

INVESTIGATION REPORT No 23U-AR0075

10 August 2023

Tallinn, Tervise 20

Investigation applicant	Director of the Estonian Safety Investigation Bureau Märt Ots
Circumstances	During the preliminary assessment of M/S Estonia in the period from 19 July to 25 July 2023, a piece of metal was cut out of the edge of a hole in the starboard side of the wreck of the vessel.
Letter No	27-2/2023/3775-1
Letter	Compiled on: 27 July 2023 Arrived on: 27 July 2023
Presented for the investigation	<p>Investigation object A piece of metal cut from the edge of a hole in the hull of the wrecked ship</p> <p>Information material Submitted by the Estonian Safety Investigation Bureau: 1. video screenshots and photogrammetric drawings (27 digital files) of the wreck of M/S Estonia; 2. 3D photogrammetric model of the wreck (online).</p>
Investigation type	Metals survey
Assignment	Does the submitted metal piece show any signs of contact or collision with a metal item/object?
Experts	Forensic Expert Meelis Toomet phone 663 6718, email meelis.toomet@ekei.ee

Description of the investigation

An elongated strip-shaped piece of a metal plate was submitted for examination (Figure 1). The thickness of the plate is between 13–13.5 mm, the approximate length is 66.5 cm and the width at the widest point is 14.5 cm. The strip is rectangular in shape, with one longer straight cut edge and one shorter straight cut edge. The other longer edge shows signs of tearing.



Photo 1. Piece of metal submitted for examination, view from the curved side

Based on the information materials, the metal strip to be examined has been cut out of the edge of a hole in the ship's hull. The edge is curved towards the interior of the vessel. The cut-out

strip is curved and the paint coating has probably separated (Photo 2).



Photo 2. Curvature of the metal strip

Based on the reference material photos, the curved side of the metal strip is the outer side of the hull. The photos show the opposite edge of the torn edge of the cut-out piece, which has bent and shifted towards the interior of the vessel. Moving downwards on the hull, the torn edge outside the cut-out continues as a crack in the hull and ends at a certain distance. The thickness of the metal strip decreases near the torn edge due to stretching. The thickness of the torn edge is mostly between 9.5–11 mm (Photos 3–6), decreasing further at the sharply angled tip of the strip (Photo 6), where the material has separated into layers and a possible joint is located (Photos 7–8).



Photo 3. Torn edge of metal strip, view of hull exterior.



Photo 4. Torn edge of metal strip, view of hull exterior.



Photo 5. Torn edge of metal strip, view of hull exterior.



Photo 6. Torn edge of metal strip, view of hull exterior.



Photo 7. Torn edge of metal strip, view of hull exterior, possible joint.



Photo 8. Torn edge of metal strip, view of hull interior, possible joint.

The internal and external surfaces, as well as the torn edge of the submitted piece of metal were examined using a Leica M300 DENT stereomicroscope at various magnifications. The paint coating has likely separated, and the surface is corroded. No signs of mechanical contact with a metal object were observed and no transferred materials were found. The surface is uniformly corroded, with no deep scratches or scuff marks. Smaller possible contact marks have likely disappeared due to corrosion and the separation of the paint coating.

Investigation deliverables

No signs of contact or collision with a metal object were found on the metal piece submitted for examination.

Note: The piece of metal submitted for examination was sent for an explosives investigation (Chemistry Department of the Estonian Forensic Science Institute).

(signed digitally)

Meelis Toomet

Expert