2017–2018

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 2017–2018

December 2018

Prepared by
Wessex Archaeology

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Protocol background

The Marine Aggregate Industry Archaeological Protocol (the Protocol) is the last stage of mitigation in a process to ensure the protection of submerged cultural heritage during marine aggregate industry dredging works. Prior to a licence being granted to dredge a particular licence area, an intensive investigation is undertaken to identify potential archaeology on the seabed. Using geophysical and geotechnical survey, and analysis of available records from various sources, archaeologists identify and protect known and suspected sites of archaeological interest within aggregate extraction regions. Even after this level of investigation, unidentified sites and stray artefacts may still be found within dredged loads. In response to this, the Protocol was proposed to define a framework through which such material could be identified, reported, investigated and, crucially, 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 archived, while in some instances further mitigation or monitoring may be required.

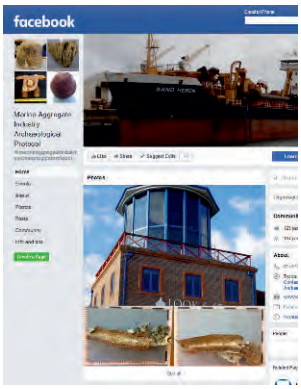
Wessex Archaeology drafted the Protocol in 2005 on behalf of Historic England (formerly English Heritage) and the British Marine Aggregate Producers Association (BMAPA).

BMAPA members adopted the scheme on a voluntary 'best practice' basis from 2006, and a reporting protocol now forms part of the formal conditions attached to all marine licences associated with marine aggregate extraction. The Crown Estate joined BMAPA in 2009 to co-fund the Protocol Implementation Service. When a find is encountered, it is reported through a Site Champion to a Nominated Contact who alerts the Implementation Service, currently operated by Wessex Archaeology.

The Protocol has been overwhelmingly successful, with over 1800 finds reported since its inception. These range from Palaeolithic handaxes and mineralised animal remains to aircraft fragments, munitions and maritime losses.

The Protocol Implementation Service has now completed its 13th year of operation and this annual report covers the period from 1 October 2017 to 30 September 2018.

Access



Marine licences place conditions relating to archaeology on permitted activities for public benefit, which includes a duty to publicise the results to the relevant bodies.

Once reported through the protocol and compiled into reports, details of all dredged finds are reported to: Historic England; BMAPA; The Crown Estate; the National Record of the Historic Environment (NRHE); and the appropriate local Historic Environment Record (HER). If considered wreck material, finds are also reported to the Receiver of Wreck in compliance with the *Merchant Shipping Act* 1995 and they receive a droit number. All aircraft material is reported to the Ministry of Defence as it may relate to the *Protection of Military Remains Act* 1986.

All finds are also published on the Marine Aggregate Industry Archaeological Protocol Facebook page[1] that was set up in March 2017 and in the annual report.[2] In addition, the discoveries and efforts made by the BMAPA companies with regard to the Protocol are acknowledged through various publications produced by Wessex Archaeology, including the biannual *Dredged Up* newsletter.

The Crown Estate has also made the information and data regarding discoveries reported through the Protocol available online through GIS,[3] in WGS 84 latitude and longitude.

1. https://www.facebook.com/marineaggregateindustryarchaeologicalprotocol
2. https://www.wessexarch.co.uk/our-work/marine-aggregate-industry-protocol-reporting-finds-archaeological-interest
3. http://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=99a2073a1b874527865fb06bfde67552

Reporting process

Archaeological finds identified by wharf and vessel staff are reported through a Site Champion or the Master of the vessel to the designated Nominated Contact of the company owning the wharf or vessel, who uploads the images and details of the find to the secure online console. In some cases, the Site Champion will report finds directly to the console. This alerts the Protocol Implementation Service operated by Wessex Archaeology and the find can then be recorded in the database and investigated.

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 Ringwood	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
	Nigel Griffiths	Principal Resources Manager
Isle of Wight Aggregates	Edward Skinner	Marine Resources Co-ordinator
Kendall Bros Ltd	Paul Stevens	Managing Director
Tarmac Marine	Edward Skinner	Marine Resources Coordinator
Volker Dredging Ltd	Will Drake	General Manager

The number thirteen

In 2017–2018, the Protocol celebrated it's 13th successful year. During this reporting period, 63 individual finds were reported through the Protocol ranging from a woolly rhino tooth to a First World War hand grenade. These have been added to a database of over 1800 finds reported since the launch of the scheme in 2005.

Without the reporting process, finds associated with dredged marine aggregate would most likely never have entered the archaeological record. The reporting framework laid out in the Protocol is designed to allow users to follow a structured and time-effective process of documenting and reporting finds to the implementation team at Wessex Archaeology who can identify or research the items before sharing the information with marine aggregate industry staff and the named authorities. In the event that the team cannot identify the object, an in-house or external specialist will be selected and contacted to ensure that the utmost is done to provide a background and relative age on the reported find.

The 10 wharf visits conducted this year have allowed us to keep in contact with the staff who report the objects through the Protocol and to meet some of the new staff members who had not previous had archaeological awareness training.

The growing number of reports and ongoing success of the Protocol confirms that it is as relevant now as it was in 2005. The support of the marine aggregate industry has once again been consistent and substantial, with the continued reporting of significant archaeological finds maintained at a high standard through the Protocol and the welcome received during wharf visits.

Through the implementation of the Protocol, the marine aggregate industry has demonstrated that this is a cost-effective mitigation option for protecting cultural heritage that is both fragile and finite. The Protocol Awareness Programme trains staff to recognise and report finds of archaeological interest discovered within cargoes without the need of an archaeologist being present. Because of this success, the Protocol model has been adapted and implemented for use in several other industries. The Offshore Renewables Protocol for Archaeological Discoveries (ORPAD), having commenced in 2010 is now equally well-established. In addition, 2016 saw a reinterpretation of the Protocol principles for non-industry audiences, with the launch of the Marine Antiquities Scheme (MAS) aimed at encouraging coastal users to report any finds they encounter. Wessex Archaeology also continues to run scheme-specific protocols for other development projects based on the marine aggregate industry model.

With the 13th year of the Protocol being a success, we look forward to the next year with the expectation of many more interesting finds and visits.

Further information about the Protocol and the Protocol Implementation Service is available online
https://www.wessexarch.co.uk/our-work/marine-aggregate-industry-protocol-reporting-finds-archaeological-interest

To contact the Protocol Implementation Service email protocol@wessexarch.co.uk or phone **01722 326 867**

Raising awareness

The Protocol Awareness Programme is funded by BMAPA and The Crown Estate and implemented by Wessex Archaeology. Members of the Protocol Implementation Team promote awareness of the Protocol and keep content up to date by visiting several wharves a year to maintain a close relationship with the staff. Emails between the Implementation Team and the wharf managers and Site Champions encourage a consistent flow of communication. Through e-mails, phone calls and during the visits, any questions can be answered, and feedback is gathered so that we can further improve the delivery and content of the Protocol. Awareness is also promoted to the wharves and vessels through the biannual *Dredged Up* newsletter.

The awareness programme:

- delivers in-person training by an archaeologist during awareness visits to wharves, aiding industry staff to identify several different types of archaeological finds through interactive slides as well as the process of reporting finds of archaeological interest discovered while receiving aggregate from BMAPA companies;
- demonstrates the different types of finds from a range of various ages that can be encountered by allowing wharf staff to handle a collection of finds that has previously been reported through the Protocol over the years;
- produces the biannual *Dredged Up* newsletter which aims to publicise the Protocol and highlight recent finds and news. The newsletter is sent out to each Nominated Contact, wharf and vessel that implements the Protocol. The most recent issue, Issue 23 printed in autumn 2018, 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; and
- is available to support and train Site Champions to ensure that new and existing staff are familiar with the Protocol.

Visits to wharves

Since the 2016–2017 annual report was published, 10 Protocol Awareness Visits have been made to wharves around the country. The Protocol Awareness Implementation Team ran training sessions to wharves in Kent, London, Essex and Hampshire.

The training sessions are informal and are designed to fit into the working day of a wharf. A member of the Protocol Implementation Team brings an array of archaeological finds previously reported through the Protocol that wharf staff can handle and discuss, as well as awareness documents and laminated scale sheets. These handouts include: an Introduction; Reporting Process; Concretions and Metalwork; Munitions and Ordnance; Prehistoric Finds; Photographing Finds (including a scale sheet); Conservation and Storage; and a Timeline. A 30-minute interactive presentation is given and there is a timeslot allocated for any questions or feedback that staff may have with regards to the way the Protocol works. The Protocol Implementation Team firmly believe that these visits are key to the success of the scheme. As well as delivering the training, the visits allow Wessex Archaeology to maintain contact with wharves and vessels, keep the content fresh, boost interest in the Protocol and promote it to both new and existing staff. The awareness materials left at the wharves enable the Site Champions to induct new starters into the scheme.

All awareness materials can be accessed through the Protocol pages on Wessex Archaeology's website (http://www.wessexarch.co.uk/projects/marine/bmapa/docs.html) and are available in English, Dutch and French.

New awareness materials

After feedback during a 2017 awareness visit, new Protocol materials were launched in the form of a training certificate to hand out to wharf and vessel staff who receive the awareness training so that they may add them to their working portfolios. These are emailed to each Site Champion or wharf manager after a wharf is visited. Additionally, a feedback form was also designed that is handed to the wharf or vessel staff at the end of each visit in order to gather comments and suggestions so that we can continue to make improvements to Protocol Awareness and the way we deliver the training.

Visits have been undertaken this year to British wharves receiving marine aggregate. Contact has been maintained with wharves, vessels and Continental wharves through regular emails, the Facebook page, the annual report and the *Dredged Up* newsletter.

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

Dredged Up newsletter

Newsletter issues 22 and 23

In 2017–2018, two issues of the biannual *Dredged Up* newsletter were produced; issues 22 and 23.

Issue 22, Spring 2018, was distributed in April, and highlighted some of the year's finds and showcased new finds and updates from the Marine Antiquities Scheme. In addition, it published the winners of the annual Finds Awards.

Issue 23, Autumn 2018, was distributed in October and shared information on the correct way to report munitions, written by the Executive Director of Planning, Mineral Resources and BMAPA. It also gave an insight in to the other work we do at wharves as archaeologists.

The newsletters are distributed to every wharf, all vessels and BMAPA member companies as well as The Crown Estate, Historic England, Wessex Archaeology and a variety of other organisations, individuals and the general public during conferences and events. A wider audience is reached by uploading a downloadable digital copy of the newsletter onto the Wessex Archaeology website and relevant social media pages.

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 and interest by publicising dredged finds and the dredging process.

Webbing net (CEMEX_0770)

Finds Awards

The 2016–2017 Finds Awards were made to the following wharf and vessels. More details about these Finds Awards are available in Issue 22 of *Dredged Up*.

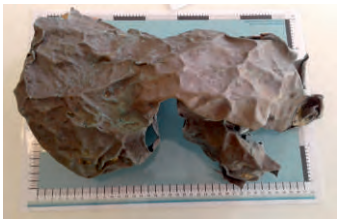
Brighton Wharf staff members

CEMEX Brighton Wharf – Best Attitude by a Wharf

The winner of the best attitude by wharf went to Cemex Brighton Wharf for their demonstrated eagerness towards the Protocol, their attitude towards archaeological finds and the warm welcome that the Protocol Implementation team receive during their visits there.

Tarmac Marine's *City of Chichester* – Best Attitude by a Vessel

Tarmac's *City of Chichester* reported three objects through the Protocol directly from the vessel during the 2016–2017 reporting year as a result of the keen eye of Rob Malloy. All three objects come from Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Tarmac_0774 is the badly crushed and torn remains of a copper alloy fuel tank and is most probably 20th century in origin. The other two objects were found and reported together as Tarmac_0771. Both items are of iron/steel origin based on the corrosion products present. One looks much like an engine valve, whereas the other appears to part of a badly damaged electric motor or similar.

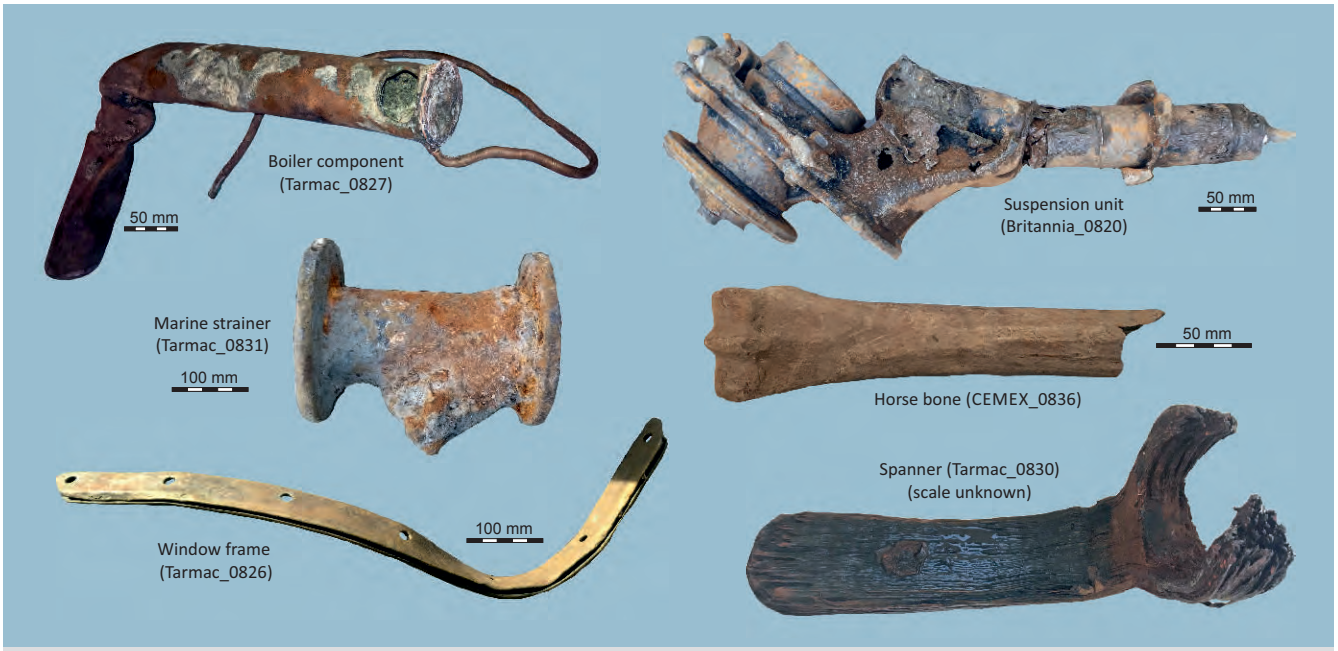


Tarmac_0774

CEMEX's *Sand Fulmar* – Best Find

The best find in the 2016–2017 reporting year was from CEMEX's *Sand Fulmar*. The object (CEMEX_0770) was discovered in Licence Area 512 in the South Lowestoft dredging region, approximately 18 km south-east of Great Yarmouth by Bob Hebblethwaite and reported as a webbing net with associated aluminium fittings. Initially thought to be a cargo net, further research suggests that based on its size it is the drogue parachute from an air dropped torpedo or sonobouy. The Royal Navy's Merlin Mk2 helicopters deploy the training version of the Sting Ray torpedo, and it is possible that the parachute, once separated from the torpedo, would travel some distance if not recovered at the time of deployment with the practice torpedo. Another possibility based on the unusual aluminium frame is that it is part of an experimental air to air refuelling drogue that has been lost. More recent designs have metal braces for all the petals of the drogue, but early experimental versions were made in a range of designs.

Tarmac_0771



Protocol reports

During the 13th year of operation Wessex Archaeology received 63 reports through the Protocol Implementation Service. These reports encompassed details of 67 separate finds. Further details of each discovery are shown below and included in the wharf reports appended to this report.

Finds reported in 2017–2018

Report ID	Licence Area	Region	Wharf/Vessel	Description	No.
DEME_0817	478	East English Channel	Flushing, Netherlands	Globe valve	1
Britannia_0820	351	South Coast	Ipswich	Suspension and hub unit	1
Britannia_0821	Unknown	Unknown	Cliffe	Cannonball	1
Tarmac_0823	509/2	Thames	Greenwich	Iron spike	1
Tarmac_0824	Unknown	Unknown	Greenwich	Lead weight	1
CEMEX_0825	137	South Coast	Leamouth	Hand grenade	1
Tarmac_0826	351	South Coast	Bedhampton	Window Frame	1
Tarmac_0827	351	South Coast	Bedhampton	Boiler component	1
Tarmac_0828	351	South Coast	Bedhampton	Compression gland	1
Tarmac_0829	498	Thames	Thurrock	Aircraft fragments	2
Tarmac_0830	351	South Coast	Bedhampton	Spanner	1
Tarmac_0831	351	South Coast	Brugge	Cylindrical metal object (marine strainer)	1
DEME_0832	228	East Coast	Flushing, Netherlands	Wooden object	1
Tarmac_0833	Unknown	Unknown	Thurrock	Chain	1
Tarmac_0834	Unknown	Unknown	Thurrock	Unknown metal object	1
Tarmac_0835	Unknown	Unknown	Thurrock	Bolt	1
CEMEX_0836	Unknown	South Coast	Dagenham	Horse metatarsal bone	1
CEMEX_0837	Unknown	Unknown	Dagenham	Fossilised bone	1
CEMEX_0838	137	South Coast	Leamouth	Minesweeper cutter	1
Tarmac_0839	Unknown	Unknown	Thurrock	Shell fuse	1
Tarmac_0840	Unknown	Unknown	Ridham	Shell plug	1
Tarmac_0841	Unknown	Unknown	Ridham	Shell body	1
Tarmac_0842	Unknown	Unknown	Ridham	Possible key	1
Tarmac_0843	Unknown	Unknown	Ridham	Possible plug gauge	1
Tarmac_0844	Unknown	Unknown	Ridham	Door handle	1
CEMEX_0845	Unknown	Unknown	Angerstein	Vertebra	1
Hanson_0846	372/1	South Coast	Unknown	Lead shot x 2	2
CEMEX_0847	Unknown	Unknown	Angerstein	Boiler hatch	1

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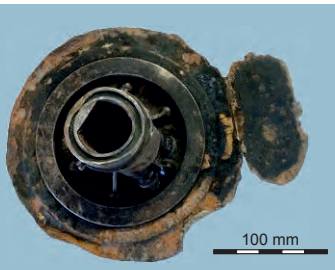
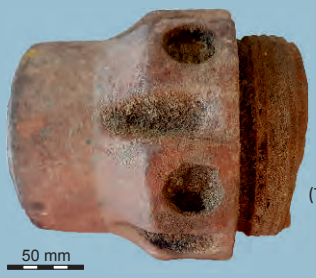


Shaft housing (CEMEX_0871)



Connector (Tarmac_0864)


Plate (Tarmac_0884) (scale unknown)

Bone vertebra (CEMEX_0856)

Pulley sheave (Tarmac_0850)

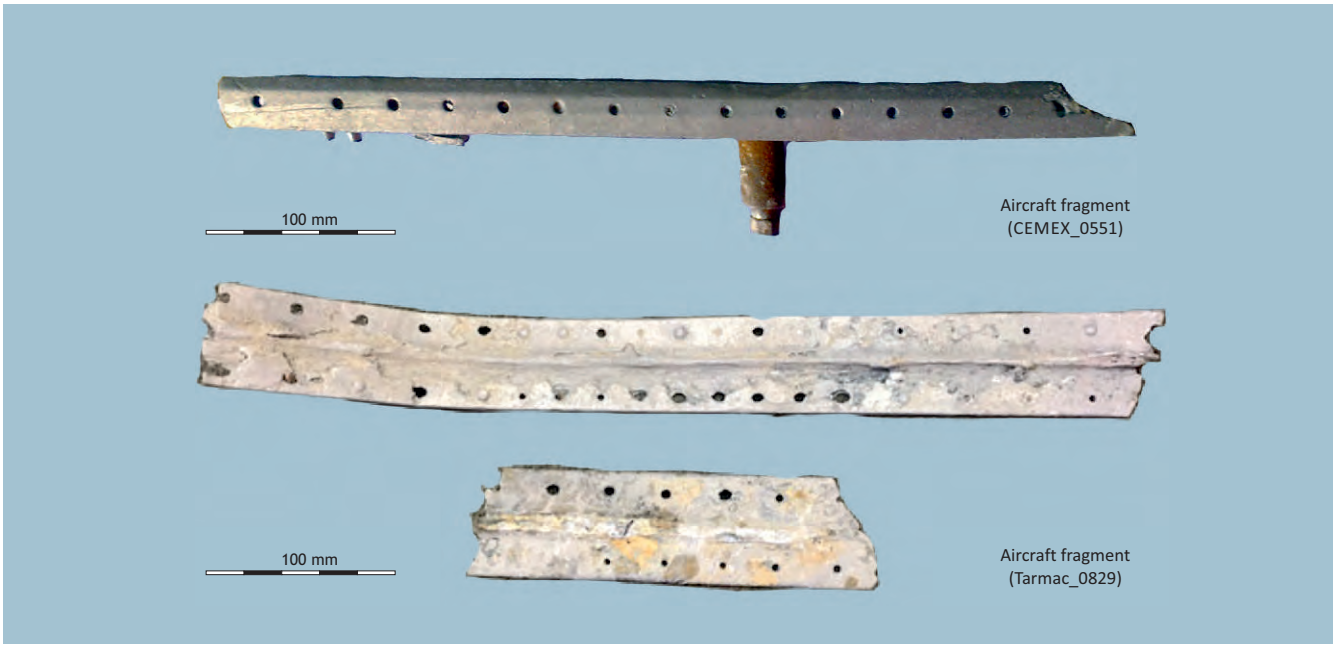
Finds reported in 2017–2018 continued

Report ID	Licence Area	Region	Wharf/Vessel	Description	No.
CEMEX_0848	Unknown	Unknown	Angerstein	Metal sheeting	1
Tarmac_0849	392	North West	Unknown	Animal bone	1
Tarmac_0850	392	North West	Unknown	Pulley sheave	1
DEME_0851	228	East Coast	Flushing, Netherlands	Fossilised tooth	1
Tarmac_0852	254	East Coast	Greenwich	Mooring bollard	1
CEMEX_0853	458	East English Channel	Angerstein	Aircraft fragment	1
CEMEX_0854	513/2 OR 458	East Coast	Dagenham	Bullet	1
CEMEX_0855	513/2	East Coast	Dagenham	Shell case	1
CEMEX_0856	137	South Coast	Shoreham	Vertebra	1
Clubbs_0857	Unknown	Unknown	Denton	Shell case	1
Clubbs_0858	Unknown	Unknown	Denton	Shell case	1
Clubbs_0859	Unknown	Unknown	Denton	Shell case	1
Clubbs_0860	Unknown	Unknown	Denton	Shell case	1
Clubbs_0862	Unknown	Unknown	Denton	Shell case	1
Tarmac_0864	351	South Coast	West Cowes	Connector	1
Tarmac_0865	351	South Coast	West Cowes	Fork	1
CEMEX_0866	511	East Coast	Northfleet	Container twist lock	1
CEMEX_0867	511	East Coast	Northfleet	Aircraft fragment	1
Tarmac_0868	395/1	South Coast	Unknown	Plank of wood	1
Tarmac_0870	351	South Coast	Greenwich	Valve handwheel	1
CEMEX_0871	511	East Coast	Northfleet	Shaft housing	1
CEMEX_0872	Mixed cargo – unknown	South Coast	Angerstein	Metal find	1
Hanson_0873	106/3	Humber	Antwerp	Hook and two bullets	3
Tarmac_0874	351	South Coast	Erith	Mooring bollard	1
Tarmac_0875	458	East English Channel	Erith	Rigging screw	1
Tarmac_0876	509/2	Thames	Erith	Diving fin	1
Tarmac_0877	Unknown	Unknown	Greenwich	Door dog	1
Tarmac_0878	Unknown	Unknown	Greenwich	Turbine Housing	1
Brett_0879	Unknown	Unknown	Cliffe	Stone cannonball	1
Brett_0880	Unknown	Unknown	Cliffe	Cannonball	1
Brett_0881	Unknown	Unknown	Cliffe	Cannonball	1
Brett_0882	Unknown	Unknown	Cliffe	Cannonball	1
CEMEX_0883	458	East English Channel	Unknown	Carriage wheel	1
Tarmac_0884	500/3	South Coast	Burnley	Plate	1
Hanson_0885	240	East Coast	Unknown	Possible handaxe	1

Specialists

If finds cannot be successfully identified by a member of the Protocol Implementation Service team at Wessex Archaeology, experts both in-house and from external companies and organisations are consulted. Since the implementation of the Protocol in 2005, the collection of willing and valuable experts we consult has grown to include a range of fields. Occasionally, the experts are consulted to add additional information about objects, or in order to ensure that discoveries are identified accurately and the archaeological value of each object is understood. The table below provides a list of the specialists who gave advice during the 2017–2018 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 extremely grateful to all the specialists who have assisted in the identification of Protocol finds over the last 12 years.

Expert	Advice given concerning	Institution/Organisation
Dr Dan Atkinson	Maritime artefacts	Wessex Archaeology
Ewen Cameron	Military aircraft	RAF Museum
Bob Davis	Archaeological artefacts	Wessex Archaeology
Toby Gane	Maritime artefacts	Wessex Archaeology
Graham Scott	Maritime artefacts	Wessex Archaeology
Lorrain Higbee	Zooarchaeology	Wessex Archaeology
Dr Adrian Lister	Mammoth remains	Natural History Museum
Phil Magrath	Ordnance	Royal Armouries Museum
Jonathan Ferguson	Ordnance	Royal Armouries Museum
Anthony Mansfield	Mechanics and engineering	Senior Naval Engineer
Lorraine Mepham	Pottery	Wessex Archaeology
Trevor Parker	Ordnance	Ordnance Society
Steve Vizard	Aircraft	Airframe Assemblies
Dr Robert Clarke	Aircraft	Wessex Archaeology
Dr Matt Leivers	Flint artefacts	Wessex Archaeology



Case Study 1 – Aircraft remains

Various aircraft remains have been reported through the Protocol since its inception with over 400 individual finds being recorded since 2005. These exclude all aircraft related ordnance but range from engine components to internal fittings and pedals. This year, three examples of aircraft fragments were reported reported through the Protocol and images were sent to two of our aircraft specialists; Steve Vizard and Robert Clarke in order to determine their use and origins.

The first to be reported were two pieces of the same fragment (Tarmac_0829), discovered in Licence Area 498 in the Thames dredging region, approximately 43 km east-north-east of Felixstowe. One of the pieces measured 300 mm in length, the other 650 mm in length and both had rivet holes along their edges. These pieces were determined to be aircraft as the rivets are evenly spaced while the shallow 'T' profile of both pieces is known to be associated with aircraft as it helps to prevent flex. Our external specialist, Steve Vizard determined that these pieces are a typical aluminium extrusion from an aircraft, and were used extensively by American aircraft types, although certain British aircraft, such as the Hurricane, also used this T section, especially in the wings. He said that the remaining rivet heads look to be more like British rivets than their American counterparts, which had a slightly different profile. Stamps and numbers visible on the parts would be able to provide further clues although in this case, there do not seem to be any present.

A separate fragment (CEMEX_0853) was believed to have originated from Licence Area 458 in the East English Channel dredging region, approximately 37 km south-west of Eastbourne. This aircraft fragment measured 400 mm in length and 110 mm in width and had a series of rivets still *in situ* running along the length of the fragment connecting other visible pieces of the same aluminium material. Steve determined that this fragment was indeed from an aircraft crash site, as indicated by the deformed nature of the part. He said that it appears to belong to a German/Luftwaffe aircraft, based on the fact that the material looks to be anodised, as early German war aircraft were. The fact that there is a magnesium piece attached to it also points to the aircraft fragment belonging to a German aircraft as they were very keen on magnesium, as opposed to the British RAF or the American aircrafts. Another clue is the small dimple visible on the top of the rivets, a distinctive feature not found on British aircraft. Interestingly, a fuel cap was dredged from the licence area and reported in 2011 (Tarmac_0387). It was identified as a German Daimler Benz fuel filter cap from a Luftwaffe aircraft by Andy Simpson, Curator at the RAF Museum. A separate unidentifiable fragment of aircraft was also dredged from this licence area in 2014 (CEMEX_0551).

Fuel cap (Tarmac_0387)

Aircraft fragment (CEMEX_0853)

Aircraft fragment (CEMEX_0867)

The third aircraft fragment (CEMEX_0867) was discovered in Licence Area 511 in the East Coast dredging region, approximately 9 km north-east of Lowestoft and measured approximately 500 mm in length and is 80 mm wide. There are rivets still *in-situ* along both edges and there is a slight curve in the piece. Both specialists said that the piece was definitely related to aircraft structure. Steve said that he believes the piece is an extrusion, as opposed to a section of formed sheet metal. He also said that the section seems fairly thick, meaning that it is quite substantial to the structure of the aircraft, suggesting it may be part of the wing structure or rib section. Although difficult to tell, Steve said that the rivet type would appear to be British rather than American. However, the piece is too small to correctly identify the type of aircraft it came from.

Aircraft remains have only been present in the archaeological record for the past 100 years or so. Despite this, the discovery of aircraft remains are considered extremely important and can be contentious for many reasons. Many of the aircraft sites around the United Kingdom are known about through records or geophysical survey. Despite this, there are still a large number of aircraft sites that are unknown due to records being lost or destroyed after both World Wars or that site locations are estimates and are thus inaccurate. Not all aircraft remains on the seabed relate to crash sites, although some do. If they relate to crash sites, they may represent the final resting place of the pilot and may still contain human remains which are of importance to the family of those involved and to the country to which they belonged. Since the implementation of the Protocol in 2005, we have had British, German and American aircraft fragments reported and some cases where human remains were present. All crashed military aircraft are protected by law under the *Protection of Military Remains Act* 1986. The discovery of any aircraft remains should be reported immediately as they may be indicative of an unrecorded aircraft crash site or related debris.

Shell body (Tarmac_0841)

Case Study 2: Munitions

The requirement to report the discovery of munitions through established company procedures over-rides any obligation to report or record them as part of the archaeological reporting protocol that is in place. Munitions finds should only be photographed and reported through the Marine Aggregate Industry Archaeological Protocol interest once suitably qualified EOD professionals have determined that it is safe to do so.

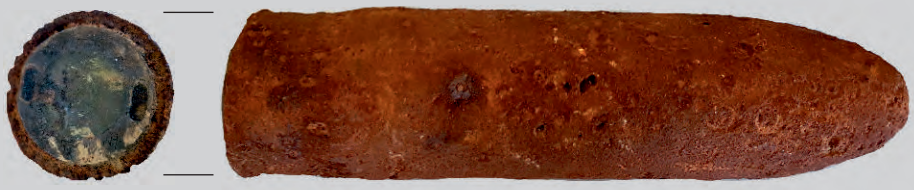
The quantity of ordnance in the seas around Britain is considerable. During the Second World War alone, it has been estimated that more than 80,000 tonnes of ordnance were dropped on Britain, on land damaging factories and homes, and at sea damaging shipping operations. Ordnance arrived on the seabed having been dropped from aircraft, fired from ships, or may even be part of a shipwreck or aircraft's munitions or cargo.

The Protocol sees a wide array of munitions every year that range from pre-First World War prototypes up until the end of the Second World War representing weapons used on land, at sea and in aircraft.

Projectiles and empty shell casings are commonly reported, reflecting ordnance that has been fired. One projectile (Tarmac_0841) was discovered by Gary Phillips at Ridham measuring 140 mm long by 40 mm wide. The copper driving band at its base displays several notches which means that the projectile has been fired. When fired, the pressure of the propellant swages the metal into the rifling of the barrel, providing a seal preventing the gases from blowing past the projectile and engaging with the rifling to provide spin-stabilisation. There are no markings on the projectile itself as they were likely to be stamped on the surrounding brass case. The hollow end has lost its adapter and fuse but the threaded column is still visible where this would have attached. The flat end would suggest that the projectile was tip fused. This is a small calibre at 1.5 inch (37 mm) and is the projectile from a Naval 2 pounder Pom-Pom anti-aircraft gun that were in service from 1915 until the 1940s and were fitted to British Naval ships during the First and Second World Wars. This example is most likely from a practice round where the steel nose plug has probably rusted away.

Other munitions reported come in the form of bullets. CEMEX_0854 is a conical shaped bullet with a casing made of brass. The bullet appeared to be live as the primer on the base did not have a characteristic dimple from the firing pin and the bullet is still sitting in the top. There appears to be a hole or a dent towards the top which may have allowed the gun powder to be emptied or drained. Experts differed in their opinion. Bob Davis, our in-house expert said that it looks like a .303 round, possibly Enfield and British. If the base was cleaned, then there may be marks telling us what Mark it came from and therefore would give us a date. Trevor Parker form the Ordnance Society suggested that it was a 0.5-inch Vickers round developed in the 1920s and 1930s for British anti-aircraft guns. It saw some use in tanks but was much more commonly used as a close-in anti-aircraft weapon on Royal Navy and allied ships, typically in a four-gun mounting. There were two different versions of this round and he believed that this one may belong to the later 1930s.

Bullet (CEMEX_0854)



Shell (Clubbs_0859)

Shell (Clubbs_0862)

Shell case
(CEMEX_0855)

Shell casings will be reported as munitions, representing the brass casing that originally contained the propellant that fired the projectile. CEMEX_0855 is a large shell case that was discovered in Licence Area 513 in the East Coast dredging region approximately 19 km east of Lowestoft. Our in-house specialist suggested that the 6-inch diameter of the shell case may mean it has come from a coastal defence gun, while the external specialist suggested that the shell case from a separate loading 4-inch round; dating from the early 1900s to the 1960s. The example was live or unfired as there was no dimple on the primer at the base of the shell casing from the firing needle and the propellant, cordite, was still visible in the tube. The propellant in these types of large shells was formed in tightly packed bundles of cords hence the name cordite. Cordite is a family of smokeless propellants developed and produced in the United Kingdom since 1889 to replace gunpowder as a military propellant, as seen in this example. Trevor Parker from the Ordnance Society said that even though they have been immersed in sea water for years, the sticks would still burn fiercely, if not explosively, when dried out. The cases would have had a metal lid, but the damage that this shell has suffered has removed it at some stage. The shell case was reported and disposed of by the Explosive Ordnance Disposal team soon after it was reported.

The numbers and letters on the base of some of the reported shells tell our specialists a lot about the type of munition. Clubbs_0859 was a projectile that measured 320 mm in length and has a 90 mm diameter. It had no driving band left and therefore it cannot be determined whether it had been fired or not. The base appeared to have a ‘P’ stamped in the centre, which tells us that this is most likely a practice shell and is therefore inert ie. contains no primer, propellant, or explosive charge. Practice shells are used to check weapon function, and for crew training. Dummy ammunition is different from practice ammunition, which may contain smaller than normal amounts of propellant and/or explosive. If the “P” was missing from this example, then it would probably mean that it was still live and very dangerous. The EOD removed this shell from the wharf shortly after this find was reported.

Some of the shells reported can be pinpointed to the exact type of gun it came from. Clubbs_0862 was a shell that belonged to a QF Hotchkiss 6 pounder gun. The QF Hotchkiss 6 pounder guns Mk I and Mk II were a family of naval guns introduced in 1885 to defend against new, small and fast vessels such as torpedo boats, with an effective firing range of 4000 yards. After the First World War the gun was considered obsolete for combat use, however, with the onset of the Second World War, the remaining guns were rushed back into service for anti-submarine defence and coastal defence meaning that this shell reported through the Protocol may have dated from either World War.

A guide for managing munitions that may be encountered with marine aggregates is available at http://www.bmapa.org/documents/Dealing-with-munitions-in-marine-sediments.pdf

Liaison and accessibility

Details of each discovery have been sent to:

Mark Russell	British Marine Aggregate Producers Association
Stuart Churchley	Historic England, Marine Planner
Neil Guiden	Historic England, National Record of the Historic Environment
Andrew Cameron	The Crown Estate
Nick Everington	The Crown Estate
Mark Wrigley	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 2017–2018 the following reports that have droit numbers were deemed to represent items of wreck:

Report ID	Droit number
DEME_0817	305/17
Britannia_0820	349/17
Britannia_0821	004/18
Tarmac_0823	005/18
Tarmac_0824	006/18
CEMEX_0825	017/18
Tarmac_0826	019/18
Tarmac_0827	020/18
Tarmac_0828	021/18
Tarmac_0829	024/18
Tarmac_0830	025/18
Tarmac_0831	028/18.
DEME_0832	032/18
Tarmac_0833	029/18
Tarmac_0834	031/18
Tarmac_0835	030/18
CEMEX_0838	036/18
Tarmac_0839	040/18
Tarmac_0840	041/18

Report ID	Droit number
Tarmac_0841	042/18
Tarmac_0842	037/18
Tarmac_0843	038/18
Tarmac_0844	039/18
Hanson_0846	045/18
CEMEX_0847	046/18
CEMEX_0848	047/18
Tarmac_0850	049/18
Tarmac_0852	054/18
CEMEX_0853	056/18
CEMEX_0854	057/18
CEMEX_0855	058/18
Clubbs_0857	065/18
Clubbs_0858	065/18
Clubbs_0859	065/18
Clubbs_0860	065/18
Clubbs_0862	065/18
Tarmac_0864	075/18
Tarmac_0865	076/18

Report ID	Droit number
CEMEX_0866	085/18
CEMEX_0867	086/18
Tarmac_0868	087/18
Tarmac_0870	088/18
CEMEX_0871	089/18
CEMEX_0872	106/18
Hanson_0873	108/13
Tarmac_0874	121/18
Tarmac_0875	122/18
Tarmac_0876	123/18
Tarmac_0877	124/18
Tarmac_0878	125/18
Brett_0879	126/18
Brett_0880	127/18
Brett_0881	128/18
Brett_0882	129/18
CEMEX_0883	168/18
Tarmac_0884	167/18

In the 13th year of the Protocol, three discoveries were made relating to aircraft. Although a military context could not be confirmed or disproven, the following reports were forwarded to Sue Raftree at the Ministry of Defence for her interest: Tarmac_0829, CEMEX_0853 and CEMEX_0867.

Although the Protocol received a number of reports of artefacts which may relate to vessels as wreck material, none of them was thought to directly relate to unknown and uncharted wreck sites. Consequently, no reports were forwarded to the United Kingdom Hydrographic Office in the 2017–2018 reporting year.

Information on each find has been forwarded to each county HER relevant to the location of the archaeological discovery. In the case of a discovery where the original location is known, this will be the HER closest to the dredging 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.

Discussion

Importance

Sixty-three individual reports were raised during the 2017–2018 reporting year, 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, from submerged prehistoric finds (Hanson_0885: worked flint), through to the First World War (CEMEX_0825: hand grenade), and up until modern times (Tarmac_0876: diving fin). The various archaeology and the amount that is still reported re-iterates the importance of the Protocol and demonstrates the wealth of archaeological material still on the seabed. Investigations into these finds expand our knowledge of the past and contribute to our understanding.

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 13 years ago. During each year of Protocol implementation, minor operational situations are recognised and the Protocol Implementation Service develops and adapts to overcome these. This year the following points have been raised for discussion.

Area dredged

The dredging industry that takes place around the coasts of England and Wales is one of the most efficient in the world. However, this activity tends to be concentrated into a relatively small area, where extraction operations are focussed. In 2017, although 1057 km^2 of seabed was licensed, extraction operations were limited to 90.94 km^2 (https://bmapa.org/documents/BMAPA_CE_20th_Ann_Rep_Aug18.pdf).

Timely reporting

The Receiver of Wreck must be notified of any wreck-related material within 28 days of it being removed from the seabed. Wreck-related finds include any artefacts that have come from a ship or aircraft. The reporting time limit is a legal requirement of the *Merchant Shipping Act* 1995. This exists regardless of the presence of a Protocol, and this is why the Protocol Implementation Team will urge all finds to be reported through the console as soon as they are found. It is vitally important that any material discovered at the wharves or on vessels be reported to the Protocol Implementation Team as soon as possible. There have been instances where by material is being kept together to be reported in one go. The longer the items are kept without being reported, the more detail is lost. We therefore ask that all material is reported in a timely fashion. The Protocol Implementation Team will notify the Receiver of Wreck with the positional details of the find as soon as possible and will follow up with additional information as the find is assessed and a Wharf Report is produced.

Mixed cargoes at wharves

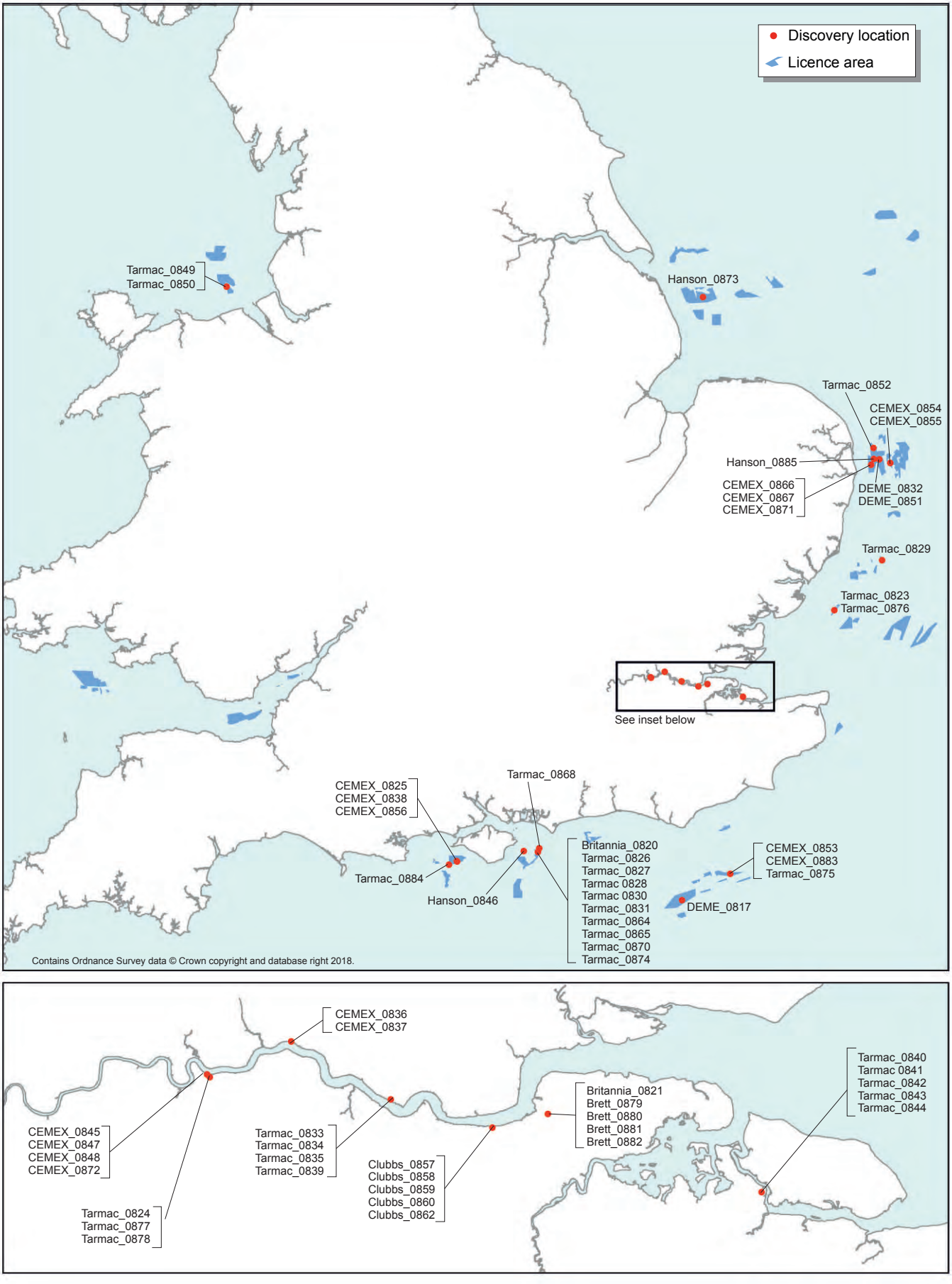
During wharf visits this year, we have become aware that some wharves are hesitant to report finds if they process mixed cargoes as they cannot pinpoint the correct licence area for the discovery. Please be assured that this is completely understandable, but we want the object reported regardless of whether the exact licence area can be confirmed. The reason we ask for the licence area number is so that we can plot all the finds reported through the Protocol so that we can see a pattern and the areas where material is coming from. If the licence area is unknown, the discovery can be reported as an unknown licence area and if the numbers of potential cargoes are known, they can be added in the comments box so that we have all the information possible. Where no licence area can be determined, the find will be attributed to the location of the wharf where it was discovered.

Regions with nil return

In the previous two years, there were no reports of finds among material dredged from the North West, South West or Humber regions. This year two finds, a pulley sheave (Tarmac_0850) and an animal bone (Tarmac_0849), were reported from the North West from Tarmac's *City of Chichester*. The North West region is targeted for sand, and screens fitted to the dredgers reject larger objects before they can enter the hold. This has always been considered the reason for the lack of archaeological reports from this region. The only report from this region prior to this year was made during the 2006–2007 reporting year. Three finds were also reported from the Humber region during this Protocol year in the form of a hook and two bullets (Hanson_0873). Only the South West region remains a region of nil return this year. However, as operations in this region are also focussed on sand production, any larger items will be lost through the screening process that is employed by dredgers. The region has previously yielded archaeological material, though reports have only been received in the reporting years of 2007–2008 and 2014–2015 (https://bmapa.org/documents/BMAPA_CE_20th_Ann_Rep_Aug18.pdf).

The reports from the North West and Humber regions, which had previously resulted in nil returns, emphasises that the Protocol is being adopted in areas where the Protocol Implementation Team has generally had less direct contact through Awareness visits. However, this highlights the importance of ongoing contact through the distribution of the bi-annual *Dredged Up* newsletter and through contact via email.

Discoveries 2017–2018



Artefact patterns and distribution

Through the use of GIS, patterns and trends such as artefact location and concentration can be studied. During the reporting process, licence areas of the objects, if known, are documented. This allows us to assess finds on a regional basis, which is helpful when considering future licence applications within existing dredging regions. Patterns in artefact concentration can potentially identify sites of archaeological interest or debris fields or alternatively, licence areas which are more likely to yield finds of archaeological interest in the future.

Archaeological material is not distributed evenly on the seabed. Some areas have a higher potential than others to contain material that entered the archaeological record either accidentally or deliberately. Some areas, such as the East Coast are known to have had Palaeolithic activity when sea levels were lower than the present day. Other areas are known to be post Second World War dumping grounds which has become apparent from artefact type and quantity in that area. We also know which licence areas tend to yield more munitions and should be approached with caution.

Survival of artefacts will depend on the marine environment in which they lie. Most of the finds reported this year are modern and made of metal which is not unusual as it tends to be a more durable material in a harsh underwater environment in comparison to wood. Organic finds such as wood or bone and teeth from the submerged prehistoric landscapes or shipwrecks may be poorly preserved unless they are buried beneath fine grained sediments, which may account for the low percentage of finds received of this material. For finds to be discovered, the high potential for loss or discard must coincide with a high potential for the preservation of archaeological materials.

Based on potential and survival, some licence areas will therefore contain more archaeological finds than others and may be associated with more specific time periods more than others. Other factors, such as whether finds are discovered in isolation or grouped with similar items, also add to their context. In most cases, objects are reported as single isolated finds but we do occasionally receive reports of multiple items found in the same location; cannonballs being a prime example. The significance of a find can therefore depend on its location as much as the nature of 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; and
- North West.

In the 2017–2018 dredging year a trend established in previous years whereby most of the finds come from the South Coast has not continued. The majority of finds during this year (26) came from unknown locations, either from wharves with mixed cargoes or recovered from oversize/reject piles once processing had ceased. This year, 18 out of the 63 reports came from the South Coast.

Three of this year's 63 reports came from the Thames Estuary region, nine from the East Coast, one from the Humber region, two from the North West and four from the East English Channel. Twenty six reports were from an unknown region as it was not possible to determine the cargo they were recovered from.

No reports were received from cargoes dredged from the South West.

Region	Millions of tonnes of construction aggregate dredged in 2017 (2016 quantity)	Number of finds reported 2017–2018 reporting year (2016–2017 reporting year)
Humber	1.88 (1.81)	3 (0)
East Coast	4.26 (4.31)	9 (5)
Thames Estuary	1.85 (1.94)	3 (3)
East English Channel	3.97 (4.65)	4 (2)
South Coast	3.77 (3.75)	18 (47)
South West	1.34 (1.18)	0 (0)
North West	0.32 (1.16)	2 (0)
Unknown	—	26 (7)
Totals		**63 (64)**

Distribution of artefacts by archaeological typology

Rhinoceros's tooth (DEME_0851)

Globe valve (DEME_0817)

Mooring bollard (Tarmac_0874)

Cannonball (Brett_0881)

36M mills bomb (CEMEX_0825)

Shell fuse (Tarmac_0839)

Palaeolithic finds

Four finds reported this year are confirmed to be of Palaeolithic date – a fossilised bone (CEMEX_0837) found at Dagenham Wharf, a fossilised tooth (DEME_0851) from Flushing wharf in the Netherlands dredged from the East Coast, a vertebra (CEMEX_0856) found at CEMEX's Shoreham Wharf from a cargo of South Coast origin and a possible handaxe (Hanson_0885) from Hanson's *Arco Beck* found in the East Coast. Due to the high level of preservation of the tooth and vertebra, it was possible to determine what animals they were from. The tooth (DEME_0851) was determined to be a rhinoceros while the vertebra (CEMEX_0856) was believed to have belonged to an aurochs. The licence areas of three of these four finds were known and have been plotted in the project GIS.

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's fittings such as a globe valve from the East English Channel (DEME_0817), a boiler component from the South Coast (Tarmac_0827) and a pulley sheave block from the North West (Tarmac_0850). Other shipping-related finds comprise a hook from the Humber region (Hanson_0873) and a plank of wood from the South Coast (Tarmac_0868).

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 351, including a window frame (Tarmac_0826), a boiler component (Tarmac_0827), a spanner (Tarmac_0830), a marine strainer (Tarmac_0831), a fork (Tarmac_0865) and a mooring bollard (Tarmac_0874).

Several metal objects that could have a terrestrial origin and were dumped at sea were reported through the Protocol this year. Examples of this include a suspension and hub unit (Britannia_0820), a door handle (Tarmac_0844), a connector (Tarmac_0864) and a shaft housing (CEMEX_0871).

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.

Ordnance and munitions

A high quantity of ordnance has been reported through the Protocol this year (17 of the 63 reports).

While not considered classic munitions, cannonballs of varying sizes came from unknown licence areas this year. Five individual cannonballs have been reported (Britannia_0821, Brett_0879, Brett_0880, Brett_0881, Brett_0882).

Of the more typical ordnance reported, 12 of the reports included shell bodies, shell fuses and shell plugs ranging in age from the First World War to the Second World War. One of the most interesting finds reported this year was a First World War Hand Grenade also known as a 36M mills bomb (CEMEX_0825) which displays all the classic characteristics of a grenade of this type. A shell fuse (Tarmac_0839) was also reported this year that had inscribed letters and numbers that revealed details about its use. The fuse was determined to be a number 230 MKII British percussion fuse that was adapted for naval service with the damage indicating that the example had been fired from a vessel, possibly at a patrolling German U-boat during the Second World War. Additionally, a shell plug (Tarmac_0840) was also reported from the same wharf. A shell plug would have been threaded on to the top of a shell during transportation in wartime. Once the shell was ready to be used, the plug would be removed and replaced with a fuse that corresponded with the numbers and letters inscribed in to the plug. Based on the letters and numbers, this example is believed to be an adaptor and transit plug for a Number 44 MKII British fuse and probably marked 'N' for a Navy round and likely dates to 1916 for use during the First World War.

Conflict, both historical and modern, on land and overseas has left a great deal of weaponry, ordnance and military paraphernalia on the seabed. Dredging and disturbance of the seabed will result in the upheaval of these items, some of which have been buried for almost a hundred years. Wharf staff and ships crew should always put company health and safety policies before any archaeological reporting. More can be read about the munitions reported this year in **Case Study 2**.

Aircraft

Three discoveries were made relating to aircraft this year. Tarmac_0829 was discovered from the Thames region, CEMEX_0853 from the East English Channel, and CEMEX_0867 from the East Coast. More can be read about these in **Case Study 1**.

Conclusion

The Marine Aggregate Industry Archaeological Protocol continues to be relevant offshore mitigation. In addition, it continues to be a model from which other industries draw inspiration. It remains a successful and applicable template for preserving heritage on the seabed and for gaining understanding about the unexpected discoveries. This is reiterated by the high volume of reports received this year from wharf and vessel staff and the contact that has been maintained with several Nominated Contacts and Site Champions this reporting year.

The application of the Protocol ensures that archaeological information is preserved through recording and is disseminated as widely as possible, so that everyone can enjoy and explore our underwater cultural heritage. The addition of a new social media page for the Protocol where reports and images are displayed has aided in the dissemination of information and targets a wider audience than perhaps the *Dredged Up* newsletter alone would reach.

The enthusiasm and diligence of wharf and vessel staff ensures the success of the Protocol. Everyone's support has ensured that the Protocol has become embedded in commercial processes, which in turn reduces the impact of dredging on underwater cultural heritage, by making the archaeological record available for future generations. By asking wharf staff to complete a feedback form after their training sessions during future visits, we hope to further engage with those who report discoveries through the Protocol and make it a success. Any feedback received through these forms or otherwise will be considered and acted upon to ensure that we are implementing the best version of the Protocol as possible.

The Protocol Implementation Service Team would like to thank everyone who has helped to support the Protocol during the 2016–2017 reporting year, as the Protocol enters its 14th year.

The future

Protocol Implementation 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.

DEME_0817: Globe Valve

This globe valve was discovered in Licence Area 478 in the East English Channel dredging region, approximately 42 km south-south-west of Eastbourne. Christophe Matton discovered it at Flushing Wharf in the Netherlands.

This corroded metal object has a threaded opening in its centre and measures approximately 160 mm in length. A logo or maker's stamp of some sort is seen on one side of the object in the form of a "B" in a diamond shape (pictured below) and there is faint text still visible on the flange rim. Marine growth is also present on the object, meaning it may have been on the seabed for several years.

Anthony Mansfield, a Senior Naval Engineer, was able to identify the find from the images. He concluded that the object is the body of a globe valve with a screw connection bonnet. A globe valve, different from ball valve, is a type of valve used for regulating flow in a pipeline, consisting of a movable disk-type element and a stationary ring seat in a generally spherical body. Anthony said that this type of valve is used as a general-purpose valve and is commonly seen around an engine room on vessels. Although not clear on the images, the symbol on the opposite side to the maker's mark should be the flow direction or the nominal size. The faint text on the flange rim should be the pressure rating or a standards reference.

This object may have entered the marine environment via a number of routes. The item could be indicative of material lost or thrown overboard during every day shipping operations. Alternatively, it could have been discarded from a dock during the construction or repairs of vessels. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (droit 305/17)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex

Britannia_0820: Suspension and wheel hub unit

This suspension and wheel hub unit was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. D. Benneworth discovered it at Ipswich Wharf.

This suspension and wheel hub unit measures approximately 500 mm in length and comprises two parts. The round end is the wheel hub unit and is bolted on to the suspension via four bolts, all of which are still intact. The object is made of steel and has corroded in the marine environment.

A wheel hub unit also referred to as a 'wheel hub assembly' and 'wheel hub bearing', is an automotive part that sits behind the tyre of a vehicle. It is used in most cars, passenger vehicles and light and heavy trucks. The suspension system is made up of tyres, tyre air, springs, shock absorbers and linkages that connects a vehicle to its wheels and allows relative movement between the two, which is what remains attached to the wheel hub unit discovered.

As this modern object is from a terrestrial context, there are two main ways in which it may have entered the marine environment. The item could be indicative of material that was taken to sea to be disposed of as there are known post-war dumping areas around the Isle of Wight. Alternatively, it could have been part of a vessel's cargo that was either accidentally lost overboard or was lost when the vessel sank. Though considered an isolated find, further finds of this type should continue to be reported as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 349/17)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

Britannia_0821: Cannonball

This cannonball was discovered at Cliffe wharf in Kent by Keith Tupper. The licence area from which the cannonball was found is unknown as it was found on a magnet from a stockpile of various dredging areas.

Britannia_0821 is a cast iron cannonball described as having a diameter of 165 mm or 6.5 inches. No weight was given. It has been heavily degraded in the marine environment resulting in a loss of shape and does not display any unusual markings or features.

Cannonballs or round shot are one of the earliest forms of projectiles fired from cannons. Round shots were made 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. Based on the diameter alone, this cannonball could have been fired by a demi-cannon which fired a 6.5-inch diameter shot typically weighing 30 lbs (Childs 2009). A demi-cannon is a brass gun that is smaller than a cannon and larger than a culverin (Garrett 2010). These guns were used by the British navy in the 16th century and were present at the seizure of San Juan de Puerto Rico in 1598 (Childs 2009).

How this find entered the marine environment is unknown. It could be related to a period of post-medieval warfare at sea or have been lost overboard during shipping operations. Even though this cannonball is considered an isolated object, any further discoveries should continue to be reported through the Protocol, as they could shed light on periods of naval conflict or a possible unknown wreck site.

References

Childs, D., 2009. *Tudor Sea Power: The Foundation of Greatness*. Seaforth Publishing, Barnsley.

Garrett, R. J., 2010. *The Defences of Macau: Forts, Ships and Weapons over 450 years*. Hong Kong University Press, Hong Kong.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Tarmac_0823: Iron Spike

This iron spike was discovered in Licence Area 509/2 in the Thames dredging region, approximately 22 km south-east of Felixstowe. Paul Scrace discovered it at Greenwich Wharf from the cargo of *City of London*.

This iron spike measures approximately 160 mm in length and 20 mm at its widest part. It was described by the finder as an iron composite hand working tool with an eye in the centre. The eye currently still contains the remains of rope.

Images of the find were sent to our in-house specialist Bob Davis. He said that the object may well be a tent peg but more likely a general-purpose iron fixing spike with a loop attached through the eye for an assortment of uses. Although the dimensions are fairly small, it looks robust enough to be driven into a wall or thick wood and the flat end could probably take a heavy blow. This iron spike is more than likely handmade and possibly 19th or early 20th century in date. This object also bears resemblance to a mid-19th century blacksmith made iron marlinspike. Marlinspikes are shaped in the form of polished metal cones tapered to a rounded or flattened point. They aid in such tasks as unlaying rope for splicing, untying knots, drawing marline tight using a marlinspike hitch, and as a toggle joining ropes under tension in a belaying pin splice (Smith 2015).

This object may have entered the marine environment via a number of routes. The item could have been lost overboard as part of a vessel's cargo or during everyday shipping operations. Alternatively, it could have been discarded from a dock or this particular licence area could possibly indicate an area where material was dumped. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

References

Smith, H. G., 2015. *The Marlinspike Sailor*. Ravenio Books

Information about this discovery has been forwarded to:

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

Tarmac_0824: Sounding Lead

This lead weight was discovered from an unknown licence area. G. Marshall discovered it at Greenwich Wharf from the cargo of *City of Chichester.*

Tarmac_0824 is a lead sounding weight measuring 280 mm in length. The wider end is 70 mm that tapers to 30 mm at the thinnest end where a small hole is present. No weight was given.

The sounding lead and line is one of the oldest of all navigational instruments and was used to determine the depth of water beneath a vessel. This was done by lowering it over the side of the ship and letting the line out until the lead hit the bottom. By about 1600, the line was marked in fathoms with pieces of material in order to make it easier to determine the distance to the bottom. Nearly all ancient sounding weights were cast in lead and follow one of several variations on hemispherical, bell, or conical shapes (Hohlfelder 2008). There is a tethering hole in a stout lug or added iron ring at the upper end, and very often a concave base designed to hold a lump of tallow (Hohlfelder 2008), although missing from this particular example. To begin sounding, one sailor (the leadsman) moved towards the bow on the outside of the ship, taking with him the lead and approximately one fathom of rope. Three or four other sailors took up the rest of the line in coils and arranged themselves at intervals along the outside of the ship, from bow to stern, necessary in order to compensate for the forward motion of the ship during sounding (Poskett 2015). By throwing the lead forwards of the ship, the sailors aimed to have the line perpendicular to the seabed when the lead reached the bottom (Poskett 2015).

This object may have entered the marine environment via a number of routes. The item is not broken and therefore could be indicative of an unknown wreck site or from material lost or thrown overboard during every day shipping operations. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Reference

Hohlfelder, R., 2008. *Testing the Waters: The Role of Sounding-Weights in Ancient Mediterranean Navigation.* University of Michigan Press.

Poskett, J., 2015. 'Sounding in silence: men, machines and the changing environment of naval discipline', 1796-1815. *The British Journal for the History of Science*. Cambridge University Press. 48 (2).

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London

CEMEX_0825: Hand Grenade

This hand grenade was discovered in Licence Area 137 in the South Coast dredging region, approximately 10 km south-west of the Isle of Wight. Steve Bomber discovered it on the magnet at Leamouth Wharf.

CEMEX_0825 is a hand grenade that measures approximately 10.5 cm by 6 cm. It has been heavily corroded in the marine environment and is missing one half. Despite this, the classic pineapple shape of a typical grenade is still visible.

Images of the find were sent to Trevor Parker of the Ordnance Society. He said that the find looks like a British hand grenade which has split open and is probably completely inert. He said that the marks on the surface of the grenade are quite common on First World War grenades and are most likely batch numbers.

Based on the shape of the remains of the spoon pin retainer towards the top of the grenade, it has been determined that this is a No. 36 or No. 36M grenade, known as the Mill's bomb. William Mills, a hand grenade designer from Sunderland, patented, developed and manufactured the "Mills bomb" at the Mills Munition Factory in Birmingham, England, in 1915. The Mills bomb was adopted by the British Army as its standard hand grenade in 1915, and designated the No. 5. Over the years, it undertook a series of modifications with the No. 23, No.36 and No.36M. The final variation of the Mills bomb, the No. 36M, was designed and waterproofed for use in the hot climate of Mesopotamia in 1917, but remained in production for many years. No. 5 and No. 23 were declared obsolete by 1918 and No. 36 followed in 1932. No. 36M was still manufactured in the UK up until 1972 and later in some countries. Over 70 million of the British Mills Bomb hand grenades were manufactured from 1915 to 1972.

The 1945 Ammunition pocket book describes the No. 36M grenade as an anti-personnel bomb with a danger zone on detonation of approximately 400 yards. The grenade had a cast iron body which was filled with a high explosive. The body was oval and its exterior was grooved to provide a grip to the hand and also to assist fragmentation. The centre piece was screwed in to the base and retained by a base plug. The high explosive filling, Baratol 20/80 was filled into the body through the filling hole in the shoulder, which was closed by a screw-threaded plug. The centre piece was made of aluminium or tinned brass and comprised of two adjacent chambers. The smaller chamber received the detonator and was empty until the grenade was primed. The larger or Stricker Chamber was positioned in the centre of the body and contained

the Striker and Striker Spring; the head of the striker protruded through the circular hole at the top; the opening in the base received the cartridge end of the Igniting Set. The Igniting Set comprised a Detonator, Safety fuse, 0.22-inch Rim-fire, cap and a zinc alloy cap chamber. The cap sat in the cap chamber with one end of the fuse attached. The fuse was formed into a U-shape to suit the Centre piece into which the set fit and its other end was crimped into the detonator. There were two types of Igniting Set that varied in time of burning of the fuse; 7 second fuses were coloured yellow while 4 second fuses were coloured white and had a rubber band around them which was never to be removed as it provided the means of identification at night.

The find was reported to the police and removed from site by the Explosive Ordnance Disposal team. 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. 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.

References

Admiralty Handbook on ammunition B.R. 932 (1945) (Restricted – For official use only)

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 017/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

The view of the grenade showing it broken in half

Tarmac_0826: Window Frame

This long, bent piece of metal was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Kevin Vine discovered it at Bedhampton Wharf.

Tarmac_0826 is a long piece of metal with periodic holes, identified by the finder as possibly being made of brass. It was reported as either aircraft or ship wreckage and suggested to be some sort of window frame. The object is around 1 m long, 50 mm wide and the holes are 160 mm apart.

Images of the find were sent to two in-house specialists, Bob Clarke and Bob Davis, and an external aircraft specialist, Steve Vizard. It was pointed out that the fact that the internal edge is folded over as if ready to take a sheet of Perspex or glass sheeting makes it look like window frame. The present rivet holes could indicate an aircraft or a boat, however, all three specialists determined that it is not believed to be aircraft related. Aircraft window frames are most commonly singular sections with large curved internal radii as it makes them better at coping with fatigue and subsequent failure. Steve Vizard said that the pitch of the holes on this piece are too far apart to be normal aircraft structure and that a part number or inspection stamp should be evident if it was aircraft material as the section seems to be complete, and not broken. It is thought that this find was originally a straight piece and has been bent or damaged at the end of its working life. It also has mitred ends which, may suggest that it was meant to joint to other sections forming corners for a panel or window, possibly from a boat. Brass or copper alloys are commonly associated with maritime vessels as iron and steel rusts due to salt water, and therefore, this possible window frame is more than likely from a sea going vessel.

This object may have entered the marine environment via a number of routes. The item is not thought to be broken, although bent, and therefore could have been lost or thrown overboard during every day shipping operations. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 019/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

Tarmac_0827 Boiler Component

This boiler component was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Kevin Vine discovered it at Bedhampton wharf.

Tarmac_0827 was reported as a pipe with a smaller pipe running alongside it. The thicker, sealed end measures 80 mm wide and tapers to 30 mm at the open end that is filled with aggregate and stones. The pipe is hollow and in its bent state measures 340 mm long. Due to the green hue of the metal, it is though that both pipes are made of copper.

Images of the find were sent to Anthony Mansfield, a Senior Naval Engineer, who said the object itself could have been anything, although the small, bore pipe that runs from the larger pipe probably ran to a drain valve or a pressure gauge. Based on this information and the fact that it is made of copper, it is thought that this pipe is part of a steam boiler system possibly from a maritime vessel. The almost perfect round hole cut in to the top of the pipe is thought to have housed a round dial which may have displayed the pressure reading when in use. The trouble is with this sort of thing being copper piping, is that the item itself is only a component part of something bigger.

Based on its shape, it was also suggested that this object may have been a steam whistle but further research has suggested that while very similar in appearance, the mechanism is not quite right.

This object may have entered the marine environment via a number of routes. The item is broken and therefore could have been lost or thrown overboard during every day shipping operations. License Area 351 has produced a mixture of items that could possibly indicate the dumping of material. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 020/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

Tarmac_0828: Compression Gland

This compression gland was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Gary Cooper discovered it at Bedhampton wharf.

This object was reported as a copper gland suspected to be from ship wreckage that appears to be in-tact. The gland would be connected to the machine it was attached to via the two larger machine fit holes seen in the photographs.

Images of the find were sent to Anthony Mansfield, a Senior Naval Engineer, who confirmed it was a compression gland, possibly for a sliding rod. He said that based on images alone it was difficult to tell what sort of machinery it was from. Compression glands (also called a packed gland) were a common form of sealing for sliding and rotating shafts. The gland could be tightened around the rod or shaft and would have provided a water-tight seal for the machine it was attached to, which is vital. Anthony said that this particular example is a replaceable gland rather than one that has been cast with the body of the machine it was sealing. This means that it was likely intended for a larger, more expensive machine, for example an engine or pump rather than a valve. This means that if anything was to go wrong with the valve, it could easily be replaced without having to replace the machine it was attached to, which is a much cheaper option and easier to do when out at sea when larger parts may not be available.

This object may have entered the marine environment via a number of routes. As the item is a replaceable valve, it may mean that something is wrong with the component and it has been thrown overboard during every day shipping operations. Alternatively, it may have been a brand new, spare valve on board a vessel that was lost accidentally, or it could be part of a wreck site. License Area 351 has produced a mixture of items that could possibly indicate the dumping of material. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 021/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

Tarmac_0829: Aircraft Fragments

These aircraft fragments were discovered in Licence Area 498 in the Thames dredging region, approximately 43 km east-north-east of Felixstowe. Tommy Merchant discovered them at Thurrock Wharf.

Tarmac_0829 was recorded as two metal sections with holes along their lengths. One measures 300 mm in length and the other is 650 mm in length.

Images of the find were sent to two in-house specialists, Bob Clarke and Bob Davis, and an external aircraft specialist, Steve Vizard. These pieces were determined to be aircraft as the rivets are evenly spaced while the shallow 'T' profile of both pieces is known to be associated with aircraft as it helps to prevent flex. Steve Vizard determined that these pieces are a typical aluminium extrusion from an aircraft, and were used extensively by American aircraft types, although certain British aircraft, such as the Hurricane also used this T section, especially in the wings. He said that the remaining rivet heads look to be more like British rivets, than their American counterparts, which had a slightly different profile. Stamps and numbers visible on the parts would be able to provide further clues although in this case, there do not seem to be any present.

All crashed military aircraft are protected by law under the Protection of Military Remains Act 1986. The discovery of aircraft remains is thus incredibly important, particularly as aircraft crash sites may contain human remains. This discovery appears to comprise isolated remains rather than representing a coherent crash site. No obstructions were identified on the seabed and there are no reports of significant aircraft structure caught in the vessel draghead. For this reason, the remains are not considered to be contentious, although the discovery of further remains from the same area should be reported immediately as they may be indicative of an unrecorded aircraft crash site or related debris.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The MOD
- The Receiver of Wreck (Droit 024/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

Tarmac_0830: Spanner

This spanner was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Gary Cooper discovered it at Bedhampton wharf from the cargo of *Arco Dee*.

Tarmac_0830 is a large open-ended spanner measuring 480 mm long and 60 mm wide. The object is thought to be made from wrought iron by the presence of multiple layers of metal at the opening that give the appearance of being frayed.

A spanner (or wrench) is a tool used to provide grip and mechanical advantage in applying torque to turn objects, usually rotary fasteners, such as nuts and bolts. A spanner with a U-shaped opening such as this one slides on to two opposite faces of the bolt or nut. The ends are generally oriented at an angle of around 15 degrees to the longitudinal axis of the handle. This allows a greater range of movement in enclosed spaces by flipping the wrench over.

Wrought iron consists of layers of almost pure iron that sandwich layers of slag which gives it a "grain" resembling wood, that is visible when it is etched or bent to the point of failure as seen on this example. It is very corrosion resistant, and it hardly rusts. It wasn't until the late 18th century that spanners diversified in type and usage to include all the types we have today. With the onset of the Industrial Revolution, the wrought iron spanners made by blacksmiths were replaced with cast iron versions produced on a larger scale, meaning that this example could pre-date the 18th century. Larger spanners such as this one are commonly associated with vessels and are largely found on-board ships or in areas where repairs are likely to take place, such as docks.

How this object entered the maritime environment is not clear as it may have arrived via several routes, however the most likely is that it was lost or thrown overboard during every day shipping operations. It also could have been purposely discarded overboard as the shaft seems to have been damaged. Although considered an isolated find, further finds of this type should continue to be reported.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 025/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

Tarmac_0831: Cylindrical Metal Object

This cylindrical metal object was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Michael De Clercq discovered it at DEME's Brugge wharf from a cargo dredged by Tarmac.

This cylindrical metal object measures approximately 340 mm long and 230 mm wide. It has a build-up of concretion on one side which may indicate that it has been exposed on the seabed for some time. It was not stated whether the object is hollow or not and is it not clear whether there are machined holed on the rims.

Images of the find were sent to Anthony Mansfield, a senior Naval engineer. Based on the photographs, he thought it was a marine strainer. The bulge of concretion is where a cylindrical strainer would have been inserted and then a cap would have been used to seal the pipe. When it started to get full, the cap would be removed in order to empty the cylinder of any rubbish such as shells and seaweed. It is not clear whether a part of this cylinder remains in the concretion or not. Anthony said that these types of strainers are commonly seen on vessels as part of sea water systems. This would mean that the cylinder shown in the image is in fact hollow and most likely attached to other components via each end, meaning that if it fails, it can be detached from the system and replaced.

This object may have entered the marine environment via a number of routes. It could have been accidentally lost overboard during every day shipping operations or thrown overboard due to being broken or unusable. It is possible that the item was broken and that the bulge on concretion on its side represent the remains of a broken component. License Area 351 has produced a mixture of items that could possibly indicate the dumping of material. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 028/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

DEME_0832: Wooden Object

This wooden object was discovered in Licence Area 228 in the East Coast dredging region, approximately 16.5 km south-east of Great Yarmouth. C. Matton discovered it at Flushing wharf.

DEME_0832 is a round object made entirely of wood that measures 80 mm by 75 mm and has a flat “base” with rounded raised sides. A circular hole is also present in the middle that appears to have been machine made. It is possible the object had contact with metal in the hollowed surface at one stage due to the present visible orange discolouration.

Images of the object were sent to our in-house specialist at Wessex Archaeology, Bob Davis. He said that the find is obviously lathe turned with a recess and has a chamfered profile. He initially thought it may have been a pulley that had been broken in half down the middle but the recess would suggest otherwise. Paolo Croce from the Coastal & Marine team suggested that the find may be some sort of plug and Bob agreed that it could be a plug or bung that possibly housed a spindle or axle through the middle.

Alternatively, it was suggested that it may be the end cap or cover off another larger object that has since been lost. The find also bears similarities to some feet found on furniture, including sofa. A metal element with a screw is usually present in the centre to be affixed to the base of the sofa, however, they are generally not hollow.

Because we are unsure of whether this object comes from a maritime or terrestrial context, it is unclear how the find came to be in the ocean. Terrestrial finds may end up in marine contexts having been washed from terrestrial deposits by rivers or eroded from cliffs or beaches. Alternatively, they may have been discarded at sea. If the item is associated with a vessel, it could have been purposely discarded overboard as I may have been damaged. Although considered an isolated find, further finds of this type should continue to be reported.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 032/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Tarmac_0833: Chain

This chain was discovered by Tommy Merchant at Thurrock wharf. The license area from which it came is unknown.

This piece of cast iron chain is 180 cm long and has evidence of studs in the links which are the visible horizontal crossbars in the middle of alternative links. The use of this type of chain would be for an anchor of a vessel as cast iron stands up well to corrosion.

In 1783, metal was experimented with to make anchor chains and gradually started to replace hemp rope cables, although many sailors clung on to the use of rope even after chain was available. Regardless of the material, it was always referred to as the anchor cable (Stone 1993). 1813 was an important year in the development of studs where arguments broke out between cable chain makers as to the benefits of twisted links versus studs with regards to making improvements in chain cables and moorings. A series of stud shapes and profiles were analysed by Thomas Burton in order to analyse which ones worked best (Curryer 1999). The Royal Navy started to use metal cable chains in 1816. The fact that this cable has studs and slightly twisted links means it is more than likely of later date that 1816 as they tended to be more flat (Curryer 1999). A chin's thickness reflected the ship's size, not the anchors (Stone 1993). English chain was proof or proved on one side of the studs; often the maker's name or city was on the other side (Stone 1993) although no evidence was found on this example.

This object may have entered the maritime environment via several routes. It does not seem to be broken therefore it may have been accidentally lost or thrown overboard during every day shipping operations. It also could have been discarded from a dock as the shaft seems to have been damaged. Although considered an isolated find, further finds of this type should continue to be reported.

Reference
Curryer, B N., 1999. *Anchors an illustrated history*. Naval Institute Press, Maryland.
Stone, D. L., 1993. *The wreck diver's guide to sailing ship artifacts of the 19th century*. Underwater Archaeology Society of British Columbia, Vancouver.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 029/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Essex

Tarmac_0834: Metal Object

This metal object was discovered by Tommy Merchant at Thurrock wharf. The license area from which it came is unknown.

This unknown metal object measures 200 mm by 120 mm and has what appears to be four screw holes with the screws still in place in the central area. The object is believed to be made of cast iron and further images were requested from the wharf.

Images of the find were sent to several in-house specialists at Wessex Archaeology. Both Bob Davis thought it was possible that this unknown object was associated with railway fixtures and fixings but the exact purpose of the find within this environment is unknown. Early rails were made of wood, cast iron or wrought iron while modern rails are hot rolled steel.

When the find was examined at the wharf, it was believed by many to be part of lifting gear, such as a crane, possibly belonging to a vessel. The single hole at the top on the item is blocked with aggregate but could have been used to secure a hook of some kind. The top half and the bottom half rotate independently of the central area which is commonly seen on crane attachments to allow the lifted items to swing. The four holes in the central area still have their bolts present and were secured with allen keys meaning that this object is no older than 1910 when allen keys were first invented.

This object may have entered the marine environment via a number of routes. The central piece that juts out on one side is missing from the back of the object. Whether this is broken or never existed is unclear. The item could have been lost overboard during everyday shipping operations or if it was broken during use, may have been discarded overboard. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 031/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Essex

Tarmac_0835: Bolt

This bolt was discovered by Tommy Merchant at Thurrock wharf. The license area from which it came is unknown.

This object was reported as a possible rivet measuring 60 mm in length. On reflection, the find is more likely to be a bolt and is believed to be made of wrought iron. The roughness of the head appears to have been beaten by hand which means the bolt is more likely to be hand-made and not machine made.

Wrought iron consists of layers of almost pure iron that sandwich layers of slag which gives it a "grain" resembling wood, that is visible when it is etched or bent to the point of failure as seen on this example. During the Industrial Revolution, wrought iron objects made by blacksmiths were replaced with cast iron versions produced on a larger scale, meaning that this example could pre-date the late 18th century.

Wrought iron is a very corrosion resistant material, and it hardly rusts, meaning that its use on maritime vessels was vital. It is known that wrought iron bolts were used in English ship construction from 1719 onwards and especially from 1750 onwards when quality improved and it because less brittle (https://maritime.org/conf/conf-goodwin.htm). Because production processes were involved, iron remained an expensive commodity in the ship building industry for the first half of the 18th century. Once cast iron replaced wrought iron, prices decreased as it was easier to mass produce.

It cannot be proven that this bolt derives from ship building as they were also commonly used on land in the development of railways. Therefore how this object entered the maritime environment is not clear. It may have been lost or thrown overboard during every day shipping operations. It also could have been purposely discarded overboard due to damage. Although considered an isolated find, further finds of this type should continue to be reported.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 030/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Essex

CEMEX_0836: Horse Metatarsal Bone

This animal bone was discovered at Dagenham wharf. The license area from which it came is unknown.

Cemex_0836 is a fragment of bone measuring 260 mm in length and 60 mm at its widest or distal end. At the distal end, it is still visible where the articulated surface would have joined another bone. The bone has been fragmented at its proximal end.

The bone was taken to Lorrain Higbee, the animal remains expert at Wessex Archaeology, who examined the find and determined that it was the metatarsal bone of a horse. Metatarsal bones are found in both to the hind leg of a horse. Each hind limb of the horse runs from the pelvis to the navicular bone. After the pelvis come the femur (thigh), patella, stifle joint, tibia, fibula, tarsal bone and joint, large metatarsal and small metatarsal bones. Below these, are the arrangement of sesamoid and phalanx bones ending in the distal phalanx which is the hoof.

The bone looks relatively new and gives the impression that it has not been exposed on the seabed for thousands of years as it is not mineralised. Lorrain said that the bones of prehistoric horses are much smaller than they are today and even had an example to compare the difference in size. Based on this, Lorrain suggested that this metatarsal belonged to a horse that was been alive sometime after the Roman period, which lasted from 43 to 410 AD in Britain.

This bone fragments may have entered the marine environment through being washed from terrestrial deposits by rivers or eroded from cliffs or beaches. Alternatively, it could derive from a wreck of a vessel that at the time of travelling, carried horses on board as cavalry. A horse may have died on the journey and the bones thrown overboard, or the animal could have been on the vessel at the time of sinking. Although considered an isolated find, any more bones of this nature should be reported as it could be indicative of a wreck site.

Information about this discovery has been forwarded to:

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

CEMEX_0837: Mineralised Bone

This mineralised animal bone was discovered at Dagenham wharf. The license area from which it came is unknown.

CEMEX_0837 are large fragments of fossilised or mineralised animal bone. The largest fragment measuring 260 mm by 105 mm and the smallest fragment 190 mm by 80 mm. Mineralised bone means that the bone has been in the ground for a long period of time and that mineral-laden waters have percolated through the porous material, saturating it with mineral deposits. It is then petrified and will become much heavier and robust than it originally was. It almost takes on the appearance and characteristic of stone. The quicker the process of petrification, the better chance the bone has of surviving.

Lorrain Higbee, the animal remains expert at Wessex Archaeology, examined the finds and determined the smallest piece is the antler of a red deer. As for the three larger pieces, she said that based on the thickness of the bone, it most likely belonged to a quaternary mammal like mammoth and the larger piece may be a tibia bone based on is roughly triangular profile. Images of the find were sent to experts at the Natural History Museum for further identification. A mammal expert, Dr Adrian Lister, determined that the three larger pieces are probably mammoth, elephant or rhino but could not identify diagnostic features to say much more.

The remains of large quaternary mammals dredged along the British coast may date to a time when the current seabed was dry land. During the Pleistocene (from about 2.5 million years ago until about 12,000 years ago), there were numerous cold periods, called ‘glacials’, separated by warmer periods called ‘interglacials’. During colder periods, large continental ice sheets covered much of Britain and most of the North-west European Peninsula (http://ets.wessexarch.co.uk/recs/humber/archaeology/ accessed 12/07/17). At these times sea levels were low and large areas of land, now forming the seabed of the North Sea and the English Channel, were available to humans and animals. Alternatively, they may have been washed by rivers from land sites.

Information about this discovery has been forwarded to:

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

CEMEX_0838: Minesweeping Cutter

This minesweeping cutter was discovered in Licence Area 137 in the South Coast dredging region, approximately 10 km south of the Needles. Steve Bomber discovered it at Leamouth Wharf.

This object comprises two iron objects held together by a rivet. The inner object will move on pivot point. There are three holes on inner object and three large holes and seven smaller holes on outer object. The smaller holes will line up when inner object is moved. The outer object measures 240 mm by 140 mm while the inner object measures 150 mm by 90 mm with an approximate thickness of 10 mm.

Suggestions were made to it being associated with deck equipment fittings or part of a mounting/lifting bracket off something, with either a wear/adaptor plate to aid directing things into the slot. Graham Scott, a Senior Maritime Technical Specialist at Wessex Archaeology, suggested the find is a minesweeping cutter. During the First World War, trawlers and drifters were fitted with mine sweeping gear to clear moored contact mines. During the Second World War, cable cutters, which the crew called Sharks' Mouths, were attached to the minesweeping cable. On the end of the cable there was a float designed to move away from the minesweeper allowing a strip of sea to be swept. Once the contact mine's tether was cut and floating on the surface the minesweepers crew would fire their rifles at it (http://www.wildfire3.com/drifters-and-trawlers.html accessed April 2018). The object in the image bears resemblance to the modified Mk 9 cutter; a mechanical end cutter that weighs approximately 38 pounds (http://engineeringtraining.tpub.com/14160/Minesweeping-Cutters-164.html accessed April 2018).

This object may have entered the marine environment via a number of routes. The item could be indicative of material lost or thrown overboard during every day shipping operations, or lost during wartime activities. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 036/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight.

Tarmac_0839: Shell Fuse

This shell fuse was discovered by Tommy Merchant at Thurrock wharf. The license area from which it came is unknown.

This shell fuse measures 100 mm long, 80 mm wide at the base where the thread is still present in some places, and 30 mm at the tip where during its functioning life it would have turned. Markings are visible on the surface of the fuse and a hole runs down the length of the fuse. The object is made of brass.

Images of the find were sent to our in-house specialist Bob Davis and to Trevor Parker from the Ordnance Society. This fuse is a number 230 MKII British fuse that began to be manufactured in 1937. It is similar to the Fuze No 117 but with a shorter magazine and threaded portion, for use over the Gaine No 9 in 6 inch and 9.2 inch coast guns and 4.5 inch AA guns firing in the seaward role. The earliest examples of this fuse were made of brass. It has been fired as noted by the severe damage visible on the example. This type of fuse is a percussion (direct action) fuse, adapted for naval service with this example most likely fired from a vessel, possibly at a patrolling German U-boat. Whether or not this example hit its target or not is unknown. This example has a small N on its surface, denoting Navy. Research shows that it was fitted to a gaine, a device to accelerate the burn to the shell. It ran to ten marks, which means 10 versions of this fuse were made before it was declared obsolete. Trevor Parker said that this was made in December 1938 by Vickers Armstrong Engineering Ltd as denoted by the VAEL on its surface and declared obsolete on 04/02/1959.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. As this fuse has been fired from a Navy vessel, possibly at a patrolling German U-boat, it has most likely lain on the seabed from this event perhaps some time during the Second World War. Although considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded wreck site or provide further information about warfare at sea.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 040/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Essex

Tarmac_0840: Shell Plug

This shell plug was discovered by Gary Phillips at Ridham wharf. The license area from which it came is unknown.

This is a plug and adaptor made of brass, originally thought to be a shell fuse. The object measures 80 mm tall and 80 mm wide and has a square hole in its top and a round threaded hole in its base. There are several marks etched into surface, including the Navy broad arrow on its surface. The thread is still present that would have screwed in to the top of the shell.

Images of the find were sent to our in-house specialist Bob Davis and to Trevor Parker from the Ordnance Society. Both came back to say that it is not a fuse, but a plug. Many shells were transported and stored with a plug which was replaced by the appropriate fuse just before firing. The central element would lift out of the collar to be replaced by the fuse. The markings on the plug and its collar would let the armourer know which fuse to use as selecting the wrong one could end in disaster. Bob thinks that it is an adaptor and transit plug for a Number 44 MKII British fuse and probably marked 'N' for a Navy round. It is marked VSM for Vickers Son & Maxim, with what looks like a mark II stamp below, meaning that this was the second version of its kind to be made. A capital L in a circle and 'A47' which is probably a maker's stamp and lot number. The collar is badly scored, possibly from bad craftsmanship as this example was never used. These adapters came in different sizes to fit different shells and the fuse mechanism screwed into the centre. Trevor said that this example is from a fairly small calibre shell where the steel shell body has probably rusted away. This example more than likely dates to around 1916 for use during the First World War by the Royal Navy.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Although considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or mark the site of a naval battle.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 041/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Tarmac_0841: Shell Body

This shell body was discovered by Gary Phillips at Ridham wharf. The license area from which it came is unknown.

This empty drawn out steel shell body measures 140 mm long by 40 mm wide. The copper driving band at its base displays several notches which means that the shell has been fired. When the shell is fired, the pressure of the propellant swages the metal into the rifling of the barrel, providing a seal preventing the gases from blowing past the shell and engaging with the rifling to spin-stabilize the shell. There are no markings on the shell body as they were likely to be stamped on the surrounding brass shell case.

The find was originally reported as a shell case, and images were sent to our in-house specialist Bob Davis and to Trevor Parker from the Ordnance Society. Trevor said that it is a shell body as a shell case is a brass 'pot' with the propellant in it where as this one is the propellant itself and would have lost the case when it was fired. The hollow end has lost its adapter and fuse but the threaded column is still visible where this would have attached. It is most likely HE or High Explosive, where the fuse detonates the bursting charge which shatters the case and scatters hot, sharp case pieces at high velocity. The flat end would suggest that the shell was tip fused. This is a small calibre at 1.5 inch (37 mm) from and is the shell body is from a Naval 2-pr Pom-Pom anti-aircraft gun that were in service from 1915 until the 1940s and were fitted to British Naval ships during the First and Second World Wars. This example is most likely from a practice shell where the steel nose plug has probably rusted away.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Though considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or provide further information about naval warfare or training in the area.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 042/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Tarmac_0842: Possible Key

This possible key was discovered by Gary Phillips at Ridham wharf. The license area from which it came is unknown.

This wrought iron object measures 120 mm long and is 80 mm at its widest. Although initially thought to be a bottle opener due to its shape, it is much too large!

Wrought iron consists of layers of almost pure iron that sandwich layers of slag which gives it a "grain" resembling wood, that is visible when it is etched or bent to the point of failure as seen on the tip of this object. During the Industrial Revolution, wrought iron objects made by blacksmiths were replaced with cast iron versions produced on a larger scale, meaning that this example could pre-date the late 18th century.

Wrought iron is a very corrosion resistant material, and it hardly rusts, meaning that its use on maritime vessels was vital. As this item's use is unclear, it is not possible to confirm whether it comes from a maritime vessel. However, it has been suggested that this may be some sort of key that may have fitted in to a deck hatch of some kind in order to lift it, the same way drain covers are lifted on land. If this is the case, it could mean that it was one of a pair, and the end that would have been shaped in a specific way in order to slot in to the designated hole has either broken off or has been worn down over time.

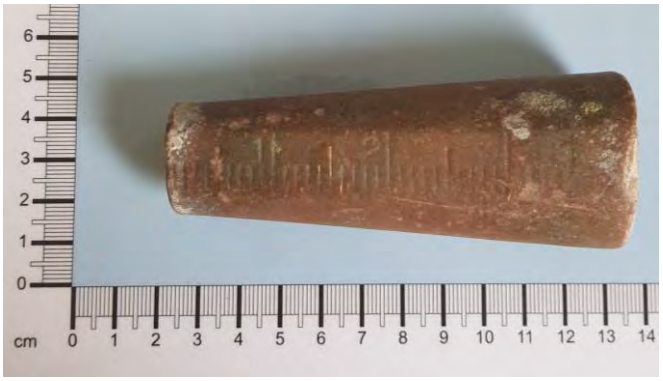
Alternatively, due to its corrosion resistant material, it may have been a door or gate latch that has broken off.

This object may have entered the marine environment via a number of routes. The item could be indicative of material lost or thrown overboard during every day shipping operations. Alternatively, it could have been discarded from a dock during the construction or repairs of vessels. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 037/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Tarmac_0843: Possible Plug Gauge



This possible plug gauge was discovered by Gary Phillips at Ridham wharf. The license area from which it came is unknown.

This possible plug gauge measures 120 mm long and 45 mm at its widest. It is a conical shape and is flat at both ends. The find is believed to be made of copper and is scored with numerical decimal inches on its surface up to the value of 4. There is a small hole in the base of the object.

It is believed that the item was used to measure rings from a component on a steam ship, for example a boiler. The ring is slotted over the thinnest end and its circumference will de denoted by the number it lands on. Images of the find were sent to Senior Naval Engineer, Anthony Mansfield who said that the find was a plug gauge. It is inserted in a hole that you want to measure and you read off the figure on the scale. However, he said it is not a direct measure on the scale as the scale does not indicate the diameter or area of the hole either in imperial or metric or even the depth of insertion as the calculations don't work based on the actual size of the taper. Also, the 10 subdivisions between each inch is a little unusual for imperial. There may have been a corresponding sheet on which the value shown on the scale would give you the diameter or area of the object being measured. Anthony said it is possibly a specialist gauge used as part of a service or repair tool kit. He said it could alternatively be part of a flow meter using a glass tube and orifice. A similar copper conical item (LTM_0608) was reported in 2015 from Licence Area 395/1 and was recorded as a possible sounding lead. A sounding lead would need to be attached to a length of rope but as there is no such fixture on this item, it is not believed to be one.

It is unclear how this object entered the marine environment. The item could be indicative of material lost or thrown overboard during every day shipping operations. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 038/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Tarmac_0844: Door Latch

This door latch was discovered by Gary Phillips at Ridham wharf. The license area from which it came is unknown.

This find is a door latch measuring 130 mm by 140 mm. One side of the latch has a brass door knob while the other has a handle and the remains of a mechanism. The three remaining screw holes indicate the latch was affixed to a door at one stage. One corner of the door latch has been broken off.

The find was examined by our in-house Senior Buildings Archaeologist, Bob Davis, who said the door latch looked to be from the 18th century. He said that this type of latch was popular in the 18th century and consisted of a brass knob, attached directly to a short, wide and tapered latch. At this time, they were largely hand made. The whole assembly is mounted on a backplate. In this case, our backplate is nicely decorated but they were also manufactured plain. The 'spring' on the latch is the mechanism in the shape of a wishbone hanging down, which originally would have been housed in a bracket that is now missing. It looks as if the spring on this particular example was below the latch and not above. He said that he has references to a very similar door latch from Surrey dated to 1721 but with a plainer backplate.

As it is difficult to ascertain whether this object derives from a terrestrial or maritime context, it is difficult to say how it may have entered the marine environment. It is possible that the door latch was attached to a wooden door when it entered the marine environment and the wood has since eroded away. Alternatively, the item was already broken when it entered the environment and was disposed of at sea. There is a possibility that the door latch could have been part of a vessel's cargo or structure that was either accidentally lost overboard or was lost when the vessel sank. Though considered an isolated find, further finds of this type should continue to be reported as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 039/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

CEMEX_0845: Vertebra

This vertebra was discovered by Martin Keeble at Greenwich wharf. The licence area from which it came is unknown.

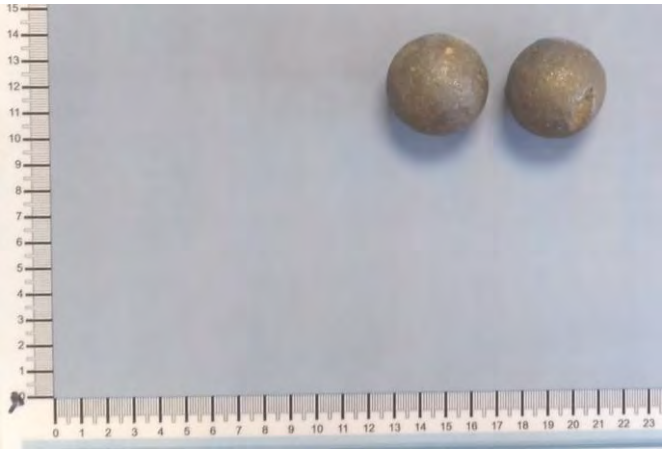
CEMEX_0845 is a large vertebra measuring 240 mm long and 140 mm wide. It is missing the transverse process on the left side and a notch is visible in the centre of the body where another vertebra would have sat on top of it. The spinous process has broken off from the top of the body. This is the section that would connect to the body of the vertebra and house the canal for the spinal cord.

Images of the find were sent to experts at the Natural History Museum for further identification. A mammal expert, Dr Adrian Lister, determined that it is the vertebra of a marine mammal, possibly a small cetacean like a porpoise or dolphin. Lorrain Higbee, the animal remains expert at Wessex Archaeology, said it looks like a vertebra from a whale. However, she said it is difficult to say exactly what species of whale it came from as it is very abraded and has lost all surface details. This abrasion is most likely a result from rolling around on the seabed for a long period of time

Unfortunately, it is not possible to ascertain a date for the vertebra from the photograph. The fragment may be prehistoric although it does not appear to be fossilized or alternatively it could be a more recent example.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck
- The National Record of the Historic Environment
- The Historic Environment Record for London



Hanson_0846: Lead Shots

These lead shots were discovered in Licence Area 372/1 in the South Coast dredging region, approximately 6.5 km south-east of the Isle of Wight. Lance Allen discovered them on board *Arco Beck.*

This pair of lead shots measure 1.5 inches (38 mm) in diameter each. One weighs 331 g and the other is 326 g.

Images of the find were sent to Jonathan Ferguson, an ammunitions expert from the Royal Armouries Museum, who said they could be projectiles, but they are just as likely to be weights or some other objects. If these two objects are projectiles, and are indeed from a maritime context, they would likely have been fired by something like a swivel gun; a small artillery piece mounted on the gunwales of a ship. Alternatively, they could be shot from a land-based weapon of some kind that have simply been lost at sea as cargo or fired out to sea.

Images were also sent to our in-house specialist, Bob Davis, who said they look like a pair of 'round shot' or 'cannister/grape shot'. Small calibre cannons existed with a range of different sizes and dated to a series of different years which makes dating the objects difficult. They were possibly fired as single shots or as a grape shot canister where several grape sots were packed in to stands and fired as a package. Based on the grape shots fired at the Battle of Lundy's Lane, 1812, a 1.5-inch diameter would mean that the shots are British and have a mould mark (http://angloboerwarmuseum.com/Boer9d_relics_shells.html accessed April 2018). This could mean that these examples are British and possibly date to the early 19th century.

England has an extensive naval history, military training and battles have taken place along this stretch of coastline for hundreds of years. Additionally, other nations would have used the English Channel during military action, trade and transport. It is not possible to say whether these shots were fired during training, battle or perhaps just lost overboard.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 045/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

CEMEX_0847: Boiler Hatch

This boiler hatch was discovered by Martin Keeble on the reject pile at Angerstein wharf. The license area from which it came is unknown.

This possible boiler hatch measures 360 mm in length but is obviously a component of something larger. The copper hatch on the front is fitted with three screw holes and has the numbers 613 etched on to the surface which may relate to a pattern part identifier.

Due to the amount of what was believed to be rivet holes, usually associated with aircraft, images of the find were sent to two in-house specialists, Bob Clarke and Bob Davis, and an external aircraft specialist, Steve Vizard. All three agreed that it was not related to aircraft. Bob Davis said that the small holes covering the object would suggest letting a substance such as air, steam or water through. The object does have captive anchor nuts on the reverse, sealing the outside from inside but is probably not a pressure vessel as the lid fits from the outside. Steve said that it was obviously of some age, as denoted by the flat top 3 in the number stamp on the copper. This may mean that this object is from the 19th century.

Images of the find were sent to the National Maritime Museum. The assistant curator, Nick Ball said that it may be a part of a condenser in which a heat exchanger removes the latent heat from exhaust steam so that it condenses and can be pumped back into the boiler.

This object may have entered the marine environment via a number of routes. The item could be indicative of material lost or thrown overboard during every day shipping operations. Alternatively, it could have been discarded from a dock during the construction or repairs of vessels. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 046/18)
- The National Record of the Historic Environment
- The Historic Environment Record for London

CEMEX_0848: Bearing Mount

This bearing mount was discovered by Martin Keeble on the reject pile at Angerstein wharf. The license area from which it came is unknown.

This bearing mount measures 230 mm long by 150 mm wide. A hole is present on one side along with several smaller holes, possibly designed to relieve pressure or heat. The back of the sheeting has a fixture still attached and traces of red paint in its centre.

Due to the amount of what was believed to be rivet holes, usually associated with aircraft, images of the find were sent to two in-house specialists, Bob Clarke and Bob Davis, and an external aircraft specialist, Steve Vizard. All three agreed that it was not related to aircraft. Bob Clarke identified the object as a bearing mount and said that the section inside is far too crudely produced to be aircraft. He also said that you almost never get square corners in aircraft material like the ones visible on the inside of the object. A mounted bearing unit acts as a system to position the bearing securely for reliable operation. It is believed a shaft would have fixed in to the hole visible on the surface of the item and secured on the inside. Images of the find were sent to the National Maritime Museum. The assistant curator, Nick Ball said that it may be a part of a condenser in which a heat exchanger removes the latent heat from exhaust steam so that it condenses and can be pumped back into the boiler.

Because we are unsure of whether this object comes from a maritime or terrestrial context, it is unclear how the find came to be in the ocean. Terrestrial finds may end up in marine contexts having been washed from terrestrial deposits by rivers or eroded from cliffs or beaches. Alternatively, they may have been discarded at sea. If the item is associated with a vessel, it could have been purposely discarded overboard as I may have been damaged. Although considered an isolated find, further finds of this type should continue to be reported.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 047/18)
- The National Record of the Historic Environment
- The Historic Environment Record for London

Tarmac_0849: Animal Bone

This animal bone was discovered in Licence Area 392 in the North-West dredging region, approximately 29 km north-west of Liverpool. Paul Warren Sinclaire discovered it on board *City of Cardiff.*

This bone measures 270 mm in length, 40 mm at its widest point (called the medial condyle) and 30 mm at its smaller end (called the medial malleolus). There is some damage to the bone in the form of chips and holes, and it has been kept wet to avoid cracking.

Images of the bone were sent to Wessex Archaeology as soon as it was discovered on the vessel. Kirsten Dinwiddy, a human bone specialist, looked at several images and was able to determine that this was animal bone rather than human bone and that there was no need to alert the authorities. Images of the animal bone were sent to our in-house animal bone specialist, Lorrain Higbee. She said that this example is a tibia from a sheep or goat. She said that it looks quite gracile which means it is an unimproved breed and could be anything from prehistoric to medieval in date.

Animal bone can enter the archaeological record offshore in a number of ways. There is the potential for the bones to be washed into the sea from terrestrial deposits. 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 (https://www.rmg.co.uk/discover/researchers/research-guides/research-guide-m6-animals-sea-sources-information-national accessed April 2018). 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 from the images. Although regarded as an isolated find, further discoveries have the potential to indicate the presence of a currently unrecorded wreck site.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck
- The National Record of the Historic Environment
- The Historic Environment Record for Merseyside

Tarmac_0850: Pulley Sheave

This pulley sheave was discovered in Licence Area 392 in the north-west dredging region, approximately 29 km north-west of Liverpool. It was discovered by a member of the crew on board *City of Cardiff* and reported by Phil Robertson.

This pulley sheave measures approximately 220 mm in diameter and has a thickness of 40 mm. There is visible damage on the rim where the wood has frayed and there is cracking on the surface. The rim is fairly worn which means that this sheave may have been in use for a long time before ending up in the maritime environment.

In a maritime context, sheaves are a wheel or disc with a grooved rim, used as a pulley as part of the ship's rigging system that sits inside a rigging block. As can be seen in the example discovered, it has a single grooved wheel spinning around a central axis. The groove allows the rope, cable or belt to move freely around it, minimising wear and abrasion. The axis would have been secured through the central hole, visible in the photograph, to the wooden rigging 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 to move cargo on and off a vessel. Prior to the 19th century, sheaves and blocks were made entirely from wood; therefore, this find may date to this period. After this date, while the rigging blocks themselves remained to be made of wood for a period of time, the sheaves themselves changed to be made of metal as the groove around the rim would not wear down as quickly. Modern sheaves can be made of plastic.

While this sheave may have come from a boat, sheaves are also regularly used in terrestrial contexts because of their versatility and mechanical advantage they provide. This find may therefore have entered the underwater context through being discarded or lost overboard from a vessel, being on-board a wrecked vessel, or through the dumping of terrestrial waste. Although considered an isolated find, any further finds should be reported as it may represent an unknown wreck or debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 049/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Merseyside

DEME_0851: Fossilised Tooth

This fossilised tooth was discovered in Licence Area 228 in the East Coast dredging region, approximately 16.5 km south-east of Great Yarmouth. C. Matton discovered it at Flushing wharf.

DEME_0851 is a complete fossilised animal tooth measuring 670 mm in length. The roots of the tooth are still present.

Images of the find were sent to Lorrain Higbee, an animal remains expert at Wessex Archaeology who determined that the find is a molar tooth from a woolly rhino. She said that they are quite distinctive teeth and was fairly confident with her identification.

Woolly Rhinoceros or *Coelodonta antiquitatis* was a large animal exceeding 2 tonnes, adapted to feeding on low-growing herbaceous vegetation in a dry climate with minimal snowfall. The large bulk of the body and short legs, lacking spreading hooves or pads, indicate an animal unable to travel well in deep snow. The woolly rhinoceros has been widely regarded as having been a 'fellow traveller' of the woolly mammoth *Mammuthus primigenius*, as their remains commonly occur together in deposits. Woolly rhinoceros disappeared from Britain around 35 000 years ago. The final extinction of the woolly rhinoceros around 13,900 years ago probably relates to a period of warming and increased precipitation (especially snowfall) accompanied by the replacement of low-growing herbaceous vegetation by shrubs and trees during the Lateglacial.

The remains of woolly rhino may date to a time when the seabed was dry land. During the Pleistocene (2.5 million to 11,700 years ago), there were numerous cold periods, called 'glacials', separated by warmer periods called 'interglacials'. During colder periods, large continental ice sheets covered much of Britain and most of the North-west European Peninsula (http://ets.wessexarch.co.uk/recs/humber/archaeology/ accessed 12/07/17). At these times sea levels were low and large expanses of land, now forming the seabed of the North Sea and the English Channel, were available to humans and animals.

Information about this discovery has been forwarded to:

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

Tarmac_0852: Mooring Bollard

This mooring bollard was discovered in Licence Area 254 in the East Coast dredging region, approximately 12 km east of Great Yarmouth. Paul Scarce discovered it at Greenwich Wharf from the cargo of *City of Westminster*.

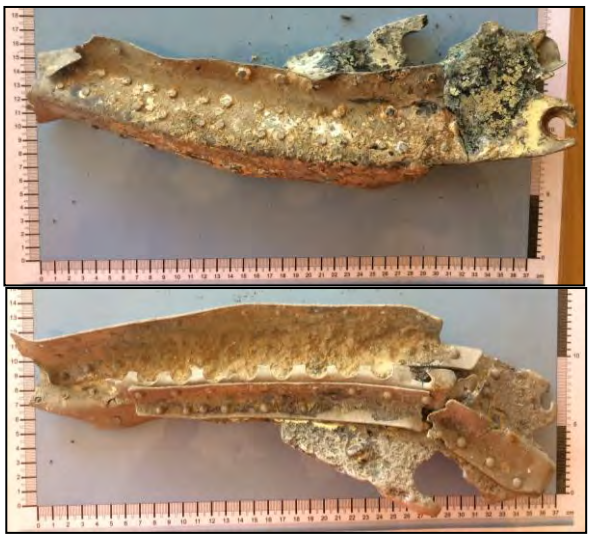
Tarmac_0852 is a cast iron object, identified by the wharf staff as being a mooring bollard. The object measures 200 mm long by 90 mm at its widest point. The object looks to be work down in places, possibly from years of abrasion from ropes. There is also a maker's stamp towards the base of the bollard that portrays the raised letters "WW".

Images of the find were discussed with our in-house specialist Bob Davis who agreed with the wharf staff that it is most likely a mooring bollard. Due to its size, it is suggested that this mooring bollard would have been fixed on to a boat. In the maritime contexts, a bollard is either a wooden or iron post found as a deck-fitting on a ship or boat, and used to secure ropes for towing, mooring and other purposes. It has a counterpart on land, usually in the form of a short wooden, iron or stone post on a quayside to which craft can be moored. Mooring bollards are rarely perfectly cylindrical, but usually have a larger diameter near the top as seen on this example to discourage mooring ropes from coming loose. Single bollards sometimes include a cross rod to allow the mooring lines to be bent into a figure eight. This example does not have a cross rod but the section that can be seen to jut out may have served the same purpose. At this time, we have been unable to identify any makers associated with the "WW".

Based on the size of this bollard, it is more than likely that this would have been attached to a vessel rather than to a dock or on land. It is therefore suggested that it was accidentally lost overboard during every day shipping operations. It also could have been purposely discarded overboard as it seems to be fairly worn and may have reached the end of its working life. Although considered an isolated find, further finds of this type should continue to be reported.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 054/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk



CEMEX_0853: Aircraft Fragment

This aircraft fragment was discovered at Angerstein wharf by Martin Keeble. It is believed that the find originated from Licence Area 458 in the East English Channel dredging region, approximately 37 km south-west of Eastbourne, however, due to the mixed cargoes at this wharf, it is difficult to say for certain.

This aircraft fragment measure 400 mm in length and 110 mm in width. There are a series of rivets still *in-situ* running along the length of the fragment connecting other visible pieces of the same aluminium material.

Images of the find were sent to Steve Vizard, an external aircraft specialist, who said that this fragment appears to be from an aircraft crash site, as indicated by the deformed nature of the part. He said that it appears to belong to a German/Luftwaffe aircraft, based on the fact that the material looks to be anodised, as early German war aircraft were. The fact that there is a magnesium piece attached to it also points to the aircraft fragment belonging to a German aircraft as they were very keen on magnesium, as opposed to the British RAF, or the American aircrafts. Another clue is the small dimple visible on the top of the rivets, a distinctive feature not found on British aircraft.

Interestingly, a fuel cap was dredged from the licence area and reported in 2011 (Tarmac_0387). It was identified as a German Daimler Benz fuel filter cap from a Luftwaffe aircraft by Andy Simpson, Curator at the RAF Museum. A separate unidentifiable fragment of aircraft was also dredged from this licence area in 2014 (CEMEX_0551).]

A geophysical review of the licence area conducted in 2016 highlighted that an anomaly classed as medium sized debris and referred to as 7001, lies within an area that has been dredged and it is protected by an exclusion zone. It is possible that the anomaly represents an aircraft crash site or debris field and that these finds have migrated from there into the current active dredging zone during recent years. All crashed military aircraft are protected by law under the *Protection of Military Remains Act* 1986 therefore any further aircraft from this licence area should be reported immediately.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The MOD
- The Receiver of Wreck (Droit 056/18)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex

CEMEX_0854: Bullet

This bullet was discovered in either Licence Area 513 in the East Coast dredging region approximately 19 km east of Lowestoft or from Licence Area 458, approximately 37 km south-west of Eastbourne. It was discovered by a staff member at Dagenham wharf.

This conical shaped bullet measures approximately 115 mm in length and 20 mm at its widest end and made of brass.

Images of the find were sent to our in-house specialist Bob Davis and to Trevor Parker from the Ordnance Society. Bob said that this bullet appears to be live as the primer on the base doesn't have a characteristic dimple from the firing pin and the bullet is still sitting in the top. There appears to be a hole or a dent towards the top on the bullet which may have allowed the gun powder to be emptied or drained. He said that it looks like a .303 round, possibly Enfield and British. If the base was cleaned then there may be marks telling us what Mark it came from and therefore would give us a date.

Trevor said that this bullet was difficult to identify, but that his best guess is a 0.5-inch Vickers round developed in the 1920s and 1930s for British anti-aircraft guns. It saw some use in tanks, but was much more commonly used as a close-in anti-aircraft weapon on Royal Navy and allied ships, typically in a four-gun mounting. There were two different versions of this round and he believed that this one may belong to the later 1930s. He said this example is unfired, but probably safe as there seems to be a large hole in the case which will probably, but not definitely, have rendered it inert.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Though considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or provide further information about naval warfare or training in the area. Always remember that Company Health & Safety policies and established operational procedures should always take priority over archaeological recording.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 057/18)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex

CEMEX_0855: Shell Case

This shell case was discovered in Licence Area 513 in the East Coast dredging region approximately 19 km east of Lowestoft. It was discovered by a staff member at Dagenham wharf.

This large shell case measures 26 inches (660 mm) in length and has a 6-inch (150 mm) diameter. The casing is made from brass and still contains its charge, visible at the opening at one end.

Images of the find were sent to our in-house specialist Bob Davis and to Trevor Parker from the Ordnance Society. Both said that this example is live or unfired as there is no dimple on the primer at the base of the shell casing from the firing needle and the propellant, cordite is still visible in the tube. The propellant in these types of large shells was formed in tightly packed bundles of cords hence the name cordite. Bob suggested that the 6-inch diameter of the shell case may mean it has come from a coastal defence gun. Trevor however, suggested that the shell case from a separate loading 4-inch round; dating from the early 1900s to the 1960s. They both agreed that seeing the markings on the base would have revealed more about the shell.

Cordite is a family of smokeless propellants developed and produced in the United Kingdom since 1889 to replace gunpowder as a military propellant, as seen in this example. Trevor said that even though they have been immersed in sea water for years, the sticks would still burn fiercely, if not explosively, when dried out. The cases would have had a metal lid, but the damage that this shell has suffered has removed it at some stage.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Though considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or provide further information about naval warfare or training in the area. Always remember that Company Health & Safety policies and established operational procedures should always take priority over archaeological recording.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 058/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

CEMEX_0856: Vertebra

This vertebra was discovered in Licence Area 137 in the South Coast dredging region, approximately 10 km south-west of the Isle of Wight. Andy Roberts discovered it at Shoreham Wharf from the cargo of *Sand Heron.*

CEMEX_0856 is a large fossilised vertebra or back bone, measuring 200 mm long and 150 mm wide. Although there is some damage to the ends of the bone, the bone is largely in-tact and the canal for the spinal cord is visible in the centre above the body of the vertebra.

Images of the find were sent to Lorrain Higbee, the animal remains expert at Wessex Archaeology who said it looks like a cervical (i.e. neck) vertebra and based on the overall size, she would guess that this specimen derived from an auroch. Aurochs, (*Bos primigenius*), are an extinct wild ox or breed of large wild cattle of Europe, from which the domestic cattle of today are descended. Auroch calves were born a chestnut colour but young bulls changed their coat colour at a few months old to a very deep brown or black. The stood at 1.8 metres (6 feet) tall at the shoulder, and had large spreading, forward-curving horns. Cave paintings in Lascaux, France clearly depict aurochs and are estimated to have been pained around 17,000 years ago using natural colourants such as ochre. This means that they held some sort of significant meaning for those people living during this time. Even though they were extinct in Britain by the Iron Age, around 2000 years ago, the aurochs are recorded as surviving in central Poland until 1627.

The fossilised remains of large mammals such as auroch may end up in marine contexts having been washed from terrestrial deposits by rivers or eroded from cliffs or beaches. Alternatively, they may date to a time when the seabed around the coast of the United Kingdom was once dry land. Before the sea level rose to the level we see today, large expanses of land, now forming the seabed of the North Sea and the English Channel, were available to humans and animals to roam on.

Information about this discovery has been forwarded to:

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

Clubbs_0857: Shell

This shell was discovered by a member of the staff at Denton wharf. The license area from which it came is unknown.

This shell measures 190 mm in length and has a 60 mm diameter.

Images of the find were sent to Trevor Parker from the Ordnance Society. Trevor said that this shell is most likely a fired 6-pounder Hotchkiss practice projectile. Based on the lack of a base fuse or plug, he said that it is a solid shot and is inert.

The QF Hotchkiss 6 pounder gun Mk I and Mk II was a family of naval guns introduced in 1885 to defend against new, small and fast vessels such as torpedo boats with an effective firing range of 4,000 yards. After the First World War the gun was considered obsolete for combat use, however, with the onset of the Second World War, the remaining guns were rushed back into service for anti-submarine defence and coastal defence.

Some practice shells have a “P” stamped on the underside to differentiate them from the live shells. Practice shells are used to check weapon function, and for crew training. Dummy ammunition is different from practice ammunition, which may contain smaller than normal amounts of propellant and/or explosive. If the “P” was missing from this example, then it would probably mean that it was still live and very dangerous. The EOD removed this shell from the wharf shortly after this find was reported.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Though considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or provide further information about naval warfare or training in the area. Company Health & Safety policies and established operational procedures should always take priority over archaeological recording.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 065/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Clubbs_0858: Shell Body

This shell body was discovered by a member of the staff at Denton wharf. The license area from which it came is unknown.

This shell body measures 150 mm in length and has a 50 mm diameter. It is most likely made of steel and has the remains of a notched copper driving band towards the base. The top of the shell case is hollow and has a threaded section on the inside to accommodate a nose fuse. There are no markings on the shell body as they were likely to be stamped on the surrounding brass shell case.

Images of the find were sent to Trevor Parker from the Ordnance Society. Trevor said that it is probably a 2-pounder fired high explosive (HE) or practice projectile that hasn't exploded but lost its nose fuse (or plug if is a practice projectile). This is a shell body, as a shell case is a brass 'pot' with the propellant inside it, whereas this one is the propellant itself and would have lost its case when it was fired. It looks empty and is therefore inert. If the shell is a high explosive shell, the nose fuse would have detonated the bursting charge which shatters the case surrounding the shell body and scatters hot, sharp case pieces at high velocity. The flat end would suggest that the shell was tip fused. If this example is a practise shell, then is would have been used to check weapon function, and for crew training. This is a small calibre at 1.5 inch (37 mm) and is most likely from a Naval 2-pounder Pom-Pom anti-aircraft gun that were in service from 1915 until the 1940s and were fitted to British Naval ships during the First and Second World Wars.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Though considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or provide further information about naval warfare or training in the area. Company Health & Safety policies and established operational procedures should always take priority over archaeological recording.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 065/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Clubbs_0859: Shell

This shell was discovered by a member of the staff at Denton wharf. The license area from which it came is unknown.

This shell measures 320 mm in length and has a 90 mm diameter. It has suffered considerable corrosion damage in the marine environment. There are a series of undistinguishable numbers on the brass plate on the base of the shell.

Images of the find were sent to Trevor Parker from the Ordnance Society. Trevor said that this shell is difficult to identify as the diameter of the shell is unclear, and that it was very difficult to make out several of the markings on the base plug. It has no driving band left and therefore it cannot be determined whether it had been fired or not. A notched driving band towards the base would indicate that the shell had been fired. The base appears to have a “P” stamped in the centre, which tells us that this is most likely a practice shell and is therefore inert *i.e.* contains no primer, propellant, or explosive charge. Practice shells are used to check weapon function, and for crew training. Dummy ammunition is different from practice ammunition, which may contain smaller than normal amounts of propellant and/or explosive. If the “P” was missing from this example, then it would probably mean that it was still live and very dangerous. The EOD removed this shell from the wharf shortly after this find was reported.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Though considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or provide further information about naval warfare or training in the area. Company Health & Safety policies and established operational procedures should always take priority over archaeological recording.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 065/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Clubbs_0860: Shell

This shell was discovered by a member of the staff at Denton wharf. The license area from which it came is unknown.

This shell measures 440 mm in length and has a 10 mm diameter. It is thought to be made of iron and has the remains of a nose fuse that has been damaged. The base of the shell is open and hollow.

Images of the find were sent to Trevor Parker from the Ordnance Society. Trevor said that this example is a fired shell, probably either a 4-5-inch and a “base ejecting” type. A base ejecting projectile includes a cavity that is closed with a cap at one end. A time fuse is used, initiating a small charge that blows off the baseplate and ejects sub-munitions from the base of the shell. Trevor said that he would guess that this shell is a star-shell which ejects flares, rather than arson and is suspended by a parachute, for illuminating a target at night. The base of the shell would have held the main chute and drogue chute while the central area would have held the flare canister. Once fired, the nose fuse would count down and blow off the base plate and release flare canister attached to the parachute. The flare would release a colour whilst suspended over an enemy target and were commonly used by the Navy.

The shell is now empty and inert and the time rings and nose of the fuse have come off. Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Though considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or provide further information about naval warfare or training in the area. Company Health & Safety policies and established operational procedures should always take priority over archaeological recording. This shell was taken away by the EOD shortly after it was reported.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 065/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Clubbs_0862: Shell

This shell was discovered by a member of the staff at Denton wharf. The license area from which it came is unknown.

This shell measures 240 mm in length and has a 50 mm diameter. It is thought to be made of iron and has a notched driving band towards the base. There are a series of letters and numbers on the base of the shell.

Images of the find were sent to Trevor Parker from the Ordnance Society. Trevor said that this shell is an example of a fired 6-pounder Hotchkiss shell which has a base fuse or plug. He said that if it had a plug at the base, rather than a fuse, there would be a large "P" stamped on the underside where as a fuse would depict another letter. From the images, this does not seem to be the case as the only noticeable stamped letter is an "N" which would mean that this shell is still live and dangerous. The shell was removed from the wharf from the EOD shortly after it was reported.

The QF Hotchkiss 6 pounder gun Mk I and Mk II was a family of naval guns introduced in 1885 to defend against new, small and fast vessels such as torpedo boats with an effective firing range of 4,000 yards. After the First World War the gun was considered obsolete for combat use, however, with the onset of the Second World War, the remaining guns were rushed back into service for anti-submarine defence and coastal defence.

Most ordnance found in British waters relates to the First or Second World War meaning that they could have lain undisturbed for 70-100 years. Though considered an isolated find, further finds of this type should be reported, as they may be indicative of an unrecorded site, debris field, or provide further information about naval warfare or training in the area. Company Health & Safety policies and established operational procedures should always take priority over archaeological recording.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 065/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Tarmac_0864: Connector

This connector was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. David Knight discovered it West Cowes Wharf.

Tarmac_0864 is a brass connector, measuring 210 mm by 180 mm, that could have been used as an attachment for a water or fuel pipe. The thread appears to be damaged, although whether this was prior to it entering the marine environment is unknown.

A similar connector, Tarmac_0780, was reported in 2017 and was attached to copper piping at the flat end. There appears to be the remains of a similar copper pipe on the flat end of this example. It was thought that the threaded end could be used to connect the copper pipe to another source, possibly a pump housing or fuel tank and tightened by using a spanner or key in the series of holes visible around the outside. Brass and copper do not spark therefore the connector could be related to fuel pipes, providing protection against fires and explosions aboard vessels.

How it entered the maritime environment is not clear. The remains of a possible copper pipe at the flat end may be evidence that this has broken off at some stage and been disposed of. There is damage to the threaded section, therefore, this may have been thrown overboard as waste material. Although, it is also possible that this has entered the maritime environment from an unknown wreck site.

Tarmac_0780

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 075/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight

Tarmac_0865: Fork

This fork was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. David Knight discovered it West Cowes Wharf.

This broken fork measures 145 mm long by 25 mm wide. There are a series of raised letters on the back of the object along with an impressed broad arrow.

Images of the find were sent to our in-house specialist, Lorraine Mepham. She said the object can be described as a four-pronged fork, with the tines and handle damaged. She said that as there is no hallmark, it is presumed that this fork is not made from silver but made from some form of alloy, and plated. The raised letters read HM & Co | 120-6108 | 1969, which gives an exact date for the piece. Lorraine said that HM & Co could refer to H Mackenzie & Co of Birmingham, or to H Mander & Co of Coventry (https://www.silvermakersmarks.co.uk/Makers/Birmingham-HI-HQ.html) however these companies did not specialise in cutlery and pre-date the date of 1969 shown on this example. Further research on the item suggests that HM & Co most likely refers to Harris Miller and Co, who were a firm in Sheffield between 1966 and 1981 that produced stainless steel cutlery. The broad arrow is the characteristic mark of British government issue goods, so the fork could have been for military use.

This fork could have entered the marine environment in several ways. It could have been damaged on board and thrown overboard as discarded waste. Alternatively, it could have been lost from the vessel by accident and damaged on the seabed. Most of the cutlery reported through the Protocol have been forks or spoons with a distinct lack of knives. This could be due to the fact that many sailors carried their own knives and that forks and spoons were of much less sentimental value. Although this is considered an isolated find, further finds should continue to be reported as they could highlight a debris field or less likely, an unknown wreck site.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 076/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight

CEMEX_0866: Container Twist Lock

This metal find was discovered in Licence Area 511 in the East Coast dredging region, approximately 9 km north-east of Lowestoft. Andrew Lingham discovered it at Northfleet Wharf.

CEMEX_0866 is a metal find that measures approximately 200 mm in length and is 130 mm wide. There are a series of raised numbers on the surface, most likely a serial number and the letters ABS. The central arm has been broken off but whether this damage occurred before or after it entered the marine environment is unknown.

Images of the find were sent to an external specialist, Anthony Mansfield, a Senior Naval Engineer. He identified the find as a manual container securing twist lock, used for locking stacks of containers together when on board a vessel. He said it's not of any significant age. Based on current examples, it is most likely made of heat treatable steel. The arm that has broken off locks the mechanism in place and will dictate whether this is a left or right locking forged cone. The central area is missing from this example.

This object most likely derives from a shipping container that carries large containers around the world. The likelihood is that the object was somehow damaged and was purposely discarded overboard during every day shipping operations. Alternatively, it may have been accidentally lost overboard. Although considered an isolated find, further finds of this type should continue to be reported as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 085/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

CEMEX_0867: Aircraft Fragment

This aircraft fragment was discovered in Licence Area 511 in the East Coast dredging region, approximately 9 km north-east of Lowestoft. Andrew Lingham discovered it at Northfleet Wharf.

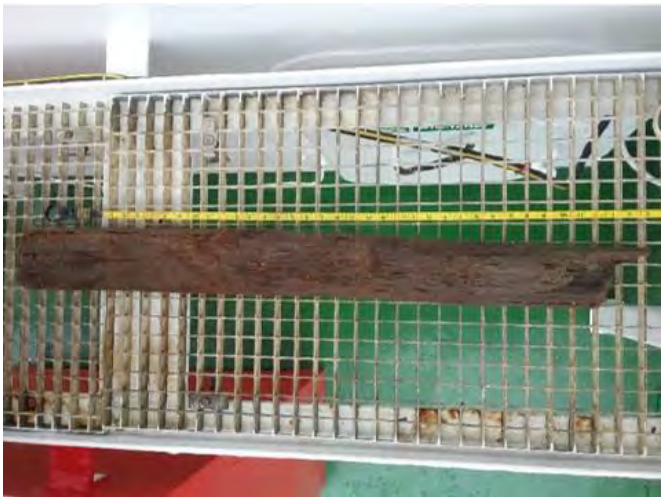
CEMEX_0867 was identified at the wharf by staff as being a fragment of aircraft. It is made of aluminium and measures approximately 500 mm in length and is 80 mm wide. There are rivets still *in situ* along both edges and there is a slight curve in the piece.

Images of the find were sent to our in-house specialist Robert Clarke and an external aircraft specialist, Steve Vizard. Both said that the piece was definitely related to aircraft structure. Steve said that he believes the piece is an extrusion, as opposed to a section of formed sheet metal. He also said that the section seems fairly thick, meaning that it is quite substantial to the structure of the aircraft, suggesting it may be part of the wing structure or rib section. Although difficult to tell, Steve said that the rivet type would appear to be British rather than American. However, the piece is too small to correctly identify the aircraft it came from.

All crashed military aircraft are protected by law under the Protection of Military Remains Act 1986. The discovery of aircraft remains is thus incredibly important, particularly as aircraft crash sites may contain human remains. This discovery appears to comprise isolated remains rather than representing a coherent crash site, however, it is the first of its kind to be reported from License Area 511 through the Protocol. There are no reports of significant aircraft structure caught in the vessel draghead. For this reason, the remains are not considered to be contentious, although the discovery of further remains from the same area should be reported immediately as they may be indicative of an unrecorded aircraft crash site or related debris.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The MOD
- The Receiver of Wreck (Droit 086/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk



Tarmac_0868: Plank of Wood

This plank of wood was discovered in Licence Area 395/1 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Mike Thompson discovered it on board *City of Chichester*.

Tarmac_0868 is a plank of wood that is square at one end and is broken at the other. The plank is approximately 1000 mm long and 10 mm wide. The species of wood is unknown at this time.

Based on the images, the wood appears to be worked at one end as it is square in shape. The plank does not exhibit any fastenings, such as nails or bolts, meaning that it is most likely not part of a ship's structure. It may instead relate to a maritime structure. One possibility is that it could have broken off from a pier, jetty or timber groyne such as those seen on beaches around the UK. Once broken, it would have been taken out to sea with the tide. The condition of the plank would indicate that it has not been in the maritime environment for a prolonged period of time as it has not been subjected to deterioration from marine borers or wear from the current.

While it cannot presently be identified as such, the possibility that this piece of wood derives from a vessel should not be ruled out. Any further discoveries of possible archaeological interest from this area should continue to be reported, as they could shed further light on this find.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 087/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

Tarmac_0870: Valve Handwheel

This valve handwheel was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Paul Stonehouse found it at Greenwich wharf.

This star-shaped metal find measures approximately 290 mm by 220 mm and has several broken 'arms'. The hole in the centre runs through the object and is most likely threaded. Based on the corrosion, it appears that it may have been in the marine environment for some time.

Images of the object were sent to Anthony Mansfield, a senior Naval Engineer who determined the find was most likely the very corroded remains of a valve handwheel. He said that it could be a few other similar things but handwheels are very common and the most likely answer. Valve handwheels usually have a series of arms connecting to the outer circular 'wheel'. Manual valve handwheels are used to start, stop, and control flow in process lines. A threaded rod connects to the valve and the centre of the valve handwheel. As the handwheel is rotated, the wedge will slide through the attached valve body to block or release the flow.

This object may have entered the marine environment via a number of routes. The item appears to be broken but whether this damage occurred before it entered the marine environment is unknown. At one time, this object would have been attached to a larger object and could have been discarded overboard due to being damaged. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 088/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

CEMEX_0871: Shaft Housing

This circular metal find was discovered in Licence Area 511 in the East Coast dredging region, approximately 9 km north-east of Lowestoft. Andrew Lingham discovered it at Northfleet Wharf.

CEMEX_0871 is a circular metal object that measures 280 mm by 220 mm. There is a hinge on one side and the remains of a metal sheet where it was attached to a larger object. There is a protruding central piece on one side and on the back, there is a large central hole surrounded by a series of smaller holes (pictured below).

Images of the find were sent to Anthony Mansfield, a senior naval engineer. He said the object looks like a water pump off a car but that he was unsure. He said that the hole running through the object indicates that it is some sort of shaft housing for something but at this stage it is unclear what it is for. The holes on the back of the object may have a system of keys that fit in to them in order to tighten the shaft.

This object may have entered the marine environment via a number of routes. The item appears to have been broken off from a larger object and could have been discarded overboard for this reason. Alternatively, it could be indicative of an unknown wreck site if it is a component from machinery on board. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 089/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

CEMEX_0872: Metal Find

This metal find was discovered at Angerstein Wharf by Martin Keeble. The licence area is unknown due to the mixing of cargoes at the wharf but the find most likely derives from the South Coast dredging region.

This brass find measures 350 mm by 240 mm. There are a series of raised letters along the outer rim reading O B 5165 1 18 G. The staff at the wharf thought that this object may be a depth charge.

Images of the find were sent to our in-house specialist, Bob Davis. He said that although there are similarities between the way this object looks and a depth charge, he did not believe that the find was a depth charge due to it being made of brass and too heavy. He also said that the projected diameter also looks very small. He said that the main 'pipe' that protrudes from this object is off-centre meaning that it would have made the mine unbalanced and too heavy on one side to launch safely and correctly. He observed that on the side of the pipe there is a broken bracket with the remains of two lugs with the left-hand lug still having the remains of a pin in it. Looking down the pipe, there appears to be a cylinder or valve. Bob said that he believes that this object is part of a hinge for a pump mechanism or at least a lever. He noted that the numbers and letters are interesting as it denotes something of quality as they wouldn't mark poor craftsmanship. As part of the sequence reads 1 18, Bob suggested this may indicate a date of issue or manufacture, in this case January 1918, therefore during the First World War.

This item could be indicative of an unknown wreck site or from discarded material lost or thrown overboard during every day shipping operations. The fact that there is a possible First World War date may mean that this component has laid on the seabed for over 100 years and may be damage as a result of warfare. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 106/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London

Hanson_0873: Hook and Two Bullets

This hook and two bullets were discovered in Licence Area 106/3 in the Humber dredging region, approximately 34 km south-east of Grimsby. Dirk Geleyn discovered them at Antwerp Wharf.

This hook and two bullets were found together but are assumed to be unrelated. The Hook is thought to be made of iron and measures 190 mm long and 110 mm wide. Both bullets are 80 mm long and approximately 30 mm wide. They both appear to be damaged in some way, and they both have a small notched driving band around their base which means they have previously been fired.

The hook is similar to a crane hook that would have been attached to the crane via the hole at the top with a secure D ring. The shape, size and bluntness of the hook rules out the likelihood of it being a fishing hook. Most crane hooks will have an additional clip to avoid the possibility of the load coming off. As this example does not, it may be of a slightly earlier variety. Images of the two bullets were sent to Trevor Parker of the Ordnance Society who said that he thinks both are examples of British 20 mm cannon shells. Based on the image, he says they resemble Hispano bullets that are fired from aircraft, rather than Oerlikon bullets that are fired from ships. The aircraft from which they were fired is unknown but they would most likely have been fired during the Second World War.

Although the hook is rusty, it does not appear to be broken, therefore it may have been lost overboard by accident during everyday shipping operations most likely associated with cargo ships carrying cranes and containers. The bullets on the other hand may be remnants of a battle that occurred between an aircraft and ship at sea and may have been lying on the seabed for over 100 years. Though considered isolated finds, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 108/13)
- The National Record of the Historic Environment
- The Historic Environment Record for North East Lincolnshire

Tarmac_0874: Mooring Bollard

This mooring bollard was discovered in Licence Area 351 in the South Coast dredging region, approximately 13 km south-east of the Isle of Wight. Barry Gould discovered it at Erith Wharf.

Tarmac_0874 is an iron or steel object, identified by the wharf staff as a twist and lock secure hook for a boat to tie a rope to. The object measures 170 mm long by 90 mm at its widest point. The object looks to have been heavily abraded in the marine environment.

The find is known as a mooring bollard. Due to its size, it is suggested that this mooring bollard would have been fixed on to a boat. In maritime contexts, a bollard is either a wooden or iron post found as a deck-fitting on a ship or boat, and used to secure ropes for towing, mooring and other purposes. It has a counterpart on land, usually in the form of a short wooden, iron or stone post on a quayside to which craft can be moored. Mooring bollards are rarely perfectly cylindrical, but usually have a larger diameter near the top as seen on this example to discourage mooring ropes from coming loose. Single bollards sometimes include a cross rod to allow the mooring lines to be bent into a figure eight. This example does not have a cross rod but the section that can be seen to jut out may have served the same purpose.

Based on the size of this bollard, it is more than likely that this would have been attached to a vessel rather than to a dock or on land. It is therefore suggested that it was accidentally lost overboard during every day shipping operations. It also could have been purposely discarded overboard as it seems to be fairly worn and may have reached the end of its working life. Although considered an isolated find, further finds of this type should continue to be reported. An almost identical mooring bollard (Tarmac_0852) was discovered recently at Greenwich wharf from Licence Area 254 in the East Coast dredging region.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 121/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

Tarmac_0875: Rigging Screw

This rigging screw was discovered in Licence Area 458 in the East English Channel dredging region, approximately 36 km south-east of Eastbourne. M. Kirny discovered it at Erith Wharf.

This brass object is 160 mm long and 60 mm at its widest. Half of the object is threaded and there are two eyelets at the tip. It appears to be relatively undamaged. The wharf suggested that it could be an attachment item for small vessel such as a rowing or sailing boat.

Images of the find were discussed with an in-house specialist, Bob Davis. He said that the find would hold heavy duty cable wire or conduits. He said that based on the images, the threaded section is for metal, not wood, and would have been bolted to a plate. Samuel Fieldhouse, a sailor and the Education Manager at Wessex Archaeology said that he believed the find is an old version of a rigging screw. He said a shackle would have gone through the eyes onto a deck fitting and then by fitting a bottle screw onto the thread they could tension the rigging.

This object may have entered the marine environment via a number of routes. The item appears to be broken but whether this damage occurred before it entered the marine environment is unknown. At one time, this object would have been attached to a larger object and could have been discarded overboard due to being damaged. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 122/18)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex

Tarmac_0876: Diving Fin

This diving fin was discovered in Licence Area 509/2 in the Thames dredging region, approximately 21 km south-east of Felixstowe. Barry Gould discovered it at Erith Wharf.

This open heel black diving fin is a standard heavy-duty fin worn by many sport and commercial divers. The name and logo on the upper section of the fin has worn away which may mean that it has been in the marine environment for some time.

These fins are known as turtle fins. They are usually quite thick and are heavier than standard scuba diving fins, so work well for technical diving. Technical divers, such as wreck and cave divers, love these fins because they provide great propulsion but are short enough to avoid kicking the ceiling in smaller areas. While fins for snorkelling and swimming may be made of rubber, plastic or combination materials, those used for scuba diving are usually high-quality polyurethane or polypropylene. This find may have had a spring strap at the open end. A spring strap is a tightly coiled, durable metal spring that stretches over a diver's heel and is different to a standard strap that clips in to each end of the heel. Although fins like these ones have been around since 1940, it is believed that this example is a fairly recent type.

The strap around the back of the fin appears to have broken away as the clips to which it attached is still visible. The most likely explanation is that the strap broke while the diver was underwater and the fin fell off and got carried away with the current. It is unlikely that the fin was disposed of in the sea as the strap would have been easily repaired.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 123/19)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

Tarmac_0877: Door Handle

This door handle was discovered by Steve Tucker at Greenwich Wharf from an unknown licence area.

Tarmac_0877 is a metal watertight door or hatch handle known on marine vessels as a door dog. The object is approximately 320 mm in length and 230 mm in width with a threaded extension from the centre that would have gone through a hole in the door and fastened on the other side.

The most common hatch or door on a vessel is closed by means of double clips and wedges (dogs) which are operable from either side of the door. When the door is closed, a knife edge on the door fits against a rubber gasket on the bulkhead. The door is secured in the closed position by hinged levers called dogs as can be seen on the image to the right. There are usually several dogs for one door and when they are hand tightened they cause a watertight seal. The phrase ‘to dog the door’ is a mariner’s term for sealing a watertight door or hatch.

This object may have entered the marine environment via a number of routes. The item does not appear to be broken and therefore could be indicative of an unknown wreck site or from material lost or thrown overboard during every day shipping operations. Though considered an isolated find, further finds of this type should continue to be reported, as they may be indicative of an unrecorded wreck site or related debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 124/19)
- The National Record of the Historic Environment
- The Historic Environment Record for London

Tarmac_0878: Turbine Housing

This metal find was discovered by Brad Troubridge at Greenwich Wharf from an unknown licence area.

This metal object was described by the wharf as an iron tube bolted to cast alloy plate. It measures approximately 310 mm in length and 150 mm at its widest point. There are a series of rivet holes around the outside and inside of the object and the tube is open ended at both ends. The item is still attached to pieces of a larger component via the rivets on the inside.

Images of the find were sent to Anthony Mansfield, a senior Naval engineer. He said that the object made him think of a turbine housing. He said that the holes on the object were for bolts and that the fact that they are so closely spaced, seems to indicate that the component was associated with either high pressure and/or high temperature containment, suggesting a turbine of some sort. He said that could have been a turbine associated with gas, steam or a turbocharger.

Alternative suggestions were that the object formed a part of a seal of some sort due to the rivet holes and the raised rim around the outside.

This object may have entered the marine environment via a number of routes. The item is broken and therefore could have been thrown overboard during every day shipping operations to be replaced by another component, although the fact that it is still attached to a broken piece of a larger component would suggest the component as a whole. Alternatively, it could possibly be from a debris field.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 125/18)
- The National Record of the Historic Environment
- The Historic Environment Record for London

Brett_0879: Stone Cannonball

This stone cannonball was discovered by Matt Reardon at Cliffe Wharf on the oversize grid. The material is likely to be from an old oversize stockpile and therefore the licence area is unknown.

The cannonball measures approximately 160 mm in diameter and has been carved from stone. Stone cannonballs were commonly used during the medieval period in addition to iron or lead. Preference changed to iron shot in the 1630s as the cost of manufacturing reduced (Caruana 1994, 189). The type of stone used is unclear without lithological identification.

The size of the cannonball is particularly large, at 160 mm or 6.3 inches in diameter, this equates to roughly a 36 pounder cannon (https://www.arc.id.au/Cannonballs.html accessed July 2018 accessed July 2018). Stone cannonballs were hand carved from blocks, often using a small pick or a hammer and chisel. This would create some variety in the shape; often the diameter varies slightly as forming a perfect sphere is extremely difficult and time consuming. Gauges were used during the carving process to ensure that the desired size was made. These were usually wooden paddles with a pre-cut hole which would slot over the ball (Hildred 2011, 402). Previously, these have been found on board shipwrecks, such as the *Mary Rose*, as many of the stone shot would not be finished until they were already on board the ship.

Cannonballs are a common find around the coast of England as, with an extensive naval history, military training and battles have taken place along this stretch of coastline for hundreds of years. It is not possible to say whether it was fired during training, battle or perhaps just lost overboard.

References

Caruana, AB 1994 *The History of English Sea Ordnance 1523-1875 Volume 1 The Age of Evolution.* East Sussex, Jean Boudroit Publications.

Hildred, A 2011 *Weapons of Warre: The Armaments of the Mary Rose Volume 3*. Portsmouth, Mary Rose Trust.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 126/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Brett_0880: Cannonball

This stone cannonball was discovered by Matt Reardon at Cliffe Wharf on the electro magnet. The material is likely to be from an old oversize stockpile and therefore the licence area is unknown.

Brett_0880 is a cast iron cannonball with a diameter of 110 mm or 4.3 inches. No weight was given. It has been heavily degraded in the marine environment and has cracked. Based on the diameter alone, this cannonball could have been fired by a Demi Culverin (Childs 2009).

A Demi Culverin is a medium sized smooth-bored brass gun with a long barrel used to bombard targets from a distance (Garrett 2010). It belongs to the Culverin class and is the second largest gun within this class (Childs 2009). The Demi Culverin was similar to, but slightly larger than, a Saker and smaller than a regular Culverin developed in the late 16th century. Barrels of Demi Culverins were typically about 11 feet (3.4 m) long, had a calibre of 4 inches (100 mm) and could weigh up to 3,400 pounds (1,500 kg). Following the standardization of artillery sizes by the British Board of Ordnance in 1716, rather than refer to guns by the various names, they were standardized to the weight of round ball that they fired, rounded up to the nearest pound of the commonest weights (Carpenter 1993).

Cannonballs are a common find around the coast of England as, with an extensive naval history, military training and battles have taken place along this stretch of coastline for hundreds of years. It is not possible to say whether it was fired during training, battle or perhaps just lost overboard.

References
Childs, D., 2009. *Tudor Sea Power: The Foundation of Greatness*. Seaforth Publishing, Barnsley.
Garrett, R. J., 2010. *The Defences of Macau: Forts, Ships and Weapons over 450 years*. Hong Kong University Press, Hong Kong.
Carpenter, A.C., 1993. *Cannon: The Conservation, Reconstruction and Presentation of Historic Artillery*. Halsgrove Press, Tiverton.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 127/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent.

Brett_0881: Cannonball

This stone cannonball was discovered by Matt Reardon at Cliffe Wharf on the electro magnet. The material is likely to be from an old oversize stockpile therefore the licence area is unknown.

Brett_0881 is a cast iron cannonball with a diameter of 125 mm or 4.9 inches. It has been heavily degraded in the marine environment resulting in an uneven surface. Based on the diameter alone, this cannonball could have been fired by a Culverin (Childs 2009).

A Culverin is a smooth-bored brass gun with a long barrel used to bombard targets from a distance (Garrett 2010). Culverin was a class that included a range of different guns, however, the Culverin itself is the largest of this class (Childs 2009) and fired shots ranging from 4¾ inches up to 5½ inches (Museum of Artillery). These guns were used by the French in the 15th century, and later adapted for naval use by the English in Henry VIII's Royal Navy in 1546 (Childs 2009). Eighteen pounders are a standardised version of the same cannon with a change of name following the standardization of artillery sizes by the British Board of Ordnance in 1716. Rather than refer to them by the various names, they were standardized to the weight of round ball that they fired, rounded up to the nearest pound of the commonest weights (Carpenter 1993).

Cannonballs are a common find around the coast of England as, with an extensive naval history, military training and battles have taken place along this stretch of coastline for hundreds of years. It is not possible to say whether it was fired during training, battle or perhaps just lost overboard.

References
Childs, D., 2009. *Tudor Sea Power: The Foundation of Greatness*. Seaforth Publishing, Barnsley.
Garrett, R. J., 2010. T*he Defences of Macau: Forts, Ships and Weapons over 450 years*. Hong Kong University Press, Hong Kong.
Carpenter, A.C., 1993. *Cannon: The Conservation, Reconstruction and Presentation of Historic Artillery*. Halsgrove Press, Tiverton.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 128/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

Brett_0882: Cannonball

This stone cannonball was discovered by Matt Reardon at Cliffe Wharf on the electro magnet. The material is likely to be from an old oversize stockpile and therefore the licence area is unknown.

Brett_0881 is a cast iron cannonball with a diameter of 180 mm or 7 inches. It has been heavily degraded in the marine environment resulting in a pitted surface and has taken on the appearance of stone.

Based on 16th century British gun calibres, this size of solid shot would have been fired from a Demi Cannon. The barrels of Demi Cannon were typically 11 ft (3.4 m) long, had a calibre of 6 inches (15.4 cm) and could weigh up to 5600 lb (2540 kg). It required 18 lb (8 kg) of black powder to fire a 32 lb (14.5 kg) round shot. The demi-cannon had an effective range of 1600 ft (490m) (Manucy, 2011). Ships featuring demi-cannons included HMS *Sovereign of the Seas*, HMS *Resolution* and HMS *James*, which fought in the Anglo-Dutch naval wars in the 17th century.

The late 18th century saw the development of a new class of cannon, the Carronade, which fired the standard size cannonballs but had a shorter barrel and lighter weight, making them easier to handle aboard ship. Their shorter barrel meant that they could be bored more accurately. If the cannonball dates to this period, it would have most likely been fired from a 42 pounder (https://www.arc.id.au/Cannonballs.html accessed 9 July 2018).

Cannonballs are a common find around the coast of England as, with an extensive naval history, military training and battles have taken place along this stretch of coastline for hundreds of years. It is not possible to say whether it was fired during training, battle or perhaps just lost overboard.

References

Manucy, A., 2011. *Artillery Through the Ages*. CreateSpace Independent Publishing Platform

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 129/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Kent

CEMEX_0883: Carriage Wheel

This cylindrical wooden object was discovered in Licence Area 458 in the East English Channel dredging region, approximately 37 km south-east of Great Yarmouth. Tomasz Augustynowicz discovered it on board *Sand Fulmar*.

CEMEX_0883 is a cylindrical wooden find with a hole running through the length of its centre. The timber looks to be very worn, possibly as a result of the marine environment. Based on the green staining of the wood, the remains copper fastening is still present in the central hole. No measurements were given.

The find was immediately identified as having a resemblance to a Naval or garrison gun carriage wheel. Bob Davis, a specialist at Wessex Archaeology, went on to say that the 'copper pin' may be an axle liner to fit over the copper axle of the gun carriage with plenty of grease. The wheel would then be held in place by a cotter pin through a hole in the axle. Naval or garrison gun carriages were designed for use aboard a ship or within a fortification and consisted of two large wooden slabs called cheeks held apart by bracing pieces called transoms. Because these guns were not required to travel about, they were only provided with four small wheels called trucks, whose main function was to roll backwards with the recoil of the gun and then allow it to be moved forward into a firing position after reloading. Gun carriages of this type can be seen to be well preserved from vessels such as the *Mary Rose*, however, they were made entirely of wood and had no metal elements (https://www.chemistryworld.com/feature/preserving-the-mary-rose/7194.article).

Wood does not tend to survive very well in the marine environment unless buried. The fact that this object is intact may mean that is has been buried in the seabed for a period of time and has been disturbed by moving sediments or other activity. Alternatively, it could be a relatively new object. Further objects of this nature should be reported as it may be indicative of an unknown wreck or an area where Naval warfare took place.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 168/18)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Tarmac_0884: Plate Fragment

This plate fragment was discovered in Licence Area 500/3 in the South Coast dredging region, approximately 11 km south-south-west of the Isle of Wight. Mia Bartlett discovered it at Southampton Wharf.

Tarmac_0884 is a fragment of a plate with a lion and crown on its front along with the words “STEAMSHIP COMPANY LTD”. On the reverse is a maker’s mark with the words “MINTONS” “EST 1793” “ENGLAND”. There appears to be an embossed production number of the back of the plate as well, that reads “1 MINTONS 5 – 25”.

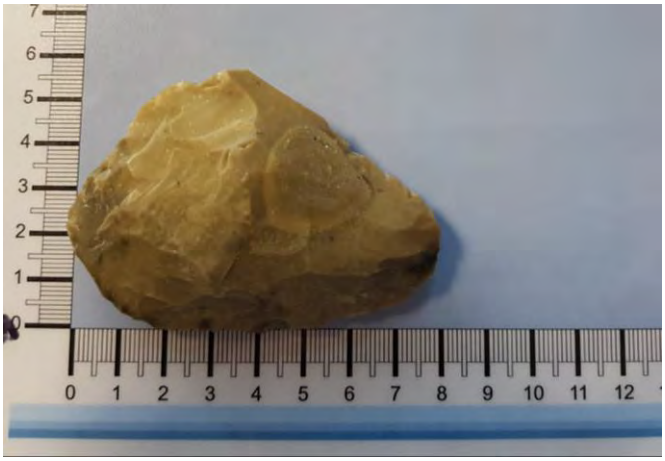
After research was conducted on both the stamps present on the plate, it has been determined that this belongs to The Cunard Steamship Company Ltd. The Cunard Line is a British-American cruise line based at Carnival House at Southampton, England, operated by Carnival UK and owned by Carnival Corporation & plc. The company was founded in 1840 as the British and North American Royal Mail Steam Packet Company and is still in existence today.

The Minton stamp on the reverse refers to a major ceramics manufacturing company, created by Thomas Minton, who established his pottery factory in Stoke-upon-Trent, Staffordshire, England, in 1793, producing earthenware. As the print mark changed over the years, and it is possible to date the pottery based on this. This new version of the standard Minton print mark had a different crown and the globe now within laurel leaves. This version of the mark was in use from 1912 to 1950 with the earlier versions having ENGLAND printed below which this one does (https://antique-marks.com/antique-minton-marks.html).

It is not clear whether this find entered the marine environment already broken or whether the damage occurred at a later stage. It is most likely that someone aboard the vessel using this plate broke it and threw it away overboard as waste. There are rumours of dishes and cutlery being thrown overboard when approaching port as a means of avoiding washing up!

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 167/18)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight



Hanson_0885: Worked Flint

This possible hand axe was discovered in Licence Area 240 in the East Coast dredging region, approximately 14 km south-east of Great Yarmouth. Malcolm ONeill discovered it on board *Arco Beck*.

This worked flint was reported as a possible handaxe due to its teardrop shape and markings. It measures 80 mm long by 550 mm wide by 20 mm thick and has visible marks where smaller flint flakes have been removed.

Images of the find were sent to our in-house flint specialist Matt Leivers. After looking at the photographs, he determined that the flint has indeed been worked by human hand and was Prehistoric in date. Despite this, he said that he did not believe the object was a handaxe and that it would need to be examined in house to confirm this.

During the Prehistoric period, large pieces of flint referred to as cores were selected to be made into flint tools. The cores were then struck or knapped to shape using other pieces of flint and stone. As the tool become smaller, the shape could be refined, and the edges made sharp so that it could have been used to hunt and butcher meat. Flint tools made in this way range in size and include arrowheads, scrapers, knives, microliths and axes. Flint comes in various colours – light or dark brown, grey or black; generally black flint knaps better than other colours which may be why this tool was never completed.

Since the start of the Protocol, there have been numerous reports of Prehistoric material from the East Coast dredging region. Although it is unlikely that this find is a hand axe, worked flint can be of great importance to our understanding of the past occupation of the area which we now know as the North Sea. During past Ice Ages this area would have been dry land; utilised by humans and animals. Potential tools such as this find aid our understanding of how they were living during this time including methods of manufacture and hunting techniques.

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

email: protocol@wessexarch.co.uk
www.wessexarch.co.uk/projects/marine/bmapa/index.html

Gillingham House
38–44 Gillingham Street
London SW1V 1HU

Tel 0207 963 8000
bmapa@mineralproducts.org
www.bmapa.org

16 New Burlington Place
London
W1S 2HX

Tel 0207 851 5311
enquiries@thecrownestate.co.uk
www.thecrownestate.co.uk

1 Waterhouse Square
138–142 Holborn
London EC1N 2STT

Tel 0207 973 3000
customers@HistoricEngland.org.uk
www.historicengland.org.uk

Portway House
Old Sarum Park
Salisbury, Wiltshire SP4 6EB

Tel 01722 326867
info@wessexarch.co.uk
www.wessexarch.co.uk