



Supplementary report to the inquiry into

The collision between the car carrier
TRICOLOR
and the container vessel *KARIBA*

COLLISION

BETWEEN THE CAR CARRIER

TRICOLOR

AND THE CONTAINER VESSEL

KARIBA

**ON 14TH DECEMBER 2002
NEAR WESTHINDER**

Warning

This supplementary report has been drawn up according to the provisions of Clause III of Act No.20023-3 passed by the French government on 3rd January 2002 relating notably to technical and administrative investigations after accidents at sea and the decree of enforcement No. 2004-85 of 26th January 2004 relating to technical investigations after marine casualties and terrestrial accidents or incidents, and in compliance with the "Code for the Investigation of Marine Casualties and Accidents" laid out in Resolutions A.849(20) and A.884(21) adopted by the International Maritime Organization (IMO) on 27/11/97 and 25/11/99.

It contains further information which was made known to the BEA*mer* investigators after publication of their final report.

In compliance with the above mentioned provisions, the analysis of this incident has not been carried out in order to determine or apportion criminal responsibility nor to assess individual or collective liability. Its sole purpose is to identify relevant safety issues and thereby prevent similar accidents in the future. The use of this report for other purposes could therefore lead to erroneous interpretations.

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1 INTRODUCTION

To complete the investigation into the collision between the car carrier *TRICOLOR* and the container vessel *KARIBA* on 14th December 2002 and the subsequent collisions with the wreck of the *TRICOLOR* of the general cargo vessel *NICOLA* on 16th December 2002 and the Ore/Oil carrier *VICKY* on 1st January 2003, the consultations laid down in the *Code for the Investigation of Marine Casualties and Incidents* of the International Maritime Organization (Resolution A.849(20)) and the French Act of Parliament No.2002-3 of 3rd January 2002, relating notably to technical investigations after casualties at sea, were carried out.

During these consultations further information concerning the wreck of the *TRICOLOR* became available to the BEAmer investigators from the five sections which had been cut from the wreck and landed in ZEEBRUGGE between July and October 2003

Their report on the inquiry was concluded in June 2004.

In October 2004, the owners of the *TRICOLOR* and the Norwegian maritime administration (Sjøfartsinspektøren) transmitted fresh information based on observations made of the wreck of the *TRICOLOR* and the sections which had been brought to the surface. It was decided to open further investigations and a supplementary report was ordered as indicated in the attached document (Annex A). Within the framework of this inquiry the BEAmer investigators visited the sister ship of the *TRICOLOR*, the car carrier *TRIANON* and one them made the crossing from ZEEBRUGGE to SOUTHAMPTON on 2nd and 3rd May 2005 to observe how the ship was operated in conditions of navigation similar to those encountered by the *TRICOLOR*.

2 SCOPE OF THE PRESENT REPORT

This report is a supplement to the report published on 24th May 2004 and modified on 14th December 2004 (page 79). It was implemented following the decision of 21st March 2005 to set up a supplementary inquiry.

It deals solely with the situation of the ship at the time the accident happened.

3 OBSERVATIONS

3.1 The damage to the hull

In January 2003 the BEA^{mer} requested a document from WILHELMSEN and SMIT TAK listing the damage sustained by the *TRICOLOR*, but such a document was not forthcoming. On 18th November 2004 the Norwegian maritime administration transmitted a report on the diving operations around the wreck on 27th and 28th February 2003.

The damage sustained by the *TRICOLOR* in the collision with the *KARIBA* was observed by the divers to be on the port side abaft the watertight bulkhead situated at frame 153 : there was a gash about 3.4 metres long and 1 metre wide in way of frames 141 to 145, with a 1 metre long vertical crack in way of frame 143; there were also cracks about 50 cms long in way of frames 147/148 (see sketch in Annex B). From these observations it was possible to deduce that the No.3 port FO tank had been pushed in by the bulbous bow of the *KARIBA*.

There was no possibility of confusing this damage with that caused by the *VICKY* which was situated on the starboard side from frame 193 to right forward above deck 7.

3.2 The watertight doors

The photographs taken on shore of the watertight bulkhead at frame 153, corresponding to the after part of section 3 of the wreck, show that the doors on decks 9 and 11 were closed (see photograph 1 in Annex D). The question remains as to whether they were really closed and locked at the time of the accident. The following points were checked : the status panel showing the position/condition of the door; the position of the hydraulic operating cylinder; the position of the safety locking pins; and whether the doors were free to move.

✓ Indication of door status

Each of the two watertight doors on the garage decks was fitted with an indicator panel placed near the open/shut, lock/unlock control panel. Both panels were situated on the after side of the watertight bulkhead, with the doors to starboard of them. There were four lights on the panel indicating : power supply, door closed, door locked and door unlocked.

The status of the doors could be checked on the bridge by means of a mimic panel which also indicated the status of the vessel's other watertight doors and ramps. As regards the garage doors, a light came on when the door was closed and locked (see photo 1 in Annex C).

During their investigations the BEAmer investigators had difficulty in ascertaining precisely what the bridge mimic lights indicated. It has now been established that the lights come on when the doors are closed and locked.

On the other hand, they were not able to find out whether the master had checked the panel after the vessel had sailed from ZEEBRUGGE.

✓ The position of the rods in the hydraulic cylinders

The watertight doors were opened and closed by means of a hydraulic winch situated to starboard of them on the after side of the watertight bulkhead.

They were locked by means of a hydraulic cylinder fixed on their forward side and supported by the door jamb on the watertight bulkhead to starboard. During the locking operation there was a forward movement of about 20 millimetres pushing the door against its frame which compressed the gasket making the door watertight.

During the locking phase the rod comes out of the cylinder and pushes a stirrup towards a stop fitted on the bulkhead jamb; at the same time, a spring-loaded unlocking lever snaps into position behind the stop. At the end of the locking operation, the rod is out, the stirrup is pressed up against the stop on the bulkhead jamb and the unlocking lever is positioned behind the stop (see photo 2 in Annex C).

During unlocking, the rod goes back into the cylinder and the stirrup flips over; the rod pulls on the unlocking lever which is hard up behind the stop on the jamb and this pulls the door to

starboard and unlocks it (see photo 3 in Annex C). When there are only about 10 centimetres of the rod left outside the cylinder, the spring return on the unlocking lever pulls it clear of the stop : the door is now unlocked and can move backwards on its frame (see photo 4 in Annex C).

When the operating cylinders of doors 9 and 11 were examined after section 3 of the wreck of the *TRICOLOR* had been brought to the surface, it was observed that the rod on the door of deck 9 was partially retracted while that on the door of deck 11 was completely retracted (see photographs 2 and 3 in Annex D).

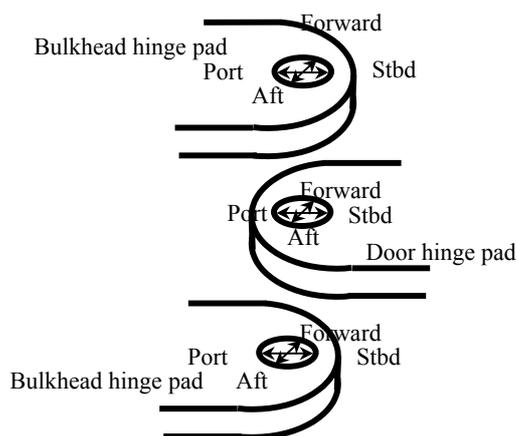
As the vessel was lying on her side, at right angles to her normal upright position, if there was no hydraulic pressure, or indeed any other force, the force of gravity may have pushed the rod back into its cylinder. This movement may have been impeded as long as the unlocking lever was held in position behind the stop on the door jamb. This could explain why, on deck 9, the rod was not completely retracted, even though it might have been fully extended, in the locked position, when the accident happened.

As regards the door of deck 11, the fact that the rod was completely retracted could be explained either because the door was not locked or because the unlocking lever did not fulfil its function. The *BEAmer* investigators on board the *TRIANON* noticed that the point on which this lever bore on the door on deck 11 was damaged but did not prevent locking and unlocking operations from being carried out.

✓ The position of the safety locking pins

Once they were closed and locked the watertight doors were secured with locking pins. There was one pin per door. They weigh about 3 kilos and are 60 mm in diameter. The diameters of the holes on the hinge pads on the door frames and the doors themselves were measured on board the *TRIANON* and are given below :

Diameter of holes for Ø 60 locking pins		Deck 9	Deck 11
Upper bulkhead hinge pad	Port / Stbd	70.2	64.0
	Fore/ Aft	72.7	70.3
Door	Port / Stbd	65.8	66.0
	Fore / Aft	66.1	65.0
Lower bulkhead hinge pad	Port / Stbd	68.6	64.3
	Fore / Aft	70.2	71.9



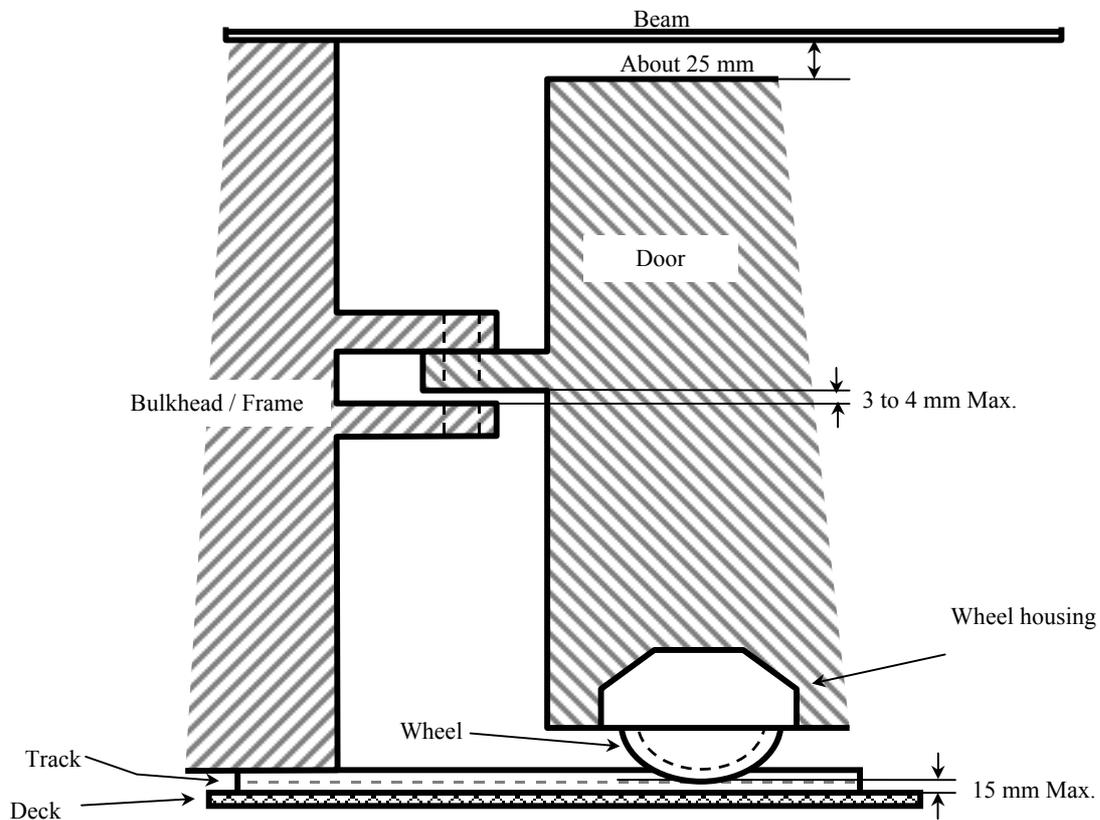
On the *TRICOLOR* the locking pins were found hanging outside their hinge pads (see photographs 1, 4 and 5 in Annex D).

In view of the play between pins and holes as measured on the *TRIANON*, it is possible that they fell out of the hinge pads when the vessel capsized or while the vessel was lying on her port side or again during the cutting and lifting operations.

✓ Operational status of the doors

The watertight doors on deck 9 and 11 roll along tracks on two wheels - their upper part being held in place by a guide rail - and are pulled sideways by a chain driven by a hydraulic winch.

The sketch below shows how the doors are hung :



The measurements were made on the *TRIANON*. They show that the door cannot move vertically more than 25 mm in its upper part and 15 mm between the wheel and the deck, giving a total of 40 mm; they also show that the play between the locking pin hinge pads on the jamb and the one on the door is about 3 to 4 mm.

Therefore the door cannot come off the track when its hinge pad is between the hinge pads on the jamb.

On section 3 salvaged from the *TRICOLOR*, the door on deck 9 is in position and closed.

The door on deck 11, on the other hand, is closed but has come off its track, both wheels having slipped off the after edge of the track (see photo 5 in Annex D). The bottom edge of the inner wheel, that is, the one closer to the ship's centre line, shows a horizontal mark on the bottom edge of its forward side, showing that it slid along the track without turning after leaving the track (see photo 6 in Annex D). It is bent vertically showing that it was subjected to excessive stress after coming off the track. Furthermore, its axle pin has come out of its housing; one of its two vertical locking plates which are normally held in place by two bolts has disappeared and the other one is only held by one bolt (see photo 7 in Annex D).

A securing strap is jammed between the door jamb and the door (see photographs 1, 5 and 8 in Annex D).

In order to explain this situation the *BEAmer* investigators considered whether the door was closed or not at the time of the accident.

If the door on deck 11 was not closed at the time of the accident :

- It was either on the track : when the vessel capsized to port, the door could have slid to port under its own weight and left the track because it was moving too fast, before its hinge pad slid between the hinge pads on the door jamb;
- Or it had already come off the track before the accident : when the vessel listed to port the door could have closed under its own weight.

If the door on deck 11 was closed at the time of the accident, the possibility that it came off the track, took an abnormal position, at right angles to its normal upright position, and was subjected to considerable strain due to the capsizing, its prolonged stay underwater with the ship on her side and the cutting and lifting operations, cannot be totally ruled out; in this event, it is not possible to explain how the securing strap became jammed between the door and the jamb. Or the door was already off the track and impossible to lock.

4 ANALYSIS AND CONCLUSIONS

The new elements supplied to the BEAmer investigators by the Norwegian administration and the owners of the *TRICOLOR* at the end of 2004 made it possible for them to establish that the *KARIBA* had holed the *TRICOLOR* abaft the watertight bulkhead of the garage in way of the No.3 port FO2 tank.

As regards the status of the watertight doors on garage decks 9 and 11, the following points were analysed, on the basis of observations made on section 3 salvaged from the *TRICOLOR* and by comparison with what was observed on her sister ship the *TRIANON* : how the status of the door was indicated, the position of the hydraulic operating cylinder, the position of the safety locking pins and whether the doors were free to move.

After examining the facts, the BEAmer investigators are convinced that the door on deck 9 was closed, but are not sure whether it was locked as the operating cylinder rod was partially retracted and the safety locking pins were not in position.

As for the door on deck 11, they consider that there are two possible hypotheses :

- Either it was not closed and closed under its own weight when the ship capsized, regardless of whether it came off the track before or after the accident;
- Or it was closed at the time of the accident ; if it had left the track beforehand, it would have been impossible to lock; if it was still on the track, no explanation can be found for the fact that a securing strap was caught between the door and the door jamb.

The main objective of the BEAmer investigators was to determine the causes of the successive accidents involving the *TRICOLOR* in order to see what lessons could be learned about the safety of navigation in the *Westhinder* area, under French responsibility.

They did not attempt to make an in-depth analysis as to why the *TRICOLOR* sank so quickly; that responsibility devolves to the flag state.



LIST OF ANNEXES

- A. The decision to open an inquiry**
- B. Sketch showing damage to the hull of the *TRICOLOR***
- C. Photographs taken on board the *TRIANON***
- D. Photographs of section 3 of the *TRICOLOR* taken in ZEEBRUGGE**

The decision to open an inquiry



Bureau d'enquêtes sur
les événements de mer

Paris, le 21 MAR. 2005
N/réf. : BEAmer/IGSAM/METATTM
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DÉCISION

Le directeur du Bureau d'enquêtes sur les événements de mer ;

- Vu la résolution OMI A 849 (20) du 27 novembre 1997 portant Code pour la conduite des enquêtes sur les accidents et les incidents de mer ;
- Vu la loi n°2002-3 du 3 janvier 2002 relative aux enquêtes techniques après événements de mer ;
- Vu le décret n° 2004-85 du 26 janvier 2004 relatif aux enquêtes techniques après événement de mer, accident ou incident de transport terrestre ;
- Vu l'arrêté ministériel du 17 février 2004 portant nomination du Directeur du Bureau d'enquêtes sur les événements de mer ;
- Vu l'arrêté ministériel du 24 février 2004 portant délégation de signature au Directeur du Bureau d'enquêtes sur les événements de mer ;
- Vu la décision n°14 du 09 janvier 2003 du Bureau des enquêtes techniques et administratives après accidents portant ouverture d'enquête sur l'abordage entre le *TRICOLOR* et le *KARIBA* ;
- Vu le rapport du Bureau d'enquêtes sur les événements de mer relatif à l'événement sus-visé ;

DECIDE

Article 1 : Compte tenu des éléments nouveaux apparus postérieurement à la clôture du rapport d'enquête, et issus des opérations de découpage et de relevage de l'épave du *TRICOLOR*, ainsi que des éléments fournis par son armateur au cours de la réunion qui s'est tenue à Paris le 25 février 2005, une enquête complémentaire est ouverte ce jour.

Article 2 : Elle portera sur la situation du navire *TRICOLOR* au moment des faits.

Article 3 : Ses conclusions feront l'objet d'un addendum au rapport original.

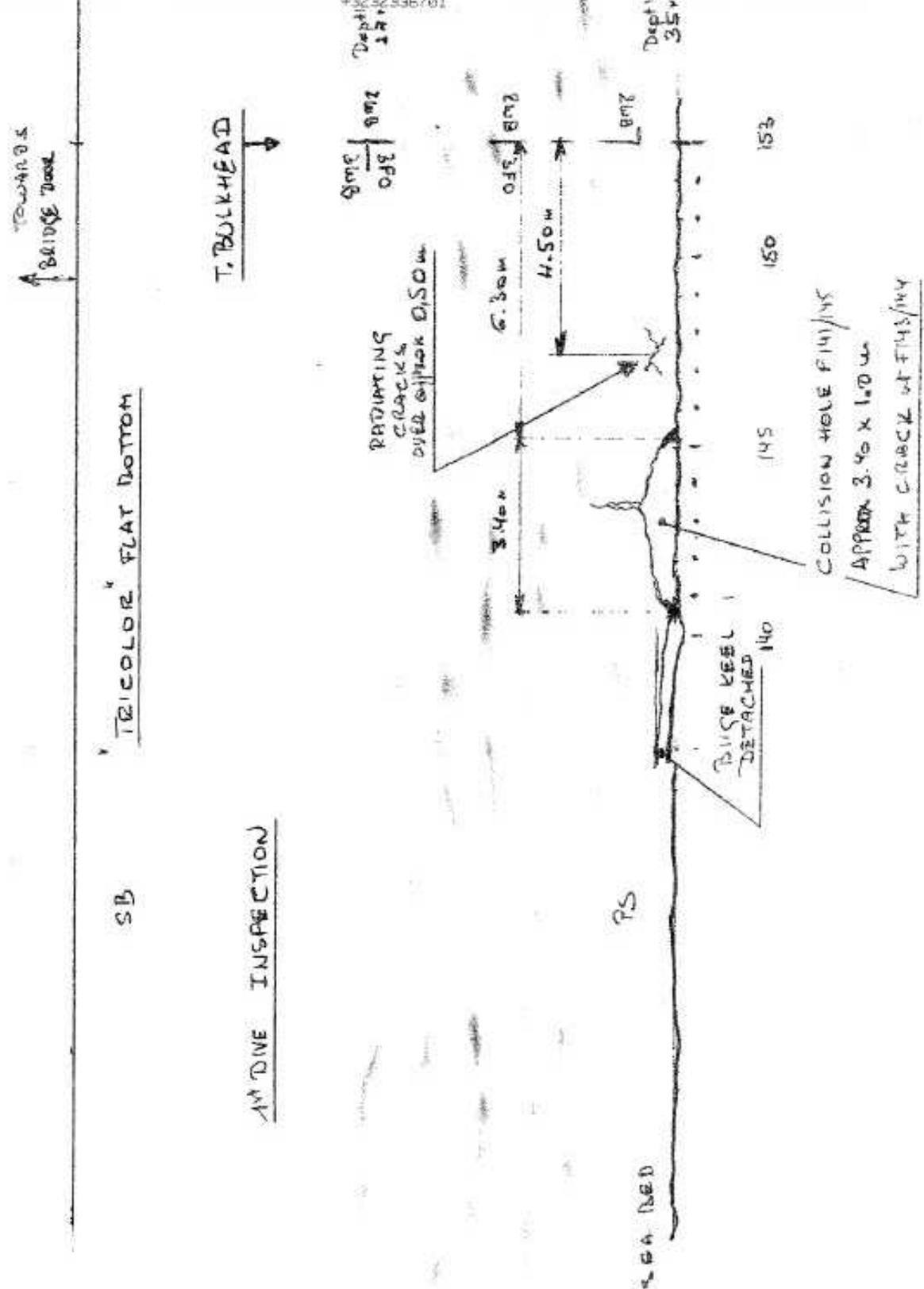
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**Sketch showing hull damage sustained by the
TRICOLOR in the collision with the *KARIBA***



Photographs taken on board the *TRIANON*

- 1. Indicator panel on the bridge showing open/closed status of doors**
- 2. Position of hydraulic cylinder rod – door locked**
- 3. Unlocking : as the rod retracts into the cylinder it pulls the door open by means of the unlocking lever**
- 4. Position of hydraulic rod – door unlocked**

Photo 1 : Status panel on the bridge for doors and ramps.



Photo 2 : Position of the hydraulic cylinder rod – door locked.



Photo 3 : The hydraulic cylinder during the unlocking phase, with the unlocking lever pulling the door.



Photo 4 : The hydraulic rod in the unlocked position, with the unlocking lever disengaged from the door jamb



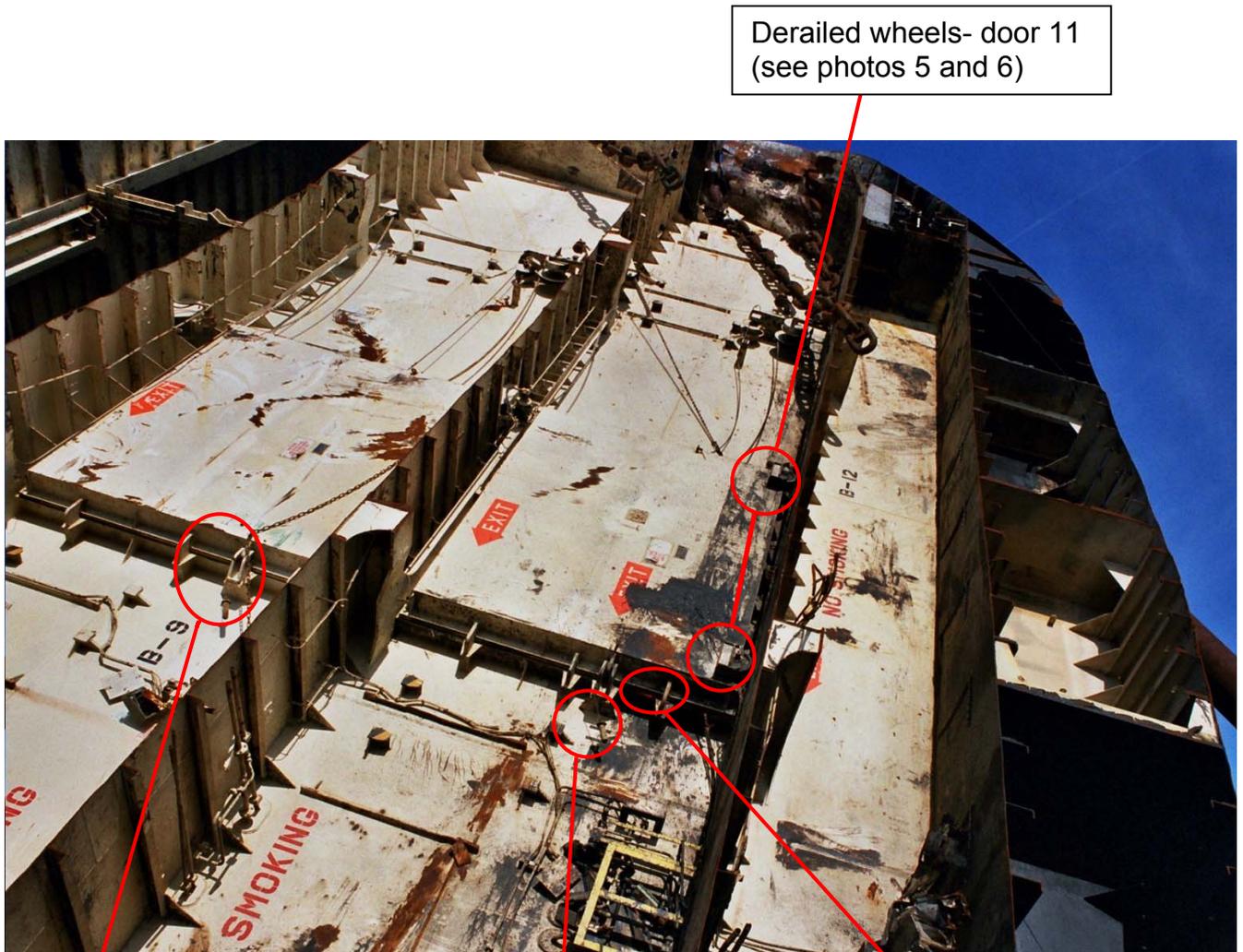
Photographs of section 3 of the *TRICOLOR* taken in ZEEBRUGE

- 1. Starboard after side of garage watertight bulkhead – decks 9, 11 and 12**
- 2. Hydraulic cylinder rod door 9, partially retracted**
- 3. Hydraulic cylinder rod door 11, totally retracted**
- 4. Housing of safety locking pin – door on deck 9**
- 5. Door on deck 12, derailed**
- 6. Door on deck 11, inner wheel**
- 7. Door on deck 11, inner wheel**
- 8. Securing strap between door 11 and door jamb**

Photo 1 : Starboard after side of garage watertight bulkhead – decks 9, 11 and 12

Notice that :

- the safety locking pins on doors 9 and 11 are not engaged in their sockets ;
- there is a securing strap between the door on deck 11 and the door jamb.



Derailed wheels- door 11
(see photos 5 and 6)

Safety locking pin deck 9
(see photo 4)

Safety locking pin deck 11

Securing strap between the
door and door jamb, deck 11
(see photo 8)

Photo 2 : Hydraulic locking rod – door on deck 9.

Notice that it is partially retracted.



Photo 3 Hydraulic locking rod – door on deck 11.

Notice that it is totally retracted.

Nota : This photograph was taken with the door laid flat after it had been removed from the wreck.



Photo 4 : Safety locking pin socket – door on deck 9.



Photo 5 : Door on deck 11.

Notice that :

- both wheels have come off the track, the inner wheel is bent and the axle pin is half-way out its bush;
- the safety locking pin is outside its socket and there is a securing strap between the door and the jamb.

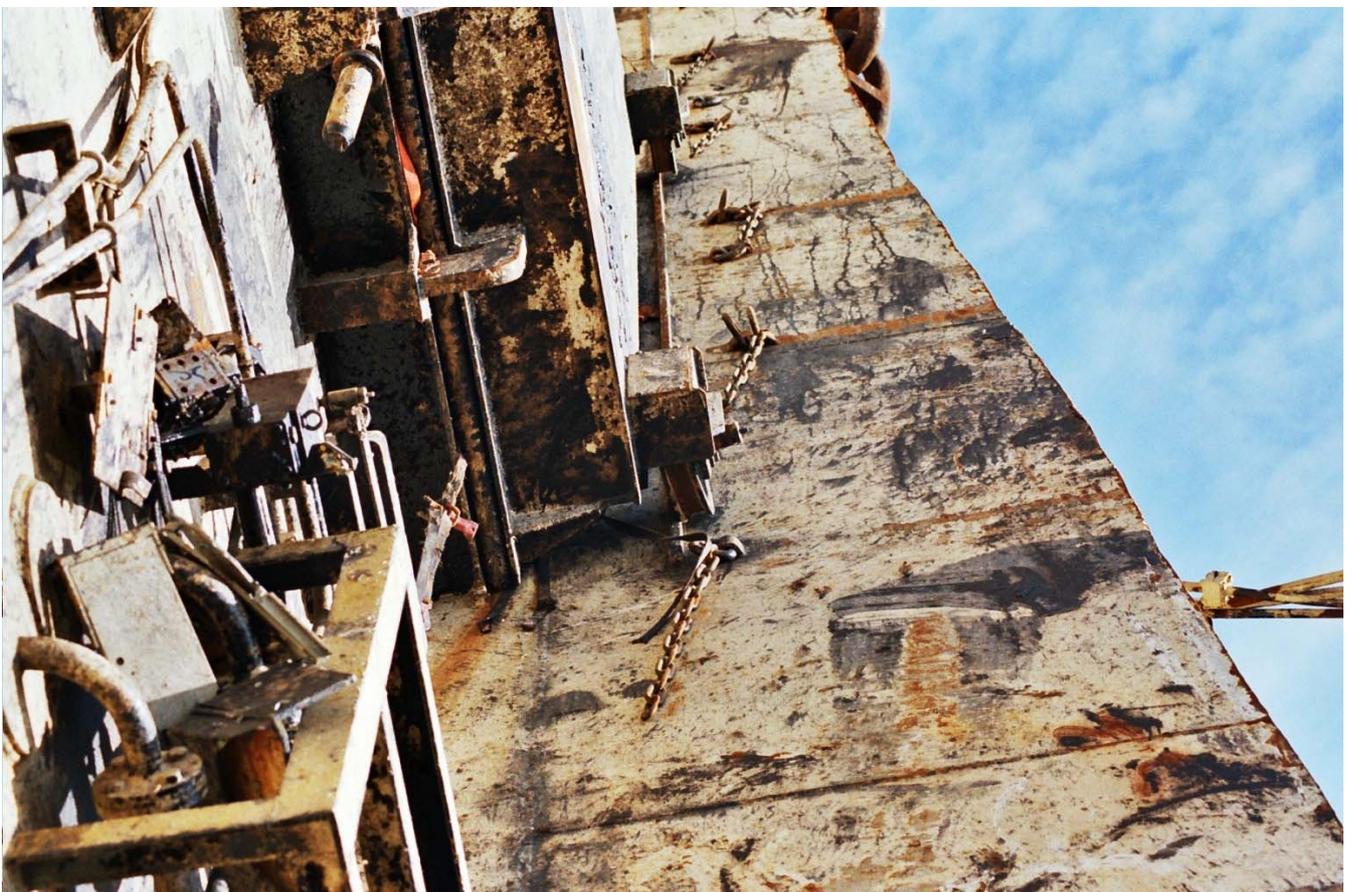


Photo 6 : Inner wheel of the door on deck 11.

Notice the mark on the lower part of the wheel, showing that it slid along the rail without turning after coming off the track.



Photo 7 : Inner wheel of the door on deck 11.

Notice that the starboard blocking plate, as well as its retaining screws, has disappeared and that the axle has come partially out of its bush.



Photo 8 : Door on deck 11.

Notice the securing strap jammed between the door and the door jamb.





Ministère des Transports, de l'Équipement, du Tourisme et de la Mer

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