The Independent Fact Group

Subject: Incontrovertible and final proof that the visor was detached from the ship after the sinking of MV Estonia.

Type: Analysis
By: The Independent Fact Group
www.factgroup.uk

Status: Proved final evidence – incontrovertible
Date: 2020-12-24
Version: Report-English

Methodology:

In the course of this task, we have assumed that the solution of a problem is never better than the validity of the basic assumptions. As a result, we have stipulated some methodological principles, of which the following are the most fundamental:

1. All scenarios must be considered to be true until the contrary is proved.
2. All observations, assumptions or statements on which a scenario is based must be considered false until the contrary is proved.

We have defined a number of criteria for concluding that an observation, assumption or statement may be considered to be true or false, and processes and routines for the route to be taken in clarifying an observation, assumption or statement. These criteria involve technical, empirical, statistical and/or semantic requirements which, if they are relevant must all be met if the observation, assumption or statement is to be classified as an objective fact.

The materials we have worked with are primarily the documents, audio recordings and films in the Swedish Accident Investigation Commission's Estonia archive, together with supplementary information from other public sources and, in addition documentation from the Meyer shipyard and its independent commission.

Summary

In this report the Independent Fact Group prove that substantial actions took place on the visor of MV Estonia BEFORE the visor was detached from the ship. It is impossible that those actions were performed before the sinking of MV Estonia, they were definitely done before the visor was salvaged to the surface.

It is therefore an incontrovertible fact that the visor of MV Estonia was removed with the support from divers at the seabed of the wreck after the disaster. Those actions must have been performed within the first four days after the catastrophe. The only possible perpetrators are organizations under the Swedish and Finnish authorities.

Specific findings on the visor that were visible directly after it was salvaged to the surface prove that divers manually had prepared the detachment of the visor from its normal position in front of the forward bulkhead.

All hydraulic pipes, both the flexible rubber hoses and the permanently mounted steel pipes on the hydraulic actuators have been dismantled to enable the visor to be removed from the vessel.

The findings also prove that the fundamental ground for the conclusions made by JAIC based on “the loss of the visor” as the cause of the sinking is FALSE. It was fabricated to fit the only official scenario and its causal relationship during the disaster.

In contrary <u>MV Estonia was lost at sea with the visor intact and in place.</u>

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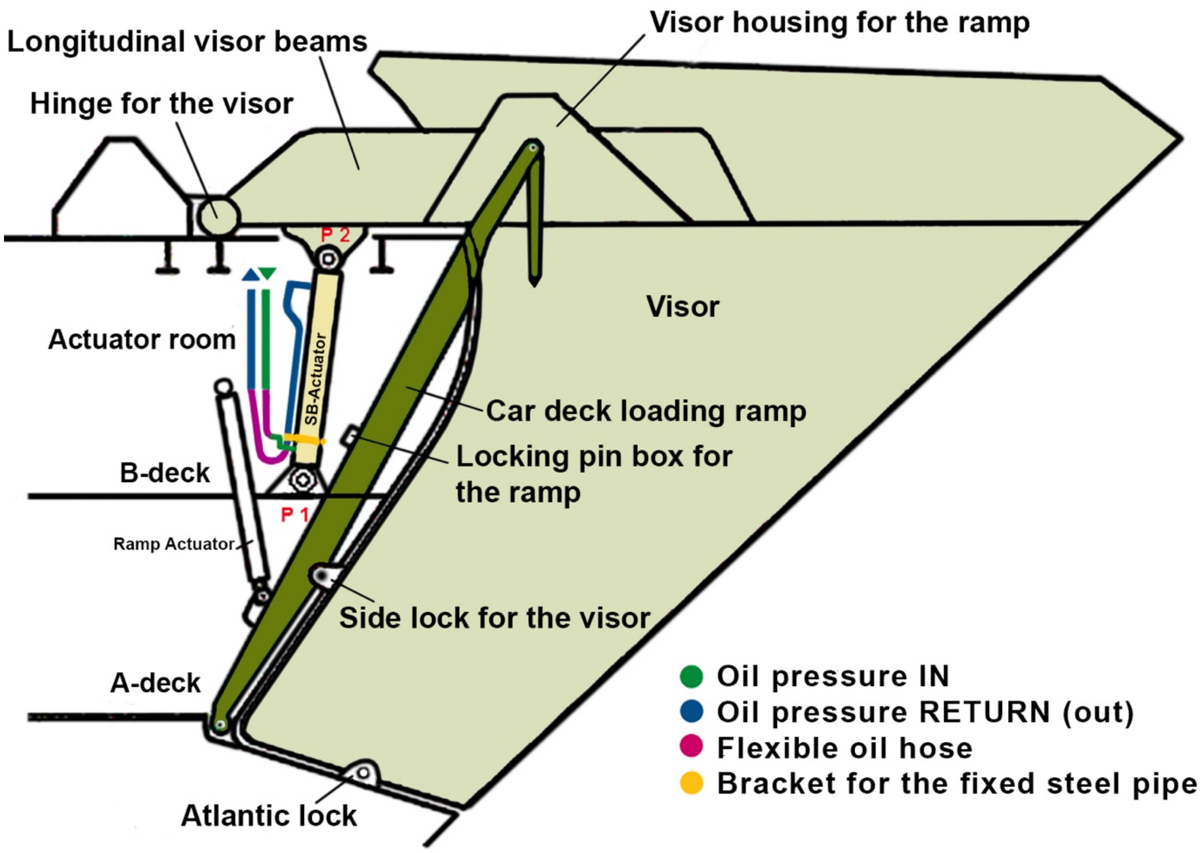
Analysis of the new incontrovertible facts.

The visor was operated (lifted and closed) by two large hydraulic actuators.

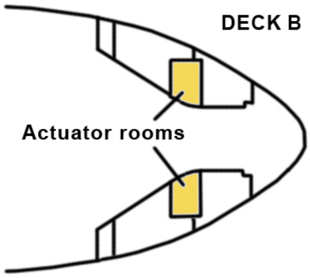
They were welded to deck B described below in picture 1 position (P 1). In the other end they were attached to the visor in the longitudinal beams, position (P 2), this at starboard and port side. The cardeck is deck A.

The oil pressure needed for the actuator was provided by one inlet and one return hose. The hoses were fixed in the actuator room to the side wall (bulkhead) and with two flexible high pressure rubber hoses to the actuator close to deck B. The inlet was attached to a 90 degree attachment pipe made in steel with its attachment sealing nut. The return hose was attached to the same kind of attachment sealing nut but on a steel pipe that was fixed in its prolonging with a steel bracket that enclosed the actuator.



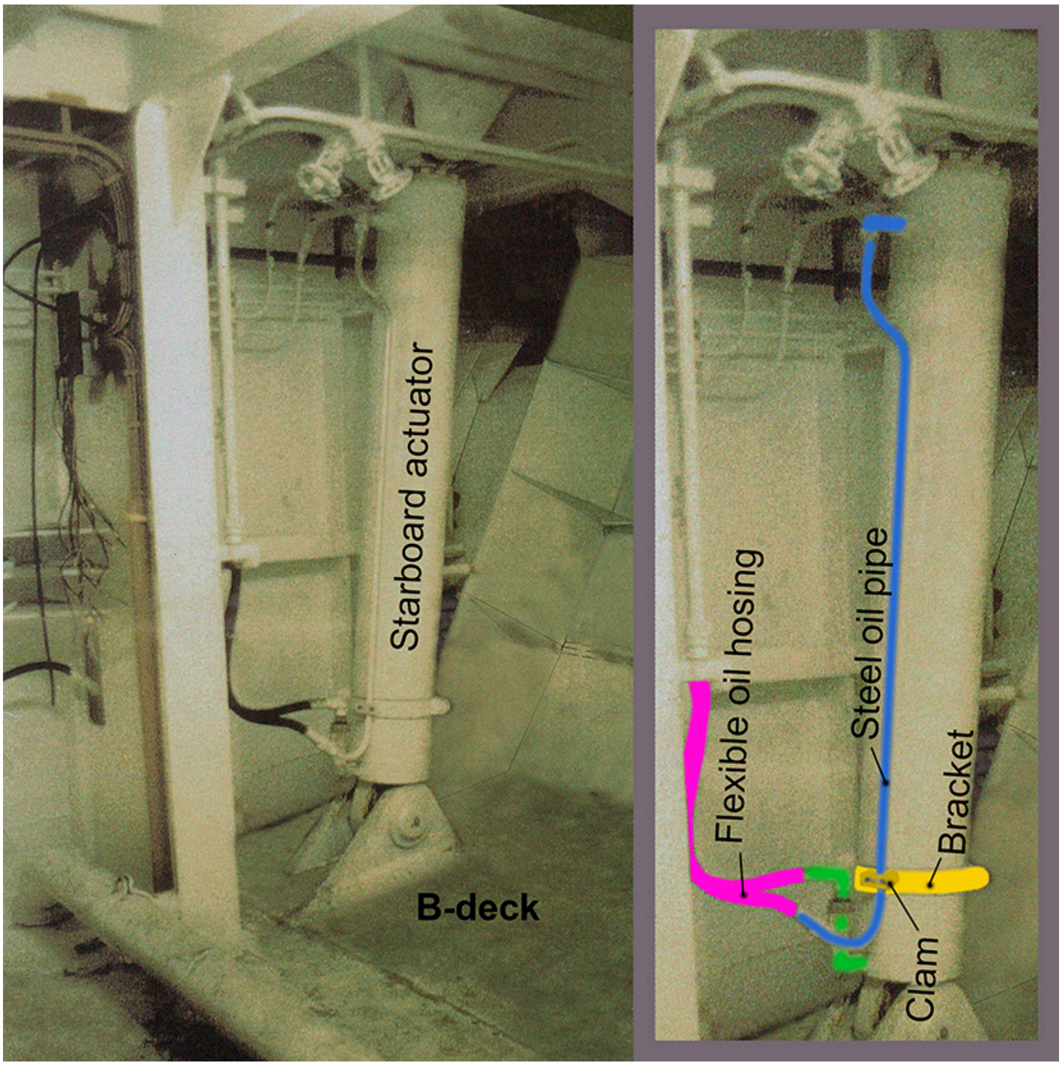
Picture 1. *The approximate installation of the oil pressure hoses, pipes and the bracket for the steel pipe.*

Each actuator was placed for operation in the so called actuator room, one on each side behind the forward bulkhead.



Picture 2. *The location of the actuator rooms.*

The arrangement was made to enable the two flexible hoses to be attached in the lower end of the actuator even though the outlet of the return oil was in the upper end of the actuator. From the upper end on the actuator a fixed steel pipe provided the return oil to flow in the system. In picture 3 and 4 below the detailed construction is shown.

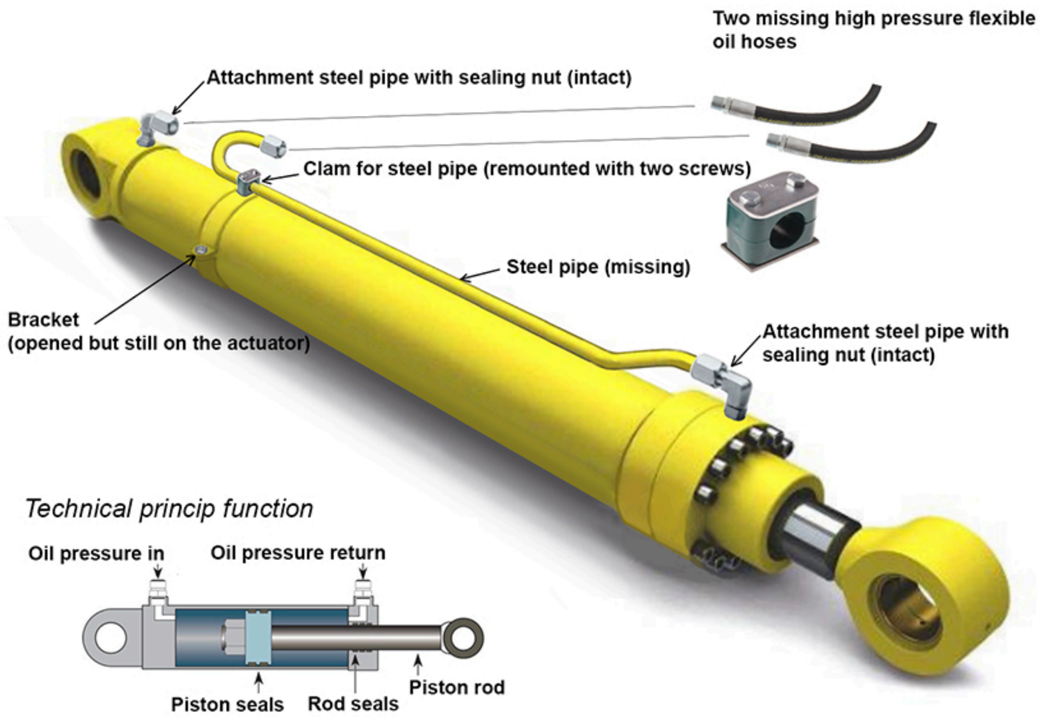


Picture 3. *The starboard actuator room. The hoses, steel pipe and bracket have been indicated with colored lines in reference to picture 1.*

If the visor had "fallen forward" and been ripped out from its attachment in deck B according to JAIC, at least some parts of the oil hosing on the actuator had been found on the actuator after the salvage. The flexible hosing was the weakest part and should have been broken and ripped off leaving parts of it on the damaged remains of the actuator. This is incontrovertible.

The flexible hoses were relatively short and fixed to mounted steel pipes on the bulkhead wall. Those hoses led the oil to the oil hydraulic pump via valves that were closed when the system was not in use, i.e. during normal condition at sea. That is the technical reason why the visor longitudinal beams (and the visor) must have remained locked and closed, held down by the actuators. It has not been taken into consideration by the JAIC investigation.

The JAIC final report concludes however, with no consideration to the actuators down holding effect, that the locking means broke initially due to overload as a result from forces from the waves. Then the visor bounced up and down slamming into the forepeak deck and first thereafter the visor hinges broke. Finally, the visor fell forward cutting its way through the upper deck and traverse deck beam (in front of P 2 in picture 1). There is however a big problem with this scenario – the oil hoses and steel pipes were missing when the visor was salvaged.



Picture 4. *The arrangement shown as an example for explanation of the different parts of the hydraulic actuator and with comments in reference to this report.*

The two actuators marked CD9-38725-6 250 were massive and each actuator had a maximum lifting/closing power at a design pressure of 250 bar of 153 ton. It is important to understand that a hydraulic actuator with an intact oil flow system is 100% stable, its piston rod cannot flex. This is due to the fact that oil can not be compressed. In any chosen position the actuator with its piston is to be seen as a fixed steel rod.

The control system consisted of a high pressure hydraulic system with tank and three pumps plus the components of a hydraulic power system, providing hydraulic power to a control panel for the visor and ramp operating and for the locking devices. The original hydraulic pumps had been set to provide 180 bar pressure but they were replaced in the mid 80's due to their inability to give adequate pressure. The new pumps had a maximum pressure rating of 400 bar and were set to deliver 225 bar to the system. The typical safety factor is "4 times" which means that each actuator would stand a pressure up to 1400 bar (The test pressure of the cylinders was 350 bar).

With an intact oil system, the visor could not have been bouncing up and down hitting the forepeak deck until it "fell off" according to the JAIC final report. As there are no damage to the remains of the hydraulic oil system for the actuators and no broken (or found) hoses and pipes, the JAIC report should have included and investigated these facts. It was not included in the JAIC final report.

When the oil hoses and pipes were removed the total function for opening the visor was as a consequence set out of order. If the oil system hoses were intact the visor could not have been lost at sea prior to the sinking.

The event of losing the visor according to JAIC had resulted in broken remains of the hydraulic hose and pipe system that still had been attached to the actuators when the visor was salvaged. And more, the actual crucial key information is found in the fact that the clam for the steel pipe on the bracket was remounted after the fixed steel pipe was removed. JAIC did not include the down holding effect of the actuators in the calculations to prove the loss of the visor.

JAIC performed an inspection of the Port-side hydraulic actuator where they found that the pressure seal for the piston rod were damaged on the piston side "most probably caused by very high pressure on the piston rod side". As a result, they claim that the piston could be pulled out with very low resistance even with an intact hydraulic system. The oil would just pass the seal. Unfortunately, the inspection report does not mention any pressure levels for the burst of the seal and the inspection report is held in general terms with the guessing's (marked in yellow) converted to facts.

See JAIC's evaluation from the Final report 15.7 and 13.5 below on page 13 and 14.

MacGREGOR

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East Europe Division

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T.Mäki

February 1, 1995

MS ESTONIA BOW VISOR

INSPECTION REPORT OF PS-SIDE HYDR. LIFTING CYLINDER

Type of the cylinder:	CD9-38725-6 250
Main dimensions:	
Outer diameter of the cyl.tube:	355mm
Inner diameter of the cyl.tube:	280mm
Diameter of the piston rod:	180mm
Diameter of the cylinder eyes:	160mm
Stroke of the cylinder:	1800mm

On the cylinder tube was stamped: 21.3.1980 TP 350 bar

Before opening the cylinder it was pressure tested on both sides and it was noted that there was no leakage on lifting side, but the oil went thorough the piston seals from piston rod side to lifting side. The piston rod was after this pressed completely out to inspect the piston rod condition and it was noticed that there was heavy damages on at the distance when the piston rod is about 400mm open.

The damages were on side SB-side of the piston rod. it was also noticed damages on piston cover's fixing screws. The ends of these hexagon screws were like hammered.

When the am. cylinder was opened the only damage inside was that the support ring and pressure seal which keep the pressure on the piston rod side was damaged which is most probably caused by very high pressure on piston rod side.

By the a.m. report we can see that the lifting cylinder has been opened at least about 400mm and there has been very high pressure on the piston rod side.

Kind regards,

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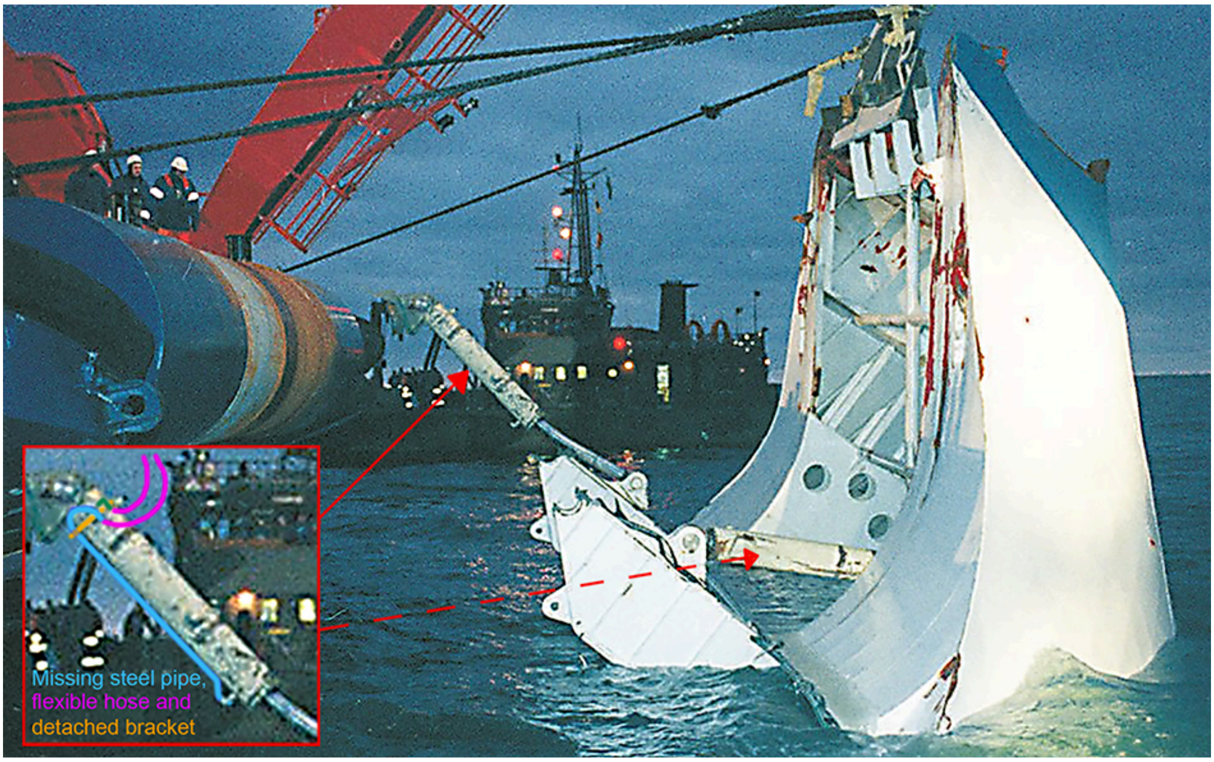
Picture 5. *The "investigation" by JAIC of the Port-side hydraulic actuator*

The salvage of the visor.

When the visor was brought to the surface no parts of the actuator hosing was to be found. The inlet 90 degree attachment pipe made in steel with its attachment sealing nut was found with no damage. The steel pipe was missing. No flexible hoses or remains of them were found. The complete return steel pipe was detached all way to the corresponding 90 degree attachment pipe in the other upper end of the actuator. This is incontrovertible.



Picture 6. *The missing hoses and steel pipe and the bracket with clam have been indicated with colored lines (close up), all in reference to Picture 1 and in detail Picture 3.*

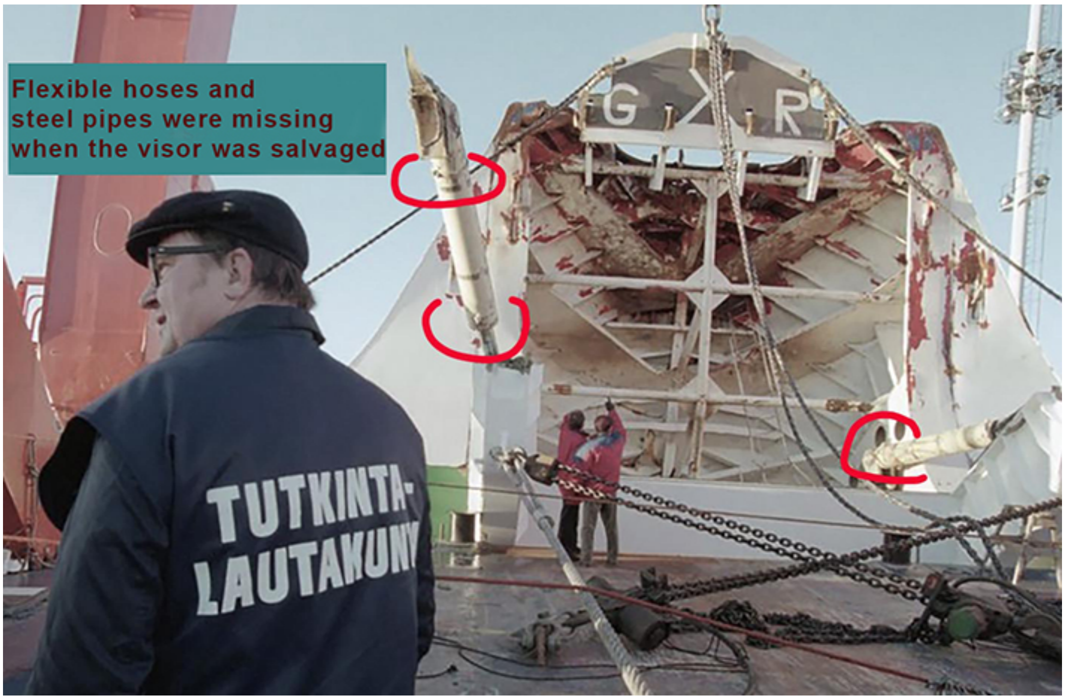
The clam for holding the fixed steel pipe had been opened and the pipe had been removed. The clam was an integrated part of the bracket and surprisingly, the bracket and clam were back in place, but now without the steel pipe. The two screws in the clam for fixation of the steel pipe to the actuator was found intact and in place.

From picture 6, 7 and 8 it is absolutely clear that the hoses and pipes were missing when the visor was salvaged to the surface.

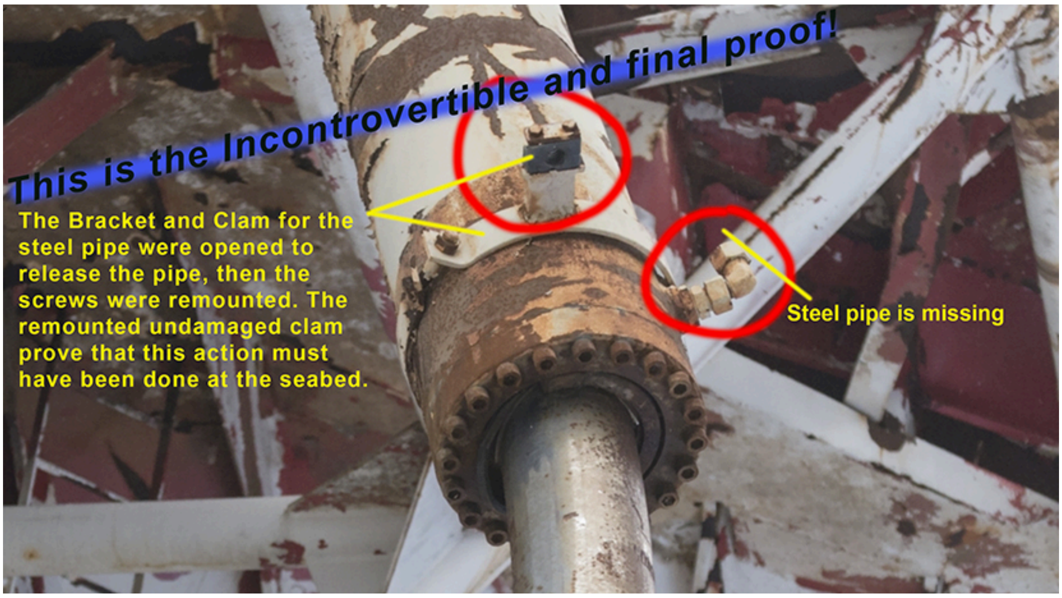
In our earlier report from 2000-01-01, **Impossible Visor Scenario**, we made the following statement *"The Independent Fact Group does not, however, draw any conclusions in this report as to how the visor was lost or what created the forces involved in such a scenario."*

In this report we are able to prove that the visor did not "fall of" before or during the catastrophe. Therefore, thanks to this crucial key information we also finally prove that the JAIC final report is a piece of disinformation and that the report is a falsification of the cause of and the sinking scenario of the MV Estonia.

The new crucial and incontrovertible key information. ***(A little tuft can often overturn a large load)***



Picture 7. *The missing hoses and pipes should have been within the red marking. The photos in Picture 7 and 8 were shot when the visor was salvaged to the surface and had been secured.*

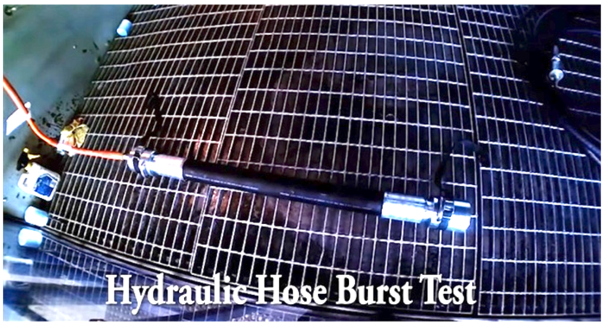


Picture 8. *This is a close up of the starboard actuator upper end (close to P 2 in picture 1). It proves that the bracket and clam to the left had been opened to release the steel pipe and that the clam was remounted with it's two screws. To the right the undamaged attachment sealing nut (90 degree steel pipe) was left with the nut still in place and found without the hydraulic pipe (or it's remains) originally attached to it. In detail, see Picture 3.*

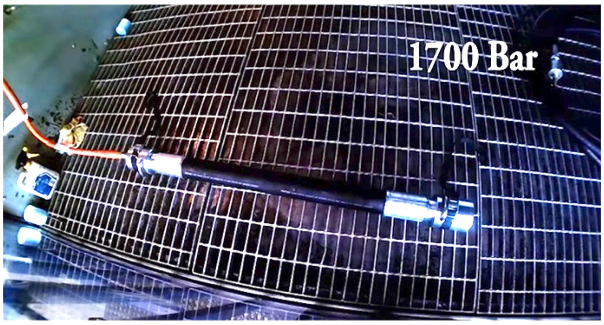
Both the steel pipe and flexible hydraulic hoses were missing. The bracket and clam for the steel pipe and the 90 degree attachment pipe made in steel were found intact. It is not possible that the hoses and pipe disconnected from the actuator and fell off by themselves. The hoses should have been in place when the visor "fell off" and the remains of the flexible hoses had been found still attached to the actuators. The steel pipe should also have been in place and found attached to the actuators. This was not the case. This is incontrovertible.

Test of hydraulic flexible high-pressure oil hose, test 1.

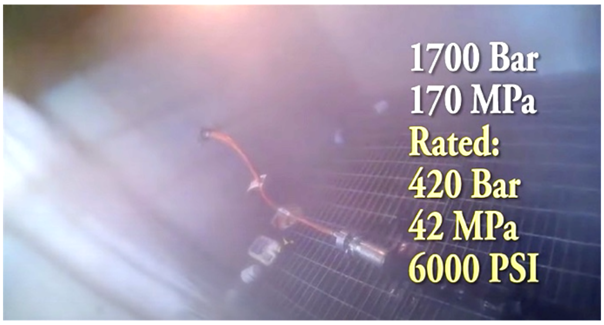
As both steel pipe and flexible hydraulic hoses are missing, is it also especially important to show what a flexible hydraulic hose looks like when it breaks due to overpressure or is ripped/pulled to breakage. The rating of the hose in this example is 420 bar and the burst occur at 1700 bar. If any of it had happened the remains of the flexible hoses had been found still attached to the actuators. This was not the case. This is incontrovertible.



Picture 9. *High-pressure hydraulic hose set up.*

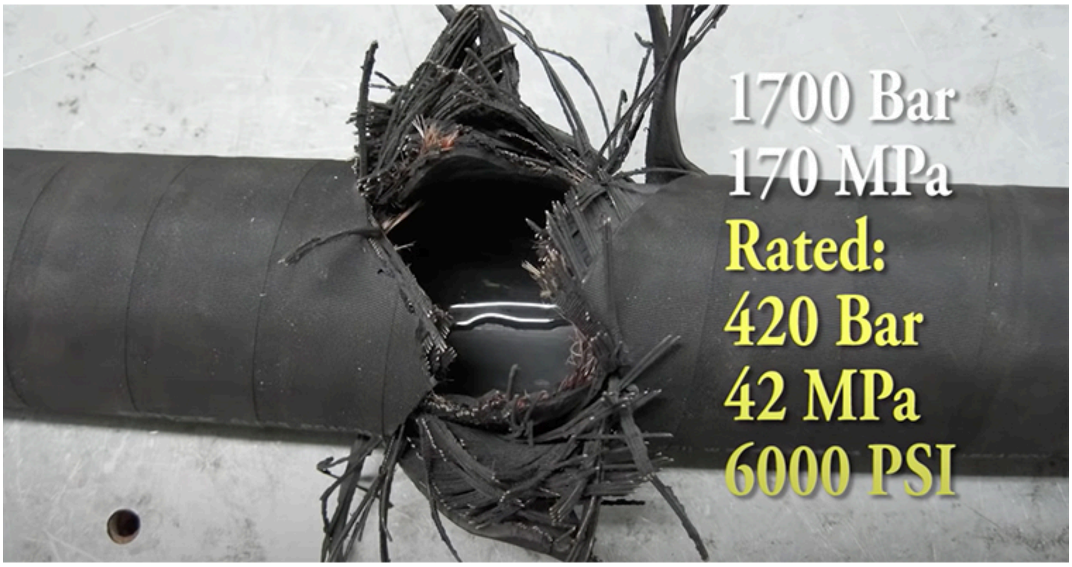


Picture 10. *Pressure, 400% overload, rated 420 bar.*



Picture 11. *Burst, exploding at 1700 bar.*

Picture 12. *Damage.*



Picture 13. *Damage, total destruction. If the hose had been ripped to breakage the damage had been similar.*

In picture 9 – 13 the result of a burst hydraulic flexible and high pressure hose is seen. As the hydraulic hose is weaker than the steel pipe it should have been ripped and broken similar to the burst of the hose in picture 13. Alternatively, the 90 degree attachment pipe made in steel with its attachment sealing nut had been broken due to the ripping effect. It was not.

Test of hydraulic flexible high-pressure oil hose, test 2.

This test is conducted in a different way with the hose mounted in a way that can be seen as an example of a normal installation. The rating of the hose in this example is 275 bar and the burst occur at 1100 bar. This example gives a clear picture of the remains of the hose attached to the actuator.

Picture 14. *The hydraulic hose rating, 275 bar.*

Picture 15. *Setting up with two 90 degree steel hose attachments.*

Picture 16. *Test, 717 bar. Approx. 250 % overload.*

Picture 17 *Test, 1100 bar. Approx. 400 % overload.*

Picture 18. *Test, burst at 1100 bar.*

Picture 19. *Remains of the hose after burst.*

The Fact Group commentary and conclusion regarding Test 1 and 2:

As the pressure needed to destroy the actuator seals must be at least 1400 bar we conclude that the flexible hosing's rated between 275 to 350 bar would have burst before the piston rod seals had been damaged. However, the flexible hoses and the steel pipe were missing and the screws in the bracket and clam were remounted, that is the crucial and incontrovertible key information in this report.

Picture 20. *Example of flexible oil hose broken due to traction.*

This example shows a hose burst at the fitting, with broken wires at the last shell grip, or at the end of the nipple where it was fixed to the steel attachment pipe. The hose was moving within - or ripped - at the fitting. This excessive movement should have been the result if the visor "fell forward" according the claim in the JAIC scenario.

JAIC description of the loss of the visor in regard to the actuator's function.

"Final report Chapter 15.7 Evaluation of the visor actuators and their attachments

The visor had two heavy-duty actuators for controlling the opening and closing of the visor. These were connected to the visor hinge beams at a distance of 1.3 m from the hinges and were mounted on reinforced horizontal platforms in the front structure of the hull. The actuators were connected hydraulically to a solenoid-type control valve, which was closed at all times except when the visor was being moved. Various restrictor valves were installed in the system to limit the speed of opening and closing. The pumps in the hydraulic power supply system had been replaced once with new ones capable of delivering a higher hydraulic pressure as the original ones had marginal capacity.

When sea loads started to open the visor, an upward load was also applied to the actuators, which resisted the opening movement. The leverage from the center of attack of the sea loads compared to that of the actuators enabled a high pulling force to be transmitted to the actuators. The port side actuator was at this moment pulled out of the hull (Figure 8.26) while only partly extended whilst the lockedin hydraulic fluid acted to transmit the force to the lower attachment of the unit. The vertical force to shear the actuator support out of the hull has been estimated to be from 4 MN down to possibly as low as 2 MN, taking into account the unsymmetrical attachment point of the load and extensive cracking in the platform edges and welds as well as the steel grade used for deck 3. Tests revealed signs of cold brittleness in this steel even at room temperature. The actuator mounting platform has undergone a detailed investigation (Supplement).

The normal operating loads from the actuators appear to have been high enough to initiate fatigue cracking of the platform plating and the welds, in particular where some crack-promoting discontinuities may have existed. The port platform exhibited cracks around a large part of its periphery, generated by vertical loads from normal visor opening and closing.

The seals in the starboard actuator failed, preventing the hydraulic fluid from transmitting the load. The piston rod of this actuator was therefore extended and the actuator remained connected in the hull during the initial phase of the visor movement. The load initially taken is uncertain but must have been below the ultimate strength of the platform, estimated to be below 8 MN."

"JAIC 13.5 Failure sequence of bow visor and ramp:

All the attachments of the visor, the locking devices, the deck hinges and the lifting cylinder mountings failed under local overload tension. The attachments may have failed in one or, possibly, a few steps. The partial initial failure may have coincided with a single metallic bang, observed by the AB seaman.

The main failure is believed to have happened in a subsequent wave impact, shortly after the metallic bang. In this main failure the remaining locking devices failed completely, allowing the visor to open partly. Once the visor had lifted off its locating horns, the port side hinge failed under the overload generated by the high twisting and yawing moments and the vertical force. The starboard side hinge failed as a result of twisting when the visor was rotating *clockwise. Hydrodynamic loads pressed the visor against the front bulkhead along which it slid upwards. The hydraulic lifting cylinders may have failed at the same moment or may have remained connected for some further time. The port side actuator, which at some stage was pulled out of the hull by failure of the already weakened bottom mounting platform, had extended by about 0.4 m at least. The starboard side actuator failed hydraulically but remained connected and was ripped out of the hull, fully extended, as the last physical connection between the visor and the hull.*

After the locking devices and hinges had failed and the actuators had lost their restraining effect, the visor had a natural tendency to tumble forward due to its forward-located center of gravity relative to the new center of rotation, i.e. the stem post area. The visor's position was at this stage governed by the actuators and the actuator attachment lugs on the hinge beams, protruding into openings in the forecastle deck. The visor was thereby constrained in the longitudinal direction.

Subsequent wave impacts caused the visor to move backwards and forwards in combination with some vertical movements, resulting in various impact damage to the bulkhead and the hinge beams. Impact marks indicate violent transverse movements, and upward movements of about 1.4 m. The damage is described in detail in Chapter 8."

The Fact Group commentary and conclusion regarding the statements in the Final report 15.7 and in 13.5:

We conclude that JAIC stated (marked green) that the actuators resisted the opening movement of the visor but in their effort to prove the scenario "the loss of the visor" they based the evidence mainly on guesses (marked yellow).

We further conclude, which is fundamentally important for this report, that NOTHING is said about the actuator hoses and pipe or the fact that they all were missing when the visor was salvaged. This is however understandable though any attempt to explain had failed unless they had admitted that the hoses and pipes had been removed at the seabed.

However, in chapter 13.5, JAIC confirms that the starboard side actuator remained connected (marked green). It is unclear if that also means that the oil hoses still were connected and in place.

The Fact Group commentary and report conclusion:

There is without any doubt proof that actions were taken to remove important and crucial parts on the actuators BEFORE the visor was removed from the ship.

As it is with 100% certainty clear that those actions DID NOT take place before the sinking of the ship, they must have been performed BEFORE the salvage of the visor.

Therefore, those actions must have been performed at the bottom where the ship rest at the seabed.

MV Estonia was lost at sea with the visor intact and in place.

This report finally proves that the JAIC final report is a piece of disinformation and that the report is a falsification of the cause of and the sinking scenario of the MV Estonia.

The evidence in this report disqualifies any participation from Sweden, Finland and Estonia in a new independent investigation of the MV Estonia shipwreck.

DEDICATION

In memory to Björn Stenberg who made this report possible we dedicate the report to all those who still 26 years after the tragedy struggle to find the truth.

If MV Estonia had been seaworthy many of the more than 850 persons who lost their lives would have had a chance to survive no matter what caused the sinking.

The Independent Fact Group
Troon, Scotland 24th of December 2020