Newest results of LUSITANIA research

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According to American researcher Michael Poirier, if the TITANIC does not sink, everyone is now talking about the LUSITANIA. The same drama, but an impact shaping the history of humanity as a whole: the tragedy of a ship sunk by a German submarine attack in the First World War contributed to the entry of the United States into the war on the side of the Entente, thus deciding the result of the world war. The LUSITANIA is one of the most famous shipwrecks in history. The phase of its exploration, which is currently taking place with Hungarian participation, began in 2022 and continued this year. In the final part of our series of articles, we report to those interested about the latest results of the research.

What the shipwreck tells about - the results of the 2023 expedition

In diving circles, wrecks of the LUSITANIA is considered to be the Mount Everest of technical (mixed-gas using) dives: on the one hand, the physical difficulties of approaching and researching the wreck (strong currents, a depth of around 90 m, visibility of only 3-8 meters), but even more so the history-shaping effect of the tragedy of the ship and its passengers, and because of the unanswered questions, conspiracy theories and political intrigue related to the events.

Fig. 1.: *Drifting in the dark. The jellyfish clinging to the stem of the ship shows the power of the currents (photo: Patrick Valkenborghs).*

The first stage of the on-site research of the wrecks - the identification of the possibility of penetration into boiler room No. 1 adjacent to the forward (cross or reserve) coal bunker affected by the torpedo hit and the first documented penetration in the history of the wrecks - was carried out in 2022, and this year the work started last year we could continue.

From her sinking on May 7, 1915 to July 14, 2022, 14 diving expeditions visited the wreck of the LUSITANIA, 9 of them in the 20 years between 2000-2022, while only 5 expeditions visited the wreck in the 85 years between 1915-2000 . This temporal disproportionality of the research activity in itself indicates a glaring contradiction: with the development of diving technologies, it is possible to dive more and more safely to great depths and work there, but by the time these technologies became widely available, the wreck was also in a worse and worse condition. While she was in the best condition and most conclusions could be drawn based on her condition regarding the reasons and circumstances of her sinking, it was not possible to approach her (or, if it was,

only with very limited effectiveness due to the rudimentary technology of the time), but now - that a range of equipment is already available to ensure extensive and thorough imaging and safe diving - the disintegration of the wreck has also reached such an advanced state that it can give researchers less and less information about the original circumstances of the sinking, mostly only about the process of its final destruction.

After the first attempts of the 1930s, the systematic research of the wreck, which began only in the 1960s, almost exclusively enabled detection that raised more questions than it answered. There were many inaccuracies and only very few tangible results, so there was too much room for estimation and conclusion, which, nevertheless, undoubtedly provided further inspiration for the determined continuation of the research. A large, sufficiently detailed picture covering the entire wreck was compiled for the first time in the mid-1990s. Even then, the state of the wreck, based on the pictures recorded, was shocking. Everyone expected something different, so what they saw caused general shock. It became clear that the shipwrecks are not time capsules preserving the conditions at the time of the sinking forever frozen in time, but have their own evolution, and this process ends in complete disintegration. The race against time began: twice as many expeditions took place in a quarter of the time.

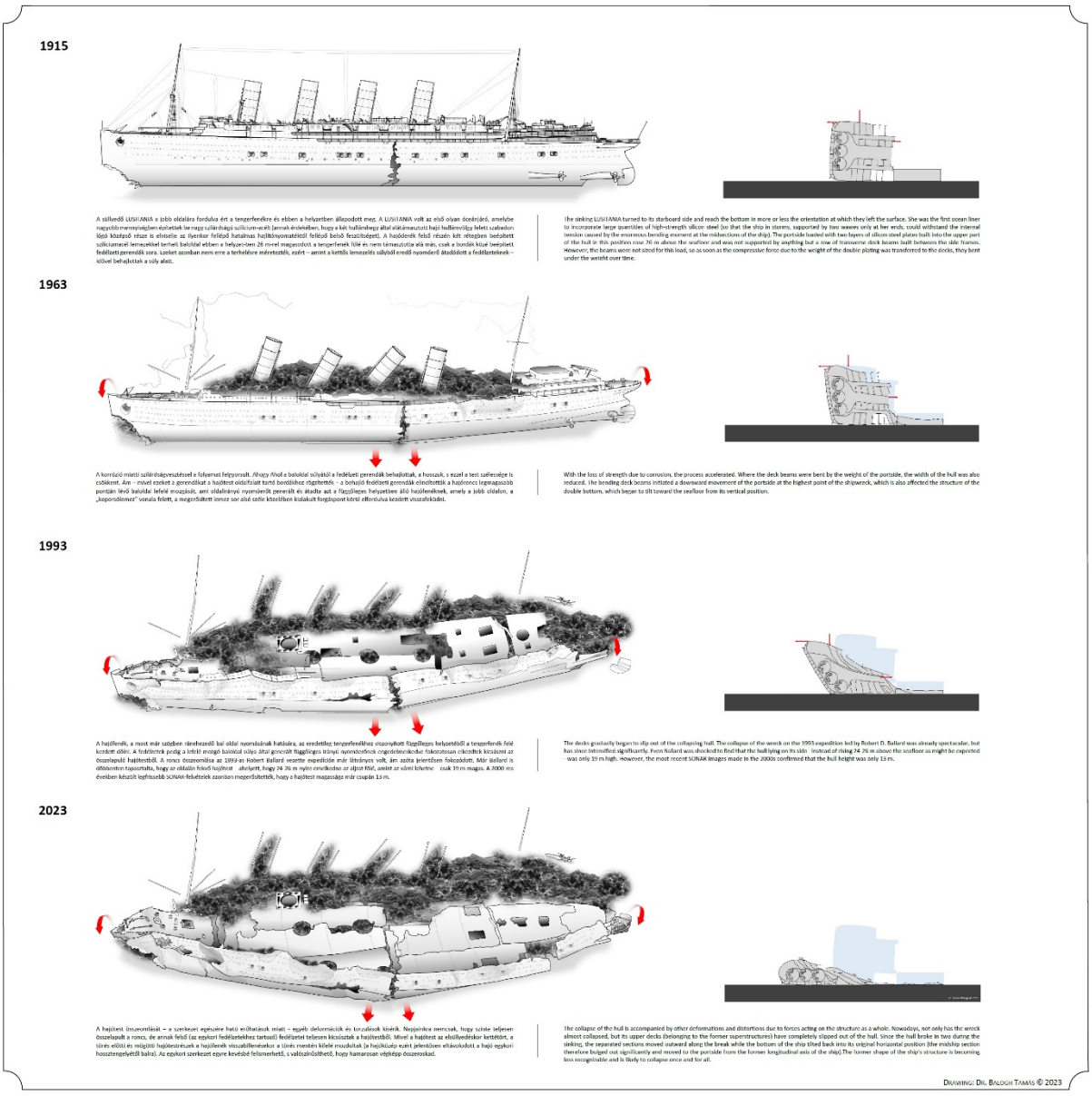


Fig. 2.: *Toward final destruction. The change in the image of the LUSITANIA wreck between 1963-2023 in side and top view.*

The ship was lying on her starboard side in the state at the time of the sinking, she was broken in two in the middle and the bow was also damaged (both damages were caused by the same thing: the sinking hull hit the shallow seabed).

However, as the corrosion progressed, the sufficient strength was lost, so the structure could no longer keep its original shape and obeyed the compressive force resulting from her own weight and the kinetic energy of the currents, and at first only slightly, but eventually deformed more and more. First the funnels and masts fell, then the elements of the superstructure that originally occupied the highest part of the ship, the deckhouses on the boat deck and the promenade decks collapsed.

In the meantime, the hull as a whole slowly moved to the portside and its height also decreased, as the weight of the original portside with reinforced (therefore heavier) plates at the highest point of the wreck was transferred to the deck beams in the hull, which were not designed to withstand this weight.

As the deck beams buckled, the compressive force from the weight of the heavy port side was applied to the rigid structure of the double hull, which buckled out more and more until, having only been able to withstand the one-sided pressure for a while, it finally broke (at the junction with the starboard side of the hull), and fell to the seabed, dragging the portside attached to it with itself, so that the height of the shipwreck (the width of the original ship) was reduced by half - from 26 to 13 m.

Meanwhile, as the continuity of the ship's keel was broken by the large break amidships, the elements of the increasingly deformed structure moved outward along the break (thereby reducing the overall length of the wreck, but increasing its width). In the following decades, these two movements (collapsing and rotation) accelerated, and the structural distortion caused by them became larger and larger.

Due to the movement of the ship's hull to the port, the decks, which were originally in a position parallel to the water level, but after arriving at the seabed following the sinking, they were turned into a vertical position, approached again the horizontal position more and more, and slipped out of the ship's hull moving from the port to the right when the superstructures crumbled, so that nothing remained in place for hold the decks.

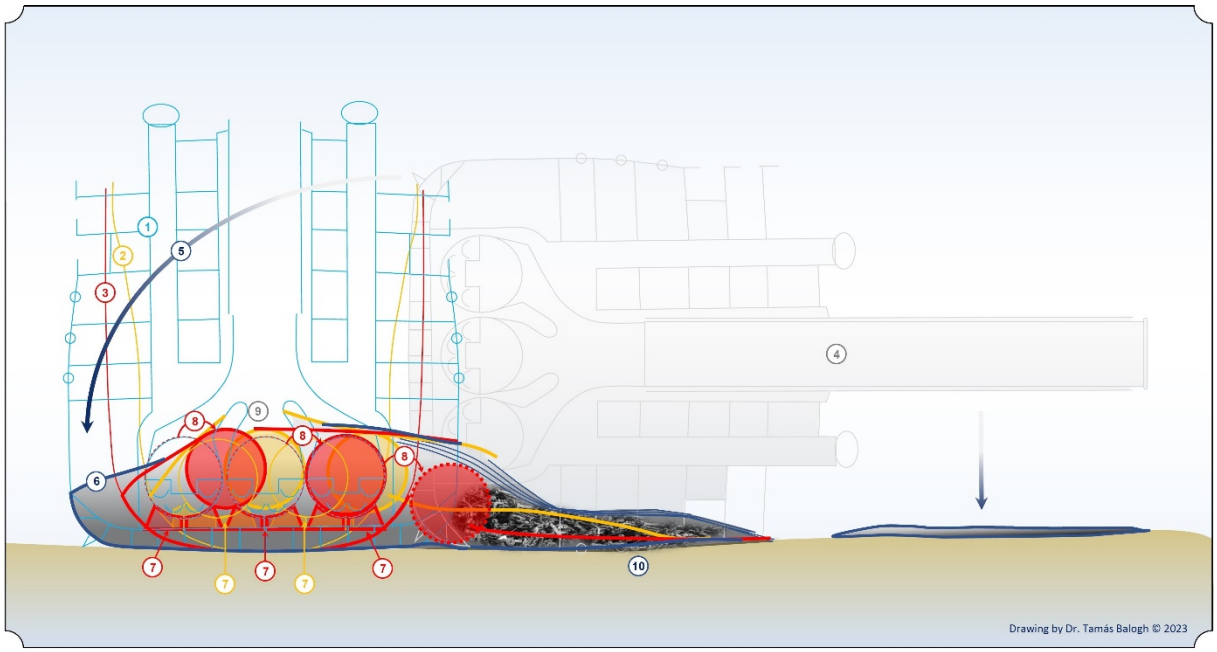
The entire bow section, from the place of the torpedo hit forward to the bow, was broken off, but remained connected to the rest of the hull on the portside. As a result, the hull, which was still moving to the port, dragged the portside of the broken bow with itself, and since there was nothing stopping it from the starboard side, the broken bow part turned to the port, at the same time - obeying the weight of the heavy machinery and parts (anchor-winches and -chains) placed on the bow deck - it tilted backwards, as the structural elements supporting it up until then corroded more and more along the break (from the back), which is why the stem rose.

The entire hull-segment between the broken bow section and the the engine room (which was a particularly strong structure, in order to withstand the vibrational load, so broken down in one piece) - the area of the boiler rooms - collapsed as soon as the boilers also moved from their original location (currently the entire original portside of the ship is held by the boilers).

In the following decades, the material that makes up the ship's hull will crumble (steel shell plates has already thinned and weakened so much that it cannot even bear the weight of the frames of bronze portholes, they fall one by one from the plates that make up the side of the ship, which could even be broken with bare hands).

At the same time, with the development of underwater imaging systems and the expansion of the availability of the necessary technology, the number of expeditions to the wrecks of the LUSITANIA is constantly increasing. Thanks to this, the image of the remains of the shipwreck is becoming more and more accurate, which is a strange paradox, since the wreck is in increasingly worse condition, so basically by the time we have the technology necessary to capture it completely (and a photo-mosaic showing the entire ship, which is made for example by the process of photogrammetry and 3D modelling), by that time there is a good chance that it will completely collapse and every piece of its researchable past will be lost.

After this will happen, you can only concentrate on the recovery of smaller and larger objects found on the wreck site, not on the reconstruction of the sinking and collapse process (scientific research). Therefore, it is extremely important to create the most detailed picture of the largest possible part of the wreck, if possible, the whole of it. In this way, the possibility of research remains even after the wreck has already collapsed.



1. A LUSITANIA keresztmetszete a 108. bordán. / Section №. 4. boiler room at frame №. 108 (looking forward).
2. A LUSITANIA keresztmetszete a 225. bordán. / Section №. 1. boiler room at frame №. 225.
3. A LUSITANIA keresztmetszete a 213. bordán. / Section №. 1. boiler room at frame №. 213.
4. A LUSITANIA pozíciója az elsüllyedést követően. / Position of the LUSITANIA's wreck just ater the sinking.
5. A roncs visszabillenése és összeroskadása a '80-as években. / Tipping back and collapse of the wreck in '80s.
6. A roncs jelenlegi körvonala. / Present outline of the wreck.
7. Kazán-alapok az 1. kazánzázban (sárgával az első két sorban, pirossal a harmadik sorban). / Boiler-bases in №. 1. boiler room (yellow = in the first two row, red = in the third row)
8. A kazánok elmozdulása a roncs visszabillenése során. / Shift of boilers, resulted by the tipping back of the wreck.
9. Törés (bejutási pont) a baloldali lemezelésen. / Break (access point) on potside plates.
10. A süllyedéskori eredeti helyzetében maradt jobb oldal. / Starboard side, in its original post-sinking position.

Fig. 3.: *The fate of the sunken ship was already realized by one of the survivors of the disaster, the third officer Albert Bestic, in the May 22, 1922 edition of the "Washington Times", noting that the hull "was probably split in two by the huge impact with which the bow slammed into the bottom. In addition, the engines must have been torn off and the boilers must have fallen forward." American diver John Light, who researched the wrecks between 1960 and 1963, confirmed these assumptions. As can be seen in the 2nd picture, the wreck of the LUSITANIA originally turned to the starboard side of the ship's hull and hit the seabed broken into two pieces. The break was caused by the shallow seabed, which, as it sank, the force of the impact crumpled the bow and split the ship in two in the middle, which, after sinking, tipped over on its starboard side. At some point in the 1980s, the bottom of the ship, standing vertically in this position, largely tilted back to its original, horizontal position, dragging the portside of the ship's hull, which had been high up until then, with it. On the side of the wreck opposite the ship's keel, the decks collapsed and the debris slid down to the seabed.*

Although the Irish seabed survey program carried out several thorough surveys of the wreck in the early 2000s, which became more and more spectacular with the development of underwater imaging equipment, the most outstanding significance is the initiative that in 2017 aimed at a complee photo-grammetric survey. However, until this goal can be realized, such traditional diving expeditions are the only reliable source of expanding knowledge about the history and present of LUSITANIA.
The key role of these expeditions play by the technical divers who, based on their knowledge and ex-perience, personally carry out the trying task of collecting information on the site. The significance of the LUSITANIA expeditions of July 7-14, 2022 and July 14-20, 2023 with Hungarian participation was expressed most eloquently by the most experienced, senior member of these researches, the Belgian Stef Teuwen - the leader of this year's expedition: "We are members of a lucky generation. Those who came before us did not yet have the technology to explore these wrecks, and those who come after us will not have wrecks to explore."

Yet we didn't just document the annihilation. It was poignant to experience that the ship still has something to say to researchers about what happened on May 7, 1915, even in its current, severely damaged state. In this sense, it became possible to experience, without exaggeration, that the ship is still "alive", therefore all members of the expedition worked with doubled effort to deliver their message to the world at the right time, while the ship was still alive. Here it is.

Although we had already been in Kinsale for three days, the stormy weather did not allow us to venture out to sea. The ship would have been seaworthy enough, but visibility on the wreck was reduced to zero in the sea sediment stirred up by the storm waves, so there would have been no point in dive. The first time could therefore only take place on Sunday, July 16, 2023. Our ship, the SEAHUNTER, ran out of the sheltered bay of Kinsale early in the morning, quite before sunrise, to take advantage of the nighttime lull to get over the wreck before the wind picked up again. There were 5 Belgian, 3 Irish and 1 Belgian-Irish divers (with dual citizenship) and 2 Hungarian researchers on board. While the intensifying light of the rising sun slowly began to shine first golden and then blinding white on the waves of the Atlantic Ocean, we thought about how exceptional the opportunity we can now live for the second time and how honored we are by this opportunity.

Fig. 4: *Golden Age. Sunrise on the Atlantic Ocean, in front of Kinsale (photo: Dr. Tamás Balogh).*

On the one hand, because one of the greatest rarities for a Hungarian coming from the continental Carpathian Basin, which is cut off from the world seas on all sides, is to be able to take part in an international diving expedition to the remains of a famous ocean liner together with divers from the seafaring nations of the world, contributing to their success by providing historical and technical knowledge, and it is a completely unique case that two Hungarian researchers can have the opportunity to do this at the same time. On the other hand, because all of this could be realized in the ideal time-window: a moment in time when the rapid development of the technology necessary to carry out underwater activities was able to provide the necessary tools for research even before the remains of the sunken ship would be disappeared for good, due to natural deterioration. This is the golden age of wreck research. We all felt this deeply, even when we were only on board the SEAHUNTER research ship, tumbling through the waves, making our way from Kinsale to the resting place of the wreck, but especially when, at the end of the expedition week, when we realised that we became able to achieve results that are fundamentally new in the reconstruction of the ship's sinking process.

Fig. 5: *Diver-fate. Clinging from dawn to late afternoon on the deck, jumping into the waves and climbing back from there to the ship, swaying on the waves above the wreck with the research boat, and sleeping, due to the morning-insomnia and exhaustion in the afternoon, during the almost two-hour journey of the research ship between the shore and the wreck (photos: Dr. Tamás Balogh and Péter Könczöl).*

The divers explored the inside parts of the wreck and the outside of her portside between the stem and the boiler rooms, following three objectives:

1) in order to penetrate the first boiler room and to document in detail the condition of the 5 boilers detected there in 2022 and the 2 additional boilers not yet detected;
2) to document the possible remains of the forward bulkhead and bulkhead door of the reserve (cross) coal bunker in front of the first boiler room, as well as the side wall on the starboard;
3) for the purpose of detailed documentation of the area situated horizontally between the stem and the first boiler room, and vertically between the promenade deck and the seafoor.

The above goals were achieved. Although the weather was not as kind as last year, for more than half of the duration of the expedition - 4 days out of 7 - it was still suitable for meaningful work (although the visibility on the wreck changed periodically). Thanks to this, the expedition was successful and fruitful. What is more! This year's expedition was the one that carried out the most extensive systematic research in the interior of the ship to date (no one has ever examined such a large area inside the ship). These spaces will eventually disappear as the condition of the wreck worsens, so the facts learned by this expedition are of outstanding importance (since after the destruction of the interior spaces, it is no longer possible to make further observations about them). As a result, the following conclusions can be made:

I.) Regarding the boiler rooms:

Special thanks go to Stewart Andrews for the internal research in the boiler rooms, who carried out the task with unprecedented courage, relying on his unique experience and practice.

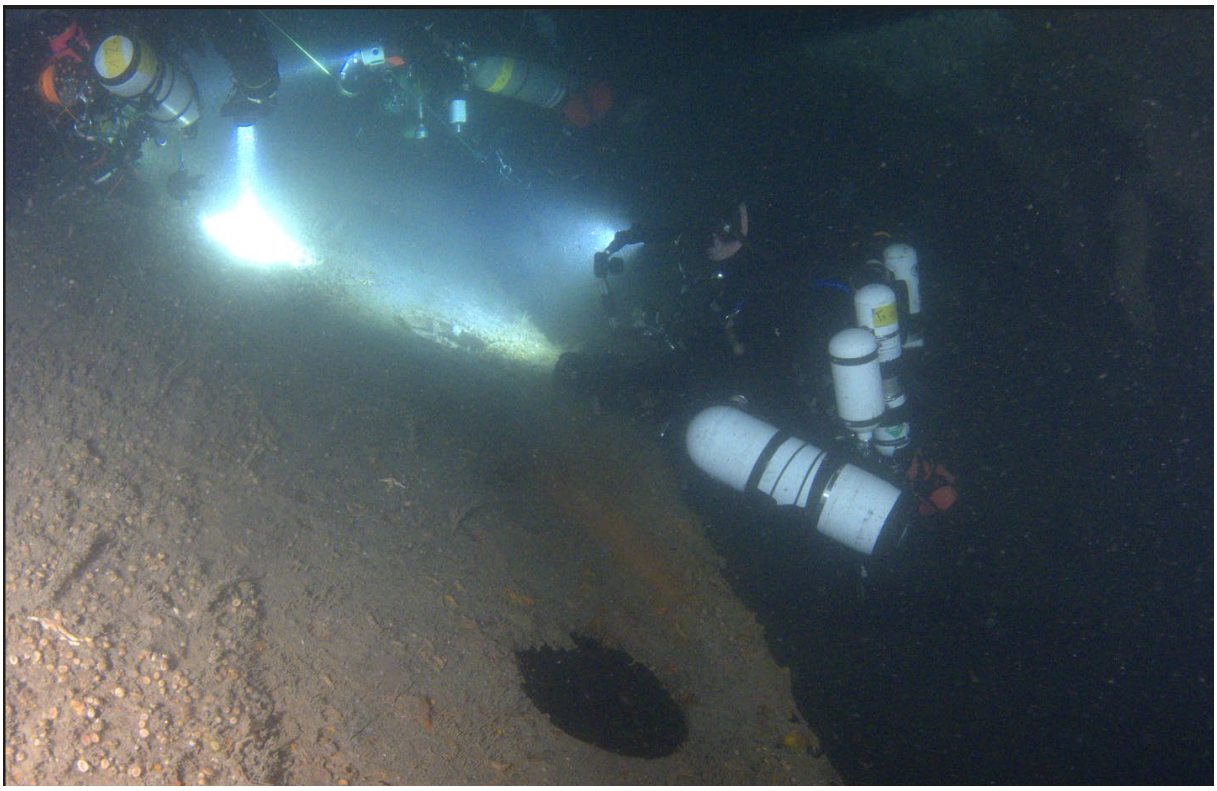
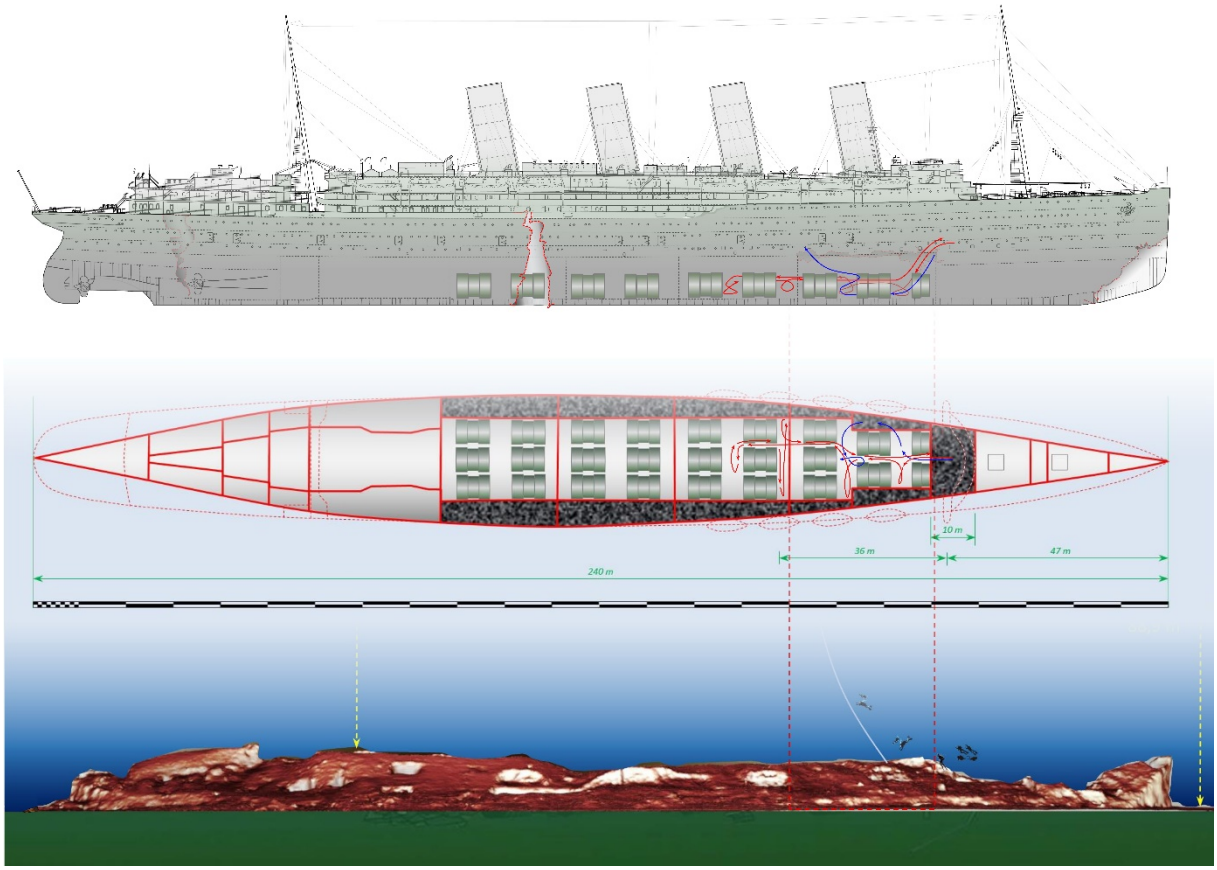


Fig. 6: *On the portside of the hull, in the original underwater part, a fracture developed between the plates attached to the reinforced frame segments and the conventional parts above the waterline. The plates moved apart horizontally along the fracture and moved vertically relative to each other. This allows the divers to enter the boiler room through the break in the portside plating that had been fall over the boiler room No. 1. Stewart Andrews is pictured doing just that (photo: Pat Coughlan).*



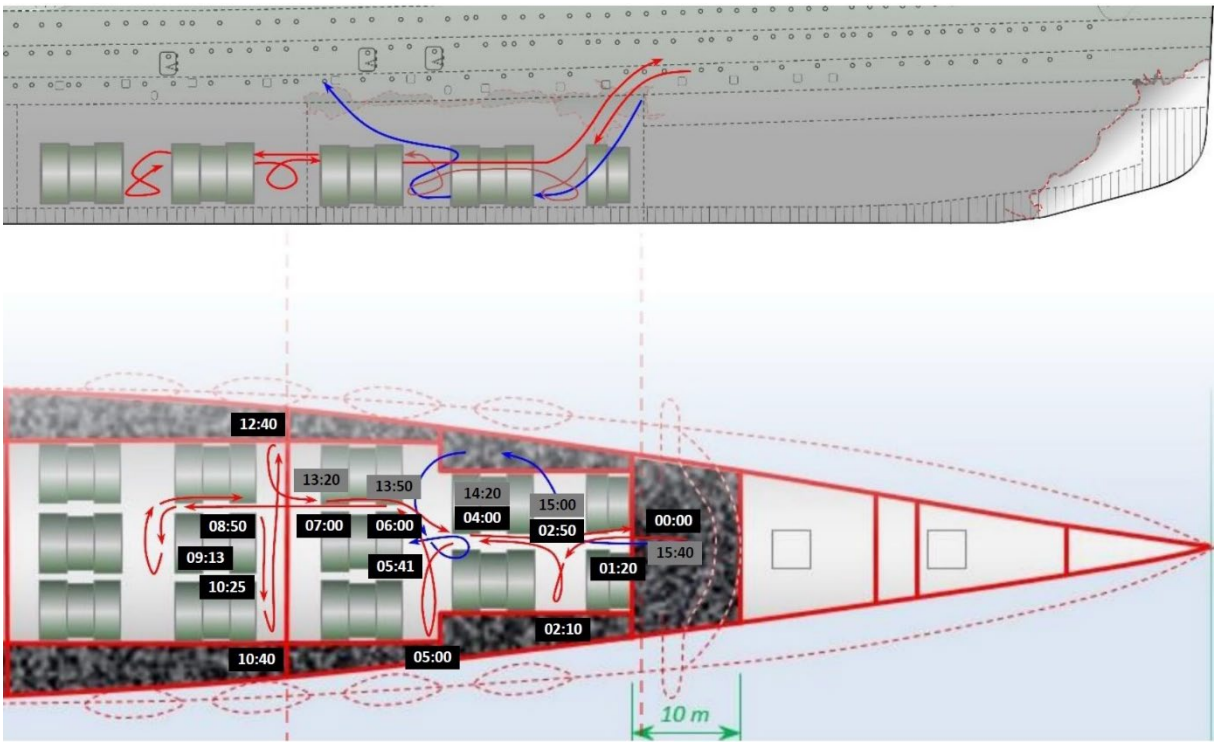


Fig. 7: *Internal exploration of boiler rooms No. 1 and 2 in 2022 (blue) and 2023 (red).*

The expedition found a total of four watertight doors in the first two boiler rooms visited and in the reserve (cross) coal bunker (for the very first time in the history of the wrecks' research). Two of these belonged to coal bunkers and two to passageways (from the boiler room No 1. to the reserve coal bunker and from the reserve coal bunker to the forward cargo hold). The expedition was the first who clarified that the doors of the coal bunkers connected to the boiler rooms were open (we did not see all of them, but the ones we saw, were all open). On the other hand, the doors for passageways between the reserve coal bunker and the cargo hold were closed (the door bet-ween the boiler room and the reserve coal bunker – that was used as a coal bunker door on the last voyage – was open). This is reasonable if we take into account that even one boiler of the ship con-sumed 24 kg of coal per minute (3 kg per furnace). A wheelbarrow approx. transports 50-60 kg of coal in one round. So, depending on how many furnaces served by a certain door of the given coal bunker (6, 8 or 10), the trimmers had to return with their wheelbarrows once a minute, but at a maximum of every one minute and a half minutes. Lowering the bulkhead doors between filling and emptying of the wheelbarrows was practically pointless - even impossible. Therefore, in order for the required amount of coal to be continuously available at the boilers, the coal bunker doors were left open, thereby speeding up the loading of coal. The 2022 and 2023 expeditions found evidence of this. All of this is important because the water breaking into boiler room No 1 could have easily entered the coal bunkers of the boiler room through the opened doors (i.e., from the inside), thus creating the 15° list to the starboard side as mentioned by the survivors (that is, it is not at all ne-cessary that the flooding of coal bunkers was only caused by one of the possibilities raised so far - a torpedo hit, a coal dust explosion, or a boiler explosion). It is much more likely that the second explosion contributed only indirectly to the ship's rapid sinking by causing a rapid and critical reduction in the amount of steam to the machinery, which had two consequences: on the one hand, the ship was no longer steerable, as the steam-driven steering engine stopped, on the other hand - and this is more important - it was no longer possible to lower the open doors of coal bunkers, which were not equipped with floats to automatically lower in response to the intruding water, so their closing depended on the functionality of the steam-powered central control system, which, in turn, stopped after the remaining amount of steam fell below the critical level in the system as a result of the second explosion. The intruding water thus quickly flooded the open coal bunkers, significantly increasing the list of the ship.

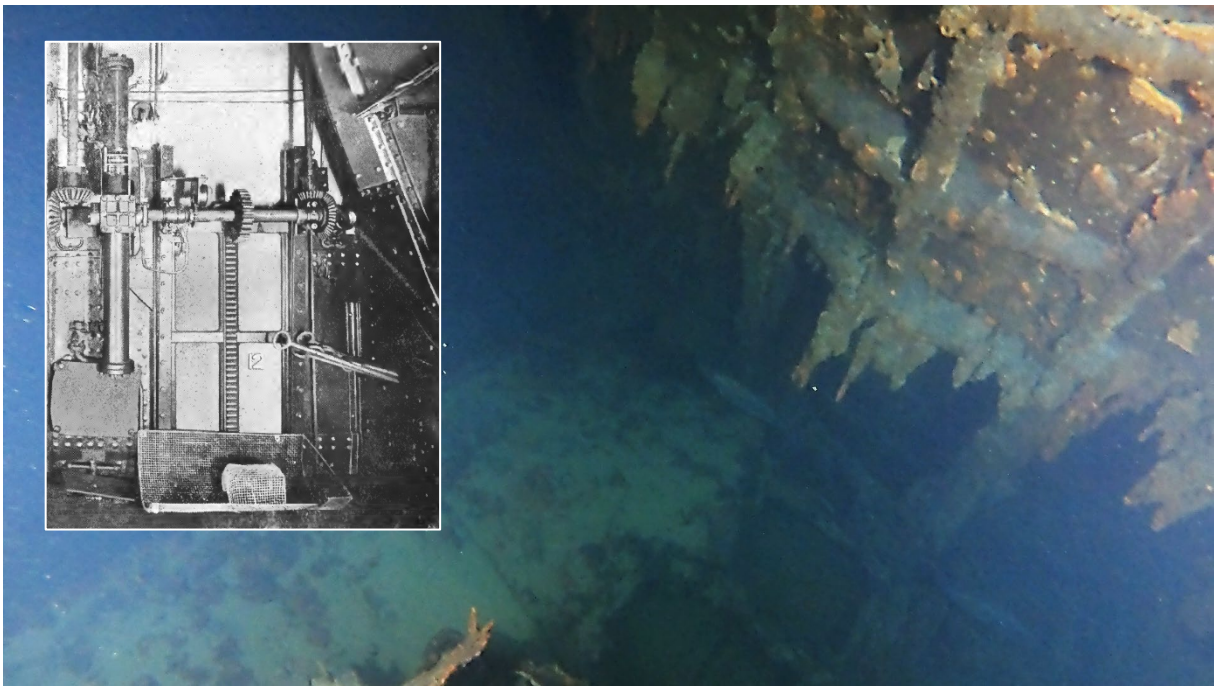


Fig. 8: *Watertight door of a coal bunker in closed situation (on the archival picture in the insert) and opened in the boiler room (on the actual underwater photo, which is shot by Stewart Andrews).*

The expedition also made important findings in connection with the position of the boilers, as it identified that the boilers had moved from their original location. When the ship sank, she capsized on her starboard side, hit the bottom and remained in this position for decades, then as a result of the natural deterioration, weakening and destruction of the wreck, the heavy double bottom of the ship - dragging the portside of the hull with itself - tilted back to the horizontal plane corresponding to the original swimming position (while the starboard side was parted lengthwise from the double bottom of the ship at the bilge keel and remained lying on the seafloor, buried under the collapsing decks that were falling on it, sliding out of the hull in an oblique plane to the right). As a result of these movements, the boilers changed their position in the following way: 1) Due to the capsizing to the starboard side that occurred during the sinking, the boilers have turned 90° to the right together with the ship's entire structure, then they detached from their foundations and moved towards the starboard side of the ship lying on the seabed (breaking through by their weight the bulkheads of starboard side coal bunkers, which had corroded in the meantime), and they fell on top of each other. 2) When the double bottom of the ship tilted back, the boilers - together with the bottom - also returned to the horizontal plane corresponding to the original swimming position, but instead of the cradles that formed their original foundations, they fell to the right of them at such a distance that the divers swimming around the boilers could clearly see the original foundation of the boilers everywhere. After the tilting of the double bottom back to the horizontal position, those boilers, which were fallen earlier close to the pivotal point of the tilting ship's bottom (i.e. close to the starboard), maintained their position, that has turned 90° to the right, while the other boilers returned to their original horizontal position.

Of the structural elements delimiting internal spaces, only the remains of the main watertight bulkheads between the boiler rooms are visible. These remains are lower parts of the bulkheads, approximately to the 1-2 m height. Original strong structural elements (vertical frames supporting the bulkheads and the lowest horizontal stiffener) are visible. However, the plates are also incomplete and strongly corroded on the remaining 1-2 m high section. In case of the bulkhead between boiler room № 1 and the cross (reserve) coal bunker in front of it, this severely deteriorated condition could be justified by the torpedo hit itself, but not in the case of the bulkhead between boiler room № 1 and № 2, of which damage shows the same characteristics as the previous one. The reason for this is probably related to the process of the hull collapse. The bulkheads played a stiffening and supporting role for a while. After arriving at the seafloor, in the wreck lay on her starboard side, the bulkheads, together with the ship, turned 90° to the right compared to their original position, and tried to maintain the portside of the hull which elevated into the highest point of the wreck. However, due to their structure and corrosion, they were only able to fulfil this task for a while (in their original position, 34 vertical frames ensured the strength of the structure of the bulkhead, while in the position turned

90° to the right, the whole weight was loaded on only 4 - originally horizontal - transversal stiffeners). However, the degradation of the hull first started (between 1915-1960) at those points where there were no watertight bulkheads built into the structure (that is, on the superstructure). In the second stage of structural damage (between the 1960s and 1980s), some side wall sections on the portside of the hull collapsed in between the bulkheads (e.g., in the turbine space, as evidenced by John Light's recordings), but the bulkheads remained standing, and they probably maintained this position until the tilting back of the double bottom of the ship occurred as described earlier. Since the resulting diagonal distortion of the hull (sometime at the turn of the 1980s and 1990s) is unthinkable without further severe damage to the bulkheads, which, by then had already suffered significant corrosion damage, their collapse can also be attributed to this period (as Robert Ballard confirmed this by the recordings of his 1993 expedition, according to which the tilting back of the ship's bottom and the accompanying collapse of the ship's hull had already occurred by then).

Fig. 9: *The collapsed remains of the bulkhead between boiler room No. 1 and 2 (which are approx. 1,0-1.5 m high), viewed from boiler room No. 2 on the starboard side of the hull (photo by Stewart Andrews). The holes visible on the wall are damage caused by corrosion.*

None of the 8 boilers documented in detail in the first two boiler rooms by the 2022 and 2023 expeditions - including all the boilers of the first two boiler rows located in boiler room No. 1 - exploded, but damage of varying extent can be seen on all of them. This damages is apparently main-ly corrosive and only to a lesser extent mechanical damage, i.e. typically the consequence of the ship's natural deterioration and, secondarily, its collapse (as the damage mostly affected the smoke boxes, i.e., the thinner, weaker structural elements built in front of the middle and upper part of the boilers, and covering the outlet section of the smoke pipes.)

II.) Regarding the cross (reserve) coal bunker:

Special thanks to Trevor Pedlow (who found the entrance to the Boiler room No 1. in 2022) for internal research of the cross (reserve) coal bunker. Former structures in boiler room No 1 - the boilers, boiler bases, stokehold plates, funnel uptakes, hanging mainten-ance walkways, etc. – they are largely found within the original boundary walls of the boiler room. Contrary of this only the rear bulkhead can be identified in the cross (reserve) coal bunker, **the contours of the bunker are less and less distinctive towards the bow**, although (as mentioned above), the bulkhead door, leading into the next room - i.e., into the forward cargo hold (which is the next space toward the bow and used to store small arms ammunition) - exists and is closed. After the collapse of the fore bulkhead of this cross (reserve) coal bunker, several pieces of the cargo from the cargo hold ended up in the coal bunker. The cross (reserve) coal bunker, especially on its starboard side, **contains an extremely large amount of debris**. A large block of coal can be seen on the floor of the coal-bunker among the debris.

III.) Regarding the port bow of the ship:

On the portside of the hull (now on the top of the wreck), there is an increasingly widening fracture: After the sinking, the ship was lying on her starboard side for a while and the bottom standing in a vertical position. Later the bottom tilted back to the plane corresponding to its original position, while the starboard side was broken off and remained in place, while the portside of the ship pulled by the tilting bottom along itself for a while, but the weakened side plates finally were torn apart along the upper edge of the double side. The plate edges separated along this rupture, moved away from each other both horizontally and vertically. The opening formed in this way is the largest above the area of boiler room No. 1, and narrows towards the bow.

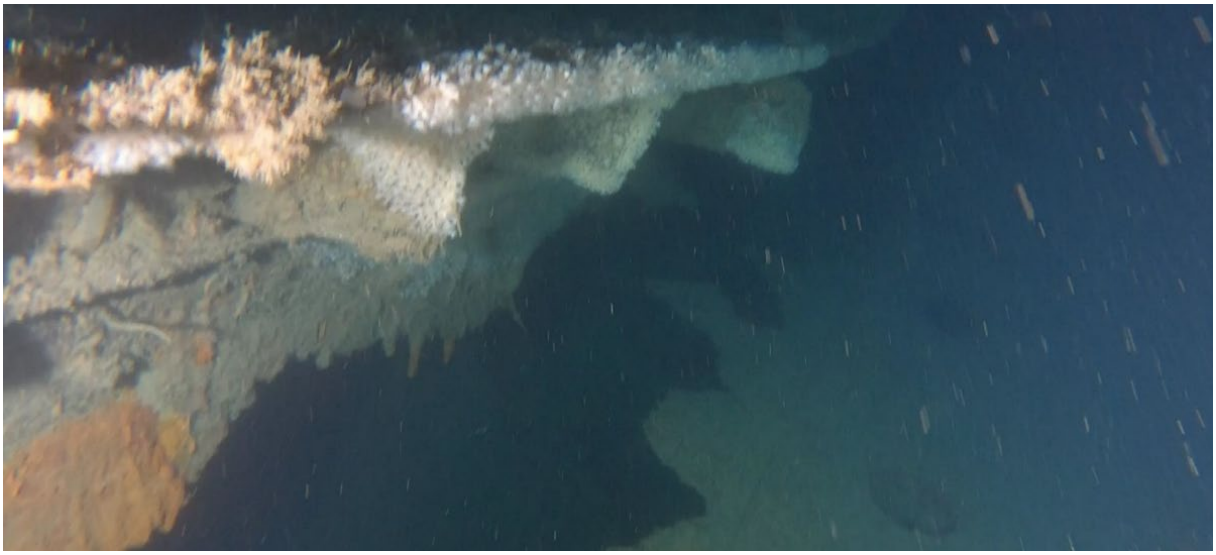


Fig. 10: *Fracture on the hull. On the left, the plates that make up the underwater part of the ships port side, and on the right, the plates that make up the part above the water (shot by Stewart Andrews).*

The bow and stern section of the ship were broken off: The movement of the midship section of the hull described above was preceded by the breaking off of the bow and stern of the ship, which had a tapered shape, and remained unsupported while lying on her starboard side. When the bottom of the ship tilted back to the horizontal position, this resulted in a slight rotation of the broken bow and stern and their tilting towards the midship section, due to pulling of the side plates still connected to the broken bow and stern on the portside. The consequence of this is the present position of the bow and stern.

The extent of the deformation of the bow part is particularly significant: It is clear that the reinforced edge of the portside of the bow deck (along which the bollards, bitts and fairleads are lined up) is now approx. located on the centerline of the full width of the hull which is collapsed below that. In other words, on the starboard side (looking under the former bow deck through the cargo hatches) and on the port side (looking through the ruptures on the former portside plates of the hull) of this reinforced edge, same spaces can be seen, namely the cargo holds, in which small arms ammunition have been transported, and the cartridges of which are scattered here now all around. The deformation associated with the collapse of the ship's hull is therefore the most significant at this point of the ship (certainly in connection with the tapering shape of the ship's bow).

Many small details can be recognized on the portside of the bow: On the portside of the broken bow section - in the place of the removed main anchor - the rust deposit of the outline of the anchor can still be seen to this day. In the vicinity of the bow (on its starboard side), within a 10 m radius of the structure, two blocks are present, which were originally an accessory to the anchor crane on the bow deck. The section of the anchor chain that was still running freely on the bow part of the promenade deck was introduced in the chain pipe in front of the anchor winches into the chain locker located several decks deeper. As a result of corrosion, the chain (hawse) pipe has now disappeared, so a section of the anchor chain, leading to the winch on the promenade deck, can be seen one level down, at the level of the shelter deck. The section of the ship's side plates bearing the ship's name can be seen near the triple fairleads, which was originally on the edge of the bow deck, on the port side, just above that plate on which the last letter 'A' of the name LUSITANIA can be clearly read.

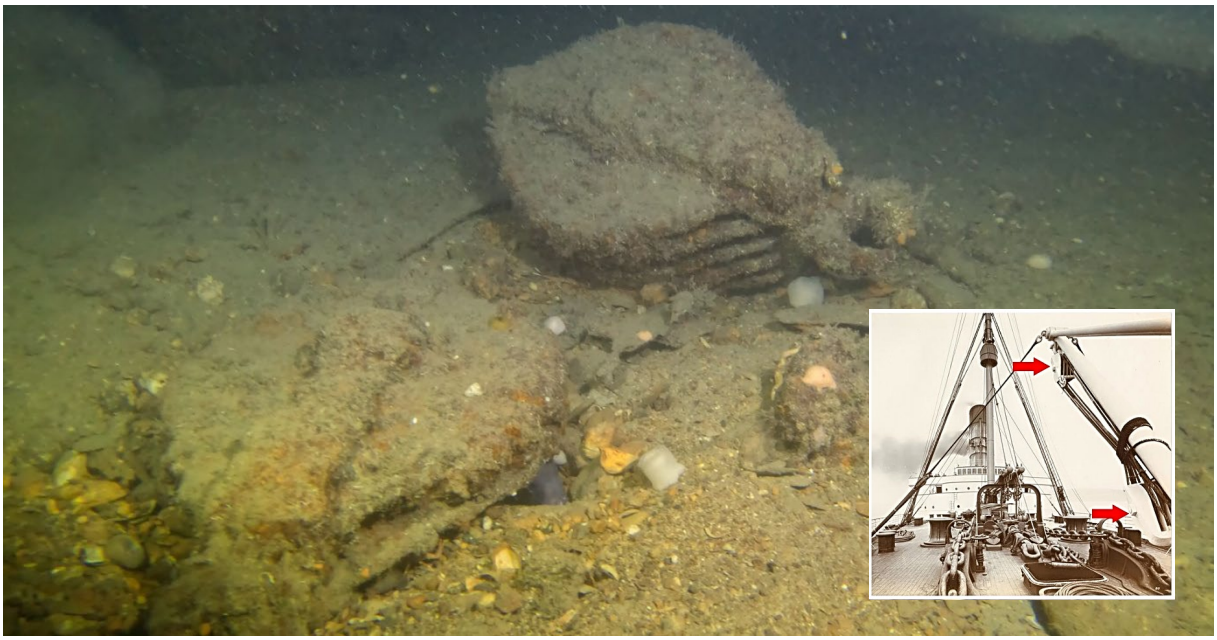


Fig. 11.: *Blocks of the anchor crane found on the seafloor near to the starboard side of the bow (photo: Patrick Valkenborghs).*

Open doors accelerated the sinking not only under water, but also above it: The divers identified the first two boarding doors on the portside plates of the bow section just in the line of the aft end of the boiler room № 1. Like those two doors identified by Robert D. Ballard in 1993 on the same deck but much further back, these two doors are also open. Since these doors could not be opened accidentally (their multiple securing prevented this), their open state clearly indicates that the crew opened them to facilitate the evacuation of passengers (trusting that through these doors would allow the passengers an easier way to enter the lifeboats which had been lowered from the boat deck in an empty state). Finally, the open doors were of no use in the rescue. However, the sinking of the ship was accelerated (similarly to the open coal-bunker doors in the boiler rooms), because as the water crossed the thresholds of these openings, it quickly started to flood the spaces above the ship's watertight deck, completely eliminating the ship's buoyancy.

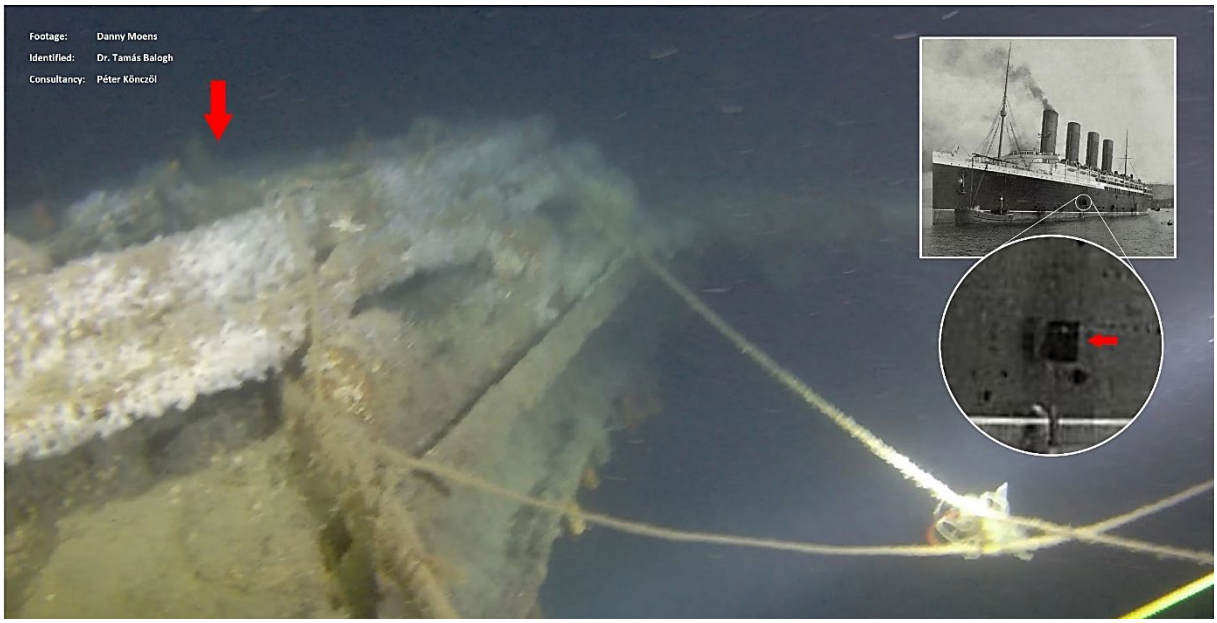


Fig. 13.: *The forward door for passengers' boarding is open on the port side of the hull (photo by Danny Moens).*

The expedition would not have been possible without the support of the Lusitania Museum & Old Head Signal Tower in Kinsale, a non-profit museum maintained by a local volunteer working group, which has owned the ship's wreck since 2020 and, and in this capacity, together with the Irish state, it authorizes the implementation of the diving expeditions planned for the wreck. The expedition expressed its members' gratitude to the museum by gifting them with a large-scale copy of the illustrative graphic made by Dr. Tamás Balogh on the basis of on-site data collected by the 2022 expedition, which shows the relationship between the once intact liner and its current wreck. Shannon Forde, the director of the museum, expressed her sincere joy over the gift, because, as she said, visitors often turn to her with the questions about the current condition of the wreck, and the museum had no relevant illustrative material up until now. However, with the drawings that have just been donated, the task of illustration will be easier in the future. Shannon especially emphasized the plasticity of the representation made with vivid colors and expressed her thanks to the expedition on behalf of the museum. We all felt that we were actually the ones being honored. Thank you for the opportunity!

Fig. 14: *Members of the expedition and the gifts for the Museum. Members of the expedition from left to right: Stef Teuwen, Danny Moens, Trevor Pedlow (squatting), Patrick Valkenborghs, Joris Stevens, Evelyn van Burm, Reinard Combrez, Guy Deno, Stewart Andrews, Tamás Balogh, Péter Könczöl. Two pictures illustrating the ship and its wreckage are available here and here.*