

British Marine Aggregate Producers Association, Historic England and The Crown Estate

Marine Aggregate Industry Protocol for the Reporting of
Finds of Archaeological Interest

Annual Report to BMAPA 2015-2016

December 2016

Prepared by
Wessex Archaeology



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Project background

The Marine Aggregate Industry Protocol for the Reporting of Finds of Archaeological Interest (the Protocol) is the last stage of mitigation in a rigorous process to protect submerged cultural heritage during marine aggregate industry dredging. Prior to a licence being granted to dredge a particular Licence Area, an intensive archaeological investigation is undertaken to identify potential submerged heritage. Archaeologists examine geophysical and geotechnical survey data, and analyse available records to identify and protect known and suspected sites of interest within aggregate extraction regions. Even after this level of investigation, unidentified sites may be discovered during dredging and isolated artefacts may be found within dredged loads. To address the potential for discoveries, a Protocol was developed to define a framework through which such material could be reported, investigated and, where appropriate, protected. The Protocol ensures that any items of potential heritage importance recovered during aggregate dredging, whether encountered on the seabed, on a dredging vessel or at a wharf after a cargo is landed, can be properly assessed. Significant items can be accurately recorded and conserved, while in some instances further mitigation or monitoring may be required.

Wessex Archaeology drafted the Protocol in 2005 on behalf of Historic England (formerly English Heritage) and the British Marine Aggregate Producers Association (BMAPA). The Crown Estate joined BMAPA in 2009 to co-fund the Protocol Implementation Service. Since 2006, BMAPA member companies have committed voluntarily to adopt the Protocol across all existing operations, encompassing wharves, vessels and Licence Areas. The requirement to adhere to a reporting Protocol is now a standard condition for all marine licences issued for marine mineral extraction. The Protocol Implementation Service has been operated by Wessex Archaeology since its inception.

Historic England is the curator for heritage in England, and finds of archaeological interest that require a high level of curatorial involvement are referred to Historic England in the first instance. However, Wessex Archaeology, as the Protocol Implementation Service, has Historic England's agreement to process non-contentious finds – that are unlikely to result in the creation of an Archaeological Exclusion Zone – directly.

The Protocol has been overwhelmingly successful, with over 1,600 finds reported since its inception. These range from Palaeolithic mammoth teeth to military aircraft remains and cannonballs.

Addendums to the Protocol

The Protocol is a blanket safety-net for artefacts and sites of all types and from all periods, but it is also a flexible and adaptive programme which responds to industry needs. The original Protocol document is available online (<http://www.wessexarch.co.uk/projects/marine/bmapa/arch-interest.html>).

Since the Protocol was introduced, two further supporting addendums have been produced which give more advice about the nature and significance of aircraft remains (2008) and to improve staff awareness and safety when dealing with munitions (2010). Both documents are available online:

Aircraft Crash Sites at Sea –

<http://www.wessexarch.co.uk/projects/marine/bmapa/dredging-hist-env.html>

Dealing with Munitions in Marine Sediments –

<https://www.thecrownestate.co.uk/media/5423/ei-dealing-with-munitions-in-marine-sediments.pdf>

1. <http://www.wessexarch.co.uk/projects/marine/bmapa/discoveries.php>

2. <http://www.wessexarch.co.uk/projects/marine/bmapa/reviews>

3. <http://www.arcgis.com/home/item.html?id=952ee00d3ff3459a91c6f821c0f13ab3>



The Protocol Implementation Service has now completed its eleventh year of operation and this annual report covers the period from 1 October 2015 to 30 September 2016.

Access

Planning conditions relating to archaeology are placed on developments for the public benefit, which encompasses a duty to publicise results accordingly.

Details of all dredged finds are reported to: Historic England; BMAPA; The Crown Estate; the National Record of the Historic Environment (previously the National Monuments Record); and the appropriate local Historic Environment Record (HER). Where appropriate, finds are also reported to the Receiver of Wreck and the Ministry of Defence.

All finds are also published on Wessex Archaeology's website on the RSS feed¹ and in the annual report². In addition, the exemplary efforts made by BMAPA companies with regard to the Protocol are acknowledged through various dissemination programmes conducted by Wessex Archaeology, including the Protocol Awareness Programme which produces the *Dredged Up* newsletter.

This year, information about discoveries reported through the Protocol is easier to access than ever before. The Crown Estate has made data from the Protocol available online, in WGS 84 lat/long, and can be viewed through a GIS website³.



Reporting process

Under the Protocol, finds identified by wharf and vessel staff are reported through a Site Champion or the Master of the vessel to a Nominated Contact, who alerts the Protocol Implementation Service, currently operated by Wessex Archaeology.

Wessex Archaeology then communicates directly with the Nominated Contact regarding the archaeological importance of the discovery, and conservation and storage recommendations.

The Nominated Contact for each company is detailed below.

BMAPA Company	Nominated Contacts	Position
Britannia Aggregates Ltd	Richard Fifield	Marine Resources Manager
CEMEX UK Marine Ltd	Samantha Bevan	GIS and Licence Co-ordinator
DEME Building Materials Ltd	Christophe Matton Tom Janssens	Marine Resources Manager General Manager
Hanson Aggregates Marine Ltd	Chris Popplestone	GIS and Resources Co-ordinator
Isle of Wight Aggregates	Edward Skinner	Marine Resources Co-ordinator
Kendall Bros (Portsmouth) Ltd	Paul Stevens	Managing Director
Tarmac Marine	Edward Skinner	Marine Resources Coordinator
Volker Dredging Ltd	Will Drake	General Manager



Raising awareness

The current phase of the Protocol Awareness Programme is funded by a tripartite agreement between BMAPA, The Crown Estate and Historic England, and implemented alongside the Protocol by Wessex Archaeology. Despite current successes, most noticeably measured by the large number of individual finds reported this year, it is important to continually promote awareness of the Protocol, particularly to those wharves who are engaging with it on a less frequent basis.

The awareness programme:

- delivers in-person training during awareness visits to wharves, empowering industry staff to recognise and report finds of archaeological interest discovered while receiving aggregate from BMAPA companies;
- produces the biannual *Dredged Up* newsletter which aims to publicise the Protocol and highlight recent finds. The most recent issue, Issue 19 printed in autumn 2016, and all previous *Dredged Up* newsletters can be found online <http://www.wessexarch.co.uk/projects/marine/bmapa/dredged-up>;
- raises Protocol awareness amongst third parties, such as geotechnical and environmental survey companies working on behalf of the marine aggregate industry;
- provides training and support to Site Champions to enable them to train new staff and refresh existing staff.

Visits to wharves

Since the 2014–2015 annual report was published, 19 Protocol Awareness Visits have been made to wharves around the country. The Protocol Awareness Programme Team ran multiple training sessions to wharves in Essex, Kent, East Sussex, West Sussex, Hampshire, Southampton and the Isle of Wight. The Team also visited wharves in south Wales – Newport and Cardiff.

These informal training sessions are key to the success of the scheme. As well as delivering the training, the visits allow Wessex Archaeology to maintain contact with wharf and vessel staff, boost interest in the Protocol and promote it to both new and existing staff.

Visits have been undertaken this year to British wharves receiving marine aggregate. Contact has been maintained with wharves, vessels and Continental wharves through the annual report and the *Dredged Up* newsletter. The new awareness materials have also been included in the remote learning packs with a new Induction Pack to enable Site Champions to induct new starters into the scheme. Increased outreach to Continental wharves is particularly demonstrated through the new translations of materials into French and Dutch.

If you would like to arrange a Protocol Awareness Visit, or would like to receive more advice on finds and finds reporting, please contact Wessex Archaeology via protocol@wessexarch.co.uk.



Presentations, artefact handling sessions, group and one-to-one discussions are some of the formal and informal approaches used during Protocol Awareness Visits to wharves and vessels.



New awareness materials

In April 2016, new Protocol awareness materials were launched, and these were distributed over the summer and shared during visits. The newly designed logo, images and text were incorporated into the scheme's poster, presentation, Preliminary Record Form and handouts.

New awareness documents include:

- **Poster** – redesigned with the eye-catching word 'DISCOVER' composed of photographs of finds previously reported through the Protocol and surrounded by images of a range of objects also discovered by marine aggregate industry staff;
- **Discoveries: Preliminary Record Form** – restyled to be clearer and more efficient with additional reminders for vessel track plots and conservation;
- **Handout** – consisting of Introduction, Reporting process, Concretions and metalwork, Munitions and ordnance, Prehistoric finds, Photographing finds (including a scale sheet), Conservation and storage and a Timeline; and
- **Remote Learning Packs** – include an Induction Pack to enable industry members to conduct their own Protocol Awareness Training, either for new staff or as a refresher.

The new materials can be accessed through the Protocol pages on Wessex Archaeology's website <http://www.wessexarch.co.uk/projects/marine/bmapa/docs.html>

In 2016, an awareness video was also developed and released which can be played at wharves and on vessels on a regular basis. The video is available in English, French and Dutch. Presentations, artefact handling sessions, group and one-to-one discussions are some of the formal and informal approaches used during Protocol Awareness Visits to wharves and vessels. The videos can be accessed via the above website or viewed directly through the following Youtube links:

English

<https://www.youtube.com/watch?v=l6RBjTzbUM0>

French

<https://www.youtube.com/watch?v=2W0tmOHofig>

Dutch

<https://www.youtube.com/watch?v=uHY9OXGEJmg>



The new awareness Poster in English, French and Dutch



Dredged Up newsletter

In 2015–2016, two issues of the biannual *Dredged Up* newsletter were produced.

Issue 18, Spring 2016, distributed in April, highlighted some of the year's finds and examined the wealth and variety of those discovered in the East Coast dredging region. In addition, it published the winners of the annual Finds Awards.

Issue 19, Autumn 2016, was distributed in September and explored ordnance photography and recording, recent finds and Protocol Awareness Visits, amongst other topics.

The newsletters are distributed not only to wharves, vessels and BMAPA member companies but also, through Historic England, Wessex Archaeology and The Crown Estate, to a variety of other organisations, individuals and the general public.

The newsletters reach a wide audience to promote the operation of the Protocol and provide a positive showcase for the industry's activities. They are also an important tool for raising and maintaining awareness by publicising dredged finds.



The new design for the newsletter beginning with Issue 19

Finds Awards

The 2014–2015 Finds Awards were made to the following wharves and vessel. More details about these Finds Awards are available in Issue 18 of *Dredged Up*.

Tarmac's Burnley Wharf – Best Attitude by a Wharf

Burnley Wharf reported 20 finds in 2014–2015, over double the number of finds reported by any other wharf.

Hanson Aggregate Marine's Arco Dart – Best Attitude by a Vessel

Arco Dart crew discovered a regular-shaped stone in the Severn Estuary. Although further analysis confirmed that the find is a naturally occurring sedimentary stone, it is particularly remarkable as few reports are made from this area due to the dredger screens used.

Tarmac's Bedhampton Wharf – Best Find

Bedhampton Wharf discovered an antique dive regulator, identified as a Dunlop Underwater Swimmer's Breathing Apparatus mouthpiece, from material dredged off the Isle of Wight. It may be linked to local naval diving activities.



Tarmac's Burnley Wharf in Southampton



Protocol reports

During the eleventh year of operation Wessex Archaeology received 96 reports through the Protocol Implementation Service. These reports encompassed details of 120 separate finds. Further details of each discovery are shown below and included in the wharf reports appended to this report.

Finds reported in 2015–2016

Report ID	Licence Area	Region	Wharf/Vessel	Description	No.
Tarmac_0635	351	South Coast	Southampton	Possible bar/chain shot	1
Tarmac_0636	395/1	South Coast	Bedhampton	Metal bar	1
CEMEX_0637	Unknown	Unknown	Northfleet	Shell	1
Tarmac_0638	395/1	South Coast	Shoreham	Rowlock	1
Tarmac_0639	430	East Coast	Erith	Side plate of machine gun	1
Tarmac_0640	395/1	South Coast	Shoreham	Brass plaque	1
Hanson_0642	240	East Coast	Dagenham	Animal bone	1
Tarmac_0643	Unknown	South Coast or Thames Estuary	Greenwich	Oil reservoir	1
Tarmac_0644	Unknown	South Coast, East Coast or Thames Estuary	Greenwich	Metal valve	1
Tarmac_0645	Unknown	Unknown	Greenwich	Ship fastening	1
Tarmac_0646	Unknown	Unknown	Greenwich	Possible weight	1
Tarmac_0647	Unknown	Unknown	Greenwich	Metal pulley	1
Britannia_0648	351	South Coast	Southampton	Piston	1
Tarmac_0649	460	East English Channel	Greenwich	Sack scale	1
Tarmac_0650	509/2	Thames Estuary	Greenwich	Copper pipe	1
Tarmac_0651	509/3	Thames Estuary	Greenwich	Oil lamp reservoir	1
Tarmac_0652	351	South Coast	Southampton	Cannonball	1
Tarmac_0653	351	South Coast	Southampton	Anode	1
Tarmac_0654	395/1	South Coast	Southampton	Boat hook	1
Tarmac_0655	395/1	South Coast	Southampton	Brass maintenance plate	1
Tarmac_0656	395/1	South Coast	Southampton	Possible lever plate	1
Tarmac_0657	351	South Coast	Southampton	Mammoth tooth	1
Tarmac_0658	395/1	South Coast	Southampton	CO2 temperature or pressure gauge	1
CEMEX_0659	510/1	Thames Estuary	Brighton	Cattle bone	1
Tarmac_0660	351	South Coast	Southampton	Timber	1
Tarmac_0661	351	South Coast	City of London	7.62 mm steel tip round	1
Tarmac_0662	Unknown	Unknown	Greenwich	Metal cargo plate	1
Tarmac_0664	197	Humber	City of London	Lead structure	1
Tarmac_0665	Unknown	Unknown	Greenwich	Stopcock cover	1
Tarmac_0666	Unknown	Unknown	Greenwich	Part of pulley or rigging	1
Tarmac_0667	458	East English Channel	Greenwich	Wooden mooring roller	1
Tarmac_0668	Unknown	Unknown	Greenwich	Exhaust manifold components	5
Tarmac_0669	395/1	South Coast	Southampton	.50 calibre bullet casing	1
Tarmac_0670	395/1	South Coast	Southampton	5 inch naval shell casing	1
Tarmac_0672	127	South Coast	Southampton	11 cannonballs, .50 calibre bullet and knife	13
Tarmac_0673	395/1	South Coast	Southampton	Cannonball and grape/musket shot	3

Continues next page

Finds reported in 2015–2016 continued

Report ID	Licence Area	Region	Wharf/Vessel	Description	No.
Tarmac_0674	372/1	South Coast	Southampton	Boat hook, knife and Bakelite handle	3
Tarmac_0675	395/1	South Coast	Medina	4 inch shell	1
Tarmac_0676	395/2	South Coast	Medina	Cannonball	1
Tarmac_0678	395/1	South Coast	<i>City of Chichester</i>	Aluminium plate	1
Tarmac_0680	351	South Coast	Burnley	Cartridge case	1
Tarmac_0681	351	South Coast	Southampton	20 mm Hispano casing	1
Tarmac_0682	351	South Coast	Southampton	4 spent bullets	4
Tarmac_0683	351	South Coast	Southampton	Hand bell	1
Tarmac_0685	395/1	South Coast	Shoreham	Brass plate	1
Tarmac_0687	351	South Coast	Southampton	British Airways knife	1
Tarmac_0688	351	South Coast	Southampton	Pedestal	1
Tarmac_0689	351	South Coast	Southampton	Spent bullet	1
Tarmac_0690	351	South Coast	Southampton	Shell casing	1
Tarmac_0691	127	South Coast	Southampton	Plate sherd	1
Tarmac_0692	351	South Coast	Southampton	Isolating flange	1
Tarmac_0693	351	South Coast	Southampton	'Zed' skin stiffener (aircraft)	1
Tarmac_0694	351	South Coast	Southampton	Aluminium strip and bent aluminium	2
Tarmac_0695	127	South Coast	Southampton	Cannonball	1
Tarmac_0696	351	South Coast	Southampton	40 mm shell casing	1
Tarmac_0697	Unknown	South Coast	Marchwood	Deadeye	1
Tarmac_0698	396/1	South Coast	Shoreham	Ship's telephone handle and earpiece	1
Tarmac_0699	Unknown	South Coast	Bedhampton	Ship's telephone mouthpiece	1
Tarmac_0701	372/1 or 351	South Coast	Bedhampton	Mammal skull fragment	1
DEME_0702	484	Humber	Flushing (Netherlands)	Mine fragment	1
Kendalls_0703	395/1	South Coast	Kendalls	Part of a German artillery sight	1
Britannia_0704	460	East English Channel	Northfleet	Wooden bung	1
Tarmac_0705	458	East English Channel	Erith	Timber	1
Tarmac_0706	458	East English Channel	Erith	Spike	1
Tarmac_0707	460	East English Channel	Greenwich	Slide mechanism	1
Tarmac_0708	Unknown	Unknown	Greenwich	Marlinspike	1
Tarmac_0709	351	South Coast	Marchwood	Pedestal	1
Tarmac_0710	351	South Coast	Marchwood	Knife	1
Tarmac_0711	351	South Coast	Marchwood	Keys	1
Tarmac_0712	351	South Coast	Shoreham	Metal 'OPEN' plate	1
Tarmac_0713	395/1	South Coast	Shoreham	Grease gun	1
Tarmac_0714	396/1	South Coast	Shoreham	Copper alloy fitting	1
Tarmac_0715	396/1	South Coast	Shoreham	Gas ribbon burner	1
Tarmac_0716	351	South Coast	Southampton	1972 German coin	1
Tarmac_0717	351	South Coast	Southampton	Battery	1
Tarmac_0718	127	South Coast	Southampton	Iron cannonball	1
Tarmac_0719	351	South Coast	Marchwood	Iron pin	1
Tarmac_0720	127	South Coast	Southampton	3 inch cannonball	1
Tarmac_0721	127	South Coast	Southampton	Rubber duck	1
Tarmac_0722	351	South Coast	Southampton	5 inch shell case	1
Tarmac_0723	351	South Coast	Southampton	Shell fuse	1
Tarmac_0724	127	South Coast	Southampton	5 inch cannonball	1
Tarmac_0725	127	South Coast	Southampton	3 inch cannonball	1
Tarmac_0726	351	South Coast	Southampton	Sheep/goat femur	1
Tarmac_0727	351	South Coast	Southampton	Threaded nut	1
Tarmac_0728	351	South Coast	Southampton	Pulley sheave	1
Tarmac_0729	396	South Coast	Southampton	Shell driving band	1
Tarmac_0730	351	South Coast	Southampton	Light fitting guard	1
Tarmac_0731	351	South Coast	Southampton	Bullet	1
Tarmac_0732	351	South Coast	Southampton	Magnet	1
Tarmac_0733	351	South Coast	Southampton	Iron disc	1
Tarmac_0734	351	South Coast	Southampton	Fitting	1
Tarmac_0735	351	South Coast	Bedhampton	Lighter	1
Tarmac_0736	351	South Coast	Bedhampton	Light or sight glass	1
Tarmac_0740	395/1	South Coast	Marchwood	Cast iron object	1
Brett_0741	498	Thames Estuary	Ipswich	Tin lid	1



Specialists

The Protocol Implementation Service at Wessex Archaeology consults with heritage experts, both in-house and from external companies and organisations, to ensure that discoveries are identified accurately and the archaeological value and significance of each object is understood. The table below lists all of the specialists that gave advice during the 2015–2016 reporting year. Specialists that we have contacted in the past but not during this operational year are still included in Wessex Archaeology's internal lists, but have been omitted from the table below. We are very grateful to all of the specialists who have assisted in the identification of Protocol finds over the last eleven years.

Expert	Advice given concerning	Institution/Organisation
Dan Atkinson	Maritime artefacts	Wessex Archaeology
Nick Ball	Maritime artefacts	National Maritime Museum
Norman Bonney	Ordnance	Royal Armouries Museum
Ian Buxton	Yarrow & Co	Newcastle University
Alistair Byford-Bates	Ordnance	Wessex Archaeology
Caledonian Maritime Research Trust members	Maritime heritage of the Clyde	Caledonian Maritime Research Trust
Ewen Cameron	Military aircraft	RAF Museum
Bob Davis	Archaeological artefacts	Wessex Archaeology
Jonathan Ferguson	Firearms	Royal Armouries Museum
Toby Gane	Maritime artefacts	Wessex Archaeology
Tom Harrison	Ordnance	Wessex Archaeology
Lorrain Higbee	Zooarchaeology	Wessex Archaeology
Anthony Mansfield	Mechanics and engineering	Senior Naval Engineer
Lorraine Mepham	Archaeological artefacts	Wessex Archaeology
Trevor Parker	Ordnance	Ordnance Society
Richard Sabin	Vertebrate zoology	Natural History Museum
Kay Smith	Ordnance	Ordnance Society
Charles Trollope	Ordnance	Ordnance Society
Steve Vizard	Aircraft	Airframe Assemblies
Dave Welch	Ordnance	Ramora UK



Brass plaque (Tarmac_0655)

Signs on ships: significant sources of study

Signs are a ubiquitous part of everyday life, including on board ships. However, this has not always been the case. Since the Age of Sail (c. 1500–1850) the inevitable progress of industry has forced an acknowledgement of new challenges, dangers, practices and lifestyles. Signage has become an important part of this change, reinforced by managerial and regulatory authorities. In the marine industry, signs now serve a vital function and are particularly well thought out during the building of new ships and, of course, their operation. Someone, somewhere, has to consider signage – and archaeologists are now among those people.

Archaeologists are, certainly, interested in objects which reveal the name of a vessel – ship’s bells and the like. Even objects such as the brass builder’s plaque reported in this year’s Protocol finds are useful in pinning down the identity of a vessel. The probable boiler plate, inscribed with YARROW & CO LTD, GLASGOW, NO 381, suggests a vessel carrying a boiler manufactured by the shipbuilding firm Yarrow & Co. at their Scotstoun yard, Glasgow (Tarmac_0640).

What of less diagnostic signs? Surprisingly, signs such as these have been reported with a degree of regularity through the Protocol and can be classified based on their function: hazardous, safety, mandatory, prohibitive, directional and departmental (accommodation, galley, deck and engine room). Protocol finds from 2015–2016, as well as from previous years, provide examples of some of these types of signs, as well as the information that can be gleaned from them.



Brass plaque (Tarmac_0640)

The brass plaque inscribed WARMES WASSER is an example of a safety sign, translating from German to ‘hot water’, and likely to have originated from a German vessel (LTM_0596, 2014–2015). Another safety sign, a metal plaque inscribed with the incomplete text ...AS PER APPROVED, ...LOAD 10 CWTS, ... LOAD 7½ CWTS, ... 5 CWTS ..., is a safe working load rating tag from some form of lifting gear (UMA_0155, 2007–2008).

A copper alloy plate, embossed with TORPEDO G ... is a directional sign, probably associated with a compartment on a ship used for torpedo equipment, such as the torpedo gear store or torpedo gyro (Brett_0253, 2008–2009). The vessel from which this plate originates would post-date the 1870s, when the self-propelled torpedo came into use. Another direction sign, a copper panel inscribed with FORE STEAMING & BOW, PORT, FORE, STARBD, DIMMER with arrows alongside the latter, is a control panel for the lights on a steamship (Tarmac_0310, 2009–2010). The vessel from which this panel originates would post-date the 1800s, when the introduction of steam power revolutionised the shipping industry in Britain. A brass plaque from this year’s Protocol reports also relates to lighting (Tarmac_0655). It reads WEATHER DECK LTG FROM M2-12-D222 (BRIDGE) CC BOX FOCASLE DK. FOR FITTING 36[...] SW.SKI & FITTING STN 36S. It would have identified a fuse or switch box controlling the lighting on a vessel of some size, given the number of lights on the weather deck.



A particularly descriptive brass fuse plate may relate to a vessel used for Admiralty-run training, in which young men were referred to as boys (UMA_0120, 2007–2008). The vessel from which the plate originates is unlikely to date to earlier than the 20th century, when electric lighting was introduced.

DIST. BOX N3.S2.D3

FUSE

1. PORTABLES 1 IN NO.
2. 1 GANGWAY LT. & 3 LTS. IN DINNER ISSUE RM.
3. 7½" FAN IN BOYS BATH RM.
4. LTS. IN BOYS PANTRY & BATH RMS.
5. 7 LTS. ON SHIPS SIDE.
6. 7 LTS. OVER CENTRE OF MESS TABLES.
7. LTS. OVER ENDS OF MESS TABLES.
8. POLICE LTS.



Brass plate (Tarmac_0685)

Another brass plate inscribed STORM VALVE FROM SPURN WATER SCUPPER 6-5 is indicative of a larger vessel with multiple scuppers (Tarmac_0685). Directional signs can also be as simple as stating OPEN, such as a metal plate with this inscription and an arrow which may relate to water- or weather-tight openings on a ship (Tarmac_0712).

Finally, examples of departmental signs include a plaque inscribed with ROYAL NAVY MESS NO.4, likely to derive from a Royal Navy vessel (UMA_0127, 2007–2008). A small plate inscribed AIR LANCEN ..., MOTEUR AUX may translate from the French, *air lancement moteur auxiliaire*, to air launch auxiliary engine – perhaps indicating the air intake for the forced induction system of an auxiliary compression ignition internal combustion engine (UMD_0240, 2008–2009).

Isolated finds in the form of signage, while seemingly insignificant, can give many clues as to the identity of vessels either lost at sea or travelling in the area. The examples above demonstrate that they can reveal the nationality, date, size and purpose or function of vessels. It may be possible to associate finds such as these with other finds reported within the area, to provide a more complete understanding of maritime activity, or even to connect two isolated finds to the same vessel. Ultimately, the continued reporting of signs through the Protocol gives us a way to follow the shifting trends in what people in the past, and present, think is important to tell others.



Staffordshire to Southampton – via Brazil, Belgium, Germany or America?

Sometimes, it can be the smallest fragments which reveal the most information about the past. Such is the case with a sherd of ceramic plate (Tarmac_0691) recovered from the South Coast region which has been dated to within a three-year period over 150 years ago! The surface of this plate features a blue monogram with the text ... AN & AMERICAN STEAM SHIPP ... and a striped flag with a cross (possibly a Union Jack) in the centre. On the base is a monogram crested by the text PEARL WARE. These two pieces of information have been used to uncover a fascinating story.

The plate was manufactured in Staffordshire in England’s West Midlands, an industrial area which became the centre of ceramic production in the early 17th century. The pottery mark, pearl ware, and the associated monogram is attributed to the pottery manufacturer Thomas Dimmock & Co. Although the ‘pearl ware’ designation references a type of white-bodied earthenware pottery popular in the first half of the 19th century, it has been suggested that its use as a label is not always accurate and may indicate a later, post c. 1845 date of manufacture. ‘Pearl ware’ was a name used by a number of pottery manufacturers but the monogram was only used by Thomas Dimmock. Thomas Dimmock (Jnr) & Co. operated the Albion Street Works and Tontine Street Works in Shelton, Hanley, Stoke-on-Trent, from c. 1828 to 1859. Thomas Dimmock died in 1860 and the works were rebuilt in 1861; the following year the company was renamed John Dimmock & Co.

Just prior to Thomas Dimmock’s death, the newly founded European & American Steam Shipping Company (EASSC) commissioned the production of company-branded dinnerware and tableware for its vessels, as was common for shipping lines. The advent of the railway for the distribution of pottery products began in the 1840s and allowed a considerable increase in business for potteries – including supplying new consumers in southern England.

The EASSC was founded in 1857 with the purchase of eight iron screw steamers from the General Screw Steam Shipping Company – paid for with shares in the new company. It was managed by the Consul of the United States, J. R. Croskey, at Southampton. Four ships, *Golden Fleece*, *Hydaspes*, *Calcutta* and *Lady Jocelyn* serviced South America, while *Queen of the South*, *Indiana*, *Argo* and *Jason* conducted a fortnightly service between Bremen (Germany), Southampton and New York. All of these vessels were built by C. J. Mare & Co, Blackwell, London, in 1852 or 1853. By 1859, the EASSC had lost a considerable sum of money and was eventually sold.

Companies sought to offer constantly renewed luxury on board their liners, and tableware in particular had a special importance on board larger vessels. Tableware on ships was often short-lived, and therefore this find is unsurprising given its location in Licence Area 127, some 11 km west of the Isle of Wight and on the approach to Southampton via the Solent. It is highly probable that this plate broke while in use on one of the EASSC vessels and was discarded overboard while the vessel was travelling to or from Southampton. It may have previously been used by passengers or crew while anchored in: Rio de Janeiro, Bahia or Pernambuco (Brazil); Antwerp (Belgium); Hamburg or Bremen (Germany); New York (America); or Calcutta (India), before it came to the end of its useful working life.

Small fragments such as the ceramic investigated here can highlight the rich history of travel and transport by ship in the 19th century. Continued spotting of diagnostic finds contribute significantly to the understanding of the historic environment submerged within UK waters.



Detail of PEARL WARE monogram (Tarmac_0685)

Liaison and accessibility

Details of each discovery have been sent to:

Mark Russell	British Marine Aggregate Producers Association
Stuart Churchley	Historic England, Marine Planner
Hefin Meara	Historic England, National Record of the Historic Environment
Mike Cowling	The Crown Estate
Ian Selby	The Crown Estate
David McChesney	The Crown Estate

Details of discoveries regarded as wreck under the Merchant Shipping Act 1995 have been forwarded to the Receiver of Wreck, Alison Kentuck. In 2015–2016 the following reports were deemed to represent items of wreck:

Report ID	Droit number	Report ID	Droit number	Report ID	Droit number
Tarmac_0635	252/15	Tarmac_0672	041/16	Tarmac_0709	161/16
Tarmac_0636	253/15	Tarmac_0673	042/16	Tarmac_0710	162/16
CEMEX_0637	276/15	Tarmac_0674	043/16	Tarmac_0711	163/16
Tarmac_0638	278/15	Tarmac_0675	050/16	Tarmac_0712	164/16
Tarmac_0639	277/15	Tarmac_0676	088/16	Tarmac_0713	165/16
Tarmac_0640	285/15	Tarmac_0678	057/16	Tarmac_0714	166/16
Tarmac_0643	286/15	Tarmac_0680	065/16	Tarmac_0715	167/16
Tarmac_0644	287/15	Tarmac_0681	066/16	Tarmac_0716	168/16
Tarmac_0645	288/15	Tarmac_0682	067/16	Tarmac_0717	169/16
Tarmac_0646	289/15	Tarmac_0683	068/16	Tarmac_0718	170/16
Tarmac_0647	290/15	Tarmac_0685	069/16	Tarmac_0719	171/16
Britannia_0648	006/16	Tarmac_0687	070/16	Tarmac_0720	172/16
Tarmac_0649	016/16	Tarmac_0688	071/16	Tarmac_0721	173/16
Tarmac_0650	017/16	Tarmac_0689	072/16	Tarmac_0722	174/16
Tarmac_0651	018/16	Tarmac_0690	073/16	Tarmac_0723	175/16
Tarmac_0652	019/16	Tarmac_0691	074/16	Tarmac_0724	176/16
Tarmac_0653	020/16	Tarmac_0692	075/16	Tarmac_0725	177/16
Tarmac_0654	021/16	Tarmac_0693	076/16	Tarmac_0727	178/16
Tarmac_0655	022/16	Tarmac_0694	077/16	Tarmac_0728	179/16
Tarmac_0656	023/16	Tarmac_0695	078/16	Tarmac_0729	180/16
Tarmac_0658	024/16	Tarmac_0696	079/16	Tarmac_0730	181/16
Tarmac_0660	032/16	Tarmac_0697	080/16	Tarmac_0731	182/16
Tarmac_0661	033/16	Tarmac_0698	081/16	Tarmac_0732	183/16
Tarmac_0662	044/16	Tarmac_0699	082/16	Tarmac_0733	184/16
Tarmac_0664	034/16	DEME_0702	107/16	Tarmac_0734	185/16
Tarmac_0665	035/16	Kendalls_0703	137/16	Tarmac_0735	186/16
Tarmac_0666	036/16	Britannia_0704	127/16	Tarmac_0736	212/16
Tarmac_0667	037/16	Tarmac_0705	157/16	Tarmac_0740	253/16
Tarmac_0668	038/16	Tarmac_0706	158/16	Brett_0741	278/16
Tarmac_0669	039/16	Tarmac_0707	159/16		
Tarmac_0670	040/16	Tarmac_0708	160/16		

In the eleventh year of the Protocol, only one discovery was made relating to aircraft (Tarmac_0693). Aircraft that crashed while in military service are automatically protected under the Protection of Military Remains Act 1986. Based on the precautionary principle, a report for Tarmac_0693 was forwarded to Sue Raftree at the Ministry of Defence.

Although the Protocol received a number of reports of artefacts which may relate to vessels, none of them relates conclusively to unknown and uncharted wreck sites. Consequently, no reports were forwarded to the United Kingdom Hydrographic Office in the 2015–2016 reporting year.

Finds information has been sent to the appropriate HER in the county which is most applicable to the discovery. In the case of a discovery where the original location is known, this will be the HER closest to the Licence Area. Discoveries made at wharves where the Licence Area is unknown are reported to the HER nearest to the wharf.

Further details of liaison and the dissemination of data to interested parties are included in the wharf reports appended to this report.



Aircraft fragments
(Tarmac_0693)



Discussion

Importance

Ninety-six individual reports were raised during the 2015–2016 reporting year, approaching double last year's reports (53) and far exceeding the Protocol Implementation Service's expectation of around 50 reports a year.

The finds reported through the Protocol this year are representative of a wide range of periods which bring to light numerous themes, from submerged prehistory (Tarmac_0657: mammoth tooth) to the Second World War (Kendalls_0703: German artillery sight). These finds and those from preceding years signify the wealth of archaeological material that exists offshore, the investigation of which is important to expand the knowledge of the past.

Key issues

The Protocol has not been rewritten since its inception and has only had minor addendums appended to it relating to the handling of specific finds, demonstrating the robustness and effectiveness of the scheme put in place 11 years ago. Despite this, during each year of Protocol implementation minor operational situations are recognised and the Protocol Implementation Service adapts to meet these needs. This year the following points have been raised for discussion.

Changes to the area of seabed licensed

The total area of seabed licensed for aggregate extraction increased in 2015 by 206 km², with increases in all regions except for the East English Channel and South West which remained unchanged. With the increase in area there is the opportunity for different seabed to be dredged within a licence area – particularly if the Active Dredge Area has changed. All aggregate extraction areas are subject to archaeological investigation before the start of dredging but discoveries are likely to be made despite this, hence the implementation of a Protocol. Previously undisturbed seabed, or seabed in areas that have not recently been dredged, is likely to hold material that may be archaeologically significant, and teams working with cargos from these Licence Areas should remain vigilant. Training is available through the Protocol Awareness Programme to support staff.

Quality photographs

As mentioned in the annual reports for recent years, in general the Protocol Implementation Service continues to receive high quality photographs of discoveries, and wharf and vessel staff are commended for their efforts! However, it is always worth keeping in mind the following.

Most of the finds reported through the Protocol are investigated solely through the study of photographs and descriptions provided by staff from the wharves and vessels making the discovery. Guidance on taking effective photographs has been shared with wharf and vessel staff through the Protocol Awareness Programme and the training packs that are given to all wharves and vessels. This guidance recommends that clear photographs of all angles of the find should be taken with the supplied photographic scale or some other form of scale (ie, coin, ruler, pencil) included in the image. Additional photographs should be taken of any distinctive markings. These steps help to ensure that the photographs provide the maximum amount of information for archaeological assessment.



German artillery sight
(Kendalls_0703)



Timely reporting

Wreck-related finds must be reported to the Receiver of Wreck within 28 days of their removal from the seabed, and therefore it is essential to report discoveries to the Protocol Implementation Service as soon as possible to ensure that the relevant report can be generated and submitted. The reporting time limit is a legal requirement of the Merchant Shipping Act 1995 that exists regardless of the presence of a Protocol. Wreck-related finds include any artefacts that have come from a ship or aircraft.

The Protocol Implementation Service Team at Wessex Archaeology

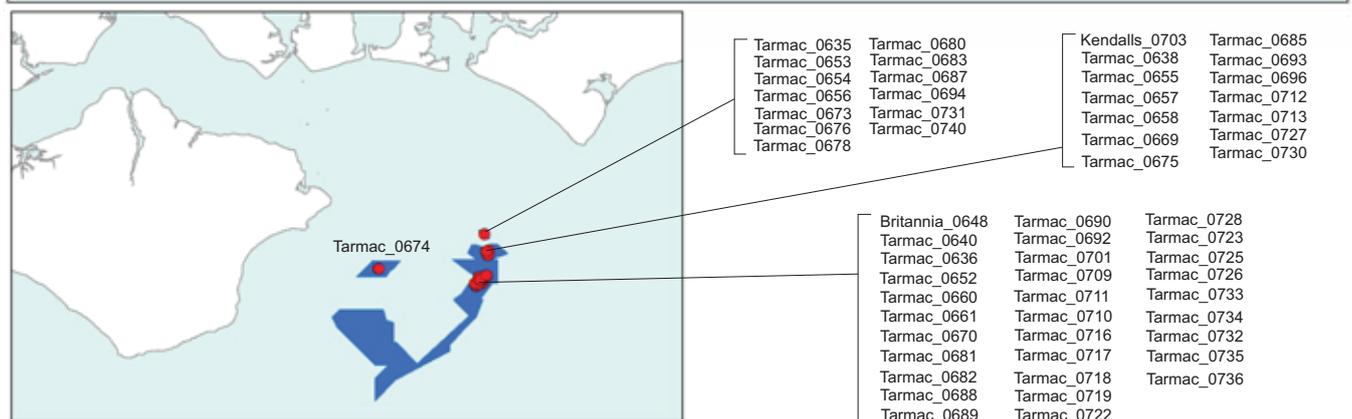
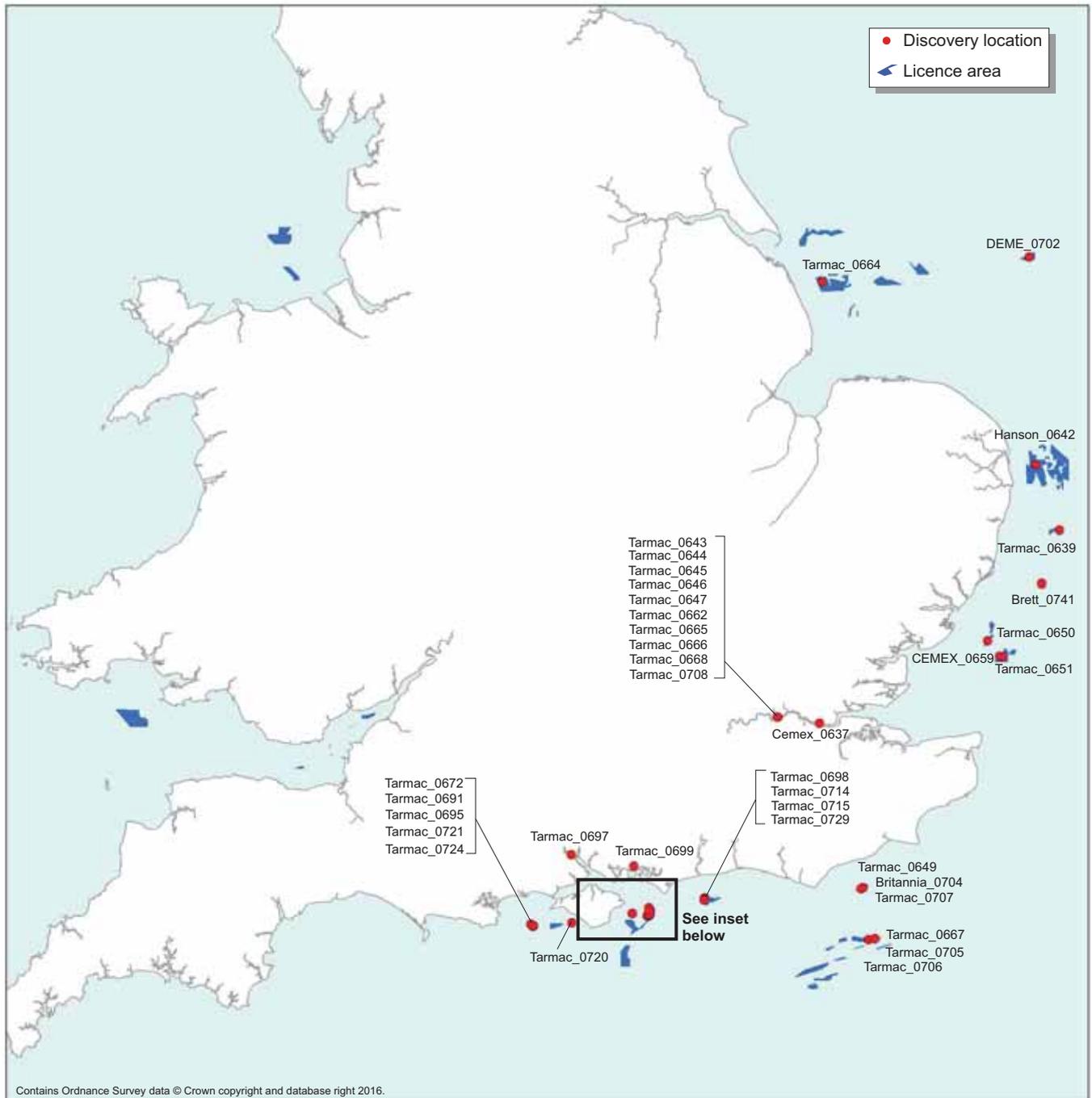
There have been several changes of staff in the Protocol Implementation Service Team at Wessex Archaeology. Team members Debra Shefi and Hannah Steyne have left. However, Tom Harrison, Alistair Byford-Bates and Maddy Fowler have joined Peta Knott, Vicki Lambert and Dee Donohue in implementing the scheme. Euan McNeill has stepped down as manager for the project, and Andrea Hamel, herself a long-standing member of the Protocol Implementation Service Team, has taken over the responsibility. Any questions or queries can be directed to any member of the team, either directly or via protocol@wessexarch.co.uk. The Protocol email address contacts every member of the Protocol Implementation Service Team and we are very happy to help and advise via email, over the phone or in-person through the Protocol Awareness Programme.

Regions with nil return

There were no reports of finds among material dredged from the North West or South West regions during the 2015–2016 Protocol year. The North West region is targeted for sands and screens fitted to the dredgers grade material before it enters the hold, likely accounting for the lack of archaeological reports from this region, the only report from this region being made in 2006–2007.

The South West region, however, has previously yielded archaeological material, though only in the reporting years of 2007–2008 and 2014–2015 have reports been received. It is unlikely that the tonnage of material dredged from the South West region can be used to explain the lack of reports, as the tonnage has increased from 1.09 million in 2014 to 1.13 million in 2015. The tonnage of material dredged from the North West has also increased from 0.52 million in 2014 to 2.05 million in 2015. The North West and South West regions account for approximately 16% of the aggregate dredged in 2015, the last year for which figures are currently published.

Discoveries 2015–2016



Artefact patterns and distribution

Assessing finds on a regional basis provides a useful overview and is particularly helpful when considering future licence applications within existing dredging regions. The long-term duration of the Protocol's implementation allows patterns and trends to be highlighted, which can potentially identify sites of archaeological interest, or licence areas which are more likely to yield finds of archaeological interest in the future.

Archaeology is not distributed evenly on the seabed, temporally or spatially. Two factors must be combined to assess the likelihood of discovering archaeological material in the submerged environment. First, some areas have a higher potential than others to contain material that entered the archaeological record either accidentally or deliberately. Some areas are known to have been high in Palaeolithic activity when sea levels were lower than the present day. Other areas are known to be high in shipwrecks due to dangerous weather patterns or naval battles.

Second, some archaeological materials have a higher potential to be preserved in the marine environment. For example, the predominantly organic finds from the Palaeolithic period will be poorly preserved unless they are buried beneath sediment. Naval ships constructed of metal are more likely to survive, to an extent, due to their durable material. Therefore, for finds to be discovered, the high potential for loss or discard must coincide with a high potential for the preservation of archaeological materials.

As a consequence, some licence areas will contain more archaeological finds than others and may represent certain time periods more than others. Other factors, such as whether they are found in isolation or grouped with similar items, also add to the context of finds. The significance of a find is therefore often due to its location as much as the nature of the object in itself.

Distribution of artefacts by dredging region

There are seven dredging regions around the UK:

- Humber
- East Coast
- Thames Estuary
- East English Channel
- South Coast
- South West
- North West

In the 2015–2016 dredging year a trend established in previous years has continued, with the majority of finds originating from the South Coast region. This year 75% of the reports raised with the Protocol Implementation Service detailed finds from this region, and 38 out of the 71 reports from this region refer to material from Licence Area 351. The South Coast region yielded 3.33 million tonnes of construction aggregate in 2015, 17% of the total tonnage dredged across all regions. A known spread of post-war rubble has contributed to the high number of reports from this region.

Four of this year's 96 reports came from the Thames Estuary region, two from the Humber, two from the East Coast and six from the East English Channel. Eleven reports were made of finds located in a mixed cargo which could relate to one of a number of regions or an unknown region.

No reports were received from cargoes dredged from the South West or North West regions.

Region	Millions of tonnes of marine aggregate dredged in 2015 (2014 quantity)	Number of finds reported 2015–2016 reporting year (2014–2015 reporting year)
Humber	2.14 (1.57)	2 (0)
East Coast	4.47 (4.72)	2 or 3 (3 or 7)
Thames Estuary	2.66 (0.59)	4, 5 or 6 (6)
East English Channel	3.67 (3.62)	6 (4 or 8)
South Coast	3.33 (2.97)	71, 72 or 73 (31)
South West	1.13 (1.09)	0 (2)
North West	2.05 (0.25)	0 (0)
Unknown	—	9



Distribution of artefacts by archaeological typology

Palaeolithic finds

Only one find reported this year is confirmed to relate to the Palaeolithic – a mammoth tooth found at Tarmac's Southampton Wharf and reported as Tarmac_0657. Because of the high level of erosion, it is not possible to determine which species of mammoth this tooth has come from. *Mammuthus primigenius*, the woolly mammoth, is the species most commonly represented by Protocol finds, though evidence of the southern mammoth, *Mammuthus meridionalis*, has also been recovered. It was dredged with material from Licence Area 351 which lies in the South Coast region, to the east of the Isle of Wight, and was identified as of potential archaeological significance by J. Jerromes in February 2016.

Maritime artefacts

Britain has a long maritime history, and therefore it is not surprising to find seafaring-related artefacts in the offshore context; several reports made through the Protocol this year have come from boats or ships. These include ship fittings such as a deadeye from the South Coast (Tarmac_0697), a pulley sheave from the South Coast (Tarmac_0728) and part of a pulley or rigging discovered at Greenwich Wharf (Tarmac_0666). An iron spike for securing ship timbers was recovered from the East English Channel (Tarmac_0706). Other shipping-related finds are a wooden mooring roller from the East English Channel (Tarmac_0667) and a marlinspike discovered at Greenwich Wharf (Tarmac_0708).

As can be expected from the high density of shipping off the Isle of Wight, a number of ship-related finds were located in Licence Area 395, including a boat hook (Tarmac_0654) and a rowlock (Tarmac_0638). A number of brass plaques related to Yarrow & Co Ltd, Glasgow (Tarmac_0640), lighting maintenance (Tarmac_0655) and a storm valve (Tarmac_0685) were also reported (see Case Study page 10–11). Another find related to shipping in this area is the plate sherd located to the west of the Isle of Wight (Tarmac_0691). It is marked with ... AN & AMERICAN STEAM SHIPP ... which researchers have identified as the European & American Steam Shipping Company in operation between 1857 and 1859 (see Case Study page 12).

A large number of other finds might also be associated with shipping, but without further related finds it is difficult to make a positive connection. An example of this are timbers found in the South Coast (Tarmac_0660) and in the East English Channel (Tarmac_0705) that could either be from wooden or composite ships or be associated with marine structures such as jetties or sea defences. Several metal fittings that could be from shipboard machinery were also found this year, although there is the possibility that they had a terrestrial origin and were dumped at sea. An example of this is a metal valve from a boiler that was found at Greenwich Wharf (Tarmac_0644). Once again, a high concentration of material was found off the Isle of Wight, in the South Coast region, including a piston from a steam engine (Britannia_0648), a gas ribbon burner (Tarmac_0715), a light fitting guard (Tarmac_0730) and a CO2 temperature or pressure gauge for fire-fighting equipment (Tarmac_0658).

Despite the high number of ship-related finds this year, none of them are thought to relate to an unidentified wreck site. All of the finds appear to be isolated discoveries, which could have been lost from ships, not with them, or have been moved along the seabed from wreck sites elsewhere.

Featured discoveries from 2015–2016

Britannia_0648 – piston
 Tarmac_0644 – metal valve
 Tarmac_0654 – boat hook
 Tarmac_0667 – mooring roller
 Tarmac_0697 – deadeye
 Tarmac_0705 – timber
 Tarmac_0708 – marlinspike



Featured discoveries from 2015–2016

Cemex_0637 – shell
 DEME_0702 – mine fragment
 Tarmac_0635 – chain shot?
 Tarmac_0718 – cannonball
 Tarmac_0723 – shell fuse

Ordnance and weapons

A considerable quantity of ordnance has been reported through the Protocol this year (28 of the 96 reports). Such reports are only made once the finds have been identified and assessed by appropriate experts in accordance with the requirements of the Guidance Note 'Dealing with munitions in marine sediments'.

Cannonballs, of varying sizes, have only been found in the South Coast, in Licence Areas 127, 351 and 395. Seven individual cannonballs have been reported (Tarmac_0652, Tarmac_0676, Tarmac_0695, Tarmac_0718, Tarmac_0720, Tarmac_0724, Tarmac_0725). Two cannonballs and one grape or musket shot were also reported as a group (Tarmac_0673), as well as a possible bar or chain shot (Tarmac_0635). The most notable find was a collection of 11 cannonballs, some of which are in excellent condition and others of which are completely concreted (Tarmac_0672a). This suggests these cannonballs may have been piled on the seabed and could indicate a munitions dump or a possible wreck site.

Numerous shells and shell casings have been reported (CEMEX_0637, Tarmac_0670, Tarmac_0675, Tarmac_0690, Tarmac_0696, Tarmac_0722), along with a shell fuse (Tarmac_0723) and a shell driving band (Tarmac_0729). Several small calibre bullets and cartridge cases were also discovered, only from the South Coast (Tarmac_0661, Tarmac_0669, Tarmac_0672, Tarmac_0680, Tarmac_0681, Tarmac_0682, Tarmac_0689, Tarmac_0731).

A fragment of a mine was recovered in the Humber region (DEME_0702). Other munitions-related finds include the side plate of a machine gun from the East Coast (Tarmac_0639) and part of a German artillery sight from the South Coast (Kendalls_0703).

Conflict, both historical and modern has left a great deal of weaponry, ordnance and military paraphernalia on the seabed and it is anticipated that further evidence of these conflicts will continue to be recovered in the future.

Aircraft

Only one aircraft-related find was dredged this year, from the South Coast region. This was a 'Zed' skin stiffener (Tarmac_0693). A number of other aluminium finds were sent to specialists, who were able to discount the possibility that they related to aircraft wreckage (Tarmac_0694, Tarmac_0678, Tarmac_0668).



Conclusion

The Marine Aggregate Industry Protocol for the Reporting of Finds of Archaeological Interest evidently continues to be pertinent to offshore mitigation, and endures as a model from which other industries have continued to draw in 2016. It remains an applicable template for overcoming the limitations and challenges of preserving heritage on the seabed.

Applying the Protocol ensures that archaeological information is preserved through its recording and, foremost, through its dissemination. Mitigation measures pertaining to heritage, such as the Protocol, that become embedded in commercial processes reduce the impact of dredging on cultural heritage, thereby preserving heritage for the benefit of future generations.

The Protocol Implementation Service Team would like to thank everyone who has helped to support the Protocol during the 2015–2016 reporting year, as the Protocol enters its second decade.

The future

The Protocol Implementation Service continues to be run by Wessex Archaeology and finds are reported regularly. If you have any questions about finds reporting and the Protocol, please contact us via protocol@wessexarch.co.uk.



Tarmac_0635: Possible Bar/Chain Shot

This artefact was found by N.C. Sait at Southampton Wharf on 29 September 2015. It was recovered from aggregate material dredged by *City of London* from Licence Area 351, which lies to the east of the Isle of Wight.

This iron artefact is roughly spherical, measuring approximately 14 cm in diameter. Due to the distorted nature of the object, it is considered unlikely that the find represents a cannonball. This find is currently unidentified, although there are a number of possible explanations as to its use. Photographs of the find were circulated around the Ordnance Society – an international society formed to promote, encourage and co-ordinate the study of all aspects of the history of ordnance. All members of the society who viewed the photographs of this find noted that an X-ray of the object could help to confirm or deny any interpretations made.

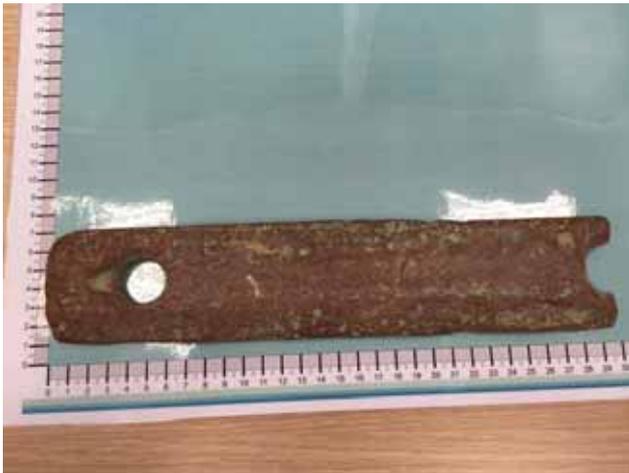
Based on a review of the photographs provided, members of the Ordnance Society arrived at a number of possible explanations for the find. One such explanation, suggested by both Charles Trollope and Trevor Parker, was that the object represented part of a bar or chain shot, a type of ammunition formed of two heavy projectiles (e.g. round shot) joined by a solid bar or chain. Bar or chain shot were used in naval warfare in the age of sail, often aimed at the rigging of a target ship. This type of ammunition became gradually obsolete with the introduction of armoured steam propelled vessels from the mid-19th century. Charles Trollop further suggested that this object represented forged rather than cast metal.

A further member of the Ordnance Society, Kay Smith, was doubtful that the object represented round shot at all. Ms Smith instead suggested that the object could represent a weight of some sort, although she noted that this identification could not be conclusive based on a review of the photographs alone.

If this object is part of a bar or chain shot, it is likely to have come to be on the seabed having been fired in battle or during training exercises. Alternatively, it may represent part of a wider assemblage of artefacts relating to a shipwreck. As such, any further artefacts relating to shipping activity in the area should be reported promptly through the Protocol. Further ship-related debris have the potential to indicate the presence of a hitherto unknown wreck site.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 252/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Hampshire



Tarmac_0636: Metal Bar

This artefact was found by D. Lutman at Bedhampton Wharf on 26 September 2015. It was recovered from aggregate material dredged by *City of Chichester* from Licence Area 395/1, which lies to the east of the Isle of Wight.

This artefact is rectangular in plan, measuring some 300 mm in length and 60 mm in width. The object has rounded corners and appears to have been broken at one end, possibly due to corrosion. There is evidence of two holes in the metal object, measuring approximately 20 mm in diameter, which are 220 mm apart. On one surface, there appears to be a slight indentation in the centre, which may represent some worn lettering although it is not possible to tell conclusively due to the highly weathered nature of the object. No other obviously distinctive elements are visible. The green colourisation of the artefact in places is indicative of the oxidisation that has taken place within a marine context, implying a copper component in its material makeup.

Due to the lack of discernible features, it is not currently possible to conclusively identify this object. If the indentation observed on the object is evidence of lettering, it is possible that it is a brass ship plaque. It is notable that two brass plaques have been recently reported through the Protocol, discovered in aggregate from the Isle of Wight dredging region (Tarmac_0634), although the precise area from which they were dredged has not been conclusively confirmed. A further two objects reported through the Protocol from the same dredge area in recent months also share similarities with this discovery, identified as electrolytic copper bars (Tarmac_0633). The process of electrolysis is a technique whereby ionic substances are broken down into simpler substances using electricity. This process was used on copper to enhance its qualities, resulting in a purer copper which in turn, had better electrical conductive properties. Bars of electrolytic copper were re-used to make various electrical components, such as wire.

At present, this artefact is regarded as an isolated find. However, a number of isolated finds that *may* derive from a vessel or relate to maritime activity have been discovered from this licence area to date. As such, wharf and vessel staff are encouraged to remain vigilant and report all discoveries as and when they occur. A high concentration of seemingly isolated finds have the potential to indicate the presence of a hitherto unknown wreck site.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 253/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Hampshire



CEMEX_0637: Shell

This shell was discovered at Northfleet Wharf on 18 November 2015. The Licence Area from which it was recovered is unknown.

This shell measures approximately 26 cm long and 9 cm in diameter. It was examined by Wessex Archaeology's Bob Davis, who made some observations regarding the find. Mr Davis first noted how largely corroded the object was, leaving many identifying marks indistinguishable. However, he highlighted the presence of a single copper drive band on the shell with characteristic angled notches around the circumference. These notches form as a result of the copper drive band engaging with the rifling of the gun barrel, the motion of which in turn, puts the spin on the projectile as it is fired. Due to the presence of these notches, we can therefore tell that this shell had been fired. The spin of a projectile enables it to travel a further distance and to strike with a greater deal of accuracy.

The approximate 9 cm diameter of the shell equates to around 3½ inches. A shell of this calibre may have been fired from a 25-pounder gun. The 25-pounder, also known as the Ordnance QF 25-pounder, was the major British field gun used during the Second World War, in service from 1940. It remained the British Army's primary field artillery until well into the 1960s. Although the 25-pounder had a smaller calibre and lower shell-weight than many other field-artillery weapons in the Second World War, it had a longer range than most and was regarded as one of the best artillery pieces in use. A shell like this may have come to be on the seafloor as a result of wartime hostilities, either having been fired offshore or washed into the sea as part of a terrestrial deposit.



Finds like this one are not uncommon offshore and staff in the aggregate industry have been trained to recognise and report them for their safety. A similar shell was reported through the Protocol in March 2013 (Hanson_0447, pictured left), resulting in the evacuation of 10 crew members aboard the dredger *Arco Arun* until the bomb squad experts were able to ensure that the shell was safe.

Unexploded ordnance (UXO) pose a significant risk as degradation of the detonator or fuse can render them unstable and an impact could potentially detonate the device. Most ordnance found in British waters relates to the First or Second World War meaning that unexploded ordnance could have lain undisturbed for 70-100 years.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 276/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent



Tarmac_0638: Rowlock

This brass rowlock was discovered by L. Weedon at Shoreham Wharf. It was discovered in material dredged by *City of Chichester* in Licence Area 395/1 off the east coast of the Isle of Wight.

This object has been identified as a brass rowlock, measuring approximately 25 cm in length. A rowlock is a brace fixture that is used to attach an oar to a boat. When a boat is being rowed, the movement of the oar in a rowlock essentially simulates a lever-type mechanism. The force exerted by the rower into the water is transferred on to the rowlock, which forms a pivot – the point of rotation in a lever system. It is this combined motion and force that enables the boat to move. On ordinary rowing craft, rowlocks are attached to the gunwale of the vessel, which is the top edge of the side of the boat.

If the fixtures attaching the rowlock to the vessel are loose, it is possible that such an object could be lost overboard whilst in use, essentially representing an isolated find. Alternatively, a rowlock could derive from a wreck of a rowing boat on the seafloor.

The recovery of this rowlock from the Isle of Wight dredging region leaves another possible explanation as to how this object came to be on the seafloor. Since the introduction of the Protocol in 2005, a vast array of finds have been reported from the Isle of Wight dredging region. Due to the quantity of finds over the years, it has been suggested that a wide spread of rubble is present in this area. The rubble was initially thought to spread across several square kilometres from the south of the Portsmouth coast to the west of Nab Tower, although recent discoveries suggest that this rubble may extend further to the east or that material from the rubble is being moved eastwards as a result of hydrodynamic regimes (e.g. wave motion). The rubble may have accumulated due to the dumping of domestic scrap or demolition debris in the aftermath of the Second World War. Portsmouth City Museum and Records Office have stated that there is no record for this and that the majority of rubble within Portsmouth was dumped inland and reused for various military projects. Archaeological finds from this dredging region vary in type illustrating a wide spectrum of domestic, commercial, industrial and miscellaneous functions, although a predominance of maritime related debris has been noted. A brass rowlock similar to that photographed above was recovered from the Isle of Wight dredging region and reported through the Protocol in 2008 (UMA_0127).

This rowlock is considered to represent an isolated find, but may derive from the rubble discussed above. However, it is currently unknown as to whether the assorted finds from this region represent rubble or a mixture of shipwreck material contaminated with discarded objects. As a result, it is important that further finds from this region are reported as they will enable us to better understand the archaeological potential of this area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 278/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Hampshire



Tarmac_0639: Side Plate of Machine Gun

J. Small discovered this object at Erith Wharf. It was recovered from material dredged by *City of Westminster* in Licence Area 430, off the east coast of Suffolk.

This artefact was recovered in material dredged from a Licence Area some 23 km east of Southwold, Suffolk. The object is metal and measures approximately 57 cm long. Photographs of the find were sent to Jonathan Ferguson, the Curator of Firearms at the Royal Armouries Museum, Leeds. Mr Ferguson confirmed the object as the right-hand side plate of a Browning M2 .50 calibre heavy machine gun.

The Browning .50 calibre machine gun was designed towards the end of the First World War by John Browning, a renowned American firearms designer influential in the development of modern automatic and semi-automatic firearms. The M2 Browning was designed in response to the growing threats of 20th century warfare, such as the use of heavily armoured aircraft like the German Junkers J.I. – the first all metal aircraft to enter mass production. Conventional rifle ammunition was ineffective against such threats, calling for the need of a larger calibre machine gun. The M2 Browning was introduced in 1918 and depending upon the model, had the ability to fire 450-550 rounds a minute with an effective firing range of around 3,000 m (McNab 2001: 196). These specifications enabled the firearm to be deployed for a variety of roles, proving to be effective against infantry, unarmoured or light armoured vehicles and boats, light fortifications and low-flying aircraft. The M2 has had the longest continuous service for a machine gun in the world and is still used today.

In a marine context, this type of machine gun was used as a light anti-aircraft gun or anti-boat defence mounted aboard a ship or as the primary or secondary weapon on a naval patrol boat. It is possible that this side plate derives from a machine gun performing one of these duties. It is likely to have come to be on the seafloor as a result of wartime hostilities, and may represent an isolated find representing debris from a damaged vessel or may relate to the remains of wreckage on the seafloor. As a result, it is important that any further objects of archaeological interest are reported through the Protocol from this Licence Area to ensure that any areas of archaeological sensitivity are identified.

Reference:

McNab, C 2001 *Twentieth-Century Small Arms*. Rochester, Grange Books

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 277/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk



Tarmac_0640: Brass Plaque

This plaque was found by S. Vince at Shoreham Wharf on 9 December 2015. It was discovered in material dredged by *Arco Dee* from Licence Area 395/1, off the east coast of the Isle of Wight.

This oval brass plaque is 9.5 cm long and just under 5 cm wide. The two holes provide points of fixture for the plaque. It is inscribed with the words 'YARROW & Co LTD, GLASGOW' around the outside with 'No. 381' stamped in the centre of the oval.

Yarrow and Co. Limited was a major shipbuilding firm founded in 1865 in London. In 1906, the company outgrew its London site and moved to a site at Scotstoun in the west of Glasgow. The Yarrow Company was one of the world's leading builders of destroyers and frigates in the first half of the 20th century, building ships for the Royal Navy as well as a number of export customers. The company also built a large number of merchant ships. In the 1960s, Yarrow extended their shipyard and was involved in designing and building most of the Royal Navy's post-war escort fleet. The Company continued to be involved in projects for the Royal Navy in the 1970s and in 1977 was merged with others to form the British Shipbuilders.

Photographs of this plaque were sent to the Caledonian Maritime Research Trust, a Trust dedicated to recording the maritime heritage of the Clyde. Members of the Trust have identified the plaque as a probable boiler plate. As well as constructing vessels, Yarrow & Co. Ltd also built boilers for other shipyards. As such, this plaque does not necessarily derive from a Yarrow built vessel. It is not currently known what the number '381' stamped on the plaque relates to or the name of the ship from which it originates. Dr Ian Buxton, a Visiting Professor at the School of Marine Science & Technology, Newcastle University, has previously visited Yarrow's in search of records and was told that many records had been destroyed. Despite this, the Caledonian Maritime Research Trust are continuing to research the find to see if anything further can be ascertained.

At present, this artefact is regarded as an isolated find. However, a number of isolated finds that *may* derive from a vessel or relate to maritime activity have been discovered from this Licence Area to date. As such, wharf and vessel staff are encouraged to remain vigilant and report all discoveries as and when they occur. A high concentration of seemingly isolated finds have the potential to indicate the presence of a hitherto unknown wreck site.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 283/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Hampshire



Hanson_0642: Animal Bone

This bone was discovered by S. Coultrip at Dagenham Wharf on 5 December 2015. It was found in aggregate dredged by *Victor Horta* from Licence Area 240, some 14 km east of Great Yarmouth.

This large animal bone measures some 450 mm in length and 130 mm in width at its widest point. It appears to have been subject to a degree of abrasion. Photographs of the bone were sent to Richard Sabin, the Principal Curator and Collections Manager of the Vertebrate Zoology Group at the Natural History Museum, London.

Although noting the difficulties in identifying bone from a photograph rather than an in-hand examination, Mr Sabin stated that the bone may represent the humerus (upper arm bone) of a fair-sized bovid. The word bovid relates to any variety of mammals which have hoofs and unbranched hollow horns, and includes cattle, bison, sheep, goats, antelopes and gazelles. The exact species from which this animal bone derives cannot be confirmed from a review of the photograph alone, although its dimensions indicate that it was part of a larger species in the bovid family.

Animal bone can enter the archaeological record offshore in a number of ways. There is the potential for animal bones to be washed into the sea from terrestrial deposits, although whether a bone from land could feasibly be moved some 14 km offshore is unknown. Alternatively, animal bones on the seabed may derive from an animal carried on board a vessel. In the 18th and 19th centuries, ships would carry livestock as a resource of fresh meat, with animals such as cattle, pigs, goats and poultry carried on board (Royal Museums Greenwich). A bone like this may have come to be on the seafloor having been discarded as a waste product overboard, or as part of a wreck assemblage. Signs of butchery such as cut marks could be a useful indicator in this respect, although no such marks have been observed on the photograph of this animal bone. This animal bone is currently being regarded as an isolated find, although wharf and vessel staff are reminded to remain vigilant and keep a look out for any further discoveries – a number of seemingly isolated finds have the potential to indicate the presence of a currently unrecorded wreck site.

Reference:

Royal Museums Greenwich 2016 *Research Guide M6: animals at sea*.

<http://www.rmg.co.uk/discover/researchers/research-guides/research-guide-m6-animals-sea-sources-information-national> (accessed 11 January 2016)

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk



Tarmac_0643: Oil Reservoir

This artefact was found by B. Troubridge at Murphy's Wharf, Greenwich, on 6 December 2015. The Licence Area and dredging region from which it was recovered is unknown.

This object was discovered at Murphy's Wharf in Greenwich. Although the Licence Area from which it was recovered is unknown, based on the cargoes being handled at the time of discovery at Murphy's Wharf, there are three possible dredging regions from which it may derive: East English Channel, South Coast or Thames.

The object is brass and circular in shape, with one solid end and an opening on the opposite side. It measures approximately 130 mm in diameter at its widest point. This object has been identified by Toby Gane, a Project Manager in Wessex Archaeology's Coastal and Marine team, as a probable fuel reservoir or chamber of a lamp. Although its date is unknown, Lorraine Mephram, a Senior Manager at Wessex Archaeology with an expertise in artefact research, suggests that a 19th or 20th century date is probable.

Fuel reservoirs or chambers are a design component of oil or fuel lamps, a form of lighting which were used as an alternative to candles before the advent of electric lighting. Although oil lamps have been in use for centuries, the basic ancient form of lamp was replaced in the late 18th century by the Argand lamp. The main disadvantage of these lamps was that the oil reservoir had to be above the level of the burner due to the heavy and sticky nature of the vegetable oil which would not rise far up the wick. The Argand lamp was in turn replaced by the Kerosene lamp which used paraffin as a fuel, the use of which continued well into the 20th century.

Oil or fuel lamps were typically used on board vessels in the form of ship's lanterns. This object is currently being regarded as an isolated find. It is possible that it came to be on the seabed having been lost overboard. As the area from which this object was dredged remains unconfirmed, it cannot be known whether this object derived from a wider assemblage relating to a shipwreck. However, even finds that have been moved from their primary context are useful to archaeologists in illuminating the past.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 286/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0644: Metal Valve

This object was found by J. Wallis on 22 November 2015 at Murphy's Wharf, Greenwich. The Licence Area and dredging region from which it was recovered is unknown.

This object was found in the metal skip at Murphy's Wharf, Greenwich. Although the Licence Area from which it was recovered is unknown, based on the cargoes being handled at the time of discovery at Murphy's Wharf, there are three possible dredging regions from which it may derive: East English Channel, East Coast or Thames.

This artefact comprises a solid brass valve, approximately 130 mm in height and 60 mm in width, attached to an iron bracket measuring approximately 110 mm long. The valve has been identified as a probable safety or escape valve; a component associated with pressurised vessels. Safety or escape valves were first used on steam boilers during the Industrial Revolution in the mid-18th to 19th centuries. They served the function of increasing the safety of a steam plant through releasing air, vapour or steam from a boiler when pressurised in order to relieve the pressure. Early boilers that were not fitted with safety valves were prone to accidental explosion.

Given that this valve was discovered on the seabed, it is feasible that it derives from the boiler of a steam engine fitted to a boat or ship. The technological innovations of the Industrial Revolution brought fundamental changes in maritime technology, which amongst other advances in naval engineering, enabled the development of steam propulsion. Following their introduction to the maritime industry in the first half of the 19th century, steam engines were initially used to supplement propulsion by sail. Boilers could also be used on board a sailing vessel for working winches and anchor capstans. In the second half of the 19th century, steam engines became more reliable and economical, and in time became commonplace as a means of propulsion until they were ultimately replaced by the diesel engine in the 20th century.

This object is currently being regarded as an isolated find. Although currently unconfirmed, it seems likely that this valve has derived from a boat or ship. It may have been lost from a vessel which did not sink, but experienced damage to its steam engine, perhaps as a result of wartime hostilities. Alternatively, it may be part of a wider shipwreck assemblage.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 287/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0645: Ship Fastening

This artefact was found by B. Troubridge at Murphy's Wharf, Greenwich, on 12 December 2015. The Licence Area and dredging region from which it was recovered is unknown as the object was discovered in the crusher house chute.

This object was identified as a possible iron stud or rivet head by the staff at Greenwich Wharf. It measures approximately 70 mm in diameter and is highly abraded.

A wide variety of ship's fastenings exist which vary greatly in size, form and material. As a result of this variety, a fastening encountered by archaeologists in place on hull timbers are understandably much easier to identify than those out a context, such as this artefact. To further complicate matters, the identification of ship's fastenings out of context is commonly based on the length of the nail or bolt, and it appears from a review of the photographs of this artefact as though the shank of the fastening has largely corroded away.

If we are to assume that the shank of this fastening is similar to its original length, albeit weathered, then a number of possible identifications can be made. Based on the photographs, the length of the shank appears to be around 30 mm long (just over an inch) and the fastening has a broad circular head which is almost flat, although ever so slightly convex. A fastening with these characteristics could represent a *flat nail*; a type of nail with a small flat shank nearly 1 inch long which were used to fasten tarred paper to the bottom of ships before the sheathing was applied (Falconer 1815: 291 cited by McCarthy 1996: 183). Alternatively, it could represent a *scupper nail*; a nail of about an inch in length with a broad flat round head, used for fastening lead, leather and canvas to the scuppers (Falconer 1815: 291, Roding 1793: 653 cited by McCarthy 1996: 184). A further possible identification for this fastening could be a *sheathing nail*, used to fasten sheathing boards onto ships to protect the hulls against shipworm and marine growths. Sheathing nails were made of either iron or copper with flat round heads and a shank measuring around 1¼ inch long (McCarthy 1996: 185). The heads of sheathing nails were often polished so that marine weed would not adhere to them. The head of this artefact is fairly smooth and may represent a polished surface.

Although these identifications are speculative at this stage and based on a review of photographs alone, they highlight the wealth of maritime related artefacts that can exist on the seafloor. This object is being regarded as an isolated find. As the area from which it was dredged remains unconfirmed, it cannot be known whether this artefact derived from a wider assemblage relating to a shipwreck.

Reference:

McCarthy, M 1996 Ship fastenings: a preliminary study revisited, *The International Journal of Nautical Archaeology* 25(3&4), 177–206

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 288/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0646: Possible Weight

This object was found by B. Troubridge at Murphy's Wharf, Greenwich, on 15 December 2015. The Licence Area and dredging region from which it was recovered is unknown.

This curious object currently remains unidentified, although a number of possible suggestions as to its function have been put forward. The object, based on the photographs provided, appears to measure some 16 cm in length and 5 cm in width at its widest point. It consists of what appears to be a wrought iron 'sleeve' that has a deliberate opening along the length of the artefact, with a deep recess within which lie brass elements. The end of the object also appears to be made of brass (to the right in the photograph above).

When the artefact was first reported through the Protocol, it appeared to be almost shell-like in appearance. Photographs of the object were sent to various specialists in an attempt to identify the item, but to no avail. Bob Davis, a Senior Heritage Consultant at Wessex Archaeology, noted that the proportions of the object are all wrong for a projectile, and noted that the long deliberate opening affirms that the object cannot represent an item of ordnance.

A number of alternative and tentative identifications have also been proposed for this object. Dan Atkinson, the Regional Manager of Wessex Archaeology's Scotland Office, suggested that the object may represent a possible counterweight or a sinker for towed gear. Counterweights are used to counterbalance a load in order to make the lifting of a heavy load more efficient and were often used in association with boats and ships. A sinker is a weight used to sink gear that would otherwise float. They are often used in conjunction with fishing equipment. Alternatively, Bob Davis suggested that the object could represent some type of mechanical component. This object remains a mystery at present, although the Implementation Service at Wessex Archaeology are continuing to explore its origin and function.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 289/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0647: Metal Pulley

This artefact was found by B. Troubridge at Murphy's Wharf, Greenwich, on 28 November 2015. The Licence Area and dredging region from which it was recovered is unknown as the object was found in the conveyor feed chute at the wharf.

This object has been identified as a probable iron pulley. The pulley measures approximately 110 mm in length and 60 mm wide at its widest point. The pulley wheel has a concave groove around its circumference and is attached to a hinge.

Pulleys on board boats and ships are commonly referred to as blocks. They are designed to aid load lifting so that the amount of force needed to lift an object is reduced, with the weight of the object being transferred to the pulley mechanism.

Blocks have a wide variety of uses on board vessels and are used in any context where the mechanical advantage of a pulley system makes the hoisting of an object easier than relying on muscle power alone. A block of this size may have been associated with the rigging of a small sailing boat with the rope (the drive element of the pulley) running inside the groove of the wheel. Alternatively, it could have been used to hoist an awning or similar. As the use of blocks in nautical contexts are manifold, it is not possible to say with any degree of certainty the role that this pulley in particular provided on board.

An alternative identification for this artefact is that it represents a castor – a small wheel mounted to the bottom of a larger object so that the object is more easily moved. If this identification is correct then the groove around the circumference of the wheel would be expected to house the tyre. Castors are found in numerous applications, including material handling equipment. A wheel of this size with a hinged fixture would not be expected to facilitate the movement of an object of any notable weight.

This artefact is considered to represent an isolated object. It may have been used in a terrestrial context and dumped out to sea or may derive from a vessel, having been lost overboard or representing part of a larger shipwreck assemblage.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 290/15)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Britannia_0648: Piston

This artefact was found by B. Murton on board *Britannia Beaver* on 21 January 2016. It was discovered in material dredged from Licence Area 351, some 11 km to the east of the Isle of Wight.

This object has been identified as a piston, measuring some 32 cm in length. The piston appears to be made of wrought iron. It consists of a cylindrical piston component which has been damaged and torn open, an internal spring and a connecting rod which would have connected the piston to a crank or crankshaft.

Pistons are mechanical components of reciprocating engines and other similar mechanisms. The purpose of a piston in a reciprocating engine is to transfer the force of expanding gas into a rotating motion. The pressure of the expanding gas is forced downwards in the piston through to the connecting rod, and in turn on to the crankshaft. This force is essentially converted into motion as it causes the crankshaft to rotate. Reciprocating engines include both external combustion engines, such as the steam turbine engine, and internal combustion engines, such as gas turbine or jet engines.

As a wrought iron piston, this artefact is thought to represent an early example of a piston as later examples were made from lighter alloys. It is possible that this piston derives from the remains of a boat or ship that had been equipped with a steam engine. The Industrial Revolution of the 18th and 19th centuries saw the development of the steam engine, and it was not long before these engines were put to use at sea. While steam propelled vessels in their early form (such as paddle steamers) date back to the first half of the 19th century, they were in the minority and sailing vessels were still more plentiful on the seas and in Britain's waterways. Steam was often used as an auxiliary form of propulsion alongside sail at this time. It was not until the introduction of screw driven compound engines in the mid-19th century, which provided a more efficient and cost effective means of propulsion than earlier forms of steam engine, that steam could truly compete with sail. By 1868 the tonnage of steam-propelled vessels being built in Britain exceeded that of sail tonnage built (Hope 1990: 303).

This piston could be seen as representative of a period of revolutionary change in ship building and design. Although it is currently being regarded as an isolated find, further maritime-related debris in the area has the potential to signify the presence of a currently unknown wreck site and wharf and vessel staff are reminded to remain vigilant for any further discoveries in the area.

Reference:

Hope, R 1990 *A New History of British Shipping*. London, John Murray

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 006/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0649: Sack Scale

P. Stonehouse found this artefact on the wharf at Greenwich after unloading *City of London*, which had been dredging in Licence Area 460 off the south coast, in the Hastings dredging region. It was reported in February 2016.

The crew of *City of London* recovered the sack scale during the dredging of Area 460, but the keen eyes of P. Stonehouse and colleagues at the Greenwich Wharf recognised the iron object. Realising that it was of archaeological significance, the crew made sure that the find was reported correctly, provided a good set of photographs and detail of the find and are praised for their commitment to heritage.

Wessex Archaeology's Bob Davis was able to identify the find as the arm from a sack scale or "cotton scale". Which would have been used in the weighing of large sacks containing various contents for trade and stock control during the process of loading and unloading a vessel.

The hole at the hook end would have had a hanging fixing attached to a beam or similar fixing point. While the sack to be weighed would be hung from the hook at the other end. The long arm would originally have displayed the weight, marked along its length. From the evidence provided it looks to be constructed from wrought iron and is likely to date to the 19th century.

Trade routes by the 19th century were highly exploited and the trade in materials between nations was rife. The use of a scale to ensure the correct deal was done during trade would have been a vital piece of a merchant ships equipment. It is possible that this is an isolated find, and was either lost or discarded overboard.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 016/16)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex



Tarmac_0650: Copper Pipe

C. Taylor and S. Bracey found this artefact on the wharf at Greenwich after unloading *City of London*, which had been dredging in Licence Area 509/3 off the southeast coast. It was reported in February 2016.

The crew of *City of London* recovered the copper piping during the dredging of Licence Area 509/3, but the keen eyes of C. Taylor and S. Bracey at Greenwich Wharf recognised the object. Realising that it was of archaeological significance, the crew made sure that the find was reported correctly, provided a good set of photographs and detail of the find, and are praised for their commitment to heritage.

Wessex Archaeology's staff had some difficulties identifying this object, but Bob Davis suggests it looks to relate with it being part of a steam or hot water system. Being made of copper, and with the plate fixed to the base with four fixing holes, it may suggest steam, but we cannot be certain.

Nearly all types of vessel will have some copper piping within its construction in relation to either hot water or steam, making this very difficult to identify. It is possible that this find is an isolated find, thrown overboard after a repair, but with it being such an internal part of a ship, it may indicate a wreck in the area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 017/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Essex



Tarmac_0651: Oil Lamp Reservoir

M. Whyman found this artefact on the wharf at Greenwich after unloading *City of Westminster*, which had been dredging in Licence Area 509/3 off the east coast, in the Long Sand Head dredging region. It was reported in February 2016.

The crew of *City of Westminster* recovered the oil lamp reservoir during the dredging of Licence Area 509/3, but the keen eyes of M. Whyman and colleagues at the Greenwich Wharf recognised the brass object. Realising that it was of archaeological significance, the crew made sure that the find was reported correctly, provided a good set of photographs and detail of the find and are praised for their commitment to heritage.

Members of the Coastal and Marine department at Wessex Archaeology compared the find to ceramic versions previously found during dredging operations, which suggest that this is an oil lamp reservoir.

Oil lamps date back at least as far as 1500 BC to the Phoenicians and Greeks who passed this on to the Romans around the 4th century BC. Originally resembling more of a dish, they developed excessive amounts of smoke and use declined over the centuries until around the 16th century where the designs became more advanced, including the invention of the bowl type reservoir and addition of empty cylinders to reduce smoke output. By the mid-18th century the Italians in particular began to make more elaborate designs, using materials such as silver. This brass example is possibly dated to the Edwardian period when brass was a common material, later to be replaced by the Victorian ceramic designs.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 018/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Essex



Tarmac_0652: Cannonball

J. Jerromes found this cannonball whilst sorting materials offloaded from *Arco Dee* at Southampton Wharf. It comes from Licence Area 351, in the Isle of Wight region. It was reported in February 2016.

Photos sent by the wharf to Wessex Archaeology of the find identify it as of a large calibre, possibly from a 42-pounder, or similarly sized, cannon.

The keen eyes of J. Jerromes and colleagues at the Southampton Wharf recognised the cannonball after noting examples seen through the Protocol and its' relating annual reports and *Dredged Up* newsletter. Realising that it was of archaeological significance, the crew made sure that the find was reported correctly, provided a good set of photographs and detail of the find and are praised for their commitment to heritage.

During the early 18th century the 42-pounder cannon was considered as the Navy's most powerful and prestigious gun. Many of these cannon would have been found on the lower gun deck, inflicting as much damage as possible to the opposing ship's hull. A projectile of this size and weight would have easily penetrated the outer timbers of an opposing ship from a distance of up to nearly 100 meters. *Victory* (1744) is one of the rare vessels to carry these guns, but they were widely adopted by Cromwell's government throughout the century. By the end of the 18th century the 42-pounder cannon was discontinued due to being 'too unwieldy'.

The Channel has seen many naval battles through time, with the great powers of the English, French, Spanish and Dutch all conjugating around the English Channel. On many occasions war broke out, with the French and the English having some 'differences' during this period.

The cannonball is considered to be an isolated object, but any further discoveries should continue to be reported through the Protocol, as they could shed light on a naval battle.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 019/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0653: Anode

Mr A. Harrigan found this anode on the conveyor whilst sorting materials offloaded from *City of Chichester* at Southampton Wharf. It comes from Licence Area 351, in the Isle of Wight region. It was reported in February 2016.

An excellent description provided by N. Sait has enabled staff at Wessex Archaeology to confidently agree that this is an anode.

A ship is continuously in contact with water and moisture laden winds making it highly susceptible to corrosion. Anodes are common upon ships nowadays as a means of protection to ships hulls, but also to ballast tanks and heat exchangers, from corrosion. They can be made from several different materials such as zinc, aluminium, chromium and others, with zinc being the most common.

They work by reacting with the sea water which acts as an electrolyte and transfers a protective layer of electrons drawn from the anode itself. They are attached at various points around the hull of the ship, being sacrificial it would not be overly uncommon for an anode to become detached at any stage.

The anode is considered to be an isolated find, however any further finds in the area should continue to be reported.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 020/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0654: Boat Hook

N. Sait found this boat hook on the conveyor whilst sorting materials offloaded from *City of Chichester* at Southampton Wharf. It comes from Licence Area 395, in the Selsey Bill region. It was reported in February 2016.

N. Sait recognised the find straight away as a boat hook, and photographs of the find sent to Wessex Archaeology confirm this. With an excellently compiled initial report, Mr Sait and those involved must be praised for their committed involvement with the Protocol.

Some of the wooden handle of the boat hook is extant, so it is likely to have been broken and thrown overboard at some point. It is difficult to date objects such as a boat hook; while there are several designs, it is a standard tool that has remained relatively unchanged in form for some time.

The boat hook is a part of the most common equipment found upon boats of all types and find many uses aboard the vessels; docking and undocking, collecting netting, lines or buoys or other debris. This boat hook is thought to be an isolated find, and it is possible that it was lost overboard from a passing vessel.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 021/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0655: Brass Maintenance Plate

A. Harrigan discovered this brass plaque on the wharf at Southampton after offloading *City of Chichester* which had been dredging in Licence Area 395/1, south of West Sussex.

The object was requested by Wessex Archaeology for closer examination and for a more thorough interpretation of the writing on the plaque.

The plaque measures 75 mm in length and 25 mm in width and, as mentioned, is made from brass, a common material for use at sea due to its resilience to corrosion.

The plaque reads:

“Weather deck LTG from M2-12-D222 (Bridge) CC box Focastle dk. For fitting 36? Sw.ski & fitting stn 36s”.

Which can be read as “weather deck lighting from M2-12-D222 (bridge) central control box forecastle deck for fitting 36s...”.

It is likely that this plaque would have been identifying a fuse or switch box controlling the lighting for the forecastle, bridge and weather deck of a vessel. It can be assumed that the vessel was of some size as the weather deck lighting runs from M2 to 12, suggesting that there may have been eleven lights and then the bridge (D222).

Small artefacts such as this may relate to the wrecking of a ship; small parts can easily come loose and be carried by tides. The find looks to be non-contentious, but further finds in the area may indicate the presence of a wreck. Either this or it has been discarded into the sea for some unknown reason.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 022/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0656: Possible Lever Plate

J. Jerromes discovered this artefact on the conveyor at Burnley Wharf, Southampton. The material was dredged by *City of Chichester* in Licence Area 395 in the Selsey Bill region.

Photos of the brass disk were shown to Wessex Archaeology staff; however, it was not possible to conclusively identify the object.

An exact replica of the artefact (LTM_0560) was reported through the Protocol in 2014, dredged by the same vessel, but to the west of the Isle of Wight. The excellent report and photographs compiled by wharf staff have been very helpful. The artefact measures approximately 14 cm in diameter and the blue/green colouring of the object suggests it is made of a copper alloy. By comparing the two discoveries it is possible to say that the notch taken out of the side is original, likely in order for it to fit within a console around a square or rectangular object. The longitudinal slot through the centre suggests that this plate once surrounded a lever.

Objects such as ships fixtures and fittings can find themselves underwater for a multitude of reasons; it may have been an isolated object that was discarded overboard by a passing vessel, or even indicate the presence of a shipwreck in the vicinity. Further attention should be paid to loads retrieved from the area for the potential of further wreckage and reported through the Protocol.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 023/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0657: Mammoth Tooth

J. Jerromes found this mammoth tooth whilst sorting materials offloaded from *Arco Dee* at Southampton Wharf. It comes from Licence Area 351, in the Isle of Wight region. It was reported in February 2016.

The keen eyes of J. Jerromes and colleagues at the Southampton Wharf recognised the mammoth tooth after noting examples seen through the Protocol and its' relating annual reports and *Dredged Up* newsletter. Realising that it was of archaeological significance, the crew made sure that the find was reported correctly, provided a good set of photographs and detail of the find and are praised for their commitment to heritage.

Photographs of the mammoth tooth were sent by the wharf to staff at Wessex Archaeology who have confirmed it as a mammoth tooth from the Palaeolithic period.

The mammoth roamed the Earth between five million years ago, up until their extinction around 4,500 years ago. During this time the area we now see as the English Channel was actually dry land, linking Britain to Continental Europe. With the retreating ice caps, sea levels rose; and about 7,000 years ago this link was broken. Many extinct animal remains lie around our southern and eastern shores and finds of mammoth teeth and other bones are not uncommon in the area. Information such as this provides us with estimated details of their territories, population and their state of health.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0658: CO₂ Temperature or Pressure Gauge

J. Jerromes discovered this artefact at Burnley Wharf, Southampton. The material was dredged by *City of Chichester* in Licence Area 395/1 in the Selsey Bill region.

Photos of the find and thorough information provided by the wharf staff's report tell us that the object has the markings "1953 England CO₂ 8S1382". This suggests that this is a temperature gauge for CO₂.

It is common aboard ships for the fire-fighting equipment to be either a CO₂ flooding system or central bank CO₂. It will release CO₂ in bulk quantity to protected spaces such as engine rooms or cargo holds during the event of a fire. CO₂ is a very effective fire suppressant with a high expansion rate; it works fast to reduce oxygen levels. A bonus is that it is a gas, so no clean-up is required after discharge.

The CO₂ flooding system relies on linking several CO₂ cylinders together and a series of pipes will be distributed around the ship. The recovered object is likely to have been either a temperature or pressure gauge for the CO₂ flooding system. The copper down pipe is a good conductor, which links it more to a temperature gauge.

Objects such as ships fixtures and fittings can find themselves underwater for a multitude of reasons; it may have been an isolated object that was discarded overboard by a passing vessel, or even indicate the presence of a shipwreck in the vicinity. Further attention should be paid to loads retrieved from the area for the potential of further wreckage and reported through the Protocol.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 024/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



CEMEX_0659: Cattle Bone

This cattle bone was discovered by M. Pettitt at Brighton Wharf on 29 March 2016. It was found in aggregate dredged from Licence Area 510/1, some 25 km east of Essex.

This cattle bone measures approximately 190 mm in length and 50 mm in width at its widest point. Lorrain Higbee, senior zooarchaeologist at Wessex Archaeology, identified the bone from photographs and stated that the cattle bone may represent the tibia shaft (lower back leg). Based on their size, cattle bones are commonly mistaken for human bones, however the shaft of cattle tibia is significantly more robust.

There are a number of ways through which animal bone can enter the offshore archaeological record. A potential means is being washed into the sea from terrestrial deposits, although the feasibility of moving 25 km offshore is unknown. Another alternative is that bone like this may have come to be on the seafloor due to being discarded as waste product on board a vessel or as part of a wreck assemblage of a ship. In the 18th and 19th centuries, livestock such as cattle were carried on board as a source of fresh meat. Butchery marks can provide important behavioural evidence archaeologically, although no such marks have been observed on the photograph of this cattle bone.

Now in your safe keeping, this cattle bone is currently being regarded as an isolated find, although wharf and vessel staff are reminded to remain vigilant and keep a look out for any further discoveries. A number of seemingly isolated bone finds have the potential to indicate the presence of cargo on a currently unrecorded wreck site and this is the second animal bone recovered from Licence Area 510/1.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Essex



Tarmac_0660: Timber

This timber was discovered by N. Sait at Southampton Wharf on 9 March 2016. It was found in aggregate dredged by *Britannia Beaver* in Licence Area 351, some 10 km east of the Isle of Wight.

This timber measures approximately 420 mm in length and 100 mm in width at its widest point, and also features two 7 mm diameter holes. Bob Davis, senior consultant in the heritage team at Wessex Archaeology, examined the timber from photographs and stated that it appears to be a bolted plank or board. One of the two holes (the lower hole in the figure above) is rebated, possibly implying that the bolt head was hidden below the surface. There also appears to be a stain running perpendicular across the area of the two bolts, presumably where another board was fixed across. In addition, the pointy end (the left hand end in the figure above) is split, as though it has been driven into the ground.

The origin of this timber is unknown. While it is possibly from a wooden boat, it is equally possible that it is not related to maritime activities. It is difficult to provide an accurate date; however, it is likely to be fairly modern (20th century) as otherwise it would have rotted away. Another plausible scenario is that this timber was utilised in a breakwater or groyne and may have washed out to sea. Coastlines have had a series of installations built along sections of them throughout the 20th century to protect against coastal erosion.

While several other finds have been reported in Licence Area 351 through the Protocol, none of them were timbers. This find is, therefore, considered to be an isolated find and does not indicate a site of archaeological significance, such as a shipwreck. Wharf and vessel staff are reminded to remain vigilant and keep a look out for any further discoveries.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 032/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0661: 7.62 mm Steel Tip Round

N. Sait made this discovery at Southampton Wharf after the offloading of *Britannia Beaver*. The dredging had been taking place in Licence Area 351, off the southwest coast of West Sussex.

The small bullet discovered by N. Sait on the wharf was retrieved from Tarmac by Wessex Archaeology for closer inspection and for a more detailed interpretation.

The bullet measures 30 mm in length and has a width at its widest point of 7 mm. The round is constructed of steel and has a hollow base. Inside the hollow base would be small amounts of chemicals that will react upon firing and illuminate the round for over 500 yards. The tracer round was filled with a small amount of chemicals that once fired will have a mild incendiary effect. Chemicals such as magnesium carbonate, strontium nitrate, barium peroxide and other variants on potassiums, iron carbonates and magnesiums were all used.

The steel round was shown to Bob Davis, senior consultant in the heritage team at Wessex Archaeology, who was able to confirm that the bullet round was a 7.62 calibre bullet, a very common round size since the 1950s and still widely used by NATO countries, Russia and others. This size of round is popularly used in sniper rifles for its favoured ballistic properties.

It is possible that this is a tracer round, first developed in the United Kingdom in 1917, although this particular example was not made until at least 1950. This type of round has been found useful as a signalling device; many ground troops in the Second World War were issued tracers as a form of SOS signalling. The principle use was that the gunner would serve to direct fire towards a given target, with the disadvantage that they can see where the round was fired from; due to this, modern tracers have a delay, only illuminating sometime after leaving the muzzle. Shooting at night, this would have been an invaluable type of round.

The area around the West Sussex coastline saw a lot of training action and is still used today, although very much less. It is likely that this is an isolated find, fired during training exercises.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 033/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0662: Metal Cargo Plate

This artefact was found by P. Scrace at Greenwich Wharf on 14 March 2016. It was recovered from aggregate material dredged by *City of Westminster*. Its dredged location is unknown.

The artefact is a torn, stamped, white metal plate, rectangular in shape measuring 150 mm by 75 mm with a punched hole at each corner. These are presumed to be for mounting the plate. The plate has the following details stamped on it: a weight of 1482Kg, a percentage nickel content of 43.1%, and manufactured in the Dominican Republic. The lot number has been partially erased. The 'Falconbridge' company logo is stamped in one corner.

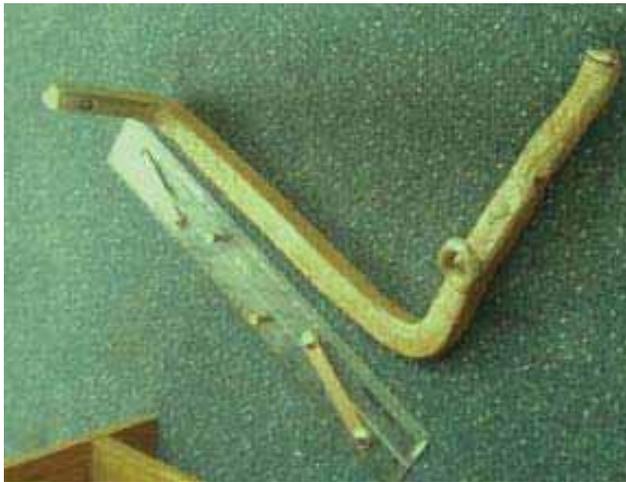
The name on the plate is from 'Falconbridge Dominicana', and relates to a nickel surface mine and processing plant in the Dominican Republic that in 2006 became part of Xstrata Nickel, they then merged with Glencore in 2013. In 2015, the mining operation was acquired by Americano Nickel Limited (ANL).

At present, this artefact is regarded as an isolated find. However, a number of isolated finds that may derive from a vessel or relate to maritime activity may have been discovered from this Licence Area. As such, wharf and vessel staff are encouraged to remain vigilant and report all discoveries as and when they occur. A high concentration of seemingly isolated finds have the potential to indicate the presence of a hitherto unknown wreck site.



Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 044/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0664: Lead Structure

D. Johnson found this object in the drag head whilst offloading material from *City of London*. It comes from Licence Area 197, off the Lincolnshire coast. It was reported in April 2016.

This peculiar find, discovered by D. Johnson, has had many of the Wessex Archaeology staff puzzled over what it is.

The object looks to be a part of a larger structure with holes for fixings at both ends and a loop welded to the structure. Those at Tarmac who reported the object, describe it as being made of lead and possibly part of fishing or trawling gear.

For a structural element to be made of lead does not sound right, as the structural support offered by lead as a material is so poor, and the addition of an eye makes this more peculiar as this would not take much force to become misshapen.

One possible suggestion for this find is that it a part of an awning found on a vessel, possibly from a sunscreen style awning on a yacht, and the eye would be used for tying it down.

The object resembles a common bracket in shape, and could have been part of a supporting structure aboard most types of vessel. But the material it is constructed from is much too soft for this type of use.

This object is considered to be an isolated find, and further similar finds may help to bring a more certain interpretation, however at this present time, the function of the find is unknown. Any further finds in the area should continue to be reported.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 034/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Lincolnshire



Tarmac_0665: Stopcock Cover

B. Troubridge found this object on the wharf at Greenwich after unloading *City of Westminster*. It was picked up by the metal detector, so the Licence Area of origin is unknown.

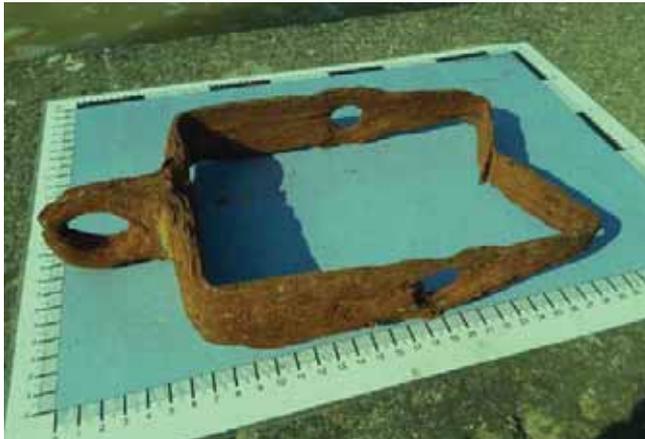
This stopcock cover was discovered by B. Troubridge whilst manning the metal detector at Greenwich Wharf. The object was dredged on 17 March 2016 by *City of Westminster*. Unfortunately, the Licence Area in which the object was picked up is unknown.

Stopcock covers are very common, found on all footpaths and streets across the country. Stopcocks are used to regulate the flow of water to residential and commercial units. The plumbing is sub-surface and requires maintenance access, the stopcock cover is the access point for any required maintenance or repairs.

The example dredged up by *City of Westminster* is notably of modern date, yet lacks any markings to suggest a date or company, making identification beyond a stopcock cover very difficult. It is highly likely that the cover was discarded into the sea and unrelated to shipping due to this being a land-based object.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 035/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0666: Part of Pulley or Rigging

B. Troubridge found this object on the wharf at Greenwich after unloading *City of Westminster*. It was dredged during March 2016, but unfortunately the Licence Area could not be confirmed.

The object was discovered by B. Troubridge at Greenwich Wharf after the unloading of *City of Westminster*. Unfortunately, the object was not discovered until it had reached the magnets at the wharf and the dredging area cannot be confirmed.

The find has been identified as part of a pulley system or a part of a ship's rigging by staff at Tarmac and staff at Wessex Archaeology agree with this interpretation.

The large outer loop would have been attached to the ship, likely to the main mast or boom, with a pulley wheel inside of the square attached via a central pin. The pulley would have been used for lifting large heavy items in particular, but also for any materials that needed to be loaded or offloaded.

Other interpretations of the find are that it would have been attached to the mast or a boom. These mast bands would have been wrapped around the masts set apart in intervals and the exterior eye used for various attachments.

With the find being square in form, it's believed to be more likely to part of a pulley system. Had it been rounded then it would have more likely been a part of the ship's rigging.

Finds such as this may be isolated or indicate the location of a shipwreck. As mentioned, unfortunately we do not know the exact area this find came from. In other cases, we would ask for the crews to pay extra vigilance in case of a wreck.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 036/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0667: Wooden Mooring Roller

P. Stonehouse found this object on the wharf at Greenwich after unloading *City of Westminster*. It was dredged from Licence Area 458, off the coast of East Sussex, at the end of March 2016.

The object was discovered by P. Stonehouse at the Greenwich Wharf after the unloading of *City of Westminster*. The find was reported and photographed very well, which allowed staff at Wessex Archaeology a better chance of identifying such a peculiar object.

The wooden roller has a brass bushing running directly through the centre and out the other end, suggesting that this would be a roller of sorts. The inner metal is brass, meaning that the core of the roller would have been naturally resistant to rust and would not require lubrication. This would give the impression that this is a roller for mooring or rigging at sea.

The exterior wood shows signs of rope wear, backing up the mooring/rigging interpretation. Wessex Archaeology's Bob Davis is to thank for his excellent interpretation of an intriguing find, and has suggested that this is most likely to be a wooden mooring roller.

Mooring points have been used since the beginnings of sea travel. They come in many different styles and can be made from many different materials. The importance of the mooring point being firmly placed is more important than the style. It is likely that this particular example either came loose or was discarded into the sea, with tidal movement taking it away from a local port or harbour.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (037/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0668: Exhaust Manifold Components

B. Troubridge found this assemblage of objects on the wharf at Greenwich after unloading *City of Westminster*. They were recovered from the magnet, and were dredged from an unknown Licence Area in March 2016.

The metal objects all look to be components to multiple exhaust manifolds. The pictures were sent to Ewen Cameron, the Curator of the Royal Air Force Museum in Stafford, to discount the possibility that the material relates to aircraft wreckage. This was discounted and it is thought that these objects relate more to motor vehicles than with shipping or aircraft.

With varying sizes of pipework, it is most likely to represent a collection of multiple exhaust systems. This along with the means of their discovery suggest that this is a collection of discarded material, either from a past dumping area or picked up over time by the dredging team.

Objects such as these are of high importance for reporting through the Protocol, as anything that may resemble an aircraft wreck site would be protected instantly under the Protection of Military Remains Act 1986. Marine aggregate dredging off the English coast has recently led to the discovery of a series of aircraft remains. Some are more dispersed wreckage but others have been found partially intact. Aircraft crash sites need to be dealt with in a sensitive way, often the aircraft itself took a major impact, but also the remains of the crew may still be within the aircraft.

These artefacts appear to be isolated finds of motor vehicle parts and are therefore not contentious.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 038/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0669: .50 Calibre Bullet Casing

A. Harrigan found this bullet casing on the wharf at Southampton after unloading *City of Chichester*. It had been dredging in Licence Area 395, off the south coast of West Sussex.

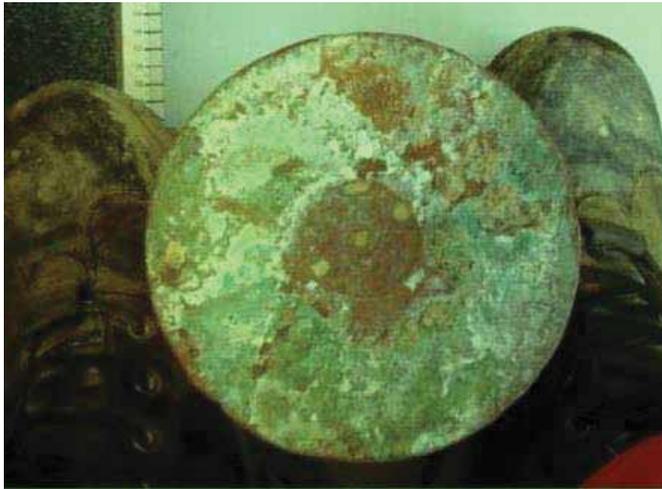
The measurements of the bullet casing match to those of a .50 calibre bullet, a large calibre bullet first designed by the Americans in conjunction with the Browning machine gun as an anti-aircraft weapon. Development of the ammunition and arms delayed their adoption in the forces until 1917. By the Second World War, the .50 calibre round was much more widely used. Aircraft, vehicles, personnel and defensive positions were now carrying these higher calibre weapons.

The force of a .50 calibre bullet can be measured in foot pounds between 10,000 and 15,000, dependant on the weapon firing the bullet and the powder within the bullet itself. In comparison, the standard military, lower calibre, weapons of the First and Second World War produced around 2,000-3,000 foot pounds of force. A .50 calibre bullet would be capable of penetrating a car's engine block in order to disable it, and this tactic is still in use today. So the .50 calibre proved to be a far superior projectile to those before it and is still a common size of munition today.

The finding of this shell casing between the Isle of Wight and Selsey is not unusual as high numbers of these bullets would have been fired in practice in the build up to D-Day and also from the aircraft and ships that were protecting our shores. This find appears to be isolated, however it is important to continue to report munitions through the Protocol, as they can enhance our understanding of naval and aerial warfare.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 039/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0670: 5 Inch Naval Shell Casing

The shell casing was found by A. Harrigan whilst sorting materials offloaded from *City of Chichester* at Southampton Wharf. It comes from Licence Area 395/1, east of the Isle of Wight.

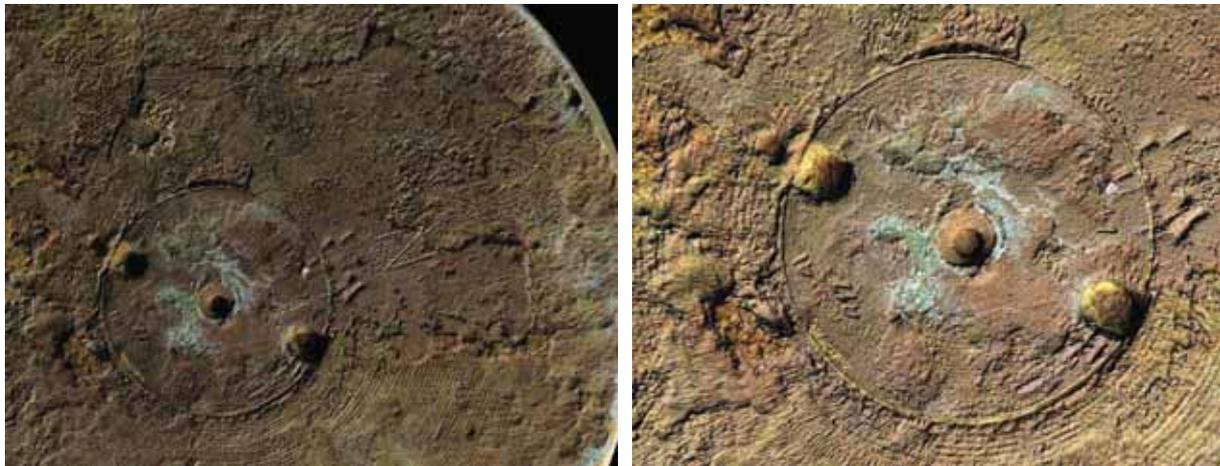
This particular object was requested into the office for further inspection for a number of reasons. First, the condition of the shell is very poor, having lost a large proportion of its length and has started to become susceptible to corrosion and the uptake of marine life. This made identification of the type of shell very difficult, namely due to all the markings about the shell being printed on the base. In order to clean the shell Bob Davis, of Wessex Archaeology's Heritage department, cleaned the base using a weak concentration of hydrochloric acid. This managed to clean off the additional growth and reveal some of the markings on the base of the shell. Second, was to experiment using new photographic techniques, which allow for light manipulation.



This allows us to create shadow coming from any chosen angle. Using this technique, a large number of the markings on the shell base are now visible. Many thanks are given to Bob Davis for his work in pushing this new technique and the impressive results he has provided.

The cleaning and photo manipulation has enabled us to conclude that the shell casing itself is a 5 inch naval shell, produced by Vickers in August 1941. The shell would have been fired from a 5 inch naval deck gun; used during the Second World War, these guns were common aboard destroyers, aircraft carriers, cruisers, but also fitted to other vessels during wartime.

The primer has two dates, one being August 1941 and the other September 1941. It is possible this could indicate the manufacture date and the filling date or that it was filled on both occasions. Also found on the primer is the British Broad Arrow, followed by the type of primer, a Number 11 Mk III.

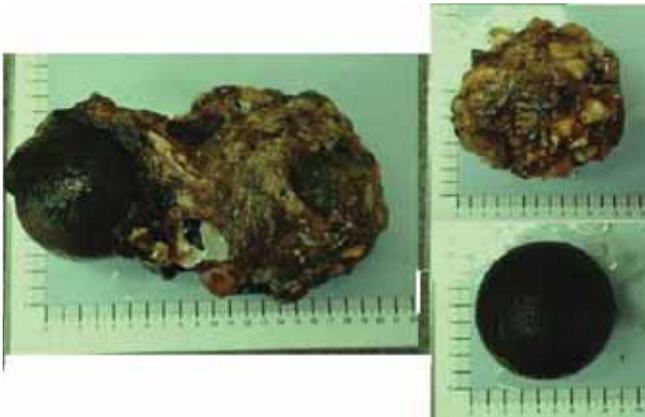


On the shell base itself the cleaning and photography has revealed that this is indeed a 5 inch naval shell, shown by a large '5' and an 'N' underneath this. Further markings that have been uncovered include the lot number, in this case it looks to read lot 3600 and there is also a 'V' with a possible 'D' following this, which would indicate that this shell was produced by Vickers. The exact date of the shell is one of the few bits of information we were unfortunately unable to obtain. There is a visible '19[.]' but the metal has been too badly damaged to show the second half of the dates.

Thank you to Bob Davis for his help in identification and particular thanks to Tarmac for their cooperation in loaning the find to us in order to test these new methods and in turn reveal more about the artefacts that are being discovered through the Protocol.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 040/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0672a: 11 Cannonballs

These artefacts were found by J. Jerromes at Southampton Wharf on 4 April 2016. They were recovered from aggregate material dredged from Licence Area 127, which lies to the east of the Isle of Wight.

A very interesting discovery made by Tarmac was an assemblage of 11 cannonballs, all of which have a similar proportion of a relatively small weight. They measure approximately 80 mm in diameter, which converts to a 4-pounder cannon. While this is one of the smallest cannon sizes used, it was widely used amongst both the Navy and Army during the 16th and 17th centuries. Shot of this size is likely to have come from a cannon known as a minion (from the French word for 'cute'). Cannon such as this would have been used aboard the faster more manoeuvrable ships of the fleet, and many merchant ships would have used this smaller size of cannon to protect their investment.

The fact that the dredging team managed to find 11 at once from the same area, may indicate the presence of a shipwreck or battle site. The fact that they found 11 during the same dredge is notable; but when looking at the mixed conditions of the cannonball, it would suggest that these were piled on the seabed. With some of the cannonball in excellent condition being protected by those above which are now fully concreted. When this information is coupled with their similarity in size, it does suggest that either a munitions crate was dropped overboard or the possible site of a shipwreck.

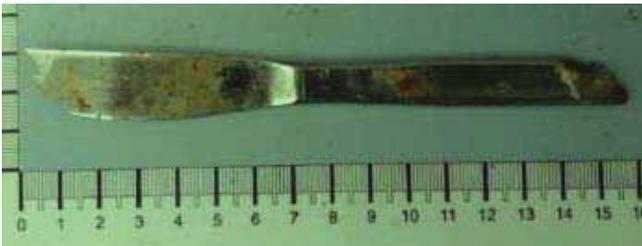
With this information it is very important for any crews working within Licence Area 127 to be extra vigilant in the lookout for further evidence of a shipwreck. This could include further cannonballs or ship's timbers to personal items, such as clay pipes and jewellery.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 041/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0672b: .50 Calibre Bullet and Knife



These artefacts were found by J. Jerromes at Southampton Wharf on 4 April 2016. They were recovered from aggregate material dredged from Licence Area 127, which lies to the east of the Isle of Wight.

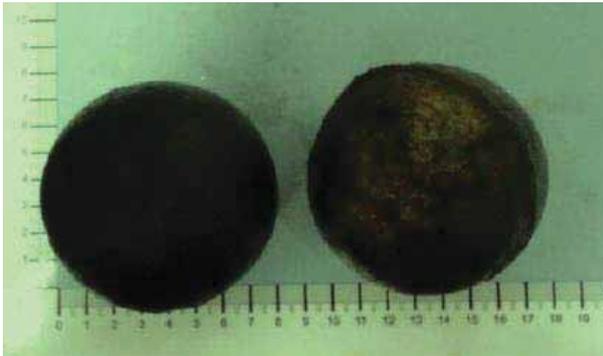
A series of finds were discovered from Licence Area 127, containing 11 cannonballs, a .50 calibre bullet and a knife. The 11 cannonballs are reported on separately, in Wharf Report Tarmac_0672a.

The .50 calibre bullet is not an uncommon discovery for the area and was identified through comparisons with previous finds reported through the Protocol. With this calibre of ammunition being used widely by the Americans and British partly during the First World War and then much more widely in the Second World War. The weapons that were capable of firing these rounds are very broad; with aircraft, ships, vehicles and personnel capable of carrying the weapons. The area in which it was discovered was a 'hot spot' for military training in the build up to D-Day and the constant defence of the British coastline.

The knife is a standard knife found in any kitchen today and made from stainless steel. Both ends are broken which is a possible reason for its discarding, with a blade length of only 7 cm and a total length of 16 cm. It is likely that a knife such as this was either lost or purposely discarded overboard from a modern vessel.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 041/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0673: Cannonball and Grape/Musket Shot

N. Sait found these objects whilst sorting materials offloaded from *Arco Dee* at Southampton Wharf. They come from Licence Area 372/1, east of the Isle of Wight. The finds were reported in April 2016.

This group of objects was discovered in April and Southampton Wharf sent photos to Wessex Archaeology of two cannonballs measuring approximately 80 mm in diameter, along with a further find of a small 30 mm musket or grape shot.

The keen eyes of N. Sait and colleagues at the Southampton Wharf recognised the cannonballs and smaller shot after noting examples seen through the Protocol and its' relating Annual Reports and *Dredged Up* Newsletter. Realising that it was of archaeological significance, the crew made sure that the find was reported correctly, provided a good set of photographs and details of the find and are praised for their commitment to heritage.

The cannonballs recovered are from a light weight cannon, likely to be a 4-pounder. Cannonball of this size may have been used in cannon known as a demi-culverin, a common lightweight, mobile cannon, adopted for both naval and land use in the late 16th century. The musket ball or grape shot recovered shows the variety of weaponry available at sea. The musket would have been used during close quarters fighting, often where two opposing ships would run alongside each other or during a boarding. If it is grape shot, then this is more similar to the pellets found within shotguns shells of present. The small iron balls would be within a bag or canister and fired upon enemy ships at close quarters. The aim of this was to destroy rigging and cause serious harm to crew on deck.

The English Channel has seen many naval battles through time, with the seafaring powers of the English, French, Spanish and Dutch all conjugating around this area. On many occasions war broke out, with the French and the English having some 'differences' during this period.

These cannonball are considered to be isolated objects, but any further discoveries should continue to be reported through the Protocol, as they could shed light on a naval battle.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 042/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0674: Boat Hook, Knife and Bakelite Handle

N. Sait found these objects whilst sorting materials offloaded from *Arco Dee* at Southampton Wharf. They come from Licence Area 372/1, off the east of the Isle of Wight. The finds were reported in April 2016.

This group of objects was discovered in April by the keen eyes of N. Sait and colleagues at Southampton Wharf, who recognised the finds after noting examples seen through the Protocol and its' relating Annual Reports and *Dredged Up* Newsletter. Photos of the finds sent by Southampton Wharf to Wessex Archaeology confirm their identification. Realising that it was of archaeological significance, the crew made sure that the find was reported correctly, provided a good set of photographs and details of the finds and are praised for their commitment to heritage.

The boat hook fragment is one of the most common pieces of equipment found upon boats of all types and find many uses aboard the vessels; docking and undocking, collecting netting, lines or buoys or other debris. It is difficult to date objects such as boat hooks as, while there are several designs, it is a standard tool that has remained relatively unchanged in form for some time.

The knife is of a domestic style, found in any kitchen today. The blade measures 12 cm and the total length is 21 cm. Specialists have been unable to ascertain a date for the knife, but based on its condition it is a relatively modern object.

Bakelite is one of the first plastics made from synthetic components, invented in the early 1900s. Bakelite was used for many household items; radio and telephone casings, and such diverse products as kitchenware, jewellery, pipe stems, children's toys, and even firearms. The example found by N. Sait looks to be a handle relating to some form of kitchenware.

The boat hook is thought to be an isolated find, and it is possible that it was lost overboard from a passing vessel. Similar conclusions can be given to both the knife and the Bakelite handle. They are likely to have been accidentally lost or discarded overboard.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 043/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0675: 4 Inch Shell

D. Knight found this 4 inch shell in the metal detector at Medina Wharf, Isle of Wight, after unloading *City of Chichester*. It was dredged from Licence Area 395/1, to the south of West Sussex.

This shell measures 14 inches in length and is a likely remnant from the Second World War. Pictures of the shell were sent to experts at the Royal Armouries Museum for identification. Norman Bonney was able to shed further light on the shell, with the limited information available to him, he offered an excellent amount of detail. There is a protective gromit over the driving band and it is unfused which suggests it was never fired. The filling is difficult to interpret from a photograph, but with it being nose fused, this suggests either High Explosive (HE), 'star shell' (illuminating), smoke or practice. Norman's final interpretation for the shell is that it is a 4 inch Naval HE shell from the Second World War, possibly a 35 lb, Mark IB.

These 4 inch guns were used aboard many of our ships and even for coastal defences on land. Many shells would have not exploded upon firing, leaving large numbers of unexploded ordnance in Britain and the waters surrounding our coastlines. Some would have been fired for practice and in the area of discovery a lot of training took place in the build up to the D-Day landings. The fact that the shell is unfired, would suggest the dumping of shells or possible sinking of a ship in the area.

This is a large shell and may have been fired from land or more likely to have been fired by a Navy vessel. Should large volumes of similar shells or other wreckage be discovered in the same area, this may indicate a shipwreck site.

Finds such as this must be taken with extreme caution and always follow company guidelines for the safe treatment of munitions. Company Health & Safety policies and established operational procedures should always take priority over archaeological reporting.

This shell has already been destroyed through EOD action.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 050/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0676: Cannonball

D. Knight found this cannonball at Medina Wharf, Isle of Wight, after unloading *City of Chichester*. It was dredged from Licence Area 395/2 in the Selsey region.

This single cannonball, discovered off the West Sussex south coast, measures approximately 90 mm in diameter. A 90 mm cannonball converts to a 6-pounder. This defines the weight of the cannonball being approximately 6 pounds. Cannon were measured by the weight of shot that they fired, so a 6-pounder cannon represents a relatively small cannon, but these were well used aboard many different types of ship, from merchantmen to 1st rate warships. Nelson's HMS *Victory*, which sank in 1744, carried cannon capable of firing shot weighing up to 42 pounds, with 28 42-pounder cannon on the main gun deck. The 6-pounder was still utilised on the 100-gun 1st rate ship of the line, with a total of 16 on the quarterdeck and forecastle.

The common name for this type of cannon was a Saker, and although weighing near 900 kg, they were often used as field guns as well, with evidence of their use in the English Civil War. In addition, New World colonists would often remove them from their ships and place them in forts in order to defend newly built towns.

Finds such as this provide a good archaeological insight in to the happenings around the British coastline, further finds may help to represent a battle site or that of a shipwreck. This artefact appears to be an isolated find and therefore not contentious.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 088/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0678: Aluminium Plate

This aluminium plate was discovered by K. Atherton on board the vessel *City of Chichester* on 19 April 2016. It was found in aggregate dredged in Licence Area 395/1, some 11 km east of the Isle of Wight.

This aluminium plate measures approximately 400 mm in length and 200 mm at its widest point. Bob Davis, senior consultant in the heritage team at Wessex Archaeology, examined the find from photographs and provided the following description. Originally a circular plate, it is now folded over and given the lack of fastening holes around the outer edge, it is unlikely to have 'attached' to anything. There is one large hole which was probably central and has bolt or rivet holes around the perimeter. These central fixing holes around the large hole suggest a flanged pipe connection. Other fastening holes appear to be in a random pattern, however this may be because the object is heavily distorted from its original shape. This may also be the location of a hinged latch, which could suggest a cover.

While of modern date, the lack of any evidence on the surface or any staining makes identification beyond an aluminium plate very difficult; particularly as to what type of pipe, fluid or electrical conduit for which it was used. Photographs of the find were also sent to Steve Vizard, managing director of Airframe Assemblies, who confirmed that the aluminium plate is not a piece of aircraft wreckage and instead concluded that it is a commercial alloy normally found in maritime or boat construction.

Since the introduction of the Protocol in 2005, a vast array of finds have been reported from the Isle of Wight dredging region, including Licence Area 395/1. Due to the quantity of finds and the varying type; including domestic, commercial and industrial, it has been suggested that a wide spread of rubble is present in this area and may have accumulated due to dumping after the Second World War.

The aluminium plate is considered to represent an isolated find, but may derive from the rubble mentioned above. Vessel and wharf staff are reminded to remain vigilant and keep a look out for any further discoveries which will enable us to better understand the archaeological potential of this area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 057/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0680: Cartridge Case

This cartridge case was discovered by N. Sait at Burnley Wharf on 26 April 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, 10 km east of the Isle of Wight.

This casing was discovered between the Isle of Wight and the West Sussex coast. It measures 30 mm in diameter and has a remaining length of approximately 110 mm. With no visible markings on the base of the casing, identification is made much more difficult. Pictures of the shell casing were sent to experts at the Royal Armouries Museum for identification, and Norman Bonney was able to identify this shell case as a 0.55 inch shell casing from a Boys anti-tank rifle.

This was a British service anti-tank rifle during the Second World War, manufactured by the Royal Small Arms Factory, Enfield, commonly referred to as the 'Elephant gun' by its users due to the large size and bore of the rifle. It was named the 'Boys' as a sign of respect to designer Captain Boys who died a few days before its approval for service in 1937.

The bolt action rifle used a five shot magazine, it was heavy and very large in size. The gun was equipped with a bipod which itself was fitted with a shock absorber to deal with the recoil. Further additions such as rubber cushioned butt pads and recoil slides were added to deal with the recoil, but it was still said to have been horrific to use and personnel would frequently strain their necks and bruise their shoulders.

The Boys anti-tank rifle fired a bullet from a cartridge, these usually had a steel core for armour piercing effect, enabling it to penetrate the armour of a half-track or armoured car or the side or rear armour of a light tank.

By 1940, most countries stopped using the Boys anti-tank rifle due to the advance in mobilised armour, although some nations continued to use it until 1943 and the latest known use was by the IRA in 1965. The weapon was adequate for light tanks such as the Panzer I and II and the Finnish effectively used the weapon against Soviet T-26 tanks. But larger, thicker armour tanks lead the Boys anti-tank rifle to become obsolete.

The area in which this casing was discovered is known as a hot spot for military training and in particular live firing trials in the build up to the invasion of the continent, so it is likely that this was fired out to sea or was washed out to sea by the tides.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 065/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex



Tarmac_0681: 20 mm Hispano Casing

This shell casing was discovered by N. Sait at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, 10 km east of the Isle of Wight.

The shell recovered by N. Sait measures approximately 20 mm in diameter and has a remaining height of around 115 mm. This is a near complete shell casing although the overall length of the shell has been reduced by damage.

The base of the bullet casing has no visible marks, making interpretation of the round difficult. Therefore, it is not possible to identify the date and country of manufacture and the company.

This is a 20 mm Hispano round from the Second World War. These were developed and used widely during the Second World War. Most were fitted out with High Explosive (HE) in order to penetrate enemy armoured vehicles. They were used with great effect on land against armoured vehicles, but they also had the benefit of being launched from guns mounted on lightly armoured vehicles and aircraft. This meant that the 20 mm Hispano round saw a lot of action during the Second World War.

Many aircraft were fitted to fire the 20 mm Hispano following the Battle of Britain. Aircraft such as the Hawker Hurricane, the Supermarine Spitfire and the US Mustang MK.IA were fitted with these autocannons. This enabled the fly-by attack on armoured vehicles, which at the time was far more accurate than attempting to deploy any air-dropped ordnance.

Unfortunately, the poor condition of the shell and the lack of visible markings from the base make it difficult accurately identify the weapon used to fire this particular round.

By the end of the Second World War a large number of shells ended up in the sea either by being fired and landing in the sea, lost in a wreck or dumped unused. In 1944, Britain alone produced nearly 40 million shells. The reporting of shell casings such as this can provide important information about military action during the wars and the reporting of these finds through the Protocol is of great help to our understanding of military actions.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 066/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex



Tarmac_0682: 4 Spent Bullets

These four spent bullets were discovered by N. Sait at Southampton Wharf on 26 April 2016. They were found in aggregate dredged by *City of Chichester* in Licence Area 351, 10 km east of the Isle of Wight.

This assemblage of bullets was discovered at Southampton Wharf. Pictures of the bullets were sent to experts at the Royal Armouries Museum for identification. Lt Col (Retd) Norman Bonney who works as the research officer has identified all four.

Top left: This is a bullet for a cartridge and the small firing band from the base is now missing. It belongs to a First World War aiming rifle. These 1 inch rounds were used with aiming rifles fitted to heavy and medium guns and were used for coastal defence. These types of round were electrically primed using an iridio-platinum wire bridge. The charge inside the cartridge is cordite and the bullet head itself is made of up to 98% lead.

Top right: This is a 0.450 lead bullet for a 577/450 Martini Henry cartridge. These were black powder, centrefire rounds with the cartridges manufactured using rolled brass with an iron rim. This ammunition was used by the British Empire until the late 1800s, most famously during the Anglo-Zulu War of 1879 as well as several other colonial conflicts in Africa and India. Due to the extensive use and the power of the shot, these were used widely by hunters, with the round being able to take down almost any sized game, even elephant.

Bottom left and right: Steel core for an armour piercing projectile. This round was possibly for the Boys anti-tank 0.55 inch AP cartridge for use in the Boys anti-tank gun, also referred to as the 'Elephant gun' due to its large recoil, and bore size. Many of those who used the weapon ended up with bruised shoulders and neck strains from the recoil. This type of round was used during the Second World War, developed in 1937 by the British, it began to be phased out by 1940. The rounds themselves were used for their anti-tank ability, and against light tanks such as the Panzer I and II it was found to be particularly effective. They were capable of penetrating armour up to 23 mm thick from 100 yards or 18.8 mm from up to 500 yards. Interestingly these two steel cores and a cartridge case from a Boys anti-tank gun have all been reported in recent weeks.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 067/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex



Tarmac_0683: Hand Bell

This small hand bell was discovered by N. Sait at Southampton Wharf on 28 April 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

The bell measures 90 mm in diameter, is made of brass and has no engraved name of a ship or manufacturing company visible. There is a flange on the top of the bell for attachment. This has a rivet running through it measuring 17 mm in diameter.

Ships usually would rely on a large bell in order to tell the time, and in turn this would indicate shift changes aboard the vessel, with eight bells calling the end of a four-hour shift. Often it would be the responsibility of the ship's cook to polish the bells. Often ship's bells are large and can be used to identify shipwrecks as it was customary to have the name of the ship engraved into the brass. Some ship's bells were also engraved with the names of those christened aboard the ship, so can provide a lot of information about particular wrecks.

Hand bells aboard ships would often be used to aid in navigation and safety during foggy or otherwise poor conditions. The sound of the ringing bells would warn off nearby ships to avoid collision. Other uses for the hand bell would be for musical entertainment – with a series of different sized bells, musical scores were produced aboard many ships as a form of entertainment on long voyages. This was not exclusively done aboard ships and bell ringing would have played a part in many religious and musical events on land.

The rivet seen on the bell would suggest a fixed axis, so it is likely that the rivet was holding in the wooden handle for the bell. The wood has since rotted away; this is one possibility. For the bell to be riveted to a structure the bell would require an internal dong, which has not been reported to us as being present.

Due to the small size of the bell it is highly unlikely to represent a true ship's bell, unless a very small rowing boat, and this is more likely to be a hand bell that may have been accidentally lost overboard or have been part of an offshore dump of rubbish.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 068/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0685: Brass Plate

This plate was discovered by S. Vince at Shoreham Wharf on 11 April 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 395/1, some 11 km east of the Isle of Wight.

This plate measures approximately 115 mm in length and 50 mm in width. It is made of brass and is marked with “Storm valve from spurn water scupper 6-5”.

The plate is likely to have come from a larger ship with multiple scuppers, these may have been under cover and this plate was to indicate the location for maintenance of the storm valves for a series of scuppers.

The spurn water is referring to a channel at the end of the deck that is used to collect and retain any water that has washed onto the deck, similar to guttering found around the side of a house or on streets countryside. A scupper is simply a pipe that allows this water to flow from the ship back out into the sea to prevent a build-up of water (and weight) on board. The storm valve referred to is a valve within the scupper that is non-return. This means that the valve will direct water flow in one direction only, preventing any further water being taken on board. In the event of a storm these valves protect further water from entering the ship, especially through scuppers in more vital areas of the ship, for example, they are used in sanitary discharge pipelines which have ship side exits, and prevent sea water from entering the system during heavy seas.

This plaque is likely to be an isolated find, either discarded overboard purposefully or by mistake. Should further finds in the area be discovered a shipwreck site could be possible, but a small and light object such as this may travel many miles in the tides.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 069/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, West Sussex and Hampshire



Tarmac_0687: British Airways Knife



This stainless steel British Airways knife was discovered by N. Sait at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This stainless steel knife measures approximately 150 mm in length and 15 mm in width. It is embossed with the mark STAINLESS STEEL SOLA 981 BRITISH AIRWAYS. The knife is slightly scratched and worn, most likely due to its discovery in a seabed environment.

British Airways was established as an airline on 31 March 1974 and is now the second largest (by passengers carried) in the UK. This date therefore gives a *terminus post quem* (the earliest possible date of an event) for manufacture of the knife. Sola is a European company which has been manufacturing and distributing its flatware to various sectors of the hospitality industry, including airlines, among others such as hotel-supply companies, restaurants and cruise lines. Safety regulations apply for stainless steel cutlery for several countries, including the UK. Airlines who use stainless steel cutlery do so to distinguish themselves from the competition, rather than serving plastic cutlery to highly-valued paying passengers.

It is extremely unlikely that this knife entered the marine environment through an aircraft crash event. There have been no documented British Airways crashes into the English Channel, although in 1983 a British Airways Sikorsky S-61 helicopter crashed into the Atlantic Ocean between the coast of Cornwall and the Isles of Scilly, killing 20 of the 26 people on board. The most likely explanation for this discovery is the souveniring/stealing of airline cutlery by passengers and its eventual discard. This appears to be a frequent occurrence given the sale of many similar items online.

This knife is considered to be an isolated find and does not indicate a site of archaeological significance. Vessel and wharf staff are reminded to remain vigilant and keep a look out for any further discoveries.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 070/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex



Tarmac_0688: Pedestal

This pedestal was discovered by N. Sait at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This pedestal measure approximately 80 mm in height and 60 mm in diameter. One end has a circular bowl shaped indentation that is described by the wharf staff as very shallow.

This is a peculiar find as it is not clear which way up it should go. The indentation may be the base end, similar to those seen on glass bottles and would be used in this instance to save weight and materials in producing the product. In which case this would suggest that the top is flat. There is no clear sign that it would join to anything else, so the object on top would have to happily sit on a flat surface.

If the object is viewed from the other way around, then the base is flat and on the top there is a shallow bowl shaped indentation. This could be interpreted as several obvious items, such as a holder for liquid incense, circular objects or possibly even an ash tray.

The object looks likely to have been some sort of small pedestal, which would have displayed an object of possible importance or decorative pleasure to the owner. Items such as this would have been mainly assumed to be middle to upper class household goods, but these sort of quality/status goods would also have found themselves aboard ships, possibly in the captain's cabin or similar.

Objects like this may have been discarded as part of terrestrial waste or discarded or lost overboard from a ship. Small artefacts accompanied by further evidence such as timbers may indicate the presence of wreck, but small personal items such as this are more likely to be moved around on the seabed by tides.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 071/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0689: Spent Bullet

This spent bullet was discovered by N. Sait at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, 10 km east of the Isle of Wight.

N. Sait discovered this bullet on the wharf at Southampton. Pictures of the find were sent to experts from the Royal Armouries Museum for identification. Lt Col (Retd) Norman Bonney, Research Officer, was able to identify this as a bullet from an aiming rifle.

The bullet seen above would have had a brass cartridge attached to its base. These 1 inch rounds were used in aiming rifles which were fitted to heavy and medium guns with their primary purpose being coastal defence during the First World War. Aiming rifles were also used for training purposes by being attached to larger guns on the same trajectory in order for gunners to practice aiming without the expense of the larger calibre shells.

These rounds were electrically primed using two different methods: an iridio-platinum wire bridge to detonate approximately 14 grains of pistol powder within the cartridge or a cartridge core of cordite. The bullet head itself was made of up to 98% lead.

Interestingly, in the past few weeks another bullet from an aiming rifle has been reported through the Protocol.

The area of discovery is known for its use as a training ground, especially for live firing. Many of these rounds would have been fired in training, either into the sea or they could have been washed into the channel by the tides.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 072/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex



Tarmac_0690: Shell Casing

This shell casing was discovered by N. Sait at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

The shell recovered by N. Sait measures approximately 50 mm in diameter and has a remaining height of around 180 mm. The overall length of the shell has been reduced by damage, and it is likely to have been around twice this length.

Without clear markings from the base of the shell interpretation is difficult. The base of all shells are marked with the size of shell, the lot number from production, the manufacturer's mark as well as dates and the nation that was using it. Without this information, we can only be speculative.

One possibility is that this is from a German gun from the Second World War, a 5 cm Pak 38 anti-tank gun. Replacing the previously used 3.7 cm gun, the 5 cm Pak 38 was widely used on all fronts during the Second World War.

Another possibility is that it is a British 6-pounder shell, produced from the late 1890s through to the end of the First World War. These shells had a total height of 306 mm, suggesting that about half the shell's length has been lost, but the diameter at the base is 57 mm, which looks to be a little on the large side for this type of shell, although the photograph may be misleading.

Unfortunately, due to the poor condition of the shell and the lack of visible markings from the base, it is difficult to be more accurate on the weapon used to fire this particular round.

A large number of shells ended up in the sea by the end of both the First and Second World Wars, from both the Allied and Axis forces. Many would have been fired and landed in the sea, while many thousands of others were dumped or lost into the sea. The reporting of shell casings such as this can provide important information about military action during the wars and the reporting of these finds through the Protocol is of great help to our understanding, and if possible, provide photos of the base of the artefact, as 90% of the information is on the base.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 073/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex



Tarmac_0691: Plate Sherd

This plate sherd was discovered by N. Sait at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 127, some 11 km west of the Isle of Wight.

The sherd measures approximately 90 mm in length and 50 mm in width. The surface features a blue monogram with the text ...AN & AMERICAN STEAM SHIPP... and a striped flag with a cross (possibly a Union Jack) in the centre.

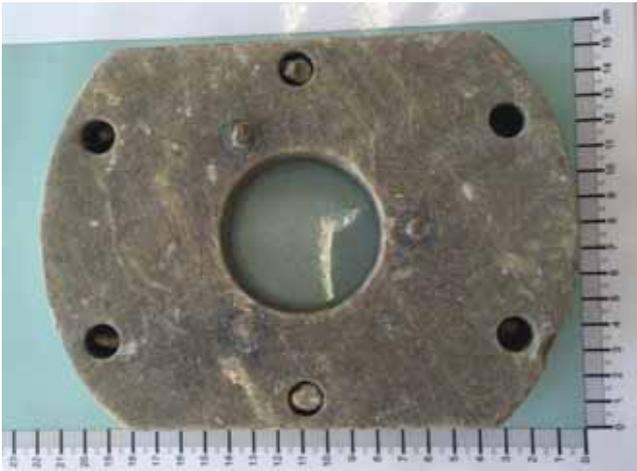
This ceramic fragment is likely to be a plate from the European & American Steam Shipping Company (EASSC). The EASSC was founded in 1857 with the purchase of eight iron screw steamers and managed by the Consul of the United States at Southampton. Four ships, *Golden Fleece*, *Hydaspes*, *Calcutta* and *Lady Jocelyn* serviced South America, while *Queen of the South*, *Indiana*, *Argo* and *Jason* conducted a fortnightly service between Bremen (Germany), Southampton and New York. By 1859, the EASSC had lost a considerable sum of money and was eventually sold.

Company and vessel branded dinnerware and tableware was common in shipping lines. Companies sought to offer constantly renewed luxury on board liners. Tableware in particular had a special importance on board larger vessels. Tableware on ships was often short-lived, and therefore this find is unsurprising given its location. It is highly probably that this plate broke while in use on one of the EASSC vessels and was discarded overboard while the vessel was travelling to or from Southampton.

Bob Davis, senior consultant in the heritage team at Wessex Archaeology, examined the find from photographs and identified the pottery mark, PEARL WARE, and the associated monogram as belonging to Thomas Dimmock & Co. 'Pearl ware' was a name used by a number of pottery manufacturers but the monogram was only used by Thomas Dimmock. Thomas Dimmock (Jnr) & Co. operated the Albion Street Works and Tontine Street Works in Shelton, Hanley, Stoke-on-Trent, from circa 1828 to 1859. Thomas Dimmock died in 1860 and the works were rebuilt in 1861; the company was renamed John Dimmock & Co. from 1862.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 074/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and Dorset



Tarmac_0692: Isolating Flange

This isolating flange was discovered by N. Sait at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This isolating flange measures approximately 220 mm in length and 160 mm in width. It has a central hole with a diameter of 59 mm, three copper alloy 8 mm studs surrounding the centre hole, along with another six holes of 13 mm diameter around the outer edge.

Mr Anthony Mansfield, Senior Naval Engineer, examined the isolating flange from photographs and suggested that it is made from a plastic composite. Plastic resin with fibre reinforcement is used to prevent dissimilar metals forming electrochemical cells and corroding the pipe. Mr Mansfield also stated that it is likely to be from a low pressure water system, where a larger diameter ferrous supply pipe joined a smaller diameter copper system – thus the copper alloy studs.

While plastic resins include products like Bakelite, which has been around for over one hundred years, this flange is likely more recent, estimated to be from the 1950s or 1960s. The fibre reinforcement could be anything from asbestos to glass or a range of other mineral fibre products. The possibility of asbestos provides a reminder to wharf and vessel staff that archaeological finds may contain asbestos. Should this find contain asbestos, for instance, it is safe providing it is not ground, sanded or sawn, creating dust which can then be breathed in.

The recovery of this isolating flange from the Isle of Wight dredging region provides a possible explanation as to how this object came to be on the seafloor. The vast array of finds that have been reported from this region suggest that a wide spread of rubble is present in this area, which may have accumulated due to the dumping of domestic scrap or demolition debris in the aftermath of the Second World War. The isolating flange is considered an isolated find, but may derive from the rubble discussed above. The continued reporting of finds from this region will enable a better understanding of the archaeological potential of this area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 075/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex

Tarmac_0693: 'Zed' Skin Stiffener (Aircraft)



This 'Zed' skin stiffener, part of an aircraft, was discovered by N. Sait at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

The 'Zed' skin stiffener measures 240 mm in length and 50 mm in width, with each angle of the 'Zed' 20 mm wide. Photographs of the find were sent to Mr Steve Vizard, managing director of Airframe Assemblies, who confirmed the object as part of an aircraft. This object is a typical 'Zed' skin stiffener as commonly used throughout airframe structure. Typically, an aircraft structure, such as a wing, is constructed as a series of smaller panel units comprising a single stiffener and skin bay bounded by lateral ribs.

Such an aircraft part is found on aircraft of all nationalities, so there is no real way of identifying it to a particular country – especially in its corroded condition. In fact, the visual aspect of corrosion such as this is a clue which often points to aircraft, as these materials are a 'harder' type of aluminium than those used in the maritime industry and tend to degrade differently.

Since the introduction of the Protocol in 2005, a vast array of finds has been reported from the Isle of Wight dredging region, including Licence Area 351. Due to the quantity of finds and the varying type; including domestic, commercial and industrial, it has been suggested that a wide spread of rubble is present in this area and may have accumulated due to dumping after the Second World War.

It is currently unknown as to whether the assorted finds from this region represent rubble or a mixture of aircraft material contaminated with discarded objects. At present, this artefact is regarded as an isolated find. However, a number of isolated finds that derive from aircraft have been discovered from this Licence Area, including *Britannia_0303* which consists of three pieces of aircraft wreckage – one possibly part of an engine. A high concentration of seemingly isolated finds has the potential to indicate the presence of a hitherto unknown aircraft crash site and other aircraft parts may assist in indicating a nationality.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The MOD
- The Receiver of Wreck (Droit 076/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex



Tarmac_0694: Aluminium Strip and Bent Aluminium



These two pieces of aluminium were discovered by N. Sait at Southampton Wharf on 1 May 2016. They were found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

These two objects are both made of aluminium alloy. The first (in the photo on the right) is a rectangular plate, now bent into a 'S'. It now measures around 300 mm in length and approximately 120 mm in width. It looks to have a black over coat of paint and the damage can be summarised as minimal. The large now 'S' shaped rectangular piece shows fixing holes along three of its sides and an obvious seam line can be seen where the alloy sheets would have overlapped. The second object (in the photo on the left) looks to measure approximately 320 mm in length and each edge has a width of 30 mm. This object is very clean metal, and shows no evidence of fixing points.

These aluminium objects were treated with caution due to their close appearance to aircraft materials. Any aircraft that were lost while in military service are automatically protected under the Protection of Military Remains Act 1986 and due to the high impacts and multiple crash sequence an aircraft undergoes when shot down, small fragmentary remains are very common.

Images of both objects were shown to Steve Vizard of Airframe Assemblies Ltd for identification. In summary to his interpretation, he discussed the lack of rivet holes and fixing points, particularly in the case of the right angled plate. From the photos available, Mr Vizard suggests that the appearance of the material would seem to be more indicative of a commercial alloy, which may relate to either maritime or terrestrial superstructures.

Material such as this can lead to very sensitive sites. In this instance it looks although these alloy fragments are more likely to relate to maritime activity or possibly terrestrial activities, likely to have been an alloy sheeting and corner support to what may have been a crate or similar structure. It is highly important that any discoveries of possible aircraft components are reported and that caution is taken within the area of discovery as any military aircraft crash sites are protected under the Protection of Military Remains Act 1986.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 077/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0695: Cannonball

This cannonball was discovered by J. Jerromes at Southampton Wharf on 1 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 127, some 11 km west of the Isle of Wight.

This iron cannonball measures approximately 130 mm in diameter, equating to 5 $\frac{1}{8}$ inches. Only approximately half the cannonball remains and wharf staff weighed the cannon at 6 lb 2 oz. It is very difficult to be precise about positively and conclusively identifying cannonballs, remembering that objects such as these suffer quite considerable weight loss and shape during the underwater corrosion process. This cannonball may have originally weighed 18 lb and could have been fired by either a culverin, if it is an early example, or an 18-pounder, if it is a later example.

There is also possible evidence for a bar to have protruded from the cannonball, suggesting it may be part of a bar shot. It is common that bar shot is no longer in one piece as, because of its use, it would usually break up on impact. When fired from a cannon the bar shot would spin on its trajectory, however, it is not very accurate so needed to be fired at close range to hit its target.

Cannonballs or round shot are one of the earliest forms of projectiles fired from cannons. Round shot was made in early times from dressed stone and from iron by the late 15th century until the early 19th century. Dating with any accuracy is extremely difficult as cannonballs did not alter much in their construction over hundreds of years.

Licence Area 127 is known for the discovery of cannonball, including a recent find assemblage of 11 cannonballs, as well as other isolated cannonballs, cannonball fragments and possible concreted cannonballs. This is unsurprising given that the English Channel has been the site of many battles and minor conflicts for hundreds of years. Finds of cannonballs on the seabed, even individual cannonballs, can indicate the location of a battle or a previously unrecorded shipwreck. As metal artefacts from marine contexts are very unstable once they are removed from the seabed, in the short term the most effective treatment is to keep them submerged in fresh water.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 078/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0696: 40 mm Shell Casing

The shell casing was found by A. Harrigan whilst sorting materials offloaded from *City of Chichester* at Southampton Wharf. It comes from Licence Area 351, east of the Isle of Wight.

This is a 40 mm shell, measuring approximately 310 mm in length. Without detailed pictures of the base of the shell, however, it is difficult to put an exact date to it, or provide further details such as the manufacturer or any specifics about the weapons it was intended for.

From the pictures provided it is likely to have come from a Bofors 40 mm gun. Designed in Sweden by AB Bofors in the 1930s, it became one of the most widely used guns of the Second World War, by both the Allied and Axis powers. Used as a general purpose gun, it was also widely used for its medium weight anti-aircraft capabilities. Due to this, both terrestrial and naval units had access to this type of gun and with a maximum range of between 7,000-12,500 m it was used to some effect. The gun was so effective that it is still in use today under a new company name BAE Systems AB.

Terrestrial guns were built into gun emplacements, but also mobilised with wheels for action in the field. The naval adaptation can be found on many classes of ship from minehunters to destroyers.

It is unclear from the photographic evidence whether this shell was fired from land or from sea. But the location in which it was found was a hot spot during the Second World War for live firing practice and for the defence of British shores from aerial attack.

It is unlikely that this shell is related to any additional materials on the seabed as many thousands of this type of round were produced and fired during the course of the war, and even post-war usage may explain its discovery location.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 079/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex



Tarmac_0697: Deadeye

This wooden deadeye was discovered by M. Wooldridge at the Marchwood Wharf on 4 May 2016. It was found in aggregate dredged by *City of Chichester* in an unknown Licence Area.

This circular wooden deadeye measures approximately 140 mm in diameter and 100 mm in width. Deadeyes are elements of standing rigging used on sailing vessels. Standing rigging refers to ropes, wires and chains that support the masts and yards (horizontal spars). These are kept taut by rigging screws or old-fashioned lanyards and deadeyes. Deadeyes provide strength usually between lanyards and stays or shroud ropes. The object has three auger/chiselled lanyard holes, known as swallows, and an outer rope score.

Deadeyes were used on many types of sailing vessels. Triple deadeyes are used in pairs, an upper and a lower deadeye, and objects such as this should continue to be reported, even if the Licence Area is unknown, as assemblages of deadeyes could indicate the presence of an unknown shipwreck.

The English coast saw heavy traffic from wooden vessels during the Age of Sail (16th to the mid-19th century) and a number of circumstances could account for a shipwreck and the discovery of this deadeye on the seabed: human errors, including poor design, cargo stowage and navigation; environmental conditions such as bad weather; and conflict, including naval battles, piracy and sabotage. It is also possible that this deadeye was no longer in a useable condition and was discarded from a vessel while at sea.

The degraded state of the object, particularly in the heavily worn swallows, indicates that it was probably exposed on the seabed for some time. Staff at Marchwood Wharf followed the correct conservation procedure; as the object was already dry at the time of discovery, it was kept dry and placed in a cool, dark area. In recent decades, steel wire came into use for sailing boat rigging and metal turnbuckles are used in the place of deadeyes for tensioning wires.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 080/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Southampton and Hampshire

Tarmac_0698: Ship's Telephone Handle and Earpiece



This ship's telephone handle and earpiece was discovered by S. Vince at Shoreham Wharf on 25 April 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 396/1, some 11 km south of West Sussex.

This ship's telephone handle and earpiece measures approximately 210 mm in length and 105 mm in width. The handle is made of Bakelite with a brass earpiece and clips. The clips hold the receiver so it cannot fall in rough seas. It also has an IMO (International Maritime Organisation) number 49 marked on it.

The ship's interior communication is considered one of the most important parts of the ship operations. Telephones on board ships usually use sound-powered technology. Sound-powered telephones allow users to talk to each other without the use of external power. This technology has been used since at least 1944 and while it is widely used on naval vessels it is also used on merchant ships for maritime service at sea. Due to their rugged, reliable and power-free nature, sound-powered telephones are still in use on military and commercial vessels today.

There are a number of ways through which this ship's telephone may have entered the offshore archaeological record. A potential means is that this isolated find represents the site of a previously unrecorded shipwreck.

However, a more likely explanation is that this telephone handle and earpiece may have been discarded when a ship was refitted and entered the sea as one object in a group of obsolete debris. The sea has been used as a dumping ground for a wide variety of industrial, commercial and domestic rubble and the continued reporting of finds made by wharf and vessel staff will assist in furthering our understanding of this archaeological environment.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 081/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0699: Ship's Telephone Mouthpiece



This ship's telephone mouthpiece was discovered by G. Cooper at Bedhampton Wharf on 19 April 2016. It was found in aggregate dredged by *Arco Dee* in an unknown Licence Area.

This ship's telephone mouthpiece measures approximately 140 mm in length and 115 mm in width. Wharf staff suggested that this may be a ship's telephone and the copper locking ring around the mouth piece could be an indication that this may be correct, as copper is much better suited to salt water than other materials.

Ship's telephones are often sound powered. The circuit is always live and can be linked to two or more telephone stations around the ship. For example, the bridge, engine room or in other key locations around the ship. The advantage of this type of telephone aboard a ship is that it only required the users voice to function. So in times of power cut or even without batteries internal ship communication is upheld; either routine or emergency communications are uninterrupted. First used in 1944, the U.S. Coast Guard regulations still require this type of communications on board vessels as an emergency communication.

The phone works by using a transducer in the microphone that converts sound pressure from the user's voice into an electrical current. This is passed on to the other phones which will then use transducers to convert the electrical current back in sound. A normal telephone would use a supplied electrical current to modulate the sound. Due to the lack of an outside electrical source, sound powered telephones are often limited to the numbers of simultaneous listeners due to the lack of amplification of the signal.

Interestingly, a ship's telephone handle and earpiece were also reported through the Protocol recently (Tarmac_0698), found in material dredged in Licence Area 396/1. It is likely that this piece of a telephone mouthpiece is a discarded object, perhaps broken and thrown overboard. Should further similar finds be dredged from the area, a wreck may have been identified. As these were not in use until 1944 that would suggest a wreck post-dating the Second World War.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 082/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Hampshire



Tarmac_0701: Mammal Skull Fragment

This fragment of mammal skull was discovered by G. Cooper at Bedhampton Wharf on 19 April 2016. It was found in aggregate dredged by the vessel *Arco Dee* – in Licence Area 372/1 or 351 located east of the Isle of Wight.

This fragment of mammal skull measures approximately 70 mm by 80 mm. It was found in aggregate dredged from either Licence Area 372/1 or Licence Area 351, which are located 5 km and 10 km east of the Isle of Wight, respectively.

Lorrain Higbee, senior zooarchaeologist at Wessex Archaeology, identified the bone from photographs and stated that while the faunal remain represents a fragment of mammal skull, the lack of distinguishing features does not allow the identification of the species. It may be either a terrestrial or marine mammal. She also noted that the bone does not look particularly old.

There are a number of ways through which terrestrial animal bone can enter the offshore archaeological record: being washed into the sea from terrestrial deposits; being discarded as waste product on board a vessel; and as part of a wreck assemblage of a ship. Marine faunal remains, however are likely to enter the offshore environment naturally, when a mammal dies, and thus are not archaeologically significant.

This fragment of mammal skull is regarded as an isolated find, although wharf and vessel staff are reminded to remain vigilant and keep a look out for any further discoveries. This is the second animal bone recovered from Licence Area 372/1 and the first from Licence Area 351. The area to the east of the Isle of Wight contains a spread of refuse material which was deposited after the Second World War, evidenced by the high quantity of diverse archaeological discoveries reported in the region. This find is therefore possibly part of this range.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and West Sussex.



DEME_0702: Mine Fragment

This fragment of metal was discovered at Flushing Wharf (Netherlands) on 20 May 2016. It was found in aggregate dredged by *Charlemagne* in Licence Area 484, 72 km northeast of Norfolk.

This object measures approximately 200 mm by 100 mm and is clearly a fragment of something larger. It is made of thin steel with three perforations clearly visible. Its convex shape can be easily seen from the photograph.

Wessex Archaeology's Tom Harrison identified the object as a fragment of a large wartime explosive due to the material, shape and the force required to fold over the metal at the edges. This object was shown to Dave Welch of Ramora Explosive Ordnance Disposal who suggested it may be a part of a buoyant sea mine. Although the holes look quite close together the perforated holes would have been where the horns of the mine would have protruded. The thinness of the metal and the force that it has undergone would suggest that this is in fact a fragment of a mine or other explosive bomb, most likely dating to the Second World War.

Using cables and heavy weights, buoyant sea mines were set to different depths to affect either shipping or submarines, in the shallows or depths of the sea. The objective of sea mines was to prevent passage of enemy ships and submarines, as well as to make their resupply difficult. In the First World War, a buoyant sea mine field was laid between Orkney and the Norwegian coast, it stretched over 230 km and contained over 70,000 mines.

The area in which this object was discovered saw intensive mine laying during the course of both the First and the Second World Wars by both the English and the Germans. The coastline off Norfolk and Suffolk was of great strategic importance as an entrance way into the Channel through the British and Dutch coasts.

The coasts around the UK still contain large numbers of both exploded fragments of ordnance and unexploded ordnance and dredging teams are reminded to stay vigilant during offshore work. Remember, company Health and Safety policies and established operational procedures should always take priority over archaeological reporting.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 107/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk



Kendalls_0703: Part of a German Artillery Sight

P. Stevens found this object at Kendall's Wharf after unloading *Deo Gloria*. The object was dredged from Area 395/1 off the south coast of West Sussex.

This object measures approximately 100 mm by 100 mm and is comprised possibly of a copper alloy and glass. This photograph of the object was shown to members of Wessex Archaeology's Coastal & Marine department and Bob Davis of Wessex Archaeology's Heritage department, who in combination managed to identify this object as part of a periscope-like optical sight.

The artefact found is likely to be German and dating to the Second World War. German optics were of a very high quality and produced on a large scale to accompany all the types of weapons used during the war. There were many different German manufacturers of optics during the Second World War, many of which were based within Germany but others spread out into occupied Europe into countries such as France, Poland and Holland. This was a part of German wartime strategy, for industry to be widely dispersed to lessen the effects of Allied bombing. All of the manufacturers were given government issued three letter codes to identify the maker and in order to obscure the maker from the Allies. The plate that would have held the makers code is now missing from this artefact. But from other examples, looking at its shape and design, it is possible that this was made by Moritz Hensoldt & Sons, of Wetzlar, Germany.

Below this section of the optic, there would have been a tube down to another mirror connected to the eyepiece. Around the eyepiece would be the dials for adjusting the trajectory of the projectile. An assessment of the picture provided to us and desk-based research on German optics revealed that it is possibly the optic from a heavy mortar or artillery piece for direct line of fire of parabolic shots, meaning the trajectory of the round could be calculated as it rises, reaches its peak height and then begins to fall, ideally onto the target.

The area in which this object was located has produced several other German military finds; in 2014 a German MG 131 machine gun (LTM_0530) and in the same area the remains of several German and Allied aircraft have been discovered (Hanson_0487, LTM_0557 & LTM_0565). With this object relating to a field gun, the find is considered to be non-contentious, yet the area looks to contain a high quantity of military associated equipment.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 137/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Britannia_0704: Wooden Bung

D. Jackson found this object after unloading *Britannia Beaver* at Northfleet Wharf. The team had been dredging in License Area 460 off the south coast of East Sussex.

This peculiar object discovered by D. Jackson is difficult to interpret. The flat base is reportedly made of sponge, while the light coloured collar is made of wood, and the domed top section is made of a much lighter wood or possibly cork. It appears to measure approximately 100 mm in length.

It is possible that this would have acted as a bung, with the wooden collar forming a tighter seal around the hole. The size of the object though would suggest that this would be used for plugging a hole in a ship's hull or a rather large barrel.

Another possibility is that one of the ends connected to a pole and that this is the head end of that pole, that may have been for the cleaning of gun barrels. Due to the materials it is constructed from this would suggest some age to the artefact, but unfortunately the object is so obscure we can only make speculative interpretations as to its function.

The find can be considered to be non-contentious, yet other finds from within the area may eventually shed more light onto the function of this object.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 127/16)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex



Tarmac_0705: Timber

This timber was discovered by M. Kirby at Erith Wharf on 1 May 2016. It was found in aggregate dredged by *City of Westminster* in Licence Area 458, some 33 km south of East Sussex.

This timber measures approximately 380 mm in length and 150 mm in width at its widest point. It features a 50 mm wide semi-circular groove which runs perpendicular to its length. This piece of timber is also very degraded through the work of wood boring animals. It is difficult to provide an accurate date; however, it is likely to be fairly modern (20th century) as otherwise it would have rotted away.

The origin of this timber is unknown, however two central possibilities are worth discussing. While it is possibly from a wooden boat, it is equally possible that it is not related to maritime activities.

If from a maritime vessel, the groove may indicate the use of wooden fasteners (known as treenails) or metal fasteners in the construction of the watercraft. The boring damage may also be the result of the shipworm *Teredo*, marine bivalve molluscs which are known to destroy ships timbers.

The timber may alternately be from a terrestrial environment, and have entered the offshore environment through any number of means. The groove may be a join on a post and the damage seen in the wood may have resulted from terrestrial boring insects.

While several other finds have been reported in Licence Area 458 through the Protocol, none of them were timbers. This find is, therefore, considered to be an isolated find and does not indicate a site of archaeological significance, such as a shipwreck. Wharf and vessel staff are reminded to remain vigilant and keep a look out for any further discoveries.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 157/16)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex



Tarmac_0706: Spike

This spike was discovered by M. Kirby at Erith Wharf on 1 May 2016. It was found in aggregate dredged by *City of Westminster* in Licence Area 458, some 33 km south of East Sussex.

This spike measures approximately 300 mm (12 inches) in length and the maximum diameter of the head is 25 mm (1 inch). It has a round head, square section and tapers to a chisel point. Spikes are one of the terms used for a host of ship's fastenings which vary in size, form and material. Other types of metallic fastenings include nails (and sheathing nails), bolts (short, through, threaded, screws) and staples. Spikes are generally defined as large nails of between 3 and 14 inches in length.

Spikes are used by boat builders for fastening thick planking, for example to fasten deck planks to the deck beams. They are driven with the edge of the chisel point across the grain, and usually into light timbers. Spikes are either driven flush with the timber or countersunk to lie beneath it. If countersunk, spikes are covered with tar or pitch over short wooden plugs in order to prevent water lying in the recess and damaging the wood.

It is highly likely that this find is from a ship. For comparison, the largest spike used in the French 74-gun ship – a third rate ship of the line – was 400 mm (15 inches) in length. Spikes can also give an indication as to the location of the ship's construction, as it has been noted that nails on French ships were square in section, while most English nails were of round section.

Prior finds reported from Licence Area 458 include a piece of timber with a groove that may indicate the location of a wooden or metal fastener (Tarmac_0705). Vessel and wharf staff working in this location should remain vigilant as additional ship-related material from this area may point toward the presence of a previously unrecorded wreck site.

Reference:

McCarthy, M 2005 *Ships' Fastenings: from sewn boat to steamship*. College Station, Texas A&M University Press

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 158/16)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex



Tarmac_0707: Slide Mechanism

This slide mechanism was discovered by P. Scrace at Greenwich Wharf on 26 June 2016. It was found in aggregate dredged by *City of Westminster* in Licence Area 460, some 12 km south of East Sussex.

This small iron plate measures approximately 115 mm in length and 60 mm in width. It has a centrally placed fixing hole which has no thread and shows no signs of wear. The two outer edges have guide slots down each side. The plate also has two stamps, one of which is a series of numbers '15 32 8' and the other is a circular shape with a rose-like or flower pattern.

Photographs of this find were shown to Bob Davis, senior consultant in the heritage team at Wessex Archaeology, who suggested that the plate is some form of slide mechanism. The plate was probably fixed in position and another item ran between the two guide channels. When an item is marked with a numeric stamp such as this one, it is usually some form of quality control. The round stamp probably indicates a maker which in turn would assist in identifying a product; however, it has not been possible to identify the maker's mark.

Many isolated metal finds have been discovered in Licence Area 460. Some, such as an iron sack scale (Tarmac_0649) and iron strap (CEMEX_0601), may have been lost or discarded overboard from a vessel. How the slide mechanism came to lie offshore is unknown, although it is likely to have been lost from, or with, a vessel. The slide mechanism is not very big and overall looks fairly unused with no obvious signs of wear and tear. It is possibly a sliding shoe for an outboard motor bracket, used where boat owners want to remove their motors regularly.

Whilst firm identification of this find has not been possible, it is not currently thought to represent a find of archaeological significance. Further finds from Area 460 may help with interpretation and details of this find will be kept, and referred to, should further material from the area be reported through the Protocol.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 159/16)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex



Tarmac_0708: Marlinspike

This marlinspike was discovered by P. Scrace at Greenwich Wharf on 13 June 2016. It was found in aggregate dredged by an unknown vessel in an unknown Licence Area.

This metal object was found on the magnet at the wharf and cannot be designated to one cargo source. It measures approximately 330 mm (13 inches) in length and is spike-shaped, the head measuring roughly 40 mm in diameter. There is also a perpendicular hole running through the spike about one-third of the way down its length, and a groove running parallel down the lower end of the spike.

Photographs of this find were sent to Nick Ball, Assistant Curator of Ship Models at the National Maritime Museum, Greenwich, who identified it as a marlinspike. Marlinspikes are used for splicing or other work requiring the opening of the strands of rope, where the dexterity provided through just using hands is inadequate. There are two types of marlinspikes – one used for wire rope and one used for fibre rope. The type for wire rope has a head or knob at the end and this is therefore the type found at Greenwich Wharf.

They usually average about 8 inches, so the example here is larger than usual. These tools are also used to pull a seizing to be considerably tighter than with the hands alone, by using them as a lever. A fid is a similar tool to a marlinspike – serving much the same purpose – however is made of wood.

Sailors frequently use marlinspikes to make, customise or fix a boat's running rigging, anchor lines, dock lines and other ropes and wires. This tool is therefore highly likely to have been lost or discarded overboard from a vessel, however is also possibly associated with a previously unknown shipwreck. The date of the manufacture of this tool is also difficult to ascertain as the simple but effective design is difficult to improve on. It is considered to represent an isolated find.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (160/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London



Tarmac_0709: Pedestal

This pedestal was discovered by G. Wells at Marchwood Wharf on 2 July 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This pedestal measures approximately 250 mm in height and 200 mm in width at its widest point. Bob Davis, senior consultant in the heritage team at Wessex Archaeology, examined the find from photographs and stated that the base appears to be made of brass and originally had three legs, of which only two remain. Each leg has a fixing hole to hold it in position, an unusual feature as the purpose of standing away from the surface to which it was fixed is unknown. Although, if used on a ship the fixed legs may prevent the pedestal from overbalancing during rough seas.

The shaft appears to have slits in it, whether decorative or practical is not known. The top end contains what appears to be a pipe, while at the widest diameter at the top is what seems to be a retaining screw hole.

The fixture or fitting which the pedestal serves to hold is unknown and thus the overall purpose of the item is inconclusive. It may have been in use on a ship or it may have originally served a purpose on land and entered the marine environment through other means. Evidence of marine growth suggests that it has been submerged for an extensive period of time.

Since the introduction of the Protocol in 2005, a vast array of finds have been reported from the Isle of Wight dredging region, including Licence Area 351. Due to the quantity of finds and the varying type, it has been suggested that the wide spread rubble in this area may have accumulated due to dumping after the Second World War.

The pedestal is considered to represent an isolated find, but may derive from the rubble mentioned above. Vessel and wharf staff are reminded to remain vigilant and to report any further discoveries which will enable us to better understand the archaeological potential of this area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 161/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0710: Knife

This knife was discovered by G. Wells at Marchwood Wharf on 2 July 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This knife measures approximately 135 mm in total length, although the handle, possibly wooden, appears to be broken. The blade itself measures 90 mm. The blade is engraved with several markings. The first of these is 'STAINLESS STEEL, HARRIS MILLER & CO, MADE IN SHEFFIELD, ENGLAND'. Beneath this are the numbers '90-45-070', an arrow, and the year 1966.

Little is known about the cutlery and silversmiths Harris Miller & Co. Their production was based at the Emu Works on Eyre Street, Sheffield – a location with a long history of cutlery manufacturing. Prior occupants of Emu Works were Ford & Medley, producers of mass market table cutlery, electro-plate and razors, from the end of the First World War until the mid-1930s. Later occupants, from circa 1989, were the Sheffield Silversmith Co Ltd.

The arrow on this knife is highly likely to be the Broad Arrow – used for signifying British Government property. This knife is therefore likely to be government issue, possibly used by the military. The numerical engraving provides various details of manufacture, ownership or issue.

This knife might therefore be a mundane part of the British armed forces kit, cutlery for use in the mess, and lost or discarded overboard from a vessel. As it was located in the Isle of Wight dredging region, known to be an area for the dumping of rubble including domestic items, it is also possible that this knife was discarded at sea with an array of other disused items. It is considered to represent an isolated find, however the continued reporting of finds which are able to be identified to a fixed date will assist in further understanding the dumping at sea mentioned above.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 162/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0711: Keys

These keys were discovered by G. Wells at Marchwood Wharf on 15 July 2016. They were found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

These two keys measure approximately 75 mm in length and 24 mm in width at their widest point – known as the *bow*. They are fixed to a plain metal keyring and appear to have been submerged in the marine environment for some time as they are quite corroded. The bows are an unusual semi-rectangular shape. The bow is often the part of the key which is used to add decorative detail. The *collar* is evident on both keys – the raised bump near to the *bit*.

These keys would have been used to open a lever tumbler lock, a type of lock patented in 1778 by Robert Barron. The lever tumbler and pin tumbler lock are the main types of lock still in use today, although the pin tumbler is now cheaper to manufacture and purchase. Interestingly, lever tumbler locks are only used considerably in the UK. Locks such as these are used for opening doors for buildings, cupboards, and cabinets, including safes and gun cabinets.

There are any number of ways through which this set of keys may have entered the offshore environment – although perhaps the most likely is that they were simply lost overboard from a vessel. The Isle of Wight dredging region, however, is known for the wide spread of post Second World War rubble that may have accumulated in this area. These keys may therefore simply be obsolete and discarded in a terrestrial context.

These keys are considered to represent an isolated find and will never be reunited with the lock/s they were made to open. Continuing reporting of finds from this area will further develop our understanding of its archaeological potential.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 163/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex

Tarmac_0712: Metal 'OPEN' Plate



This metal plate was discovered by S. Vince at Shoreham Wharf on 30 June 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This metal plate measures approximately 115 mm in length and 50 mm in width. It has four rivet holes, one in each corner, to fix it in position. An arrow pointing from right to left, and the text 'OPEN' is inscribed on the plate.

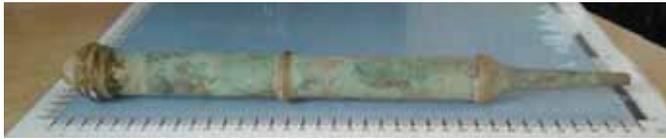
The origin of this find is unknown, however it is possibly a plate from a ship. The arrow and text indicates that it was likely to be located alongside a lever or handle. This lever was probably for operating a very simple mechanism, which only had two positions, open or closed. Such a lever may have been used in any number of circumstances, such as in the operation of machinery or equipment such as engines, boilers, generators or pumps. Equally, it could have been used to open or close a simple valve, such as for a pipe or ventilation to supply air to machinery. It may also have been used in one-off circumstances, such as for an emergency door or hatch where clear instructions are beneficial.

This find was, however, located in a Licence Area within the Isle of Wight dredging region, within which a wide array of varying types of finds have been discovered. This area of rubble has been attributed to the dumping of domestic and commercial items following the Second World War. The metal plate may therefore have originated in a terrestrial context and serve as part of a host of control and instrumentation panels used in a variety of contexts.

This plate is considered to represent an isolated find, and may derive from a vessel or an un-related onshore context. Vessel and wharf staff are reminded to remain vigilant and to report any further discoveries in this area in order to further refine our understanding of the archaeological potential of the region.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 164/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0713: Grease Gun



This grease gun was discovered by L. Weedon at Shoreham Wharf on 7 July 2016. It was found in aggregate dredged by an unknown vessel in Licence Area 395/1, some 11 km east of the Isle of Wight.

This large brass object measures approximately 400 mm in length and 30 mm in width. Photographs of the find were shown to Nick Ball, Assistant Curator of Ship Models at the National Maritime Museum, Greenwich, who identified it as a grease gun. He also hypothesised that it dates to the late 19th or early 20th century.

Proper lubrication is essential to maintaining a wide assortment of equipment and while there are different types of lubricant delivery systems available, the hand operated grease gun is the simplest and most common. Of the two main types of lubricant, grease and oil, grease is used in conditions where oil is not readily retained or where additional protection against corrosion is needed.

The hand operated grease gun is now available in push-, screw-, lever- and air-operated types. The find made at Shoreham Wharf is push-operated, where there is no trigger mechanism, and the grease is forced through the aperture by the back-pressure built up by pushing on the butt of the grease gun, which slides a piston through the body of the tool, pumping grease out of the aperture. This gun would have been loaded by paddle or spatula, after first removing the butt, a messy process which also exposes the lubricant to dirt and moisture. The nozzle was held stable by being on the end of a brass tube.

Grease guns are standard equipment, used in many industries including the military, locomotives and automobiles. The brass material may, however, indicate its use on maritime vessels. This grease gun is considered to be an isolated find, however may have been lost with a previously unrecorded shipwreck. A much smaller but similarly shaped object – a pewter syringe – was previously found in Licence Area 395/1 (LTM_0496). This area has been the location of numerous reported finds and the continued reporting of finds from this area will assist in further understanding the offshore environment in the Isle of Wight dredging region.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 165/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0714: Copper Alloy Fitting



This copper alloy fitting was discovered by L. Weedon at Shoreham Wharf on 24 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 396/1, some 11 km south of West Sussex.

This copper alloy fitting measures approximately 150 mm in length and 40 mm in width at its widest point. Photographs of the find were shown to Bob Davis, senior consultant in the heritage team at Wessex Archaeology, who suggested that it is part of a lever mechanism. The object is quite small – not heavily engineered – and has no visible makers stamp. The copper alloy material may be either bronze or brass.

This fitting would have functioned using the two sets of opposing holes along the two shafts, which would have original held pins, pivot pins or even bolts. The purpose of this copper alloy fitting is not known, however it may be associated with a level mechanism that was on a ship.

The item is covered in verdigris – a green or blue natural patina formed when brass or bronze is exposed to seawater over a period of time. It is therefore likely that the object has been in a marine environment for some time.

Although this find may be derived from a shipwreck, and other artefacts have been reported from Licence Area 396/1, they appear to be isolated objects, having possibly become detached from a vessel and lost by accident. Further discoveries in this Licence Area could determine the true nature of this and other finds and may indicate the location of a previously unknown shipwreck or aircraft crash site. Therefore, it is important that any further finds of archaeological interest in this area are reported through the Protocol.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 166/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0715: Gas Ribbon Burner



This gas ribbon burner was discovered by L. Weedon at Shoreham Wharf on 24 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 396/1, some 11 km south of West Sussex.

This metal object measures approximately 230 mm in length and 40 mm in width. In the middle it is stamped with the text 'C 22228', while at one end it is marked '24 NO ?6'. This end has also suffered some damage and is partly broken off. The object has also been subject to some corrosion from the underwater environment it was recovered from.

Photographs of this find were shown to Bob Davis, senior consultant in the heritage team at Wessex Archaeology, who identified it as a possible gas ribbon burner. Gas ribbon burners are used in direct fired applications where a uniform flame or heat source is required over a set width. The object is made of two parts. First, a single-rowed, centre hole drilled insert bar constructed of a stainless steel ribbon. The holes in the ribbon are arranged to give the required heat output and flame pattern and are constructed of stainless steel due to its non-corroding and non-oxidising properties.

Second, this ribbon is mounted into a suitable manifold, usually inserted into a pipe to create the bar burner. In this case, the manifold is made of cast iron – and this may be what the 'C' in the marking indicates, with the remainder of the numbers being related to a model, issue or quality control number.

The tubular manifold, as in this example from Shoreham Wharf, is usually supplied with an end feed connection, coupled to a suitable gas source with a pipe thread. Gas ribbon burners are highly efficient and used in many applications, however this may be an example from a domestic boiler. While difficult to date, this is likely to be from the 20th century. While it may be related to maritime activities, it is more likely to have been intentionally discarded at sea when it came to the conclusion of its safe working operation.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 167/16)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex



Tarmac_0716: 1972 German Coin



This coin was discovered by A. Harrigan at Southampton Wharf on 24 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This coin measures approximately 26.75 mm in diameter. Wharf staff were able to inform us that it is a 1972 German coin. The diameter of coins is an essential feature to aid in their identification. A German coin, dated to 1972 and 26.75 mm in diameter, is a 2 Deutschemark.

Following the Second World War, the Allies could not agree on the issue of currency reform within occupied Germany. In 1948, the Director of Economics on the Bizonal Economic Council announced the creation of the Deutschemark. This new German currency proved to be a strong one, resisting the inflammatory pressures that were afflicting the currencies of many Allied nations after the Second World War. The Deutschemark was used from 1948 until 2002 when Germany adopted the Euro.

This 2 Deutschemark is most likely the fourth series 1970-1987, featuring the bust of Professor Theodor Heuss and commemorating 20 years of the Federal Republic of Germany with the text 'unity, justice and freedom'. Interestingly, 1972 saw the production of one of the largest single-focused coin series ever, issued by Germany and focused on the Munich Olympics. Celebrating the 20th Olympiad, six different themed coins were manufactured by four of the five German Mints. These coins, however, were 10 Deutschemarks, measuring 32.5 mm in diameter.

Prior to this find, only one other coin has been reported through the Protocol – a 1797 'cartwheel penny' recovered from Licence Area 127 (Tarmac_0335). The German coin may have been lost overboard from a German vessel working in the area. The reporting of finds which can be accurately dated, such as coins, are incredibly important to furthering our understanding of finds reported in this area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 168/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0717: Battery

A. Harrigan found this item at Tarmac's Burnley Wharf, Southampton, on 31 May 2016. It was dredged in Licence Area 351, some 10 km east of the Isle of Wight.

Tarmac_0717 was reported as a bullet 13 mm in diameter and 44 mm long, lead filled with what appears to be part of a copper jacket/sleeve at one end.

Following an assessment by Wessex Archaeology's finds expert, Bob Davis, and marine archaeologist, Alistair Byford-Bates, the object appears to be a heavily corroded battery, due to what appears to be an electrode at the jacketed end. The reason for this assessment are four fold.

First, it is an odd diameter, being approximately 12-13 mm. There are small bullets of this calibre but the length of the 'casing' is barely 20 mm, which could possibly be a hand gun calibre. The 'bullet' end also appears to be wider than the base. But, this may be due to swelling brought on by corrosion.

Second, the base of the object has what appears to be a small round central projection. If this was a bullet casing and this projection was a primer, then it would fit flush to the base of the casing. There is no ammunition with a primer projecting in this way that could be identified in the literature. Though again this could be as a result of swelling of the primer due to corrosion.

Third, if it is just a projectile, the clean edge to the copper band points to the item not being fully jacketed. With an open base there would be a high risk that the jacket would be left in the barrel of the gun when fired, fouling the barrel and rendering it inoperable.

Finally, and perhaps most crucially, the base of the copper 'casing' does not have a retaining lip – at least one is not visible in the photograph. It would need a lip when sat in the breach or chamber of the weapon. The lip would retain the casing after the bullet travels up the barrel, otherwise, the whole thing would wedge in the barrel.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 169/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0718: Iron Cannonball

J. Jerromes found this cannonball at Tarmac's Burnley Wharf, Southampton, in material dredged from Licence Area 127/1 South West Needles, Zone A, on 31 May 2016.

Tarmac_0718 is a cast iron cannonball weighing 1 lb, 7.5 oz. and measuring 3 inches (76.2 mm) in diameter. The weight of this cannonball is unusual as a 3 inch diameter cast iron cannonball would be expected to weigh around 3.75 lbs. The cannonball is from a light weight cannon. Based on its size it would have been fired from a cannon known as a minion before Borgard's standardisation of ordnance during the early 18th century. Minions were a common mobile cannon, adopted for both naval and land use in the late 16th century. These cannons would have been used for signalling and close quarters fighting. Carpenter's (1993) list of Tudor Ordnance shows ordinary minions as being smooth bore muzzle loaders, made of brass or iron, with a 3 inch calibre, weighing 800 lbs, 7 foot in length, and with a maximum range of 1,200 paces, and a point blank range of 120 paces.

The English Channel has been a choke point and frequent area of conflict with many naval battles through time, with the seafaring powers of England, France, Spain and Holland as well as more recently Germany all attempting to dominate and control this area. On many occasions conflict broke out, with the French and the English having some 'differences' during this, the Tudor, period.

This cannonball is considered to be an isolated object, though it is not the only cannonball recovered in this area (see Tarmac_0725) of this size, therefore any further discoveries should continue to be reported through the Protocol, as they could shed light on a naval battle.

Reference:

Carpenter, A C 1993 *Cannon: the conservation, reconstruction and presentation of historic artillery*. Tiverton, Halsgrove Press

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 170/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and Dorset



Tarmac_0719: Iron Pin

This iron pin was discovered by G. Wells at Marchwood Wharf on 28 July 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This metal object measures approximately 250 mm in length and 50 mm in width at its widest point. It is a metal bar with a ball shape at one end that tapers to a narrow end which has a linear notch cut into it. It is showing signs of significant corrosion due to the marine environment from which it was recovered.

The purpose of this object has not been conclusively identified, however it appears to be a type of large pin. The narrow end is evidently designed to slot into an adjoining link. Photographs of the find were shown to Anthony Mansfield, a Senior Naval Engineer, who hypothesised that the round end may either be a ball joint to allow lateral movement or, alternatively, a handle to manipulate the fitting.

If this is the case it could therefore be a form of linkage, where the joint allows movement, or a single lever – part of a control mechanism for some form of machinery. This item is considered to represent an isolated find and dates to the late 19th or 20th century. It may relate to a shipwreck or have been discarded from a vessel and further discoveries from the area could shed light on past activities. The area to the east of the Isle of Wight sees a considerable amount of marine traffic.

Licence Area 351 possibly contains some of the spread of post-war dumping of Blitz rubble, which accounts for terrestrial finds within the Licence Area. Staff working with aggregate from this area should remain vigilant for future finds and report them promptly through the Protocol.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 171/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0720: 3 Inch Cannonball

Small cannonball discovered at Tarmac's Southampton Wharf by J. Jerromes on 31 May 2016, in a cargo dredged from Licence Area 127, off the Isle of Wight.

Tarmac_0720 is a 3 inch (76.2 cm diameter) cannonball weighing 3.05 lb (1,376 g) dredged from Licence Area 127 off the Isle of Wight. This cannonball is similar to Tarmac_0718, though of a more usual weight for one recovered from the sea. As mentioned in the report for Tarmac_0718, these were fired from a light weight cannon known as a minion before the standardisation of naval artillery in the 18th century, in the case of English naval ordnance. Used for signalling and close quarters fighting the ordinary minion was a smooth bore muzzle loader, made of brass or iron, with a 3 inch calibre, weighing 800 lbs, 7 foot in length, and with a maximum range of 1,200 paces, with a point blank range of 120 paces (Carpenter 1993).

The English Channel has been a major shipping route since at least the Roman period and therefore a frequent area of conflict as the seafaring powers of England, France, Spain and Holland as well as more recently Germany, along with their earlier iterations, all attempted to dominate and control the sea-lanes, so protecting commerce and shipping.

This cannonball, though similar to Tarmac_0718, is considered to be an isolated object, but any further discoveries should continue to be reported through the Protocol, as they could shed light on a naval battle helping our understanding of naval conflict and sea power during the post-medieval period.

Reference:

Carpenter, A C 1993 *Cannon: the conservation, reconstruction and presentation of historic artillery*. Tiverton, Halsgrove Press



Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 172/16)
- The National Record of the Historic Environment
- The Historic Environment Records for Isle of Wight, Hampshire and Dorset



Tarmac_0721: Rubber Duck

This rubber duck was discovered by N. Sait at Southampton Wharf on 14 May 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 127, some 11 km west of the Isle of Wight.

This yellow rubber duck measures approximately 40 mm in width, 50 mm in height and 55 mm in length and has a small hole in the base. It is made of plastic with a painted beak and eyes and has two wings and a tail. Rubber ducks, also known as rubber duckies, are commonly used as a floating toy for the bath. First produced in the early 1800s and made of rubber, they are now usually made out of vinyl plastic that has the look and feel of rubber. The example discovered at Southampton is in the traditional rubber duck colour – yellow – although they now come in many different colours and designs. Rubber ducks are also collectors' items, with the Guinness World Record set at 5,631 individual duckies.

Rubber ducks may enter the offshore environment through a number of means, two examples of which are rubber duck races and container ships. Rubber duck races are a popular way of raising money for charity. Usually held in rivers, ponds, lakes and swimming pools, the first rubber duck race was held in the US in 1988. The first event in the UK was in the Thames in 2006.

In 1992, 29,000 plastic yellow ducks broke free from a cargo ship in the eastern Pacific Ocean. From 2007 they began to appear on beaches in south-west England after travel through the Atlantic currents. They are largely faded to white and, made in China, have the words 'The First Years' stamped on them. Studies tracking these ducks have helped researchers to chart the great ocean currents. Items lost from shipping containers are a surprisingly frequent occurrence, with a 2014 World Shipping Council survey suggesting that around 2,683 containers are lost at sea annually.

This rubber duck, the first reported through the Protocol, may have been swept out to sea after following a river – an escapee of a rubber duck race – may have travelled around the world from a lost shipping container, or may have been dropped overboard from a passing ship. Finds such as this contribute to our understanding of oceanic currents.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 173/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0722: 5 Inch Shell Case

Truncated 5 inch shell case found by A. Harrigan at Tarmac's Burnley Wharf, Southampton, on 5 May 2016 in the cargo of *City of Chichester* from Licence Area 351, east of the Isle of Wight.

This damaged and apparently unmarked 5 inch rimmed shell casing was recovered from cargo dredged in Licence Area 351 by *City of Chichester*. It appears to be made of brass and would probably date from the early to mid-20th century in origin. Without any visible mark on it, it is not possible to identify its country of origin, manufacturer or date. It can, however, be assumed that as it is a 5 inch diameter case it is American or British manufacture rather than of general European origin, based on its Imperial rather than metric measurement.

The 5 inch/38 calibre was a single and dual purpose gun used on many naval vessels during the Second World War. This meant it could be either used for surface engagements only, or in both a surface and anti-aircraft role. The calibre is the shells diameter and equates to 127 mm. This calibre is no longer used by the Royal Navy or US Navy, but this gun is still present on the USN reserve fleet.



Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 174/16)
- The National Record of the Historic Environment
- The Historic Environment Records for Isle of Wight, Dorset and Hampshire



Tarmac_0723: Shell Fuse

Found by A. Harrigan at Tarmac's Burnley Wharf, Southampton, in cargo dredged by *City of Chichester* in Licence Area 351 off the Isle of Wight.

Tarmac_0723 is the corroded remains of a shell fuse approximately 70 mm in diameter, missing its ballistic cap. When first examined it was heavily corroded with some visible markings. Wessex Archaeology's, Bob Davis, a Senior Buildings Archaeologist, initially thought that it was a British No 80 time/percussion fuse from the First World War. The initial images show a partly corroded example missing its top percussion cap. Originally, these caps were made entirely in aluminium but, rather ironically, they suffered from corrosion so ended up entirely in brass which is why there are so many found in archaeological contexts. This fuse may therefore have had an aluminium cap which has corroded away in the saltwater. Bob Davis undertook further treatment to see if any further information could be gleaned.

Having subjected it to a light acid treatment it started to rattle, which was unexpected in a fuse with a powder time train. After emptying the dissolving material from the centre it turned out to have a clockwork timing mechanism inside. This instantly changed the interpretation as to the type of fuse that it was. Closer examination after cleaning also revealed a date stamp on the exposed top plate of the clockwork of 1940, making it a Second World War fuse. Corrosion has removed a lot of the outer casing marks, however just enough is visible to identify this as an early British 206 fuse. Also visible on the inside following cleaning was a maker's stamp 'VAEL'. This may stand for 'Vickers Armstrong Experimental Laboratories'. Later models were produced by Smith & Sons and these fuses have the stamp 'S&S'. This example is therefore quite early (1940), it's ballistic cap is missing and it's badly corroded. It appears to have been fired as it has damaged threads, though this is not confirmed.

An irony about these fuses is that the Krupp-Thiel 45-second clockwork mechanism was made under license from Germany. This is a familiar story in fuse design as the British No 80 time/percussion fuse from the First World War was also made to a Krupp design.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 175/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Hampshire and Dorset





Tarmac_0724: 5 Inch Cannonball

J. Jerromes found this cannonball at Tarmac's Burnley Wharf, Southampton, in material dredged from Licence Area 127/1 South West Needles, Zone B, on 31 May 2016 in the cargo of *City of Chichester*.

This iron cannonball measures approximately 140 mm in diameter, equating to 5.5 inches, with approximately half the cannonball remaining. No weight was given. It is very difficult to be precise about positively and conclusively identifying cannonballs, remembering that objects such as these suffer quite considerable weight loss and shape during the underwater corrosion process. This cannonball could have been fired by either a culverin, if it is an early example, or an 18-pounder, if it is a later example.

Culverins are smooth bore, muzzle loaded cannons and are defined as large, ordinary, small, special, bastard and basiliske in size. They were constructed of brass or iron weighing between 3,000-4,800 lbs, and 6-12 foot long. They had an effective range of 1,800-2,500 paces firing a 15-20 lb ball. Eighteen-pounders are a standardised version of the same cannon with a change of name following the standardisation of artillery sizes by the British Board of Ordnance in 1716. Rather than refer to them by the various names that the different cannons variations had had up to this time, they were standardised to the weight of round ball that they fired, rounded up to the nearest pound of the commonest weights. The range of gun sizes was also reduced to 4, 6, 9, 12, 18, 24, 32 and 42 pounds for those in military service. Cannonballs or round shot are one of the earliest forms of projectiles fired from cannons. Round shot was made in early times from dressed stone and from iron by the late 15th century until the early 19th century. Dating with any accuracy is extremely difficult as cannonballs did not alter much in their construction over hundreds of years.

Licence Area 127 is known for the discovery of cannonballs, including a recent find assemblage of 11 cannonballs (Tarmac_0672a), as well as other isolated cannonballs (Tarmac_0718 & Tarmac_0720), cannonball fragments and possible concreted cannonballs. This is unsurprising given that the English Channel has been the site of many battles and minor conflicts for hundreds of years. Finds of cannonballs on the seabed, even individual cannonballs, can be indicative of the location of a battle or a previously unrecorded shipwreck. As metal artefacts from marine contexts are very unstable once they are removed from the seabed, in the short term the most effective treatment is to keep them submerged in fresh water.

Reference:

Carpenter, A C 1993 *Cannon: the conservation, reconstruction and presentation of historic artillery*. Tiverton. Halsgrove Press

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 176/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight, Dorset and Hampshire



Tarmac_0725: 3 Inch Cannonball

J. Jerromes found this cannonball at Tarmac's Burnley Wharf, Southampton, in material dredged from Licence Area 127/1 South West Needles, Zone A, on 31 May 2016.

This heavily corroded cannonball measures approximately 3 inches in diameter (76.2 mm) and, although the weight of this cannonball was not recorded, as a 3 inch cast iron cannonball it would be expected to weigh around 3.75 lbs. Based on its size it would have been fired from a cannon known as a minion before Borgard's standardisation of ordnance during the early 18th century. These light weight, and therefore very mobile, smooth bore muzzle loading guns were used for signalling and close quarters fighting. They were made in brass or iron and weighed about 800 lbs with a length of 7 feet. Their range was about 1,200 paces. Generally, they would be mounted on the upper decks of a warship.

The English Channel has been a major shipping route and choke point since at least the Roman period and more significantly once the major European powers of Britain, France, the Netherlands and Spain developed overseas trade with the Far East and the Americas during the 17th-18th centuries. This has led to frequent conflict and misunderstanding between the various nations of North West Europe as they vied for control and dominance of these routes and the control of access to them. The area of the Isle of Wight and Portsmouth has been party to a number of these conflicts, with both battles and skirmishes occurring between Britain and the other powers on a number of occasions.

This cannonball, though similar to Tarmac_0718, is considered to be an isolated object, but any further discoveries should continue to be reported through the Protocol as they could shed light on a naval battle helping our understanding of naval conflict and sea power during the post-medieval period. There has been reported through the Protocol a significant number of cannonballs from this area in a variety of sizes and weights. These help in our understanding of ships armaments and fittings by corroborating the documentary and archaeological sources that we have and adding to our knowledge of this complex period of weapon development.

Reference:

Carpenter, A C 1993 *Cannon: the conservation, reconstruction and presentation of historic artillery*. Tiverton, Halsgrove Press

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 177/16)
- The National Record of the Historic Environment
- The Historic Environment Records for Isle of Wight, Hampshire and Dorset



Tarmac_0726: Sheep/Goat Femur



This sheep or goat femur was discovered by J. Jerromes at Southampton Wharf on 6 June 2016. It was found in aggregate dredged by *Arco Dee* in Licence Area 351, some 10 km east of the Isle of Wight.

This piece of hollow bone measures approximately 100 mm in length and 80 mm in width. Photographs of the find were shown to Lorrain Higbee, senior zooarchaeologist at Wessex Archaeology, who identified it as the distal end of a sheep or goat femur. The femur is the upper hind limb of the animal and the distal end is the end that forms the knee joint with the lower limb.

Both sheep and goats are members of the subfamily Caprinae – goat-antelopes or caprids – however belong to different genus'. The straight cut sections at either end of the femur are very useful in estimating the age of the bone, as such cuts could only be achieved with the use of a saw or butchery implement that was not developed until the post-medieval period. This sheep or goat femur therefore dates to the post-medieval or modern period and is from a domesticated animal.

There are a number of ways through which animal bone can enter the offshore archaeological record. A potential means is being washed into the sea from terrestrial deposits. An alternative is that bone like this may have come to be on the seafloor due to being discarded as waste product on-board a vessel. In the 18th and 19th centuries, livestock were carried on-board as a source of fresh meat. The butchery marks indicate that this bone was prepared for consumption.

This femur is considered to represent an isolated find, although wharf and vessel staff are reminded to remain vigilant and keep a look out for any further discoveries. A number of seemingly isolated bone finds have the potential to indicate the presence of cargo on a currently unrecorded wreck site. A previous bone find – a fragment of either terrestrial or marine mammal skull – was potentially dredged from the same Licence Area (Tarmac_0701).

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0727: Threaded Nut

This threaded nut was discovered by J. Jerromes at Southampton Wharf on 13 June 2016. It was found in aggregate dredged by *Arco Dee* in Licence Area 351, some 10 km east of the Isle of Wight.

This large threaded nut measures approximately 90 mm in external width, 64 mm in diameter internally between the thread and 54 mm in diameter internally between the lip. These detailed measurements were recorded by wharf staff who also calculated the weight of the nut at 469 g. It is hexagonal in shape and made of brass. Given its size, it is unlikely that this nut was used with a washer and bolt and more probable that it was used for pipework. It is possibly a lock nut or stop cap.

Nuts are a common type of fastener – a preformed block of metal possessing an internal or female threaded hole. Nuts are intended for use on an external or male thread, such as holding two or more bodies in definite relative positions. They are often of hexagonal shape as this shape makes it easier to use when gripping it with tools such as spanners. Solid brass nuts and other brass fasteners are generally used in marine applications where corrosion is a problem, or other applications where corrosion resistance is wanted.

The discovery of this large threaded nut from the Isle of Wight dredging region provides a possible explanation as to how this object came to be on the seafloor. The vast array of finds that have been reported from this region suggest that a wide spread of rubble is present in this area, which may have accumulated due to the dumping of domestic scrap or demolition debris in the aftermath of the Second World War.

The threaded nut is considered an isolated find but may derive from the rubble discussed above. Other hardware relating to pipework has been found in Licence Area 351 including an iron pipe spacer (Kendalls_0214) and an isolating flange (Tarmac_0692). The continued reporting of finds from this region will enable a better understanding of the archaeological potential of this area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 178/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0728: Pulley Sheave

This pulley sheave was discovered by J. Jerromes at Southampton Wharf on 13 June 2016. It was found in aggregate dredge by *Arco Dee* in Licence Area 351, some 10 km east of the Isle of Wight.

This pulley sheave measures approximately 85 mm in diameter and the rim is partially damaged on one side. In a maritime context, sheaves are a wheel or disc with a grooved rim, used as a pulley as part of the ships rigging system. As can be seen in the example discovered, it has a single grooved wheel spinning around an axis. The groove allows the wire or rope to move freely, minimising wear and abrasion. The axis would have been secured through the central hole, visible in the photograph, to the block.

Blocks were, and continue to be, used all over vessels – usually found hanging from the rigging or to assist with manoeuvring cargo or equipment around the ship or on and off a vessel. This sheave may have been used to run a cordage or wire rope. Prior to the 19th century, sheaves and blocks were made entirely from wood. This find almost certainly dates to the 20th century.

While this sheave may have come from a boat, sheaves are also regularly used in terrestrial contexts because of the mechanical advantage they provide. This find may therefore have entered the underwater context through being discarded from a vessel, being on-board a wrecked vessel, or through the dumping of terrestrial waste.

This pulley sheave is considered to represent an isolated find. Vessels working in this Licence Area should remain vigilant for further finds, which may be able to shed light on maritime activities in this region – perhaps even giving a context to this find.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 179/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0729: Shell Driving Band

Tarmac_0729 was recovered by J. Jerromes at Tarmac's Burnley Wharf, Southampton, on 15 June 2015 from the cargo of *City of Chichester* dredged in Licence Area 396 Inner Owers A, south of West Sussex.

Tarmac_0729 is an artillery shell driving band. It has an internal diameter of approximately 4.15 inches (106 mm) and weighs 3.65 oz. (105 g). Due to the nature and variety of bands it is not possible to identify the type of projectile it was part of with any confidence.

Driving bands are soft metal bands pressed into grooves cut in the circumference of a shell. They engage with the gun's rifling grooves to impart spin to the shell and stabilise its flight. The modern driving band was invented by a British engineer called Vavasseur in the 1880s. The band is generally a continuous ring of copper that is pressed into the aforementioned groove, whose base is incised with patterns designed to hold the copper band so that the rotary spin is transferred to the shell. The external surface of the band is designed to ensure that the shell cannot slip backward when the weapon is elevated, by gripping the interior of the barrel. It is also designed to expand outwards into the rifling of the barrel. Occasionally shells have an additional band that acts as a steadying band on shells with long noses; these do not play a part in the spinning of the shell.



Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 180/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0730: Light Fitting Guard

This light fitting guard was discovered by A. Harrigan at Southampton Wharf on 17 June 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

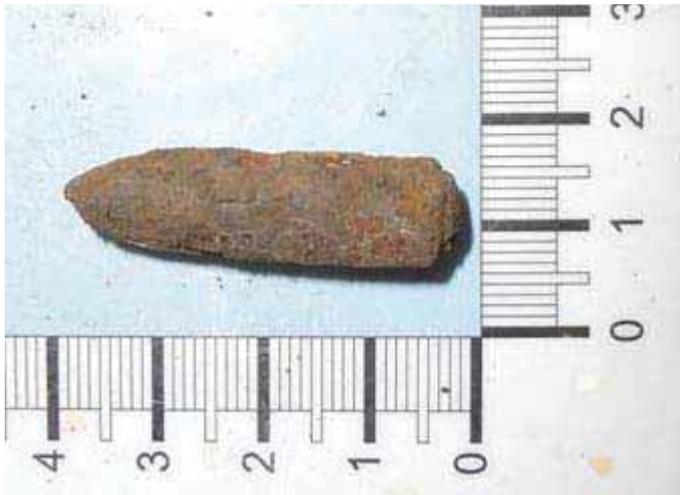
Wharf staff provided detailed measurements of this possible light fitting guard. The outer rim is 114 mm in diameter, the outer lip is 100 mm in diameter and the inner rim is 89 mm in diameter. There are three holes equally spaced around the outer rim with thread inside, measuring 7.3 mm in diameter. In addition, there are six smaller holes equally spaced around the outer rim to which the wire guard remains secured to three of these.

Wharf staff suggested that the find is a possible light fitting guard for a small vessel. Photographs of the object were shown to Bob Davis, senior consultant in the heritage team at Wessex Archaeology, who agreed with their identification. The three threaded holes would have been used to affix screws to attach the fitting to the mounted fitting after the bulb was inserted. The wires, now incomplete and considerably crushed, would have crossed to form a cage around the light bulb. Light fitting guards are used to protect both the light bulb and the people who may accidentally come into contact with them. The find dates to the 19th or 20th century.

This find is possibly from a small ship or a boat and could have either been discarded overboard after sustaining damage while in use on the vessel, or be associated with a previously unknown shipwreck site. This possible light fitting guard is considered to represent an isolated find, however it is important for vessel and wharf staff to continue to report further finds of archaeological interest from this area through the Protocol.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 181/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0731: Bullet

Tarmac_0731 was recovered by A. Harrigan at Tarmac's Burnley Wharf, Southampton, from cargo off *City of Chichester* dredged in Licence Area 351.

Tarmac_0731 is described as an iron bullet with a fragmented core 34.26 mm long, 10.8 mm wide at the base and weighing 16 g. Wessex Archaeology's finds expert, Bob Davis, looked at the report on this item to try and identify it.

Due to the state of corrosion and poor preservation the only thing that can be said about this item is that it was made of steel, suggesting that it might be an armour piercing rifle round. With no other distinguishing features and based on its length and diameter it may have been fired by a weapon such as the Lee Enfield rifle. This fired a .303 calibre round, equivalent to 7.7 mm. It was the standard British and Commonwealth military cartridge from 1889 until the 1950s when it was replaced by the 7.62 × 51 mm NATO.

Tarmac_0731 appears to be an isolated find, however further discoveries in the area should continue to be reported as they could shed light on military operations in the area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 182/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0732: Magnet

This magnet was discovered by N. Sait at Southampton Wharf on 16 June 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This ring magnet measures approximately 79 mm in outside diameter, 60 mm in internal diameter and 43 mm in thickness. There are three circular marks evenly spaced around the outer edge. It was found on the magnet at the wharf where it would otherwise have probably gone unobserved.

Magnets are an unnoticeable part of everyday life and are used in almost every commercial application across the world – from industrial manufacturing and consumer electronic devices to sustainable energy and domestic power generation. First discovered by Ancient Greeks and called ‘lodestone’ – naturally magnetised pieces of iron ore – they have been re-engineered and industrialised for decades.

Magnets come in thousands of different types, sizes and strengths. Ring magnets are permanent rather than electromagnets meaning they have a constant magnetic field. They have a central, straight-walled through hole for fixing onto a rod or tube and the thickness does not exceed the diameter. They are commonly used when a mechanical attachment method is needed to secure the magnet, such as for vacuum cleaners, motors, generators and rotor shafts. While not as strong as disc magnets given the lesser volume due to a hollow centre, ring magnets are, however, significantly more versatile. Ring magnets are either magnetised with north and south pole on opposite circular faces (through the thickness) or diametrically magnetised so the north pole is on one curved side and the south pole is on the opposite curved side (through the diameter).

This magnet is considered to be an isolated find. It may have been discarded overboard from a vessel or dumped at sea with a collection of onshore rubble. Unremarkable finds such as this still provide interesting reminders as to the development of engineering.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 183/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0733: Iron Disc

This iron disc was discovered by N. Sait at Southampton Wharf on 16 June 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This metal object is a round iron disc. Measurements provided by wharf staff include the diameter of 74 mm, thickness of 7 mm and weight of 197 g. While it has no visible markings, there is a thread on the outside. The iron has clearly suffered some corrosion from being in the underwater environment.

Photographs of the artefact were examined, however no definitive identification for the item could be given. A likely date of the 20th century has been proposed based on the construction of the find and the likelihood of it having been machine made. It is possibly a component of some form of machinery.

The item comes from a Licence Area without any identified shipwrecks and appears to be an isolated find. No finds similar to this have previously been reported through the Protocol.

Identifying this has been problematic and it is yet to be conclusively identified. However, it is possible that it could have originated from a shipwreck or have been part of something washed overboard.

During ten years of Protocol reporting numerous diverse and interesting discoveries have been made amongst material from Licence Area 351, including an admiralty telescope, a worn iron drill bit and a modern red ensign complete with cord for attachment to a flag pole. There is the potential that future discoveries from the Licence Area may provide information on the origin of this find and so information about it will be added to national databases.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 184/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0734: Fitting

This fitting was discovered by N. Sait at Southampton Wharf on 16 June 2016. It was found in aggregate dredged by *City of Chichester* in Licence Area 351, some 10 km east of the Isle of Wight.

This metal object measures approximately 100 mm in diameter at the base and 70 mm in height. It is predominantly made of iron, but also has a brass ring attached near the top. In the base, three slotted screws are visible and there are also three small round holes in the brass section.

This find is likely to be some form of fixture or fitting, most probably deck hardware. Fittings and equipment are used for anchoring, mooring, docking, lifting and towing of boats. 'Strong points' are required for such purposes, generally defined as any fitting on a boat that is designed to be used for the attachment of anchor chains, anchor lines, tow lines and warps. These include bollards, bits, cleats, samson posts, masts and bow eyes.

The fitting discovered by wharf staff is small in size and therefore was unlikely to be used for high energy purposes. It is very important to consider how energy is dissipated around attachment points and this determines where a fitting is located and the types of purposes it serves. Fittings are the cornerstone in keeping a vessel where it belongs when conditions deteriorate. A simple yet most essential piece of hardware, other types of fittings are now largely replaced by cleats, which removes the need to use knots.

This fitting might therefore have been used to secure smaller lines to the deck of a vessel. It may have been lost overboard, or may have been intentionally discarded when it came to the end of its useful working life. It is considered to represent an isolated find.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 185/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0735: Lighter

This lighter was discovered by G. Cooper at Bedhampton Wharf on 11 May 2016. It was found in aggregate dredged by *Arco Dee* in Licence Area 351, some 10 km east of the Isle of Wight.

This brass lighter measures approximately 42 mm in height and 48 mm in width. Starting at the base, which has been crushed at which time the base section has been lost, a screw can be seen, as well as packed fibre. At the top, the wick is visible and the perforated hood for the wick is still attached, however badly damaged. Alongside the wick is the remnants of the striking wheel.

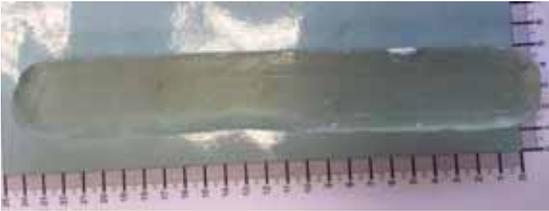
Lighters are portable devices that generate stable and consistent flame by combining flammable liquids or pressurised gases with a spark. They are ubiquitous, inexpensive and dependable and come in a myriad of sizes, types and styles. Lighters as we know them today began to make an impact in 1907, when the first factory to make ferrocerium – an amalgam of iron and cerium patented in 1903 – was used for flints. All lighters generally use the same basic method and materials – flint and petrol. There is a flint and striking wheel to produce a spark, a wick soaked with fuel to carry the flame, and a fuel storage tank most typically packed with cotton or wool fibre. Earlier lighter fluids included gasoline, kerosene and naphtha. The variances, therefore, are in the casement and striking mechanism.

The example discovered at Bedhampton Wharf features a perforated hood for the wick which was a common part to make the lighters flame less sensitive to wind. There does not appear to be any fixings to which a hinged flip top lid would attach, suggesting this lighter did not have a lid. It is possibly pre-1950s, as after this time lighters became much more disposable. Although, it is also unlikely to have been made during the Second World War, as the shortage of brass meant lighters during the war were made of other materials.

As the basics have not changed, it is difficult to date this find, however it may be from the early 20th century. It is considered to represent an isolated find, which was possibly lost or discarded overboard a vessel.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 186/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0736: Light or Sight Glass



This light or sight glass was discovered by J. Lutman at Bedhampton Wharf on 25 April 2016. It was found in aggregate dredged by *Arco Dee* in Licence Area 351, some 10 km east of the Isle of Wight.

This oblong-shaped clear glass object measures approximately 250 mm in length and 40 mm in width. It is chipped in places around the edges and shows some signs of abrasion. It is possible that this piece of glass is one of several items, all of which serve similar purposes – to allow the penetration of natural light and to provide a viewing window.

If part of a boat or ship this glass may be from a porthole or deadlight. Such windows were used to allow light to enter cabins and for air to circulate if opened. They also provided viewpoints from below decks for both aesthetic and functional reasons. Portholes are stereotypically round in shape, however they were manufactured and installed in a variety of other shapes.

This item could also possibly be a deck light, however deck lights are usually prism shaped to allow light to be refracted and dispersed. A flat deck light glass window would form a spot light and not allow for general illumination. Prior to electricity, candles, oil and kerosene lamps provided light although were quite hazardous.

This glass may also be from a view or sight window or port. Observation windows are commonplace in manufacturing equipment and machinery, providing temperature resistance, light transmittance and protection and safety. Sight glass is also used in boilers.

Regardless of the function this glass served, it would have been fitted into a frame. If used for maritime purposes the frame would have been made of a corrosion resistant material such as bronze, brass or copper. This light or sight glass is considered to represent an isolated find, which may have been lost from a ship or with a wrecked ship, as part of the hull, deck or machinery on board, or may be a sight glass from a terrestrial context.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 212/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex



Tarmac_0740: Cast Iron Object

This metal object was discovered by M. Woolridge at Marchwood Wharf on 5 September 2016. It was found in aggregate dredged by *City of Cardiff* in Licence Area 395/1, some 11 km east of the Isle of Wight.

This metal object measures approximately 19 cm in length and 15 cm in width. Photographs of the find were distributed to Wessex Archaeology's Coastal and Marine team, and Alistair Byford-Bates put forward a number of hypotheses as to its purpose.

First, he suggested that it looks as though it is designed to affect the trim or flow of water. Based on this assessment, it is possible that it might have come from a large ship's rudder or hull. Trim tabs are small surfaces connected to the trailing edge of a larger control surface on a boat, used to counteract the hydro-dynamic forces.

Second, it could be a cast iron anode. Anodes are used for cathodic protection of metallic structures in marine environments. If this is a cast iron anode, however, it would be fairly unusual as zinc is generally the first choice in material for the manufacture of such objects.

Third, it is also possible that it might be the base of some form of mounting. While all of these possibilities are inconclusive, as the find was reported through the Protocol it has now become part of a permanent record, through which additional information may come to light to more decisively identify the object.

This find is being treated as non-contentious as it appears to be an isolated find. It may have entered the marine environment through becoming separated from a vessel while at sea, or it may have been intentionally discarded as part of a terrestrial dumping process. The 2015–2016 Protocol year has seen the vast majority of finds originating from the South Coast dredging region (75%), within which Licence Area 395/1 lies. A known spread of post-war rubble has contributed to the high number of reports from this region, to which this cast iron object may relate.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 253/16)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight and West Sussex

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<http://www.wessexarch.co.uk/projects/marine/bmapa/index.html>



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