



Investigation of an uncharted wreck located in Scapa Flow, Orkney.

Final Report

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CONTENTS

	PAGE
EXECUTIVE SUMMARY	ii
1. INTRODUCTION & AIMS	1
2. METHODS	2
3. RESULTS	3
3.1 Side scan survey	3
3.2 Dive investigation	4
3.2.1 <i>Overall site arrangement</i>	4
3.2.2 <i>Stern area</i>	5
3.2.3 <i>Engine & boiler</i>	5
3.2.4 <i>Funnel</i>	6
3.2.5 <i>Wheelhouse</i>	6
3.2.6 <i>Cable</i>	6
3.2.7 <i>Foredeck & bow</i>	6
4. DISCUSSION	16
REFERENCES	24
Appendix 1: Dive log	25

EXECUTIVE SUMMARY

In May 2016, a possible wreck site was discovered by accident during survey work being carried out near the island of Fara in Scapa Flow, Orkney. Subsequent investigation by side scan sonar revealed a discrete wreck site in approximately 27m water depth. A survey of the site by divers was made in August 2016. The results of the survey were as follows:

- The wreck was that of a wooden vessel of approximately 30m in length. While the timbers had largely disappeared the remaining parts and layout suggested she was a steam powered herring drifter.
- The engine was present, although largely obscured by wreckage and could not be identified. A number of other features were recorded, including the ships wheel, eroded but in place, pressure gauges, sighting gauges, lamp housings, capstan winch, anchor and other miscellaneous wreckage.
- A large amount of what may have been telecommunications cable was found forward of the wheelhouse.
- The wreck did not appear to have been dived previously.
- No direct evidence of the vessel's identity was found although based on the remains of the vessel's registration number located on the funnel, it is possible that this wreck is that of HMD Chance (WK 270), lost in Scapa Flow in 26th January 1916. This identification should be treated with some caution and further survey work might help to confirm this.
- The remains of the cable and the circular object would also be interesting to examine in more detail. The site would form a valuable addition to the diving resource in Scapa Flow, although heavy use might be precluded by its location in a shipping channel and close proximity to the SS Prudentia, where diving is prohibited.

1. INTRODUCTION & AIMS

On the 23rd May 2016 during a multibeam echosounder survey¹ of the seabed to the east of the island of Fara (Scapa Flow, Orkney), an uncharted object was detected on the seabed. The object, which was lying in a depth of approximately 27m, was located a short distance from the wreck of the SS Prudentia, which sank during World War 1.

Subsequently, on the 18th June 2016, the object was investigated by SULA Diving using side scan sonar. The sonar images illustrated a discrete site of approximately 30m long that stood almost 4m off the seabed. The position of the site was reported to the local dive vessel MV Huskylan and an exploratory dive was carried out by a recreational diver on the 1st August 2016. That initial dive confirmed that the wreckage was that of a wooden vessel, previously unknown to the local diving community.

Information of the discovery was passed by SULA Diving to Historic Environment Scotland, which subsequently commissioned SULA Diving to undertake an emergency survey of the site with the following objectives:

- Carry out a visual appraisal to determine the condition and extent of the site;
- Itemise any parts/objects on the site; and
- Attempt to identify the vessel from survey data and an examination of historical records.

The following pages detail the results of the dive survey and discuss the possible origins of the wreck.

¹ MBES survey being conducted by Triscom Marine and SULA Diving, on behalf of the Orkney Islands Council.

2. METHODS

The side scan sonar survey was carried using a CMax CM2 side scan sonar system, which included a digital towfish with depth sensor. Sonar data were collected using a medium frequency setting of 325 kHz and recorded using MaxView software. An Evermore SA380 Marine GPS (accuracy +/- 3m), attached to the winch was used to collect spatial data. The towing wire was routed through a counter pulley at the stern of the vessel, to record the layback (the distance of the towfish behind the vessel). The distance between the GPS and the counter pulley was then used during post processing to determine the location of the towfish (and thus any sonar contacts) relative to the boat. Post processing of sonar data was achieved using SonarWiz 5. All locations were given in degrees and deci-minute format, (datum WGS84).

The dive survey was carried out under the Scientific & Archaeological Approved Code of Practice (ACoP). Using SCUBA, the wreck was dived twice by a team of two divers, supervised from the surface. Video footage of the site was collected and information was recorded on the condition of the site and details of the remaining wreckage. The dive support vessel (DSV) was the MV Huskylan. Details of the diving procedures and risk assessment are contained in SULA Diving document 16-329.

Additional video and photographic material was provided to the project from Marjo Pauliina Tynkkynen, a photojournalist from Finland who was the recreational diver to first dive on the site. Marjo also dived on the wreck on the 11th August dive to record additional images of the site, which she kindly donated to the project. Marjo's dive was done out with and separate to the SULA Diving operation.

3. RESULTS

3.1 Side scan survey

A side scan survey was carried out on the 18th June 2016, prior to the dive survey. The location of the site and the side scan survey coverage is shown in Figure 1. The sonar image is shown in Figure 2 and illustrated what appeared to be wreckage on the seabed of approximately 30m in length by 10m wide and standing approximately 4m off the seabed. No distinctive features could be distinguished in the sonar image.

The wreckage was located at the following position:

58° 50.819' N, 003° 08.090' W

The site lay approximately 100m to the west of the wreck of the SS Prudentia, where recreational diving is prohibited due to the remaining presence of heavy fuel oil. The side scan survey also revealed the presence of a circular object 2m in diameter located 60m to the north-east of the site at position 58° 50.855' N, 003° 08.087' W (Figure 2).

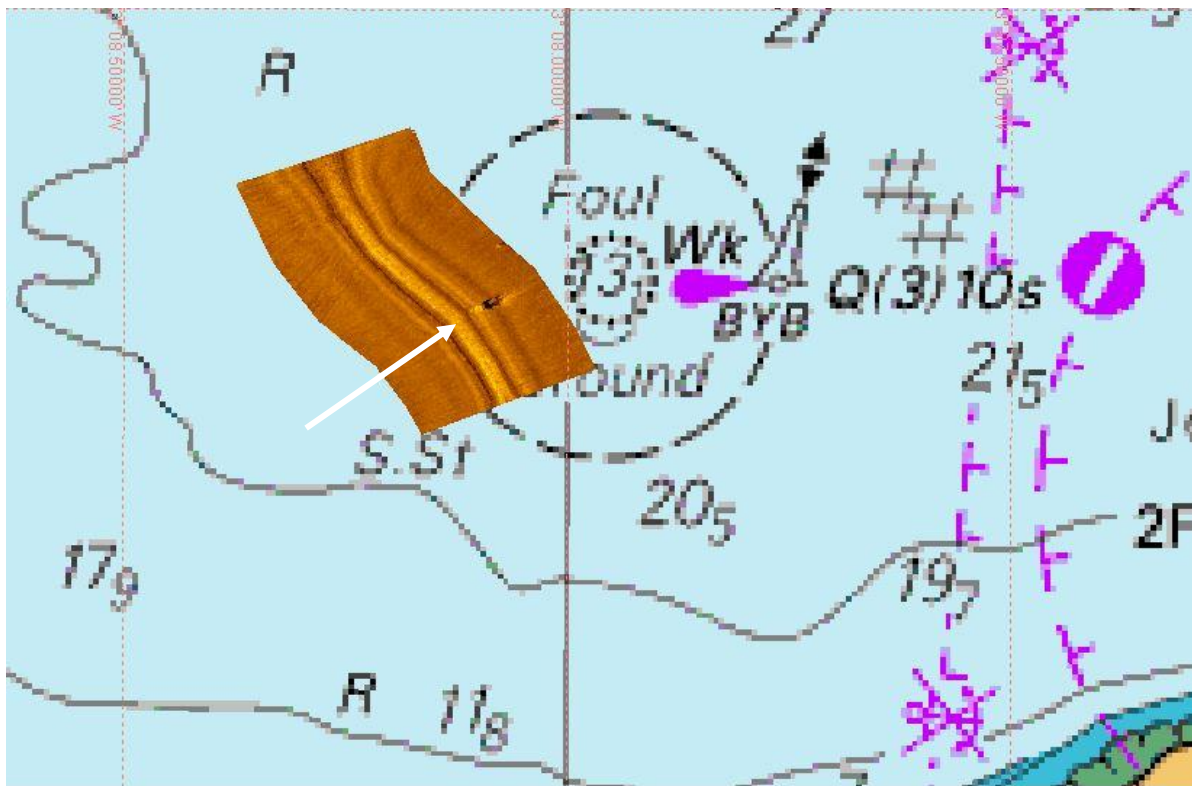


Figure 1: The side scan survey coverage showing the position of the wreck (white arrow) relative to that of the SS Prudentia (marked above as "Wk"). The coastline of Flotta is just shown to the south-east.

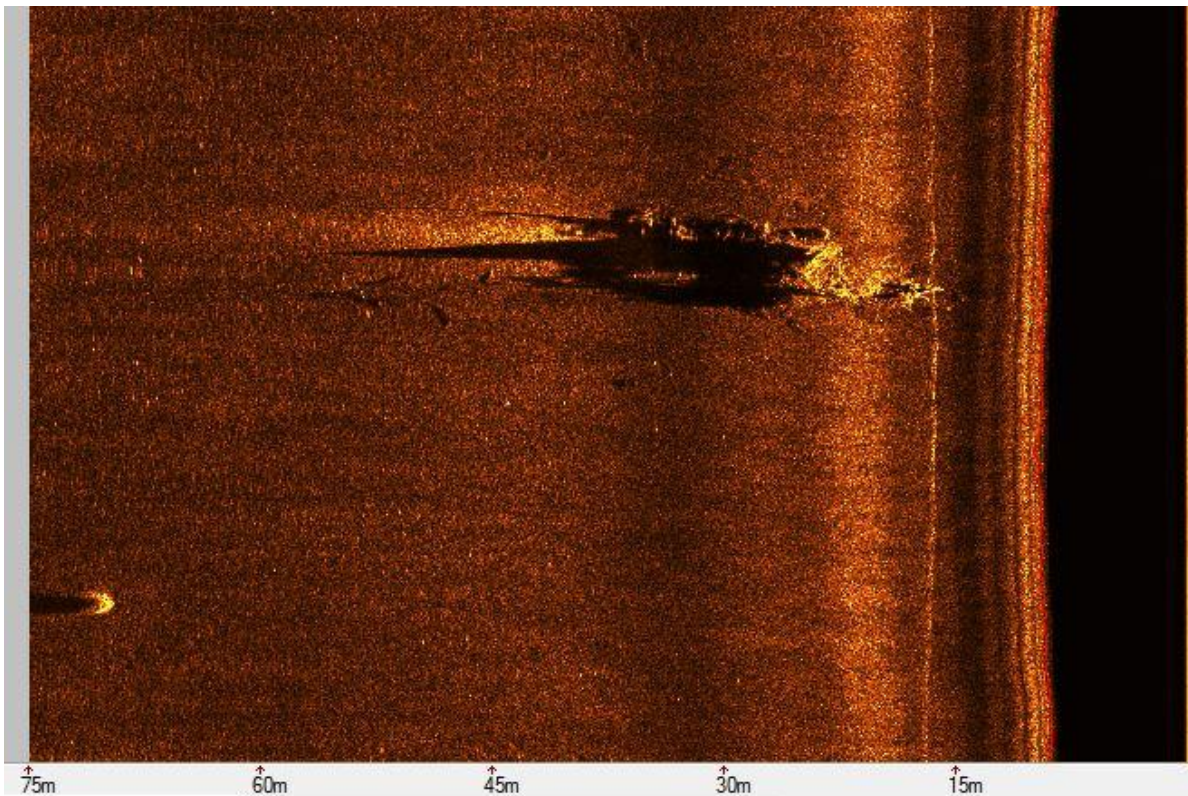


Figure 2: Sonar image of the site showing an unknown contact to the north.

3.2 Diving survey

The diving inspection of the site was carried out on the 11th August 2016. The first dive team of two divers focussed on providing an overview of the site that was used to brief the second team of two divers prior to their dive. The second dive aimed to collect more detail on the site and identify specific remains. The results are described below.

3.2.1 Overall site arrangement

The wreckage was that of a vessel, resting almost upright on the seabed, with bow pointing approximately westwards (heading 260° M). The positions of the main features of the wreck are shown below in Figure 3. The hull appeared to have been wooden and largely rotted away to leave minimal remains. The propeller and rudder were present at the stern, as well as the propeller shaft which ran forward through a substantial stern tube to the engine. A second propeller, presumably a spare, was located on the seabed next to the propeller shaft. The engine however could not be seen clearly due to the wreckage of the engine room housing that had collapsed on top. Moving forward, a boiler was located approximately half way along the vessel and underneath the wheelhouse. The steel base of the wheelhouse was intact although the upper half and roof were absent. Moving forward, a large pile of cable was draped across the foredeck and spilled onto the adjacent seabed. Towards the bow the capstan winch was present and a fisherman's type anchor lay nearby. More detail on each section of the wreck is provided below.

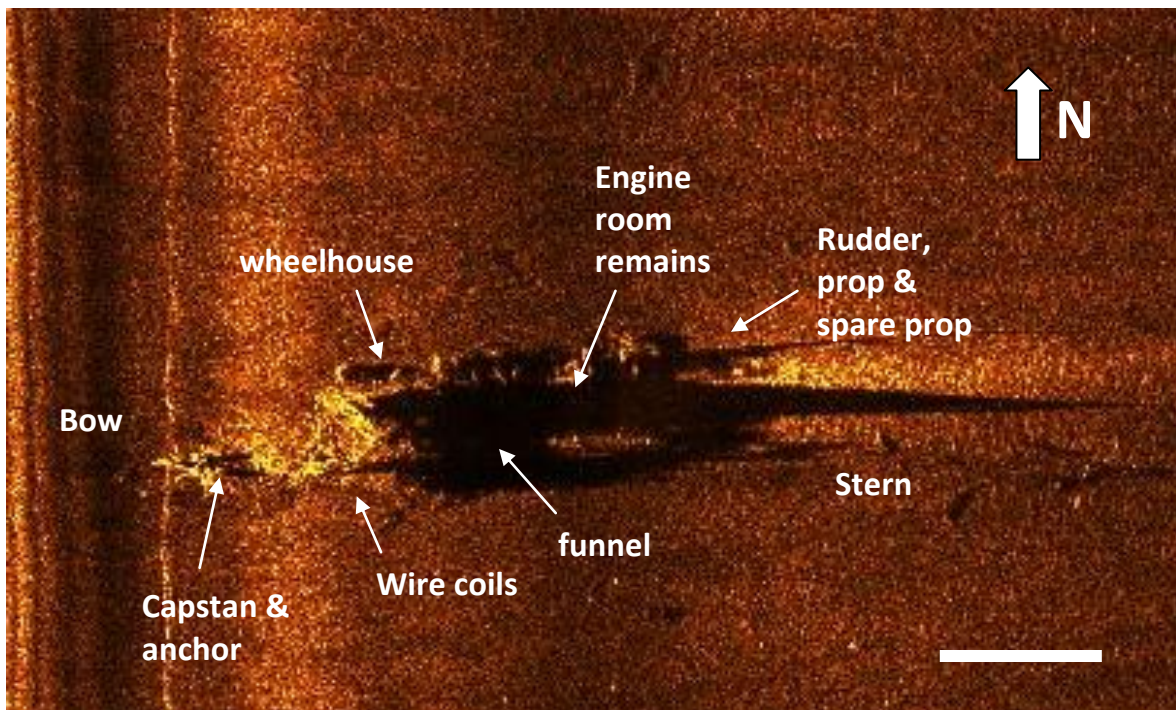


Figure 3: Sonar image of the site. White bar = 10m approx.

3.2.2 Stern area

The rudder, propeller and shaft were the main features of the stern area as the hull in this area had almost completely disintegrated. The four-bladed propeller was approximately 1m in diameter and still attached to the shaft which ran forward through a substantial brass stern tube. The steel rudder was standing upright on the seabed and listing slightly to port.

The spare propeller, of similar size, was lying flat on the seabed right next to the rudder. Still images are shown in Figures 4 & 5.

3.2.3 Engine room & boiler

The engine room casing appeared to be constructed from metal but had largely collapsed, with the result that the engine itself was obscured. The presence of a boiler indicated that it was a steam engine, but no further evidence could be gathered that would indicate its type. Engine components observed included valves and gauges.

The boiler (approximately 2m in diameter) was intact and situated just forward of the engine room casing. It was installed within a steel frame that supported the bridge above. Access to the boiler was restricted due to the surrounding steelwork and debris, although two sight gauges were observed at the front end. Coal was also observed scattered around the area. Images of the area are shown in Figure 6 – 10.

3.2.4 Funnel

The remains of a funnel were present. While the base was attached to the top of the boiler, the remaining parts had fallen off to the port side (north) of the wreck. The middle sections had largely disintegrated but the top section (~1m in length) was sitting upright (but upside down) on the seabed. On the side of this section were the remains of what appeared to be steel letters and/or numbers. These were attached by short studs which raised them off the funnel surface. Shackles were also present on the outer face of the funnel. The funnel remains are considered further in the discussion, below. The top section of the funnel is shown in Figure 11.

3.2.5 Wheelhouse

The lower half of the wheelhouse, which was made from steel, was intact. The upper section was missing. Inside the wheelhouse, the steering wheel and helm were in place but severely eroded. The telegraph was not observed. There were large glass fragments on the wheelhouse floor, presumably from the windows. One of these fragments was curved. A maker's plate was mounted on the steel plate on the outside of the wheelhouse, facing forward. The plate was rectangular and covered in encrusting marine growth and no characters or writing were visible. It was unclear what material the plate was made from, but probably steel or wood. In either case, no attempt was made to remove the growth in case the plate and/or any writing was damaged. It was also possible that the plate on the wheelhouse was a backing plate and that the name plate had fallen off. No other plates were found in the vicinity however. A brass cover, possibly from a navigation light, was also seen in this area. Images are shown in Figures 12 – 15 & 21.

3.2.6 Cable

A large amount of cable was located forward of the wheelhouse, mostly spilled over the starboard side onto the seabed. The cable appeared to comprise an outer steel sheath, which was severely eroded, with multiple, plastic-coated copper wires within. These were white-gray in colour. The cable is shown in Figures 16 & 17.

3.2.7 Foredeck & bow

The foredeck had largely collapsed leaving a mixture of steel and timber wreckage. Concrete ballast was visible there that contained voids where the ship's timber ribs were once located. A capstan winch (drifter type) was located near the bow as well as a fisherman's type anchor. A steel tank was also noticed within the wreckage which may have been for freshwater storage. A timber box was also observed with some contents, possibly paint tins. Images from this area are shown in Figures 18 – 20.



Figure 4: Stern of the vessel showing the rudder and stock. A spare propeller is lying flat on the seabed in the middle of the picture while the tips of the in service propeller can be seen behind the top edge of the rudder.



Figure 5: Main propeller with stern tube visible behind.



Figure 6: Collapsed wreckage in the engine room area, looking forward from the stern area. The back of the wheelhouse is visible at top middle of image.



Figure 7: Front side of the boiler, located under the wheelhouse. Image courtesy of Marjo Pauliina Tynkkynen.



Figure 8: Engine gauge lying among the engine room wreckage. Image courtesy of Marjo Pauliina Tynkkynen.



Figure 9: Second gauge located within the engine room wreckage.



Figure 10: Sight gauge, lying among the engine room wreckage.

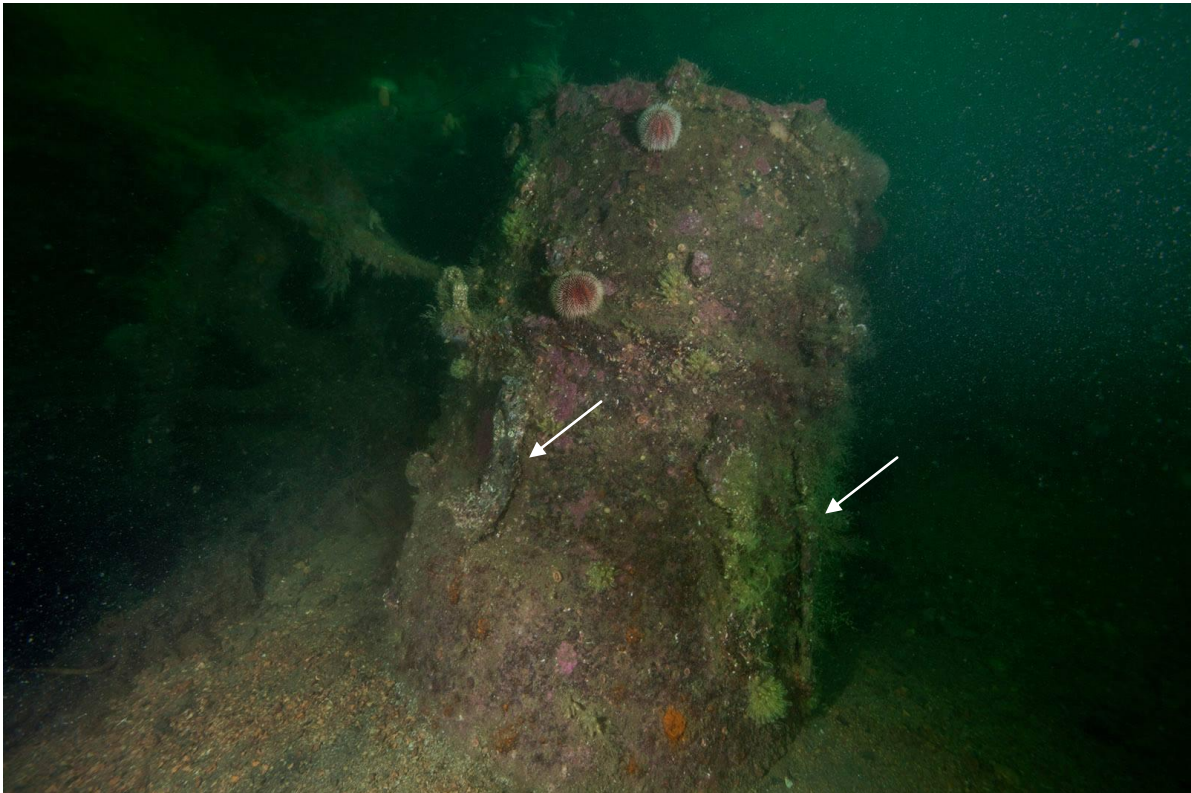


Figure 11: The top section of the funnel (~1m long) lying upside down on the seabed to the port side (south) of the wreck. The remains of raised lettering are indicated by the white arrows. Image courtesy of Marjo Pauliina Tynkkynen.



Figure 12: Front of the wheel house (constructed of steel) showing a length of cable draped over the top. Upper section of wheelhouse missing. Makers plate located on the front wall, located just to the right of the cable.



Figure 13: Interior of the wheelhouse show the steering wheel and helm as well as the cable draped over the top.



Figure 14: Makers plate on the front of the wheelhouse. Material was either steel or wood. Writing was obscured by encrusting marine growth.



Figure 15: View from the bow area looking aft towards the wheelhouse. Pile of cable is just visible to left of image.



Figure 16: Pile of cable located forward of the wheelhouse on the starboard side of the vessel.



Figure 17: Close up shot of cable showing multiple cores of plastic insulated wires. The corroding steel sheathing on the cable is evident behind.



Figure 18: Fisherman's type anchor lying at the bow. Image courtesy of Marjo Pauliina Tynkkynen.



Figure 19: Water tank located at the bow of the vessel. Concrete ballast is evident below with regular spaces where the ribs would have been originally.



Figure 20: Capstan winch lying in the bow wreckage. It is lying upside down with remains of the timber decking still attached to its base.



Figure 21: Brass cover, possibly from a navigation light. Image courtesy of Marjo Pauliina Tynkkynen.

4. DISCUSSION

The side scan and diving surveys conducted on the site, which lies between the islands of Fara and Flotta in Scapa Flow, Orkney, revealed the remains of a wooden vessel that was clearly of some vintage. Lying in a water depth of approximately 27m, the timber elements of the vessel, e.g. the hull and deck, had largely disintegrated, leaving predominantly metal remains, including the steel section of the wheelhouse, which was still standing upright the top of the wreckage. Despite the level of deterioration, the original layout of the vessel was still evident, i.e. rudder/propeller (& spare prop), prop shaft, engine, boiler & wheelhouse above, foredeck and bow area where an anchor and capstan winch were present. The boiler indicated that it was a steam powered vessel, although the engine was largely obscured under the collapsed remains of the engine room casing. The roof of the wheelhouse was missing, which provided a clear view within, where the steering wheel and helm were observed. No bell was located and although a maker's plate was found on the front of the wheelhouse, no writing was evident due to marine growth. A large pile of cable was found forward of the wheelhouse, piled against the starboard side of the vessel. The site lies around 100m west of the wreck of the SS Prudentia, where diving is prohibited. A circular object of ~2m diameter lies ~60m to the north. It is unclear if this is associated with the wreck.

The timber parts of the vessel were significantly degraded, although some parts remained, such as the deck boards still attached to the capstan winch at the bow. The metal components exhibited corrosion but were in moderately good condition. The rudder, propeller, stern tube, boiler and wheelhouse were all easily recognisable. A number of smaller metal items were also found, such as pressure gauges, sight gauges, brass fittings and the steering helm. The presence of the wreck was not known to local dive boat operators or scallop divers, both of whom work extensively around Scapa Flow. Consequently it is possible that the site has never been dived until it was found this year. It is possible that its location in a shipping channel and proximity to the wreck of the SS Prudentia, where diving is restricted, may have caused the wreck to remain undiscovered until now.

The significant length of cable located forward of the wheelhouse was an interesting feature of the site. Its steel reinforcing contained seven or eight, plastic coated wires. One possibility is that this was a communications cable, several of which were known to be deployed in that area by the British Navy during World War 2. These were deployed from land, out along the seabed to an offshore buoy, where naval vessels could literally "plug in" to get telephone communications. A map showing two of these cables located to the north-west of Flotta, along with the area covered by the side scan survey during this project, is shown in Figure 22. The cable seen at the wreck site was clearly coiled up however and what it was doing on the vessel is unclear. The vessel may have been in the process of deploying or recovering the cable, although its disorganised state is not typical of a deployment or recovery operation. The possibility also exists that the cable has simply been dumped and landed on the wreck coincidentally. Further survey work might focus on the cable and whether or not it runs away from the wreck site and if this was a WW2 communications cable, could the circular object located 60m north of the wreck site be the offshore communications buoy?

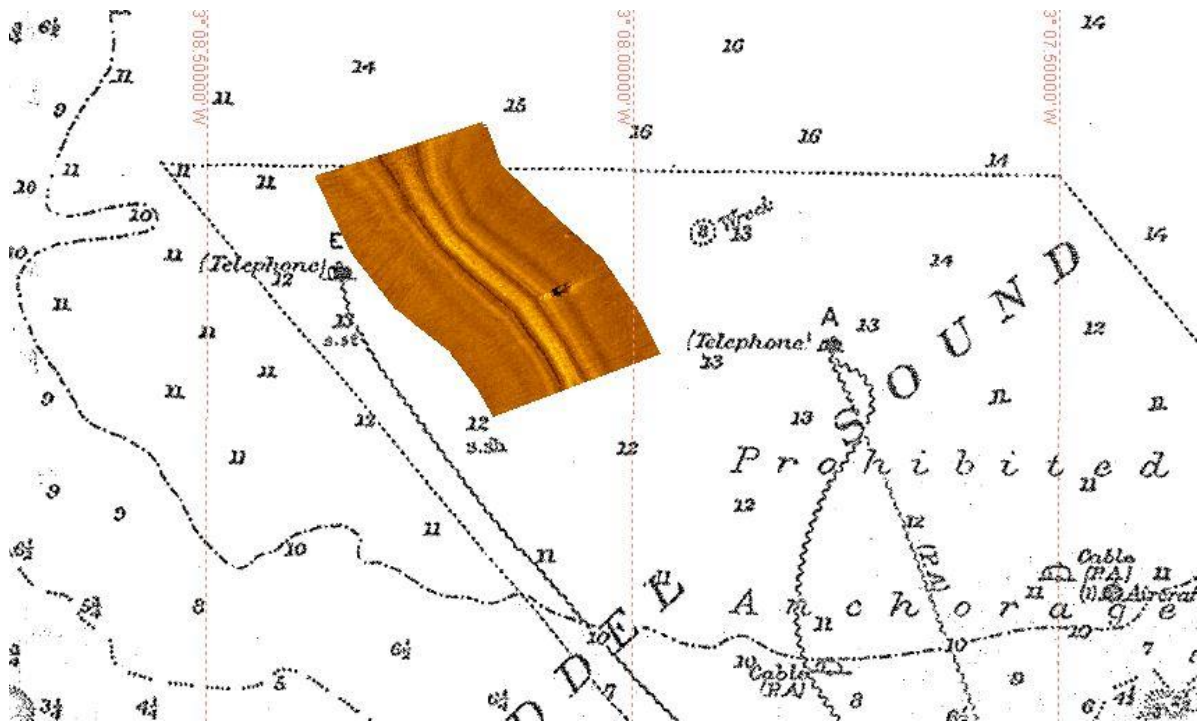


Figure 22: Admiralty map of the area around the wrecksite. This shows the presence of two telecommunications cables on the seabed which run out from the island of Flotta and terminate at offshore buoys marked E and A. Naval ships would moor to the buoys and plug into the cable to get telephone communications with shore. These cables are not shown on modern charts. Georeferenced side scan data shows the wreck is located in between the two cables.

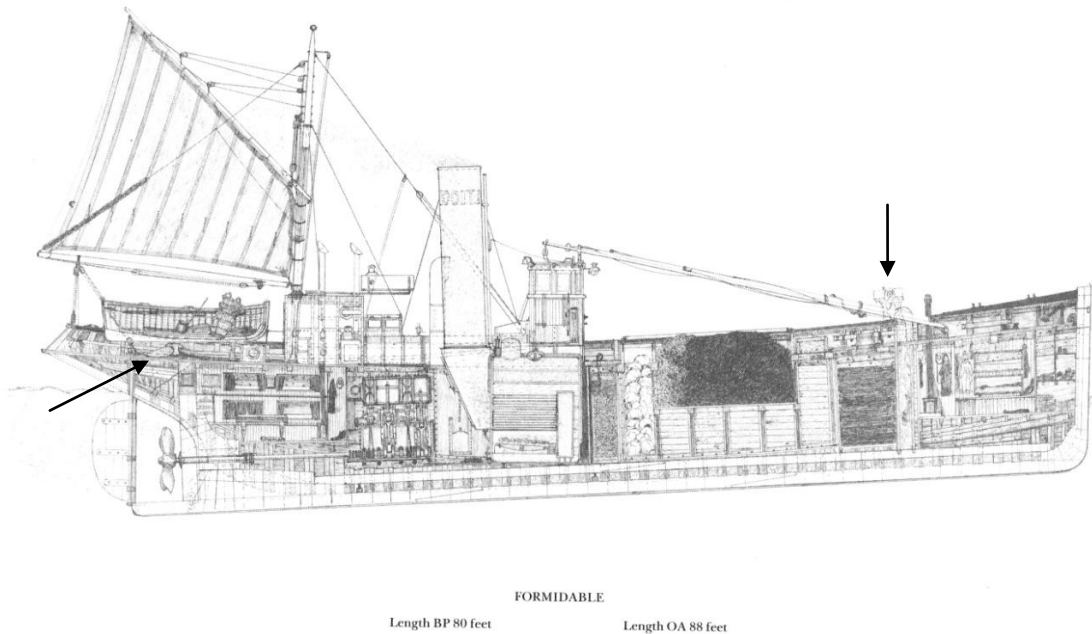


Figure 23: General layout of a steam drifter from Frost (1985). The size, layout and type of remains corresponded closely to that pictured above. The capstan winch and the spare propeller on the aft deck are indicated by arrows.

In terms of the vessel's identity, the size, components and layout of the vessel suggest very strongly that she was a wooden steam drifter. The general layout of a steam drifter is shown in Figure 23, which shows the same components and layout as those found during this project. The shape of the wheelhouse, the spare propeller on the aft deck and the capstan winch on the foredeck were also highly characteristic of the drifter specification.

Drifters became common in the late 1800s and were principally designed to fish for herring, but they were commonly engaged by the Royal Navy to provide support to its warships, particularly around naval bases. Known as Her Majesty's Drifters (HMD), numerous vessels of this type operated in Scapa Flow when it was used as a naval base in World War 1. Their duties included minesweeping, towage and general harbour work. Historical records show that several steam drifters were lost in the Orkney area from the late 1800s to mid-1900s. These are listed in Table 1, which shows that seven drifters have been lost in the Scapa Flow area: the Chance, Dewey Eve, Susie Ross, Imbat, Token, Rose Valley and Catherine. The wrecks of the Rose Valley and Dewey Eve are both known and charted, but the whereabouts of the other five were unknown prior to this survey.

No direct evidence of the vessel's identity was found during this initial survey. While the maker's plate was present on the wheelhouse, marine growth obscured any details and no attempt was made to remove the growth in case of irreversible damage. No engine or boiler plates were found which might have contained information that could have identified the vessel. However, the remains on funnel provided clues as to the identity of this vessel, as these were most likely the registered fishing number of the vessel, comprising letters followed by numbers. In this case the characters were made from steel and attached to the funnel exterior by metal bolts or studs. Their remains and the location of studs on the funnel provided an indication of their original form. The reconstruction of the top two characters is illustrated in Figure 24, which suggests that they may originally have been the letters "W" and "K". The characters below were similarly corroded and the process of reconstruction was more difficult (Figure 25). The first character had some remains and based on these and the stud pattern may have been a "2". The second character had completely disappeared but the remaining stud pattern in a triangle strongly suggested it was a "7". The final character exhibited remains on each of its four studs, which were shaped in a diamond pattern and could confidently be identified as a "0". The overall suggestion therefore is that the registration number was WK 270, which corresponds to that

Table 1: Records of lost drifters in the Orkney area.

Year	Vessel	Registration	Location of loss	Reference
1899	Dewdrop	No data	Stronsay	Whittaker (1998)
1901	Glengairn	A203	Copinsay	Whittaker (1998)
1909	Merlin	A 44	Eday	Whittaker (1998)
1916	Laurel Crown	FR 506	Marwick Head	Whittaker (1998)
1916	Chance	WK 270	Scapa Flow	Reid (2002)
1941	Imbat	PD 105	Scapa Flow (Lyness)	Whittaker (1998)
1942	Rose Valley	INS 94	Scapa Flow	Reid (2002)
1942	Catherine	No data	Scapa Flow	Whittaker (1998)
1918	Susie Ross	WK 325	Scapa Flow	Reid (2002)
1940	Dewey Eve	FR 269	Scapa Flow (Gutter Sound)	Whittaker (1998)
1941	Token	BF 103	Scapa Flow (Skerry Sound)	Whittaker (1998)
1942	Ruby	No data	Lamb Holm	Whittaker (1998)
1942	Legend (ex Pearl)	No data	Flotta	Whittaker (1998)

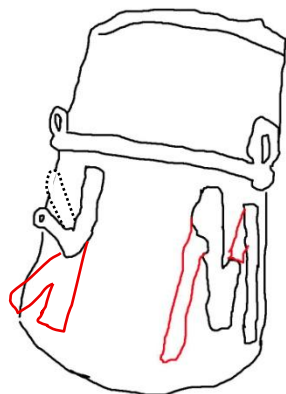


Figure 24: Series of images showing a possible reconstruction of the top two characters attached to the funnel remains. Top image: funnel section lying upside down on seabed. Middle image: remains of characters outlined in black. White arrows show possible stud locations used to attach characters to funnel. Lower image: Based on the remains and the stud pattern, the missing character parts (red lines) as they may have appeared originally, spelling "WK". The dotted black line represents the original line of the lower leg of the "K", which is bent. Images courtesy of Marjo Pauliina Tynkkynen.

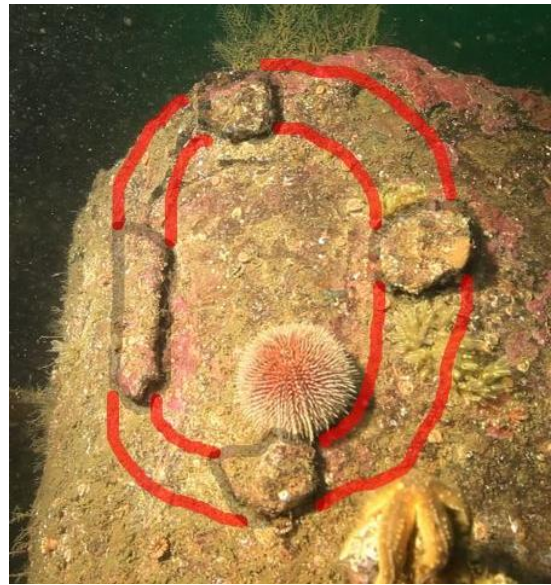
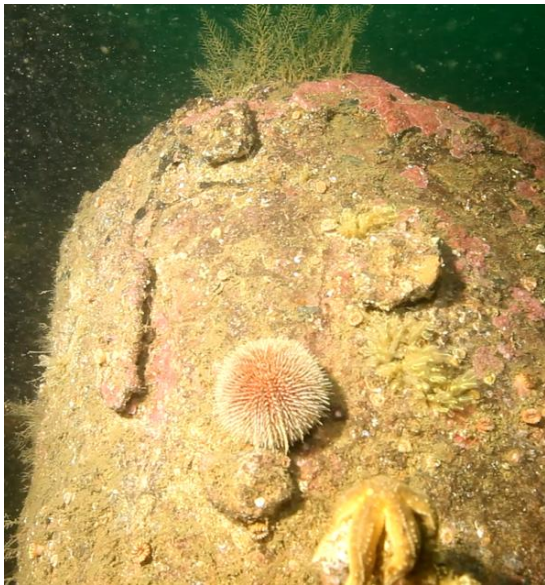
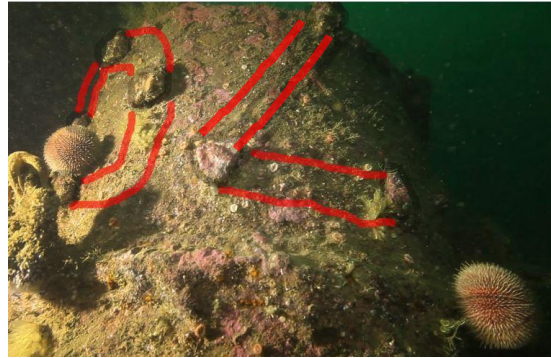


Figure 25: Reconstructions the three characters which form the second line on the funnel. Bear in mind all characters are upside down. Black lines show character remains and red lines show the possible original forms of each character. Top image: first character in the sequence is possible a "2". Middle image: very little remains of the second character but the triangular stud pattern would correspond to a "7". The "0" is shown beside it for context. Bottom image: third character, stud pattern and remains suggest a "0". Images courtesy of Marjo Pauliina Tynkkynen.



Figure 26: Steam drifter Chance shown in Wick Harbour (circa 1908). Image courtesy of Wick Heritage Centre.



Figure 27: Close up showing the registered fishing number in raised letters attached to the exterior of the funnel. Note the presence of a shackle just above the "2" which corresponds exactly to the shackle found beside the "2" on the funnel at the wreck site.

of the Wick registered drifter (HMD) Chance (88 feet, 92 GRT), which was lost in Scapa Flow, on the 26th January 1916, during WW1 (see Figure 26). Additional supporting evidence for this identification is the position of the shackles on the funnel, which correspond to that shown in Figure 27, the rectangular maker's plate (oval plates were more common) and the presence of curved glass in the wheelhouse (the Chance had curved panes of glass on the front corner windows).

Although no direct proof was found during the dive survey, the indirect evidence described above supports the possibility that the wreck is that of HMD Chance, lost on the 26th January 1916. The case that these are the remains of any of the other drifters lost in the Scapa area is less compelling. The Susie Ross, Token and Catherine were smaller than the Chance and their registered fishing numbers do not match the remains seen here. Furthermore, the Token was known to be wrecked on a skerry on the east side of Scapa Flow. The Catherine (there is some uncertainty as to whether she was actually a drifter or not) was also fitted with two machine guns, evidence of which was not seen here. The Ruby and the Legend can be ruled out as they were fitted with diesel engines (Whittaker, 1998). Only the Imbat (PD105) remains a candidate, although its registration number does not match the remains seen here. There is also anecdotal evidence that the remains of the Imbat are located in Longhope Bay (K. Heath, *pers comm.*). Further examination of the wreck, in particular the maker's plate, might reveal conclusive evidence as to its identity. It is worth noting, that HMD Chance was lost just 14 days after the SS Prudentia, which is located nearby.

If this is the wreck of HMD Chance, lost in 1916, then it would mean that the cable found on the site must have been deposited there many years after its loss, as plastic coating wiring was rare during WW1. The area was also a known anchorage for oilers (oil tankers) using Scapa Flow in WW1, so it is very unlikely that there were any cables laid on the seabed there at the time of the loss of HMD Chance. The presence of telecommunications cables in the area during World War 2 was discussed earlier. Modern Admiralty charts do not show their presence so presumably they have been recovered but it is unclear when this took place or whether there is any association with the cable found at the wrecksite.

In summary, this project has identified the remains of a wooden vessel, approximately 100 feet in length, between the islands of Flotta and Fara, in Scapa Flow, Orkney. The vessel is almost certainly that of a steam powered drifter, which were commonly engaged by the British Navy to carry out harbour duties during its use of Scapa Flow as a wartime base. Although the majority of the timbers have rotted away, the metal components were laid out close to their original position. The engine was present, although largely obscured by wreckage and could not be identified. A number of other features were recorded, including the ship's wheel, eroded but in place, pressure gauges, sighting gauges, lamp housings, capstan winch, anchor and other miscellaneous wreckage. Given the number of artefacts, it is unlikely that the site has been dived previously. A large amount of what may have been telecommunications cable was also piled on the wreck, forward of the wheelhouse. A maker's plate on the front of the wheelhouse was present but marine growth obscured any writing and no attempt was made to remove the growth in case the plate was damaged. A number of steam drifters are recorded as being lost in the Scapa Flow area and prior to this project, five remained undiscovered. Based on the remains of the vessel's registration number located on the funnel, it is possible that this wreck is that of HMD Chance (WK 270), lost in Scapa Flow in 26th January 1916. This identification should be treated with some caution however and further survey work might be necessary to establish this

conclusively. The remains of the cable and the circular object would also be interesting to examine in more detail. The site would form a valuable addition to the diving resource in Scapa Flow, although heavy use might be precluded by its location in a shipping channel and close proximity to the SS Prudentia, where diving is prohibited.

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APPENDIX 1: Dive log from the 11th August 2016

Diver	Gin (BAR)	Tin	D (m)	BT (mins)	Tout (mins)	Gout (BAR)
B. Taylor	220/175	1754	28m	34	1834	50/175
K. Kohnfelder	200/220	1754	28m	34	1834	50/220
M. Thomson	200/175	1904	28m	32	1942	60/175
K. Rendall	200/200	1904	28m	32	1942	50/200