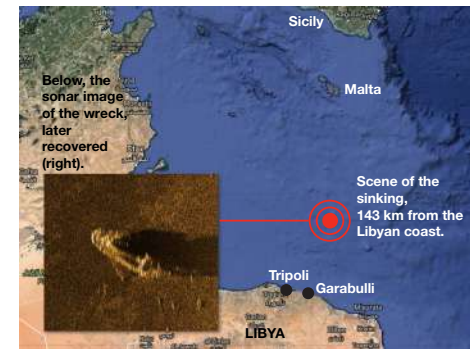


**READY TO DIVE.**  
One of the divers of Comsubin, the specialised unit of the Italian Navy that took part in the recovery of the fishing boat and the victims.

# ANATOMY OF A SHIPWRECK

The recovery of the boat that went down in the Strait of Sicily with 800 migrants on board: a humanitarian and scientific challenge.



## THE STORY: A TRAGEDY OF OUR TIMES

**NAVIGATION.** The traffickers first sailed from Egypt in a fishing boat. On 18 April 2015, they reached the Libyan coastline and waited offshore while the migrants were ferried across on rubber dinghies from the beach at Garabulli. Their passengers, numbering roughly 800, mostly young men, were from Syria, Ethiopia, Somalia, Senegal, Mali, Gambia, Côte d'Ivoire and Bangladesh. Each had paid at least \$US 1,500 for the trip. Those who had paid more were accommodated on deck; the

others were packed into the hold and the engine room. After several hours' sailing, one of the two traffickers on board (a Tunisian and a Syrian) telephoned the Italian Coast Guard requesting assistance. The nearest vessel, the Portuguese container ship King Jacob, was diverted to the area. But one of the traffickers miscalculated and steered the fishing boat into the larger vessel, causing it to sink. Only 28 of the occupants (including the two traffickers, who were subsequently arrested and given custodial sentences) escaped alive.

A reconstruction of how the fishing boat was raised from the seabed: watch the video in enhanced reality.

DOWNLOAD THE APP (INFO. ON PAGE 5)



**DELICATE MANOEUVRES.** Right, a naval rating monitors the recovery of the wreck, which is hitched to a crane (below). The boat will go on show at Milan's Museum of Human Rights.



The jacket had a strange feel to it. In the lining was in fact concealed a plastic bag. It contained a sheet of paper covered in writing, rubber stamps and figures. They were marks:

an eighth-grade report card issued by a school in Mali. It belonged to Ibrahim, a 16-year-old. He had carried it with him throughout his dangerous 5,000-kilometre journey. He wanted to prove he had completed his secondary studies, so he could continue his education or find a job. Ibrahim's story – we have changed his name as a matter of respect – could have remained buried for ever on the seabed. The fact that we now know his identity, and that his parents will be able to grieve over his tragic loss, is thanks to a historic achievement in maritime technology. And the operation to recover a boat packed with migrants that sank on 19 April 2015 off the coast of Libya is also revolutionising the science of identifying disaster victims.

This was the most tragic shipwreck in the recent history of the Mediterranean, claiming at least 800 lives. And it was also the most complex recovery operation ever attempted: the fishing boat transporting the young people, aged between 10 and 30, from the poorest countries in sub-Saharan Africa, lay in open water at a depth of 370

## After almost three years of hard work, it may be possible to identify 80 of the victims.

metres. Hundreds of people – naval personnel, forensics experts, firefighters and volunteers – have been involved for almost three years in this arduous mission. And now we are beginning to see some results: after circulating requests for information via the consulates and International Red Cross offices of dozens of countries, the Office of the Commissioner for Missing Persons – the Italian authority that coordinates investigations concerning nameless victims – has received the details of 156 missing migrants, supplied by families living in Africa, Asia and Europe.

**THE CHALLENGE.** «There is a good chance that we shall be able to identify 80 of them», the outgoing Commissioner, Vittorio Piscitelli told *Focus*. «And in the case of six of them – five young people from Mali and one from Côte d'Ivoire – we have an almost perfect match». How has this been achieved? The opera-

tion has been an unprecedented challenge, from a technical/scientific and human point of view. According to Rear-Admiral Paolo Pezzuti, commander of Comsubin, the Navy diver and special forces unit that has coordinated the operation: «The wreck had settled on the seabed in the Strait of Sicily, 143 km from the Libyan coast, at a depth of 370 metres. No one had ever undertaken a recovery operation of this kind». In 1997, it is true, an Albanian launch was raised from a depth of 800 metres in the Strait of Otranto: «But on this occasion we had to recover a wreck in open water, where the weather conditions are often hostile. And rather than transport it 74 km to the nearest harbour (Brindisi), we had to make for Augusta (Siracusa): a distance of 365 km».

To further complicate matters, the wreck weighed 240 tonnes, as compared with 35 for the Albanian launch. Moreover, the fishing boat was embedded in the mud, so

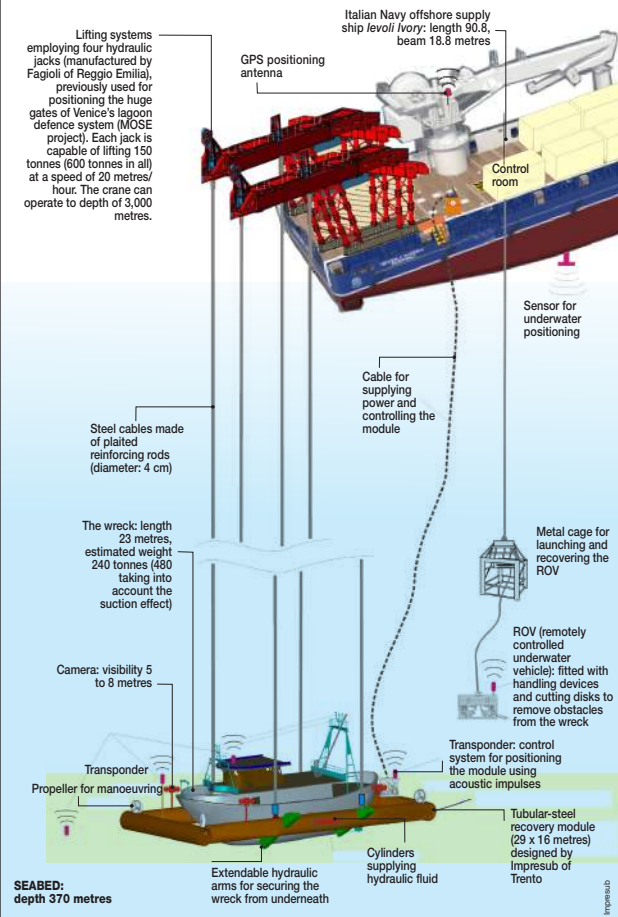
the load to be raised was in fact 480 tonnes because of the suction effect drawing it to the seabed. It was like lifting a 12-coach railway train to the height of the Empire State Building. «We entrusted this mission» Pezzuti told us «to Impresub, the same company as had recovered the Albanian launch».

**DUMBSTRUCK.** While a remote-controlled vehicle belonging to the Italian Navy was beginning to recover the migrants' bodies, Impresub produced a digital reconstruction of the wreck, using an underwater robot (ROV) equipped with laser sensors to carry out a 3D survey. They then designed a made-to-measure recovery module to support and lift the wreck (see drawing on left): a steel rectangle a third the size of a football pitch, fitted with propellers for manoeuvring, sensors and cameras for the largest ROV ever created. And to lower it to the seabed and secure the fishing boat, they used one of the cranes deployed to lay the huge underwater gates of Venice's lagoon defences (MOSE project). The recovery mission began on 19 April 2016, one year after the sinking: «We had to work within tight limits», explains Captain Giampaolo Trucco. «We could only operate in grade 2 conditions or less (waves up to 50 cm), and we needed five consecutive days of good weather to complete ▶

## AN OPERATION THAT TOOK MORE THAN A YEAR

**THREE PHASES.** The recovery of the sunken fishing boat was a 3-phase operation:

- 1) May 2015: an Italian Navy minesweeper, using an autonomous underwater vehicle (AUV), finds the wreck.
- 2) October – December 2015: A naval Remotely Operated Underwater Vehicle (ROV), using its mechanical arms, recovers 169 bodies from the seabed. The company responsible for the operation, Impresub, designs a module for raising the wreck.
- 3) April – June 2016: the recovery operation begins. The offshore supply ship *Ivory* sets sail from Ravenna, escorted by a flotilla of naval vessels: the salvage ship *Anteo*, carrying the specialised divers; the *San Giorgio*, to ensure security in the area; the *Tremiti*, fitted with refrigeration units for the bodies; and the support ship *Alghero*. 200 people in all. On 27 June, the wreck is raised to the surface and on 30 June is brought in to the port of Augusta after a 365-km journey. Here, at the NATO base of Melilli, a team of forensics experts performs autopsies on the bodies. The operation has cost EUR 9.5 million.



#### ONGOING INVESTIGATIONS.

Remains of the victims being examined in a tent erected at the Melilli NATO base. Below and in the larger photograph: forensics expert Cristina Cattaneo examines some of the artefacts recovered from the seabed: clothing and personal effects.



Tattoos, teeth, birthmarks: all useful in reconstructing a person's identity.



**LIVES DESTROYED.** Below, some of the items found on migrants: comb, USB pen drive, dental hygiene stick, medicines, money, sim card. All catalogued with the letters "PM" for post mortem.



the operation. This was because it took the ROV 20 hours to reach the seabed, and another 20 to return to the surface. But in that area conditions change very quickly: twice we hooked on to the wreck but had to lower it back to the bottom because of sudden rough seas. They had to wait more than two months for favourable conditions. Then, on the evening of 27 June, at 22.28, the wreck broke surface. «In the stern and on deck were an undefinable number of skeletons. It was a sight that affected us profoundly: we were all struck dumb».

**A LAST EMBRACE.** On 30 June, the wreck arrived at the NATO base of Melilli (Siracusa), where the second and no less difficult part of the operation began: the autopsies to identify the victims. The fire brigade removed from the boat, refrigerated with liquid nitrogen, hundreds of corpses in pitiful condition: saponified bodies, with the parts not covered by clothing (faces and hands) gnawed to the bone by fish. Many of those trapped in the hold were holding each other in their arms. How could their identities possibly be established? The currents had scattered the bodies over an area of 2 km<sup>2</sup>, often mixing

their remains, which filled 450 body bags. All were examined by a team of volunteer forensics experts, coordinated by Cristina Cattaneo of the Milan-based University Laboratory of Forensic Anthropology and Dentistry (Labanof). «Those nights», Cattaneo tells us, «I dreamed of walking along a path and finding other bones on the ground; I was afraid I had lost some». But why so much effort to be able to name these victims? The recovery operation was decided on by the then prime minister, Matteo Renzi, as a wake-up call to the EU authorities to take political measures to stem the flow of migrants. But the operation also had an important humanitarian purpose: to provide answers for the living. «Many people think that no one is searching for those unfortunates, but they are wrong», explains Cattaneo in her book *I diritti annegati (Drowned rights, pub. Angeli)*. «A nameless body is unfinished business. The loss of a family member leaves their relatives in a kind of limbo, their suffering unresolved. And it leaves people unable to get on with their lives: widows who cannot remarry or inherit their spouse's property, or children who cannot be adopted by other relatives. So, identifying migrants who die trying to reach Europe

is an act of respect for their dignity. After all, no one is scandalised when people and resources are mobilised to identify the victims of a plane crash or an earthquake». Identifying the victims of this particular shipwreck, though, was very difficult. Only 70 identity documents were found on the seabed: many migrants travel without them, so they are not obliged to apply for asylum in the first country they come to. Then there was the terrible state of the bodies after twelve months under water. And the remoteness of the family members from whom confirmation was needed.

**UNIQUE SMILES.** «To identify a victim, you have to compare the post-mortem data (the person's physical appearance, DNA, fingerprints, teeth) with ante-mortem information: photographs, genetic samples, dental records», explains Cattaneo. «But in the case of migrants, no such data exists: their relatives are too far away to provide DNA, their fingerprints are not kept in European databases, and they don't have dental records. So we have to focus on secondary data: we photograph the bodies in search of distinguishing features, such as birthmarks, tattoos or scars. Their configuration, when compared with

an ante-mortem photo of the deceased is a sure means of recognition». This method was used for the first 169 bodies recovered from the wreck, those in best condition. For the others, mere skeletons or totally unrecognisable, the Lab adopted a different approach: they performed 3D scans of the skulls, which could be superimposed, using computer technology, on the photographs of possible victims sent by relatives. «If the two images match, we get the relatives to send us a sample of DNA (e.g. on a toothbrush) to compare with the DNA of the victim, to see if they correspond. But when the smile of a deceased person is visible in a photograph, and the profile of his teeth

matches that of a skull we have scanned, the identification is unambiguous: dental profiles are unique».

**A POCKETFUL OF EARTH.** This is why the medical experts have not only taken samples of DNA, photographed the bodies and taken fingerprints, but have also catalogued the personal items recovered: wallets, T-shirts, USB pen drives. Some of the victims had concealed in their clothing a plastic bag containing a handful of their native soil: a souvenir of a one-way journey. «You can't perform these investigations without feeling compassion», says Cattaneo.

The experts are now keen to extend this methodology to all persons lost in the Mediterranean. «We are faced here with a tragedy that defines our day and age», says former Commissioner Piscitelli. «And identifying the victims is an act of respect for their dignity and for their surviving relatives. Existing legislation, however, does not prescribe autopsies and DNA sampling of all dead migrants: the magistrates generally focus on the people-traffickers and how the survivors should be dealt with. I have therefore officially asked the Italian judiciary to ensure that DNA samples of

shipwreck victims are taken in all cases and entered in the Italian Lost Persons database, which is managed by the police. But this is just a first step: the database is available only to the security forces and only general parameters are included. Meanwhile our office, with a staff of seven, has to manage 15,000 cases every year. More resources are needed for this operation: data on victims needs to be gathered by the Mediterranean countries and managed by an international authority. But the EU has turned a deaf ear».

In the meanwhile, the Mediterranean continues to swallow up victims each and every day. Many will remain nameless and their families will never know what became of them. As may well happen in the case of young Ibrahim. **G**

**Vito Tartamella**  
(translated by Simon Knight)

20,000

The number of migrants lost in the Mediterranean since 2000. At least 65% of them have not yet been identified. (IMO estimate).