



Ministry
of Defence

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Recycling of the Former **HMS Illustrious** Defence Equipment Sales Authority



Equipping and Supporting our Armed Forces
Defence Equipment & Support

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The former HMS Illustrious at sea during Cougar 13. Cougar is the annual deployment of the UK Armed Forces' Maritime Response Force Task Group to the Mediterranean and East of Suez. The deployment serves to protect the free, safe and lawful use of the sea and to promote UK interests by developing international partnerships.

Front cover - Royal Navy Aircraft Carrier HMS Illustrious is escorted by tugs as she returns to Portsmouth following her refit in Scotland.

The 22,000 tonne ship, affectionately known as "Lusty", was in the Rosyth dockyard in Fife for 16 months where she underwent modifications to turn her into a helicopter and commando carrier capable of carrying a force of up to 20 helicopters and 600 fully kitted out personnel.

Introduction

The Disposal Services Authority, rebranded as the Defence Equipment Sales Authority (DESA) on 1 September 2017, was tasked in 2013 with the sale of the former HMS *Illustrious*.

In September 2013 ministers expressed their preference to see the ship preserved intact as a lasting tribute to the service personnel who served on her. A written ministerial statement was published in Hansard on 15 October 2013 (official reference: Columns 48WS-49WS), announcing the launch of a competition to seek innovative reuse bids to retain the ship in the UK, with part or all of it developed for heritage.

DESA approached the market in 2013 to secure interest in the preservation of the vessel. This resulted in a series of briefings and the hosting of an industry day on board the former HMS *Illustrious* in early 2014. DESA received six heritage bids, which included a conference venue, visitor attractions, a heritage museum and a privately run heliport. However, from the six interested parties invited, four subsequently withdrew, one failed to meet the criteria and the final bid was withdrawn. Once DESA had exhausted all of the heritage and future use options the only route left was to recycle the vessel. Following an open competition against strict criteria for the recycling DESA awarded preferred bidder status to the Turkish company LEYAL Ship Recycling Ltd, whose formal proposal was to conduct the recycling of the vessel at their dedicated ship dismantling facility in Aliaga, Turkey.

The vessel left HMNB Portsmouth under tow on 7 December 2016 and arrived in Turkey on 27 December 2016, taking less than three weeks. On 22 June 2017 LEYAL reported that the vessel had been completely dismantled and recycled in accordance with the relevant EU waste management legislation and the UK's ship recycling strategy in just six months.



Royal Navy Aircraft Carrier the former HMS Illustrious is pictured returning to Portsmouth on 7 July 2011 following her refit in Scotland.

Background

General particulars



The former HMS Illustrious, a light aircraft carrier of the Royal Navy and the second of three Invincible-class ships, was laid down at Swan Hunter on the River Tyne in 1976 and launched in 1978. She ceased operational service with the Royal Navy on the 1 August 2014.

Displacements & Weights	Lightweight: 16000 tonnes
Estimated metal weight	10000 tonnes including machinery
Current Draughts	5.5m fwd. 6.0m mid. 6.0m aft. Ship upright.
Length	OA 211m. W/L 193m
Beam (moulded)	Extreme 36m. Ex walkways 32m. W/L 27.53m
Mainmast-head height	46m (estimated, at current draught)

Historical Interest

The former HMS *Illustrious* was the fifth warship and second aircraft carrier to bear the name *Illustrious* and was affectionately known to her crew as “*Lusty*”.



As the ship neared the end of its fitting out period, the Falklands War broke out and, as a consequence, work on her was speeded up. On 28 August 1982, she joined her sister ship, the former HMS *Invincible*, for the conflict in the Falklands. She returned to the United Kingdom where she was formally commissioned into the fleet on 20 March 1983. She saw no further action during the remainder of the 1980s, but continued to be a valuable asset to the Royal Navy, participating in exercises all around the world. She was deployed on Operation Southern Watch in Iraq, Operation Deny Flight in Bosnia during the 1990s and Operation Palliser in Sierra Leone in 2000. An extensive re-fit during 2002 prevented her from involvement in the 2003 Iraq War, but she was repaired in time to assist British citizens trapped by the 2006 Lebanon War. In 2010 the ship featured on a Channel 5 documentary ‘*Warship*’. The series looked at the daily routines and lives of the crew on board and filming took place during one of her deployment exercises abroad.

In 2013 Bags of food and supplies line the dockside in Singapore as the former HMS *Illustrious* arrived to ship the supplies to the typhoon Haiyan stricken island of the Philippines.



Following the retirement of the fixed-wing Harrier II aircraft in 2010, *Illustrious* operated as one of two Royal Navy helicopter carriers. After 32 years she was formally decommissioned on 28 August 2014 and was one of the oldest ships in the Royal Navy's active fleet.

Competition - Heritage Preservation & Recycling

In September 2013 ministers expressed their preference to see the ship preserved intact as a lasting tribute to the service personnel who served on her. A written ministerial statement was published in Hansard on 15 October 2013 (official reference: Columns 48WS-49WS), announcing the launch of a competition while the ship was still in service to seek innovative reuse bids to retain the ship in the UK, with part or all of it developed for heritage.

However, the commercial reality is that the preservation of former Royal Navy warships as museums or tourist attractions requires continued subsidy. With the current economic climate, the best way in which to secure the preservation of the last of class Carrier Vertical Strike (CVS) was to seek proposals that would include heritage as part of the plans to preserve the vessel, but also recognise and accept a need to use the vessel in part for some form of commercial operations.

DESA approached the market in 2013 to secure interest in the preservation of the vessel resulting in an industry day on board the vessel in early 2014.

The process included a formal published set of criteria that DESA used to evaluate and subsequently down select bidders in order that preferred bidders could be selected. Minister for Defence Procurement approved the commercial strategy to invite six interested parties to participate in the Invitation to Negotiate process, which included each of the parties making a formal proposal to DESA. This was followed up by a detailed presentation of their proposals.

The proposed heritage bids included a conference venue, visitor attractions, heritage museum and a privately-run heliport. From the six interested parties invited, three subsequently withdrew stating:

- The financial backer had pulled out of one project (no reason was given as to why the backer withdrew)
- The costs associated with participating were higher than anticipated, and therefore unaffordable
- They felt there was insufficient time to put a proposal together, but did not ask for an extension to the return date

And one failed to meet the competition criteria.

Following a number of discussions and meetings between the last potential purchaser and DESA, the final bid for the former HMS Illustrious to use the vessel as a heliport on the Thames was withdrawn. The Mayor of London's office could not support the proposal on the grounds that it would not conform to his strategic plan for London.

This competition was completed in November 2015 as it had not been possible to identify a suitable bidder. All options for preserving the vessel for heritage purposes had also been exhausted. DESA, therefore, recommended to ministers that disposal for recycling was the only remaining viable option.

DESA advertised the sale of the former HMS Illustrious for recycling with the clause "The issue of this notice is not a commitment by the Secretary of State for Defence "The Authority" to commit to a sale as a result of this notice and this process may be discontinued at any time should a Government to Government (G2G) sale or heritage option be forthcoming". Five recycling companies declared a viable interest; one from the UK, three from Turkey and one from USA. No heritage bids were received.

As recommended by the UK ship recycling strategy tenders were limited to bidders from within the European Union (EU) and the Organisation for Economic Cooperation and Development (OECD) countries. The five companies that expressed an interest were sent invites to tender and of these only two companies responded.

The information provided to the bidders was to enable them to identify key environmental issues and cost drivers in their tender responses.

DESA secured additional provisions from the bidders in the form of a substantial financial bond. This acted as a security to ensure that the vessel was recycled in the destination stated and not re-flagged and taken to a non-compliant yard, or outside the EU or OECD. It was sold on an 'as seen, as lying' basis. The recycling was to be in full compliance with the principles of the Basel Convention and all other associated EU and UK legislation including Regulation (EC) No 1013/2006 of the European Parliament and the Council of 14 June 2006 on Shipments of Waste. This includes, but is not limited to:

- The Waste Shipments Regulation (EC)
- No 1013/2006 of the European Parliament Of the Council of 14 June 2006
- Parts of the Radioactive Substances Act 1993
- Environmental Protection (Duty of Care)
- Regulations 1991 SI 2839
- Hazardous Waste (England and Wales)
- Regulations 2005 SI 894
- Health & Safety at Work Act 1974

To prepare the former HMS Illustrious for recycling, a number of tasks had to be carried out. These were undertaken by the MOD's Disposal Reserve Ship Organisation (DRSO), which is based in Portsmouth.

DRSO played a vital role in the preparation of the vessel, assisting the Ship's Platform Team in the production of an inventory of hazardous materials and an independent asbestos management survey (provided by Lucion Environmental Ltd); both of which were included as part of the tender documents. DRSO hosted potential bidders, escorting them around the vessel, provided a technical brief and answered questions on the viewing day.

Prior to the planned departure date of the vessel, the purchaser liaised with DRSO to ensure the towing plan was acceptable and DRSO assisted the purchaser with contacting the Maritime and Coastal Agency (MCA) for approval of the tug responsible for towing the vessel. DRSO also played an important part in supporting the towing and rigging preparations on deck which contributed to the successful sale and departure of the former HMS Illustrious.

The necessary formalities for departure, including export licence clearance was the responsibility of the purchaser.

Ship Recycling Evaluation

Before contract award can be made, as per the recommendation of the UK Ship Recycling Strategy (SRS), DESA convenes a ship recycling evaluation committee, involving representatives from the MCA, DRSO and DESA to assess the tender responses against set criteria called for in the strategy. Prospective purchasers were required to produce a detailed ship recycling plan, demonstrating their understanding of all the requirements involved in ship dismantling against each of the following:

- Facilities and dismantling methodology
- Health and Safety
- Environmental plans
- Operations, sub-contractors
- Licences and permits
- Media and Trans-Frontier Shipment of Waste (TFS)

The ship recycling plan is paramount to the consideration of offers to purchase and provides evidence to enable the evaluation committee to score each of the tenders.

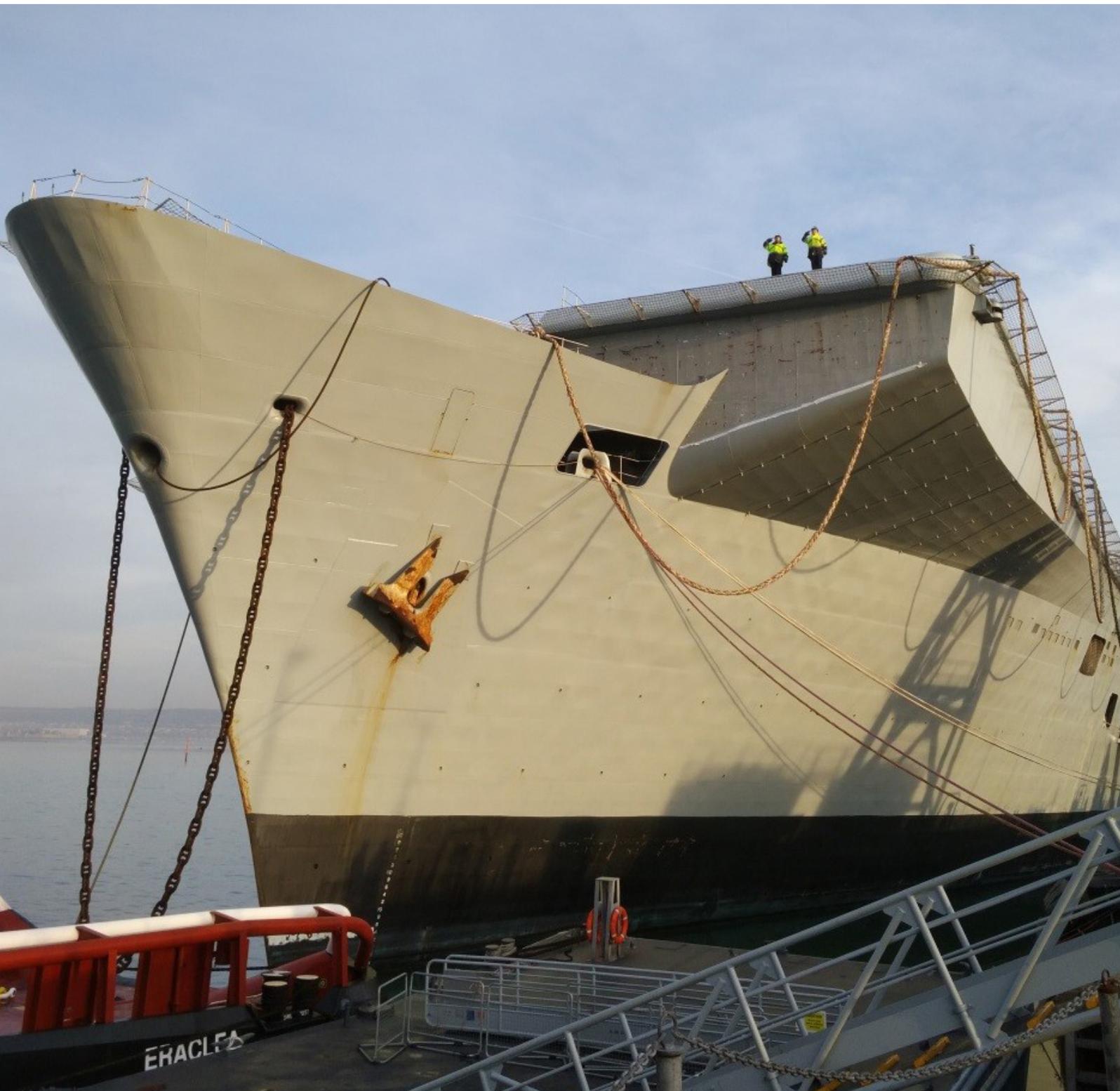


Prior to any sale, HM vessels have the radar absorbent sheeting (RASH) removed as part of the declassification of the vessel, this process takes three to four months. (Type 42 frigate used for illustration)

Contract Award

DESA awarded the contract for recycling of the vessel in August 2016 to LEYAL Ship Recycling, which is based in Turkey.

On 7 December 2016 the vessel transferred from MOD ownership and Naval Base Commander (Portsmouth) custody, to LEYAL Ship Recycling.



The former HMS Illustrious in preparation for her departure from HMNB Portsmouth on the 7 December 2016.





'Lusty' departed from HMNB Portsmouth under the towage of AHT ERACLEA on her final voyage to the ship dismantling facility in Aliaga, Turkey on 7 December 2016.





22 Dec 2016 - Aerial view of the former HMS Illustrious passing through Malta.

Arrival of the Former HMS Illustrious

On 27 December 2016, just 20 days after leaving Portsmouth Naval Base, the former HMS Illustrious arrived safely at the winning bidders recycling yard in Aliaga, Turkey, under the tow of the tug AHT ERACLEA.





Arrival Photo 27 Dec 2016.

Recycling of the Former HMS Illustrious

Once the vessel arrived at the recycling yard, DESA's work continued to ensure that the dismantling of the vessel was carried out as per the recycler's ship recycling plan detailed in their tender. The recycler provides DESA with a monthly breakdown of the outturn of metals and waste during the recycling process.

Audits are conducted by DESA during the life of the project, which involves inspection of weighbridge tickets, licences and consignment notes, which are checked against the reported outturn.

Photographic evidence was provided at key stages of the dismantling process ensuring that DESA could be confident on the method and manner in which the vessel was dismantled and recycled.



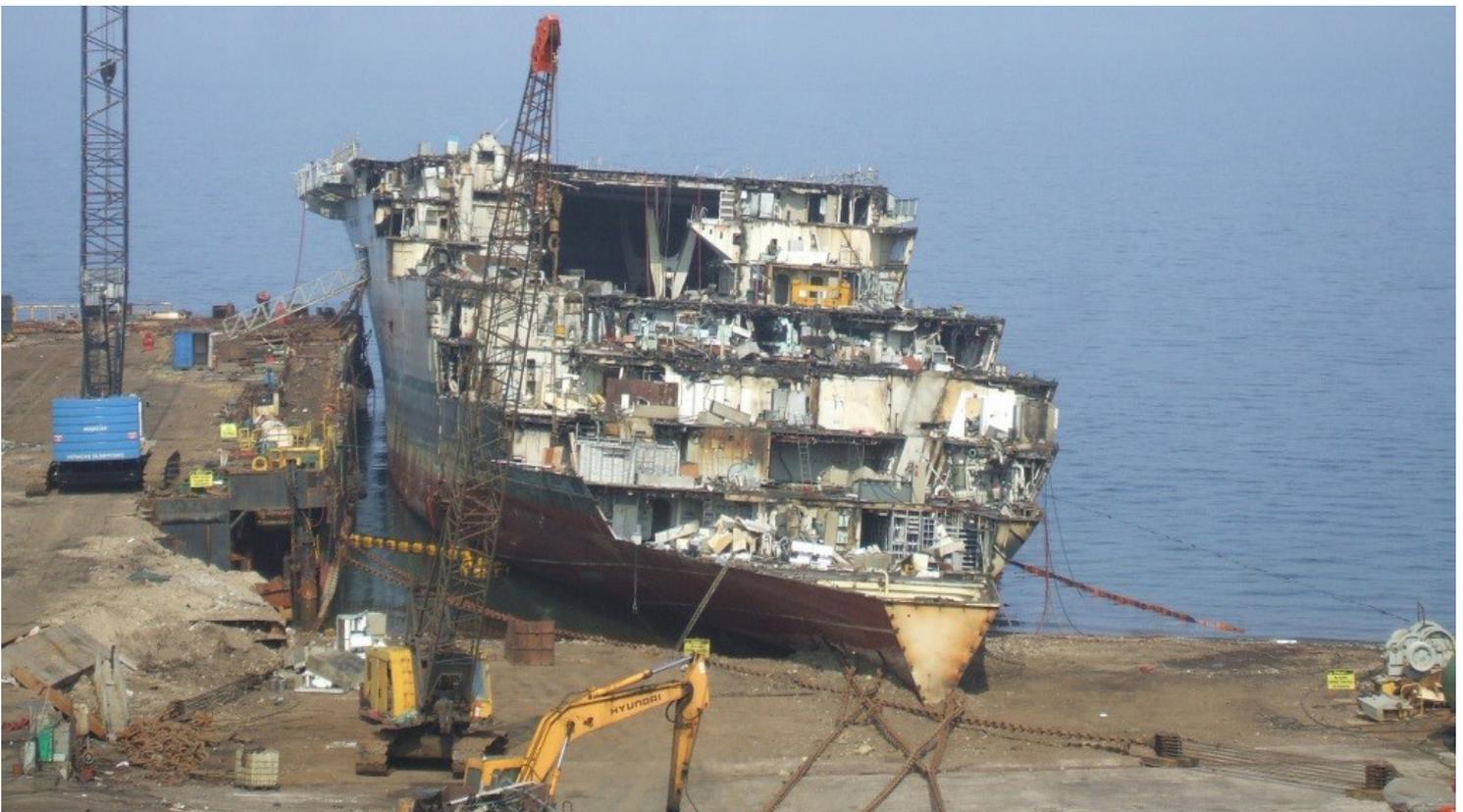
Start of the flight deck dismantling on 30 December 2016.

Photographic Evidence

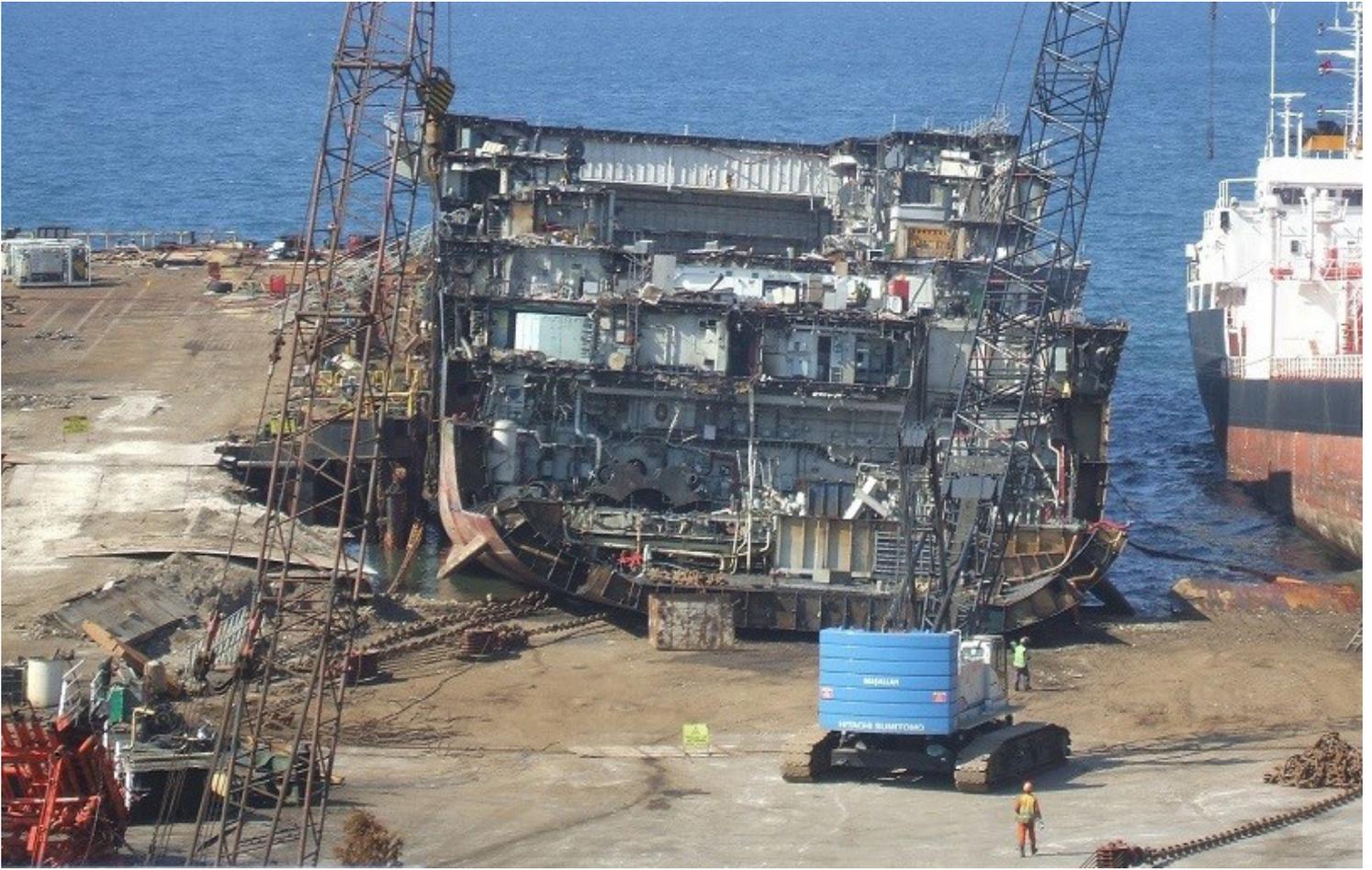
The photographic evidence shows the dismantling progress and this coincides with the monthly reports, demo schedule and the sales progress.



1 February 2017 Progress of works showing the start of dismantling of the flight deck, airplane garage and bridge.



Progress of works as of 28 February 2017.



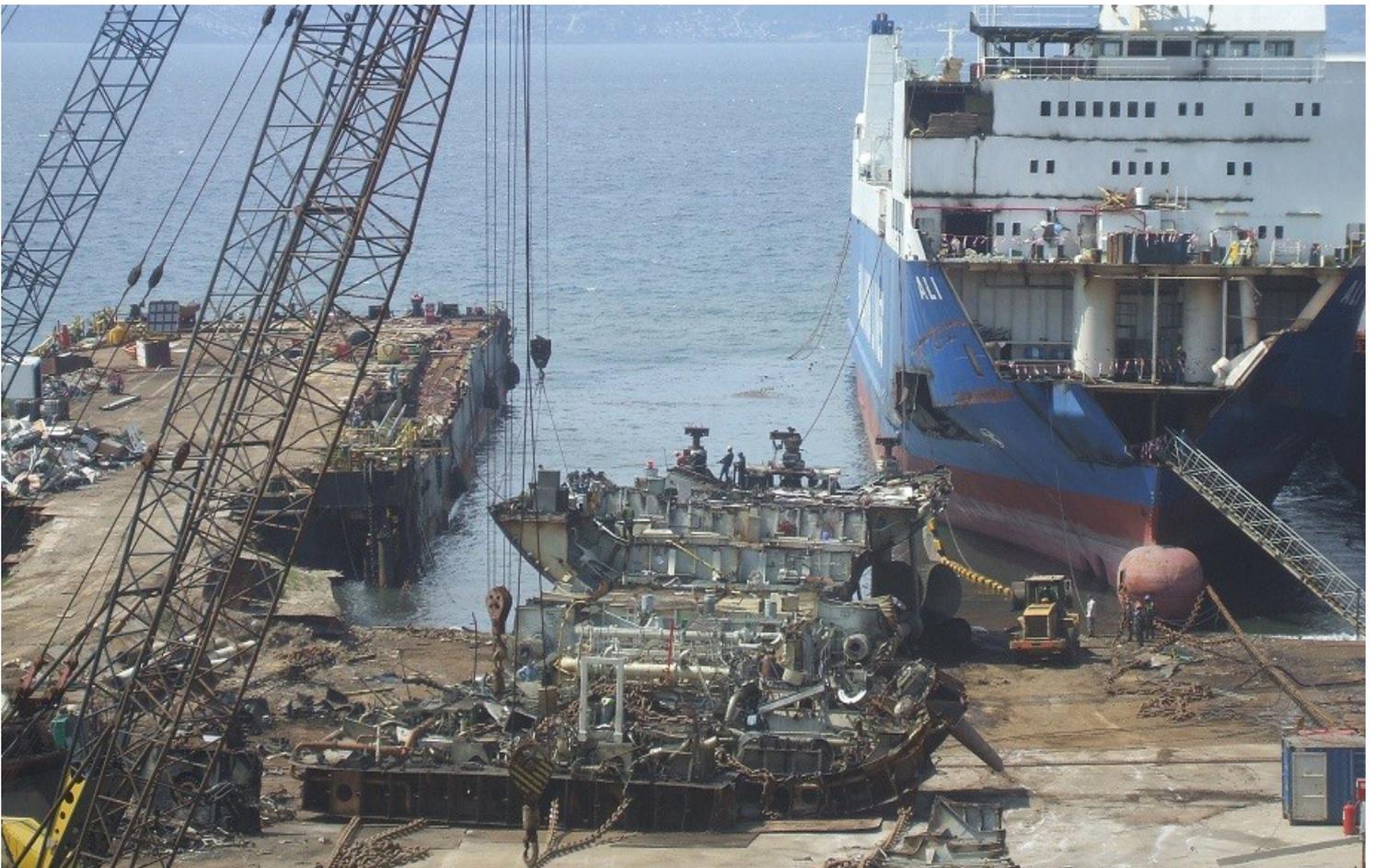
Progress of works as of 28 March 2017.



Progress of works as of the 19 April 2017.



3 May 2017 Ship on slipway.



12 June 2017 the former HMS Illustrious as a hull has been fully dismantled.

Final Outturn

A detailed outturn of materials (ferrous, non-ferrous, plastics, asbestos, oils, etc.) is recorded by the company and this information is communicated to DESA on a monthly basis, with hard copies available for inspection during the regular visits made by DESA personnel.

A summary of this information is presented in the tables below.

(All figures in Tonnes)	Expected	Actual	Destination
Ferrous Metals	10,800	11,854.15	Recycled
Non-Ferrous Metals	700	611.08	Recycled
Cables	150	112.60	Recycled
Other Products	350	268.08	Sale/Recycled
Waste	750	811.58	Disposed
Total	12,750	13,657.49	

The relatively small amounts of asbestos found on board (1,660kg) were primarily woven conduits and gaskets. This was in line with DESA expectations for a vessel of this age; the former HMS Invincible had 1,740kg and HMS Ark Royal 1,640kg.

As a comparison:

- 93% of material was recovered and recycled from the former HMS Invincible with a final outturn of 11,683 tonnes.
- 94% of material was recovered and recycled from the former HMS Ark Royal with a final outturn of 12,580.44 tonnes.
- 94.06% of material was recovered and recycled from the former HMS Illustrious with a final outturn of 13,657.49 tonnes. This figure could have been higher had some equipment not been removed to support other vessels i.e. engines, generators, flight-deck lighting, amplifiers, dental and domestic equipment that was operationally required for other vessels including HMS Ocean, Dauntless, Albion and Westminster.

Final Destination	Tonnes	% age of Total
Sold or Recycled	12,845.91	94.06%
Disposed	811.58	5.94%
Totals	13,657.49	100%

The current regulation on Waste Management of Turkey came into effect on 2 April 2015. This regulation, based on European legal texts (namely, Directive No. 2008/98/EC and Decision No. 2000/532/ EC), aimed for synchronisation of the Turkish law with the EU acquis. This regulation has unified three previously valid Turkish regulations into a single legal framework, according to the EU waste framework. Turkey, in its continuous efforts to improve its standards regarding environmental management, has launched an extensive accession program that has been implemented in co-operation with the European Commission. Turkey being an OECD member, an EU member candidate and party to major international conventions (such as the Basel Convention, the Stockholm Convention and the Rotterdam Convention) has established a robust legal framework and industrial infrastructure that is broadly equivalent to relevant international and EU standards.

While the vast majority of the materials originating from the dismantling process are recycled or recovered (94%), the operation also yields a small fraction of non-hazardous and hazardous waste streams. These materials are identified, removed, handled and temporarily stored with the support of the Ship Recyclers' Association of Turkey. This is an organisation specifically licensed for this activity by the Ministry of Environment and Urban Planning and the Ministry of Transportation, Maritime Affairs and Communications of Turkey. The final disposal of waste is carried out at specialised licenced waste facilities. Both DESA and the Environment Agency of the UK review the proposed waste disposal routes in Turkey prior to granting permission for the export of the vessel. The process is controlled by the Environment Agency of the UK under the TFS waste shipment regulation (European Regulation (EC) No.1013/2016) pre-informed consent export procedure.

The main waste recovery and disposal methods utilised in relation to ship recycling in Turkey	Materials	Weight
D1/D5: Regular/industrial engineered landfill	Asbestos, insulating materials, remnant waste, general wastes & recyclables	764.84 tonnes
D10: Incineration at high temperature for disposal	Fluorescent lamps and lights	<1 tonnes
R1: Incineration for power generation	Fuel/oils (liquids)	46.74 tonnes
R4: Metal reclamation/separation	Metal reclamation, including electric & electronic waste, batteries & cables containing hazardous insulation	12,845.91 tonnes

The waste related activities classed as recycled (R) or disposal (D) is defined in the EU Waste Framework Directive 2008/98.

Conclusion

The recycling of the vessel was completed on 22 June 2017, with 94.06% of the vessel being sold or recycled. DESA undertook three audits during the dismantling process. The recycling was completed relatively quickly mainly because the ship's construction was simple for dismantling, with large spaces and limited accommodation. There were low levels of non-ferrous metals from this vessel and in the short time in which the ship was recycled and with a stable commodity market, the level was in line with DESA expectations.

DESA has now successfully conducted the sale of 30 vessels, all of which have complied with all international agreements and principles concerning environmentally sound management of waste.

Since 2008, LEYAL Ship Recycling Ltd has won 13 recycling projects. This includes the three former aircraft carriers; HMSs Ark Royal, Invincible and Illustrious, four RFA tankers RFAs Oakleaf, Bayleaf, Fort George and Orangeleaf, three Type 22 frigates; HMSs Cumberland, Campbeltown and Chatham and the icebreaker and ice control ship, HMS Endurance.

Leyal has also successfully recycled 11 Type 42s; HMSs Cardiff, Newcastle, Glasgow, Exeter, Southampton, Nottingham, Manchester, Liverpool, York, Gloucester and Edinburgh.

This report can be found at:-

<https://www.gov.uk/government/collections/dsa-ship-recycling>



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The former HMS Illustrious is illuminated by fireworks during celebrations for the 100th anniversary of naval aviation in 2009. Moored on the River Thames in London, Illustrious visited the capital for 6 days culminating in a 50 aircraft flypast and the fireworks display.

