Dangerous shipwrecks of the Gdańsk Bay

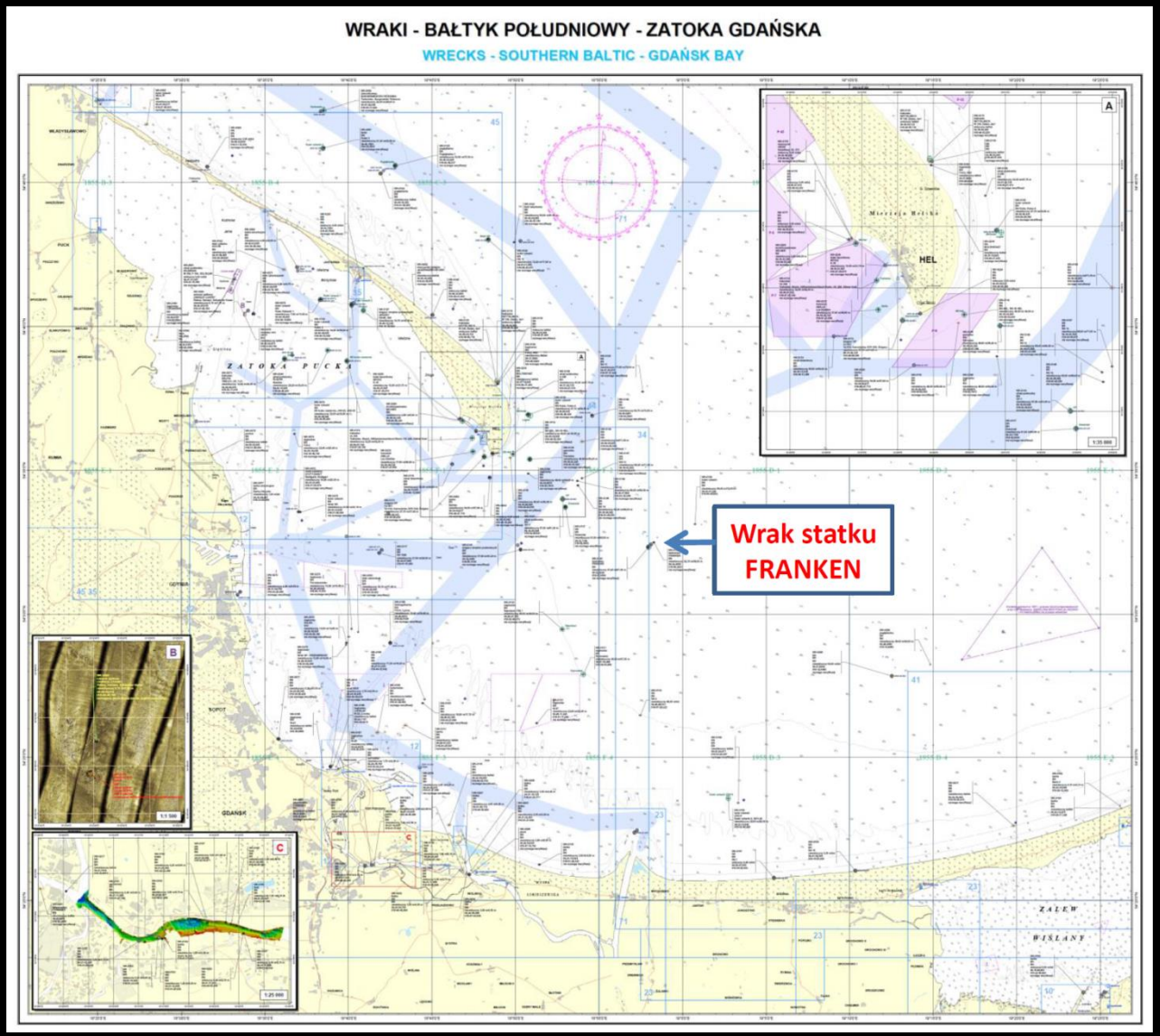
Fuel and UXO on **T/S FRANKEN**

Benedykt Hac, Dr. Eng.

Head of Operational Oceanography Depatment in Maritime Institute in Gdansk, POLAND

Berlin 2-4 May 2018

T/S FRANKEN

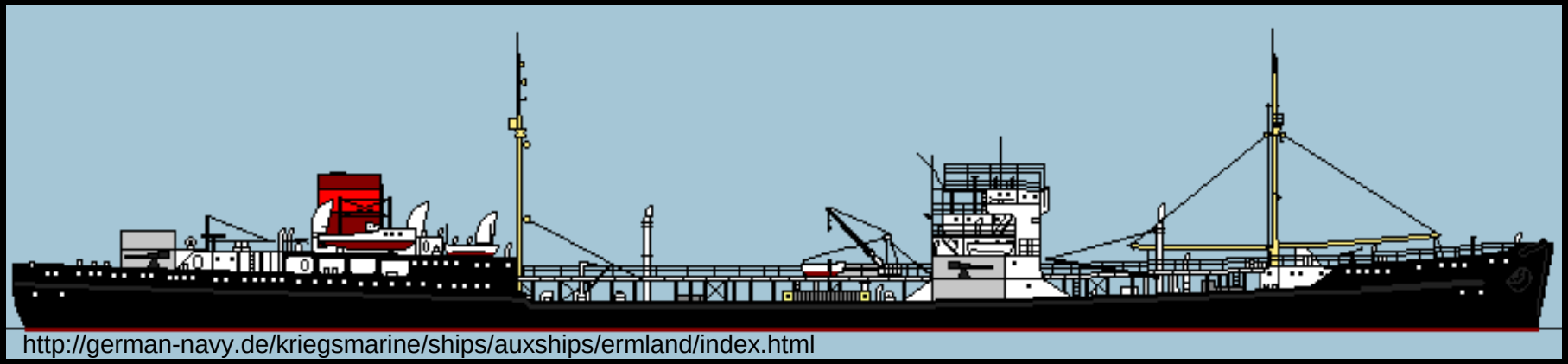


T/S Franken is the biggest

(179 m/126 m) known wreck of the Gdańsk Bay

Source: BHMW

T/S FRANKEN



http://german-navy.de/kriegsmarine/ships/auxships/ermland/index.html

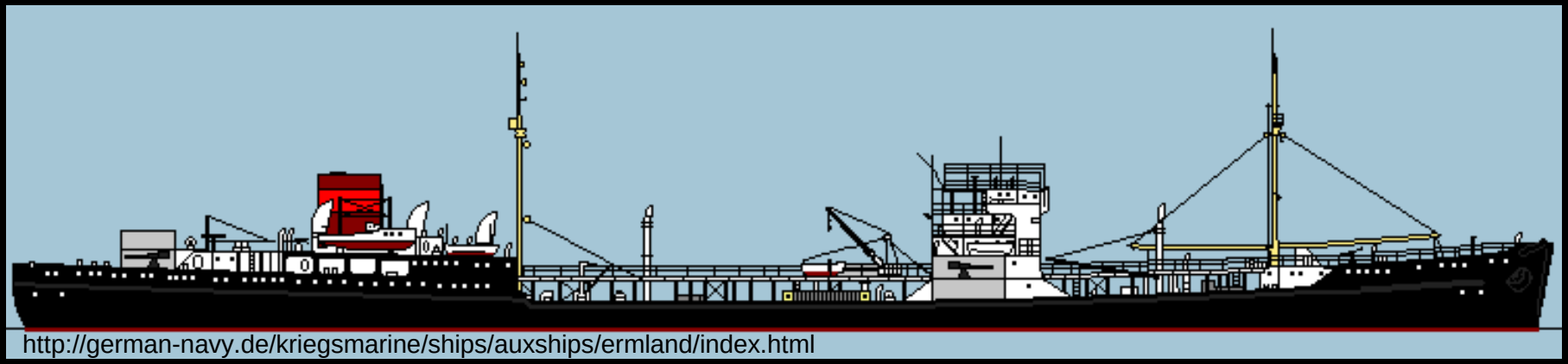
Support vessel (Troßschiffe - tanker/supply ship)

of Kriegsmarine, „Dithmarschen” type

Main dimensions of the vessel :

- Total length Lc 179.00 m
- Breadth in the midship section 22 m
- Draft 10.2 m
- Displacement 22850 t
- Crew 94 - 208 people, depending on the mission

T/S FRANKEN



http://german-navy.de/kriegsmarine/ships/auxships/ermland/index.html

The ship was able to supply:

- **9 500 tons of fuels (heavy fuel, light fuel, aviation gasoline),**
- **306 tons of lubricating oils of various types,**
- **973 tons of ammunition (of calibers from 20mm to 280 mm)**
- 822 m3 (790 tons) of spare parts, technical supplies for ships,
- 119 m3 of packed food supplies
- 1472 m3 of food supplies in coolers (295 m3 in 8 degrees Celsius, 161 m3 of frozen foods, 991 m3 of cooled food supplies)

T/S FRANKEN

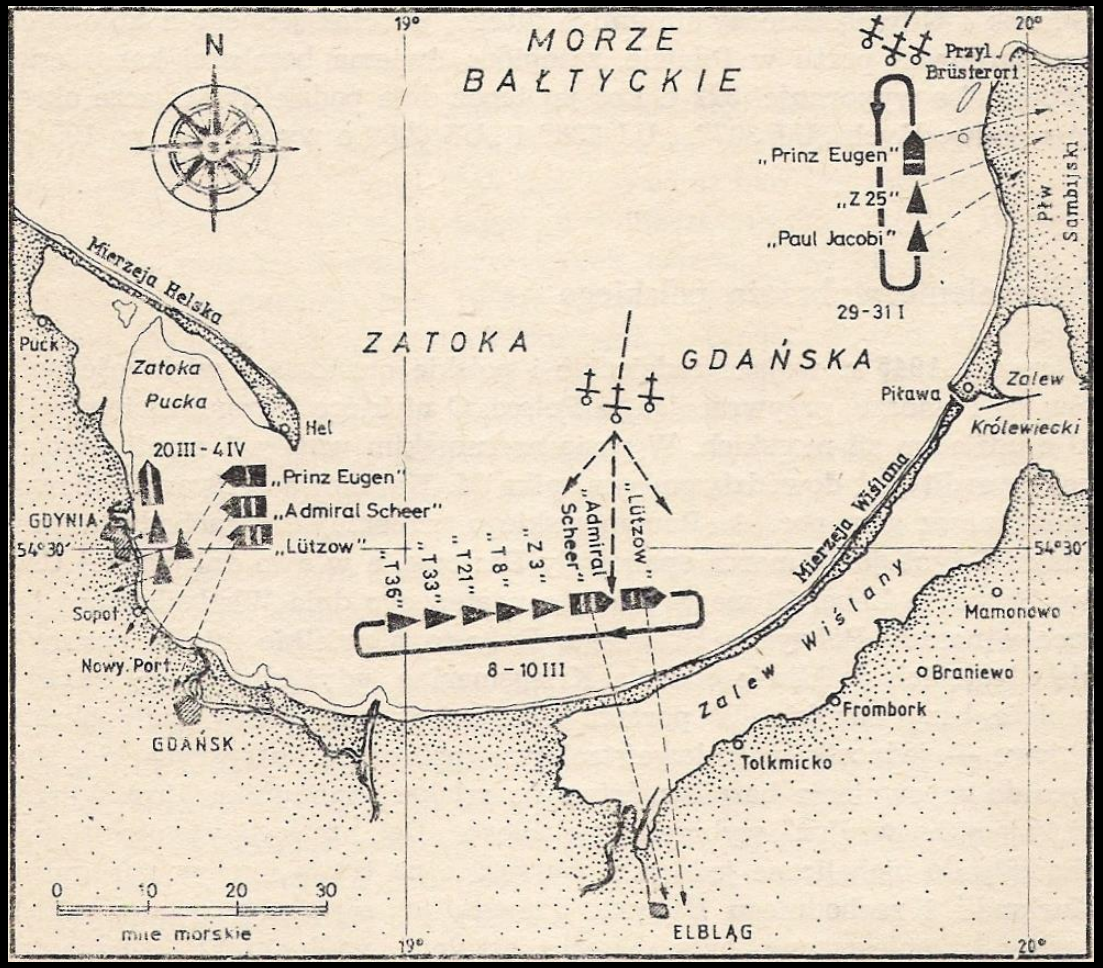
T/S FRANKEN

On the rigth:

Altmark (Franken's twin ship)

During handing over of fuel to a Kriegsmarine vessel

T/S FRANKEN



Due to intense battles and partial occupation of harbors in Gdynia and Gdansk the supplying of battleship Lutzow and Admiral Scheer and the cruiser Prinz Eugen was prevented
Therefore, the role of the supply ship Franken has grown to such an extent that after its sinking on 04/08/1945 all battleships and the cruiser were sent away from the Bay of Gdansk to the Western Baltic.

T/S FRANKEN accompanied by the heavy cruiser Prinz Eugen

T/S FRANKEN

T / S FRANKEN - projection of decks entered in scale into the Długi Targ square in Gdansk

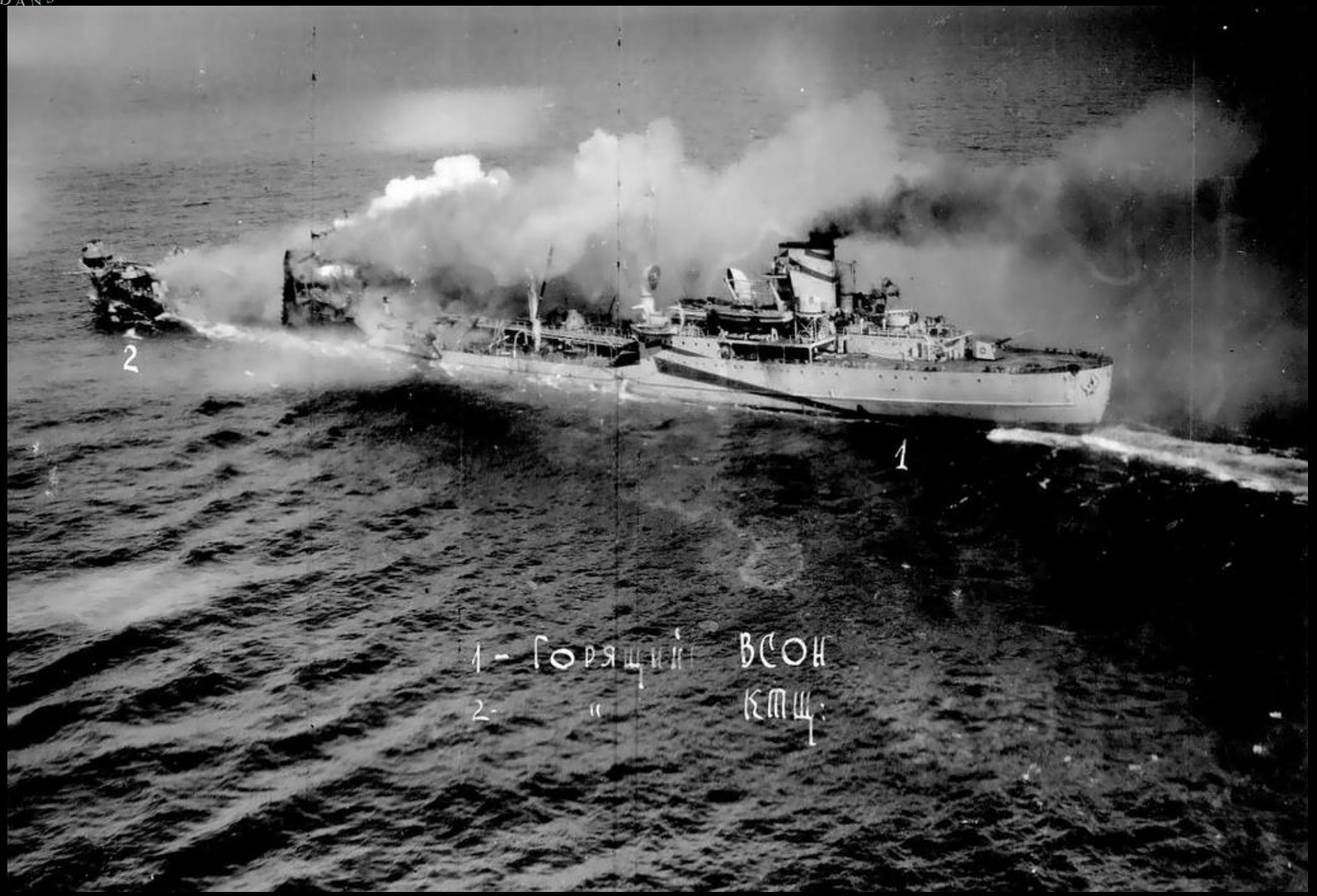
T/S FRANKEN

T/S FRANKEN – ship silhouette entered in scale into the Długi Targ square in Gdansk

T/S FRANKEN

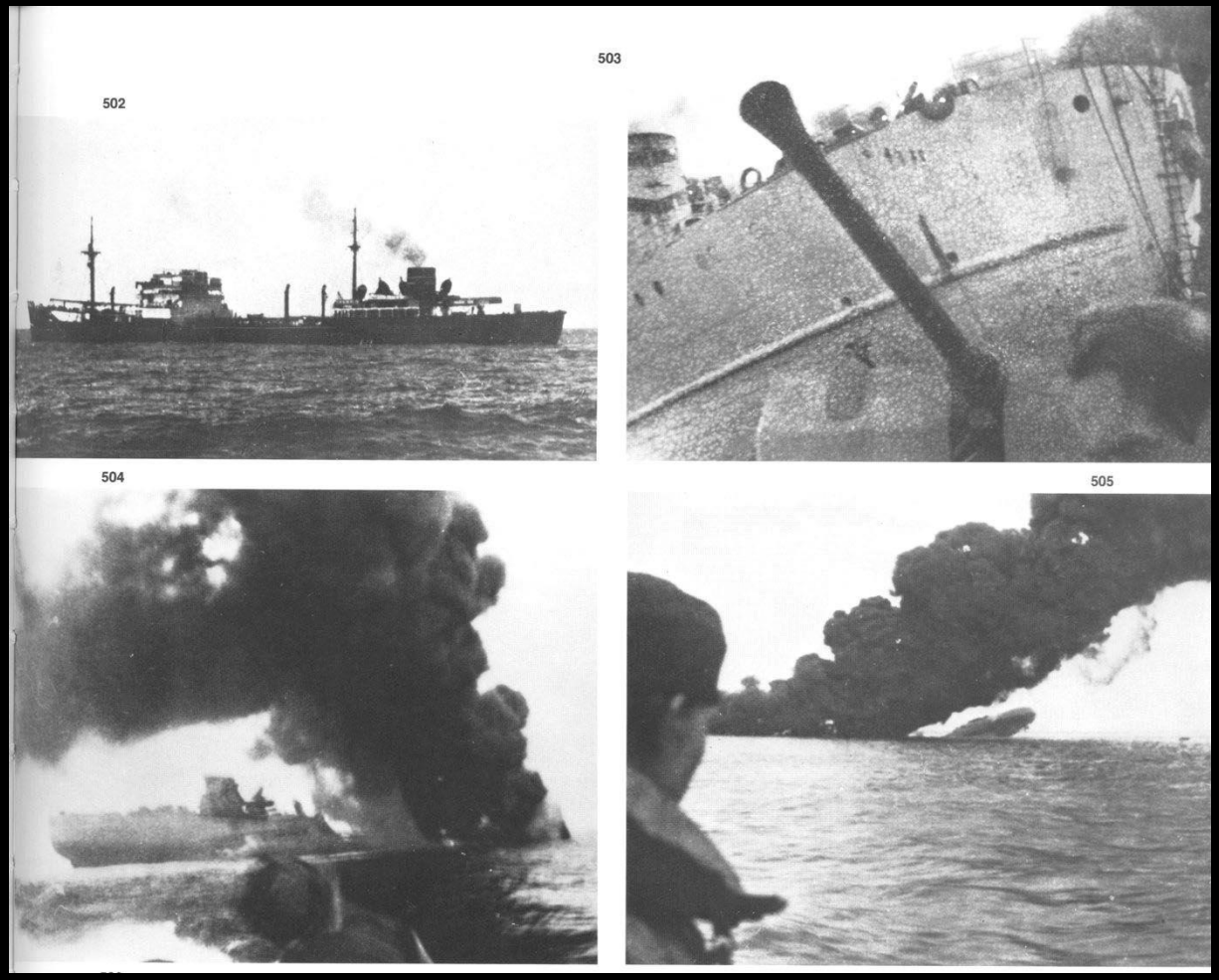
T/S FRANKEN during a bomb attack of IŁ aircrafts – 04/08/45 time: 1130

T/S FRANKEN



T/S FRANKEN during a bomb attack of IŁ aircrafts – 04/08/45 time: 1130

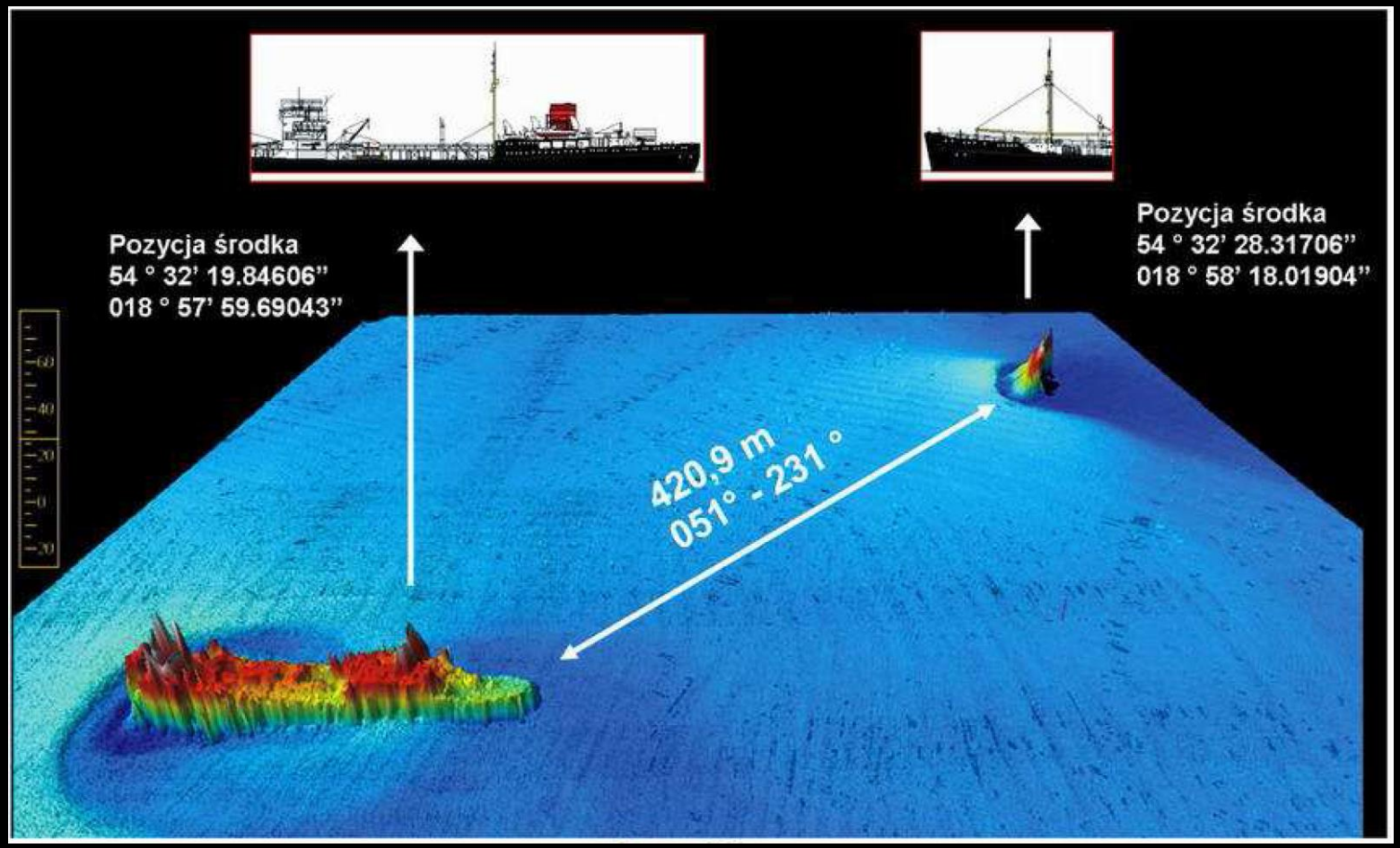
T/S FRANKEN



T/S FRANKEN during a bomb attack of Ił aircrafts – 04/08/45 time: 1200

"Die Tragödie der Flüchtlingsschiffe: Gesunken in der Ostsee 1944/45" (author Heinz Schön) -"Lufttorpedos versenken TMS Franken".

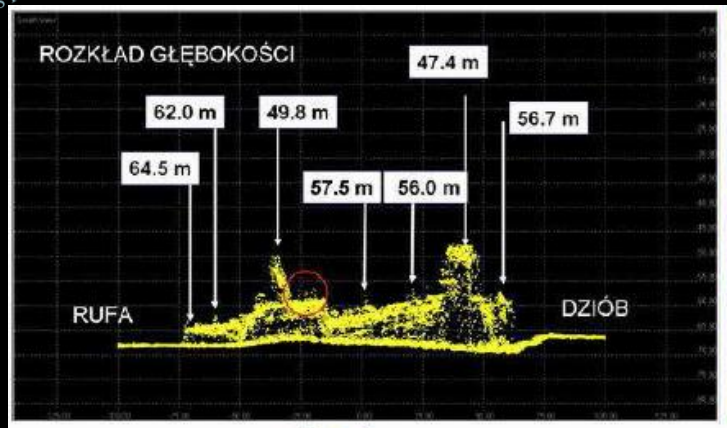
T/S FRANKEN



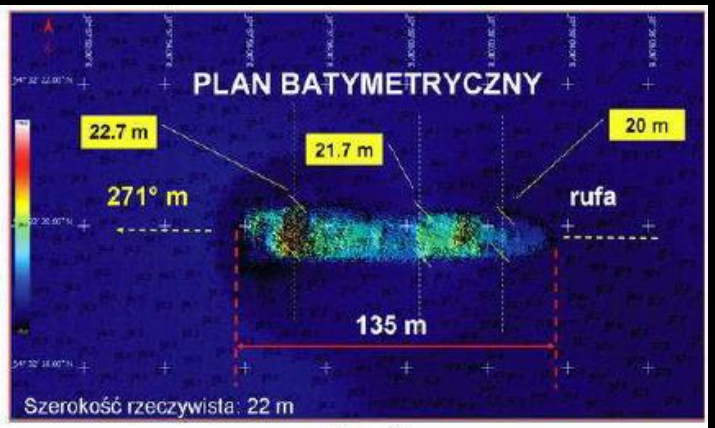
T/S FRANKEN - current state – hydrographic surveys

„Badania hydrograficzne wraku Franken” - Artur Grządziel, *www.dzh.mw.mil.pl/zasoby/archiwum/upload/badania.pdf*

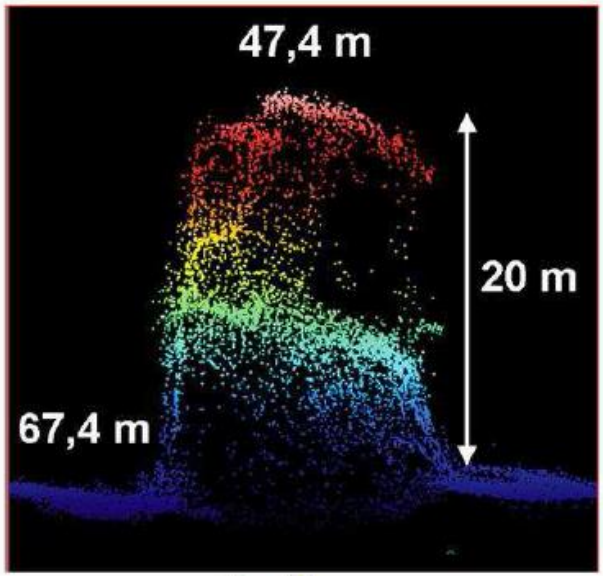
T/S FRANKEN

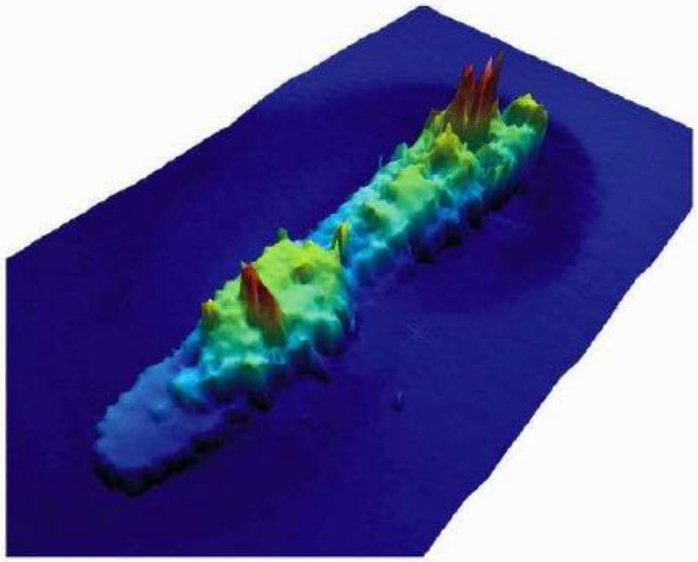


Rys. 8.



Rys. 9.





T/S FRANKEN - current state – hydrographic surveys

„Badania hydrograficzne wraku Franken" - Artur Grządziel, *www.dzh.mw.mil.pl/zasoby/archiwum/upload/badania.pdf*

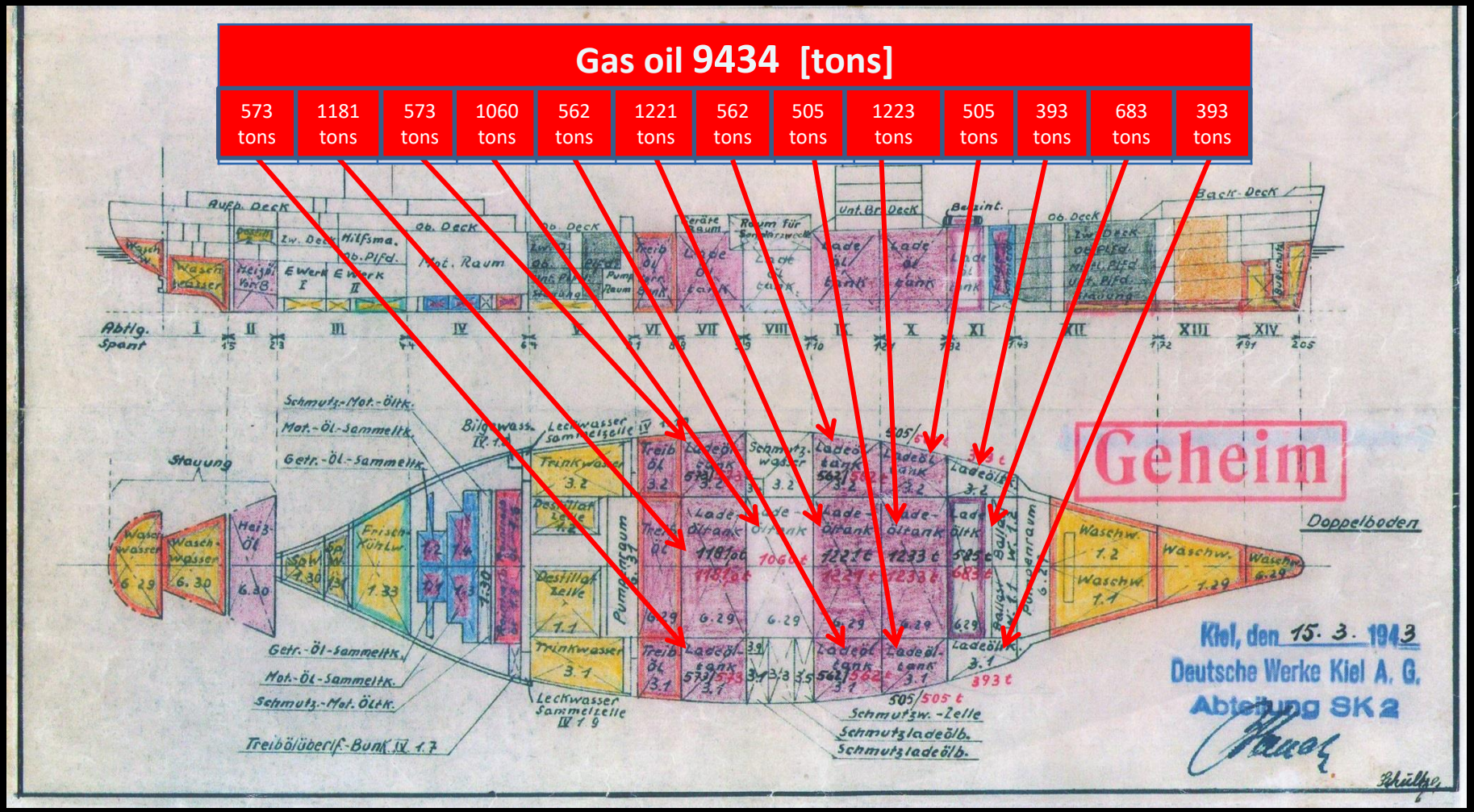
T/S FRANKEN

T/S FRANKEN - current state – artist’s vision

http://divingbaltic.pl/pl/wraki-baltyku/franken.html

Why could the T/S Franken wreck be so dangerous?

T/S FRANKEN



T/S FRANKEN - could have had 9500 tons of fuel in its tanks

FROM: TANKER 'FRANKEN'

TO: ADMIRAL EASTERN BALTIC

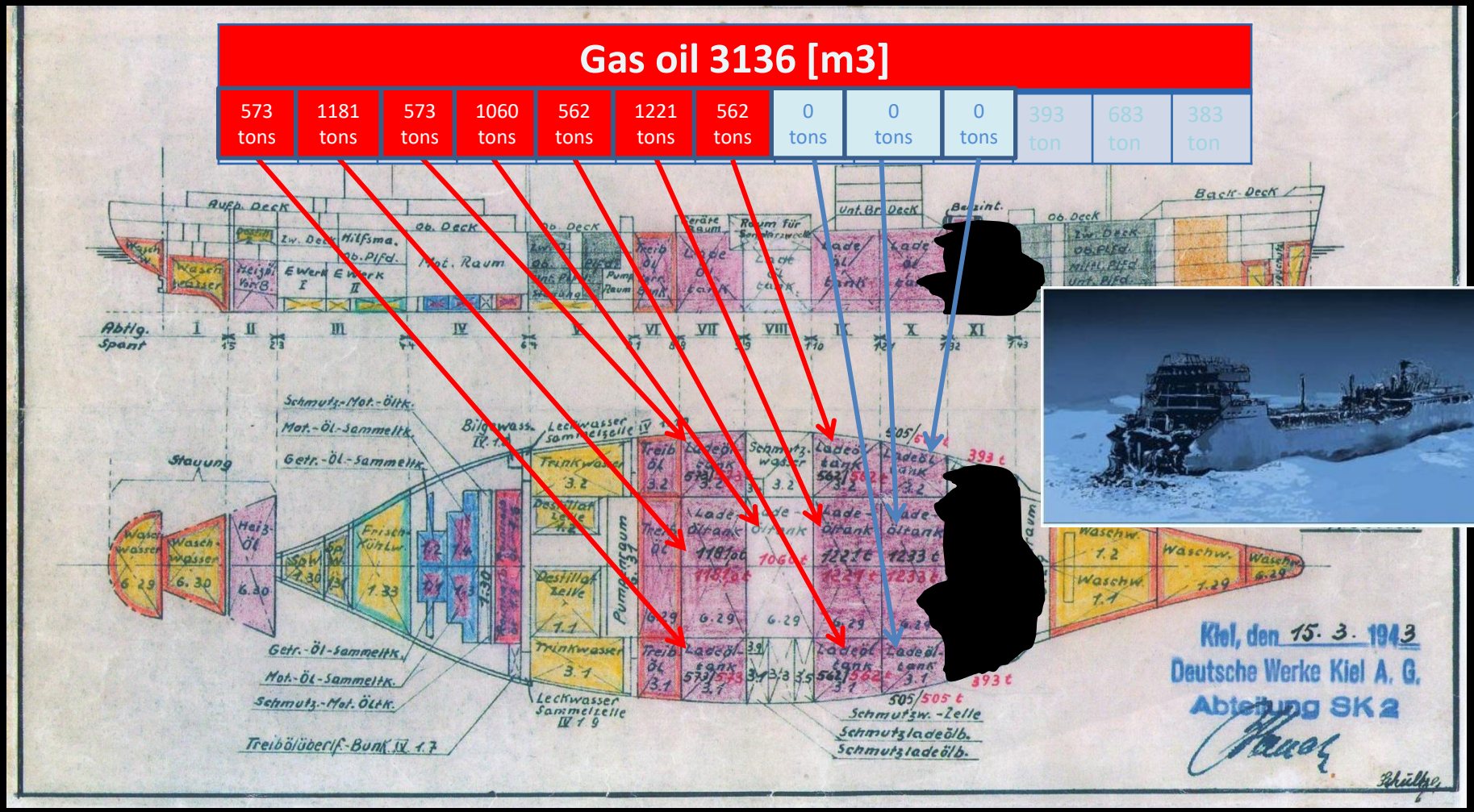
BATTLE GROUP THIELE

BATTLE GROUP ROGGE

HAVE TAKEN OVER 2066 CBM. OF FUEL OIL FROM TANKER 'THALATTA'.

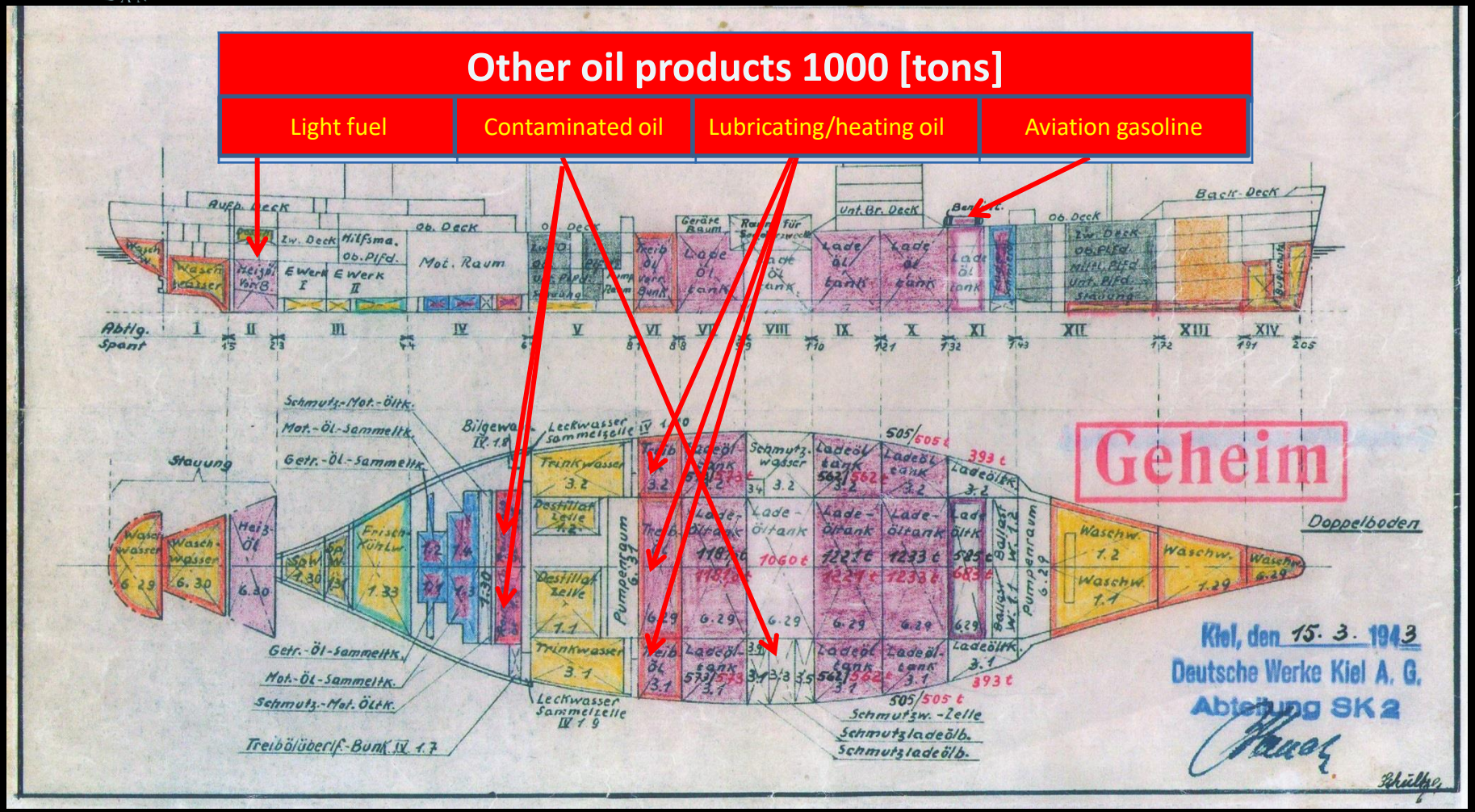
STOCKS AT 0800/29/3: 3135 CBM.

T/S FRANKEN



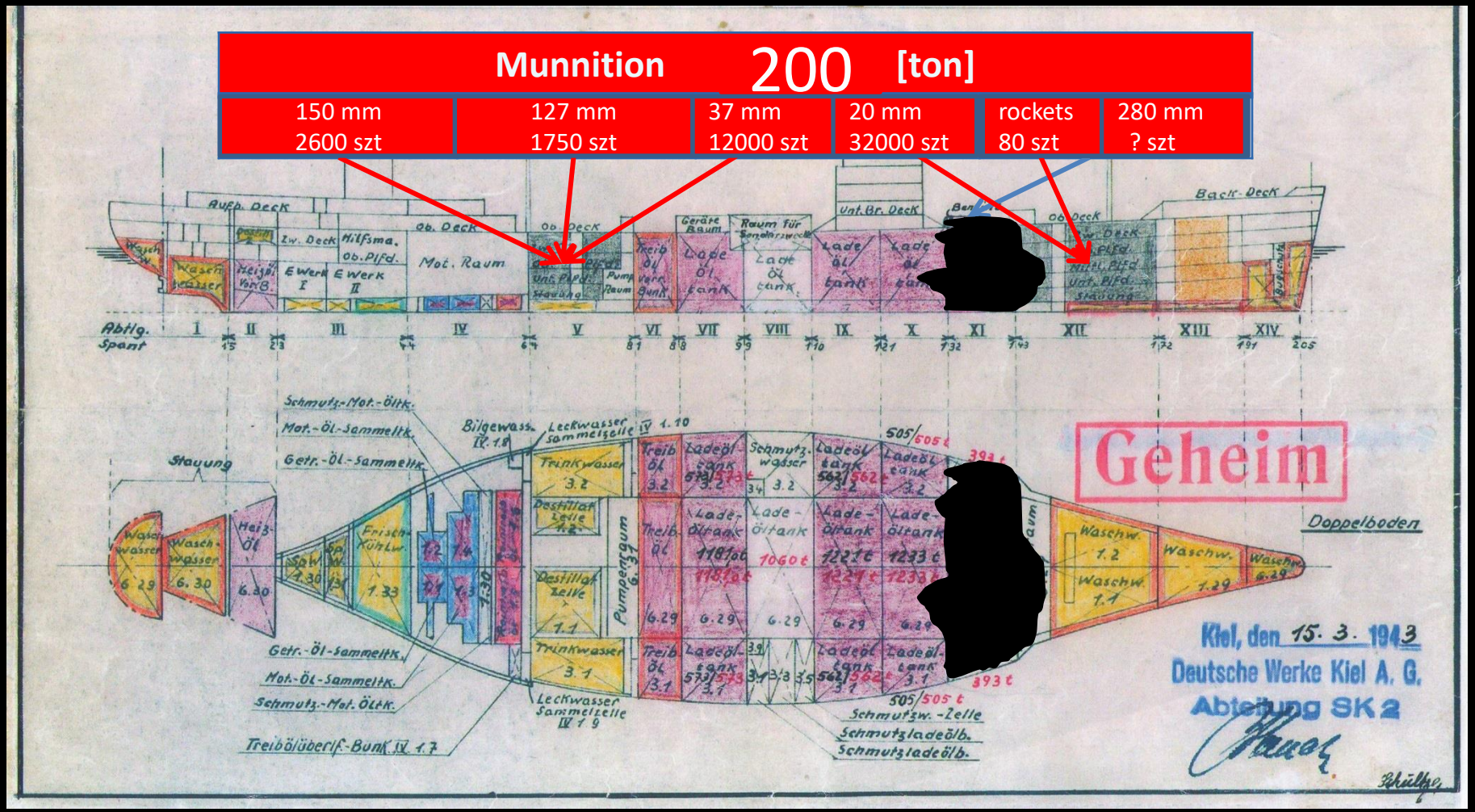
T/S FRANKEN - could still have about 6 thousand tons of fuel in its tanks

T/S FRANKEN



T/S FRANKEN - could have had about a thousand tons of other oil products in its tanks

T/S FRANKEN



T/S FRANKEN - supported "Kampfgruppe Thiele",("LÜTZOW", "PRINZ EUGEN" and group of desrtoyers.

Specification of dangerous substances, which could be present aboard the wreck

Gas oil 3000 [tons]												
573 tons	1181 tons	573 tons	1060 tons	562 tons	1221 tons	562 tons	0 tons	0 tons	0 tons	393 ton	683 ton	383 ton

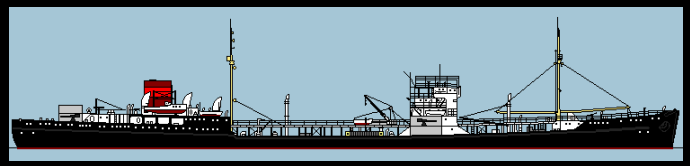
Other oil products 1000 [tons]			
Light fuel	Contaminated oil	Lubricating/heating oil	Aviation gasoline

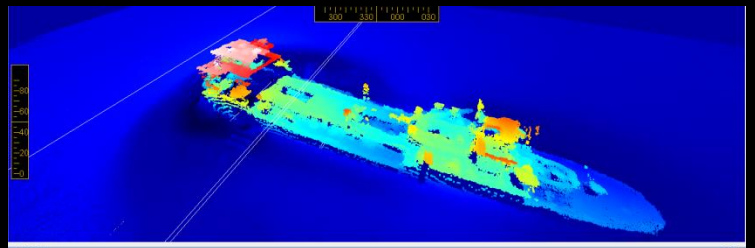
Other products ? [tons]			
Food supplies	Frozen food supplies	Ammunition / propelling charges	Chemical substances

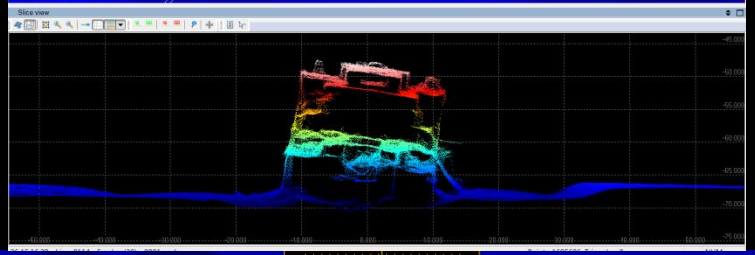
What can we do in this situation?

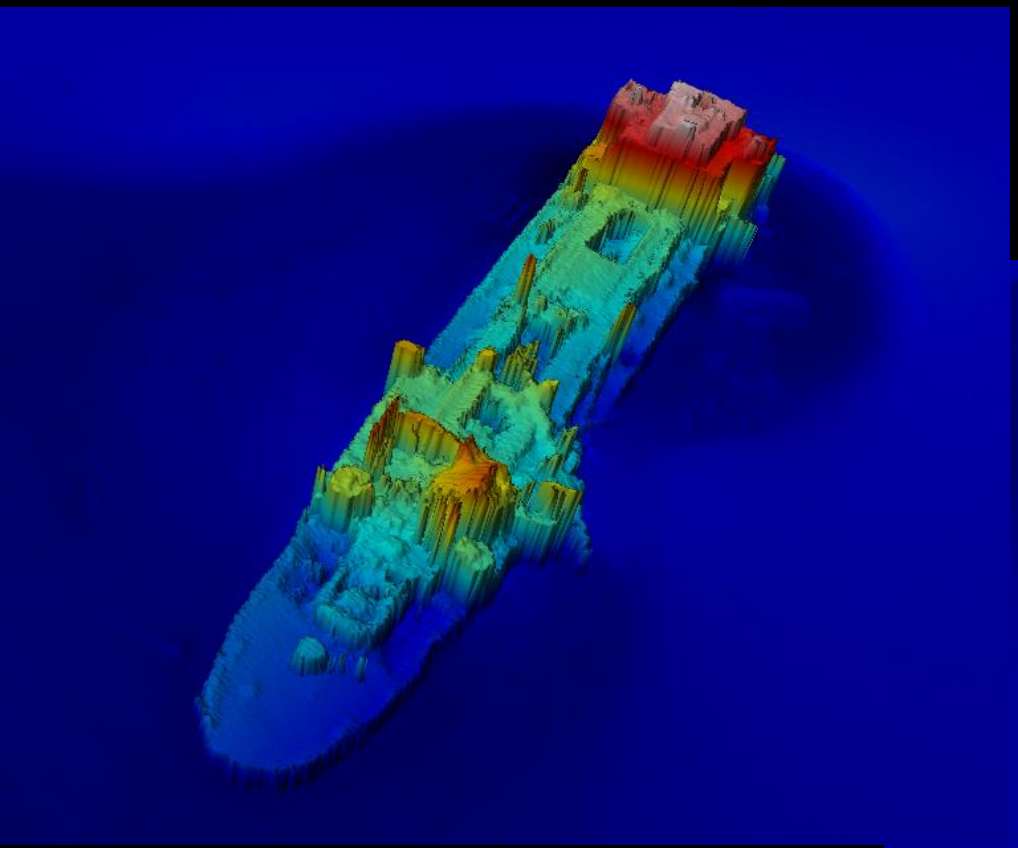
1. Accurate inventory of the wreck's state with a current assessment of the environment's state and a visual inspection of the wreck. Report.
2. Based on the analysis of available information – making a decision regarding further actions. Initiating the process of obtaining necessary funds.
3. Procedure of selecting the company for cleaning the wreck and emptying its tanks.
4. Cleaning the wreck/ emptying tanks:
   a. Specialized recognition of tanks suspected of containing fuel.
   b. Cleaning the wreck of the nets and preparation of selected tanks for the operation of removing fuels, oils.
   c. Operation of removing fuels, oils.
   d. Checking and possible disposal of conventional ammunition and other dangerous cargo.
2. Re-inventory of the wreck's state with the assessment of the environemnt's state (soil and water surveys, macrozoobenthos). Report .

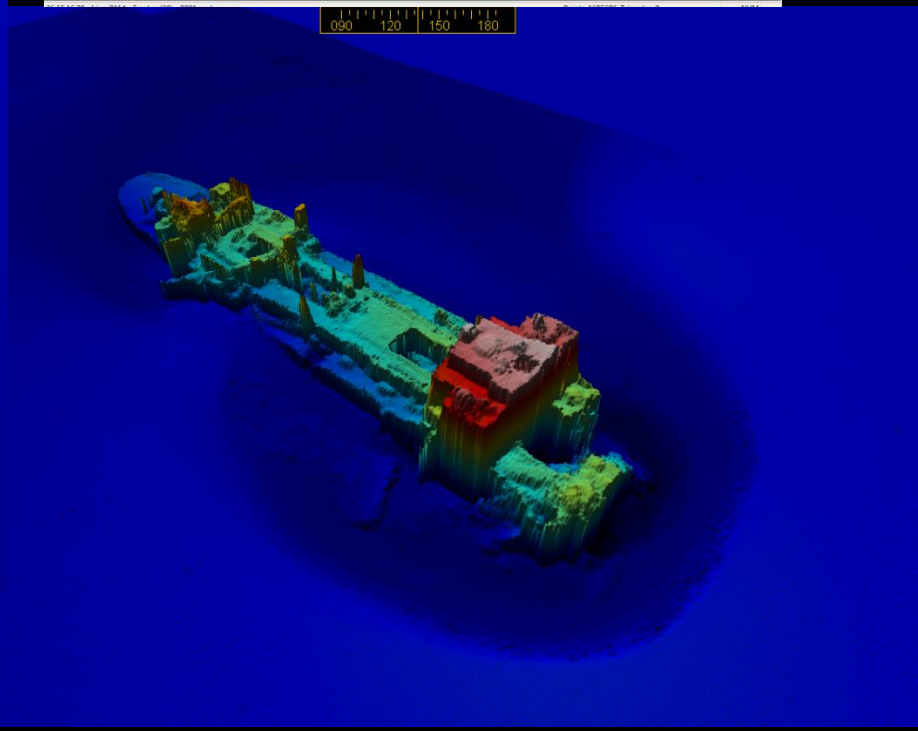
Current state of knowledge









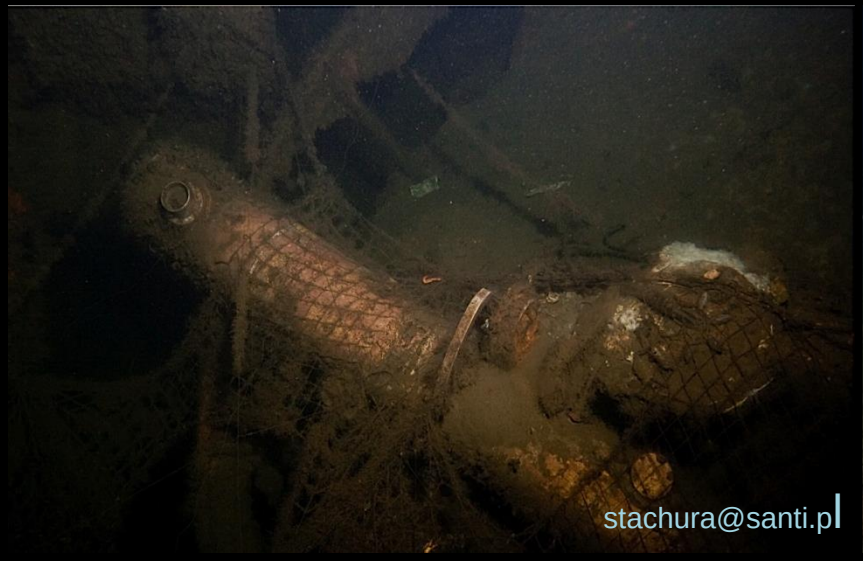


J. Koszałka
(Maritime Office in Gdynia)

Current state of knowledge

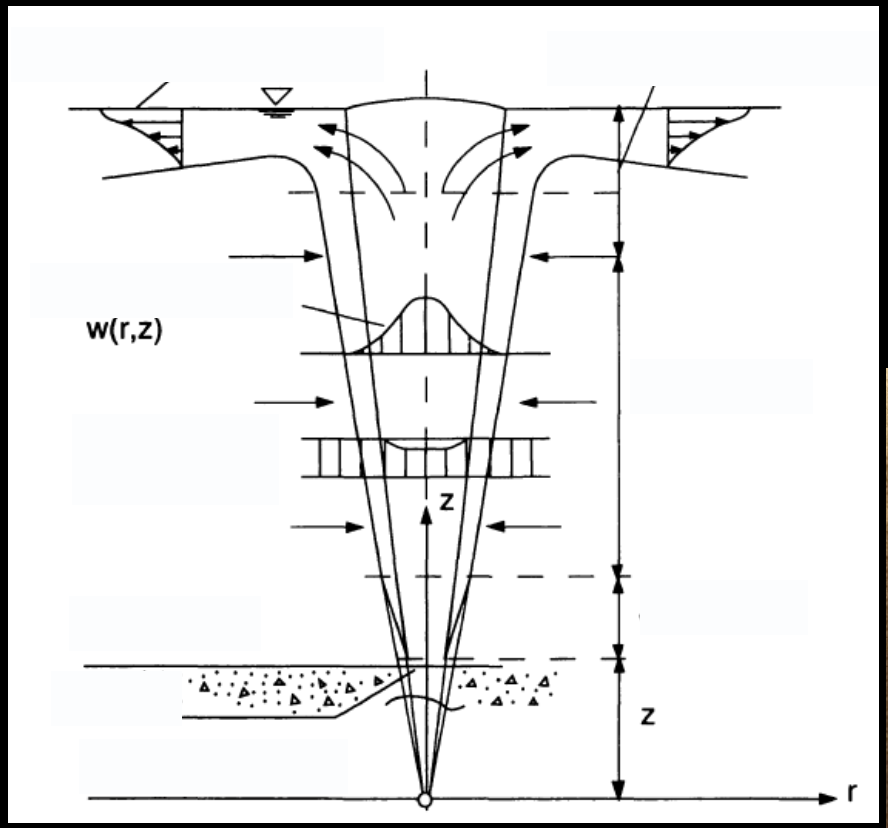
Taken from a presentation by Daniel Pastwa - Known and unknown wrecks around Hel

Current state of knowledge

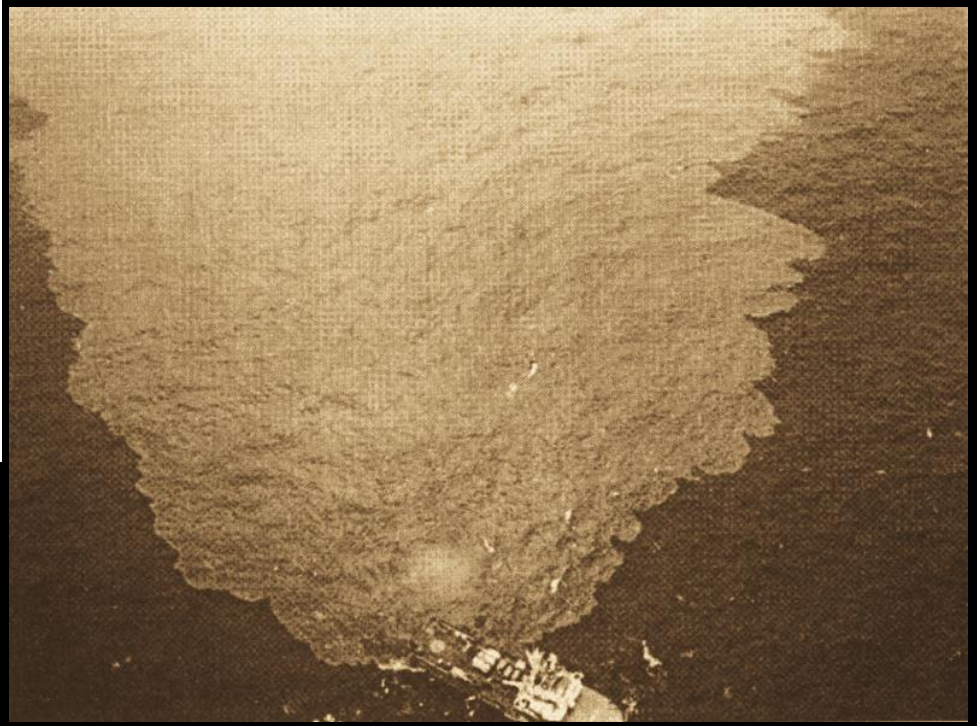


Taken from a presentation by Daniel Pastwa - Known and unknown wrecks around Hel

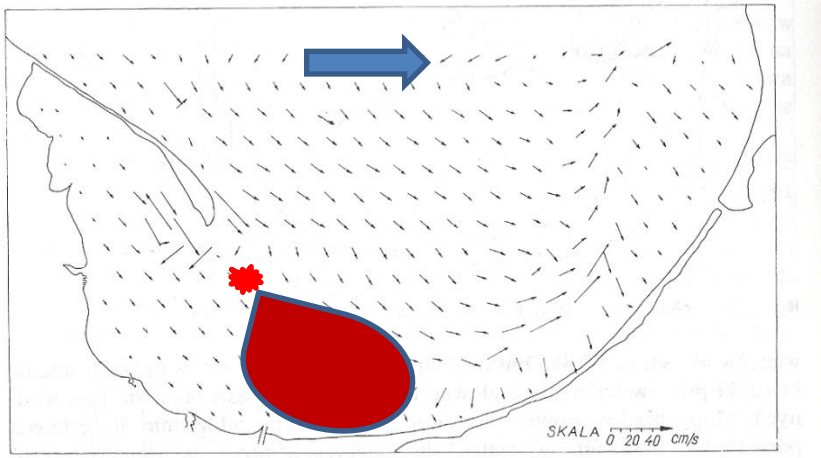
Current state of knowledge



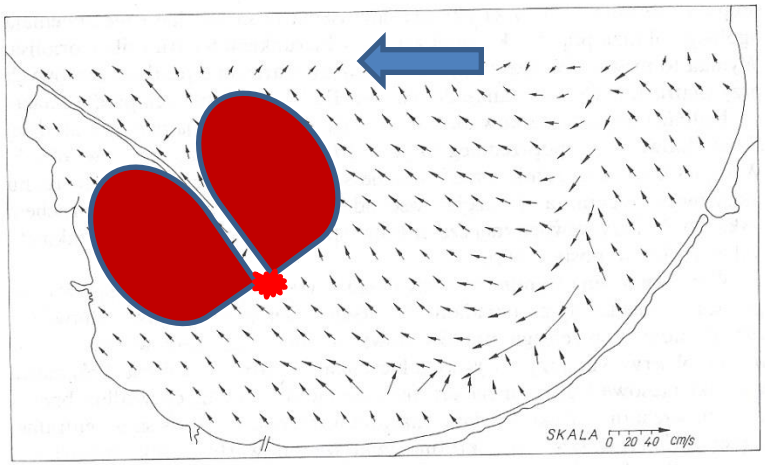
Typical lekeage from wreck



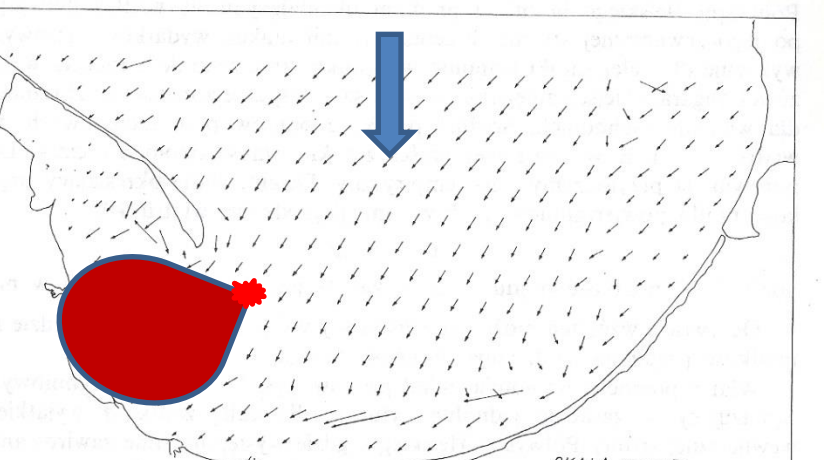
Current state of knowledge



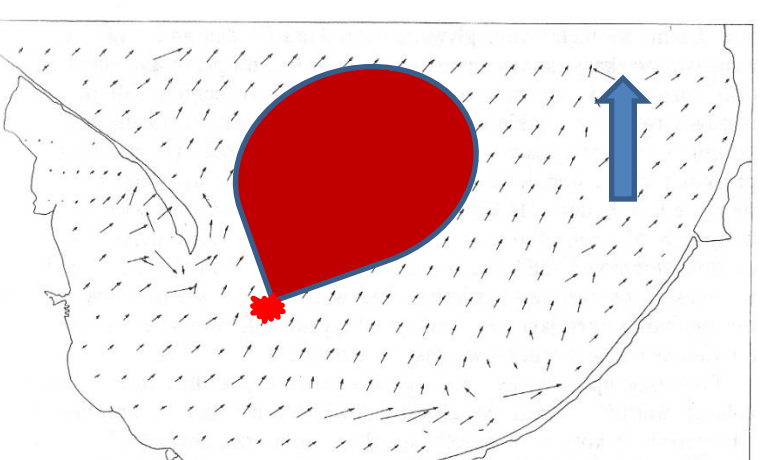
Rys. 5.2.9. Prądy powierzchniowe przy wietrze W 10 m/s



Rys. 5.2.10. Prądy powierzchniowe przy wietrze E 10 m/s



Rys. 5.2.11. Prądy powierzchniowe przy wietrze N 10 m/s



Rys. 5.2.12. Prądy powierzchniowe przy wietrze S 10 m/s

Possible scenarios for spreading the oil spill depending on the wind direction

Current state of knowledge

1. The load condition of the wreck is unknown - photos and known circumstances (e.g. the Kriegsmarine HQ reports from April 1945) indicate that at the time of the sinking, there were a lot of supplies aboard the ship - which we estimate for 8 - 10 thousand tons.
2. We know - from the intercepted telegrams- that 10 days before being sunk on the ship there were **3136 cubic meters of fuel (3000 tons)**
3. It is impossible to define the current state of „supplies" and the load without thorough surveys of the wreck – even if only 10% of the load and supplies remained – we can still expect about 1 thousand tons of substances, which can contaminate the water and seabed in the area. The lack of information about previous contaminations suggests, that in reality the amount of fuel can be much greater than the assumed 1 thousand tons.
4. Annually– due to corrosion of steel – from 0.06 to 0.14 mm of steel wanes from the hull (side, frame etc) of the wreck. Assuming that in the case of FRANKEN it is 0.1 mm, after 70 years of being settled on the bottom about 7 mm of steel has waned, which means that the wreck is on the verge of collapsing under its own weight (the photographs show serious gaps in the strucutre of the ship).

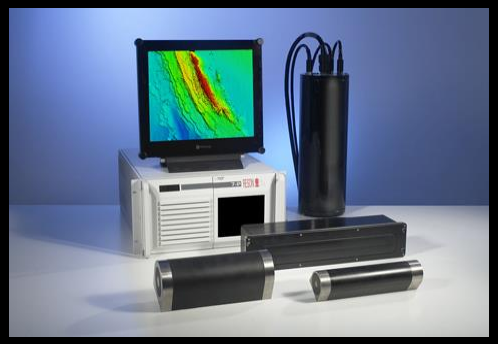
Current state of knowledge

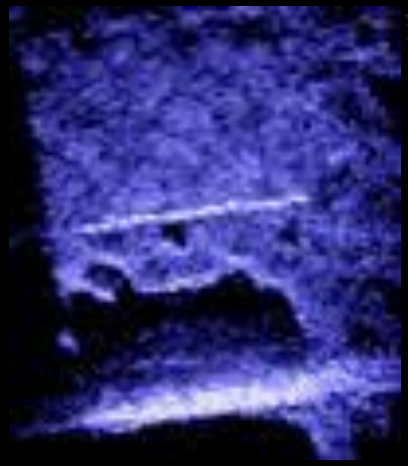
5. A SUDDEN COLLAPSING OF THE SHIP UNDER ITS OWN WEIGHT WILL CAUSE UNCONTROLLABLE RELEASE OF FUELS, OILS AND OTHER SUBSTANCES CONTAMINATING THE ENVIRNMENT

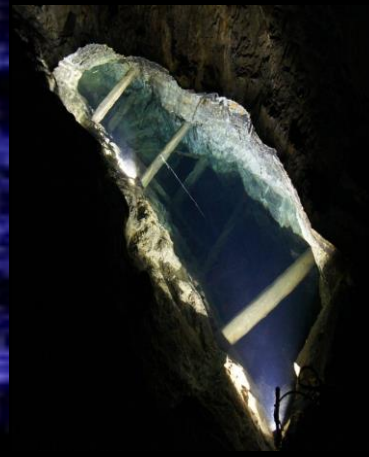
6. We do not know the possible scenarios of such a spillage – but we do know, that the wreck is located in an area, which is highly sensitive to contamination and the current system in the area will cause the spillage to be directed to the area of the nearby beaches located in the distance of 10 to 25 km from the place of wreck's settling.

7. In result of the location of the wreck (the middle of the Gdańsk Bay) a very intense contamination of the whole Gdańsk Bay area can be expected with a particular emphasis on the shores from Piaski to the Harbour of Hel.

Expediton on wreck 23- 28 of April 2018







Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

1. Measurement activities - IMOR ship

Participation is taken by the ship's crew, measuring group, media group - altogether 14 to 16 people for 6 days

1. Works:

- Setting of lighting lamps on the wreck position.
- Preparation of photographic documentation using ROV cameras.
- Taking technical photos for the mosaic.
- Making sheet thickness measurements.
- Making measurements with an acoustic camera.

Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

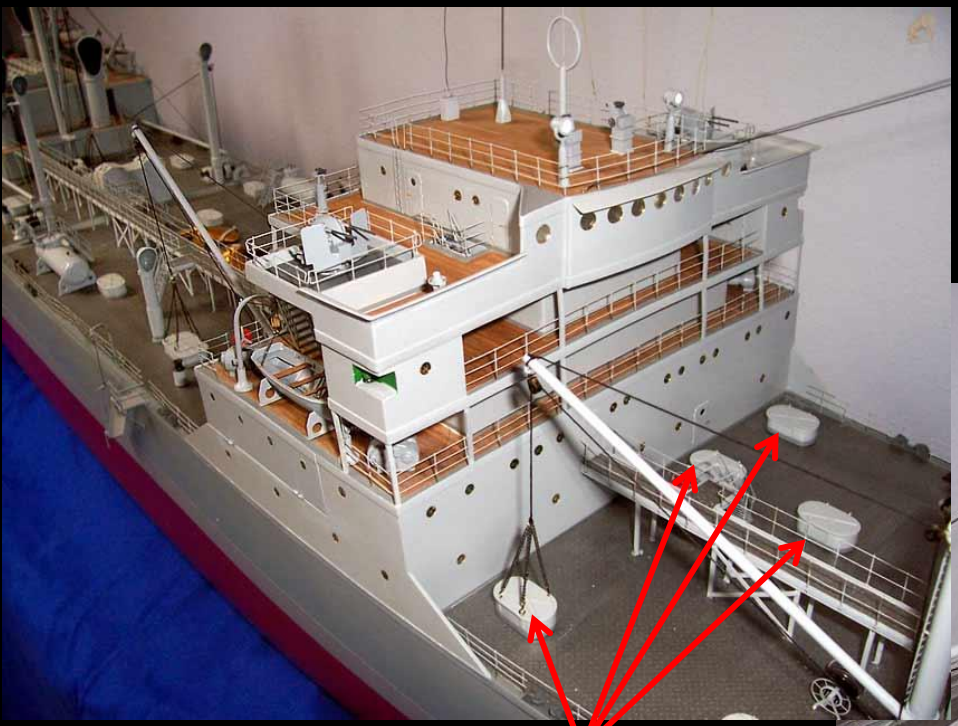
Diving activities - LITORAL ship:

Participation is taken by the LITORAL ship crew and 6 divers for 4 days

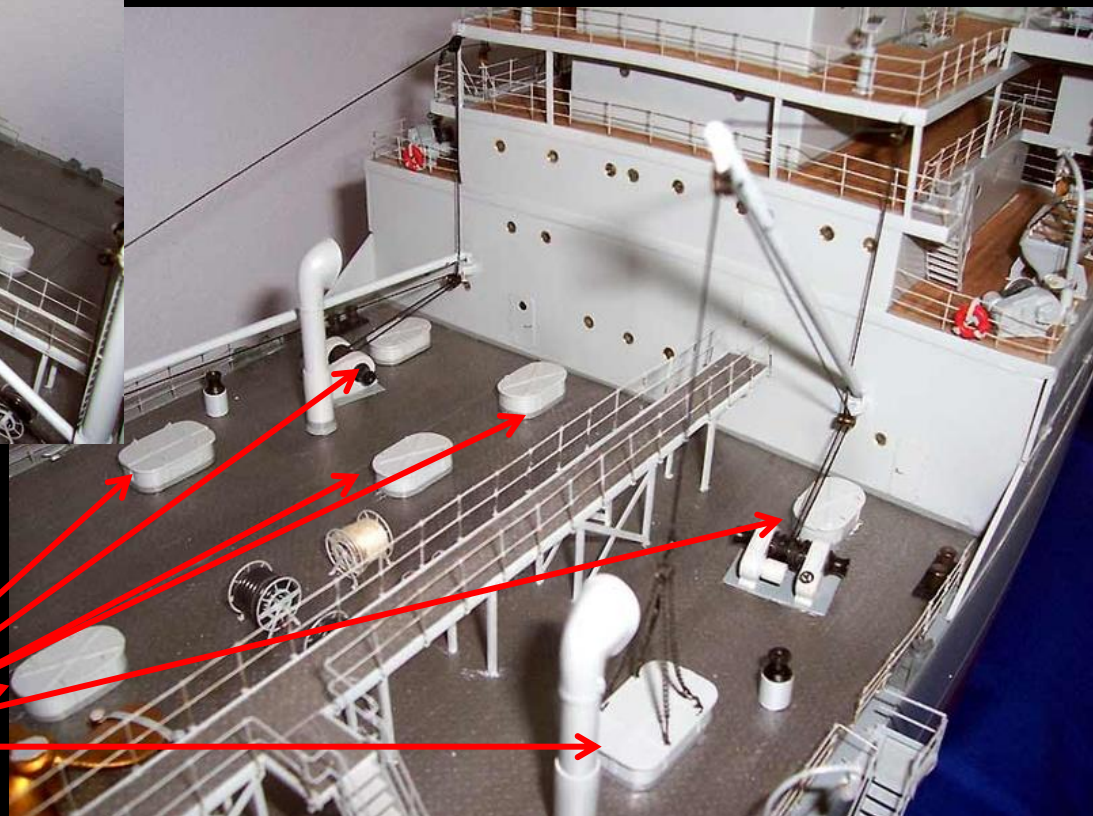
Works:

- Preparation of photographic documentation for the needs of the film.
- Preparation of photographic documentation for the needs of a documentary mosaic.
- Performing an inspection of the tanks
- Setting traps on fuel.
- Search for places where fuel is visible - sampling.
- Selection and Preparation of places for measuring sheet thickness.
- Sheet thickness measurement.
- Collecting traps.
- Preparation of acoustic documentation for the needs of documentation of wreck

How to clean the wreck from fuels and lubricating oils



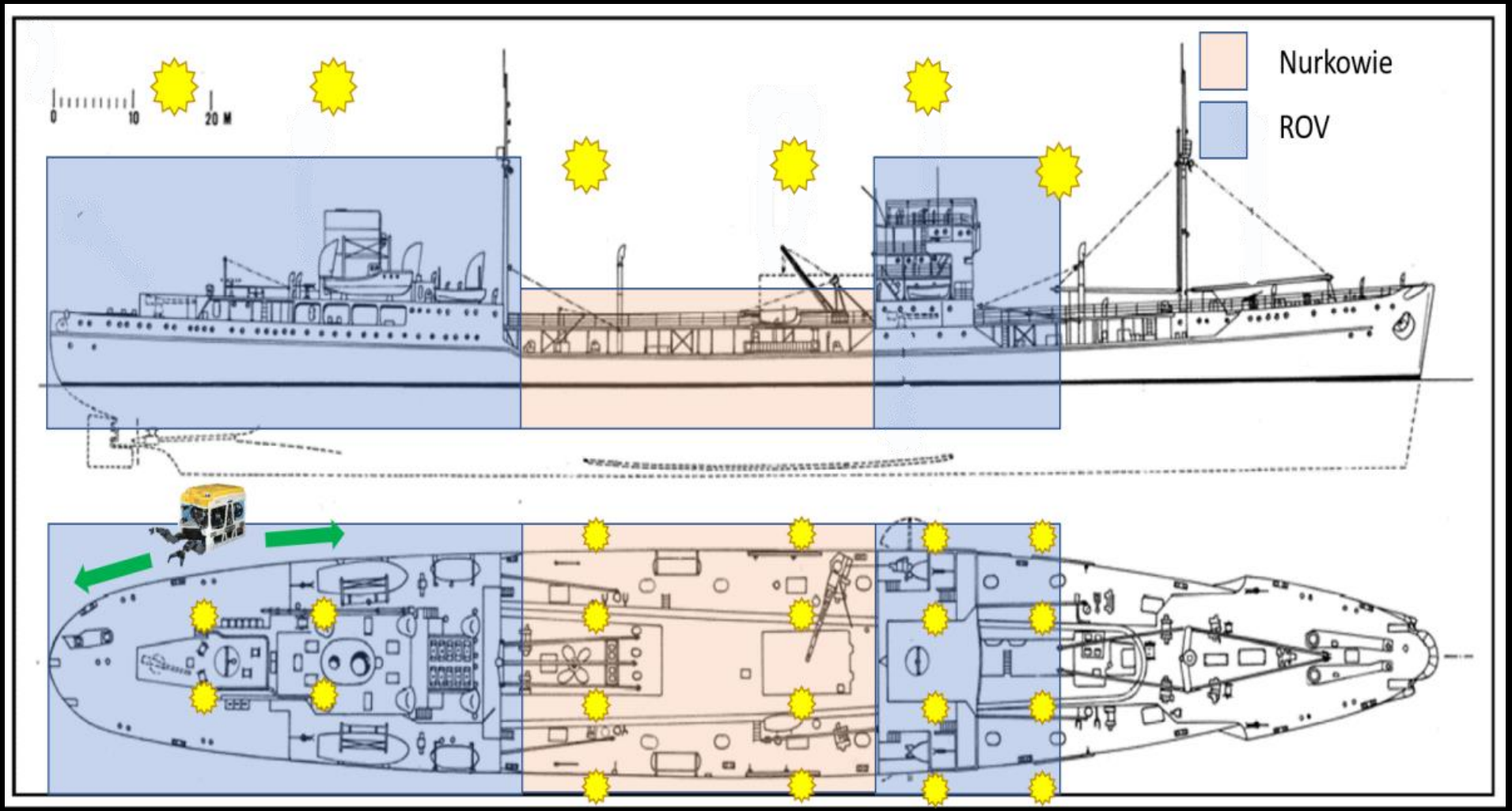
Model of the T/S Altmark (twin ship of T/S Franken)



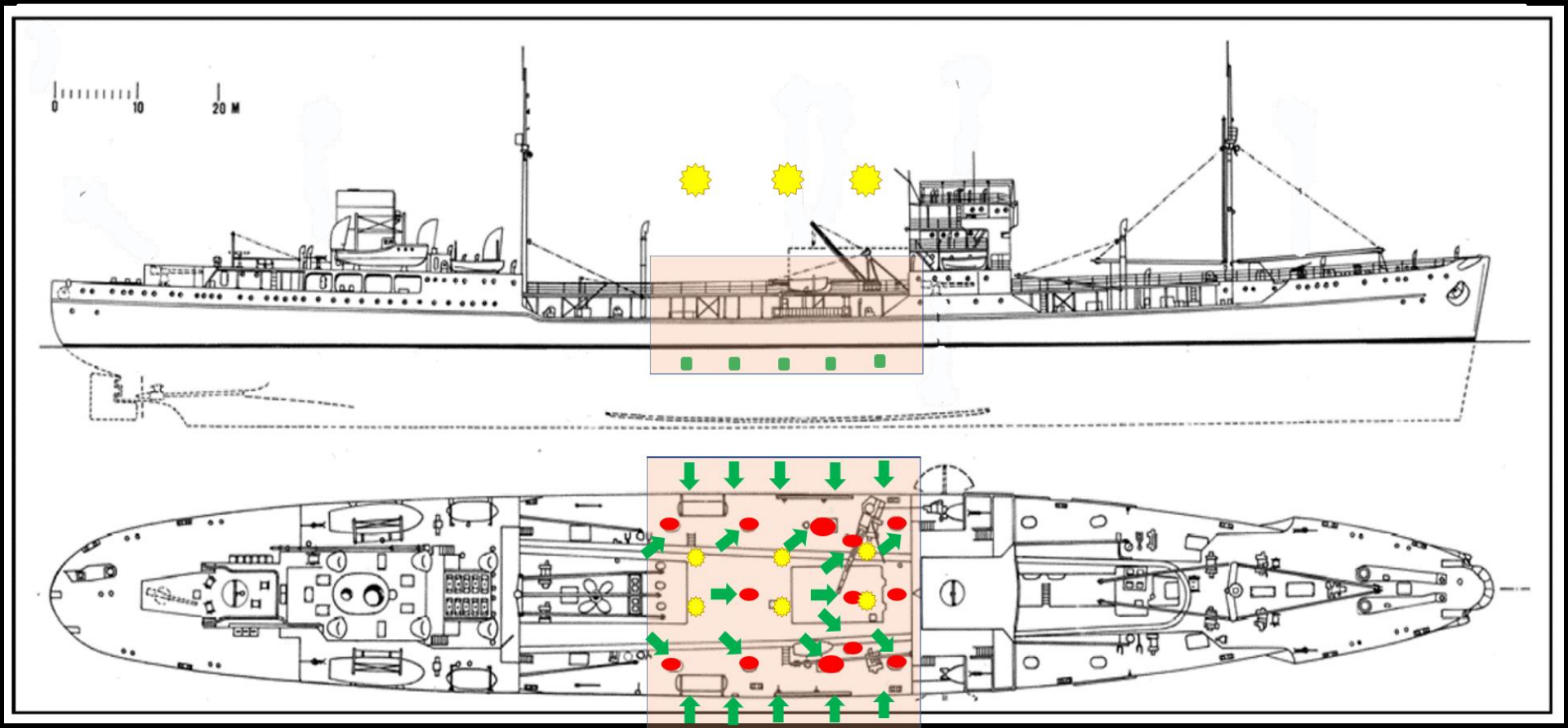
Fuel tank inspection hatches on the fore deck

Amidship fuel tank inspection hatches

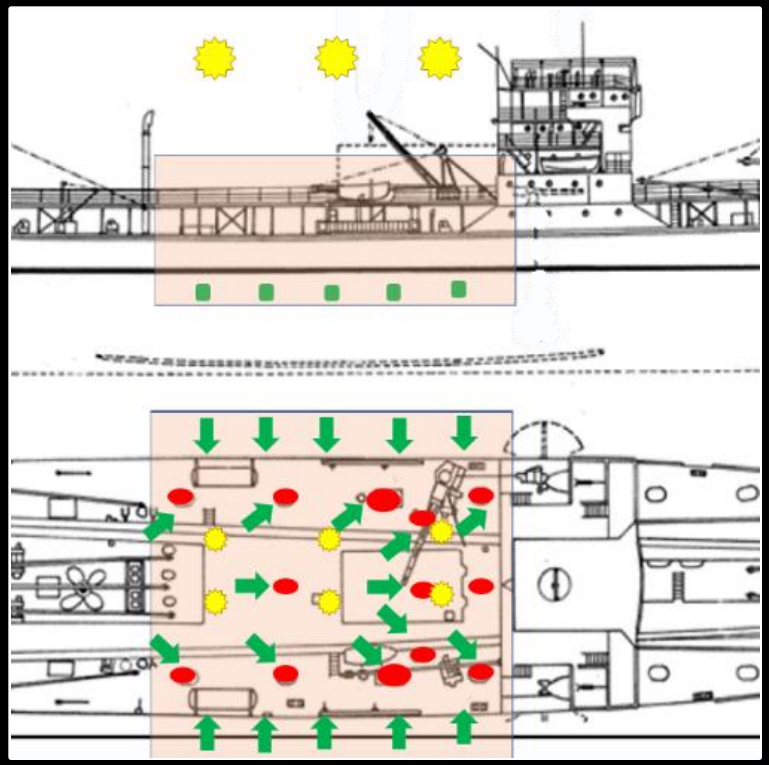
Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker



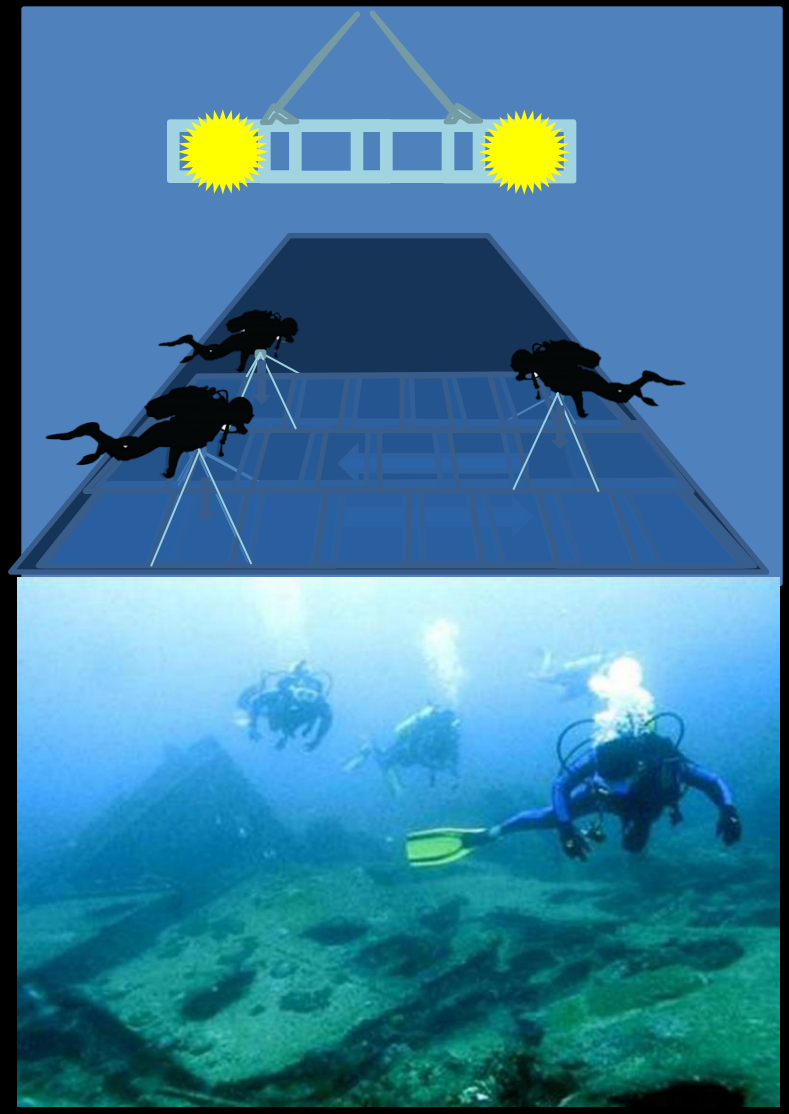
Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker



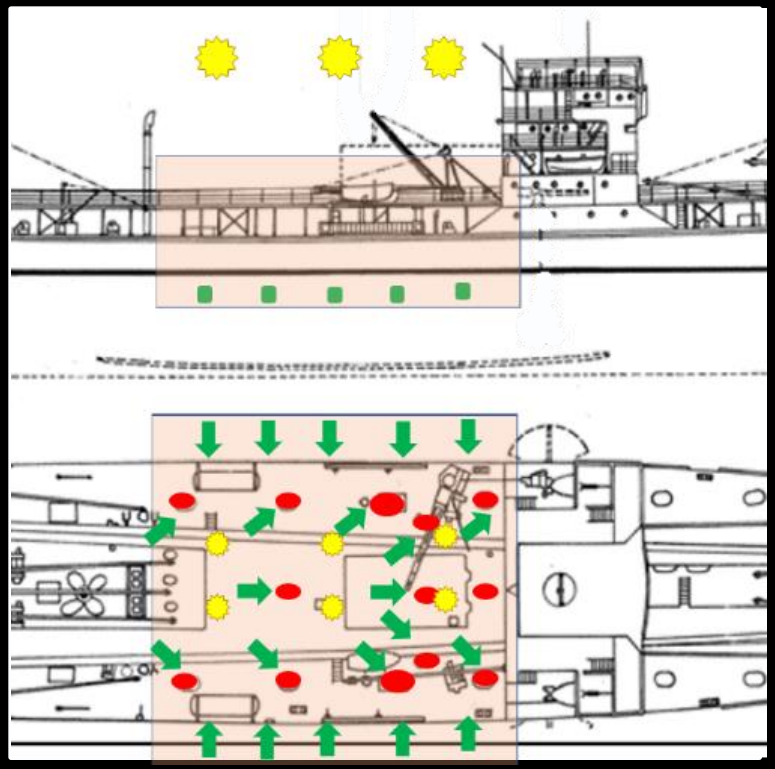
Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker



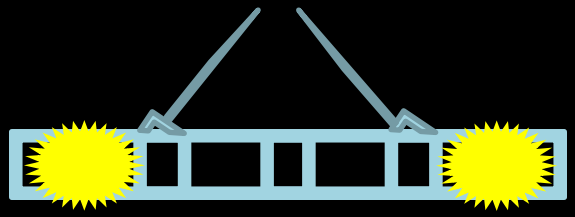
mosaic design

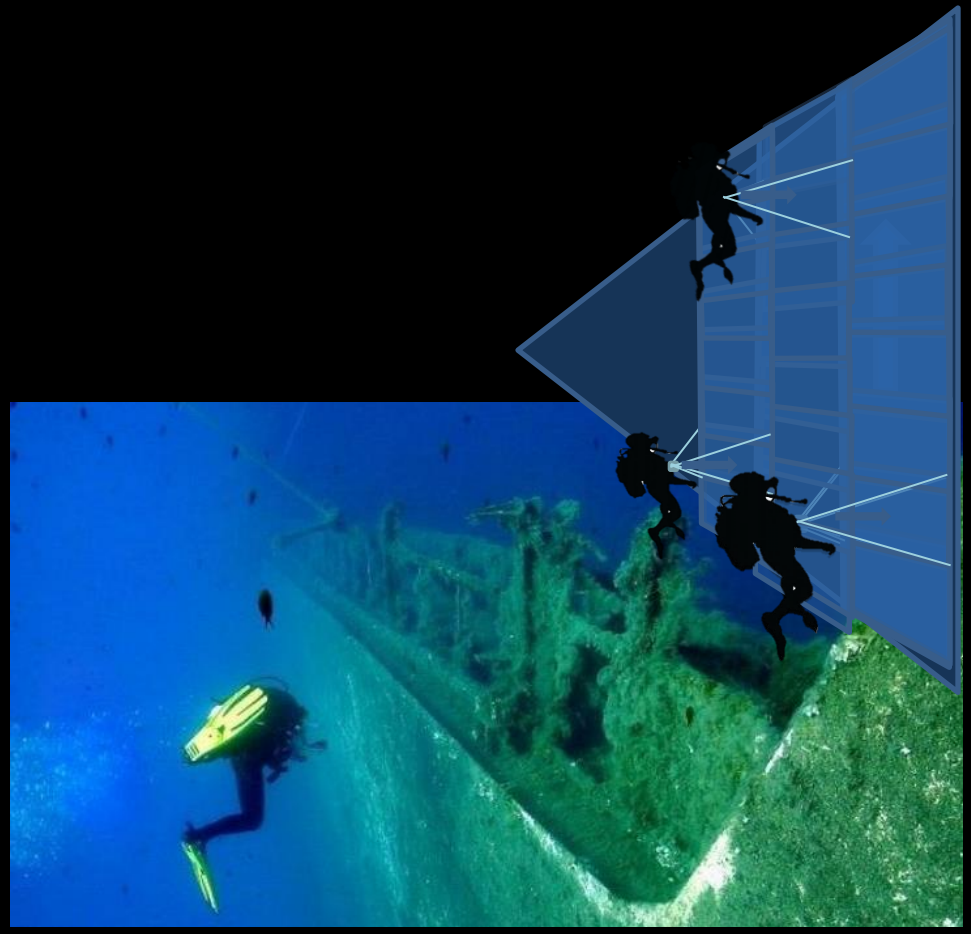


Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker



mosaic design



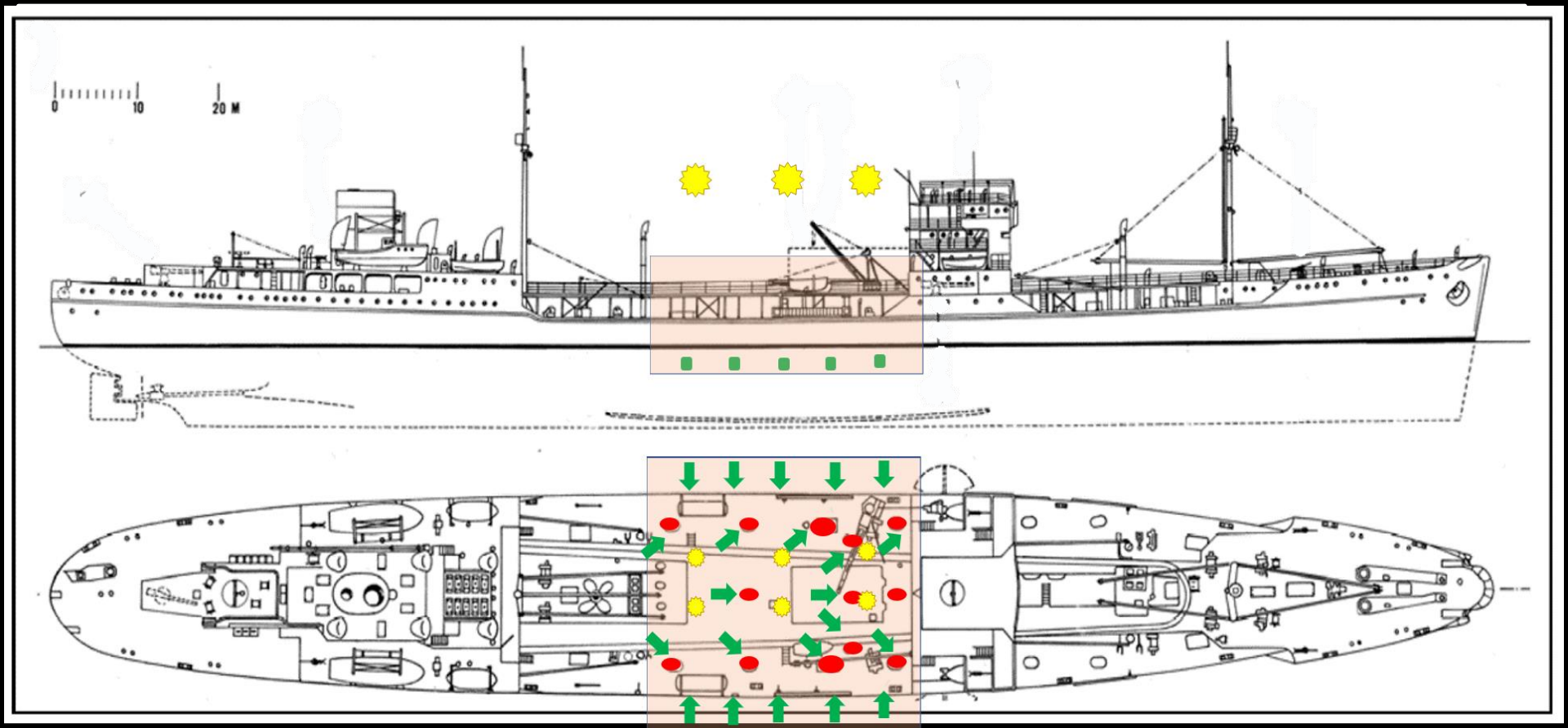


Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

Day 1

		DZIAŁANIE	23.04.2018	6 dni po 12 godzin pracy (08:00-20:00)	RZECZYWISTE ROZPOCZĘCIE	RZECZYWISTY CZAS TRWANIA	PROCENT WYKONANIA
		Rozpoczęcie projektu "Badanie wraku FRANKEN"	1	72	1	72	0%
8:00	20:00	**Dzień 1 (0800 - 2000)**	1	12	1	12	0%
8:00	10:00	**Mobilizacja ludzi i sprzętu** w porcie Gdynia Statki IMOR + LITORAL	1	2	1	2	0%
10:00	12:00	**Szkolenie dodatkowych uczestników** (ekipa Fundacji MARE) odprawa dla nurków	3	2	3	2	0%
12:00	14:00	**Przejście w rejon pomiarów** - szkolenie	5	2	5	2	0%
14:00	15:00	**Wystawienie sprzętu** oświetleniowego i rozpoczęcie nurkowania wystawienie ROV inspekcyjnego do asysty nurkom	7	1	7	1	0%
15:00	19:00	**Rozpoczęcie nurkowania** 1. Zdjęcia do filmu, rozpoznanie sytuacji na dnie, poszukiwanie miejsc wycieków 2.Wstępne rozpoznanie za pomocą ROV (przy wystawionych lampach)	8	4	8	4	0%
19:00	20:00	**Odprawa z nurkami** - podsumowanie dnia, wypracownaie danych do działania dnia następnego.	12	1	12	1	0%
20:00	22:00	Powrót do portu Gdynia					

Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker



Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

Day 2

		DZIAŁANIE	23.04.2018	6 dni po 12 godzin pracy (08:00-20:00)	RZECZYWISTE ROZPOCZĘCIE	RZECZYWISTY CZAS TRWANIA	PROCENT WYKONANIA
6:00	22:00	**Dzień 2 (0800-2000)**	13	12	13	12	0%
6:00	8:00	**Przejście w rejon pomiarów**					0%
8:00	9:00	**Odprawa** na statku iMOR dla nurków, sprawdzenie sprzetu nurkowego oraz pomiarowego	13	1	13	1	0%
9:00	10:00	**Wystawienie sprzętu** oświetleniowego i wystawienie ROV inspekcyjnego do asysty nurkom	14	1	14	1	0%
10:00	14:00	**Rozpoczęcie nurkowania** 1. Wykonanie dokumentacji fotograficznej dla potrzeb mozaiki dokumentacyjnej 2. Wykonanie obserwacji (inspekcji) części zawierającej zbiorniki – przygotować dostępną dokumentację techniczną i zdjęciową – prezentacja dla nurków. 3. Postawienie łapek na paliwo 4. Przygotowanie miejsc pod pomiar Cygnusem – wystawienie fleszy, pierwsze pomiary	15	4	15	4	0%
14:00	15:00	**Odprawa z nurkami**, zebranie danych i informacji, wstępne wypracownaie danych do działania dnia następnego	19	1	19	1	0%
15:00	19:00	**Rozpoczęcie nurkowania ROV** 1. Wykonanie dokumentacji fotograficznej za pomocą kamer ROV 2. Jeśli się uda – kamera akustyczna – wyznaczyć strategię pomiarów	20	4	20	4	0%
19:00	20:00	**Odprawa** - podsumowanie dnia, wypracownaie danych do działania dnia następnego	24	1	24	1	0%
20:00	22:00	**Powrót do portu Gdynia**					0%

Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

Day 3……

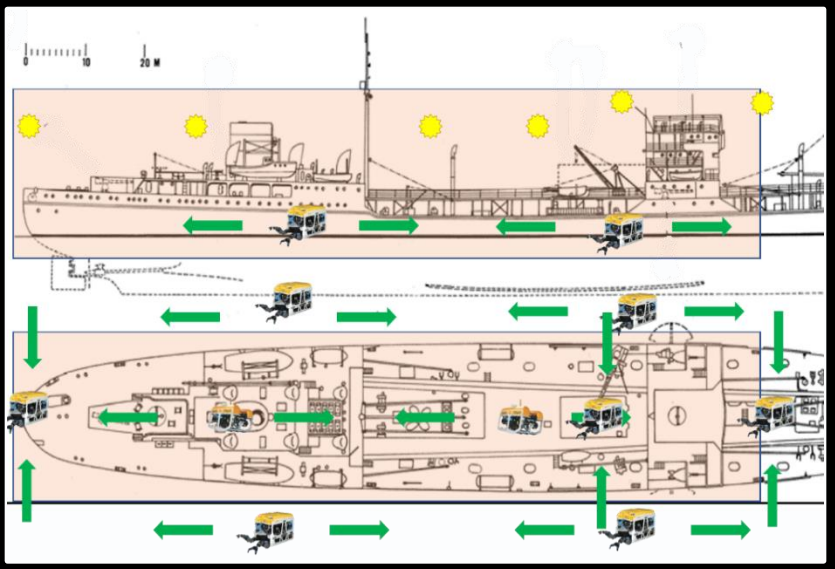
		DZIAŁANIE	24.04.2018	6 dni po 12 godzin pracy (08:00-20:00)	RZECZYWISTE ROZPOCZĘCIE	RZECZYWISTY CZAS TRWANIA	PROCENT WYKONANIA
6:00	22:00	**Dzień 3 (0800-2000)**	25	12	25	12	**0%**
6:00	8:00	**Przejście w rejon pomiarów**					**0%**
8:00	9:00	**Odprawa** na statku IMOR dla nurków, sprawdzenie sprzetu nurkowego oraz pomiarowego	25	1	25	1	**0%**
9:00	10:00	**Wystawienie sprzętu** oświetleniowego i wystawienie ROV inspekcyjnego do asysty nurkom	26	1	26	1	**0%**
10:00	14:00	**Rozpoczęcie nurkowania** 1. Wykonanie dokumentacji fotograficznej dla potrzeb mozaiki dokumentacyjnej 2. Zbieranie łapek, pobór paliwa w innych miejscach niż zbiorniki – przygotować dostępną dokumentację techniczną i zdjęciową – prezentacja dla nurków. 3. Pomiar Cygnusem – dodatkowe pomiary	27	4	27	4	**0%**
14:00	15:00	**Odprawa z nurkami**, zebranie danych i informacji, Poodsumowanie współpracy, przekazanie danych, wyznaczenie celi do sprawdzenia za pomocą ROV	31	1	31	1	**0%**
15:00	19:00	**Rozpoczęcie nurkowania ROV** 1. Wykonanie dokumentacji fotograficznej za pomocą kamer ROV 2. Pomiary kamerą akustyczną	32	4	32	4	**0%**
19:00	20:00	**Odprawa** - podsumowanie dnia, wypracownie danych do działania dnia następnego	36	1	36	1	**0%**
20:00	22:00	**Powrót do portu Gdynia**					**0%**

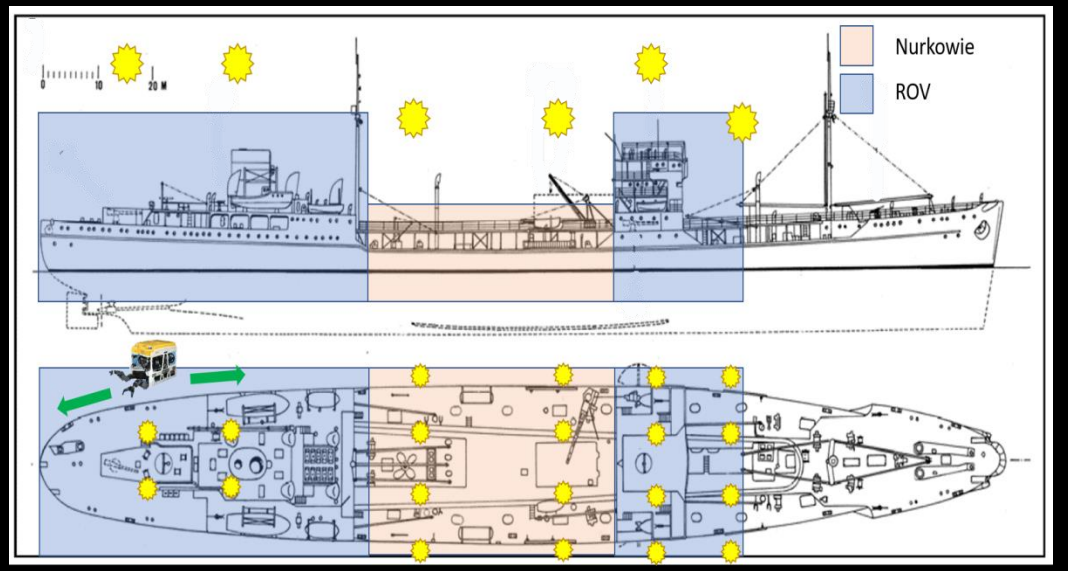
Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

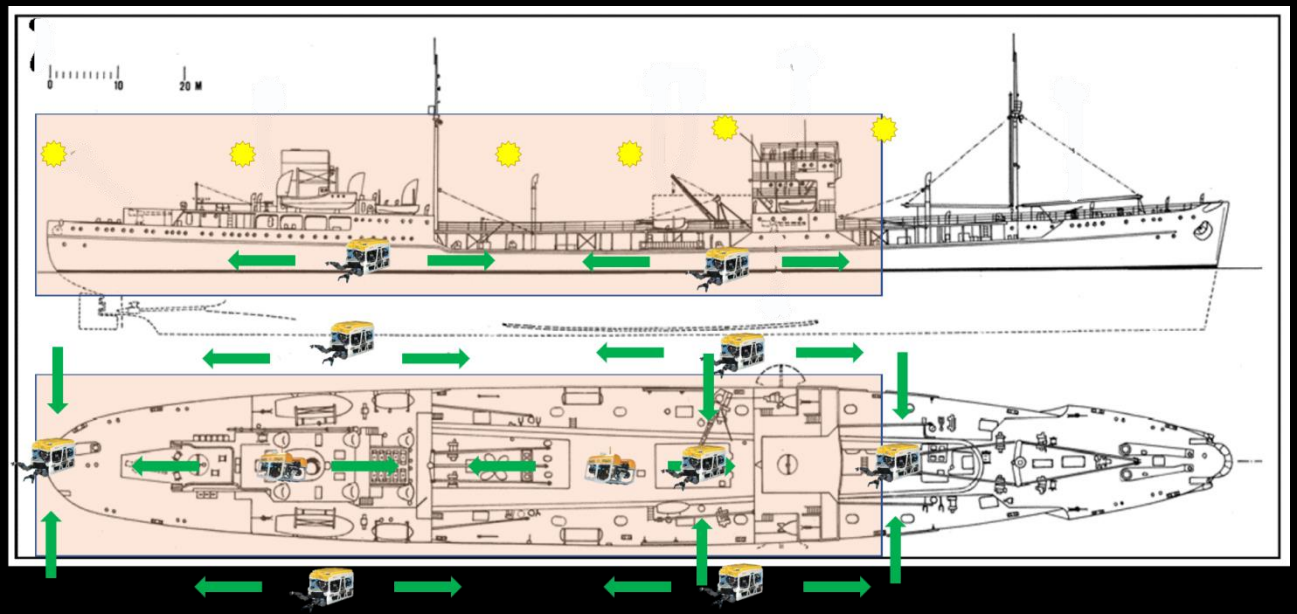
Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker



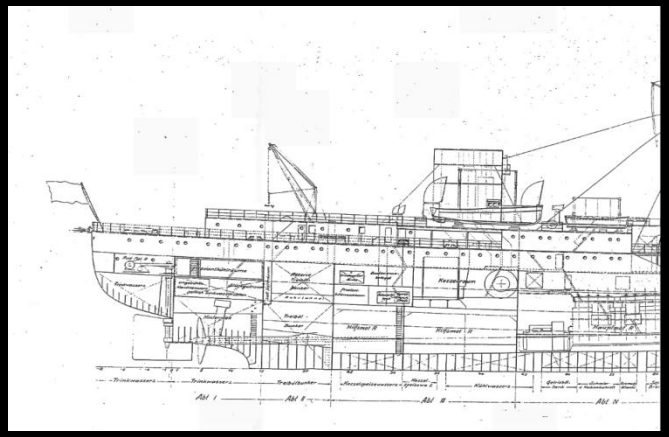


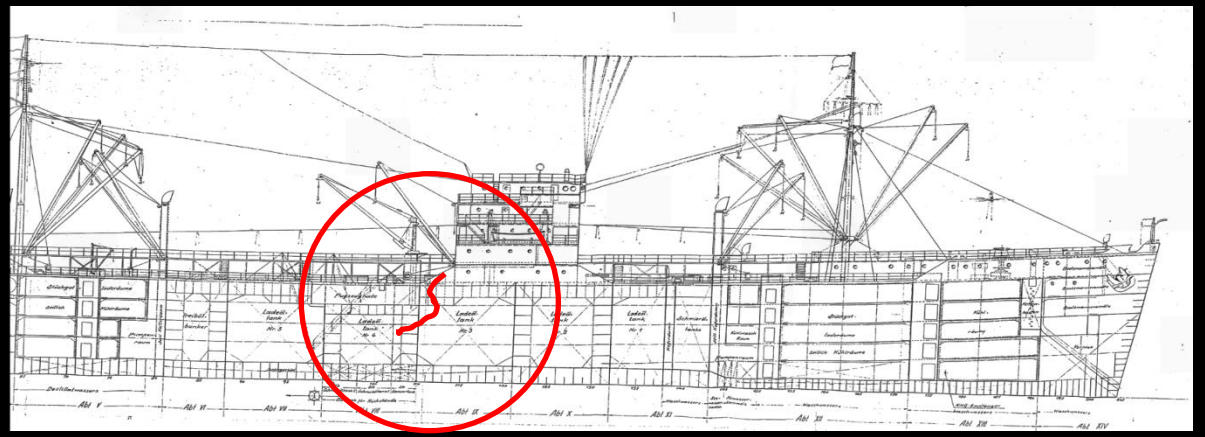


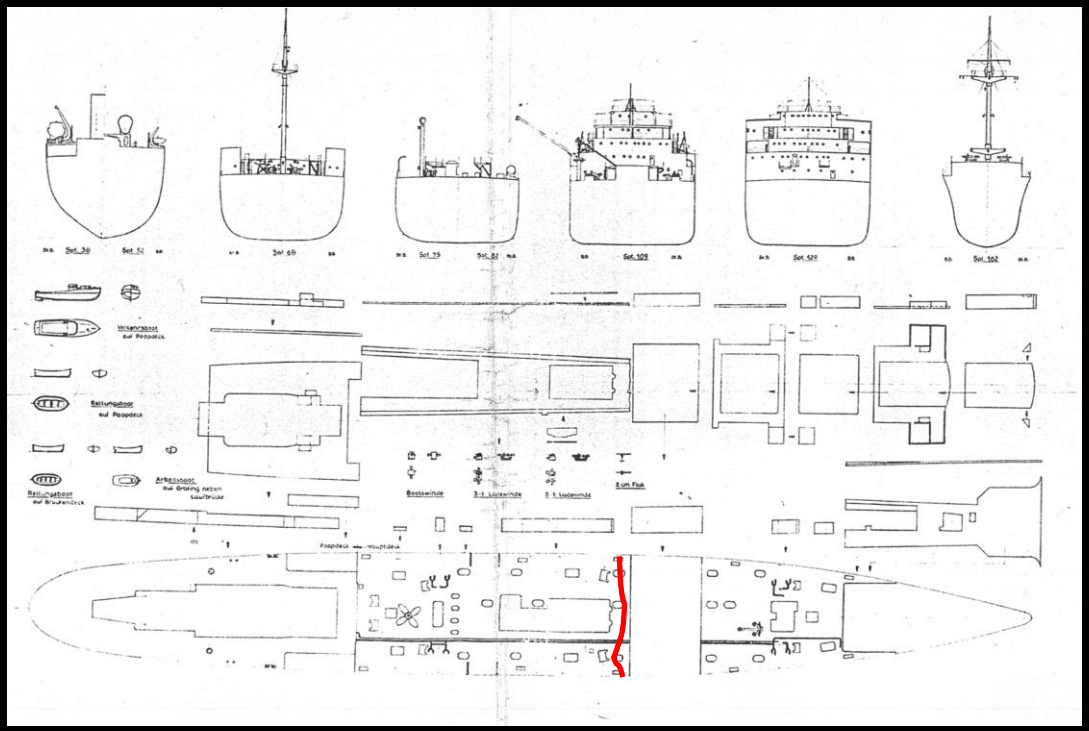
Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker

150 mm ammunition close to aft antiaircraft gun

Reduction of the negative impact of fuel leaks from the wreck of the Franken tanker







Conclusions

1. The T/S FRANKEN wreck is the most dangerous wreck of the Gdańsk Bay

2. There is an urgent need to determine the state of environment's contamination in the area of the wreck

3. There is an urgent need to undertake actions leading to a reliable assessment of contamination risk through identifying the actual amount of harmful substances and identifying the current technical state of the wreck.
4. Undertake actions:
   - In order to create a project of cleaning the wreck,
   - Obtain financial resources,
   - Determine the technology of actions related to cleaning
   - Commencement of operations involving the removal of harmful substances' remains.
5. After the completion of the cleaning operation perform another assessment of the environement's state.

Thank you for attention

Dr Inż. Benedykt Hac

benhac@im.gda.pl

benedykt.hac@im.gda.pl