges of the fire-room below the main and foremast shrouds. Square sectioned chimneys or fire-trunks carried the flames from the fire-barrels to the shrouds, thus spreading the fire to the rigging of the fireship. The fire-trunks were made of copper, brass or wood and were roughly 18 inches square in section (Coggeshall, 1997). Flames were also communicated to the upper deck via scuttles situated along the upper deck waterways.

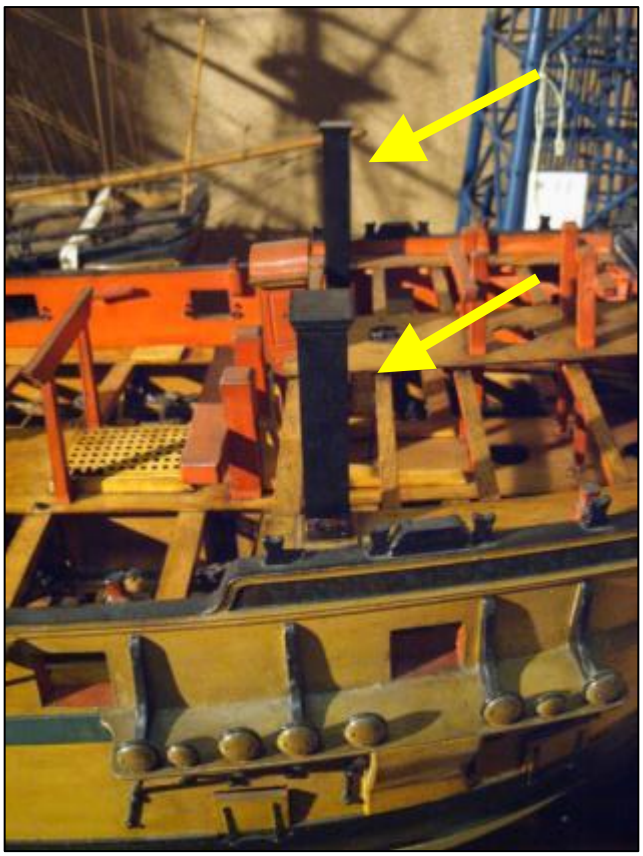


Fig 9
Fire-trunks or chimneys, shown here (arrowed) with their protective caps in place. Model of the Firebrand 1777 at the National Maritime Museum.

Sally Ports

Sally ports were provided to allow the crew of the fireship to escape in the ship's boat once the fireship had been fired. The sally ports were situated astern of the fire-room bulkhead, on the same level as the fire-room and fire-room ports. The sally ports were often closed by two doors, hinged on the vertical edges. The fuses from all parts of the fire-room were led aft to the sally ports so that the captain of the fireship could light the fuses and then exit through the sally port once he was certain the ship was properly alight (Falconer, 1780).

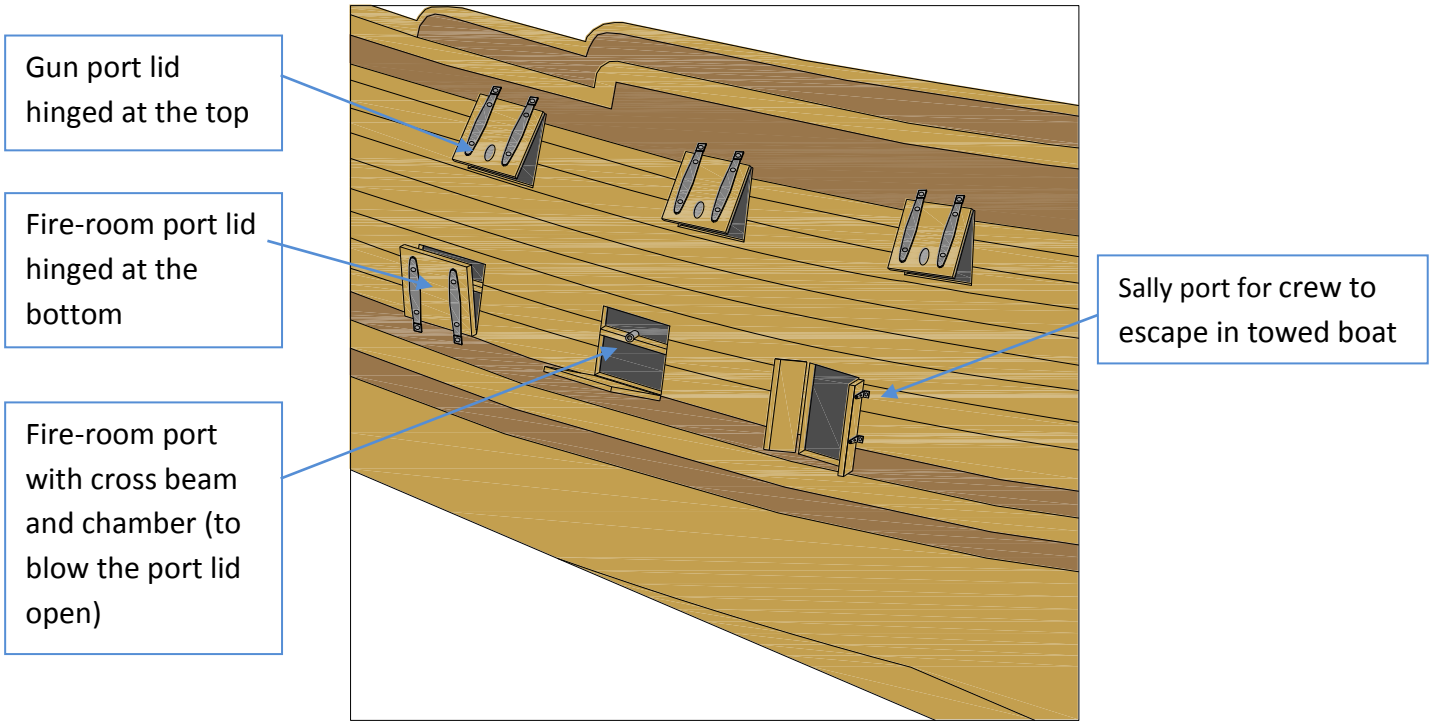


Fig 10
Arrangement of the fire-room, gun and sally ports on a fireship

Sheer hooks and grapnels

Sheer hooks and grapnels were fixed to the yardarms and bowsprit prior to an attack to entangle the enemy vessel. These would ensure that the burning fireship would stay in contact once the enemy ship had been reached. These would be fitted during the preparation of the fireship for an attack.

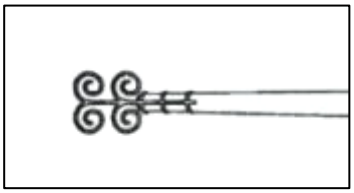


Fig 11
Sheer hook (Falconer, 1780)

Fig 12
Grapnel (Falconer, 1780)

Preparation (or priming) of the fireship

There are several accounts of how to prepare a fireship. These preparations would only be made immediately before an attack due to the obvious risk of fire and to help prevent the enemy from easily identifying the vessel as a fireship.

A summary of the instructions for priming a fireship are given below, these are based mainly on the account in Falconer (1780) with some additions from (AM41362, c.1758)

- Take up the reeds and place the composition in the fire-troughs, replace the reeds
- Throw composition over the reeds throughout the fire-room
- Lay double quick match over the reeds
- Lay bavins around the fire-room - bavins are bundles of brush-wood which have been dipped into an inflammable composition (Falconer, 1780, p.127)
- Remove covers from the fire-barrels, fire-trunks and fire-room scuttles
- Lay quick match from the reeds to the fire-barrels and into the vents of the freshly primed chambers.
- Communication troughs laid from the sally ports to the fire-room doors
- Quick match laid ‘4 or 5 times double’ in the communication troughs
- Port fires used to prime the ship – ‘great care must be taken to have no powder on board when the ship is fired’
- Fasten sheer-hooks to yard arms
- Fire grapplings fixed to yard arms or are thrown by hand
- When the commanding officer of a fleet displays the signal to prepare for action, the fireship fix their sheer hooks, and dispose their grapplings in readiness. The battle being begun, they proceed immediately to prime and prepare their fireworks. When they are ready for grappling they inform the admiral thereof by a particular signal (Falconer, 1780)

Fighting Instructions from Lord Howe to the fleet in 1782 state: “captains of fireships are not to quit them till they have grappled the enemy, and have set fire to the train” (ADL 252/28). This order, if followed, would have made the escape of the fireship’s crew difficult. The Royal Navy court-martialed at least seven captains for igniting their vessels too soon against the French at Rhé in 1628 (Coggeshall, 1997, p.25). As a further hazard, captains of fireships could face execution if captured (Kirsch, 2009, p.82). There were, however, rewards for success: fighting instructions promised rewards of cash and gold medals for fireship sailors who destroyed an enemy ship of the line (Kirsch, 2009, p.83). The pay scale of fireship officers and crew was that of a 5th rate ship of the line (Coggeshall, 1997, p.40).

Several of these documents mention dumping the gunpowder as part of the priming of a fireship: “to every Commander of a Fire Ship when he is certain of coming to Action to throw all the Powder overboard except what may be kept in a couple of horns or may be found necessary for the defence of his ship from boats attempting to Board him” (AM 41362).

Other duties

A fireship is a specialised attack vessel: “it might be seen as a forerunner of a modern guided missile – also expensive, but cost-effective if it destroys a far more expensive target” (Gardiner, 1996). Deploying a vessel as a fireship was a once-only event – once set alight the fireship was expended. Thus fireships spent their service life performing other duties while being available for use as a fireship. It is interesting to observe the ultimate fate of the 24 purpose-built fireships constructed between 1690 and 1694. Of these only six (25%) were ‘expended’, the designed function of a fireship.

Number	Fate
6	Expended
4	Converted to 5th rate
2	Accidentally burnt
5	Captured
2	Wrecked or foundered
5	Broken up or sold

Fig 13
Table showing the ultimate fate of the 24 purpose built fireships launched between 1690 and 1694 (Lyon, 1993) and (Colledge & Warlow, 2006)

Their relatively light armament and small crews meant they were of less use as fighting ships than similar conventional vessels. This, however, also probably resulted in improved sailing qualities compared to similar conventional vessels – so they were probably used as carriers of messages and personnel (Lyon, 1993).

Documented History (Janet Witheridge)

A number of primary sources of information have been studied to build a complete timeline for the service history of HMS *Firebrand*. This section highlights some aspects not already included in other areas of this report together with an abbreviated time line. The full record is included in Appendix II.

Crew and survivors

HMS Fireship *Firebrand* had a complement of 45 men, and the pay and muster books list a commander, lieutenants, a physician, a master and midshipmen. In the thirteen years between her launch and her sinking she had eight commanders: see table below.

Commander*	Start date	Source
Will Carter	1st April 1694	ADM 8 3 Monthly disposition of ships ADM 33 180 Pay book
John Soule	26th October 1694	ADM 52 33 i Master's Log
Joseph Hickman	1st Oct 1695	ADM 33 180 Pay book
John Balchin	21st March 1700	ADM 33 215 Pay book
Cha Adamson (while in Ordinary)	1st March 1702	ADM 8 7 Monthly disposition of ships
Henry Turvile	11th April 1702	ADM 33 211 Pay book
Samuel Bourne	20th March 1705	ADM 39 789 Muster Book
Francis Percy	Between Jan and April 1707	ADM 33 239 Pay Book ADM 8 9 Monthly disposition of ships

Fig. 14 Captains of HMS Firebrand

*The commander of a vessel of this type/size was given the courtesy rank of captain. (Lavery, 1989, p.98)

Following the wreck on 22nd October 1707 in Smith Sound in Scilly, to the West of the island of St Agnes, 25 survivors were listed in the muster book of the *Salisbury* (ADM 36 3285). These whose names correspond to the final pay and muster books including her physician Chas Bradford, Lieutenant Wm Probyn and midshipman B Marshall. According to a letter written by Captain Francis Percy, dated 25th October 1707 (ADM 1 2279) “17 men were saved in the boat, with the Captain and five drove ashore on a piece of the wreck”. It is recorded that Edw Wilford, midshipman died in the wreck. (ADM 39 789)

Ordnance supplied to HMS Fireship *Firebrand* 1697 (ADL H 22 NMM)

This is a pre-printed form where the ship’s names and amounts of each item are filled in by hand. Four ships are included in this document *Defyance, Mary, Firebrand* & *Isabella Yacht.* The items supplied to *Firebrand* are listed in the table below. The items in the second table

were added by hand at the end of the document. These items were only supplied to *Firebrand* and appear to be items specific to fireships.

Office of the ordnance - 9th September 1697

A proportion of ordnance, carriages, powder, shot, match & other ammunition and habiliaments of war, hereafter mentioned, to be presently issued out of his majesties stores within the office of ordnance, for supply & furnishing his majesties shipps hereunder named at Portsmouth by order of ye board dated ye 9th last.

Heading	Item	REM	SUP
Iron Ordnance	Minion	6	
	Falconette	3	
Ship Carriages	Minion	6	
	Falconette	3	
Round shot for	Minion	107	13
	Falconette	36	4
Tin cases filled with musquet shot for	Minion	13	26
	Boxes for tin cases		1
Parchment cartridges	Minion		60
	Hand grenades	36	4
	Fuzes for same		70
Ladles & sponges for	Minion	2:2	
	Falconette	1:1	
	Ladle staves	24	6
Cases of wood for cartridges for	Minion	3	2
	Falconette	1	1x
	Funnels of plate	2	1
	Corn powder	5	4
	Match	½	1
	Short pikes	10	
	Bills	2	
	Hatchets	9	
	Swords	14	1
	Musquet shot	90φ	½ φ
	Pistol shot	6 φ	
	Sheet lead	½ φ	
	Aprons of lead	φ	
	Crows of iron	5	1
	Tackle hooks	2p	4p
	Ladle hooks		15p
	Face lock eyes		10
	Great melting ladels	1	
	Small melting ladels	1	
Nails	40d		400
	20d		200
	10d		200
	2d		500
	Beds	9	
	Coins	10	6
	Trucks (ord)	10	1
	Axel trees – saker & minion	1	1
	Tompeons (small)	11	90
	Pulleys (great)		10
	Pulleys (small)	2	6
	Formers (small)	2	
	Budge barrels	1	
	Tann'd hides	2	1
	Sheep skins	5	7
	Baskets	2	5
	Barras		19
	Paper royal	4 qr	16 qr
	Fine paper	2 qr	4 qr

Heading	Item	REM	SUP
	Oyl	½ gal	
	Tallow	3	¼
	Starch	1 t	2t
	Needles	2 doz	2 doz
	Thread		2
	Lanthorns ord	1	1
	Lanthorns dark	1	
	Wadhooks	?	1
	Handcrow levers	4	6
	Rope sponges	9	2
	Priming irons	3	1
	Linstocks	1	2
	Twine		3
	Wire	2	7
	Hand screws	1	1
	Tar'd rope 4"	20 fs	
	Tar'd rope 2"	½ φ	
	Breechings	9	
	Tackles	16	
	Portackle	½	
	Junk	2	1
	Musquets (snaphance) *	15	
	Musquetoones	3	
	Musquet rods	4	2
	Pistols	4 p	
	Cartouch boxes	15	1
	Flints	97	

* Snap-haunce : A fire lock or musket; a spring lock for fire-arms.

Hand written addition to the form assumed to be items unique to fireships

Heading	Item	REM	SUP
	Reeds dipt	171	96
	Reeds double dipt	60	95
	Topps of reed	150	75
	Shaveing	39	30
	Curtins	30	10
	Bavins	150	75
	Iron chambers	13	
	Composition	300t	½ r
	Searce of laion	7	
	Do of hair	7	
	Fire barretts	9	
	Fire truncks	20	2
	Mortar & pestle	1	
	Priming boxes	19	9
	Sulphur		6
	Salt peter		6
	Camphize		2
	Linseed oyle		6 gal
	Charcoals		6
	Cotton wyck		40

Fig. 15 Table of items supplied to Firebrand in 1697

Active service of HM Fireship *Firebrand*

Examination of her logs - and numerous other sources - shows that she spent the majority of her active service on Channel Service, protecting trade. She was briefly in Newfoundland in Canada in 1702. Between 1704 and 1707 she made several voyages to the Mediterranean, was engaged in the battle of Valez off Malaga (see detail below) in August 1704 with Sir Cloudesley Shovell and Rear Admiral Leak's Squadron, participated in the capture (retention) of Gibraltar in November 1705, and was present when the army took possession of Barcelona in 1705 under Admiral Sir Cloudesley Shovell. She was returning from the Mediterranean with Admiral Sir Cloudesley Shovell's fleet following the siege of Toulon, when the flagship (HM Ship *Association)* mistook the longitude and led the fleet onto the rocks on Scilly - see the abbreviated time line below for sources.

Battle of Valez off Malaga 1704

10th Aug	At night we lay in line of battle and so continued until morning
13th August	At half past 10 *Prince George* hoisted flag of France and began to engage the enemy
14th August	Fleets were engaged until 7 at night – very hot. Admiral Leake, Vice of the Blue, at 3 enemy was bearing away. He did not follow because of breaking the line. At 6 am both fleets lay in a line, at 3 wind shifted…
15th August	Weighed anchor … so we bow down… French fleet lay near them ready to engage next am but they blew away and we lost sight of them
16th August	… French fleet bore away in night and got from us
17th August	…we had 52 sail of Line of Battle ships, 19 of these 3 deck ships. They had 30 and additional galleys. We engaged we had no flags hurt but 2 Captains killed …
18th Aug	At 4 pm hauled down the sign for the line

Fig. 16 (Source ADM F L 138 iii A Journal of the proceedings of HM Fireship Firebrand Mr Thomas Knowles – 6th January 1703/4 to 30th January 1704/5)

Firebrand Abbreviated Time Line

Firebrand – Abbreviated Time Line			
	Notes	**Officers & crew**	**Source**
1693			
15th December	" A list of ships for the Main fleet for next year" lists 13 fireships by name + " two new ones"		ADM 8 3
	Firebrand ordered		The Sailing Navy List 1993
1694			
31st March	*Firebrand* launched at Haydon's Yard in Limehouse. Began rigging wages	11 crew listed mostly servants, 2 AB and 1 boy. Alexander Smith Master	The Sailing Navy List 1993, ADM 33 170
April - October	With Admiral Edward Russell (HMS *Britannia)* in main fleet in the Mediterranean	Sea wages begin. 1st April Commander: Will Carter	ADM 33 170, ADM 8 3
October - December	Bound for Portsmouth and from thence to West Indies	Commander: John Soule from 26th October	ADM 52 33 i,
1695			
January - October	West Indies Squadron	Commander: Joseph Hickman from 1st Oct	ADM 8 3, ADM 33 180
November	Homeward bound (Cape Henry and thence Lizard)		ADM 52 33
December	At anchor Portsmouth Harbour		ADM 52 33, ADM 8 4
1696			
January - March	Portsmouth harbour - refitting	Commander: Joseph Hickman 45 men 8 guns	ADM 8 4, ADM 2 23
April – August	With Lord Berkeley's fleet (*Britannia*) on Channel Service. (7 other fireships recorded) 2 1st rates, 13 2nd rates and 1 4th rate)		ADM 8 4
September	Portsmouth harbour - refitting		ADM 52 33 2, ADM 106 489 320
October to December	In Channel Service Designed on foreign voyage with Sir Cloudesley Shovell	Commander: Joseph Hickman	ADM 8 5, ADM 52 33 3, ADM 8 5
1697			
January and February	With Sir Cloudesley Shovell		ADM 8 5, ADM 52 33 3
March	Portsmouth harbour - refitting		ADM 8 5, ADM 52 33 3

Firebrand – Abbreviated Time Line			
	Notes	**Officers & crew**	**Source**
April to December	Channel Service under command of Sir George Rooke attending to "security of the trades expected home", "Continue from Plymouth with ye Virginia ships", "with 17 other ships going to sea with Mr Mitchell"	Commander: Joseph Hickman	ADM 52 33 3, ADM 8 5, ADM 52 33 4
1698			
January to December	Plymouth, guard ship while waiting to be laid up		ADM 8 6
1699, 1700, 1701			
January 1699 - February 1701	Plymouth, In Ordinary	6 crew listed under a bosun	ADM 42 682, ADM 52 33 iv, ADM 49 95, ADM 2 26 509, ADM 51 355 3i, ADM 33 215
March	Plymouth, fitting out	Commander: John Balchin from 21st March, Lieutenant: Nathaniel Dowse from 1st April	ADM 8 7, ADM 49 95, ADM 51 355 3i, ADM 33 215
April	Plymouth, taking on provisions for 8 months. Orders to proceed to Spithead (also to Kingston, Pendennis and Kinsale) once supplies received		ADM 2 26 537, ADM 2 27 57, ADM 51 355 3i
May and June	Portsmouth with Sir Cloudesley Shovell preparing for a foreign voyage		ADM 51 355 3i, ADM 8 7
July to August	Listed under West India Squadron under Captain Whetstone but logs show her in and around Plymouth. (Orders to try gunner in a court martial in Plymouth on 12th August)		ADM 8 7, ADM 2 27 172, ADM 2 27 233, ADM 51 355 3i, ADM 49 95 48
September to November	Kinsale, Ireland with the squadron	Commander: John Balchin	ADM 49 95, ADM 51 355 3i
December	Portsmouth, in Ordinary. Removed men and self into fireship *Vulcan*	Commander: John Balchin	ADM 49 95, ADM 51 355 3i
1702			
January to April	Portsmouth, in Ordinary	Commanded by Lt Cha Adamson from 1st March	ADM 8 7
April to June	Portsmouth fitting out	Commander: Henry Turvile from 11th April, Lieutenant: Jn Dobney	ADM 51 355 3 ii, ADM 33 211, ADM 8 7

Firebrand – Abbreviated Time Line			
	Notes	**Officers & crew**	**Source**
July - September	Part of Newfoundland Squadron based in St Johns	Commander: Henry Turvile Lieutenant: Tho Knowles	ADM 8 7, ADM 51 355 3ii
October	St Johns, Newfoundland, weighed for England		ADM 51 355 3 ii
November and December	Channel Service based in Portsmouth	Commander: Henry Turvile	ADM 51 355 3 ii, ADM 49 95
1703			
January to May	Channel Service escorting convoys with Admiral of White. On 13th May Sir Cloudesley Shovell hoisted his flag aboard the *Triumph*	Commander: Henry Turvile Lieutenant: Jonathan Harris	ADM 49 95, ADM 51 355 4 i, ADM 51 355 4 ii, ADM L F 138 i, ADM L F 138 iv, ADM L F 138 v, ADM 8 8, ADM 8 7
June and July	Channel Service with Admiral Beaumont's Squadron - Sailed off Ostend, Gravesend, Dunkirk, Flemish Banks and Broad Fourteens. Cruise – stop and search. On 30th July orders for *Mary* and *Firebrand* to refit at Portsmouth. *Mary* to return to Admiral Beaumont; *Firebrand* to stay at Portsmouth		ADM 33 233, ADM 49 95, ADM 51 355 4 i, ADM 8 8
August	Portsmouth harbour - refitting	Commander: Henry Turvile	ADM 51 355 4 ii, ADM 49 95 94, ADM L F 138 i, ADM 8 8
September to December	Channel Service based at Spithead	Commander: Henry Turvile Lieutenant: James Rooke	ADM 33 233, ADM L F 138 i, ADM L F 138 ii, ADM 51 355 4 i, ADM 8 8
1704			
January	Channel Service based at Spithead	Commander: Hen Turvile Lieutenants: James Rooke to 6th Jan, Tho Knowles from 7th Jan	ADM 33 233, ADM L F 138 i, ADM L F 138 iii, ADM 51 355 4 i, ADM 49 95, ADM 8 8

Firebrand – Abbreviated Time Line			
	Notes	**Officers & crew**	**Source**
February - August	Mediterranean Squadron under Sir Geo Rooke with *Royal Katherine* designed to convoy the King of Spain to Portugal. Based in Lisbon and patrolling the Straits of Gibraltar. In Gibraltar in July with Sir Cloudesley Shovel and Rear Admiral Leak's Squadron. Sailing in day and returning to anchor at night. Engaged in the Battle of Valez off Malaga August 10th – 18th.	Commander: Henry Turvile, Lieutenant: Tho Knowles	ADM 8 8, ADM 51 355 4i, ADM F L 138 iii, ADM 8 9
September	Mediterranean Squadron returning to Portsmouth		ADM 51 355 4i, ADM L F 138 i, ADM L F 138 iii
October - December	Woolwich / Deptford refitting	Commander: Henry Turvile, Lieutenant: Tho Knowles	ADM 8 9, ADM 49 95, ADM 51 355 4i, ADM L F 138 i, ADM L F 138 iii, ADM 51 4189 4
1705			
January - March	At Deptford, Woolwich, Sheerness and Gravesend refitting	Commanders: Henry Turvile to 20th March Samson Bourne from March 20th	ADM 51 4189 4, ADM 1 4189 4ii, ADM 2 33 185, ADM 49 95 14, ADM 51 355 4 ii, ADM L F 138 v, ADM 39 789, ADM 8 9
April - May	With Rear Admiral of Blue and several ships of war and transports in the Channel		ADM 51 4189 4ii, ADM L F 138 v, ADM 49 95 91, ADM 8 9, ADM 51 355 4 ii, ADM 51 4189 4ii

Firebrand – Abbreviated Time Line			
	Notes	**Officers & crew**	**Source**
May - November	Mediterranean Squadron left St Helens, bound for Lisbon on 24th May under Sir Cloudesley Shovell. The fleet consisted of 39 ships of the line of battle, 7 fireships and 4 bombs, several light frigates and a great many transports and tenders. On 26th May joined the Fleet commanded by Lord Peterborow (sic). On 15th June Rear Admiral of the Red took his flag on board the *Association*. On 5th July *Nottingham* and *Garland* joined from Gibraltar. In July in company with the *Ranleagh* bearing the King of Spain. In October supported army who took possession of Barcelona. In November in Friggscale Bay (Gibraltar) "fired on by the Spanish during the capture (retention) of Gibraltar". Sailed for England on 10th November	Commander: Sampson Bourne Lieutenant: Rob Cramer from 19th Feb	ADM 51 355 4 ii, ADM L F 138 iv, ADM L F 138 v, ADM 1 4189 4ii, ADM 8 9, ADM 33 257, ADM 39 788
December	Deptford / Woolwich refitting	Commander: Sampson Bourne	ADM 51 355 4 ii, ADM L F 138 v, ADM 49 95, ADM 8 9
1706			
January to March	Deptford refitting	Commander: Sampson Bourne to 11th March Lieutenant: Cha Vanburgh	ADM L F 138 v, ADM 39 789, ADM 8 9
April - July	Channel Squadron under the command of Sir Stafford Fairbone	Commander: Francis Percy from 1st June Lieutenant: Tho Harvey	ADM 8 9
August - December	In the Main fleet Under the command of Sir Cloudesley Shovell, Torbay, Lisbon, Alicante, Gibraltar, Lisbon	Commander: Francis Percy Lieutenants: Tho Harvey from 24th April Fra Wallis from 19th August	ADM 8 9, ADM 51 4189 5, ADM 39 789, ADM 33 257

Firebrand – Abbreviated Time Line			
	Notes	**Officers & crew**	**Source**
1707			
January - October	Mediterranean Squadron under the command of Sir Cloudesley Shovell, Lisbon etc.	Commander: Francis Percy Lieutenants: Fra Wallis to 3rd March , Wm Probyn from 1st April	ADM 51 189 5, ADM 8 10
22nd Oct	Sank in Smith Sound in the Isles of Scilly	Commander: Francis Percy Lieutenant: William Probyn Physician: Charles Bradford Midshipmen: Edward Wilford Ben Marshall	The Sailing Navy List 1993, ADM 39 789 ADM 33 257

NB All the primary sources listed above are located in the National Archives (PRO) apart from the Lieutenants logs prefix "ADM L F" which can be found at the National Maritime Museum (NMM).

Fig. 17 Abbreviated timeline for HMS Firebrand. The complete timeline is in appendix II

Sources

Muster Book – *Salisbury* **ADM 36 3285**

Letter from F Percy in Plymouth dated 25 10 1707 - reporting loss of Firebrand **ADM 1 2279**

Captains Letters P

Firebrand Muster Book 1704 - 1706 **ADM 39 789**

Office of the ordnance (9th September 1697) **ADL H 22** at the National Maritime Museum

Work on the site

There was at least one salvage attempt not long after the wrecking. It would appear that the *Association* was their main target, but apparently the *Firebrand* was also located. *'We hear from Scilly that the gentlemen concerned in the wreck of Sir Cloudesley Shovell's ship have taken several iron cannon, seven brass guns with a cable, and have found the Association in 4 fathoms of water at low tide, the hull of the ship being whole wherein there is vast treasure. … The divers go down in a copper engine and continue two hours underwater, wherein they have also met with the fireship cast away at the same time as the Association'.* (Unknown, 1710)

The wreck of *Firebrand* was relocated in 1981 by a team led by Roland Morris, a Penzance salvor and owner of a private shipwreck museum. The team recovered a number of items from the wreck including the ship's bell, a wooden nocturnal (a navigational instrument) and two carved wooden cherubs. They also made a sketch of the exposed remains (Morris, 1982). The ship's bell is owned by Mark Groves, but the whereabouts of the other items is uncertain. We do not know the extent, position or results of the excavations undertaken by the Morris team. Sketches were also made by Ken Dunstan in the early 1990s and by Todd Stevens in 2005.

In 2006 a survey of the seabed remains was started as a field school for Bristol University post-graduate archaeology students. Ten days were spent on site during which the survey control point network was established and the guns and anchors were recorded and mapped. The team consisted of eight students and four tutors.

The survey was continued in 2007 by a team of four divers from CISMAS and Bristol University. This work was jointly funded by Bristol University and Sonardyne International Ltd. The work concentrated on detailed recording of the exposed wreck material and seabed topography using planning frame drawing at a scale of 1:10. Approximately 30% of the site was surveyed during six days' diving.

In 2008 the survey was continued by a team of six CISMAS divers. The survey in 2008 concentrated on the recording of the iron elements of the wreck and the topographic features of the site. Bathymetric data was collected to enable a detailed contour plot of the site. The survey team was on site for six days in 2008. This work was funded mainly by Sonardyne International Limited, with additional support from The Isles of Scilly Steamship Company, Kerrier Developments, 3H Consulting and Ambient Pressure Diving.

In 2009 the survey was continued by the CISMAS dive team, consisting of six divers on site for a total of six days. The topographic survey of the wreck was completed, as was the bathymetric survey. A search of the area around the wreck was made to establish the extent

of the debris field. In addition, three small test pits were excavated to establish the nature and depth of the stratigraphy on the site.

Fig 18
An iron gun, G4, propped against one of the bower anchors, A5

Fig 19
Survey in progress 2008

Project Team

Firebrand – Project Team		
NAME	**ORGANISATION**	**PARTICIPATION**
Sharon Austin	CISMAS	2008 and 2009
James Burris	Bristol University Student	2006
Kevin Camidge	CISMAS & Darkwright Archaeology	2006 to 2009
Philip Cooper	Bristol University Student	2006
Mary Harvey	Bristol University Student	2006
Peter Holt	3H Consulting	2006 to 2009
David McBride	Scilly Charter	2007 to 2009
Fiona McLean	Bristol University Student	2006
Innes McCartney	CISMAS	2009
Kimberly Monk	Bristol University	2006 to 2008
Luke Randall	CISMAS & Bradford University	2008 and 2009
Martin Reed	Plymouth University and CISMAS	2006
Phil Rees	CISMAS	2008
Bren Rowe	CISMAS	2008 and 2009
Sarala Sharma	Bristol University Student	2006
Joshua Solomon	Bristol University Student	2006
Janet Witheridge	CISMAS	2007 to 2009

Fig. 20 Participants in the Firebrand Survey Project

Survey Methodology (Peter Holt)

Aims

The primary aim of the survey work on the fireship *Firebrand* was to accurately record the positions of the guns, anchors, ship's structure and artefacts in relation to one another in three dimensions, producing the results as a two-dimensional plan and vertical sections.

Secondary aims were to obtain a position and orientation for the site in the real world, to record the topography and sediment depths on the site and to identify and position any finds around the outside of the main site.

An additional aspect of the work was to determine the precision that could be achieved using the methods selected under the given conditions. This section of the report includes detailed discussions on the methods used for this survey and the results that were obtained.

Requirements

The primary requirement was to accurately record the positions of objects on the seabed by undertaking a pre-disturbance survey of the site. A number of factors would make this task more complicated:

- The main site is large in size but it was still important to maintain sufficient and reliable precision when positioning objects anywhere on the site
- There is a significant difference in depth from one end of the site to the other so any techniques used must be able to compensate for this difference by computing positions in three dimensions
- The depth on site limited dive times to only 30 to 40 minutes so the methods used had to be efficient
- The effect of nitrogen narcosis at depth would also affect the diver's ability to work underwater so the methods used must be simple and have the potential to detect mistakes in the measurements
- The underwater visibility was approximately 5m which would be considered good for many Northern European sites, but ambient light levels were low at that depth which limited the usefulness of photography for recording
- The budget for the project was small which meant that any newly developed sonar and laser mapping systems could not be used as they were too expensive.

A combination of methods were chosen to record the site based on the limitations given above. Firstly, 3D tape trilateration was used to set up a network of fixed survey control points around the site then this control point network was then used to position survey detail points on guns, anchors and structure. The site was then drawn in detail using

planning or drawing frames positioned using tape measure baselines laid between survey control points.

Although it would have been possible to set up a grid frame over the whole site this would have been more expensive than the chosen method and would have taken a considerable time to set up. A smaller, portable grid frame could have been used but this still requires a precisely positioned control network to position each frame location. Creation of a photomosaic was considered due to the clarity of the water but the low light levels did not give enough contrast to show the details we needed to record. The use of a Sonardyne Fusion acoustic positioning system for precise positioning of artefacts and structure was considered but was beyond the budget of the project.

The Assessment Survey Method

The first step was to undertake an assessment survey of the site so the information gathered could be used to assist planning the subsequent phases of work. The assessment survey determined the approximate extents of the site, the site's position and orientation, basic topography, the main visible features and the main seabed types. Assessment surveys should be quick, simple and efficient so this task was completed in a single dive which included a combination of sketching and photography along with a few basic distance and depth measurements. Information from previous site plans was also incorporated and together they formed the basis of a new and very basic site plan that could be used for planning further work.

The assessment survey showed that the site lay in a shallow gully between boulder field to the east and a 20m long rock ridge to the west. The site was approximately 40m long and 10m wide with 25m depth at southern end dropping to 30m at northern end. The seabed was made up of sand and boulders with a scatter of anchors, guns, concretions, a few visible timbers and a few small artefacts.

The Recording Survey Method

With the assessment survey completed the recording survey tasks could be started. The methods used for this phase still needed to be efficient but also needed to be detailed and precise so a combination of 3D trilateration and planning frames were used. A set of fixed survey control points (CPs) were set up around the site that were then used to position survey detail points on artefacts and structure and to position planning frames used for detailed recording. The series of tasks undertaken to set up the CP network include:

1. Plan the position of the Control Points (CPs)
2. Install the CPs
3. Make distance measurements between the CPs to be able to position them
4. Make a depth measurement at each survey point

5. Process the measurements and compute the positions of the CPs using Site Recorder 4
6. Fix the positions of the CPs in the processing software

Planning the Control Point Locations

The next task was to plan the positions for the local survey control point network. The network that was used for this project was designed using basic rules but was adapted to fit with the limitations of the site.

The rules for network design are:

- The primary CPs should surround the outside of the site
- Network should be circular or elliptical (with length less than twice the width)
- Made up of sets of four points in a square pattern ('braced quads')
- Using distance measurements less than 20m
- Primary CPs should not be installed on artefacts or structure

It is important that the primary control points surround the outside of the site as this ensures that all detail points to be positioned are inside the CP network which gives better results. This also ensures that the primary control points remain undisturbed if the site is excavated or if objects on the site are moved. Where further CPs are needed within the site

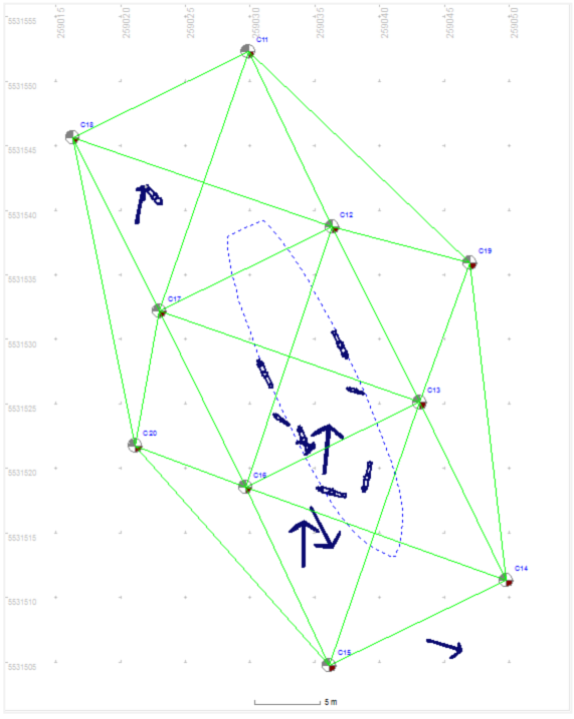


Fig. 20 Planned CP network A

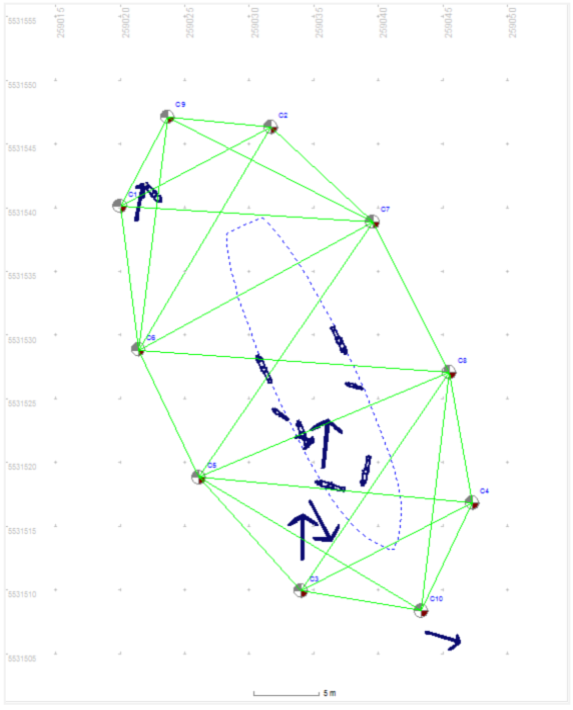


Fig. 21: Planned CP network B

they are added as extra secondary control points which are not crucial to the main survey network.

The control points should be set out in groups of four in a square or rectangular pattern. This is because the mathematics used to compute positions from distance measurements (trilateration) uses the six distance measurements made between the four points to determine their relative positions and how well they fit together. Networks made up solely of triangles of measurements should be avoided as they do not provide enough information to be able to detect any mistakes in the measurements and so give a poor result.

The two networks shown above are similar and are both suitable for use on this site:

- Network A is based on four interlinked braced quads but because the network is long and thin a pair of 'outrigger' points has been added at the sides to provide additional measurements. Each of the braced quads is 15m along each side with diagonal measurements of 21m.

- Network B is based on an elliptical shape and again contains three braced quads. The network has been made slightly wider so the outrigger points used in Network 1 are not needed. One additional point has been added at each end to extend the length of the network a little. Most measurements are less than 15m and all are less than 21m.

The anchor to the south of the site appears to be on its own so was not included in the main CP network as this kept the main network as small as possible to make it quicker to install.

Note that only the minimum number of measurements was required as the network shape should be defined by a small number of high quality measurements with enough extra measurements to be able to identify any mistakes. Measuring the distance from every control point to every other point on the site should be avoided as this adds little extra useful information but greatly increases the work to be done and also complicates processing.

Both network shapes shown above are ideal designs and the nature of any site will dictate how closely they could be achieved. In this case the reef to the west of the site severely limited how wide the CP network could be and it also put limits on where the west side CPs were actually located. The rounded granite boulders to the east of the site provided few suitable locations for control points so initially the network was set out very close to the guns and anchors on the seabed.

Secondary control points were added inside the site. The secondary points were used to provide additional control points for distance measurements to position detail points and

they were also used to set up tape baselines through the site used to position planning frames. Each secondary point was positioned relative to the primary network using four or more distance measurements to primary CPs plus a depth measurement.

Installing the Control Points

The rock ridge that runs the length of the site on the west side was used as the starting point for the primary control point network. Three primary control points (CP1 – 3) were placed on the tops of rock pinnacles where each would have a good line of sight to the others and to other CPs on the site. Each primary control point was made from a 10mm diameter stainless steel rod 500mm long, stainless steel rod was used so that the points would survive for a considerable time underwater. Mild steel was only used for temporary secondary points as mild steel rods of similar dimensions were found to corrode within 18 months if placed near iron objects like guns or anchors. Tape measures can easily be attached to these rods using releasable cable ties.

Each rod installed on rock was hammered and cemented into a fissure in the top of the rock. The cement used for this was a mixture of 3 parts sand to one part Portland cement, with a small amount of PVA glue added to bind the mixture together and enough fresh water to give the mixture the consistency of toothpaste. The mixture was made up on the boat just before the dive and put in small polythene bags in handful amounts. Underwater, the cement bags go stiff under the water pressure so have to be pushed and hammered into the crack which will take the control point pin. The pin itself can then be hammered into the crack through the plastic bags full of cement. Any cement or bag visible should be covered in small stones or gravel to stop it washing away, and once the cement has set any plastic bag still visible can be removed.

Installing CP30 was unusual as a chisel mark on the top of a very large granite boulder was used to mark the survey point as no other location was suitable and it was not possible to attach anything directly to the boulder.

Each point was labelled with a yellow Disk-mark tag and a length of yellow flagging tape was tied around the top of the rod to make the points more visible. Survey points were named in sequence starting with CP1 (Control Point). Primary and secondary points use the same naming format for convenience and as the role of any point could change as the survey work progressed.

The Installed Network

In the 2006 season the primary control points CP1 to CP8 were added to the site (Fig 22). In 2007 we found that the pins marking CP2 and CP3 had been removed since the last visit to the site so they were replaced with points CP2B and CP3B in new positions close to the original locations. The new points were given names similar to those they replaced but different names were used as the replacements were not in exactly the same place as the ones that had been removed.

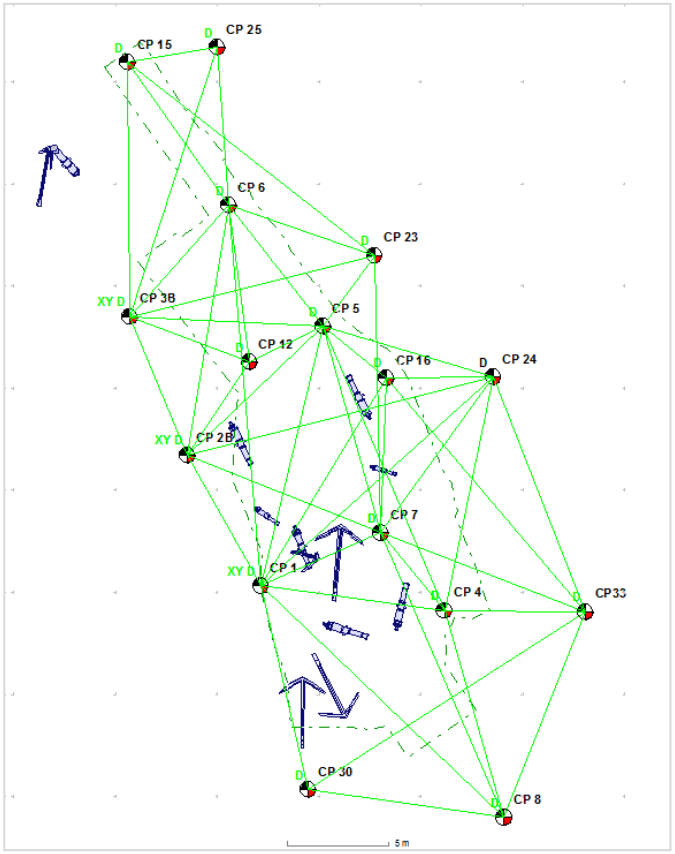


Fig. 22: Primary control point network

The primary point CP12 was added in the middle of the site along with secondary points CP9 to CP11. In 2008 the primary point CP15 was added to extend the site to the North and CP30 to extend it to the South. Points CP16, 23-25 were added to the East of the site to improve the network shape by making it wider. In 2009 point CP33 was added to strengthen the network at the south end of the site.

Secondary points CP17, 20 and 31 were added to support the planning frame survey and were left in place. Secondary points CP18, 19, 22, 26, 27, 28, 29, 32 were added for the same reason but were subsequently removed (fig 23).

The positions on the site are recorded with Z positive downwards so Z measurements are given as depths. All depths are reported relative to a temporary benchmark (TBM) defined as the top of the cascabel of Gun 1, at survey detail point G1c. This point was given a fixed value of 25m and all depth measurements have been corrected for the effects of tide height using this point.

Making Measurements

With the control points in place the next step was to measure the distances between the points based on the network design shown above. Distance measurements were made using conventional builder's fibreglass tape measures, less than 30m long with open frames so they could be washed after use. As tape measures can stretch with use, each tape was

checked for accuracy against a steel-cored tape measure kept solely for this purpose. Measurements were recorded in millimetres standard recording forms.

Depth measurements were made using a Suunto Vyper digital dive computer and a single computer was used for all depth measurements to minimise offset errors. The range of tide on site is up to 5m so all depth measurements had to be corrected by having the tide height removed. To do this, one point was nominated to be the depth reference point and was given a nominal depth. Before any depth measurements were made at other points the depth and time were first recorded at the depth reference so the height of tide at that time could be calculated. Depth and time measurements were then made at other points, finishing off with another measurement at the reference point so we could calculate the change in depth during the dive. The tide height at the time each other depth measurement could then be calculated from the two depth measurements and times recorded at the reference point, and the calculated tide height could then be removed from each raw depth.

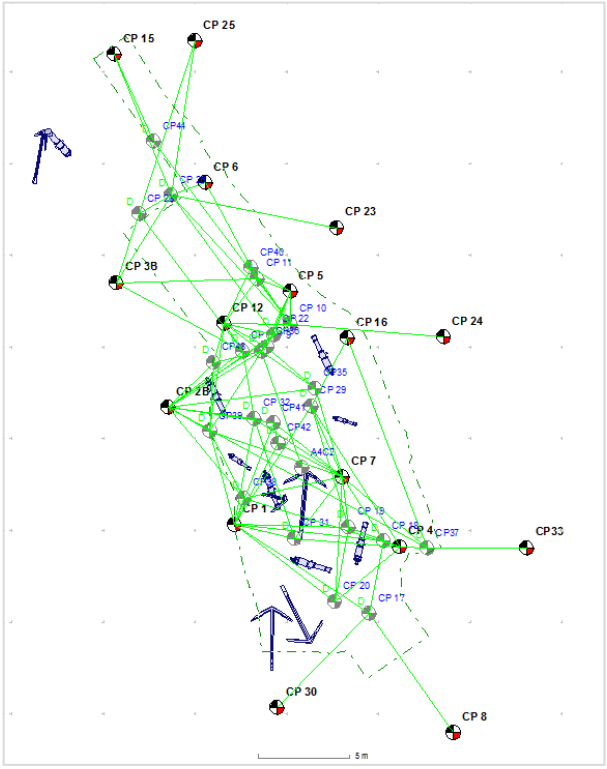


Fig. 23: Secondary control point network

Position measurements were used to locate the site in real-world co-ordinates and to calculate the alignment of the site. Surface buoys on ropes were attached to two known points at the extreme ends of the site, using points far apart would provide a long baseline between the points and this would increase the precision of the alignment. Surface positions were taken using a WAAS enabled Garmin 76C GPS receiver. The estimated position error for a static fix at the surface using this receiver is 4m however additional offset error will occur because of the rope attaching the buoy to the seabed.

Fix	Easting	Northing	Notes
GPS001	259021.760 E	5531541.550 N	Crown of Anchor 5
GPS002	259039.750 E	5531514.760 N	Gun 1 Cascabel

The site was moved and aligned to these positions so that the crown of Anchor 5 was at the position GPS001 and the cascabel of Gun 1 was placed as close as possible to GPS002. The position of the cascabel computed from the trilateration survey differs from the GPS fix by only 3.6m, a small difference given the errors associated with this method.

Processing

The positions of the primary survey control points were calculated by combining the distance, depth and surface position measurements using the Site Recorder 4 computer program (version 4.25.6). The program calculates the best estimate of the position of the points, an estimate of the position error for each point and calculates quality metrics for each of the measurements using a survey quality least-squares adjustment. Any measurements that were found to be in error were re-measured and the point positions recalculated. As the surface position measurements were included in the position calculation the computed positions for the points were automatically given in real-world co-ordinates.

The estimate of error used in the adjustment for distance measurements was 30mm and for depth measurements it was 100mm. After adjustment, the 71 measurements made between the 16 primary control point fit together to within 21mm (RMS of residuals) horizontally and 30mm in the vertical. A total of 119 measurements were processed together to position the 41 primary and secondary points giving an overall RMS of 16mm. These results are as expected for a survey of this type under the conditions found on site.

Position of the centre of the site (Crown of Anchor 4)

49° 53.252 N	006° 21.286 W	(WGS84 DD MM.mmm format)
259036 E	5531523 N	(WGS84 UTM30U)

All positions are given using the WGS84 datum and grid positions use the Universal Transverse Mercator (UTM) projection Zone 30N.

Positioning Detail Points

Once the positions for the primary control point network had been calculated, these CPs were used to position detail survey points on guns, anchors and artefacts (fig. 23).

To position each detail point, measurements were made from each detail point to the four primary control points nearest to it. Where not enough primary points were within a close enough distance a measurement was

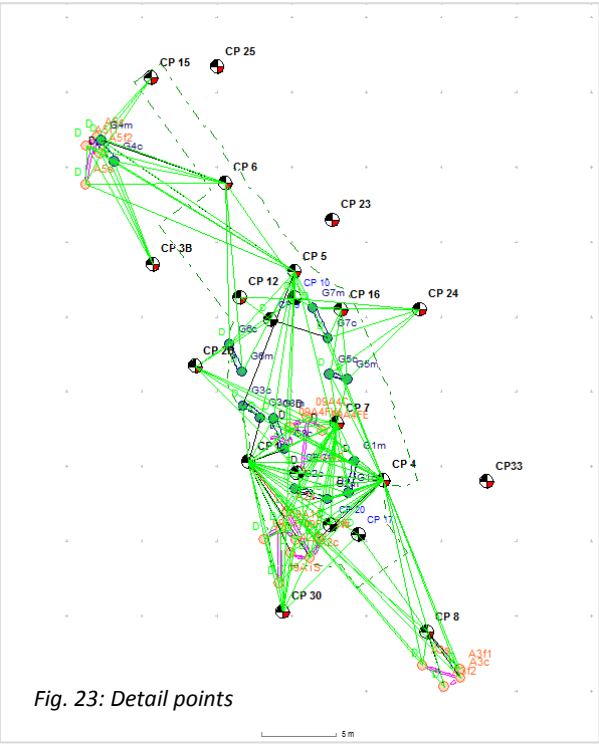


Fig. 23: Detail points

made to a suitable secondary control point instead. A depth measurement was also made at each detail point.

Guns were positioned using two detail points, one on the top of the cascabel and the other the top of the front face of the muzzle. The name of each detail point included a 'G' prefix, the gun number and either 'c' for cascabel or 'm' for muzzle (for example, the two points on Gun 6 were G6c and G6m). Anchors that were intact were positioned using four detail points, one on the shank, one on the crown and one on each of the two flukes. The name for each detail point included an 'A' prefix, the anchor number and one of four identifiers for each location 'S', 'C' 'fW' and 'fE' (for example, Anchor 4 used the four points A4S, A4C , A4fW, A4fE). Small artefacts were positioned using a single detail point.

The adjustment of the positions of the detail points positioned from the fixed control network gave an RMS of residuals of 24mm.

Recording using Drawing Frames

Drawing or planning frames were used to record a plan view of the site in two dimensions. If a drawing frame grid is laid on the site in a known location the seabed under it can be drawn to scale by a diver and that drawing can then be replicated to scale on the site plan. If this is done across the whole site the separate drawings can be stitched together to form a complete site plan.

To maintain precision in the site plan the drawing frames need to be accurately positioned. Drawing frames were positioned relative to a tape measure baseline set up between two CPs or occasionally they were positioned relative to two or more survey points. Where a baseline was used to position the frame the two points where the tape crossed the edge of the frame were recorded on the drawing along with the distance along the tape baseline of one of those crossing points. The positions of any survey points were also recorded on the diver's drawing so these could be used to position the frame or as an additional cross-check on position accuracy.

Processing the drawing frames was also done using Site Recorder 4 directly onto the digital site plan. For each drawing frame drawn underwater a Drawing Frame object was added to the Site Recorder file and positioned on the chart using a baseline (Distance Measurement) or two survey points. For each frame the points where the baseline crosses the edge of the frame was defined so it would automatically position itself on the site plan in the correct location. The drawing made underwater was then scanned and added to the appropriate Drawing Frame in Site Recorder where its image was then shown on the chart at the correct scale and in the right location and orientation. The scanned drawing was then traced (digitised) separating rock, concretion and timber onto different drawing Layers. As a final

step, the traced lines between adjoining frames were joined together by hand to make a seamless site plan.

Area search, Probing and Topography

Radial measurements were used to position the artefacts found during the area search. A tape measure was laid from a nearby control point to each artefact and the distance measured along with the back bearing along the tape to the CP. The distances and bearings were processed in Site Recorder as Radial measurements so could be directly plotted on the site plan.

The sediment depth probing was done along baselines between existing CPs and on baselines from CPs and other known points on the site.

The topography of the site was estimated from depth profiles measured across the site. Depth measurements were made using a dive computer and were corrected for the effects of tide. Distance measurements were made using a tape measure attached to a control point and run out at a known bearing, or a Sonardyne Homer Pro beacon locator was used in place of the tape measure.

Site Data Management

The project was managed during the planning, data collection and post-processing phases using the Site Recorder 4 (SR4) program from 3H Consulting Ltd. The program was used to increase working efficiency, minimise paperwork and to allow data sharing and publication.

Site Recorder was used during the planning phase undertaken before fieldwork started to collect together all of the information we had about the site and its surroundings. This included digital charts of the area and previous site plans on paper scanned and included as georeferenced basemap images.

During each season's fieldwork the program was used to record and process distance, depth, position and radial measurements used to position control and detail survey points on the site. The planning frame drawings made each day were scanned, added to Site Recorder and digitised each evening so each morning we knew if any work needed to be added to or repeated. Finds were added to the archive as Artefact objects along with Sectors to represent trenches and a Sample added for each sample taken. The archive also included linked documents, dive logs, information about divers and 16 metal detector targets.

During the post-processing the raw data collected during the fieldwork was cleaned, processed and rendered on the plan. The data in Site Recorder was then used as primary information source during the creation of the site plan, AutoCAD was used to create the fair sheet site plans using data exported from SR4 as a DXF file.

Surfer 8 was used to create a bathymetric model of the site using depth profile data exported in XYZ format from SR4.

The entire digital archive of information about the site is available as a Site Recorder file that can be viewed using the free Site Reader program. Later work on the site can reuse this digital archive using a copy of Site Recorder or by incorporating data exported from the archive into another data management program.

Analysis

Analysis of the results of this survey and recording work may help us identify areas in which the process can be improved.

The planning phase for this survey work included the design of an ideal control point network for the site. Comparisons between the ideal design and the installed design show that what was installed was close to what was planned but was limited in a number of ways. The main limitation was the shape and substance of the seabed; the rock ridge to the west of the site limited the width of the network as did the boulder slope to the east. This meant that the installed network was three times as long as it was wide (46m x 15m), whereas the ideal for optimum positioning is no more than twice as long as wide. The rocky seabed also caused problems with line of sight between CPs as the points themselves could not easily be installed on the tops of the large, rounded granite boulders that surround the site.

Adjustment of the distance and depth measurements showed that they fitted together (RMS of residuals) in the order of 16 to 30mm, typical for this kind of work. With the given network geometry this produces a post-computed position error estimates of 100mm (95% semi-major) for a typical point inside the network. This means that we have a 95% confidence that the position of any point within the network is within 100mm overall, this looks like a large figure but it is typical for a conventional tape trilateration survey.

In practice the limits of precision show up as differences in the positions of objects on the seabed positioned using different methods. Fig. 21 shows the location of Gun 1 on the site plan positioned using both direct distance measurements and a planning frame drawing

The blue shaded drawing is the estimated position of Gun 1 based on a separate drawing of the gun and the two detail points that position it. Underneath is the scanned planning frame drawing of that same part of

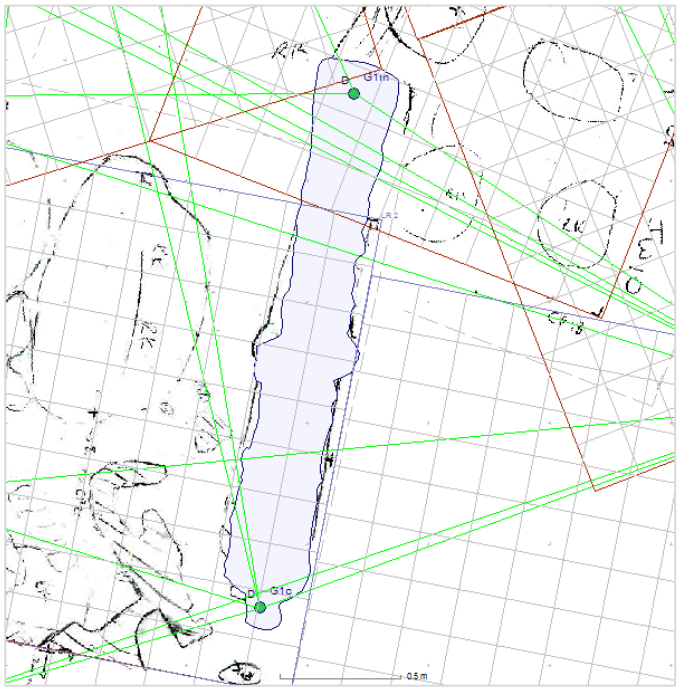


Fig. 24: Gun 1 position comparison

the seabed also showing the outline of Gun 1. The planning frame drawing is shifted 100mm northwards compared to the estimated position of the gun. If we consider how each position is derived we may learn more about the reason for this discrepancy. For this we

will only consider relative accuracy as absolute accuracy (in real world coordinates) below the metre level is hard to determine and does not affect the archaeological interpretation.

The detail points are positioned using a number of distance measurements made to control points around the site plus a relative depth measurement. The estimated error in each tape measurement is in the order of 30mm so with an ideal control point network the point should be positioned to similar precision. However, the control point network was not precisely positioned relative to itself so errors in the network shape will show up as an increase in the measurement residuals at each detail point.

The comparative inaccuracy in depth measurements will also affect the quality of the position fix. The relative depth measurements of each point have an estimated measurement error of 100mm and the measurements are usually only reported by the instrument to 0.1m. So the distance measurements are three times more precise than the depth measurements and so have less effect than the distance measurements where the points at either end of the distance measurement are at significantly different depths, as we have with the control network used on the *Firebrand*. However, where there are less than four distance measurements to each detail point the imprecise depth measurement may have an effect and that may be to skew the position of the point sideways. The easiest solution to this problem is to ensure that each detail point has four good quality distance measurements made to it from four points surrounding the detail point. The second solution would be to use a more precise way to measure relative depth.

The accuracy of the original drawing of the gun also has to be considered as any discrepancies in the gun drawing will be highlighted in this comparison. As will differences in the point measured to at each end of the gun where thick concretion obscured the edges of the gun and many of the details. Careful recording and drawing and clear marking of the detail point on the gun would help minimise errors here.

The planning frame drawing is positioned indirectly from a baseline and secondary control points so many factors affect the position accuracy of the scanned drawing on the site plan. The scanned drawing is positioned within a planning frame so there will be a small error in the registration of the drawing with the frame itself. The process of hand drawing what is seen under the frame will also incur errors, particularly where there is a large vertical distance between the frame and the seabed. The frame may be positioned relative to a tape baseline laid out between two secondary control points so lateral movement of a long tape will also create positional errors, as will registration of the frame on the tape. Errors in the position of the secondary points will affect the position of the tape baseline and thus the position of the frame. If the post computed position error for any point on site is 100mm (95%) then position discrepancies of the same order of magnitude are to be expected, as we have seen with the example of Gun 1.

Fig 25 shows a similar comparison for Anchor 4, here the crown of the anchor on the site plan is 215mm to the east of the same point on the planning frame drawing. Curiously, the drawing of the anchor done in the first season is also different in shape to that on the planning frame suggesting there is an error in one or both representations.

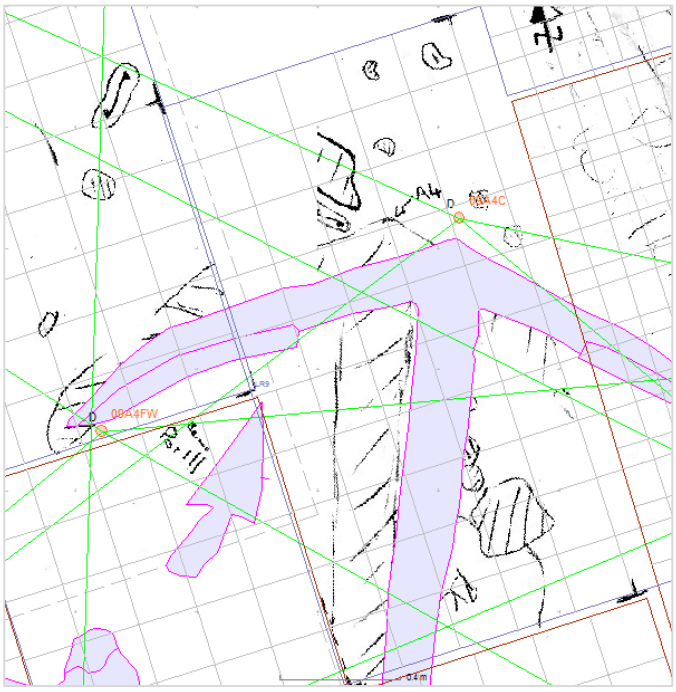


Fig. 25: Anchor 4 position comparison

A better method is to position each planning frame relative to two detail points on the seabed, with each detail point positioned with four distance measurements to the primary control point network. This method reduces the chain of position dependencies and makes for more direct positioning of each frame. However, this process takes considerably longer than using a tape baseline to position the frames so a compromise is required between efficiency and accuracy.

Conclusion

In summary, the methods used for this project were a good compromise between precision and cost.

The achieved precision was similar to the computed precision so the results were as expected for this type of survey. A more precise result could have been achieved by taking additional distance measurements to those points with only three measurements, using a more precise method for measuring depth, more care in positioning planning frames or by using a different method to position them.

However, the site is 46m long by 15m wide and it has been disturbed by salvors so an estimated achieved precision in the order of 100mm is acceptable. There may be little more useful information to be gained by doing a more precise survey on this site, but the cost of the project would have increased significantly.

Research Aims and Objectives

No fireship wrecks have been investigated in British territorial waters. This site offered a unique opportunity to investigate this type of vessel. Although builders' plans exist for the fireship *Griffin*, a contemporary of *Firebrand*, these plans show very few of the specialised fittings of a fireship. Exploration of this site offered the chance to investigate the actual specialised weapons system of a fireship of this period.

- Produce a pre-disturbance survey of the wreck
- Determine which elements of the wreck (if any) are peculiar to *Firebrand's* role as a fireship.
- Establish the extent and preservation of the buried elements of the wreck.
- Establish the extent of previous excavation on the site if possible
- Trial and evaluate different recording systems
- Complete the documentary history of *Firebrand*
- Research the role and nature of fireships in the Royal Navy

Results

The guns

Eight small cast iron guns were recorded on the site. These guns are all heavily concreted with iron corrosion products. Although removal of this iron concretion would have allowed recording of much more detail on the guns, it would also have destabilised them, and so the concretion was not removed. Hence all recorded dimensions for the guns are likely to be larger than the original dimensions, due to this concretion.

The position of the guns was fixed by direct survey measurement to the survey control point network. The guns were drawn at a scale of 1:10, using underwater planning frames.

Firebrand was armed with six minions and two falconets (Lyon, 1993). A minion was a small gun firing a ball with a nominal weight of 4lb and a gun bore of about 3 inches. A falconet is an even smaller gun firing a shot of only 1.25 to 1.5 lb and having a bore of around 2.25 inches. However, the guns on board *Firebrand* were recorded in the Priddy's Hard records on 7th February 1701 and 6th August 1703 as six minions and two falcons (Caruana, 1994). The falcon was slightly larger than the falconet and fired a ball of nominal weight 2.5lb with a gun bore of 2.75 inches (Caruana, 1994). There is little chance of resolving this discrepancy from the recorded gun dimensions, the bore difference of only half an inch (12mm) not being discernable due to the heavy concretion covering the guns. The Priddy's Hard archive is a record made by the storekeeper of the Board or Ordnance at Portsmouth and represents the record of survey onboard *Firebrand* made by him, so it seems likely that *Firebrand* was armed with the slightly larger falcon instead of the falconet at some time prior to February 1701. One possible resolution would be to locate and recover shot from the wreck; this could be measured after removal of concretion to determine whether it was 1.25 or 2.5 lb shot.

The distribution of the guns, with the exception of gun 4, suggests that they are all located close to their original locations on board *Firebrand* – see fig 28 - and note the gun positions relative to the postulated outline of the gundeck. Gun 4 has been moved at some time after 1981, when Roland Morris made his sketch plan of the site (fig. 40) which shows gun 4 opposite gun 8 on the port side of the ship (Morris, 1982). It is likely that gun 4 along with anchor 5 were moved to their present location on the NE edge of the site sometime in the 1980's, possible for use as a boat mooring to facilitate easier diving on the site.

The following table summarises the length in feet and inches (from base ring to muzzle face) of the guns on site, along with their identification. More detailed, metric measurements are

recorded in the section on each gun further below. Interestingly the six minions seem to have been of two different lengths; four of them are 6'8" in length and two are 6' 10/11" in length.

Gun number	Length	Type
G1	6' 10"	Minion
G2	6' 8"	Minion
G3	4' 3"	Falcon or falconet
G4	6' 8"	Minion
G5	4' 1"	Falcon or falconet
G6	6' 8"	Minion
G7	6' 11"	Minion
G8	6' 8"	Minion

Fig 26
Table of gun types found on Firebrand

Scrutiny of the 1696 survey of ordnance (Caruana, 1994) shows that minions on board Navy ships at this period varied between 5 and 6.5 feet, the commonest length listed being 6.5 feet. The same survey records two vessels carrying falcons: *Dover Prize* had three of 4.5 feet length and *Mermaid* had eight of five feet length (Caruana, 1994). Interestingly elsewhere Caruana calls the three small guns on *Dover Prize* falconets, possibly suggesting a degree of inconsistency in naming this type of gun.

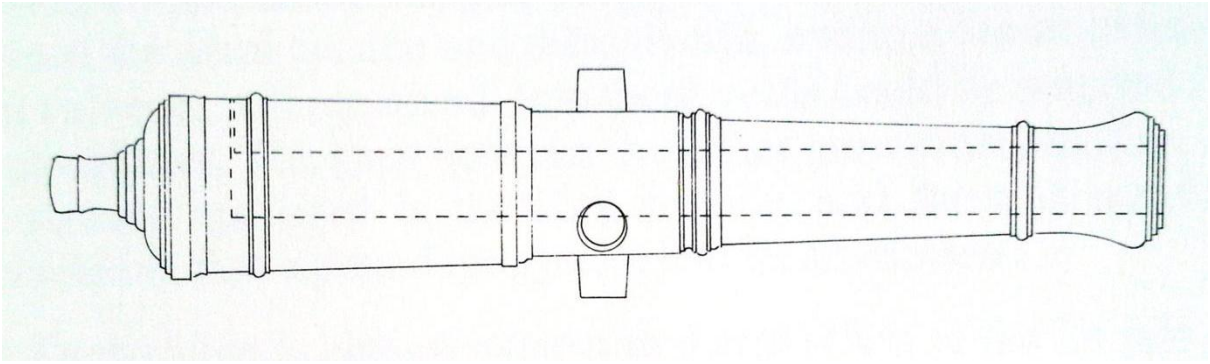


Fig. 27 A Commonwealth iron minion (Caruana, 1994)

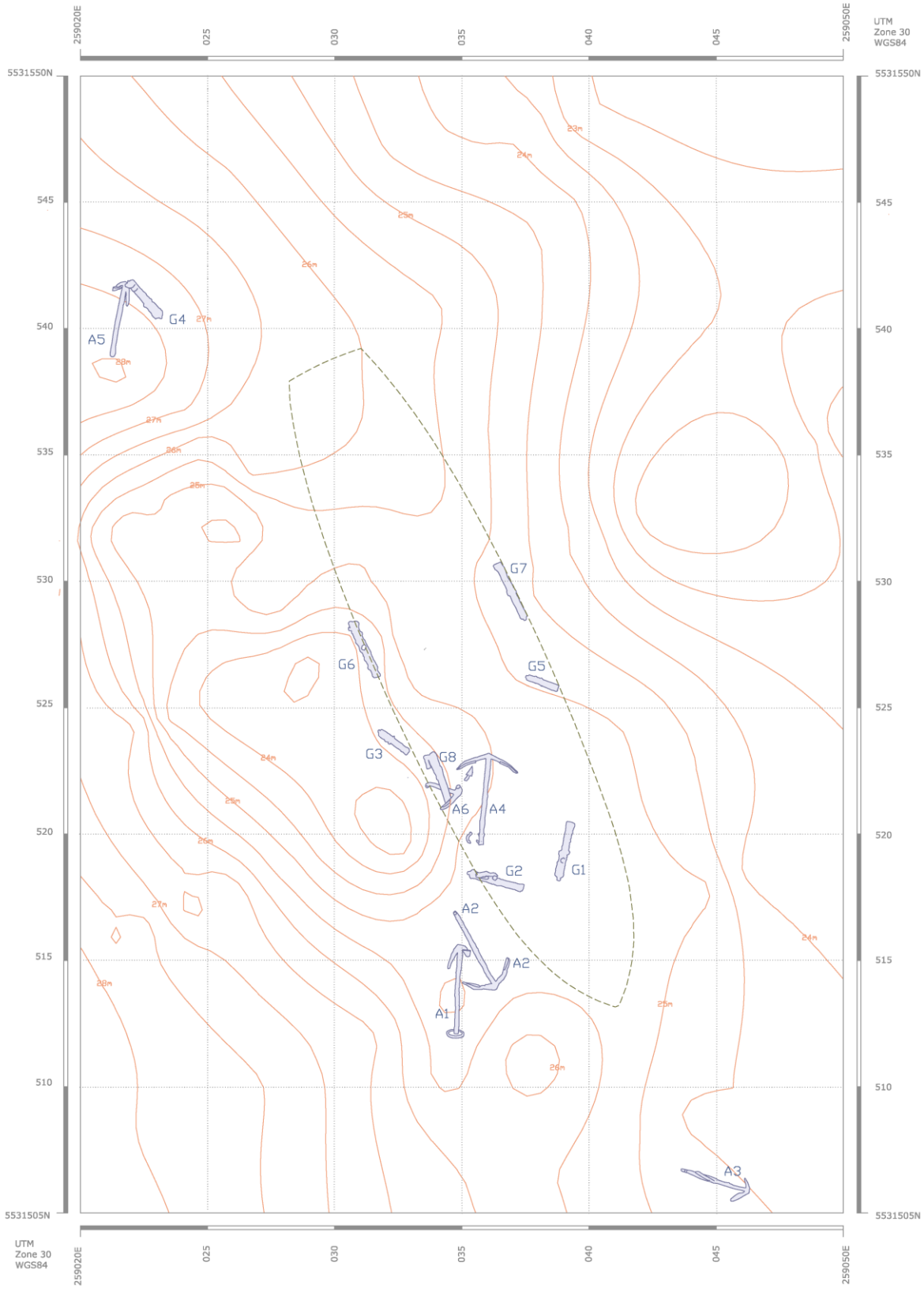


Fig. 28 - Site plan showing contours, guns and anchors only. Here the guns and anchors are shown as they appear on the seabed. The dashed line shows the conjectural outline of the Firebrand's hull.

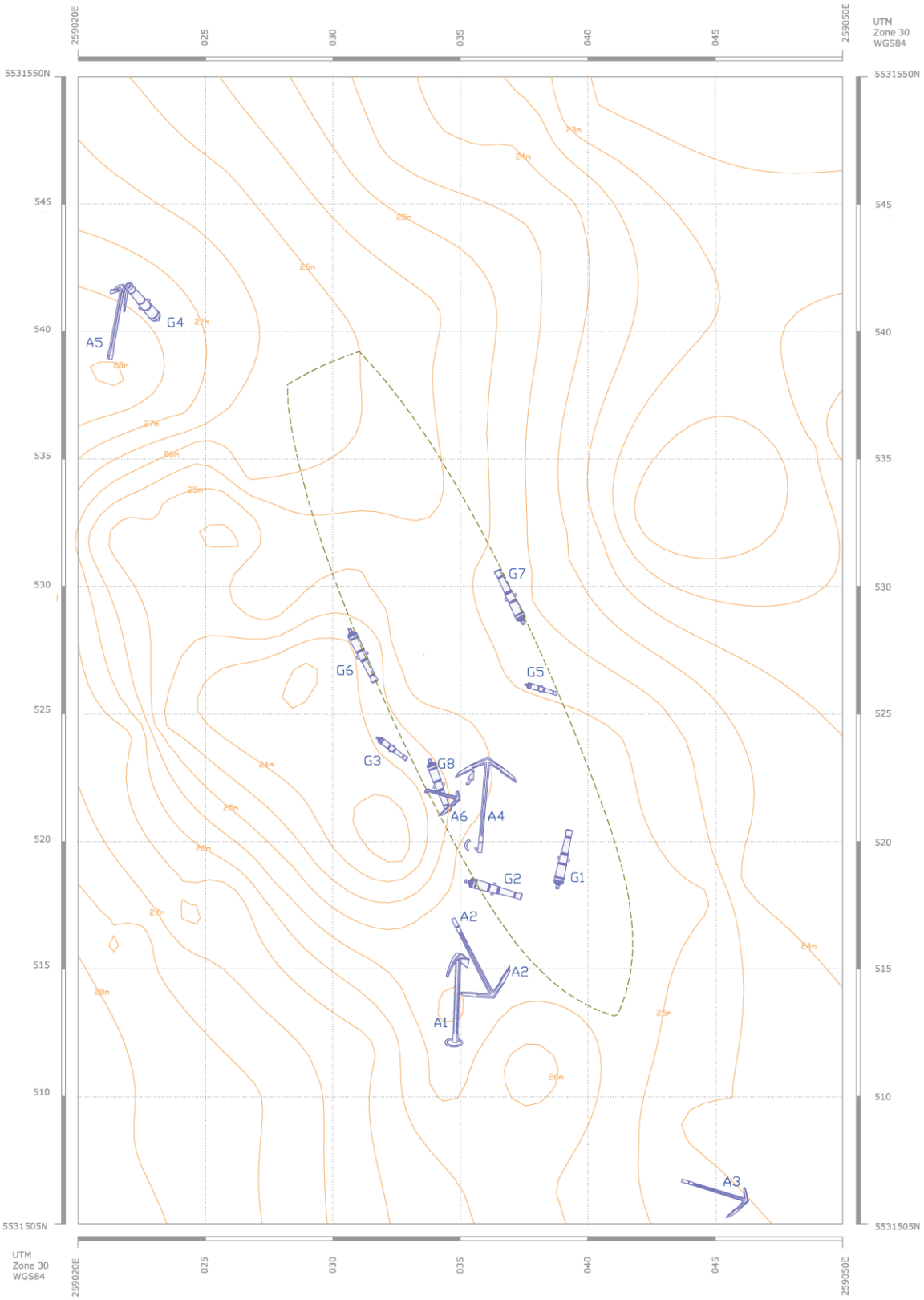


Fig. 29 - Site plan showing contours, guns and anchors only. Here the guns and anchors are shown stylistically to aid interpretation. The dashed line shows the conjectural outline of the Firebrand's hull.

G1			
	Metric	Imperial	Comments
Length (BR to MF)	2.10	6’ 10.6 “	
Basering diameter	0.39	1’ 3.3”	
BR to trunnion	0.87	2’ 10.2”	
Trunnion diameter	0.19	0’ 7.4”	Heavily concreted
Bore	0.10	3.9”	

Gun 1, a minion (c. 4lb shot)

Lying upside-down on the seabed

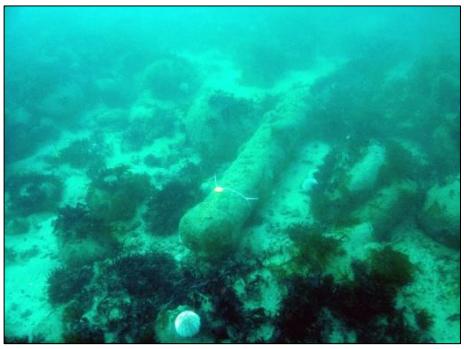


Fig 30 Gun 1

G2			
	Metric	Imperial	Comments
Length (BR to MF)	2.05	6’ 8.7 “	
Basering diameter	0.37	1’ 2.5”	
BR to trunnion	0.90	2’ 11.4”	
Trunnion diameter	0..07	0’ 2.7”	Possibly damaged
Bore	-	-	

Gun 2, a minion (c. 4lb shot)

Fig 31 Gun 2

G3			
	Metric	Imperial	Comments
Length (BR to MF)	1.3	4’ 3.2 “	
Basering diameter	0.27	10.6”	
BR to trunnion	0.42	1’ 4.5”	
Trunnion diameter	0.15	5.9”	
Bore	0.12	4.7”	Worn

Gun 3, a falcon (c. 2.5lb shot) or falconet (1.25lb shot)

Lying among rocks on the edge of the reef

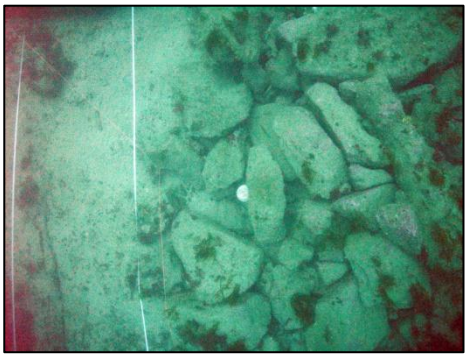


Fig 32 Gun 3

G4			
	Metric	Imperial	Comments
Length (BR to MF)	2.04	6’ 8.3 “	
Basering diameter	0.37	1’ 2.5”	
BR to trunnion	0.82	2’ 8.2”	
Trunnion diameter	0.16	6.3”	
Bore	0.025	0.9”	Heavily concreted

Gun 4, a minion (c. 4lb shot). Found propped against one of the bower anchors (A5). This gun has been moved sometime after 1981.

Fig 33 Gun 4

G5			
	Metric	Imperial	Comments
Length (BR to MF)	1.26	4’ 1.6 “	
Basering diameter	0.23	9”	
BR to trunnion	0.46	1’ 6.1”	
Trunnion diameter	0.095	3.7”	
Bore	-	-	

Gun 5, a falcon (c. 2.5lb shot) or falconet (1.25lb shot) Lying the right way up on the seabed

Fig 34 Gun 5

G6			
	Metric	Imperial	Comments
Length (BR to MF)	2.05	6’ 8.7 “	
Basering diameter	0.32	1’ 5.9”	
BR to trunnion	0.96	3’ 1.7”	
Trunnion diameter	0.15	5.9”	
Bore	0.14	5.5”	

Gun 6, a minion (c. 4lb shot)

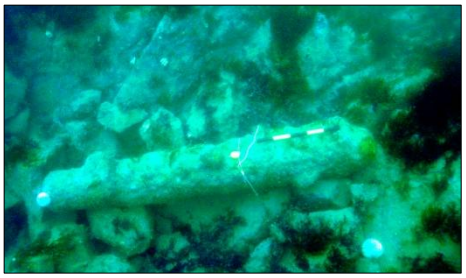


Fig 35 Gun 6

G7			
	Metric	Imperial	Comments
Length (BR to MF)	2.12	6’ 11 “	
Basering diameter	0.40	1’ 3.7”	
BR to trunnion	0.91	2’ 11.8”	
Trunnion diameter	0.16	6.3”	
Bore	0.07	2.7”	Heavily concreted

Fig 36 Gun 7

Gun 7, a minion (c. 4lb shot)
Lying upside-down on the seabed

G8			
	Metric	Imperial	Comments
Length (BR to MF)	2.05	6’ 8.7 “	Hard to measure
Basering diameter	0.40	1’ 3.7”	
BR trunnion	1.02	3’ 4.1”	
Trunnion diameter	0.17	6.6”	
Bore	-	-	

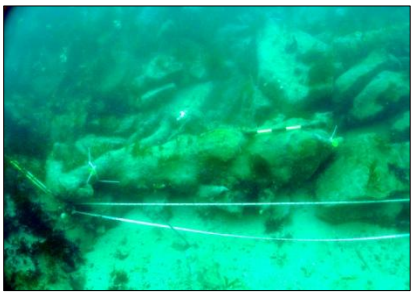


Fig 37 Gun 8

Gun 8, a minion (c. 4lb shot)
Lying upside-down on the seabed

Shot

Only four iron shot were recorded on site, three round shot and a single piece of bar shot. The round shot was all heavily corroded and covered with considerable iron corrosion (concretion). Thus it is not possible to derive the likely calibre of the shot. The part bar shot sphere was found with the concretion layer partly missing, and thus a realistic diameter was measurable. At 0.07m (2.75”) this is too large for a falcon and thus was probably for the minions.

Type	Easting	Northing	Diameter	Condition
Bar shot	259030.46	5531534.91	0.074m (Bar hole 0.016)	Part of concretion was missing – see photograph
Round shot	259035.49	5531528.18	0.104m	Concreted
Round shot	259038.93	5531528.48	0.157m	Concreted
Round shot	259038.12	5531528.68	0.096m	Concreted

Fig. 38 – Table of shot recorded on the site

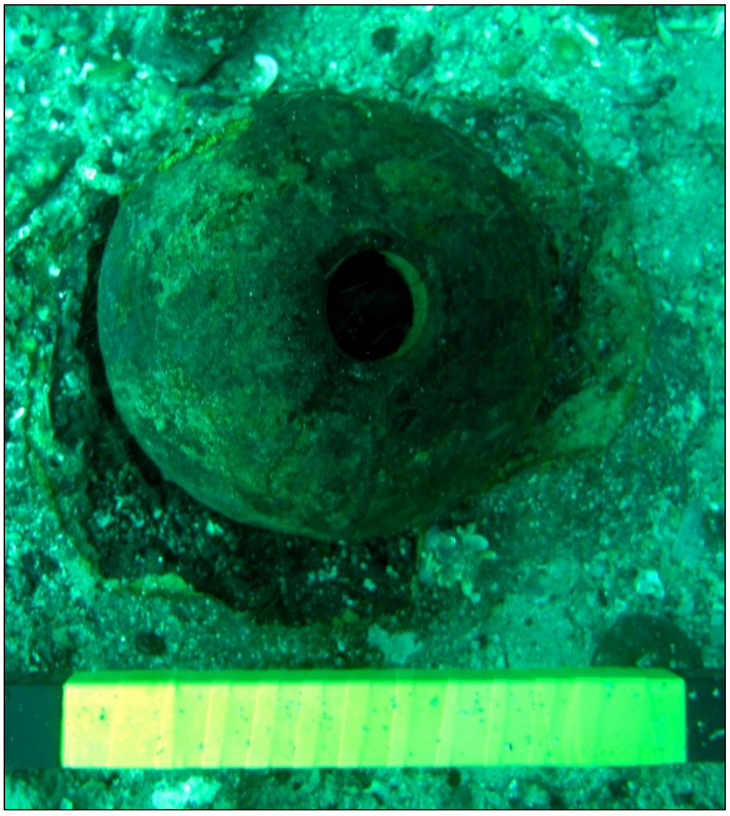


Fig 39
08A05
Part of a barshot
Scale division = 0.10m

The Anchors

There are currently six anchors on the site; details of their dimensions are given in the tables below. All six anchors are of the standard angle-crown type in use by the Royal Navy from at least 1600 to 1815 (Curryer, 1999). This type of anchor was forged from wrought iron, the various parts being formed from iron bars fire-welded together. The anchors would have been fitted with wooden stocks, none of which survive. However, the nut or ridge where the wooden stock was attached to the iron shank was evident on all except anchor 6 (where the ring end of the shank is broken off).

The number of anchors carried by Royal Navy ships varied according to the vessel's size and the date. However, a fairly standard configuration for a ship of the *Firebrand*'s size was a sheet anchor, three bower anchors and a kedge and stream anchor – which is almost exactly what we have on the seabed now. The sheet anchor differed from the bowers only in size, being somewhat larger than the bowers. The Morris plan of the site reproduced in fig 40 below shows nine anchors on the site. If these were all from the *Firebrand* this would have been somewhat unusual, and would possibly be the result of her carrying spare anchors as cargo. The possibility that the plan is in error, or that anchors which were on site were not from *Firebrand,* cannot be discounted.

The number and weights of anchors in 1686 (Jobling, 1993, p.73)						
Rate	Guns	Tons	Sheet	Bower	Stream	Kedge
5th	32	250	1 x 15 cwt	2 x 14 cwt 1 x 13 cwt	1 x 5 cwt	1 x 2 cwt

Thus it can be seen that a ship of *Firebrand*'s size would be expected to carry four principal anchors (one sheet and three bowers) as well as a sheet and kedge anchor, which corresponds almost exactly with what was found on site. By 1717 the weight of the 'biggest' anchor carried on a ship of 365 tons was given as just over 18 cwt with a shank length of 12 feet 2 inches. This is the same length as the largest of the two bowers found on site (A2 and A4).

Only two of the anchors still have both flukes attached (A2 and A4) possibly indicating a weakness in the fire-welding attaching these to the arms of the anchor. Perhaps not surprisingly, only one of the anchors (A1) has an intact anchor ring still attached. Anchor 4 has part of a broken anchor ring in place. As the ship's bell (recovered by Roland Morris' team in 1981) is shown under this ring, it was probably broken during the recovery of the bell.

Summary of anchors on the site						
No	**Length (ft)**	**Length (m)**	**Flukes**	**Ring**	**Position**	**Use**
A1	12’	3.66	1	✓	Bows	Bower
A2	12’ 2”	3.72	2	x	Bows	Bower
A3	8’ 2”	2.49	1	x	10m SE of bow	Stream?
A4	12’ 2”	3.72	2	✓	Bows	Bower
A5	10’ 6”	3.20	1	x	8m NW of stern (30m NW of A1)	Bower
A6	5’ 3” *	1.6 *	1	x	On gun 8 (* part of shank missing)	Kedge?

It has been suggested that anchor three (A3), which lies some 10m SE of the bows, was an anchor deployed by *Firebrand* while the crew abandoned ship. This is unlikely for a number of reasons. The anchor in question is the smallest of the bower anchors and as such is not likely to have been used as the ‘best bower’, which is traditionally kept at the bows ready to let go in an emergency. Also the distance from the bows is probably too small to have held the vessel (more cable would have been deployed to ensure good holding). Lastly, the anchor is not orientated in line with the wreck. It is possible that this anchor has been moved to its current location at some time after the wrecking – possibly as a mooring for vessels ‘working’ the wreck.

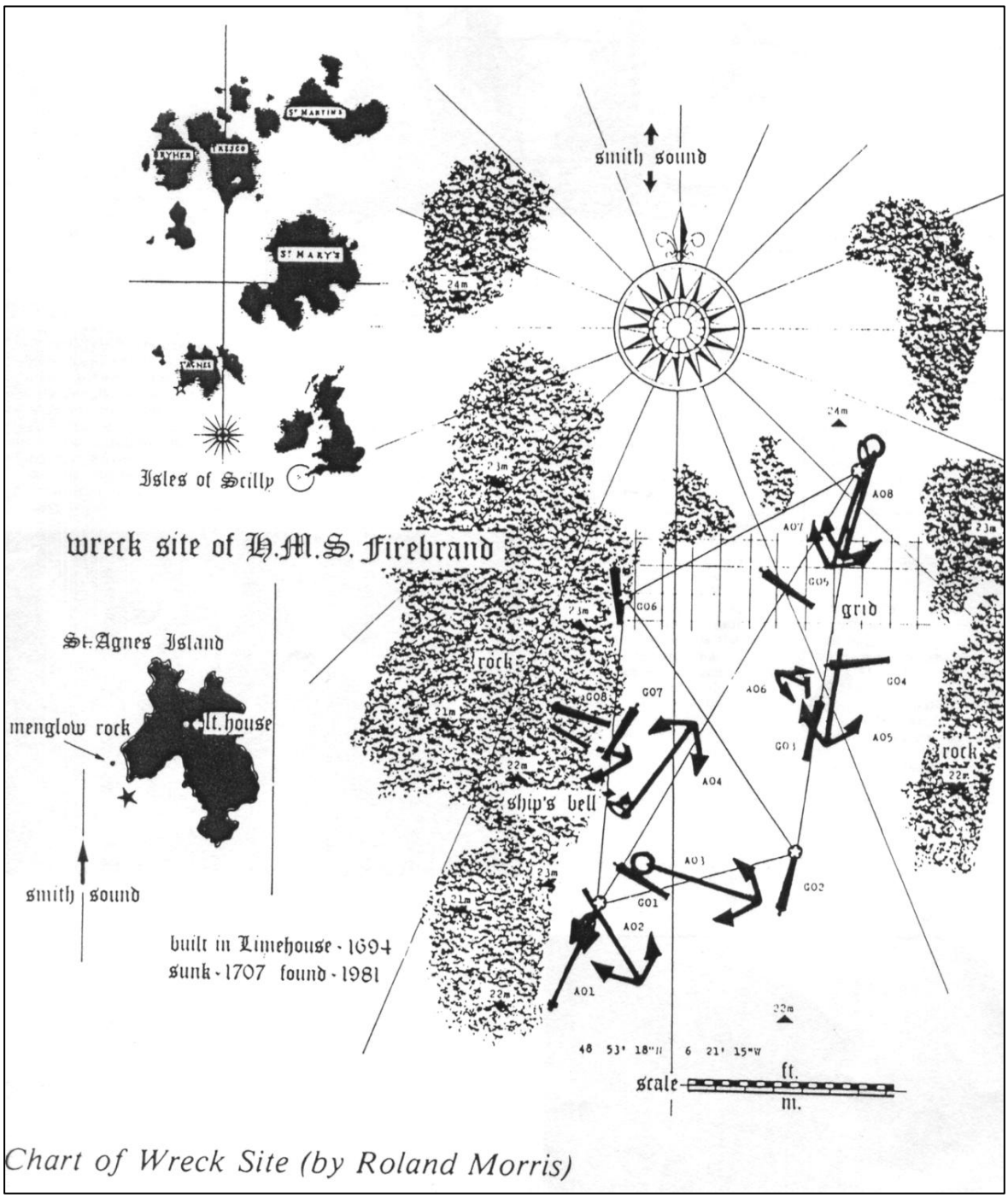


Chart of Wreck Site (by Roland Morris)

Fig. 40
Plan of the site published by Roland Morris (Morris, 1982). Note the presence of no less than nine anchors on the wreck. Compare the positions of the guns and anchors to the current survey in figs 28 and 29.

A1			
	Metric	Imperial	Comments
Length (shank)	3.66	12’ 0”	Anchor upright
Length (arm)	1.26	4’ 1”	
Fluke to fluke	2.17	7’ 1.4”	Upper fluke missing
Fluke (L x W)	0.77 x 0.54	2’ 6” x 1’ 9”	
Ring	0.69	2’ 3.1”	Ring diameter
Shank section	0.15 x 0.16	6” x 6.3”	

Fig 41 Anchor 1

Anchor 1

A bower was found in 2006 standing upright with one fluke buried in the seabed. Sadly, on our return to the site in 2007 it had fallen and now lies flat on the seabed. The iron anchor ring is intact. The upper fluke is missing from the anchor. This anchor is moderately concreted.

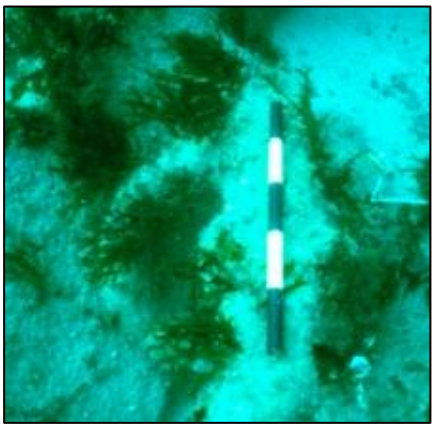


Fig 42 Anchor ring on anchor 1

A2			
	Metric	Imperial	Comments
Length (shank)	3.72	12’ 2”	
Length (arm)	1.50	4’ 11”	
Fluke to fluke	2.10	6’ 11”	
Fluke (L x W)	0.64 x 0.44	2’ 1” x 1’ 5”	
Ring	Missing	-	
Shank section	0.16 x 0.17	6.3” x 6.7”	

Anchor 2

A bower, or possibly the sheet anchor, lies flat on the seabed close to anchor 1. Both flukes are in place but the anchor ring is missing. This anchor is moderately concreted.

A3			
	Metric	Imperial	Comments
Length (shank)	2.49	8’ 2”	
Length (arm)	0.86	2’ 10”	
Fluke to fluke	1.37	4’ 6”	One fluke missing
Fluke (L x W)	0.41 x 0.24	1’ 4” x 9.4”	
Ring	Missing	-	
Shank section	0.15 x 0.15	6” x 6”	

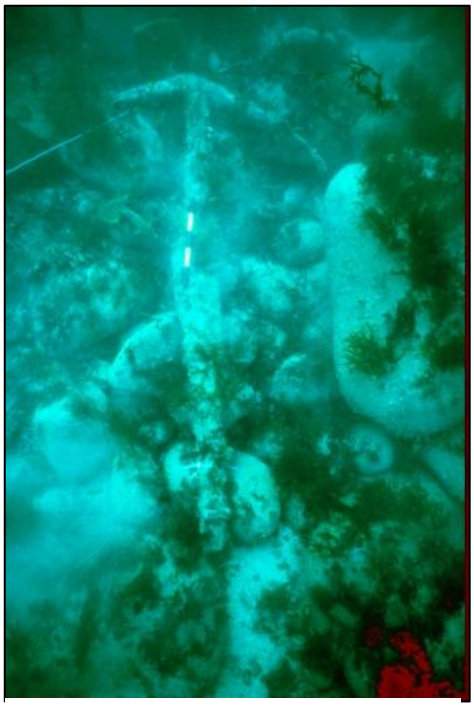


Fig 44 Anchor3

Anchor 3

Probably the stream anchor, this lies flat on the seabed 11m to the southwest of the wreck. Only one fluke survives and the anchor ring is missing. This anchor is heavily concreted. The reason this anchor lies so far from the rest of the surviving wreckage is not clear. It is not shown in this position on the 1981 Morris plan, so may have been subsequently moved.

A4			
	Metric	Imperial	Comments
Length (shank)	3.72	12’ 2”	
Length (arm)	1.42	4’ 8”	
Fluke to fluke	2.26	7’ 5”	
Fluke (L x W)	0.72x0.54	2’ 4” x 1’ 9”	
Ring	Missing	-	Ring broken
Shank section	0.18 x 0.19	7” x 7.5”	

Fig 45 Anchor 4

Anchor 4

A bower anchor, this lies flat on the seabed about 8m to the north of the postulated position of the bow of the wreck. Both flukes survive. The anchor ring is broken, probably when the ship’s bell was recovered from under the anchor ring in 1981. This anchor is moderately concreted.

A5			
	Metric	Imperial	Comments
Length (shank)	3.20	10’ 6”	
Length (arm)	1.09	3’ 7”	
Fluke to fluke	1.80	5’ 11”	Upper fluke missing
Fluke (L x W)	0.65 x 0.40	2’ 2” x 1’ 4”	
Ring	Missing	-	
Shank section	0.19 x 0.19	7.5” x 7.5”	

Fig 46 Anchor 5

Anchor 5

This, the smallest of the bower anchors, lies propped against gun 4 to the northwest of the site some 24m from the main group of anchors (A1, A2 and A4). This anchor is not shown in this position on the Morris plan, so was probably moved to this position sometime later.

A6			
	Metric	Imperial	Comments
Length (shank)	1.60	5’ 3”	Not complete
Length (arm)	0.88	2’ 10”	
Fluke to fluke	-		One arm missing
Fluke (L x W)	0.46x0.18	1’ 6” x 7”	
Ring	Missing	-	
Shank section	0.14 x 0.14	5.5” x 5.5”	

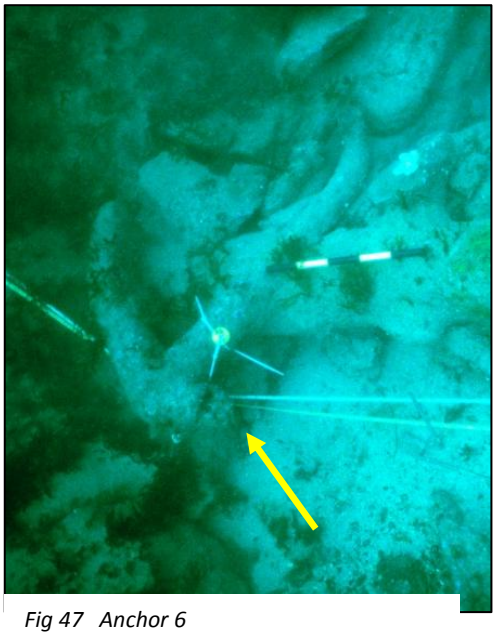


Fig 47 Anchor 6

Anchor 6

This is the smallest of the anchors found and is probably the kedge anchor. The kedge was designed to be deployed by small boat. Note the broken and bent shank and broken arm – considerable force was required to damage this anchor to this extent. This anchor lies over, and is concreted to, Gun 8. This anchor is only lightly concreted.

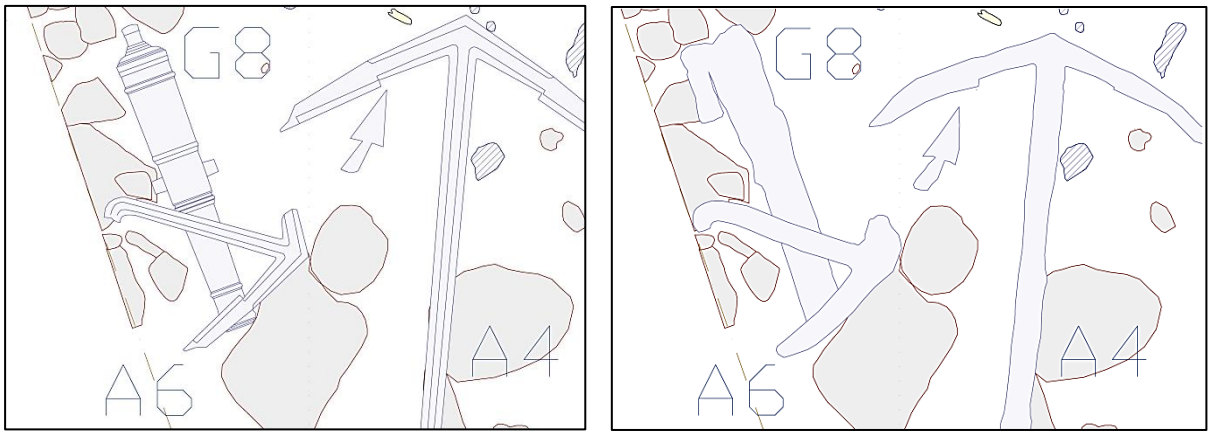


Fig 48 Anchor 6 shown stylistically (for clarity) on the left, and as it appears on the seabed on the right.

The Timber

A total of 23 separate pieces of timber survive exposed on the seabed. The timber survives best in two small areas, to the west of CP5 and to the northeast of gun 3 (see appendix I). In addition to these two areas a number of very small, scattered pieces of timber were recorded. The timber is in very poor condition; generally it is very worn with few original edges surviving. The timber is very soft and decayed, although there is only slight attack evident from wood-boring organisms. The poor, fragmentary nature and preservation of the timber makes it difficult to identify what part of the vessel the timbers are from.

Much of the site is covered in a fine-particled silty sand. On other sites in the islands this has been found to be an excellent medium for the preservation of buried ships timber (Camidge, 2009). Given the presence of timber exposed on the seabed, albeit in a poor state of preservation, it is reasonable to assume that more timber from the *Firebrand* lies buried, and preserved, within this sediment.

The abundance of small, abraded and broken pieces of timber on the site is notable. It is interesting to speculate why this should be. The possibility that these fragments are the result of past intrusive work on the site is one possibility which has been considered. Another possibility is that violent storms are causing periodic disturbance to the sediments and buried wreck fabric. Given the depth of the site, the latter seems less plausible but cannot be dismissed without evidence to the contrary.

For a key to the shading and colouring used in the drawings see fig 61 on page 70.

Alignment of timber

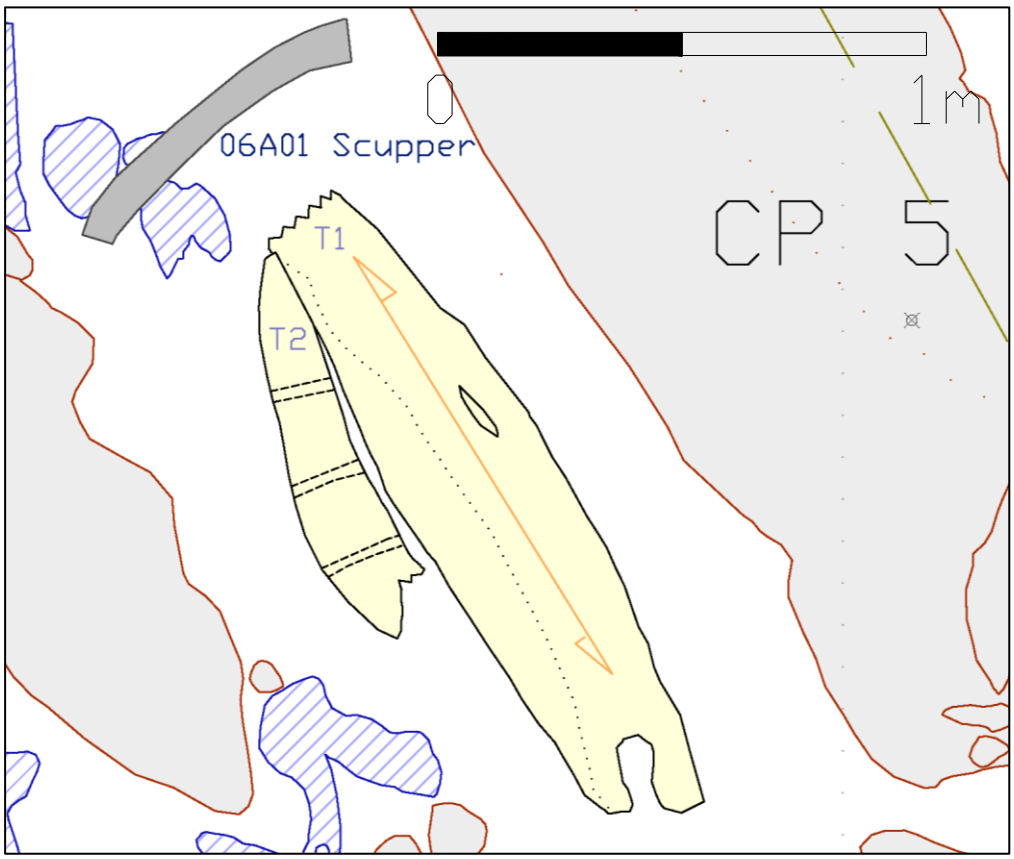


Fig 49
Timber T1 & T2

For a key to the colouring and shading used see the key in fig 61 (page 70).

Timbers T1 and T2 are the best preserved of the timber surviving exposed on the seabed of the site. The surface of the timber exhibits moderate attack by wood boring organisms, which suggests that this timber is only periodically exposed (otherwise it would be more severely decayed). It is not clear from which part of the vessel this timber came.

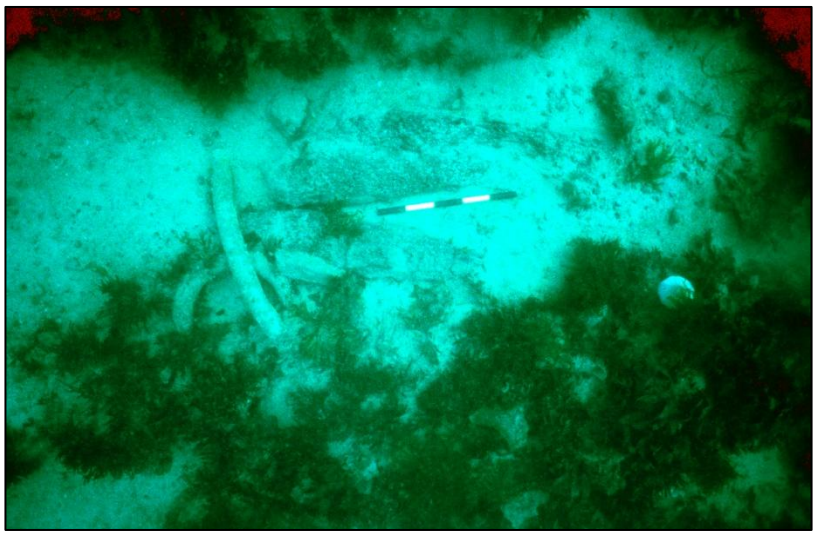
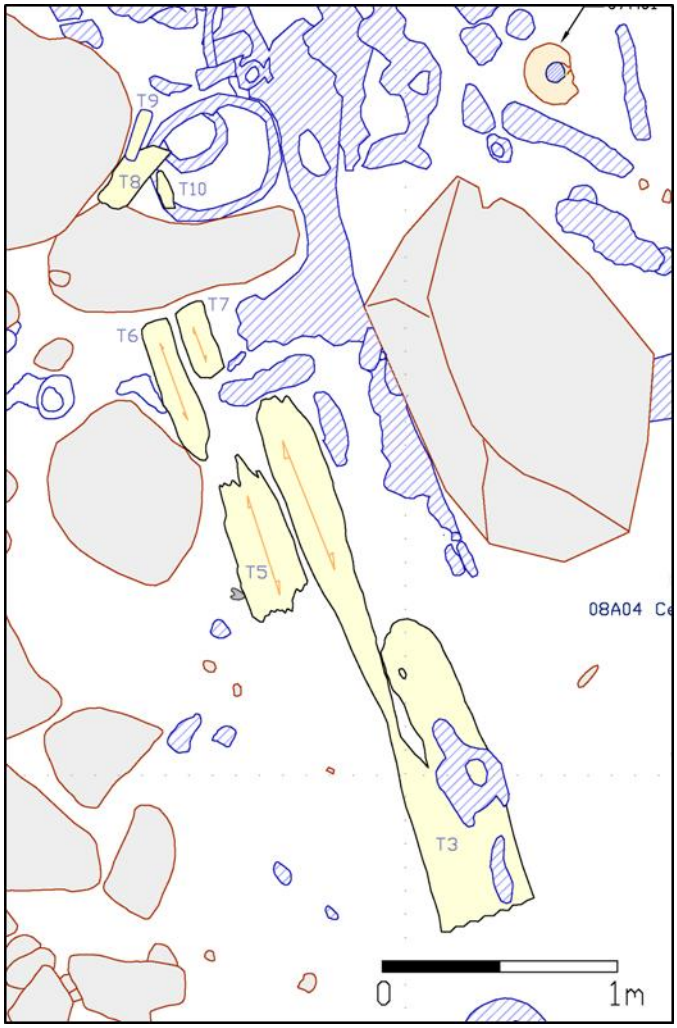


Fig 50
Timber T1 & T2
View from above
Scale = 0.5m

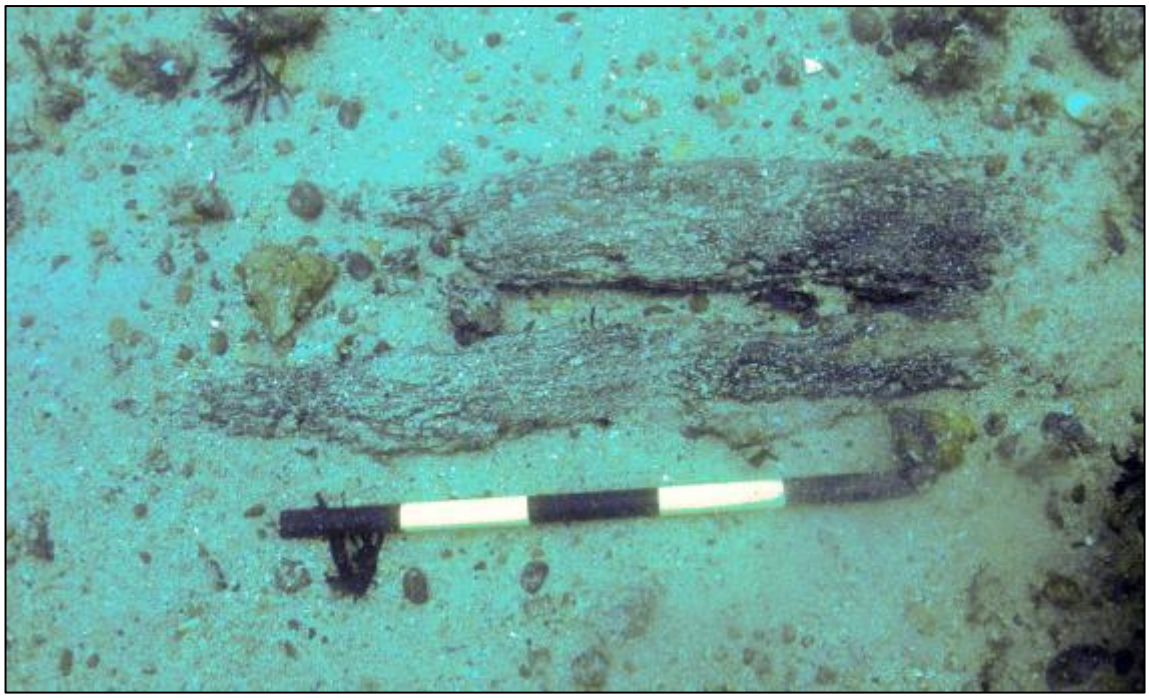


T3 and T5 to T10

The majority of these timbers are aligned with the grain running along the line of the wreck (fore and aft). Note the iron 'fastenings' attached to T3 and the barrel hoops concreted to T8.

Fig 51
Timbers T3 & T5-T10

Fig 52 (below)
Scale = 0.5m



T4

Timber fragment of T4 can be seen just sticking out from under a rock. T12, T13 and T14 are all small fragments of timber attached to iron concretions. All these fragments are heavily abraded, making identification impossible.

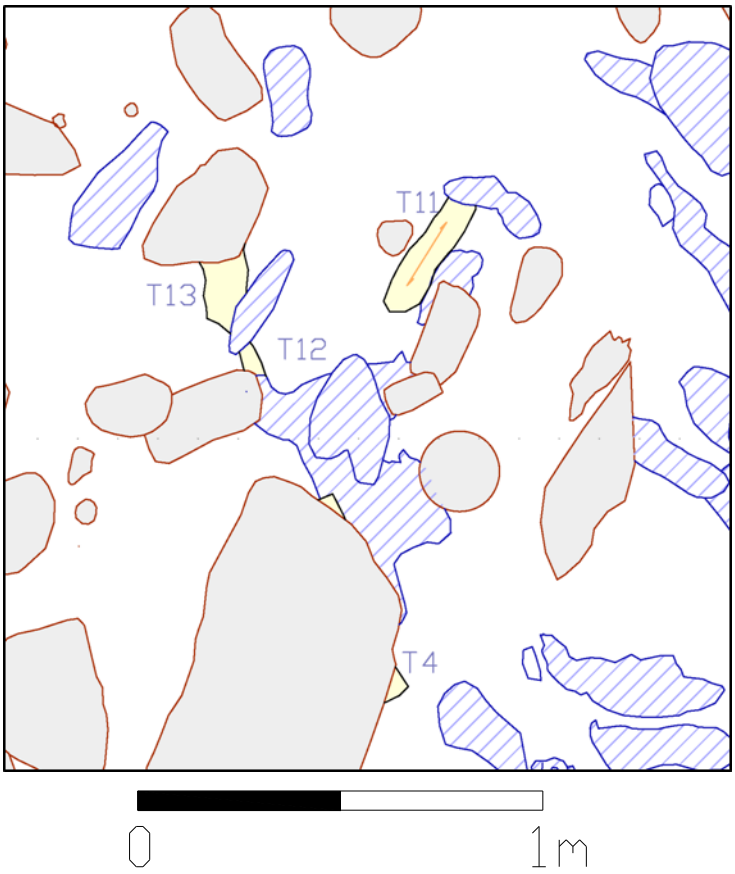
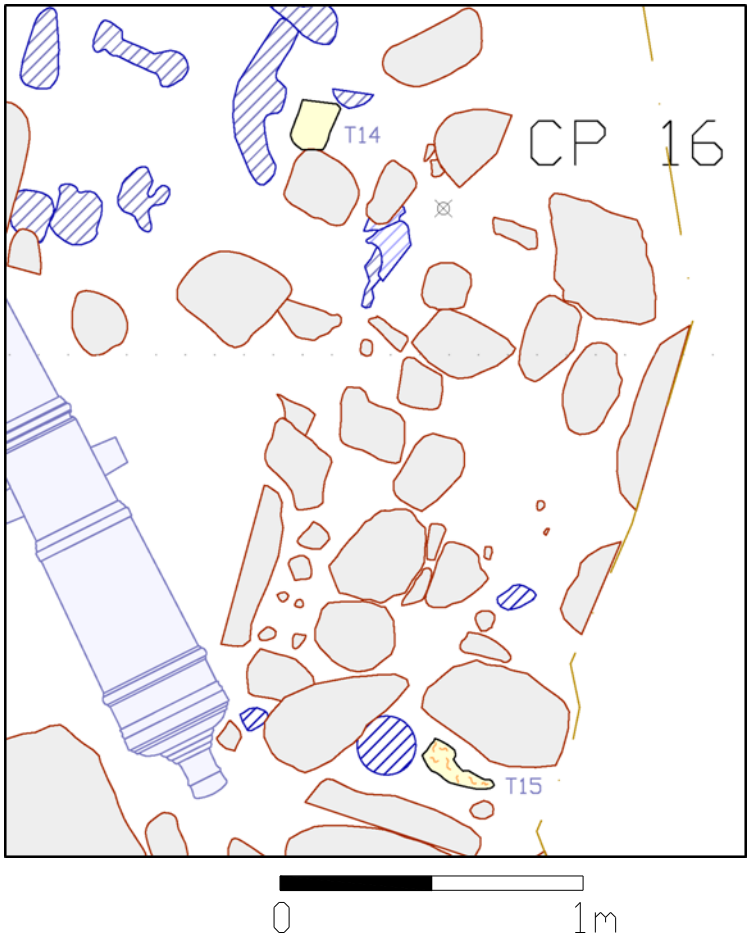


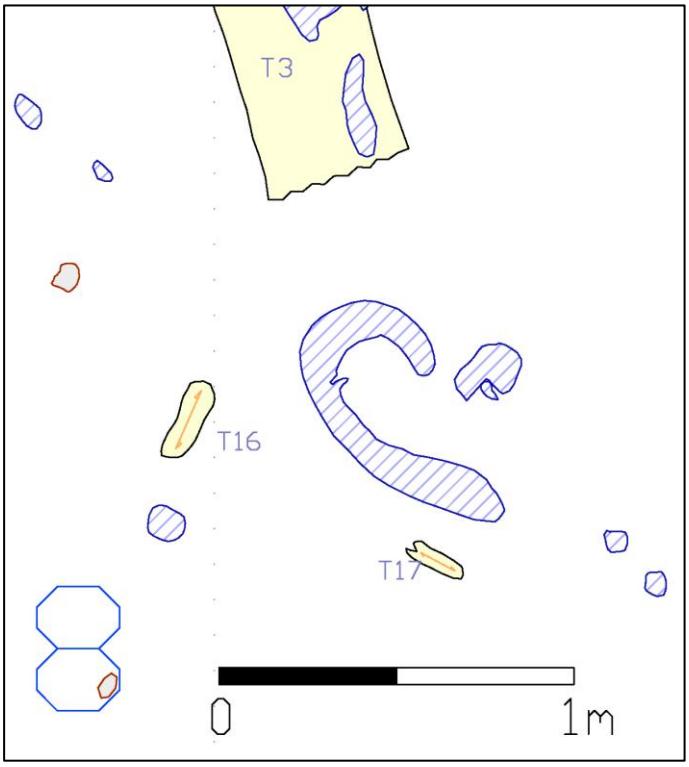
Fig 53
Fragments of timber
T4 & T12-T14



T14 and T15

Fragments of timber. T15 exhibits heavy attack by wood boring organisms.

Fig 54
T14 & T15



T16 and T17

Two very small fragments of timber – possibly mobile.

Fig 55
T16 & T17

T18 to T20

Three small fragments of timber attached to an iron concretion.

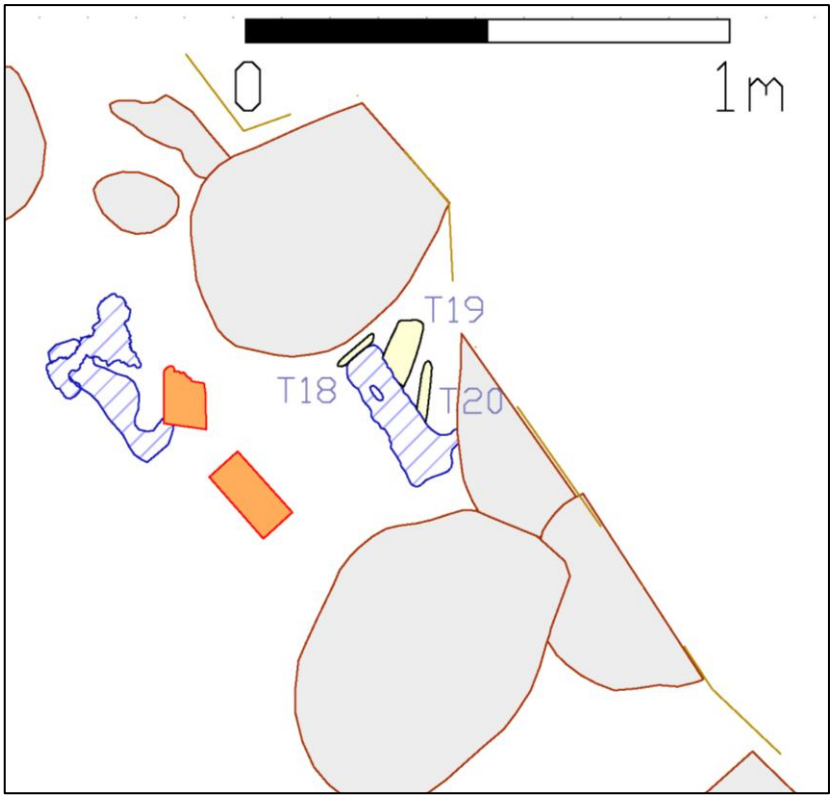


Fig 56
T18-T20

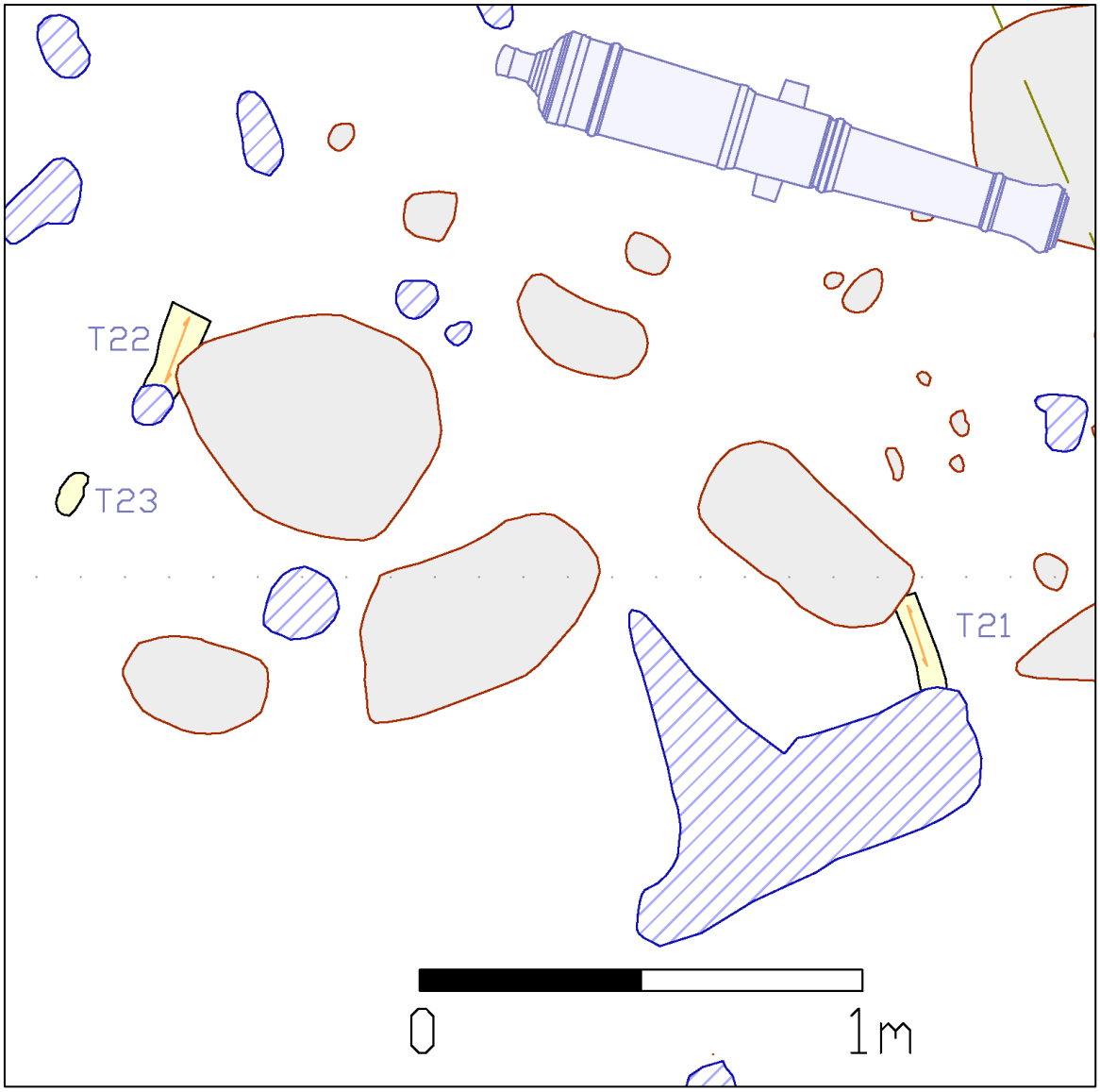


Fig. 57 T21-T23

T21 to T23, three small fragments of timber. T23 appears to be mobile

Firebrand Timber			
ID No	**Dimensions (m)**	**Orientation**	**Comments**
T1	1.70 x 0.35 x 0.08	335	Surface gribble attack, edges abraded/decayed. Thickness is an approximation. No fastenings detected
T2	0.97 x 0.20 x 0.35	340	Irregular plank with abraded /decayed edges. Has three shallow grooves across the upper face 0.03 wide x 0.015 deep. Moderate attack by wood-borers.
T3	2.40 x 0.48 x 0.075	340	Has decayed/eroded into a very irregular shape. Iron concretions possibly indicating iron fastenings. Deck plank? Thickness is approx.
T4	0.53 x 0.07 x 0.05	340	Small piece of timber trapped under a rock.
T5	0.71 x 0.20 x 0.06	340	Fragment of plank – both ends broken off. Possibly associated with T3. Deck plank?
T6	0.63 x 0.15 x 0.06	340	Small fragment of planking. Possibly associated with T7. Moderate gribble
T7	0.33 x 0.13 x 0.05	340	Small fragment of planking. Possibly associated with T6. Moderate gribble
T8	0.33 x 0.12 x 0.05	35	Fragment of timber, soft and eroded. Possibly mobile
T9	0.22 x 0.05 x 0.04	20	Small fragment of timber, close to barrel hoops
T10	0.16 x 0.06 x 0.04	330	Very small fragment of timber associated with iron concretion of barrel hoops
T11	0.32 x 0.08 x 0.05	35	Fragment of timber with iron concretion attached
T12	0.08 x 0.04 x 0.04	-	Very small fragment of timber – probably mobile
T13	0.20 x 0.11 x 0.05	-	Fragment of timber, soft and decayed, trapped under a rock. Iron concretion attached
T14	0.17 x 0.12 x 0.05	-	Small fragment of abraded timber
T15	0.25 x 0.09 x 0.04	-	Small, irregular shaped fragment of timber, damaged, abraded and heavily gribbled
T16	0.23 x 0.07 x 0.04	30	Small fragment of timber, very soft. Probably mobile
T17	0.17 x 0.05 x 0.04	300	Small fragment of timber, probably mobile
T18	0.09 x 0.015 x 0.015	-	Small fragment of timber attached to iron concretion
T19	0.13 x 0.06 x 0.03	-	Small fragment of timber attached to iron concretion
T20	0.13 x 0.03 x 0.03	-	Small fragment of timber attached to iron concretion
T21	0.23 x 0.06 x 0.04	340	Small piece of timber attached at one end to large iron concretion
T22	0.18 x 0.08 x 0.03	20	Small piece of timber with small iron concretion attached
T23	0.10 x 0.06 x 0.03	-	Small fragment of timber, eroded

Fig. 58 Table of the timbers recorded. Orientation is in degrees (0=north, 90=east, 180=south and 270=west)

The Iron

As is normal with wreck sites of this date, the ironwork is all heavily concreted with iron corrosion products. This tends to obscure the original shape and size of iron objects. The size and shape can be determined by removing the coating of corrosion products – but this will destabilise the object, and for this reason none of the concretions were removed. The original form of the iron can also often be determined by X-radiography, but the iron must be recovered to make this possible. Thus it is very difficult to interpret the original function of much of the ironwork on the site.

Central concentration of iron

The distribution of the ironwork on the site is interesting. Fig 61 shows the whole of the exposed wreckage. Although the scale is such that little detail is visible, what is clear from this plan is that much of the iron is concentrated in a cluster to the west of Gun 7 (iron is shown in blue). This concentration of iron is unusual and consists in the main of long sections of what appears to be distorted sheet iron. The sheet iron appears to have originally been formed into box sections of square or rectangular section. This does not have any parallels among other warship wrecks of this period. Looking at the features peculiar to a fireship the fire-trunks are an obvious candidate for these strange features.

Fig. 59 Plan of the possible iron fire-trunk. Note the iron barrel hoops to the left of the 'fire-trunk'

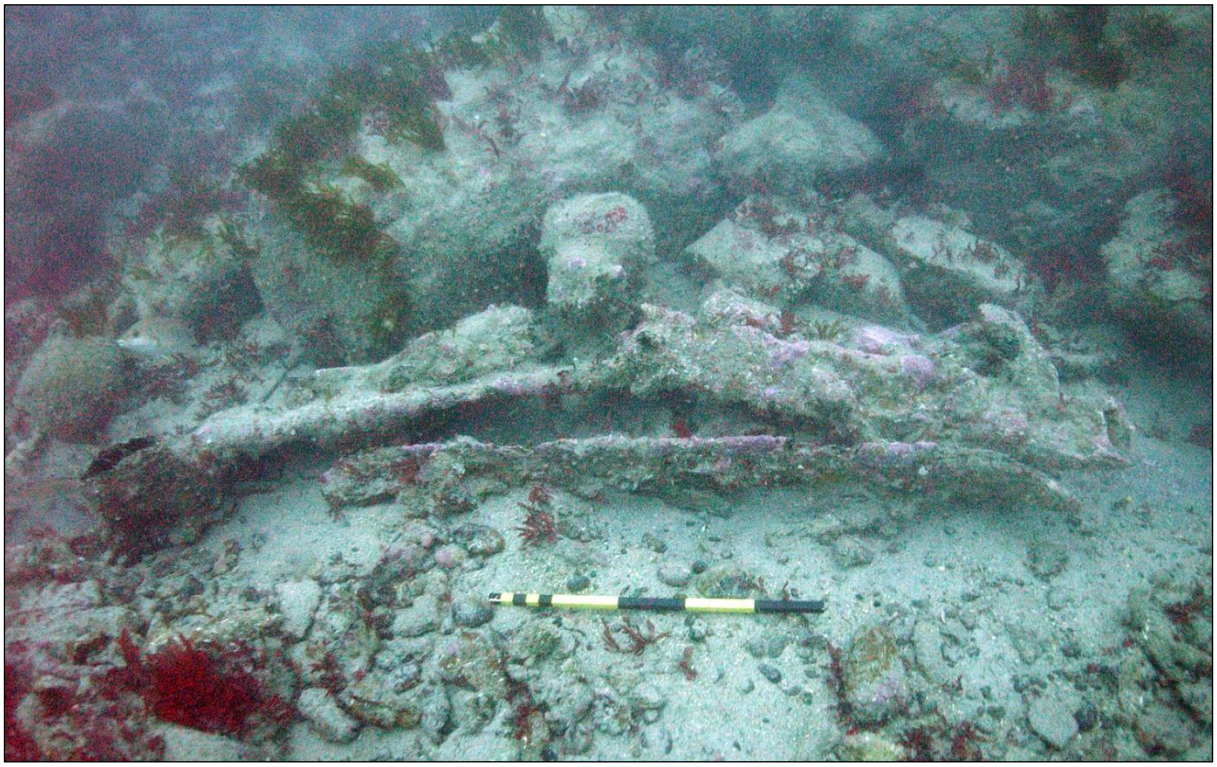


Fig. 60 The possible iron fire-trunk. Scale = 0.5m, looking north

The most likely component of a fireship which this iron feature could represent is one of the fire-trunks (see fig 9 above). The fire-trunks were usually made either of wood (Falconer, 1780) or of brass or copper (Coggeshall, 1997). However, it would seem from the surviving evidence that the fire-trunks on *Firebrand* may have been made of iron. The close proximity on the seabed of a number of iron barrel hoops may represent the remains of the fire-barrels which would have stood at the base of the fire-trunks. If this iron does indeed represent the fire-trunks then they are the rearmost pair, adjacent to the fire-room bulkhead – reference to figs 6 & 61 shows that this ironwork is in the position expected for the rear fire-trunks.

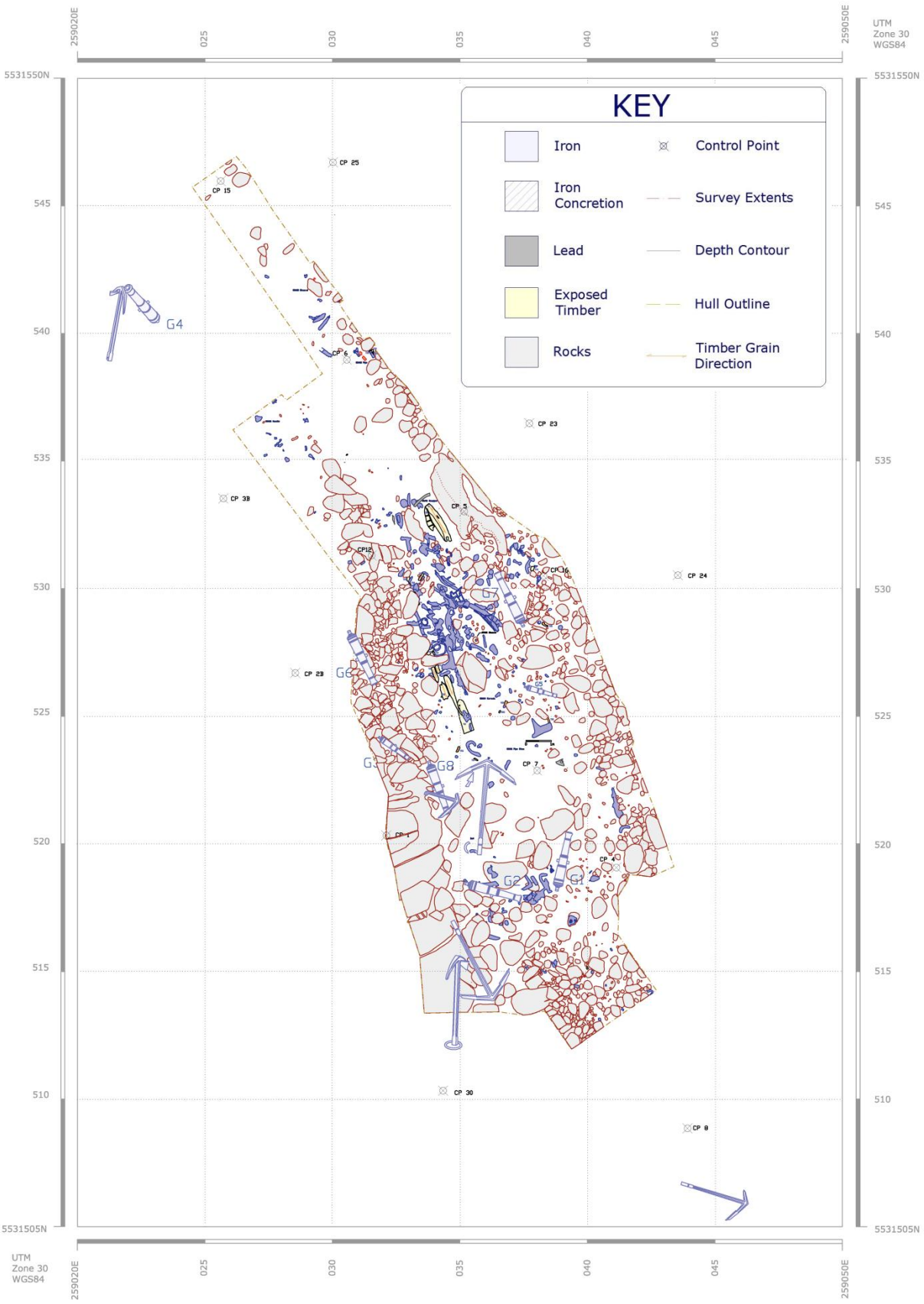


Fig. 61 Site plan showing distribution of ironwork, iron shown in blue

Most of the iron on the site is unidentifiable in its current state of corrosion. The only solution to this problem (common to many wrecks of this period) would be to recover the iron and X-ray it – but this would be a costly exercise and could possible lead to partial destabilisation of the site. All the iron was drawn (see fig 61 and the large scale site plan which accompanies this report). Some of the more notable iron is discussed below:

Iron fastening on T3

Timber T3 has a concreted iron fastening attached (fig 62). The exact form of this fastening is not discernable due to the advanced state of corrosion – but it could possibly have been a ring bolt or similar.

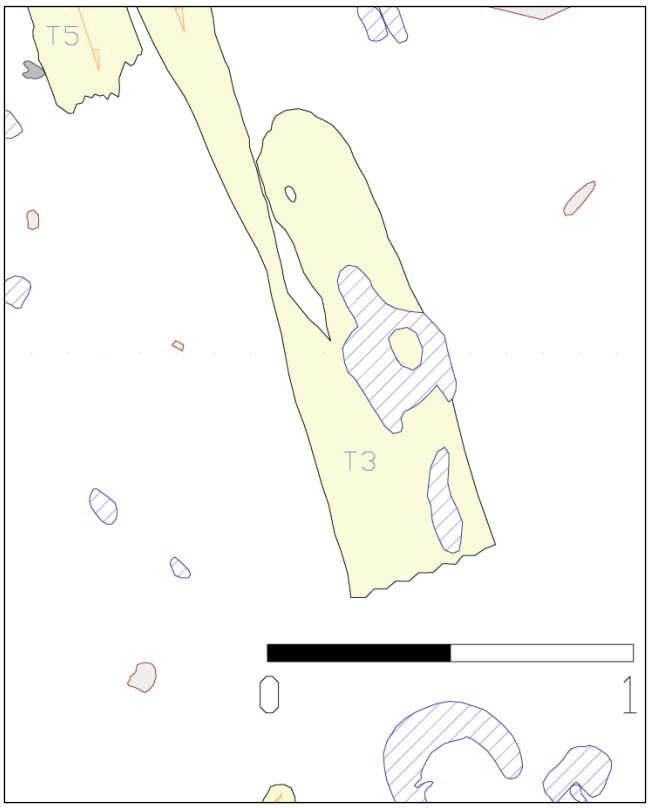


Fig 62
Iron fastening attached to timber T3

Possible anchor part

A piece of iron concretion 0.95m north east of gun 7 appeared to be a part of a very small broken anchor. The iron was so badly corroded/concreted that no positive identification was possible. The surviving fragment, possibly part of the arms and the very end of the shaft, was 0.56m long and 0.10m in diameter. This iron is in roughly the same position as two anchors shown on Roland Morris' plan fig 40.

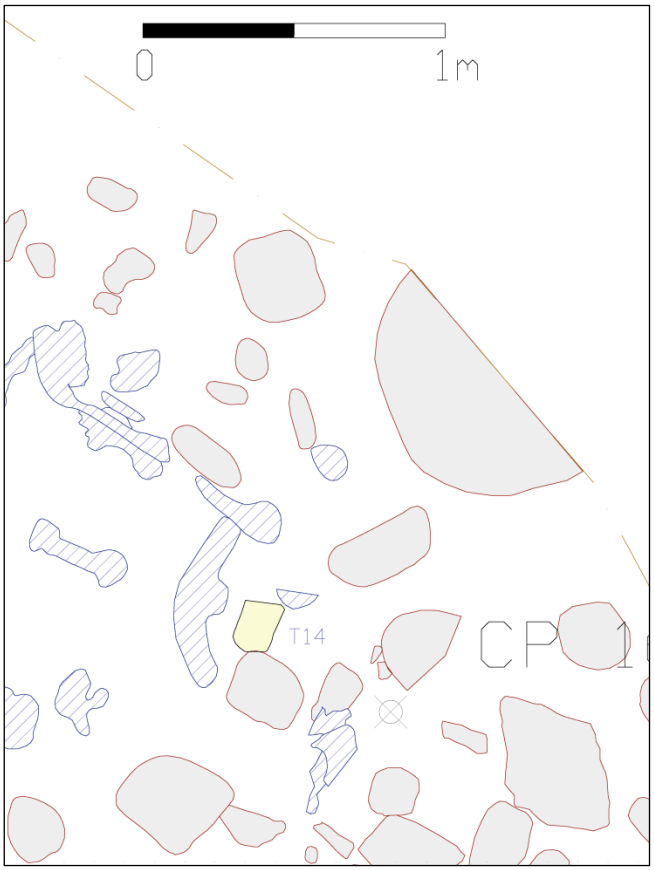


Fig 63
Possible iron anchor part

Concretion patch (gun 'ghost')?

A large area of iron concretion to the south of Gun 5 has the appearance of an area where a large iron object has been removed. The concretion patch is approximately 0.88m x 0.70m and is only 0.02-0.03m thick. In this position a gun is shown on the 1988 Morris plan. This concretion could represent the original position of Gun 4 before it was moved to its current location some 22m to the north west (see Gun 4 above).

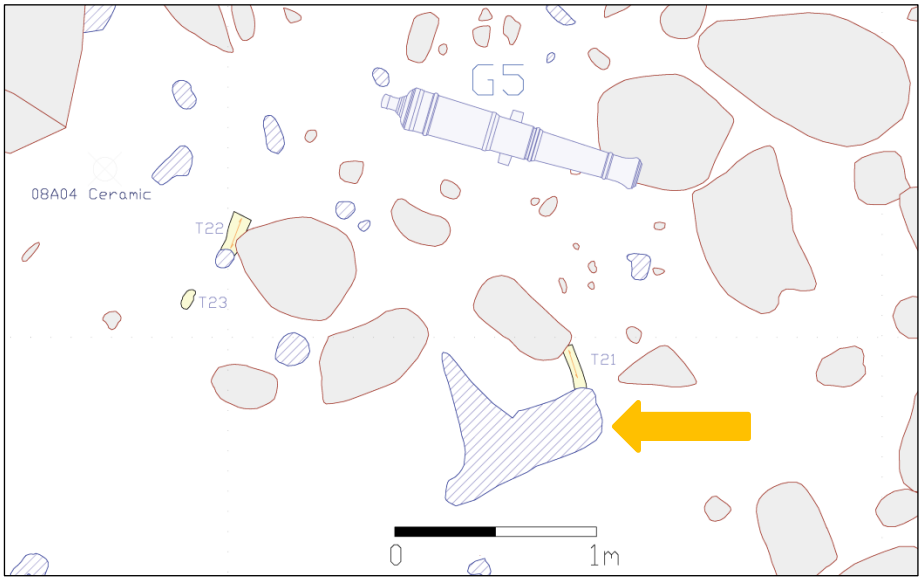


Fig 64 Iron concretion (arrowed) – possibly the original position of Gun 4

The Artefacts

The first artefacts recorded from this site are those recovered by Roland Morris' team in 1981 (Morris, 1982). These included a bronze bell (marked 1692) and a wooden nocturnal (the bell is now in the possession of Mark Groves on Scilly). Other artefacts reported by Morris include two carved timber cherubs, a 'carved dolphin', several onion bottles and a bellamine flask. The whereabouts of these latter objects are not known.

Most of the artefacts noted during this survey were recorded *in situ*, but occasionally they were recovered to enable more detailed recording to be undertaken. All the artefacts except one (09A06) were reburied in test pit 3 (TP3) at the end of the survey.

All artefacts numbered 09A10 to 09A43 were located by the area search conducted around the wreck to determine the extent of the wreck material.

Artefacts by material	
Material	No
Ceramic	8
Composite	4
Copper alloy	1
Glass	3
Iron	18
Lead	6
Stone	6
Wood	4
TOTAL	50

Artefacts by type	
Type	No
Personal & tools	4
Ship fittings	22
Storage & possessions	4
Navigation	1
Other & unknown	14
Modern	5
TOTAL	50

Fig. 65 Tables of artefacts numbers by material and object type

Name	Easting	Northing	Depth	Material	Description	Length	Width	Diameter	Depth	Photo	Drawn
06A01	259032.79	5531533.55	25	Lead	Scupper pipe	0.78		0.1			
06A02	259037.65	5531528.50	25.3	Lead	Sheet lead bent roughly into a part cylinder. Possibly a gun apron	0.21	0.24		0.003		
07A01	259035.51	5531527.85	25	Wood	Sheave wheel - part of block			0.26	0.015		
08A01	259036.63	5531523.49	24.5	Ceramic	Tobacco pipe stem fragment - white ceramic. Reburied TP3 2009	0.033	0.009	0.009		●	●
08A02	259030.83	5531538.74	26.1	Ceramic	Pipe bowl fragment with make stamp an foot (base). Reburied TP3 2009	0.045	0.024	0.02	0.04	●	●
08A03	259029.01	5531541.69	26.5	Glass	Vessel glass fragment. Reburied TP3 2009	0.07	0.04		0.004	●	●
08A04	259036.15	5531525.82	24.3	Ceramic	Earthenware pot shard, Greenish brown glaze inside and out, buff coloured fabric. Reburied TP3 2009	0.05	0.005		0.03	●	●
08A05	259030.46	5531534.91	26.2	Cast iron	Bar shot - part. Spherical iron ball with circular hole where the bar would have been			0.07			
08A06	259027.13	5531536.34	26.2	Wood	Wooden handle for knife or other tool. Reburied TP3 2009	0.07	0.015	0.015		●	●
08A07	259031.74	5531542.47	25.5	Lead	Sheet lead	0.3	0.26	0.004			
09A01	259033.21	5531533.68	26.3	Copper Alloy	Copper alloy object hammered thin and cut to shape with square holes cut in 4 corners and tapered and curved end. Found in TP1-3 and reburied in Test Pit 3	0.167	0.05		0.001	●	●
09A02	259033.21	5531533.72	26.3	Ceramic	Small frag of pot found in layer TP1-3	0.042	0.035		0.016		
09A03	259051.16	5531551.58	22.5	Wood	Wooden fragment. Reburied TP3 2009	0.06	0.04		0.01		●
09A04	259051.12	5531551.94	22.5	Wood	Wood fragment with bored hole and signs of rope wear. Reburied TP3 2009	0.14	0.11		0.05		●
09A05	259051.15	5531552.28	22.5	Ceramic	Ceramic tile fragment, light brown in colour, with decorative line and signs of fixing hole at break edge. Reburied TP3 2009	0.1	0.07		0.015		●
09A06	259033.21	5531533.65	26.3	Stone	Fragment of slate. Possibly used as a writing slate. Clear scratched lines and pin pricks Found in TP1-3	0.088	0.055		0.005	●	●
09A07					NOT USED						
09A08					NOT USED						
09A09					NOT USED						
09A10	259012.25	5531537.12	28.5	Iron	Iron concretion	0.4		0.08			

Name	Easting	Northing	Depth	Material	Description	Length	Width	Diameter	Depth	Photo	Drawn
09A11	259009.57	5531528.53	29.7	Composite	Iron concretion with lead in it	0.1	0.01				
09A12	259040.45	5531518.10	25	Iron	Iron concretion	0.15	0.07		0.05		
09A13	259038.85	5531515.91	25.3	Iron	Iron concretion	0.2	0.1				
09A14	259037.93	5531515.27	25.6	Iron	Iron concretion	0.3	0.1				
09A15	259038.26	5531514.97	25.7	Iron	Iron concretion	0.1	0.05				
09A16	259036.86	5531512.97	26.1	Iron	Small iron concretion	0.05	0.05				
09A17	259033.80	5531513.81	25	Iron	Two concreted iron pipes	0.2		0.05			
09A18	259040.62	5531514.07	25.5	Iron	Bent iron loop with two eye holes in one end	0.1		0.05			
09A19	259039.67	5531510.64	25	Stone	Cut granite stone 400mm long	0.4	0.15				
09A20	259008.89	5531533.41	29.4	Lead	Lead sheet	0.05	0.05		0.003		
09A21	259008.89	5531548.43	28	Glass	Modern glass bottle						
09A22	259014.86	5531550.83	27.1	Stone	Small pumice stone	0.1	0.1				
09A23	259031.60	5531552.45	24.4	Iron	Crowbar - wedged in between two rocks	0.35			0.015		
09A24	259028.92	5531550.66	29.2	Coal	Lump of coal	0.05	0.05				
09A25	259032.23	5531546.92	24.5	Lead	Lead scupper - similar to 09A31	0.35		0.07			
09A26	259033.99	5531542.02	25.6	Stone	Slate stone / Devonian shillet type. Probably natural?	0.12	0.1		0.01		
09A27	259009.26	5531535.00	29.2	Ceramic	Light browm earthenware tile	0.2	0.15		0.02		
09A28	259029.96	5531540.36	26.3	Iron	Iron concretion 500mm x 200mm	0.5	0.2				
09A29	259030.36	5531539.85	26.2	Iron	Iron concretion	0.3	0.1				
09A30	259034.13	5531538.99	25.7	Stone	Piece of slate Devonian shillet type	0.09	0.08				
09A31	259032.31	5531546.84	24.3	Lead	Lead scupper - similar to 09A25	0.35		0.08			
09A32	259049.92	5531541.51	23.3	Other	White circular plastic disk with lead pipe through middle - modern	0.4		0.02			
09A33	259040.37	5531530.04	25.2	Glass	Modern brown glass bottle (glass shard)	0.12		0.04			
09A34	259049.85	5531519.36	23.4	Composite	Small pieces of wood and iron concretion	0.05	0.03				
09A35	259035.15	5531512.16	25.5	Iron	Re-inforcing bar? Modern	0.3		0.01			
09A36	259042.26	5531513.59	25.6	Iron	Iron concretion with eyelet	0.25	0.08				
09A37	259032.07	5531507.23	26.4	Iron	Bent iron pipe, rectangular in section						

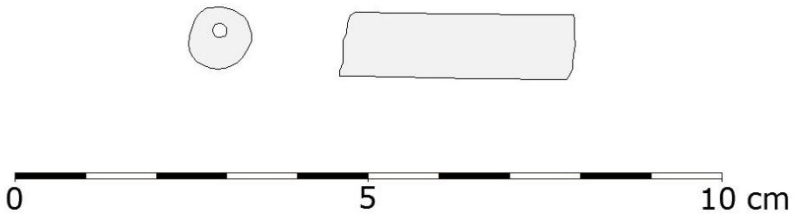
Name	Easting	Northing	Depth	Material	Description	Length	Width	Diameter	Depth	Photo	Drawn
09A38	259012.66	5531515.13	29.4	Ceramic	Large earthenware pot rim	0.25	0.29		0.015	•	
09A39	259015.61	5531531.90	28.5	Iron	Iron concretion						
09A40	259017.06	5531546.23	27.2	Iron	Iron concretion - pipe						
09A41	259010.65	5531538.38	28.6	Iron	Iron concretion - pipe						
09A42	259027.31	5531547.74	26.1	Composite	Pieces of wood and iron concretion						
09A43	259007.63	5531531.66	29.6	Ceramic	Earthenware tile – looks like a roof tile fragment	0.2	0.16				

Fig. 66 Table of recorded artefacts

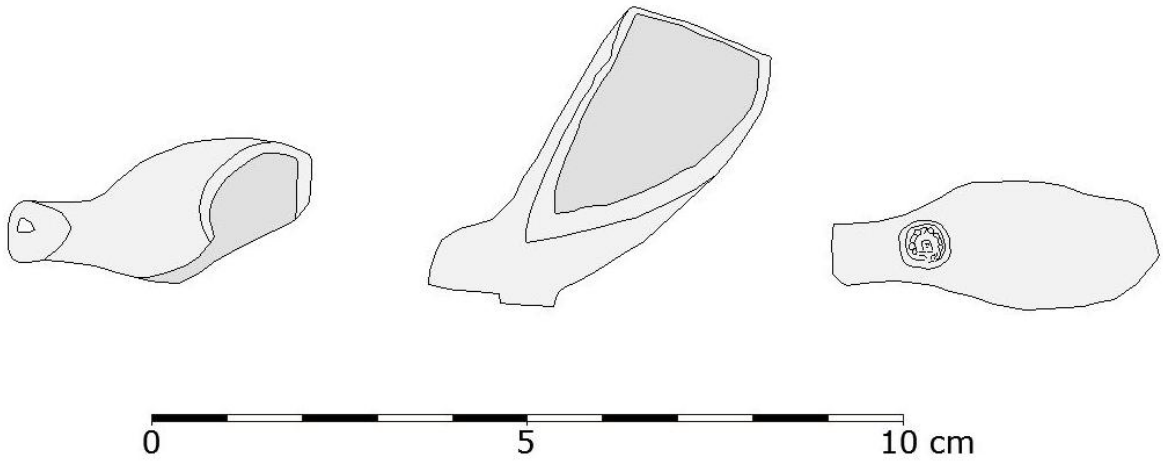
Artefact Illustrations

There follows a selection of those artefacts which were drawn and photographed. All the finds drawings were made by Janet Witheridge.

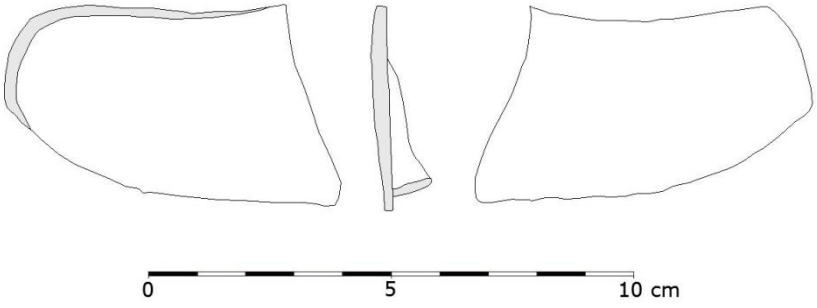
08A01 Tobacco pipe stem fragment



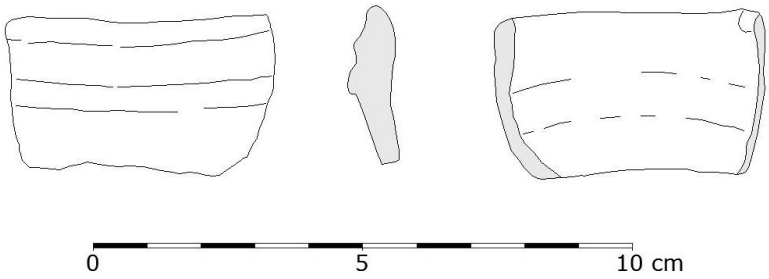
08A02 Tobacco pipe bowl fragment



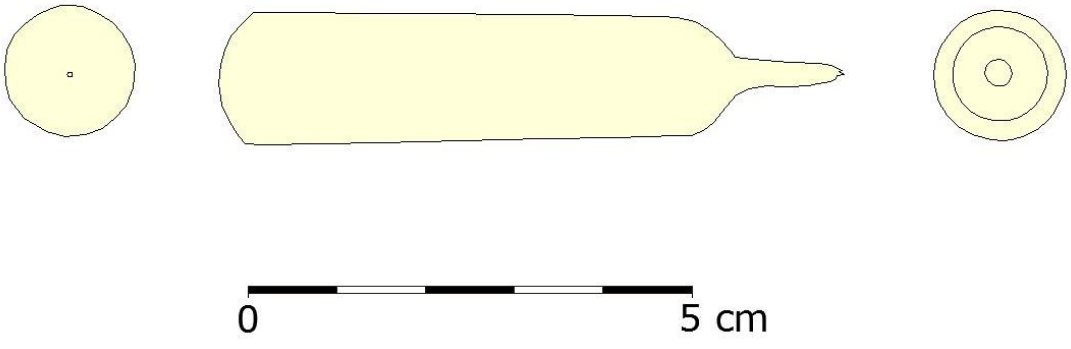
08A03 Vessel glass fragment



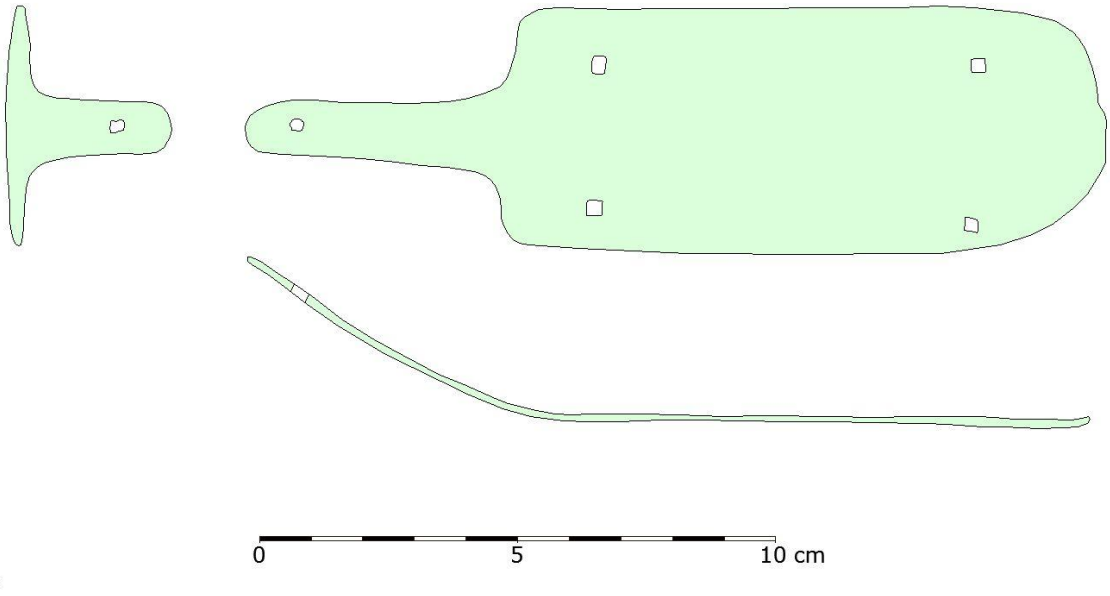
08A04 Glazed pottery fragment



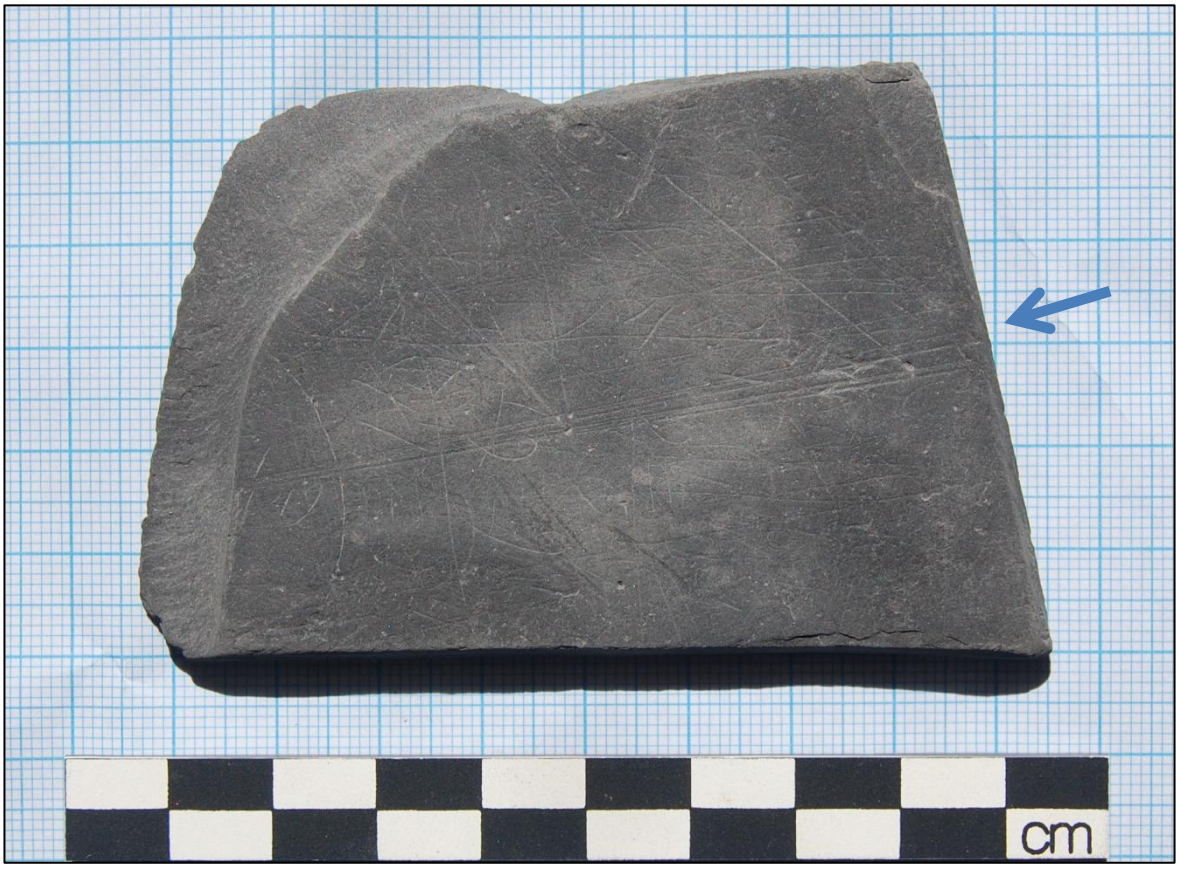
08A06 Small wooden handle

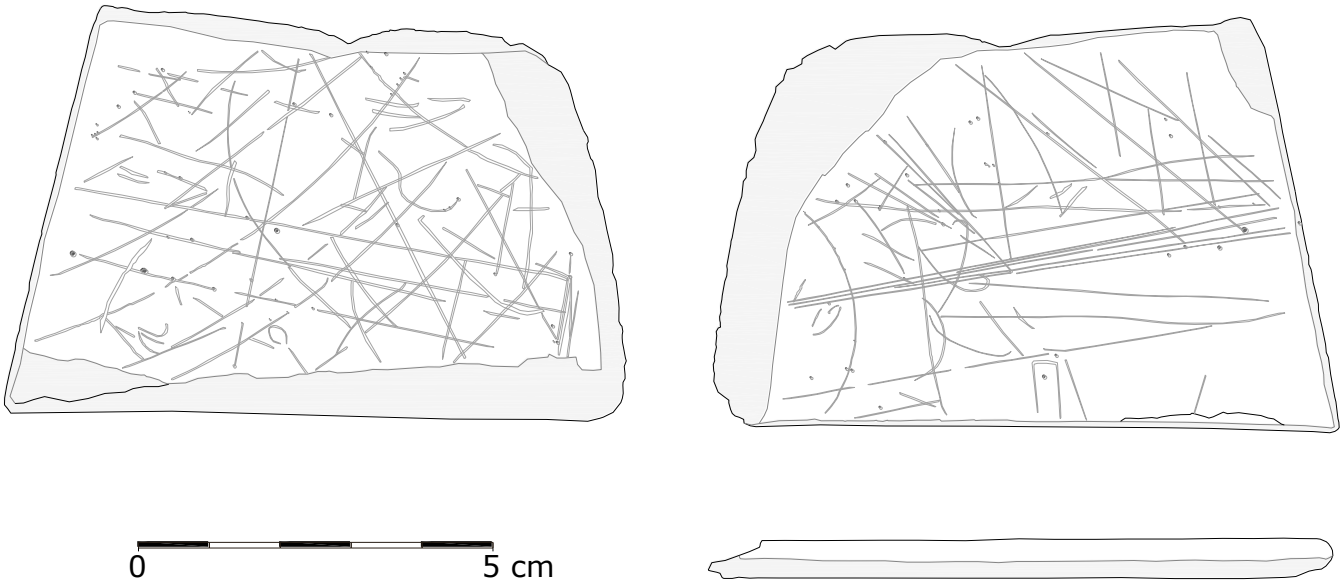


09A01 Copper alloy object



09A06 Fragment of Slate





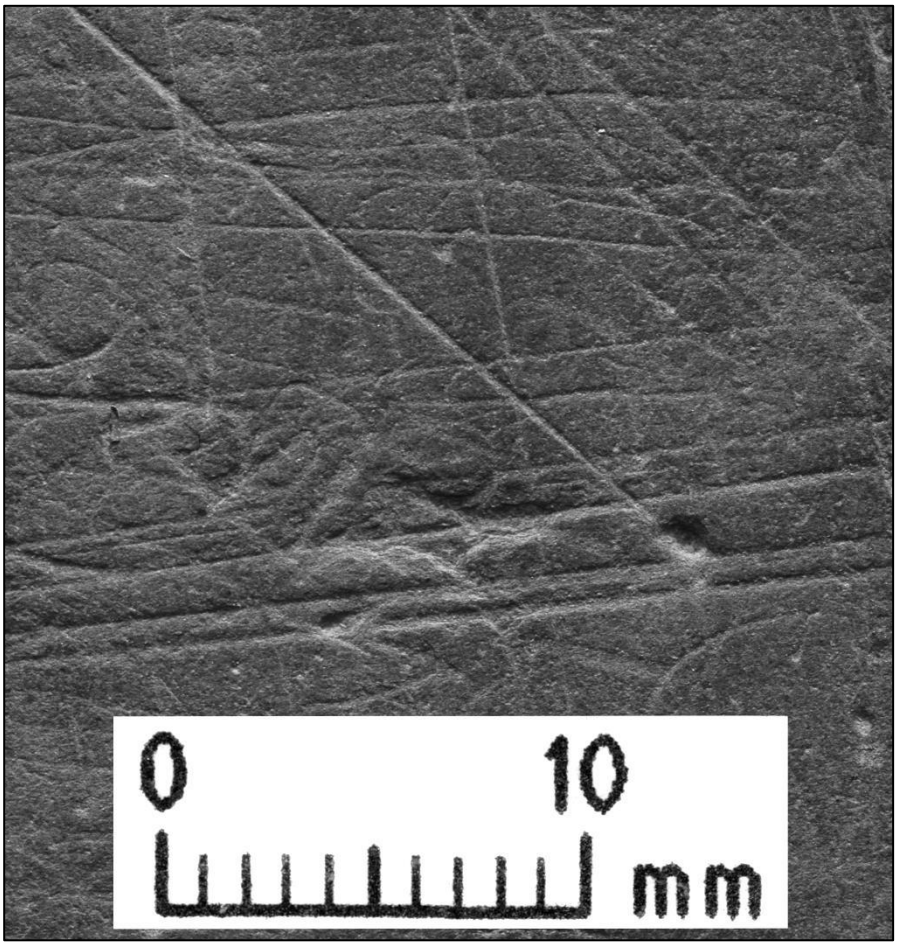
This small fragment of slate has fine lines inscribed on each side; the lines are, on average, 0.2mm thick. There are also a number of small prick marks (average 0.5mm diameter) which often correspond with the ends or junctions of the inscribed lines. Many of these lines are 'drawn' over earlier lines. The slate is broken, the only original edge being the one shown arrowed in the photographs above.

It seems likely that these marks were made deliberately. However, the function the slate served is uncertain. It has been suggested that the slate may have been used for practising navigation, but it is hard to see why the lines were inscribed rather than using chalk, which would be more easily erased. The slate fragment was found in TP-1, which is situated aft of the fire-room bulkhead.

Research into this object is continuing.

This is the only object retained from the site – all other objects were reburied on site.

MCA Droit No 031/11 *Firebrand* 7th April 2011



Detail of the slate object 09A06 showing the incised lines and prick marks

Area searches

The area around the exposed wreckage was searched to determine the extent of material relating to the wreck. This was accomplished by diver circular searches centred on existing survey control points. Distance lines marked in metres were used to determine distance from the survey control points and an underwater compass to determine bearing from the control point. The bearings obtained from an underwater compass are probably only accurate to about 5 degrees – so the positions of these objects should be considered approximate. That said, the accuracy is sufficient to give a good idea of the object distributions.

The area searched is shown shaded in light green on fig 69 below and the objects located by the green crosses (09A10 to 09A43). It is clear that relatively few objects were found to the south and east of the wreck while objects were more common to the north and west of the wreck. This is perhaps not surprising as the seabed slopes down (gets deeper) in these directions. What is clear is that only a relatively small number of objects have been dispersed from the main area of the wreck.

Fig 67 09A038 Pottery

Fig 68 09A027 Ceramic tile

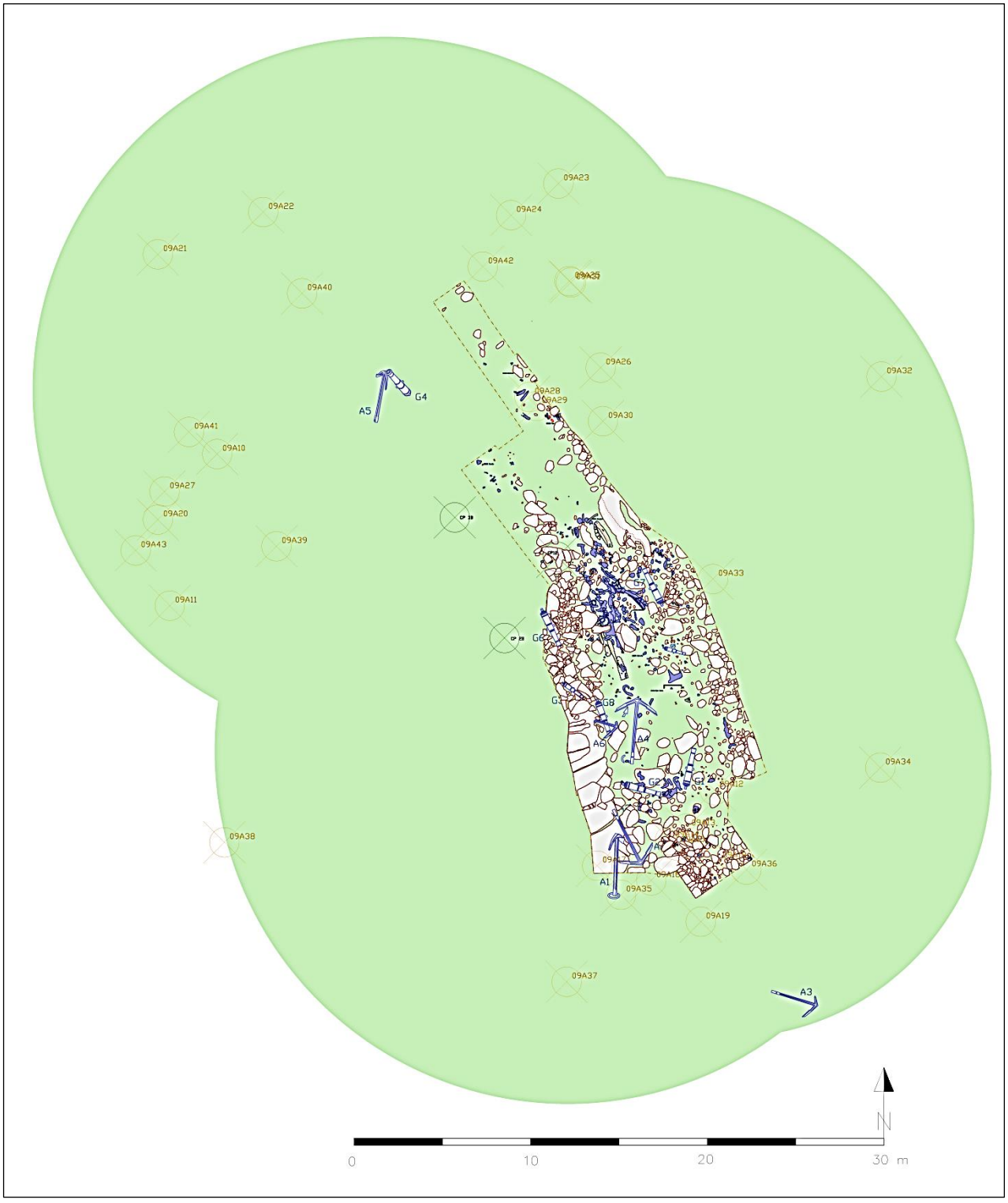


Fig 69
Distribution plan of objects located in the area searches (green crosses). The area searched is shown shaded in light green.

Stratigraphy and test pits

Three small test pits (TP1, TP2 & TP3) were excavated to determine the nature of the stratigraphy and the survival of the buried wreck elements on the site. Each test pit was approximately 0.5m in diameter and on average 0.3m in depth. In TP1 and TP2, excavation was discontinued when wreck material was encountered to ensure that no remains were damaged; TP3 was continued to a depth of 0.35m and no wreck material was encountered.

Excavation was undertaken entirely by hand using a trowel to excavate the sediments. The 'fluid' nature of the sediments prevented the use of standing sections (the angle of repose was about 45 degrees). All layers were recorded during excavation. Although the differences between the different layers was fairly subtle, no difficulty was encountered digging the test pits stratigraphically.

The location of the three test pits is shown in fig 66 below. TP1 and TP2 were situated close to exposed surviving timber, while TP3 was located to the north (outside) of the postulated hull outline. This is an area which seems likely to have been excavated prior to our survey of the site – so TP3 was used to test this hypothesis.

Fig 70
TP3 during excavation; note the trowel/scoop sat in the bucket. Scale = 0.5m

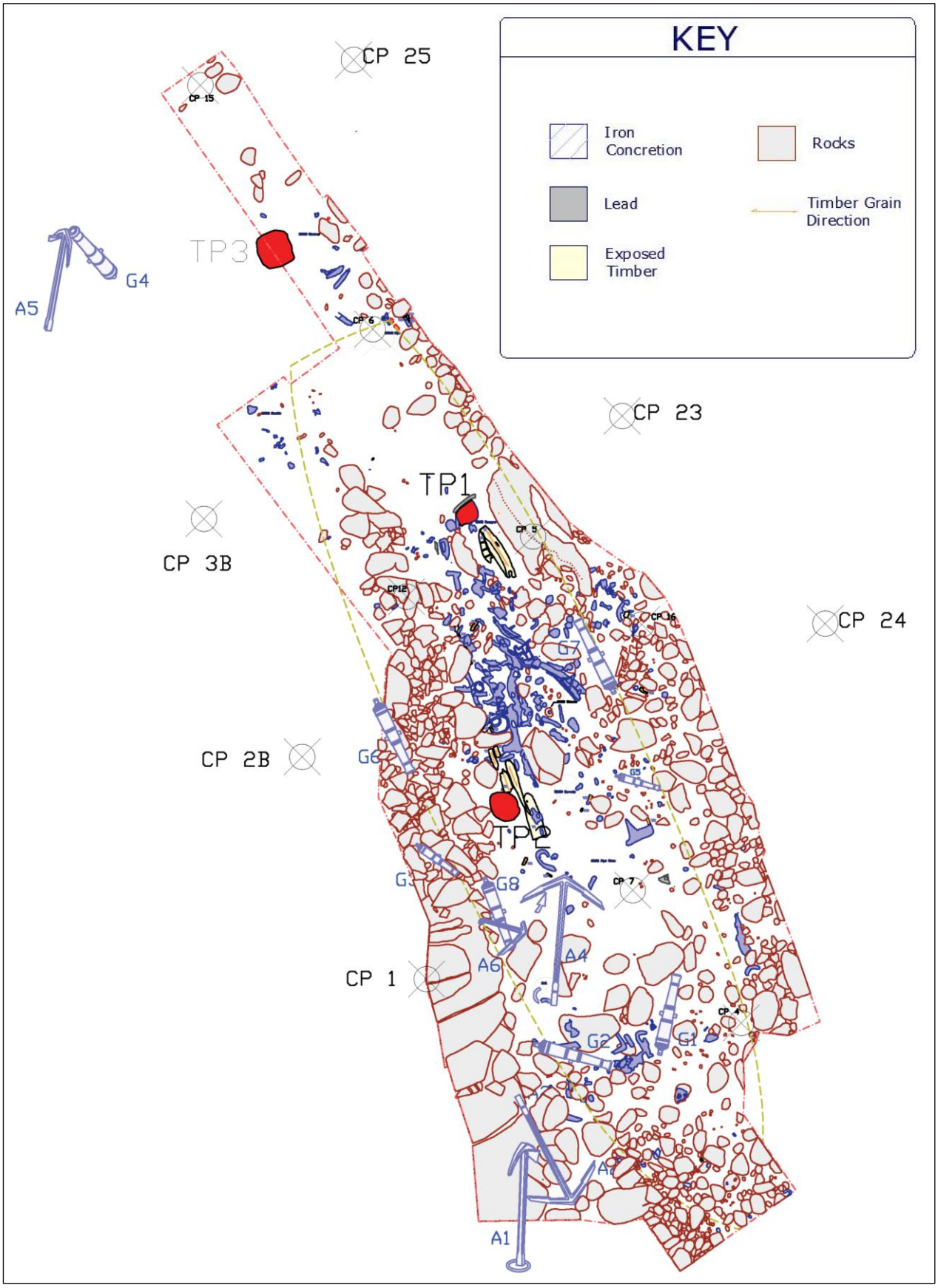


Fig 71

Plan showing the location of the three test pits TP1, TP2 and TP3 (shown in red)

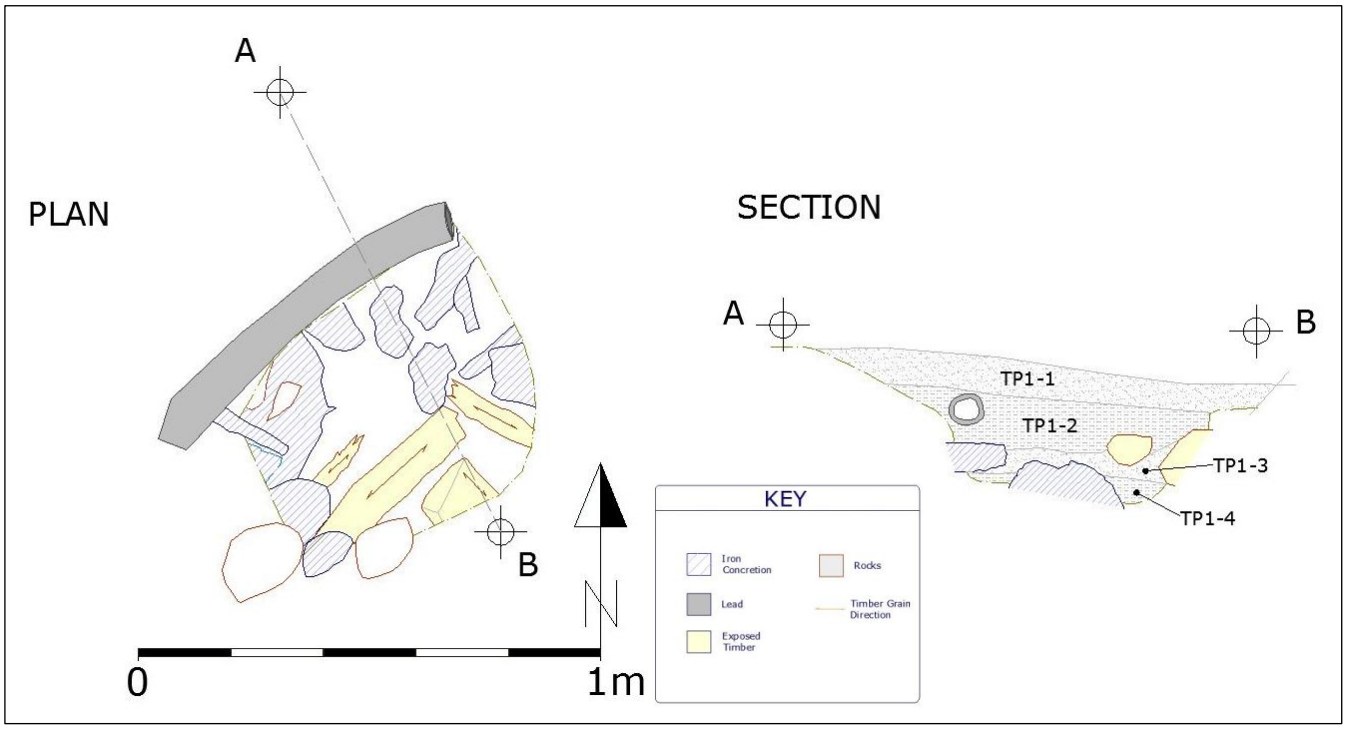


Fig. 72 Plan and section of TP1

TP1 stratigraphy		
Layer	Description	Depth (below seabed)
TP1-1	Light brown silty sand with some small flecks of broken shell. No artefacts	0-90mm
TP1-2	Light greyish brown sand with some wood and charcoal flecks. Some patches of coarser sand. Small pieces of broken/distressed timber (up to 100mm long)	90-200mm
TP1-3	Dark grey coarse sand with some small pebbles. Contains fragments of damaged (ragged) timber with some evidence of gribble. Also fragments of iron concretion, coal and a fragment of glazed earthenware pot (09A02), copper alloy object (09A01) and slate fragment (09A06)	200-250mm
TP1-4	Pebbles and small angular granite stones and some pockets of coarse dark grey sand. This layer was not bottomed.	250-?

Fig 73
Table of stratigraphy in TP1

The surface layer TP1-1 is probably subject to movement in the water column, especially during the winter. TP1-2 and TP1-3 have pieces of broken timber which show evidence of distress (they have been broken and appear as if they have been almost shredded). Some pieces also exhibit signs of wear (smoothing) and some attack by wood boring organisms; this would indicate that they are (or have been) exposed on the seabed. The 'distressed' timber was also present in TP1-3, but in addition there were fragments of broken iron concretion. They probably result from damage to iron objects on the site.

The bottom of the test pit was almost filled with iron concretion and pieces of timber, apparently in situ. Again, the timber shows evidence of having been damaged, rough and 'torn' ends indicating that some disturbance has taken place at some time in the past (but after iron had time to form concretion – so post wrecking).

Once the test pit was recorded it was backfilled with the same sediment which had been excavated from it. The surface of the test pit was consolidated using a layer of loose boulders.

Three objects were recovered from this test pit – all from layer TP1-3. They were 09A01 (a copper alloy object), 09A02 (a shard of earthenware glazed pottery) and 09A06 (a fragment of slate with incised lines and pricks on its surface). The latter may have been used to record or practise navigation – research into this object is on-going. Photographs and drawings of all three of these objects appear above in the artefacts section.

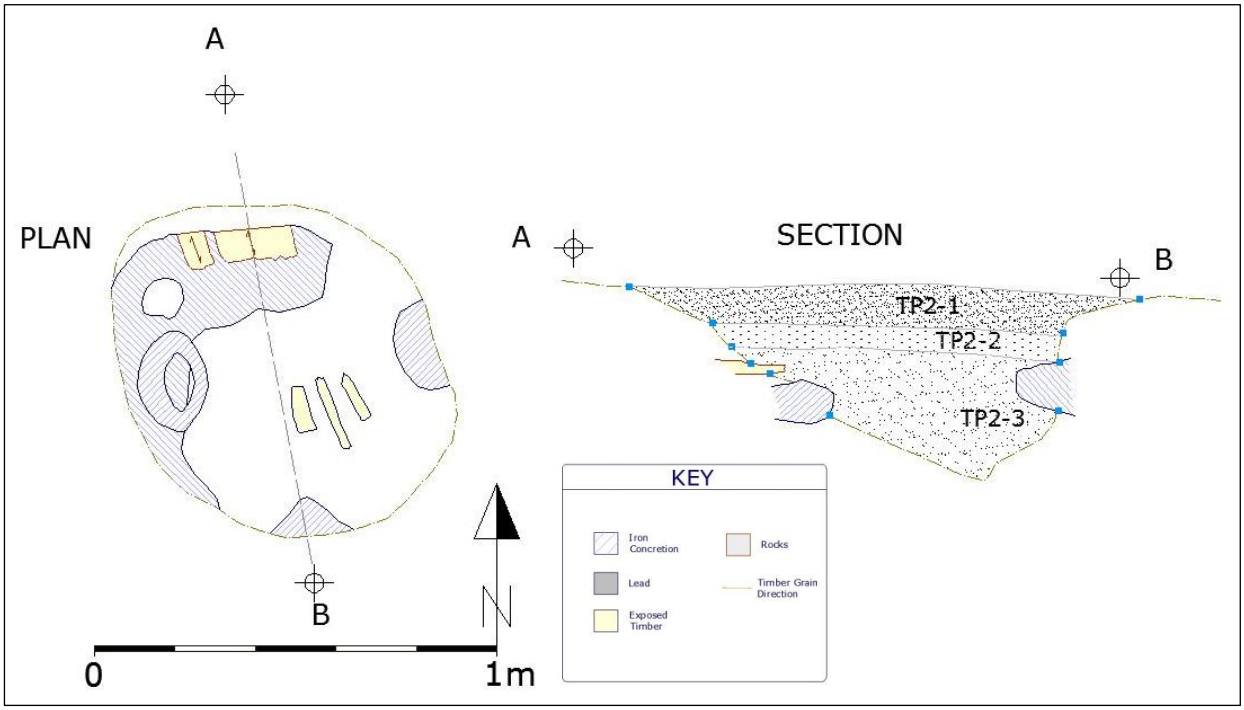


Fig. 74 Plan and section of TP2

TP2 stratigraphy		
Layer	Description	Depth (below seabed)
TP2-1	Light brown silty sand with a few small stones and shell flecks. No artefacts	0-100mm
TP2-2	Grey sand with shell flecks and very small stones. Contains small pieces of broken iron concretion. This layer sits over an area of iron concretion as well as TP2-3	100-150mm
TP2-3	Dark grey coarse sand with shell flecks and many very small stones and pebbles. Small pieces of soft timber. Some larger pieces of worn timber some of which exhibit gribble attack. This layer was not bottomed	150-?mm

Fig 75
Table of stratigraphy in TP2

The results from this test pit are very similar to those obtained in TP1. The upper three layers (TP2-1 to TP2-3) are all broadly similar and the same comments made in TP1 apply here. Once again, pieces of broken timber and iron concretion were observed in the lower

two layers. The remains of a concreted iron ring bolt and the ends of timber planking were observed at the base of the test pit. This test pit was backfilled with the sediment removed and consolidated with boulders.

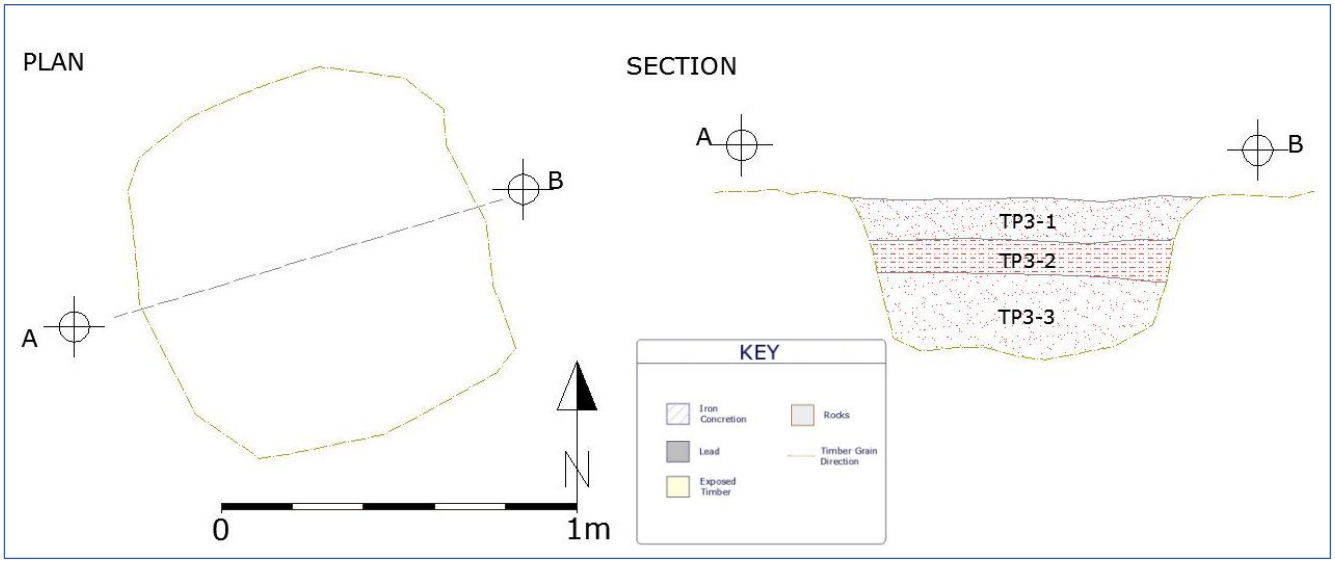


Fig 76 Plan and section of test pit 3

TP3 stratigraphy		
Layer	Description	Depth (below seabed)
TP3-1	Greyish-brown fine sand with a few small shell flecks. Occasional very small pebbles and pockets of fine light brown silt. No artefacts	0-110mm
TP3-2	Light grey coarse sand with broken shell, pebbles and very small fragments of timber and iron concretion.	110-200mm
TP3-3	Dark grey coarse gritty sand with shell fragments and small pieces of soft, decayed wood. Some tile fragments and pieces of broken slate.	200-350+mm

Fig 77
Table of stratigraphy in TP3

This test pit differed from TP1 and TP2 in that no evidence of wreck was encountered (no *in situ* timber or iron concretion). The stratigraphy encountered was, however, broadly similar, with the same fragments of broken timber and iron concretion encountered in the lower two layers.

Test pit conclusions

The stratigraphic sequence is broadly similar in each of the three small test pits excavated, suggesting that the stratigraphic sequence is similar over most of the site. There are three layers, the lower two of which often contain fragments of distressed timber and broken iron concretion. Pebbles and stones become more prevalent towards the bottom of the sequence (in and under TP1-3, TP2-3 and TP-3-3). The only layer which produced small finds (as opposed to fragments of timber and iron concretion) was TP1-3 (four objects from this layer – see 09A01, 09A02 and 09A06). The main difference between the three test pits is that TP3 lies outside the postulated outline of the ship, while TP1 and TP2 lie within the hull outline. TP1 and TP2 both came down onto solid iron concretion and larger pieces of timber while TP3 did not. This suggests that, at least within the outline of the hull, there are wreck remains at some 0.25m under the sediment of the site.

Timber beyond what has been recorded exposed on the seabed does survive buried within the sediments of the site. However, from the very small sections seen within TP1 and TP2 it would appear to survive as small pieces rather than as a coherent structure.

There is evidence that intrusive work has taken place on the site (many fragments of iron concretion and small pieces of distressed timber)

Probing

In order to understand the depth of sediment on the site a limited probe survey was undertaken in 2008. This was accomplished using 2mm thick steel wire survey arrows 0.65m long. These proved relatively easy to push into the sediment, and it also proved possible to judge whether the object encountered was hard (stone or iron) or softer (wood). Probes were undertaken along baselines fixed between existing survey control points. In each case the position, depth of 'soft' sediment and an estimate of the hardness of obstructions encountered was recorded. The mean of the recorded depths was 0.34m.

No	Depth (m)	End	Easting	Northing
1	0.40	H	259024.8	5531537
2	0.18	H	259025.7	5531538
3	0.17	H	259026.8	5531538
4	0.18	H	259027.8	5531538
5	0.15	H	259031.8	5531538
6	0.10	H	259030.5	5531539
7	0.39	H	259029.7	5531539
8	0.44	S	259029.4	5531538
9	0.30	H	259041.2	5531519
10	0.30	H	259041.2	5531519
11	0.45	H	259038.8	5531521
12	0.50	H	259023.2	5531537
13	0.50	H	259023.2	5531538
14	0.60	H	259023.2	5531539
15	0.10	H	259034.6	5531527
16	0.30	S?	259035.5	5531526
17	0.40	H	259036.1	5531525
18	0.20	H	259036.8	5531525
19	0.30	H	259037.4	5531524
20	0.45	H	259038	5531523
21	0.40	H	259026.1	5531546
22	0.20	H	259027.1	5531546
23	0.40	H	259028	5531546
24	0.25	H	259029	5531547
25	0.46	H	259028.4	5531539
26	0.30	H	259028.1	5531540
27	0.20	H	259027.7	5531541
28	0.35	H	259027.3	5531542
29	0.23	H	259026.9	5531543
30	0.30	H	259026.6	5531544
31	0.30	H	259026.1	5531545
32	0.25	H	259025.7	5531546
33	0.25	H	259038.3	5531530
34	0.40	H	259038.3	5531531
35	0.45	S?	259028.9	5531538
36	0.45	S?	259029.5	5531537
37	0.50	H	259030.1	5531537
38	0.62	H	259030.9	5531536
39	0.65	0	259031.6	5531535
40	0.65	0	259032.4	5531534
41	0.38	S?	259033.1	5531534
42	0.13	S	259033.6	5531533
43	0.27	H	259034.7	5531532

Fig 78
Table of sediment probes.
Depths are in metres below the seabed
Positions are in UTM zone 30
The "End" column is an indication of the hardness of obstructions encountered
H = Hard object
S = Soft object
0 = No resistance encountered

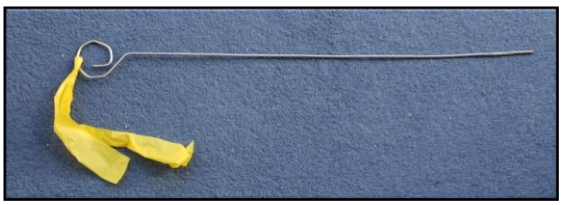


Fig 79
Example of a steel wire survey arrow, a longer version than that shown was used for the probe survey

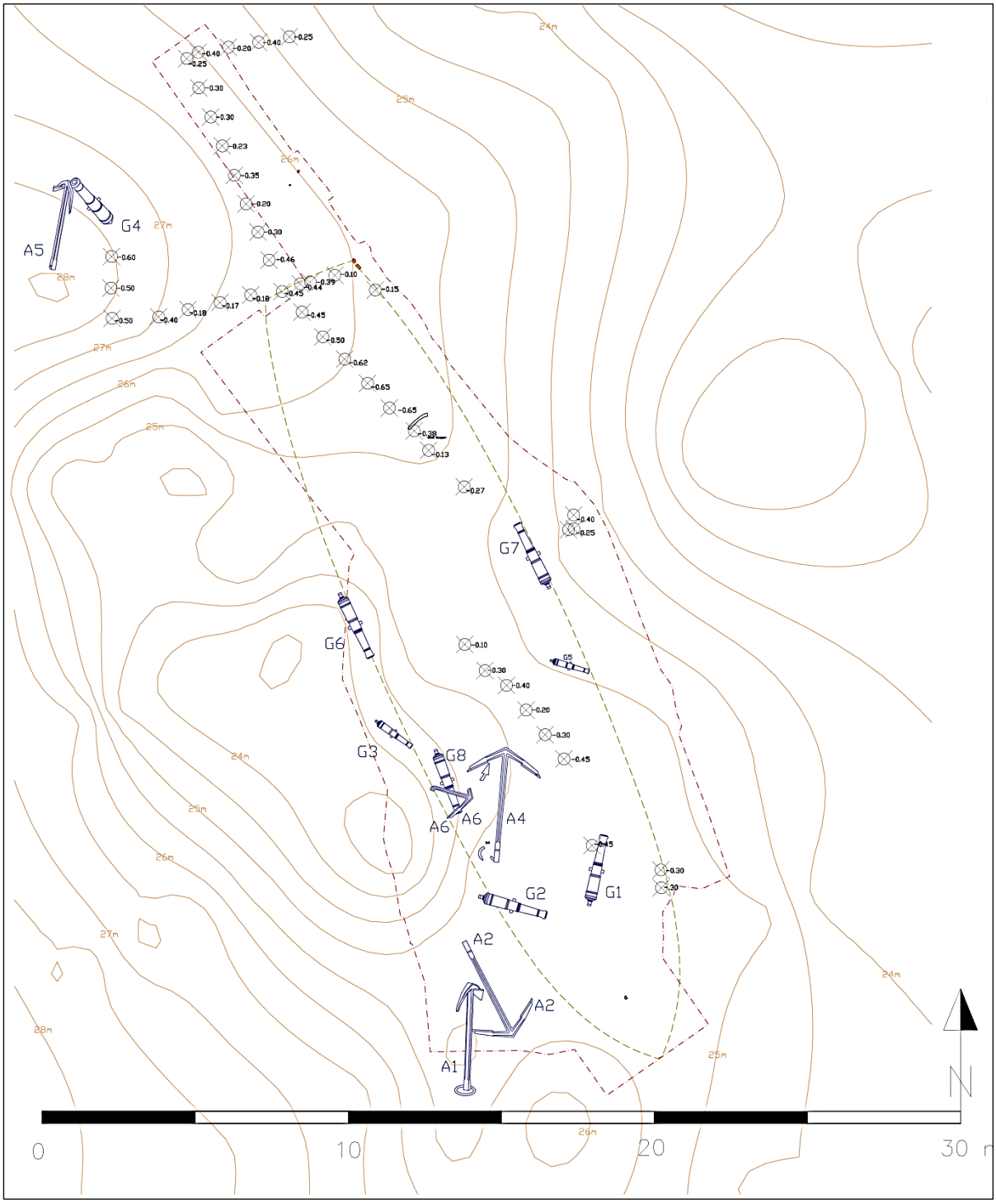


Fig 80
Plan of the location and values of the sediment probing. The edge of the survey area is shown in red and the postulated hull outline in green. The depth contours are in metres below chart datum.

Topography

The site lies in a shallow depression on a gently sloping seabed. The site is some 25m deep at its southern end and some 30m deep at the northern end. A granite reef some 2m high is situated along the western edge of the site.

A contour map of the site was produced – see fig 80 above. The data for this was obtained by taking readings on the seabed using a digital depth gauge along baselines set out across the site. This data was processed using Surfer 8 software to produce the 0.5m contour plan seen above. Two 'profiles' across the site have been constructed from this data and give a good visual impression of the topography of the site (figs 81-83).

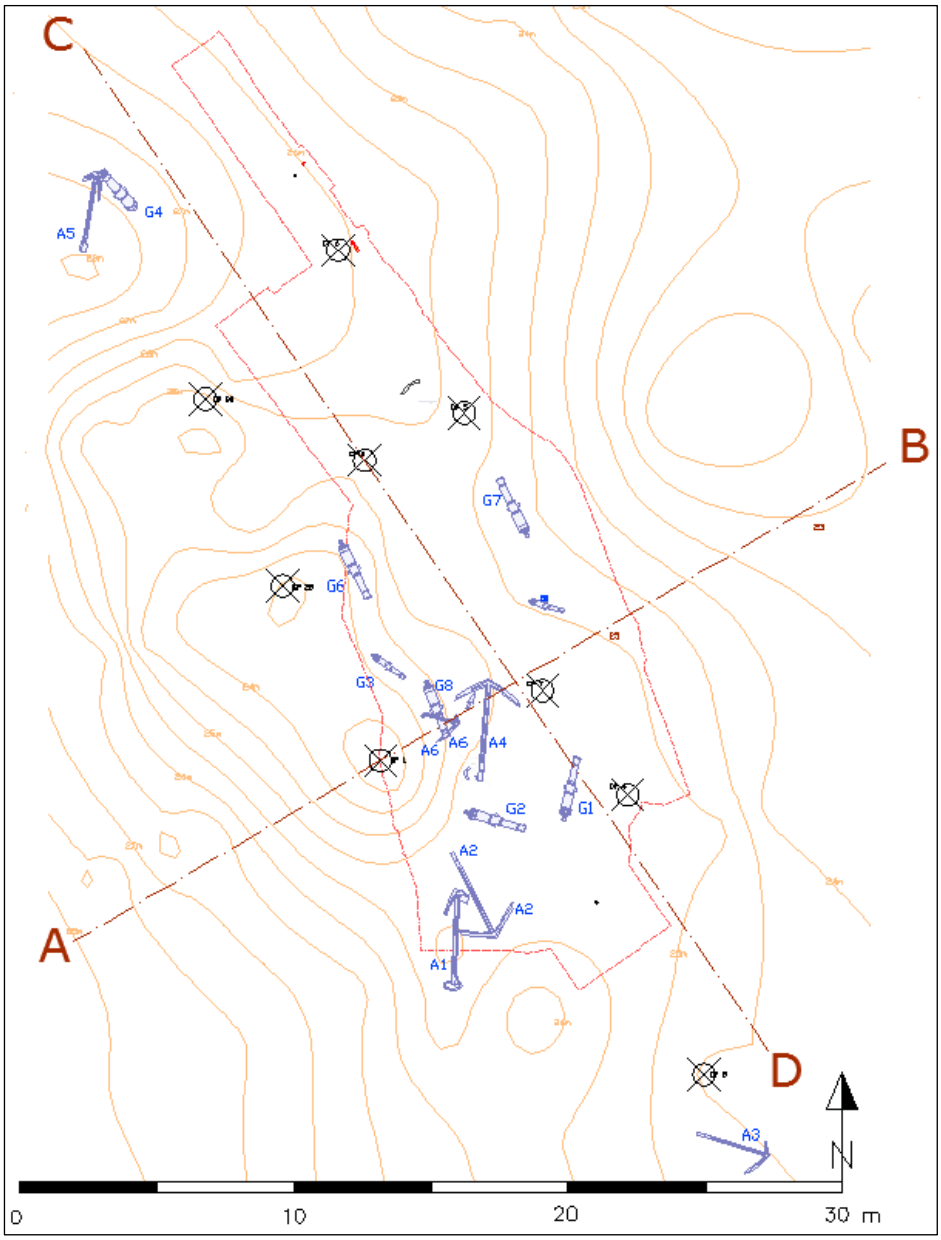


Fig 81
Location plan of the two profile lines AB and CD. The survey edge is shown outlined in red.

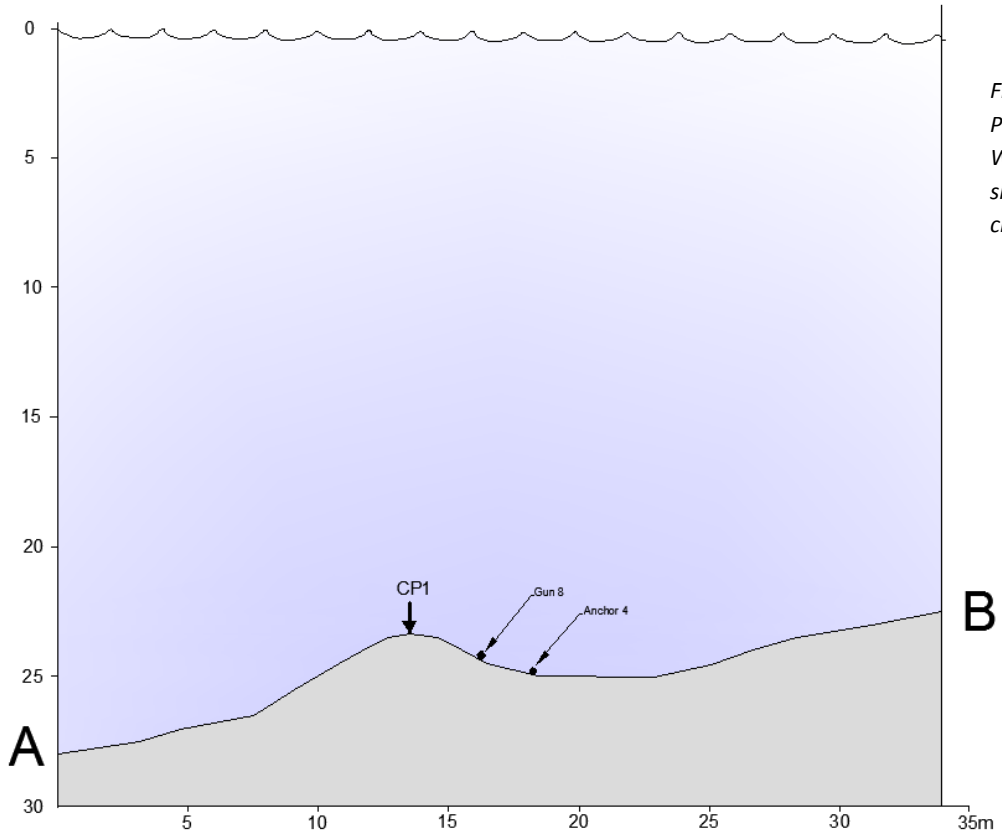


Fig 82
Profile AB across the site. Water depth (y axis) is shown in metres below chart datum.

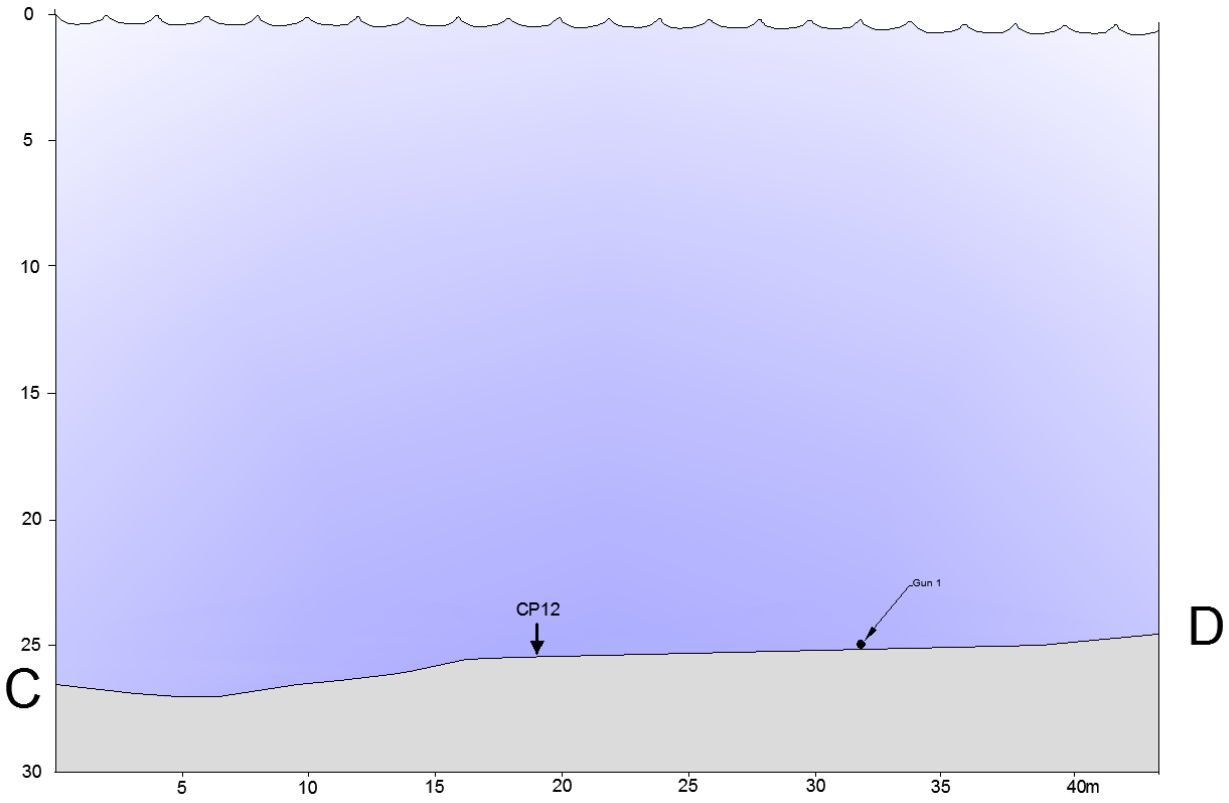


Fig. 83
Profile CD across the site. Water depth (y axis) is shown in metres below chart datum.

Conclusions

Identification of the wreck

No positive identification of the wreck as that of the *Firebrand* has been made; however, the circumstantial evidence is fairly strong. The wreck lies in the position shown for the *Firebrand* on the Gostelo map (Gostelo, c.1711). The ship's bell recovered by the Morris team is unmarked but dated 1692 (one year earlier than the *Firebrand* was ordered). The eight guns on the wreck are the correct number and size for the guns *Firebrand* was reported as carrying (Lyon, 1993). This number/size combination of guns is ubiquitous on fireships of the period. The six anchors on the site are the correct number and size for a ship such as the *Firebrand* (Jobling, 1993).

The guns and anchors

The eight guns and six anchors form the most obvious feature of this site. They are all heavily concreted with iron corrosion products. This makes taking precise measurements difficult but it was decided not to remove any of the concretion to avoid destabilising them.

The guns are of two different sizes; the larger six are between 2.05m (6' 8") and 2.12m (6'11") in length while the smaller two are 1.25m (4' 3") and 1.30m (4' 3") in length (measured between the muzzle face and the rear of the base ring). Because of the concretion it was not possible to obtain an accurate bore diameter. However, the six larger guns appear to be minions, which would fire a ball of about 4lb with a bore diameter of about 3" (0.0762m). The two smaller guns are probably either falcons or falconets which would have fired shot of 1.25lb to 2.5lb. Positive identification of these guns is not possible without an accurate bore measurement.

Seven of the guns appear to be distributed along two parallel lines, as if they are in roughly their correct position on the ship; suggesting perhaps that the *Firebrand* lay on an even keel on the seabed. The exception (G4) lies to the north of the wreck, propped against anchor 5. The Morris sketch made in 1981 (fig 40) shows this gun in an appropriate position on the wreck. Thus it seems likely that G4 and A5 were moved to their present position some time after 1981, possibly by Morris for use as a mooring while the site was worked.

The six anchors found on the site consist of four large 'bower' anchors, a slightly smaller 'stream' anchor and an even smaller 'kedge' anchor. This number and type of anchors accords well with the expected configuration on board a ship such as *Firebrand*. Three of the larger 'bower' anchors are located close together at the bows of the wreck. The small kedge anchor (A6) is broken and lies concreted to one of the minions (G8). Two of the anchors are

some distance from the wreck. The already mentioned anchor 5 found propped against G4 and the stream anchor (A3) which lies some 10m south of the bows. This anchor is not shown in this position on the 1981 Morris plan. It is possible that this anchor has also been moved for use as a mooring at some time since 1981.

Remarkably, the Morris plan shows no fewer than nine anchors on the site, seven large (bower) anchors and two smaller anchors. This number of anchors seems somewhat in excess of the norm for a ship of this size and date. Furthermore, there are now only six anchors on the site. If we assume that the Morris plan is correct then three large anchors have been removed from the site since 1981. If this is the case then Firebrand must have been carrying extra anchors for some reason – possibly as 'cargo'?

Overall, the distribution of the guns and anchors suggests that the wreck originally settled on an even keel with her bows facing south. If the wreck was on her beam ends, the guns would have been displaced into a single line.

The timber

Some timber survives on the seabed, but what survives is eroded and decayed. Apart from very small fragments of timber, two areas of eroded planking were recorded. It was not possible to identify this planking and no framing elements were found. Timber also survives buried within the sediments of the site – as evidenced by test pits TP1 and TP2, but again these timbers were fragmentary and decayed.

The ironwork

There are considerable quantities of corroded ironwork on the site. As on similar underwater sites it is often difficult to identify the function of this iron as in its corroded state it tends to present as amorphous collections of corrosion products. Some iron items are however identifiable, notably ring bolts, several of which were identified. The majority of the iron remains beyond identification even after careful recording and examination. This is an area where further work is required to improve our understanding of post-medieval wreck sites.

There is a large concentration of iron on the wreck of the *Firebrand* (see fig 61). Much of this appears to be composed of sheet iron formed into square sectioned 'trunking'. This may represent the remains of iron fire-trunks, which were effectively chimneys designed to convey the flames from the fire-room to the rigging of the ship. Contemporary sources state that the fire-trunks were made from wood, copper or brass. However, it seems likely that on Firebrand they were formed from iron. The presence of iron barrel-hoops associated with these iron structures may represent the remains of the fire-barrels which were situated at

the base of the fire-trunks. These were the only features peculiar to a fireship which have been identified in the survey. This is not surprising, as much of the specialised material consisted of organic combustibles concentrated in the fire-room of the vessel. One exception is provided by the iron chambers deployed behind the fire-room ports and used to blow them open when the fireship went into action. The ironwork on the site was scanned carefully for any trace of these chambers, but without success.

The remainder of the ironwork on the site is characterised by scatters of small, often fragmented pieces of iron corrosion. This has the appearance of resulting from the breakup of larger iron structures. If this is the case this could be the result of storm action or of possible intrusive work on the site after its discovery in 1981 by Morris.

The Sediments and topography

The small test pits excavated (TP1-TP3) demonstrated that the sediments on this site are conducive to preservation of timber. They will therefore also probably preserve other organic remains although none were seen in the three small pits excavated.

Unusually, the survey included all the rocks encountered inside the survey area, which were plentiful and often substantial in size (see site plan appendix I). Reference to this plan shows two notable areas which are largely clear of rocks, one at the stern and the other just forward of the iron concentration. One explanation of these is that they represent areas previously excavated, where the rocks have been cleared. If this is the case, then the iron concentration could also have been partly formed by iron being cleared from these areas and placed on a ‘pile’ in its current location. Enquiries have established that intrusive work did take place after the Morris work on the site, but it has proved impossible to establish any further details.

Further work?

The following is a list of the tasks which could be usefully undertaken on this site to augment the survey already undertaken.

- Recovery and detailed examination of shot to establish actual gun types on Firebrand
- Research into the possible writing slate 09A06
- Identification and examination of the ship’s ballast
- Identification and detailed examination of a fire-port chamber
- Monitoring of the site for any changes or deterioration
- Research and definition of the previous intrusive work on the site, including artefacts recovered

Bibliography

AM41362, c.1758. *Method of priming a fireship - written in the back of a signal book*. Additional Manuscripts 41362: Martin Papers Vol XVII.450 FF43.

Camidge, K., 2009. HMS Colossus, an Experimental Site Stabilization. *Conservation and Management of Archaeological Sites*, 11(2), pp.161-88.

Caruana, A., 1994. *The History of English Sea Ordnance 1523-1875*. Rotherfield, East Sussex: Jean Boudriot Publications.

Coggeshall, J., 1997. *The Fireship and its Role in the Royal Navy*. Texas: Texas A&M University (MA Thesis).

Colledge, J. & Warlow, B., 2006. *Ships of the Royal Navy*. London: Chatham.

Cooke, J., 1883. *The Shipwreck of Sir Cloudesley Shovell on the Islands in 1707*. London.

Curryer, B., 1999. *Anchors, an Illustrated History*. London: Chatham Publishing.

Falconer, W., 1780. *An Universal Dictionary of the Marine*. London: T Cadell.

Gardiner, E.(., 1996. *Fleet Battle and Blockade: The French Revolutionary War 1793-1797*. London: Chatham.

Gostelo, E., c.1711. *A Map of the Islands of Scilly: Showing all the Rocks, Ledges. and ye exact places The Association, Eagle, Romney and Firebrand was Lost*.

Jobling, H., 1993. *The History and Development of English Anchors 1550 to 1850*. Texas: Texas A&M University (MA Thesis).

Johns, C., Larn, R. & Tapper, B., 2004. *Rapid Coastal Zone Assessment for the Isles of Scilly*. Unpublished report for English Heritage. Cornwall Archaeological Unit.

Kirsch, P., 2009. *Fireship: The Terror Weapon of the Age of Sail*. Barnsley: Seaforth Publishing.

Larn, R., 1971. *Cornish Shipwrecks: The Isles of Scilly*. Newton Abbot: David and Charles.

Larn, R., 2006. *Poor England has Lost so many Men, Isles of Scilly*. St Mary's: The Council of the Isles of Scilly.

Lavery, B., 1987. *The Arming and Fitting of English Ships of War 1600-1815*. London: Conway Maritime Press.

Lavery, B., 1989. *Nelson's Navy: The Ships, Men and Organisation 1793-1815*. London: Conway Maritime Press.

Lyon, D., 1993. *The Sailing Navy List: All the Ships of the Royal Navy - Built, Purchased and Captured - 1688 - 1860*. London: Conway Maritime Press.

McCarthy, M., 2004. HM Ship Roebuck (1690-1701). *IJNA*, 33(1), pp.54-66.

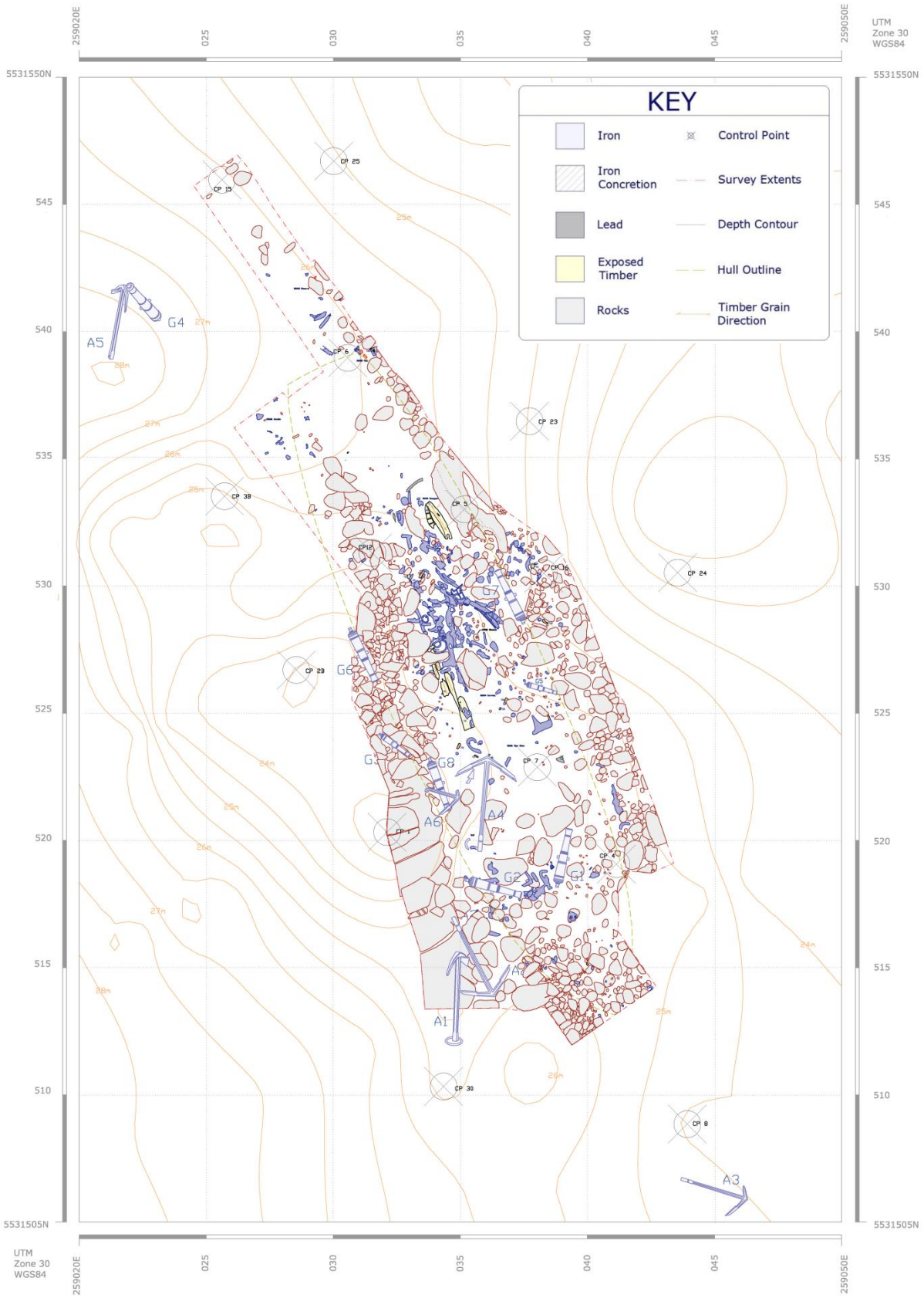
Morris, R., 1982. The Dive which found Firebrand. *Subaqua Scene*, pp.8-9.

Roger, N., 2004. *The Command of the Ocean*. London: Penguin Books.

Seller, J., 1691. *The Sea Gunner*. London: John Seller.

Unknown, 1710. Herbert Expedition. *The London Letter*, 9 July.

Appendix I – Site Plan



Appendix II – HMS *Firebrand* Service History

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
1693				
15 Dec 1693		Lists 13 fireships by name + " two new ones" in " A list of ships for the Maine fleet for next year"	ADM 8 3 Monthly disposition of ships - an account of all HM Vessels in sea pay	
	Firebrand ordered		The Sailing Navy List, Lyon D 1993,	
1694				
31 Mar 1694	*Firebrand* launched at Haydon's Yard in Limehouse	Began rigging wages (11 crew listed mostly servants 2 AB and 1 boy) Alexander Smith master Burthen 268 War Men 45 guns 8 6th rate, Peace Abroad men 45, Home and Abroad Men 45 guns 8	The Sailing Navy List, Lyon D 1993, ADM 33 170 pay book ADM 106 3120 ships Lost or converted	Launched
1st Apr 1694		Lists 17 vessels including *Firebrand* Commander Will Carter men 45 guns 8	ADM 8 3	
28th Apr 1694		Sea wages begin	ADM 33 170 pay book	
1st May 1694		List 19 fireships in the main fleet including *Firebrand*	ADM 8 3	With Admiral Edward Russell (HMS *Britannia*) in main fleet in the Med
1st July 1694	With Admiral Edward Russell (HMS *Britannia* 100 guns (780 men) in main fleet	Lists 9 fireships including *Firebrand* (photo)	ADM 8 3	
Oct 1st 1694		Start of wages	ADM 8 4 monthly disposition of ships	
Oct 1st 1694	Ships in the Mediterranean	Admiral Russell's fleet quotes 13 fireships by name including *Firebrand* (this is possibly in error)	ADM 8 3	
26th October		Bound for Portsmouth and from thence to West Indies Captain Soule	ADM 52 33i Master's Log	

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
Nov 1st 1694	In the channel at Sheerness ordered to Spithead with fireship *Terrible*	*Firebrand* listed amongst 8 fireships Commander John Soul 45 men 8 guns	ADM 8 3	
Nov 25th 1694	Listed as being in the West Indies or going thither	*Firebrand* and *Terrible*	ADM 8 3	
1695				
Jan 1st 1694/5	West Indies Squadron	Commander John Soule	ADM 8 3	West Indies Squadron
24th Jan	Sailing of Lizard		ADM 52 33	
19th Feb	Sailing off Madeira		ADM 52 33	
6th March	cleaned		ADM 8 4	
5th May 1695	No further mention		ADM 8 3	
5th May 1695 – 8th Dec	No mention in record		ADM 8 4	
25th Jul 1695	In Jamaica	Bill for biscuit etc	ADM 106 495 58 Navy Board: Records	
1st Oct 1695	Off Florida	Commander Joseph Hickman Lt Geo Paine Lt Jn Windup	ADM 33 200 pay book ADM 52 33	
7th Nov		Bound for Cape Henry and thence Lizard	ADM 52 33	
– 7th Dec 1695	No mention in record		ADM 8 4	
8th Dec 1695	Plymouth		ADM 8 4	
19th Dec	Spithead		ADM 52 33	
21st Dec	Portsmouth Harbour	At anchor	ADM 52 33	
23rd Dec	Spithead		ADM 52 33	
1696				
1st Jan 1696	Listed no details		ADM 8 4	
1st Feb 1696	Portsmouth harbour	Commander Joseph Hickman 45 men 8 guns	ADM 8 4	
6th Feb 1696	Warrant for refit for Channel Service		ADM 106 487 51 Commissioner Henry Greenhill	
9th Feb 1696	Spithead	Ordered to proceed to Bilboa with the Sterling Castle	ADM 2 23 orders	
1st Mar 1696	Portsmouth - refitting	Commander Joseph Hickman 45 men 8 guns	ADM 8 4	Refitting in Portsmouth
22nd Mar 1696	Portsmouth	5th rate, *Firebrand* fireship ready but want men	ADM 8 4	
29th Mar 1696	Spithead	Ordered to Downes	ADM 8 4	

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
5th Apr 1696	Downes Spithead?	(7 other fireships recorded) 2 1st rates, 13 2nd rates and 1 4th rate) Captain Joseph Hickman 45 men 8 guns – last cleaned 6th March 95	ADM 8 4 ADM 8 4	
12th April 1696		Ordered to lay off of Dunkirk	ADM 8 4	
19th April	Downes		ADM 8 4	
25th Apr	Downes		ADM 8 4	
1st May	Spithead	Captain Joseph Hickman At anchor	ADM 8 4 ADM 52 33	
21st May		With the Admiral	ADM 8 4	
1st June		With Lord Berkeley's fleet (*Britannia*)	ADM 8 4	With Lord Berkeley's fleet (*Britannia*) on Channel Service
1st July	Ushant	With the fleet	ADM 8 4 ADM 52 33	
23rd July	Torbay	At anchor	ADM 52 33ii	
1st Aug	Torbay	With the fleet	ADM 8 4	
24rd Aug	Torbay	Weighed and sailing off Portland	ADM 52 33ii	
Aug 26 1696	Portsmouth Harbour	Anchored until 12th September Order to go into harbour for refitting	ADM 52 33ii ADM 106 489 320 Navy Board: Records	Refitting
1st September	Portsmouth	Designed on a foreign voyage	ADM 8 4	Refitting
10th September	Portsmouth		ADM 8 4	Refitting
Sept 1696	Portsmouth	Designed on foreign voyage with Sir Cloudesley Shovell	ADM 8 5 Monthly disposition of ships	Refitting
13th Sept	Spithead	Anchored until 30th	ADM 52 33ii	
1st Oct 1696	Spithead	Commander Joseph Hickman In Channel Service Designed on foreign voyage At anchor until 18th	ADM 8 5 ADM 52 33iii	
1st Nov 1696	Spithead	Commander Joseph Hickman Designed on foreign voyage	ADM 8 5	
22nd Nov	Spithead	Ships designed on a foreign voyage with Sir Cloudesley Shovell	ADM 8 5	
29th Nov	Spithead	Ordered to the Downes	ADM 8 5	

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
Dec 20 1696	Survey	Having by survey cast my foure shrouds and the most part of our rigging and like with our bowsprit, sprtitsail yard and crossjack yard and on Monday next we are to goe in the dock ahead of *Eagle*	ADM 106 489 91 Navy Board: Records	
26th Dec	Off Lizard	Sailing	ADM 52 33iii	
1697				
1st Jan 1697	Spithead	With Sir Cloudesley Shovell	ADM 8 5	With Sir Cloudesley Shovell
11th Jan	Spithead	At anchor to 23rd Feb	ADM 52 33iii	
1st Feb 1697	Spithead		ADM 8 5	
24th Feb	Portsmouth harbour	At anchor until 27th	ADM 52 33iii	Refitting at Portsmouth
28th Feb	Spithead	At anchor to 11th April	ADM 52 33iii	Refitting at Portsmouth
1st Mar 1697	Portsmouth	Refitting	ADM 8 5	Refitting at Portsmouth
14th April	Off Lizard	Sailing	ADM 52 33iii	Channel Service
1st May 1697	Cruising in ye soundings	Commander Joseph Hickman for security of the trades expected home	ADM 8 5	Channel Service
4th May	Off Lizard	Sailing	ADM 52 33iii	Channel Service
18th May	Spithead	At anchor until 14th	ADM 52 33iii	Channel Service
1st June 1697	Cruising in ye soundings		ADM 8 5	Channel Service
28th June	Plymouth Sound	Sailing	ADM 52 33iii	Channel Service
1st Jul 1697		Commander Joseph Hickman Continue from Plymouth with ye Virginia ships	ADM 8 5	Channel Service
July 6th	Downes	Sailing	ADM 52 33iii	Channel Service
1st Aug 1697	St Helens		ADM 8 5	Channel Service
9th Aug	Torbay	Anchored until 22nd	ADM 52 33iii	Channel Service
29th Aug	Spithead	Anchored until 2nd Sept	ADM 52 33iii	Channel Service
1st Sept 1697		With 17 other ships (listed) going to sea with Mr Mitchell and at Spithead with Sir Geo Rook and later at Torbay	ADM 8 5	Channel Service with Sir Geo Rook

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
3rd Sept	Portsmouth Harbour	Anchored until 11th	ADM 52 33iii	Channel Service
12th Sept	Spithead	Sailing	ADM 52 33iii	Channel Service
28th Sept	Torbay	Anchored until 10th October	ADM 52 33iii	Channel Service
1st Oct 1697	Torbay	And later at sea with Mr Mitchell	ADM 8 5	Channel Service
14th Sept	Rame Head	Sailing	ADM 52 33iii	Channel Service
26th Oct 1697	Plymouth	Orders to go to Plymouth to be laid up	ADM 2 24 orders	Channel Service
28th Sept	Spithead	Sailing	ADM 52 33iii	Channel Service
1st Nov 1697	Plymouth	Commander Joseph Hickman Ordered to be laid up at Plymouth	ADM 8 5	
9th Nov	Start Point	Sailing	ADM 52 33iii	Channel Service
11th Nov	Hamoaze	Anchored	ADM 52 33iii	Waiting to be laid up
24th Nov	Hamoaze	Laid up	ADM 52 33iv	
1st Dec 1697	Plymouth	Commander Joseph Hickman Ships ordered to be laid up	ADM 8 6 monthly disposition of ships	
1698				
1st Jan 1698	Plymouth	Ordered to be guard at Plymouth	ADM 8 6	Guard ship
1st March 1698	Plymouth	Guard ship till paid off	ADM 8 6	
1st Jul 1698	Plymouth	Commander Joseph Hickman	ADM 8 6	
1st Aug 1698	Plymouth	Listed under ships to be paid off and laid up	ADM 8 6	
1st Nov 1698 – 1st May 1699	Plymouth		ADM 8 6	
1699				
1st Jan 1699	Plymouth	In Ordinary 6 crew listed under a bosun	ADM 42 682 Plymouth pay books ordinary	In ordinary
1st June 1699 – 1st Feb 1701		Not listed in disposition of ships	ADM 8 7 monthly disposition of ships	
Nov-1699 May	Hamoaze Plymouth Laid up?	Commander Joseph Hickman Master Geo Richardson	ADM 52 33iv	
1700				
14 March 1700		Orders to sail to the Downs to take on provisions	ADM 2 26 509 orders	

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
21st March		Captain Balchin – Commander	ADM 51 355 3i Captain's log ADM 33 215 pay book	
21st March 1700	Plymouth	Commander Balchin In dock	ADM 49 95 List of ships refitted	
1701				
1st March 1701	Plymouth	Just ordered to be fitted out. Cleaned and sheathed 1 Lt no Commander	ADM 8 7	
21st March 1700 / 1701	Plymouth	Commander Balchin In dock	ADM 49 95	
March 21	Hamoaze	Commander Balchin Ballasting and rigging	ADM 51 355 3i	
21st March		Commander John Balchin Lt Nat Dowse (11th March 01)	ADM 33 215	
22nd Mar 1701	Plymouth	Commander John Balchin	ADM 8 7	
29th March 1701	Plymouth	Complement 45 Borne 9 Mustered 7	ADM 8 7	
1st April 1701		Lt Nathaniel Dowse	ADM 8 7	
7th Apr 1701	Plymouth	Orders to proceed to Spithead (also to Kingston, Pendennis and Kinsale) once supplies received	ADM 2 26 537 orders ADM 2 27 57 orders	
April 8		8 months provisions	ADM 51 355 3i	8 months provisions
12th April 1701	Plymouth	Complement 45 Bore 18 Mustered 17	ADM 8 7	
19th April 1701		Compliment Borne and Muster 45	ADM 8 7	
1st May 1701		Orders to proceed to Corke	ADM 2 27 57	
May 6		sailed	ADM 51 355 3i	
May 10	Spithead	Under Sir Cloudesley Shovell	ADM 51 355 3i	Under Sir Cloudesley Shovell
10th May 1701	Spithead	Under Sir Cloudesley Shovell	ADM 52 355 3i	
1st June 1701	Spithead	Listed under ships ordered to be fitted out for foreign voyages	ADM 8 7	
26th June 1701		Orders to proceed to Jamaica	ADM 2 27 172 orders	
1st July 1701		Listed under ships ordered to Jamaica with Captain Whetstone	ADM 8 7	Listed under ships ordered to Jamaica with Captain Whetstone
July 15		sailed	ADM 51 355 3i	

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
18th Jul – 22nd Jul 1701	Plymouth	Commander Balchin In dock	ADM 49 95 48	
July 19	Plymouth	anchored	ADM 51 355 3i	
19th Jul 1701	Plymouth	Commander Balchin In dock	ADM 49 95 recorded as 1702	
July 22		Sailed off Lizard	ADM 51 355 3i	
July 28	Plymouth		ADM 51 355 3i	
1st August 1701	Plymouth	Listed under ships ordered to be fitted out for the West Indies	ADM 8 7	
12 August 1701	Plymouth	Orders to try gunner in Court Martial	ADM 2 27 233	
1st Sept 1701		Listed under West India Squadron under Captain Whetstone	ADM 8 7	Listed under West India Squadron under Captain Whetstone
September 14		Weighed anchor	ADM 51 355 3i	
Sept 17	Kinsail	anchored	ADM 51 355 3i	Ireland
17th Sep 1701 – 2nd Nov 1701	Kinsale	Commander John Balchin with squadron under Whetstone In dock	ADM 49 95	Ireland
November 22		Weighed anchor	ADM 51 355 3i	
29 Nov 1701 – 1st Dec 1701	Plymouth	Commander Balchin	ADM 49 95 49	
Nov 30	Plymouth	anchored	ADM 51 355 3i	
December 4	Spithead		ADM 51 355 3i	
1st Dec 1701 – 19th Dec 1702	Portsmouth	Commander Balchin In Ordinary	ADM 49 95	In ordinary
19th Dec 1701	Portmouth	Removed men and self into fireship *Vulcan*	ADM 51 355 3i	In ordinary
1702 (In ordinary)				
7th Feb 1702 – May 1702	Portsmouth	Commander Hen Turvill (11th April) Fitted out	ADM 49 95 43 Recorded as 1701	
1st March 1702	Portsmouth	Cha Adamson Commander and Jn Dobny Lt. (no longer listed in West Indies Squadron)	ADM 8 7	In ordinary
1st Apr 1702	Portsmouth		ADM 8 7	In ordinary
11th April 1702	Portland	Commander H Turvill anchored	ADM 51 355 3ii	
1st May 1702	Spithead	Henry Turvill Commander and Jn Dobney Lt	ADM 8 7	
1st June 1702	St Helens		ADM 8 7	
1st July 1702		Time of beginning of wages	ADM 8 8 monthly disposition of ships	
July 1		Weighed for Spithead Time of beginning of wages 1st Jul 1702	ADM 51 355 3ii ADM 8 8	
2nd July 1702	Spithead	Part of Newfoundland Squadron	ADM 8 7	Newfoundland

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
16th July 1702	Spithead	Weighed for Newfoundland	ADM 51 355 3ii	Newfoundland
25th July 1702	Going to Newfoundland		ADM 8 7	Newfoundland
7th Sept 1702	St Johns, Newfoundland anchored	Commander Henry Turville Lieutenant Tho Knowles	ADM 51 355 3ii	Newfoundland
22nd Oct 1702	St Johns, Newfoundland	Weighed for England	ADM 51 355 3ii	Newfoundland
29th Nov 1702	Portsmouth	Arrived and anchored	ADM 51 355 3ii	Channel Service
29th Nov 1702 – 6th March 1703	Portsmouth	Comm H Turvile	ADM 49 95	Channel Service
1st Dec 1702	Newfoundland Convoy	Listed under ships abroad	ADM 8 7	Channel Service
1703				
1st Jan 1703	Portsmouth	anchored	ADM 51 355 4i	Channel Service
1703 Jan	Channel Service Lisbon	Cleaned	ADM 51 355 4ii ADM L F 138iv Lieutenant's log ADM L F 138v ADM 8 8	Channel Service
1st Feb 1703	Portsmouth		ADM 8 7	Channel Service
6th March	Spithead	Anchored until 2th May	ADM L F 138i	Channel Service
1st April 1703	Spithead		ADM 8 7	Channel Service
1st May 1703	Spithead		ADM 8 7	Channel Service
2nd May	Spithead	Unmoored with Admiral of White	ADM L F 138i	Channel Service
13th May	Spithead	Sir Cloudesley Shovell hoisted his flag aboard the *Triumph*	ADM L F 138i	Channel Service
24th May 1703	In the Downs	At anchor with convoy	ADM 51 355 4i ADM L F 138i	Channel Service
24th May 1703 – 4th Jun 1703	Downs	Commander Hen Turvile Lt Jonathan Harris In dock Sailed Northwards	ADM 49 95 ADM 8 8	Channel Service
4th Jun	Downs	Weighed bound for Yarmouth Roads, many galley in company	ADM 49 95	Channel Service
22nd Jun	Downs	At anchor	ADM L F 138i	Channel Service

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
24th June 1703	Downs	Sailed off Ostend, Gravesend, Dunkirk, Flemish Banks and Broad Fourteens. Cruise – stop and search	ADM 51 355 4i	Channel Service
26th Jun		Sailing with Admiral Beaumont's Squadron	ADM 51 355 4i	Channel Service
1st Jul 1703		Commander Henry Turvile (and Jul 04) Lt John Harris	ADM 33 233 pay book	Channel Service
10th July	Yarmouth Roads	At anchor	ADM 51 355 4i	Channel Service
23rd July	cruising on the Broad fourteens for the Dunkirk ships	With Rear Admiral Beaumont cruising on the Broad fourteens for the Dunkirk ships	ADM 8 8	Channel Service
26th Jul 1703	Downes	Commander Hen Turvile In dock Sailed Northwards	ADM 49 95	Channel Service
27th July 1703	Downs	Anchored	ADM 51 355 4i	
30th July 1703	Cruising on the Broad fourteens	*Mary* and *Firebran*d to refit at Portsmouth. *Mary* to return to Admiral Beaumont *Firebrand* to stay at Portsmouth	ADM 8 8	Channel Service
31st July	Spithead	Anchored	ADM 51 355 4ii	Channel Service
1st Aug 1703 – 23rd Aug 1703	Portsmouth	Commander Hen Turvile In dock	ADM 49 95 94 ADM L F 138i	Channel Service
6th August 1703	At Portsmouth	Refitting Cleaned	ADM 8 8	Channel Service
13th August 1703		Listed at one of rear Admiral Beaumont's ships of which he is to choose one of 60n guns, 6 of 50 guns, one of 40 guns, one of 30 guns and to send the others to the Downs	ADM 8 8	Channel Service
22nd Aug	Spithead	Anchored until Oct 13th	ADM L F 138i	Channel Service
25th Aug 1703		Lieutenant James Rooke	ADM 33 233 ADM F L 138ii	Channel Service

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
27th August 1703	Downs	"out of which to order one 4th and 2 6th rates to Yarmouth roads to protect the herring fishers and a 5th rate of 49 guns to the North Foreland for the same purpose	ADM 8 8	Channel Service
1st September	At Spithaed	Commander Henry Turvill	ADM 8 8	Channel Service
15th October 1703	At Spithead		ADM 8 8	Channel Service
25th Oct	Portsmouth Harbour	Anchored until Nov 27	ADM L F 138i	Channel Service
1st December 1703	At Spithead	Commander Henry Turville and Lt James Rooke	ADM 8 8	Channel Service
6th Jan 1703/4	Portsmouth Harbour	moored	ADM F L 138ii	Channel Service
15th Dec 1703	Portsmouth	Into dock	ADM 51 355 4i	Channel Service
24th Dec 1703	Portsmouth	Out of dock	ADM 51 355 4i	Channel Service
1704				
1st Jan 1704		Gone to Lisbon with the King of Spain under the command of RL Hamble and Lt Geo Rooke etc	ADM 8 8	
1st Jan 1704	Spithead	anchored	ADM L F 138i	Channel Service
6th Jan	Sailing off the Needles / St Helens	Commander Hen Turvile Lt Rooke last day	ADM 49 95 ADM F L 138iii ADM 51 355 4i	Channel Service
7th Jan 1703/4	Between Portland and Start	Tho Knowles starts	ADM 33 233 ADM L F 138i	Channel Service
18th Jan 1704	Torbay		ADM 51 355 4i	
19th Jan 1704	St Helens	anchored	ADM 51 355 4i	
21st Jan 1704	Torbay		ADM 8 8	
23rd Jan	Spithead	At anchor until Feb 13th	ADM L F 138iii	Channel Service
28th Jan 1704		Designed for Sir Geo Rook's squadron with *Royal Katherine*	ADM 8 8	Mediterranean Squadron Designed for Sir Geo Rook's squadron with *Royal Katherine*

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
1st Feb 1704		One of the ships designed to convoy the King of Spain to Portugal. *Firebrand* with Commander Henry Turvile and Ltd Thos Knowles	ADM 8 8	Mediterranean Squadron One of the ships designed to convoy the King of Spain to Portugal.
13th February 1704	at sea – off Lizard		ADM 51 355 4i	Mediterranean Squadron
26th Feb 1704	Lisbon	Anchored until 28th April	ADM 51 355 4i ADM F L 138iii	Mediterranean Squadron
1st Apr 1704	Lisbon Squadron	With Geo Rooke. Commander Henry Turvile, Lt Tho Knowles	ADM 8 9 Monthly disposition of ships	Mediterranean Squadron
29th April 1704		At sea – off St Vincent	ADM 51 355 4i	Mediterranean Squadron
3rd May	Off Gibraltar	Sailing in the Straights until 23rd July	ADM F L 138iii	Mediterranean Squadron
9th May 1704	In The Straits		ADM 51 355 4i	Mediterranean Squadron
18th June 1704	Without the Straits		ADM 51 355 4i	Mediterranean Squadron
1st July 1704	Lisbon	With squadron	ADM 8 8	Mediterranean Squadron
6th July 1704	Maligo Road		ADM 51 355 4i	Mediterranean Squadron
23rd Jul 1704	Gibraltar	Anchored Troops in Town	ADM 51 355 4i	Mediterranean Squadron
26th Jul 1704	At sea cruising the Straits	Weighed with Sir Cloudesley and Rear Admiral Leak's Squadron . Sailing in day and returning to anchor at night until August 2nd	ADM 51 355 4i ADM F L 138iii	Mediterranean Squadron with Sir Cloudesley and Rear Admiral Leak's Squadron
1st Aug 1704	Off Targo point	Under the command of Sir George Rooke	ADM 8 9	Mediterranean Squadron
10th Aug		At night we lay in line of battle and so continued until morning	ADM F L 138iii	
13th August		At half past 10 *Prince George*? Hoisted flag of France and began to engage the enemy	ADM F L 138iii	Mediterranean Squadron
14th August	Malaga	Fleets were engaged til 7 at night – very hott. Admiral Leake, Vice of the Blue ?? at 3 enemy was bearing away. He did not follow because of breaking the line. At 6 am both fleets lay in a line at 3 wind shifted…	ADM F L 138iii	Mediterranean Squadron

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
15th August		Weighed anchor … so we bow down… French fleet lay near them ready to engage next am but they blew away and we lost sight of them	ADM F L 138iii	Mediterranean Squadron
16th August		… French fleet blow away in night and got from us	ADM F L 138iii	Mediterranean Squadron
17th August		…we had 52 sail of Line of Battle ships, 19 of these 3 deck ships. They had 30 and additional galleys which .. we engaged we had no flags hurt but 2 Captains killed …	ADM F L 138iii	Mediterranean Squadron we had 52 sail of Line of Battle ships, 19 of these 3 deck ships. They had 30 and additional galleys which .. we engaged we had no flags hurt but 2 Captains killed …
18th Aug		At 4 pm hauled down the sign for the line	ADM F L 138iii	
20th Aug	Gibraltar Bay	Anchored until 24th Aug	ADM F L 138 iii	Mediterranean Squadron
24th Aug		Weighed bound for home	ADM F L 138iii	Mediterranean Squadron
17th September 1704	Spithead		ADM 51 355 4i	Mediterranean Squadron
24th Sept	St Helens	At anchor	ADM F L 138iii	Mediterranean Squadron
25th Sept	St Helens	Moored until 28th	ADM L F 138i	
29th Sept	Beachy head		ADM F L 138iii	Mediterranean Squadron
1st Oct 1704	Downs and to the river		ADM 8 9	
3rd Oct	Galleons Reach	Anchored until 12th	ADM F L 138iii	
1st Oct 1704 – 2nd Oct 1704	Downes	Commander Hen Turvile In dock Sailed for the Nore with 12 other ships	ADM 49 95	
4th October 1704	Gallions Reach	anchored	ADM 51 355 4i	
3rd Oct 1704 – 13th Oct 1704	Woolwich	In dock (? Refit)	ADM 49 95	Refitting
13th Oct 1704	Deptford	Anchored until 30th Jan	ADM 51 355 4i	
13th Oct 1704 – 8th March 1704/5	Deptford	Commander H Turvile Refit until 8th March 1704/5	ADM 49 95 7 ADM 51 355 4i	

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
1st Nov 1704	Deptford	Commander Henry Turvile, Lt Tho Knowles	ADM 8 9 ADM 51 4189 4 Captain's log	In dock
21st Nov	Deptford River		ADM L F 138i	
Dec 1704	Gibraltar Channel	Commander Henry Turvile Lieutenant James Rooke	ADM L F 138v	In dock
1705 (In dock)				
Jan 1705	At Deptford and Woolwich in Dock		ADM 51 4189 4	In dock
19th February	At Deptford and Woolwich in Dock		ADM 51 4189 4ii	In dock
3rd March 1704/5	Deptford	Orders to Capt Turvile to go to Woolwich to be refitted for the Summers Service	ADM 2 33 185	In dock
9th Mar 1704/5 – 22nd Apr 1705	Woolwich Dock	Commander H Turvile Refit	ADM 49 95 14	
20th March 1705		Change from Commander Turvile to Bourne	ADM 39 789 Muster book	
1st April 1705	Woolwich Dock		ADM 8 9	
6th April 1705 – 11th Jan 1706	Woolwich on board the hulk	Commander Sampson Bourne	ADM 51 355 4ii ADM F L 138v	
9th Apr 1705	Sheerness	In dock	ADM 49 95	
22nd April	Gravesend	At Anchor	ADM 51 4189 4ii ADM F L 138v	
23rd April	Naze	Found Rear Admiral of Blue and several ships of war	ADM 51 4189 4ii ADM F L 138v	
26th April	Downs	At Anchor with several ships of war and transports	ADM F L 138v	
27th April 1705 – 29th April 1705	Downes	Commander Sampson Bourne In dock Left heading Westward with 8 other ships	ADM 49 95 91	
1st May	Off Beachy Head		ADM F L 138v	
1st May 1705	Spithead		ADM 8 9	
4th May	Off Shoarham		ADM F L 138v	
6th May	Spithead	Anchored until 23rd	ADM F L 138v ADM 51 355 4ii ADM 51 4189 4ii	
23rd May	St Helens	Weighed and sailed to St Helens	ADM F L 138v	

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
24th May	St Helens	Fleet weighed under Sir Cloudesley Shovell Being 39 ships of the line of battle, 7 fireships and 4 bombs, several light frigates and a great many transports and tenders	ADM 51 355 4ii ADM F L 138v	Med Squad
25th May	Off Rame Head		ADM F L 138v	
26th May	Lizard	Joined the Fleet commanded by Lord Peterborow (sic)	ADM 51 4189 4ii	
27th May	Ushant		ADM 51 4189 4ii	
27th May		Off Lizard	ADM 51 355 4ii	Med Squad
1st June 1705	Gone to Lisbone	Under Sir Clo Shovell	ADM 8 9	Med Squad
9th June	Off Burlings		ADM 51 355 4ii ADM F L 138v	Med Squad
10th June	Off St Julian's Castle		ADM F L 138v	Med Squad
12th June	Bay of Waves	Anchored. Watered ship	ADM 51 355 4ii ADM F L 138v	Med Squad
15th June	Bay of Waves	Rear Admiral of the Red took his flag on board the *Association*	ADM F L 138v	Med Squad
22nd June	Bay of Waves	Weighed being about 40 sail of ships of war etc.	ADM F L 138v	Med Squad
23rd June	Off Cape Roxant		ADM F L 138v	Med Squad
24th June	Off Cape St Vincent		ADM 51 355 4ii ADM F L 138v	Med Squad
29th June	Off Cadiz		ADM F L 138v	Med Squad
				Med Squad
1st July	Trafalgar		ADM 51 4189 4ii	Med Squad
1st Jul 1705	Off Trafalgar	Commander Samps Bourne Lt Rob Cramer (19th Feb)	ADM 33 257 pay book ADM 39 788 ADM 51 355 4ii ADM F L 138v	Med Squad
2nd July	Cape Sparwell	Fleet pushing to windward	ADM F L 138v	Med Squad
3rd July	Cape Trafalgar		ADM F L 138v	Med Squad
5th July	Cape Trafalgar	Nottingham and Garland joined from Gibraltar	ADM F L 138v	Med Squad
10th July	Off Cape Sparwell	Signal for line of battle	ADM F L 138v	Med Squad
12th July	Cape Trafalgar		ADM F L 138v	Med Squad
20th July	Cape Trafalgar	At noon saw fleet, commanded by Lord "Peterborrow " who proceeds for Gibraltar with the King of Spain on board the *Ranleagh*	ADM F L 138v	Med Squad
20th July		King of Spain on board flagship	ADM 51 4189 4ii	Med Squad
23rd July	Through the Straights mouth	Sailing	ADM F L 138v	Med Squad

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
25th July	Cape Wropa	This day at noon joined with a fleet that came out of Gibraltar consisting of 40 odd sail, about 16 men of war, On board the *Ranleagh* was the King of Spain and the Lord "Peterborrow"	ADM F L 138v	Med Squad
31st July	Alba Bay	Anchored until 5th August	ADM F L 138v	Med Squad
5th August	Alba Bay	Fleet weighed and turned out of the Bay bound for Barcelona	ADM F L 138v	Med Squad
8th August	Off Barcelona		ADM 51 355 4ii	Med Squad
11th August	Barcelona	Anchored until 12th October	ADM F L 138v	Med Squad
				Med Squad
13th August	Barcelona	anchored	ADM 51 4189 4ii	Med Squad
12th Sept 1705		Lieutenant Chas Vanbrugh	ADM 33 257 ADM F L 138iv	Med Squad
1st Oct 1705	Mediterranean Squadron		ADM 8 9	Med Squad
4th October		Our army took possession of the City	ADM 51 4189 4ii	Med Squad
12th October	Barcelona	Signal to weigh	ADM F L 138iv	Med Squad
13 October	Off Mole Head	Under sail with fleet. At 8 Sir Cloudesley with 6 sail of English and 6 Dutch with several frigates and fireships "of which we was one" made sail to sea leaving 4 sail to take care of the transports and tenders.	ADM F L 138iv	Med Squad
14th October	Island of Lucia		ADM F L 138v	Med Squad
17th October	Cape Pallos		ADM F L 138v	Med Squad
18th October	Cartagena		ADM F L 138v	Med Squad
22nd October	Toulon		ADM F L 138v	Med Squad
26th October	Malaga		ADM F L 138v	Med Squad
29th October	Gibraltar		ADM F L 138v	Med Squad
1st November	Friggscale Bay (Gibraltar)	At Anchor. …Flag of Truce to our waiting ships but the Spanish fired on us … lost sight of fleet on Monday last	ADM 51 355 4ii ADM F L 138v	Med Squad
2nd Nov	Gibraltar	Spaniards fired 3 shots at our ships without doing any damage	ADM F L 138iv	Med Squad

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
5th November	Friggscale Bay (Gibraltar)	The Spanish fired shot at us from Fuggroal Castle without doing any damage	ADM 51 355 4ii ADM F L 138v	Med Squad
7th November	Friggscale Bay (Gibraltar)	Wearing our ship	ADM F L 138v	Med Squad
9th November	Friggscale Bay (Gibraltar)	Signal to weigh	ADM F L 138v	Med Squad
10th Nov	Sailed to England		ADM 51 355 4ii	Med Squad
16thNovember	Off Cape Finisterre	Sailing	ADM F L 138v	Med Squad
29th Nov	Downes	anchored	ADM 51 355 4ii	
27th November	St Helens	At anchor	ADM F L 138v	
29th November	The Downs	At anchor	ADM F L 138v	
29th Nov – 1st Dec 1705	Downes	Commander Sampson Bourne In dock Sailed for the Nore	ADM 49 95 93	
1st December	Margate Bay	At anchor	ADM F L 138v	
1st Dec 1705	Ordered to Deptford to refit		ADM 8 9	
3rd December	Galleons Reach	At anchor	ADM F L 138v	
3rd Dec 1705 – 10th Dec 1705	Woolwich	In dock (refit)	ADM 49 95	Refit
6th December	Galleons Reach	A hoy came aboard to look at our fireworks guns and shott … and took away our powder	ADM F L 138v	Refit
10th Dec	Deptford	dock	ADM 51 355 4ii	Refit
10th Dec 1705 – 14th March 1705/6	Deptford	Commander Sampson Bourne	ADM 49 95 8	Refit
1706				
11th January	Deptford	In the Wall Dock Final day of Commander Bourne	ADM F L 138v ADM 39 789	Refit
14th March	Deptford	Out of dock		Refit
1st Apr 1706	Nore	Commander F Percy Lt Cha Vanburgh	ADM 8 9	
1st May 1706	Ordered to Spithead		ADM 8 9	
1st Jun 1706	Downs	Under the command of Sir S Fairbone. Commander F Percy and Lt Tho Harvey	ADM 8 9	
1st Jul 1706	Downs and Ostend	In the command of Sir Stafford Fairbone	ADM 8 9	
1st Aug 1706	In the Main fleet	Under the command of Sir Cloudesley Shovell	ADM 8 9	Med squadron
19th August 1706	Torbay	Captain Percy	ADM 51 4189 5	Med squadron
1st Dec 1706	In the Main fleet	Under the command of Sir Cloudesley Shovell	ADM 8 9	Med squadron

HMS Firebrand - Timeline				
	Position	**Officers and notes**	**Ref**	**Location**
1707				
Aug 1707 Mar	Torbay Lisbon Alicante Gibraltar Lisbon	Commander Francis Percy 1/06 - Lieutenant Tho Harvey 24/4/06 – 8/06 Fra Wallis 19/8/06 – 3/07 Wm Probyn 01/4/07 -	ADM 51 4189 5 ADM 39 789 ADM 33 257	Med squadron
1st Jan 1707 – Oct 1707		Listed under Mediterranean Squadron under the command of Sir Clo Shovell, Commander Francis Percy Lt Tho Harvey	ADM 8 10 monthly disposition of ships	Med squadron
19th March 1707	Lisbon		ADM 51 4189 5	Med squadron
Apr-Oct	?			Med squadron
22 Oct	Sank in Smith Sound in the Isles of Scilly	Commander Francis Percy Lieutenant William Probyn Physician Charles Bradford Midshipmen Edward Wilford Ben Marshall	ADM 39 789 ADM 33 257	Med squadron
1st Nov 1707		Not listed	ADM 8 10	

NB All the primary sources listed above are located in the National Archives (PRO) apart from the Lieutenants logs prefix "ADM L F" which can be found at the National Maritime Museum (NMM).

In addition to the sources listed above the following were also consulted	
Source	Location
ADD 29587 ff 164 13 Aug 1702 Proposals of Peregrine Osborne – fitting out of fireships	British Library
ADD 37041 Includes explanation of fireroom and combustibles and bombardment of Copenhagen	British Library
AAD 49102 Napier papers Vol XVII Recipes / instructions for the manufacture of Ordinance and fitting out a fireship	British Library
Additional manuscripts 41362 British Museum Martin Papers Vol XVII Method of priming a fireship written in the back of a signal book	British Library
Kings 249 French tracts on artillery too early	British Library
ADM 1 5266 Courts Martial	National Archive (PRO)
ADM 104 484 /224 15th August 96 Letter saying *Firebrand* fit for foreign voyage	National Archive (PRO)
ADM 106 478 /51 Warrant for refitting for Channel Service	National Archive (PRO)
ADM 106 3070 Contracts	National Archive (PRO)
ADM 106 3071 Contracts *Phoeni*x Fireship	National Archive (PRO)
ADM 106 3583 Abstract of contracts from 4th October 1693 No order for *Firebrand*	National Archive (PRO)
ADM 49 29 Abstract of contracts ends May 91 No order for *Firebrand*	National Archive (PRO)
ADM 49 30 Abstract of contracts ends May 93 No order for *Firebrand*	National Archive (PRO)
SP 42 2 Assorted letters - nothing	National Archive (PRO)
ADM 2 22, 32, 18, 34, 35, 21, 20 nothing ADM 2 31, 17, 30, not indexed	National Archive (PRO)
ADM 42 111 vessels in Sea Pay duplicate of ADM 8	National Archive (PRO)

Appendix III – Diving Safety Policy (Brendon Rowe)

Diving supervisor will be Brendon Rowe. The diving supervisor, Kevin Camidge, David McBride or Peter Holt may assume the role of "surface support" as required. At least one of these people will remain on the surface in this role at all times.
The diving supervisor's responsibilities are as follows:

- To check weather and tides daily
- Complete daily risk assessment
- Decide and inform divers of assembly and "ropes off" times
- Decide diving pairs and order
- Task the divers
- Consult and liaise with the boat's master
- Ensure surface support is maintained
- Ensure oxygen, first aid and evacuation procedures are in place.

The "surface support" responsibilities are as follows:

- Check divers' equipment for suitability and operation
- Complete the divers' checklist
- Complete and maintain the diving control sheet
- Monitor the conditions and divers and take emergency action if necessary
- Liaise with the boat's master.

All diving will follow BSAC safe diving practices and BSAC 88 /ambient pressure diving closed circuit rebreather decompression tables as appropriate with the following additions/clarifications:

- All divers must hold a CMAS 2 star qualification or equivalent and a current certificate of fitness to dive
- All divers will carry an alternative air source independent of their main air supply
- All divers will carry an alternative means of buoyancy inflation independent of the main air supply
- All divers will carry a surface marker buoy. This should be deployed immediately if the diver is in trouble or feels it is not possible to return to the fixed upline.
- Dive times and instructions from the dive supervisor are to be adhered to unless an emergency situation arises.

Communication to/from divers will be by means of rope signals, all divers to understand these rope signals.

Rope signals:

Signal	Surface	Diver
One Pull	Attention/Are you OK?	I am listening/OK
Two Pulls	Stay put	I am stationary
Three Pulls	Go on down/move away	I am going down/away
Four Pulls	Come up/ move towards	I am coming up/towards
Continuous Pulls	Emergency-come up immediately	Emergency-I am coming up immediately