She's cosy and welcoming
She's entertaining
She's a floating bomb

BY

HEROLD VESPERI



How the cruise industry, inebriated by the abundance of easy credit and big bonuses, is putting hundreds of thousands of people on a fleet of unsafe giant ships.

How the passengers are kept unaware, entranced by the party atmosphere and a pressing, wide ranging, media deception.

She's cosy and Welcoming. She's entertaining. She's a floating bomb Copyright © Herold Vesperi March 2024

All rights reserved. No part of this book may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without written permission from the author, except in the case of a reviewer, who may quote brief passages embodied in critical articles or in a review.

Edited by Herold Vesperi
Cover Art by Herold Vesperi

Self published by Herold Vesperi
Contact address: herold-vesperi@posteo.net
Online Distribution reference: TBD

ISBN: TBD

Foreword

This work is self edited, please be patient with eventual typos or syntax errors. This is also a work in progress. I am ready to take into account any comment, advice, remark or missing point that readers might want to raise on the content.

If you have something to say or you would like to point out an eventual mistake or a misunderstanding please write an email to herold-vesperi@posteo.net

The version you are reading is the first edition, released at the beginning of October 2024.

Table Of Contents

1 Introduction **5**
1.1 Oil 7
2 The story of the Costa Concordia **10**
2.1 The lessons not learned 18
3 The high stakes gamble **27**
3.1 Some references for this chapter 34
4 The new fuel **40**
5 Rethinking the story of the Titanic **45**
6 Closing thoughts **49**
7 Other books from the same author **51**
8 Appendix **53**
8.1 The email with the questions sent to Royal Caribbean 54
8.2 The questions sent to Carnival Corporation 56
8.3 The questions sent to MSC Cruises 58

1 Introduction

The party machine is seized by an unstoppable drive. People must be kept happy, people must be kept dancing, people must be kept oblivious. The party machine is a giant cruise ship that burns huge amounts of oil while the looming scarcity, day by day, is bringing closer the time of reckoning. Unwilling to confront its public with the hard reality, the party industry has no other option, but to switch to liquefied gas to power their machine while the ships get increasingly massive in order to minimize the cost per passenger. The choices they made are inherently dangerous and the only way to carry them out, without damaging the sales, is to keep the public entranced in a state of denial.

The danger is obvious, it is in the combination of thousands of people sitting on a volatile power source, with ships whose size and huge inertia render extremely difficult every single manoeuvre. The absence in all the information channels of any discussion on the issue is inexplicable, unless we take into account the possibility that it is deliberately suppressed. When the latest giant, the Icon of the Seas, was presented to the public the only issue about the chosen fuel raised by the media was about the risk of gas leakages and the impact of methane on climate change. It is the usual counter argument raised in these cases and it looks like a way to distract the attention from the major issue by pointing out a secondary issue.

The writer of this monograph is not an expert about shipping nor about the engineering of power supply, however it is clear that experts have no voice here. In this context any voice that can get

through the wall of silence is useful. It cannot prove anything, but by raising the issue it can force people to look into it and start an open discussion.

The choice for the transition could not be more extreme. The first ship powered by liquefied gas to enter service, the AIDAnova, with a length of 337 metres belongs to the new generation of giant cruise ships. The second is the biggest cruise ship in the world at the time, she is the Icon of the Seas. As if they wanted to be polite with an overweight lady, the owner does not even dare to make public her displacement, they only declared the gross tonnage which measures the internal volume and it is more than 248 thousands tons. However by making a comparison with similar ships we can infer that the displacement is way over the 100 thousand tons. It is twice as big as the Costa Concordia, the cruise ship that dominated the news at the beginning of 2012 when she was wrecked in front of a small Italian island. Apparently all the lessons to be learned from that disaster went by unheeded, not only for the kind of fuel, but also for the unstoppable growth in the bulk and the mass of the new cruise ships. Dozens of massive new ships are under constructions and expected to enter service within three years. Seven of them will weigh more than 100 thousands tons and six out of those seven will be powered by liquefied gas.

1.1 Oil

The recent news announced that the oil production of the United States has never been so high. In the meantime many reports and articles every now and then point out the huge oil reserves of this or that country. Together with the rest of the reporting they paint an optimistic picture. However it is just a picture. If we start to look at the smaller details we can find a lot of them that do not fit that picture. To begin with we can take a look at all the stories that surround the Keystone pipeline. Why do oil companies consider it so important? How come Canadian oil is considered a fundamental resource? How come it is still on the market? It is not oil, it is tar that must be dug out together with tons of sand and melted with hot water vapour. It is expensive and cumbersome and sometimes given all the costs it is way more expensive than the average market price. There are many other sources of oil that are as much expensive, drilling rigs that operate where the sea depth is about 1500 metres are now common. Even more common are the fields in the desert that keep producing because on the other part of the field some wells are injecting precious water to push towards the producing wells the remaining bits of oil. How come the industry depends on such resources? If oil were really so abundant most of those the marginal fields would not be exploited, it would not be worth the costs.

Even some oil fields in Iraq are so much depleted that the producers need a lot of water to push out the remaining oil. They use so much water that they caused a crisis[1]. However Iraq is still

[1] https://www.aljazeera.com/program/people-power/

described as one of the countries with the largest oil reserves in the world [2].

The truth is that the current oil production levels are maintained partly by exploiting marginal or expensive fields, partly by devising any possible technological trick to scrape the bottom of depleted oil fields. The other truth is that it is not enough. The growth of the human population until now was maintained by a constant exponential increase of energy production. Oil has been for a long time the backbone of this growth. Some sectors like transport, the chemical industry and all the agricultural machinery depend almost entirely on oil. Electrification and biofuels are not enough to replace oil. The production of electricity itself needs to be increased dramatically in order to supply the expanding population, also coal, which was the backbone of the sector is facing the depletion of the reserves. However even in the case of coal the news keep pointing out every now and then the presence huge coal reserves. Trouble is that even in this case they cannot explain why many producers are exploiting difficult and expensive coal sources notwithstanding the costs and the pain. There are some underground mines that are so deep that the machinery has to be constantly sprayed with water otherwise they would break down, overheated by the combination of their own heat with geothermal heat.

This books is addressed to readers living in the Westernised world, many of them probably fail to notice how serious is the

2023/9/20/iraqs-water-wars-part-1
https://www.aljazeera.com/program/people-power/2023/9/27/iraqs-water-wars-part2

[2] https://en.wikipedia.org/wiki/Oil_reserves_in_Iraq

situation because most of the oil and the other fossil fuels are used to keep their countries running. However even including in the category Asian countries like Japan, Taiwan and South Korea the total population of those countries is less than 20% of the total world population. The rest of the world needs a bigger share of the available oil. Part is needed by those countries that are trying to develop. Part is needed by those many poor countries whose overpopulation put them under such pressure that they risk to explode in endless civil wars similar to the war that is still ravaging Syria. Inevitably the share of oil going to poor and developing countries in the future will increase while there is little room to further increase the current production levels.

This is the real reason why many power plants are switching to gas. All the stories about the greener fuel that will power the transition to renewable sources are there just to fool the public.

Note that I used and I will keep using the terms gas and liquefied gas instead of the name natural gas or the acronym LNG because the language used has an effect on how things are perceived, I prefer to avoid the edulcorated term *natural*. Methane, propane and the other gases that might make up liquefied gas are as much natural as oil. They all derive from the decomposition of dead organic matter. They all are the result of what was brought underground by the geological processes during the ages and slowly transformed in an anaerobic environment.

2 The story of the Costa Concordia

When the Costa Concordia entered service in 2006 she was among the largest cruise ships in the world, a magnificent example of a joyous and carefree world. The passengers were not supposed to do anything else, but enjoy their time on board. They did not enjoy their last night though, packed on the bridge of a sinking ship, waiting to board a lifeboat for the unexpected journey towards safety. The following day the reporting was sensationalistic, full of surprise and confusing. So much confusing that what really happened was never properly told. All we know is that the ship deviated from the planned route, something went wrong and the ship struck rocks with such a force that not only it tore open the hull, it also broke off and lodged in the hull a massive granite block. The breach was so long that it spanned multiple watertight compartments, it flooded both generator rooms and the sea water quickly knocked off all the main generators. In a short time the ship was left powerless, drifting away, still pushed by that inertia that the hard rocks could not dissipate.

After a while a small emergency generator restored some power, just enough to power the emergency lights, the speakers, some instruments and the rudder. After drifting for about 2 kilometres finally the inertia was dissipated and the crew exploiting the wind and the little help that the rudder could provide directed the ship towards the coast, where she partially sank in shallow water and went to rest on the sea bed. The evacuation began when the ship stopped drifting and it took about six hours to complete. 32 People died, few

drowned after jumping overboard, some fell or were sucked under water when the ship capsized, for others the circumstances are not clear. The remains of many of the victims were recovered days later, some were recovered months later. In all the cases the news did not disclose any detail that could shed a light on the circumstances of their death. Even the trial of the captain, the only trial that was held after the sinking, failed to clarify this point. The judges treated almost all of the cases as if they were the same.

***

All the news about the accident contained in one way or the other always the same message. How is it possible for a modern ship equipped with the most advanced technology to sink in this way in calm waters and fair weather? After few days everybody was sure that the only possible explanation was that everything was the fault of an incompetent captain, Francesco Schettino, who made several mistakes guiding his ship into a disaster. But then all the journalists stopped before asking the obvious follow up question. How come the lives of thousands of people and a ship worth more than 400 million Euros were put into the hands of such incompetent? The answer to the follow up question is that nobody put the lives of thousands of people into the hands of such incompetent. Nobody asked the follow up question because the explanation for the first question was just an excuse. Any journalist asking few questions to anybody with a little knowledge of the field could understand how difficult it is to steer ships as long and as massive as the Costa Concordia, how unforgiving they are, often they give no room to recover eventual mistakes, mistakes are not allowed.

It is clear that many journalist feigned their surprise and it is not difficult to understand why. The carefree world must remain carefree, the public must not understand the dangers involved. How misleading was the reporting, was evident in the following days, when among the public many people were asking the same question. How come the crew did not notice the rocks? There had to be a sonar on board, was anybody looking at it? They were all asking this question because nobody explained that a ship is not a car. A car has the steering wheels on the front and it touches the ground only on four points. When the driver turns the wheel the front of the cars turns and the entire car follows the trajectory. A ship has the rudder on the back, or better say at the aft, it works in a different way. When the rudder moves, it forces the ship to rotate, the pivot of this rotation changes with the speed of the ship, but in any case it is closer to the bow than the aft. It means that, when the ship turns, the aft shifts sideways and the amplitude of the movement is bigger that the one of the bow. When a ship like the Costa Concordia that is almost 300 metres long turns, the aft could slide sideways by 100 metres. Considering also the the massive inertia, the result is that every correction to the route needs a lot of space to be executed. These giant ships are so difficult to steer that every single manoeuvre must be carefully planned in advance in all the details. When the sonar starts sounding the alarm it is already too late, or at least this was the case in this accident because the speed of 15 knots made things more difficult by adding a huge inertia, there was not enough space to correct the mistake.

The reporting actually stated that the alarms were turned off, but this is not credible, anyway the story was so thoroughly confused that few people understood that there was no need for

a long series of mistakes to doom the ship, one small mistake was enough.

The description of the accident at the beginning of this chapter is very scant. Not because the details were missing, but because they were unreliable. That description contains the only facts that could be taken out of the noise. Some accounts went as far as claiming that the captain took the helm to impress his mistress after a dinner during which he had some alcoholic drinks. Nobody cared about the absurdity of the story. A ship like this is not piloted by a single person, but by a team with strict roles and everyone of them is well aware of the risks involved. Had the captain tried to take the helm the rest of the crew would have assumed that he was gone mad and they would have locked him up. This story was reported even by the RAI, the main Italian outlet, funded by the public and whose directors are named by elected officials.

During the trial emerged a completely different story, but at the moment the media reporting about the trial was very scant the only part that took their attention was the conviction of the captain for multiple manslaughter. Some time later, after the public was persuaded that everything was the fault of a single man the story could be retold in another manner letting people forget the most absurd details of the first stories. A lot of documentaries were released in the following years and they all talk about a series of misunderstanding between the helmsman and the captain.This is what many officers who were on the bridge at the time declared during the trial, but the helmsman never told his version of the story, he escaped abroad before the official enquiry and the Italian police did not make a lot of efforts to bring him back.

Other details of the story did not make a lot of sense. Many the reports and also later documentaries stated that the crew after the ship hit rocks called the harbour master of the city of Giglio Porto, which was close by, requesting for help, but they did not tell them how serious was the situation until one hour later. However the harbour master did not believe them and on his own initiative alerted all the rescue services. What nobody explained is how he could do it, he did not have the authority to alert on his own all the rescue services including helicopters from the Coast Guard, the Navy and the Air Force. It is also not credible that in such a serious situation with the lives of thousands of people at risk the entire crew on the bridge accept this behaviour without a mutiny. To make the story more credible later reporting attributed the same initiative to a coast guard officer instead of the harbour master. Many even added the recording of a phone call allegedly done by the coast guard officer to an officer on board who downplayed the severity of the situation. This is one of several phone calls recordings that emerged without explaining why they were recorded in the first place. Also the computer logs do not match the stories told by the media, they show an evacuation command 25 minutes after the collision, more than 35 minutes before the evacuation began.

There is another detail that does not fit. The first officer declared to the investigators that the captain repeatedly asked to check the radar for him because he left his reading glasses in the cabin. However Schettino at the time was 51 years old. How come at this age he needed reading glasses to check a radar screen that does not have to be looked from a close distance? All the pictures showed him without reading glasses or other prescription glasses and he appeared in good health.

The absurdities did not stop there. Of all the phone calls recorded the most famous one is between the captain and and officer of the coast guard, it dominated the news for a while and the sentence "*vada a bordo cazzo*" is still quoted sometimes. The officer of the coast guard harshly reprimanding the captain for abandoning the ship before the evacuation was completed became the heroic moment within the tragedy. Even in this case nobody questioned who decided to record the phone call and how it ended up in the hands of the journalists. But the strangest detail is that the first recording aired by the Italian TV channels the first few days after the accident was a bit different from the one released later and included in many documentaries. The probable reason is that the officer of the coast guard was not an actor, the first recording seemed staged, the second recording is a little bit more credible. In the confusion and the drumming of the story by the media traces and memory of the first recording quickly disappeared. All considered it reasonable to imagine that the captain did not abandon the ship to escape the shame, but to attract the attention on himself, to play the role of the villain and the buffoon. It does not mean the he is innocent, when he decided to break the rules and let the ship abandon the planned route he was well aware of how dangerous it was. He put the ship and more than four thousand people in such a situation that a small mistake could become fatal. But this is his responsibility, everything else is the show designed to distract the attention from the underlying causes, from the risks of cruise ships too big to handle.

***

Unfortunately this chapter could dedicate few lines to the story itself and entire pages to all the details of the false image that the media painted over the story. But this is what we have and it shows how the reality of the situation can be hidden in plain sight. It does not happen only in the case of this accident, it is a constant attitude and this attitude is the main inspiration for this work.

The readers who would like to know a little bit more about the legal side of this story might want to look the open letter published by the Skagerrak security foundation, a Swedish no profit organisation.

https://skagerrak.org/wp-content/uploads/2022/01/skagerrak-costa-concordia-letter-with-attachments-130122.pdf

Other articles can be found at the following link:
`https://skagerrak.org/?s=costa+concordia`

There are also some articles published by the Lloyds, but to access them it is necessary to have a subscription:

Costa Concordia the ISM code under attack:
https://www.lloydslist.com/LL110553/Costa-Concordia-The-ISM-Code-under-attack

Villains victims and the blame game:
https://www.lloydslist.com/LL018257/Villains-victims-and-the-blame-game

The last articles is a bit biased. It can already be seen reading the title how all the blame is shifted on the Italian authorities. In reality the shame is more widespread and the industry is not innocent, but it gives an idea of the situation:

Industry viewpoint shame on you Italy:
https://www.lloydslist.com/LL016821
/Industry-Viewpoint-Shame-on-you-Italy

The last most important reference will be missing for the moment because there is no verified link. They are the papers of the trial of Francesco Schettino released by the Corte di Cassazione of the Tribunal of Grosseto, Tuscany. They have been made available online by an independent organisation and they are easy to find online, but only in Italian.

2.1 The lessons not learned

The comedy revolving around the figure of Comandante Schettino worked. The accident was dismissed as an exceptional event and soon everything restarted, business as usual. The first and obvious lesson that was not learned is the size of the ships. The cruise lines keep commissioning to the builders ships as big as the progressing technology allows. Three years after the Costa Concordia entered service its dimensions were surpassed by the Oasis of the Seas which is almost 70 metres longer and 20 metres higher. After the accident the program to build more ships of the same class went on as planned, nothing changed, one of them is currently under construction with the plan to power her with liquefied gas. Then came the Icon of the Seas which is the beginning of a new class of ships that surpasses the current record holder by another 10 metres in length and a lot more by gross tonnage. Considering the internal volume she is twice as big as the Costa Concordia.

In the last ten years these ships have been working smoothly. They are not something impossible, but the problem is always the same they have little margin for any unforeseen event and no margin for error.

The last class of ships actually has a new feature to mitigate the problem, they have azimuthing engines that improve a little bit the manoeuvrability, but in a ship that is almost 370 metres long there is a limit to the improvement they can bring, in any case a simple turn needs a lot of manoeuvring space. Obviously they will be supported by accurate positioning system, detailed weather reporting, advanced mapping and route computation. But that will work until there is time to preplan every single move and nothing

will force the ship to stray from the planned route. At least there is another feature that helps the steering. There is a set of steering propellers in the bow. However even the Costa Concordia had this feature and it did not help. The reporting was totally silent about them, I do not know why they did not help, but I assume that they also require some time to be activated and have an effect, after all they have to push the side of the entire ship against the resistance of thousands of tons of water. They are supposed to be used at low speed inside the harbour, whether they could help in an emergency situation is an open question.

Alongside the size there is the number of passengers and crew members to take into account. It took more than five hours to complete the evacuation of the Costa Concordia and since then the number of people carried by the newer cruise ships kept growing. According to the international regulations the lifeboats must be arranged in such a way that the ship can be evacuated in half hour. Everyone in the cruise industry is convinced that this is possible. All their convictions are based on the results of safety drills conducted in calm water and without the pressure of whatever might cause the sinking of a ship. Considering the past experience it seems overly optimistic, but in a ship powered by liquefied gas this might be a critical requirement. Any kind of damage to the piping or to one to the tanks could cause a leak. With the hulls filling with gas and the looming risk of an explosion how much time could the passenger and the crew have to leave the ship? On a ship like the Icon of the Seas there could be at full capacity almost 10,000 people on board, more than twice the amount of people on board the Costa Concordia. Here the optimism is out of place, the real feasibility

of a fast evacuation is critical, not just because gas is volatile and explosive, but also because the simple smell of a gas leak could cause a some panic on board.

The next point is the total power loss of the Costa Concordia after she hit rocks. The following investigation established two causes, the vulnerable position of the switchboard and the long breach that caused the flooding of three watertight compartments, the engine room, the first and the second generators rooms. The first issue was easy to mitigate in the new designs, but the second is a little bit tricky. With the lives of so many people involved someone might think that redundancy is a crucial requirement. In fact the Costa Concordia did have some redundancy, two main engines and six big generators, but they were all knocked out by a single breach. The trouble is that the designers placed everything close together. The first thought might be that this was a particularly unlucky event, a long breach spanning all the vital rooms of the ship. But when there is such inertia involved a long breach is not an exceptional event, it is obvious that if the ship hits rocks at a speed she does not stop. A breach that is a long gash in the hull is going to be the norm, the designers should have taken it into account. In this case it did not happen for a simple reason, cost. A cable that is able to carry enough power for a 21MW electric engine from the generators is thick heavy and expensive. It requires a lot of copper, adds a lot of weight and takes a lot of space. Had she been a warship this issues would have been ignored. The generators rooms would have been placed at the opposite side of the ship and probably the engines would have been encased in some kind of shielding that lets the cooling system work, but insulates from the saltwater in order to

let them work even when submerged. A cruise ship as we can see has different requirements, but in this case they were too different. Cost keeps dictating the design and in many new ships the vital compartments are still close together. Few people looking at the case of the Costa Concordia are considering that with a slightly different weather the total loss of power might have cost a lot of lives.

***

Also about the security there is something to say. The result of Schettino's trial was the assertion by the judges that all the casualties of the sinking were caused by the delay of the evacuation order. According to them except for the few people who drowned after jumping over board, most of the victims were waiting for the rescue on the third deck, were taken by surprise when the ship eventually capsized and this was the sole responsibility of the captain that waited too long to give the order. They did not take into account many details, including the fact that the evacuation was not supposed to take so much time. In any case when it actually began many passengers noted that many crew members did not know how to properly launch the lifeboats. Furthermore, the captain immediately after the accident alerted the crisis team of the operator, they evaluated together the situation, the decision was taken with the support of a team of experts, not by a person alone. It is reasonable to imagine they were all aware of the lack of training of the crew. Had just one of those lifeboats capsized during the launching the death toll could have been way higher. The decision to wait

until the ship was standing still to give the evacuation order might have been the safer one, given the circumstances. What is questionable are the circumstances. Back then the cruise line was not legally required to put on board enough crew members trained to launch the lifeboats. There is an international convention that sets minimum qualification standards for those who work on board[1]. It deals with security duties, safety and social responsibilities, fire fighting, first aid and survival techniques. At the time there was no requirement for practical training, all the required theoretical knowledge could and still can be taught in five courses two to three days long. By coincidence a new version of the standard, a stricter one, entered into force the same year of the sinking of the Costa Concordia. Since the accident showed that it was not enough new rules on the practical training of the crew were introduced later, now the crew of all the cruise ship must make periodical safety drills which include launching the lifeboats. But these rules are restricted to the cruise sector and it is not clear how they are enforced. In any case the approach is always the same, the rules are tailored to define the minimum necessary to ensure that the problems that emerged in the past are addressed, should a future accident show that some aspects are not strong enough, that something is lacking, they will be revised.

The poor handling of the lifeboats points to another lesson that went by unheeded. On the Costa Concordia at the time there were more than four thousand people counting passengers and crew members. From all the pictures publicly released it can be seen that the ship had 26 lifeboats, 13 per side. I assume it complied with the

[1] https://en.wikipedia.org/wiki/STCW_Convention

regulation that states that each lifeboat should not accommodate more than 150 persons. Another rule states that there should be enough lifeboats for at least 75% and enough rafts for 50% of the people on board. The numbers fit well with the assumption, hence we can also assume that the weight of each fully loaded lifeboat was more than 15 metric tons. Even if they are not lowered by manual winches such a weight is not easy to handle. The official story tells that the operations did not go well because the crew was not properly trained, but the difficulty of the task might have played a role.

Since then things got worse. The operators argued that with 7 to 8 thousands people on board the limit of 150 persons per lifeboat was too strict and they found many ways to circumvent it. The growth of the lifeboats became unstoppable, one recent example is the mega-lifeboat[2] that can carry 370 people and fully loaded might weigh 45 metric tons. The novelty is that those lifeboats are also used as tenders, therefore they are used often and the crew can make a lot of experience in their operation. But they are used only in the calm waters of a port. In case of an emergency in the rough sea, how easy is it to lower a 45 tons craft while the ship is rolling and pitching? The launch of a lifeboat is such a dangerous task that a study made in 2017 found that in a period of ten years there have been 60 fatalities during testing or safety drills [3]. The figure is mainly related to commercial shipping, but also in the cruise sector there have been few deadly accidents.

[2] https://rina.org.uk/publications/the-naval-architect/mega-lifeboat/

[3] https://rina.org.uk/publications/the-naval-architect/seahaven-makes-case-for-evolution-in-cruise-safety/

When the managers of the cruise lines say that the limit of 150 persons is too strict it could be possible to agree with them. The trend toward bigger cruise ship is pushing towards increasing height and bulk. The space in length available for the lifeboats might not be enough. But going to the extreme opposite is definitely questionable. It is enough to see the pictures of many modern cruise ships to see that the boat decks do not take the entire length of the ship. In some cases all the lifeboats plus the space for the rafts and access to eventual rescue vessels altogether take a little bit more than half the length of the ship. The shrinking of the boat decks gave additional room for extra cabins and for all the amenities. The choice to adopt the mega-lifeboat was not dictated by necessity, but by commercial reasons.

***

Going back to the problems created by the increasing dimensions also the height of the new ships deserves some attention. The new ships have broad sides that expose two big façades to the wind, the new designs that rise almost vertically from the bow enhance the effect by increasing the amount of exposed surface. The effects of the wind were already visible on ships with a much smaller ratio between the weight and the lateral surface. For example the Costa Concordia had a small accident four years before the sinking, when the strong winds pushed her against the dock. The trouble is that one side of a new giant ship might have the effect of a sail, but it cannot be directed and controlled like a sail.

The operators are well aware of the potential dangers and they know that that many people are aware of it. Years ago, to ally the

fears, when the first ship of the Oasis class entered into service they announced that they tested her in stormy seas and gale winds and the ship's officers were pleased with her stability. Since those ships can be more than 70 metres high above the waterline there is room for a little bit of doubt. Of course they can handle gale winds, but when such a big ship goes through a busy sea route or a strait she does not have a lot of choice, she must follow her course even if the wind keeps changing direction and eventually hits her at a right angle on one side. There can be different ways for the wind to affect the ship's course. One is by pushing her constantly while she is on autopilot with the crew realising that she is off course only when the difference with the planned route is significant. Another way is by hitting her on the side with a strong, prolonged wind gust that causes a small list. It might be enough to change the shape of the submerged part of the hull, making is asymmetrical. That is when the forces of hydrodynamics come into play. When an asymmetric hull advances into the sea the dynamics can force the ship to rotate. On a small sailboat the effect is evident, but it can be countered balancing the sails or adjusting the rudder. On a giant cruise ship it is not so easy, the change cannot be judged with a quick look. There will be a route officer checking the deviation on the instruments and telling the captain the amount of adjustment that is needed. The captain will then tell to the helmsman by how much he should turn the wheel to correct the course. The reaction time will be slow, especially if in the worst moment the ship was on autopilot. Therefore even if the effect is not dramatic the wind might force the ship to stray off the preplanned route and enter in the zone where there is no more room for error.

All is fine until there is no unforeseen. But at sea the unforeseen can never be ruled out.

3 The high stakes gamble

The first time I read the description of the Icon of the Sean on Wikipedia I saw the construction cost and I could not believe it. 1.86 billion Euro, more than 2 billion dollars. I began to wonder how could she pay back such a huge investment. After a while I decided that I wanted to figure out and I made a rough calculation to get an idea of what is happening.

I started by calculating what could be the yearly turnover. I went on the site of the operator, I checked the ticket prices and the schedules. I saw that the ticket prices changed frequently depending on the route and the season, I had to put together many dates and ticket types until eventually I got an approximate average. I took as an example the entire year 2025, I assumed an average weekly ticket price of 1700$ per person and that the ship is nearly full for all the 50 weeks on schedule with an average of 6000 paying passengers per week, the result is that the total revenues from the tickets can be more than 500 million dollars.

I know that a cruise ship is full of extra services designed to let the passengers pay for everything. But there is a limit to how much more money they can extract from each passenger. I checked many of the yearly and quarterly financial reports released by the three major cruise lines and I saw that usually the value of the turnover of the on board services is about 50% of the value of the income generated by the tickets. Assuming that the Icon of the Seas is entering into service backed by the latest marketing experience and that it will be able to extract a little bit more from each passenger

a reasonable estimate of the total yearly turnover could be about $800 million, it is a lot of money, but there are huge operating costs to take into account.

An idea of the operating cost comes from the yearly figures for 2023 of the Royal Caribbean Group, the parent company of the owner of the Icon of the Seas. The total operating costs of their entire fleet is $7775 million, plus there are $1772 million extra costs for the marketing, selling and administration and $1455 million for depreciation and amortization expenses. They did not release the data about the cost of each ship, but the detailed data of the passengers capacity is publicly available. Calculating the cost of a single ship via the cost per passenger is not precise, but it can give an approximate idea, after all voices like food, commissions, marketing and selling take up 40% of the cost and are strictly dependent on the passengers number, also the crew is proportional to the passengers capacity and the payroll take another 10% of the cost. With this method I calculated that the Icon of the Seas might cost between $400 and $500 million per year. To that should be added the financial costs of investing about $2 billion. The construction of the ship started two years and the half before it entered into service, the design started more than five years earlier. A lot of money had to be paid well in advance, even in a period of low interest rates the total cost is high.

The result that I got is that if the business is always as good as it was in 2023 it might take seven to ten years to pay back all the investments, but only if the ship is fully booked all the time during this period. Trouble is that in ten years everything could happen, a small accident, an economic downturn, a COVID crisis or a small

epidemic on board [1]. Everything could hurt the sales. A simple technical issue blocking the ship for few days could cost $10 million in missing revenues simply counting the weekly cruise tickets for 6 thousand passengers. All of this seems difficult to believe, therefore I looked for a way to verify my assumptions and I noticed that for each new ship the company issues some bonds and those bonds are listed in the quarterly financial data. There are still existing bonds for ships that were built ten years ago or more. For example the bonds issued for the Harmony of the Seas will reach maturity 12 years after she entered service. These bonds do not rule out that some ships might generate profits before their expiry, but the longer is the term of a bond, the more expensive they it is, therefore if they were issued on such long term it means that long payback times are not uncommon.

Since the money spent on the construction of a ship is a long term investment I wondered whether usually the cruise industry can really be profitable for the many years required to pay back the investments. That is when the information released by the third biggest line on the market came in handy. The Norwegian Holdings releases all the financial data of the past fifteen years. In 2008, during the financial crisis that started in 2007, they made a loss. Then for three years they made a small profit, but the debts kept growing. After that period the profits picked up slowly, year after year, they passed the threshold of $900 million in 2020. Then

[1] Note that sometimes the operator in order to discharge their responsibility might declare an epidemic even if the problem was caused by a batch of spoilt food served to their passengers. Thus the probability of having “an epidemic” on board may dramatically increase.

came the COVID crisis with the loss of about $4 billion in 2020. The year 2021 was even worse, then in 2022 the losses halved, profits came back in 2023, but in all these years the debts kept growing, now the total debt almost 1.5 times the total revenues[2].

The story of the other lines is not much different, except that for Royal Caribbean the year 2023 saw higher profits, for them that was an exceptional year. However their total debt is still much higher than the total revenues. For Carnival corporation, which is the biggest on the market, the years between 2013 and 2019 brought big profits, rising from $1 billion up to $3 billion. But then the COVID crisis wiped out everything, in three years the total losses were more than $20 billion. Even their total debt now is about 1.5 times their total revenues.

The first three lines on the market account for more that 70% of the total revenues. The next three in the list do not make their financial data so easy to find, but for many aspects they are following similar trends. The current picture of the financial situation could be applied to at least 90% of the cruise industry and it bears the weight of huge debts. Part the reason for those debts is in the continuous building of new ships. From 2009 to 2019 the capacity of the cruise industry grew by 68%. It may bring a lot more profits in the future, but there is a drawback, when the customer base is expanded the fluctuations between good and bad years become much stronger. Now the lines may pay back their debts only if they have almost ten good years in a row, but this is not a given, it depends so much on the rest of the economy that it cannot be

[2]Note that I am including Norwegian in this chapter only because their books are useful to get a picture of the financial situation, not for other reasons, it is the only major line that is not planning to switch to gas propulsion.

predicted, the next ten years could see huge profits or huge losses. Almost the entire industry is caught in the grip of a high stakes gamble.

***

The consequences of such a gamble can be noticed by simply looking at the scheduled cruises. The ships dock in their home port at the end of a cruise, disembark the passengers, embark the new ones and start a new cruise the very same day. In order to pay back the huge investments these ships have to work round the clock. When I checked the schedule for the year 2025 of the Icon of the Seas I saw that since the previous year she sails ceaselessly until the 20th of September. Then she stops for a week, she sails again from the 27th until the 11th of October. She stops for another week then she restarts sailing ceaselessly for many months. And the rough calculation that I made above was based on this schedule, if the Icon or another newly built ship cannot sustain this schedule for at least eight years in a row or even more the time to pay back the investments to build it grows.

Almost the whole year working ceaselessly and only two weeks left for maintenance. And she is a ship laden with luxurious fittings that must keep their shiny appearance at any cost. It is reasonable to imagine that a big part of the maintenance effort will be dedicated to polishing the surface. How much time is left to inspect the electric network that is exposed to the saline environment is an open question. I am talking about a network that must distribute 60 MW to all the engines and almost 30 MW throughout the ship for

the other services. How much time is left to inspect the safety equipment is another question. It is worth to remember that, among the other problems that plagued the rescue of the passengers of the sinking Costa Concordia, many inflatable rafts failed to open after they were thrown into the water. I did send few questions on the issue to three major cruise lines, I did not receive a single answer. The text of the questions I sent can be found in the Appendix.

The method I used to check the schedules of the cruises had a limit. I could not see further than two years, that is how in advance clients can book a room on a cruise ship. But booking was not the motivation for my search, I wanted a better picture and I decided to repeat the search many times taking as an example ships of different ages. From new ships to ships that were eighteen and even twenty years old, I checked many of them. All of them spent more than 94% of the time in navigation or embarking and disembarking passengers. Few of them could spend an entire year without a single stop. What I noticed for the Icon of the Seas is a common practice. The time dedicated to the maintenance of the ship and the training of the crew is compressed in small intervals. Assuming that this is an old practice, one can also understand why a big part of the crew of the Costa Concordia lacked a proper training. Back then the rules did not require any practical training, since then the rules have been updated and the crew must do periodical safety drills, including the launch of the lifeboat[3]. But how they can find the time for an effective training is another of the open questions still waiting for an answer by the cruise lines.

[3]The STCW cited in the previous chapter is part of the SOLAS (Safety of Life at Sea) convention which was first adopted in 1914 following the Titanic disaster.

***

In part the huge building cost of the Icon of the Seas is due to the inflation that hit everything, including the raw materials, in the last four years. To make an example of the change, the Harmony of the Seas which is about 10% smaller than the Icon of the Seas, was delivered in 2016 at a cost of 1 billion Euros, 1.35 billion dollars at the change of 2016 and almost half of the cost that inspired this chapter. But inflation did not stop the current trend towards increasing size. To get an idea of what is happening it is enough to check the new ships on the order books of the six biggest cruise lines, which together represent between 85% and 90% of the market. All of them are bigger than the ships they are replacing, the overwhelming majority is powered by liquefied gas.

All the top managers of those line are well aware of the risks. Nonetheless this transformation seems inevitable. The usual capitalist drive for ever increasing profits is not enough to explain the scale of the gamble. The only possible explanation is that they are caught in the high stakes game and they are fully aware that the cost of the fuel is going to increase, maybe not immediately, but the service life of those ships is going to be between twenty and forty years, depending on their commercial success. The cost per passenger must be brought down as soon as possible, whatever it takes.

3.1 Some references for this chapter

This will probably be considered one of the most controversial chapter. It is better to clarify that it is based on the data gathered from the following references.

Royal Caribbean Group:

Overview of historical earnings:
https://www.rclinvestor.com/financial-info/key-statistics/

First quarter 2024. Useful to see the breakdown of fuel costs and the outstanding debits of each ship:
https://www.rclinvestor.com/content/uploads/2024/04/RCL-1Q24-Public-Schedule.pdf

2023 Full Year Results:
https://www.rclinvestor.com/press-releases/release/?id=1687
https://app.quotemedia.com/data/downloadFiling?webmasterId=101533&ref=318240964&type=PDF&symbol=RCL&cdn=cd999974e7203e94c85d9bf2985e27e9&companyName=Royal+Caribbean+Cruises+Ltd.&formType=ARS&dateFiled=2024-04-17

https://www.rclinvestor.com/press-releases/release/?id=1639
https://app.quotemedia.com/data/downloadFiling?webmasterId=101533&ref=117278618&type=PDF&symbol=

RCL&companyName=Royal+Caribbean+Group&formType=10-K&dateFiled=2023-02-23&CK=884887

https://www.rclinvestor.com/press-releases/release/?id=1585

https://app.quotemedia.com/data/downloadFiling?webmasterId=101533&ref=116506312&type=PDF&symbol=RCL&companyName=Royal+Caribbean+Group&formType=10-K&dateFiled=2022-03-01&CK=884887

Carnival:

Main page:

https://www.carnivalcorp.com/financial-information/annual-reporting

Last report 2023:

https://www.carnivalcorp.com/static-files/fcbec4e1-3a75-4c6e-a3ad-721a95250782

Other years:

https://www.carnivalcorp.com/static-files/ef80ac8c-e40e-42ad-ba8e-62a02fb13d6d

https://www.carnivalcorp.com/static-files/fe45aec4-02e8-4aaa-9ff2-308ec21a488b

https://www.carnivalcorp.com/static-files/48701769-9f2c-48c6-ac4f-4772bad2ff8b

https://www.carnivalcorp.com/static-files/9ba84dfd-b96a-486f-8617-34e49820077a

https://www.carnivalcorp.com/static-files/9296f17e-0bbc-4d59-850c-4d59b3fc8c57

https://www.carnivalcorp.com/static-files
/256582f8-4363-4911-b8a9-504e00c709a6
https://www.carnivalcorp.com/static-files
/a0cb9a3e-b0de-4d1c-adae-105db62e8e02
https://www.carnivalcorp.com/static-files
/73b8e940-ceaa-41e8-8296-731ea67ab612

Wikipedia:

List of cruise lines
Useful to see the market share of the cruise lines and get the links to all the subsidiaries:
https://en.wikipedia.org/wiki
/List_of_cruise_lines

The list of ships and passengers capacity of Royal Caribbean was taken from the following pages:
https://en.wikipedia.org/wiki
/Royal_Caribbean_International
https://en.wikipedia.org/wiki/Celebrity_Cruises
https://en.wikipedia.org/wiki/Silversea_Cruises
Owned by Royal Caribbean by 50%
https://en.wikipedia.org/wiki/TUI_Cruises
https://en.wikipedia.org/wiki/Marella_Cruises
https://en.wikipedia.org/wiki
/Hapag-Lloyd_Cruises

Norwegian

Main page:

https://www.nclhltd.com/investors/financial-information/financial-results

Full Year Earning release from 2023 to 2009

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2024-02-27_Norwegia_Cruise_Line_Holdings_Reports_Strong_584.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2023-02-28_Norwegian_Cruise_Line_Holdings_Reports_Fourth_534.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2022-02-24_Norwegian_Cruise_Line_Holdings_Reports_Fourth_471.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2021-02-25_Norwegian_Cruise_Line_Holdings_Reports_Fourth_24.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2020-02-20_Norwegian_Cruise_Line_Holdings_Reports_Fourth_80.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2019-02-21_Norwegian_Cruise_Line_Holdings_Reports_Fourth_106.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2018-02-22_Norwegian_Cruise_Line_Holdings_Reports_Financial_137.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2017-02-22_Norwegian_Cruise_Line_Holdings_Reports_Financial_158.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2016-02-23_Norwegian_Cruise_Line_Holdings_Reports_Financial_178.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2015-02-17_Norwegian_Cruise_Line_Holdings_Reports_Financial_202.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2014-02-18_Norwegian_Cruise_Line_Reports_Financial_Results_224.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2013-02-11_Norwegian_Cruise_Line_Reports_Results_for_the_244.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2012-02-13_Norwegian_Cruise_Line_Reports_Results_for_Fourth_310.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2011-01-31_Norwegian_Cruise_Line_Reports_Results_for_Fourth_319.pdf

https://d1io3yog0oux5.cloudfront.net/_d5a57b0321e90e2d6600d0668075b05d/nclhltd/news/2010-02-23_Norwegian_Cruise_Line_Reports_Results_for_Fourth_333.pdf

Disney Cruise:

https://disneycruiselineblog.com/2023/07/disney-cruise-line-fiscal-year-2022-annual-report-financials-directors-strategic-report/

https://disneycruiselineblog.com/wp-content/uploads/2023/07/DCL-Annual-Report-FY22.pdf

https://disneycruiselineblog.com/wp-content/uploads/2023/02/DCL-Annual-Report-FY21.pdf

https://disneycruiselineblog.com/wp-content/uploads/2021/10/DCL-Annual-Report-FY20.pdf

4 The new fuel

Liquefied gas is the main motivation behind this monograph, but it did not receive a lot of attention because the real danger rather than the gas itself is the combination with all the other factors. Gas is very volatile, it mixes with air quickly and once it is mixed it could explode. Any accidental damage to a tank or to a pipe could create a dangerous situation giving little time to the thousands of people on board to get to safety. The gas leaking from a pipe could be quickly contained by blocking the pipe. But if that small amount of gas remained trapped in a compartment in the hull it could cause an explosion strong enough to damage other pipes or a tank. In the Icon of the Seas the fuel is stored in two tanks 27 metres long, placed close to the bottom of the hull. The technical designs have not been released, but it is reasonable to imagine that even the length of all the pipes is measured in dozens of metres, they have to reach six generators distributed in two separate compartments. That is a complex system placed in a confined space.

A striking change that liquefied gas brings is the drastic reduction of the reaction time allowed to the crew and the passengers in case of emergency. The captain and the officers, well aware that moving ten thousand people is not something that can be done in a matter of minutes, might be forced to take snap decisions. In the meantime the pressure on the passengers and the rest of the crew might cause panic on board.

It does not mean that we are surely heading for a disaster. The big dimension have been put under test. Several ships only slightly

smaller than the Icon of the Seas have been in service for eight to fifteen years with no accidents. Gas on a smaller scale has been tested as well. The first ship powered by gas has been in service for six years. However, we ought to take a look at the history of the supertankers. Notwithstanding their size they proved to be quite safe, the number of accidents compared to the amount of overall time they spent sailing is small, but many still remember the name of the Exxon Valdez, in France they still remember the Amoco Cadiz. One single accident can have dramatic consequences. The real problem is the scale of the potential danger.

Many supporters of liquefied gas often repeat that it has been widely used for decades and it is a well tested technology. But the tank of a road vehicle contains the fuel at a lower pressure and the piping is much simpler. It is a small system with a short connection bringing the fuel to the engine. The same can be told of the gas bottles that once were used to power the kitchen stoves. The pressure, the density, the amount of gas per unit of volume contained is one of those bottles is a fraction of what is stored in a LNG tank. The pressure of the gas in an urban distribution network is even lower. Nonetheless in all these examples we did have a small number of deadly accidents, thay are usually ignored because the usage of gas is so widespread that in comparison those number become negligible, but also those examples are not comparable with a liquefied gas tank and the piping system enclosed in the hull of a giant ship.

There are two more examples of existing technologies that could be cited. There are the liquefied gas storage facilities that often contain so much gas that the total energy stored is the equiv-

alent of a thermonuclear bomb. However these facilities do not travel all the time and, except for few workers, all the other people are kept at a safe distance. Something similar can be told of the second example, the LNG carriers. They, at least for now, are smaller ships, more manoeuvrable and there is only the crew on board. A liquefied gas system contained in a ship big and difficult to manoeuvre, with eight to ten thousand people sitting on top is a unique combination never seen before.

The chances of a dramatic accident are slim, but there is another factor to take into account. The trend towards bigger, more efficient ships is not limited to the cruise industry. The future oil scarcity and the increasing costs are pushing towards the adoption of giant vessels in every sector. With a quick check of the data available online it is possible to find out that in the last 5 years at least 128 container ships with a length of about 400 metres entered into service. In this sector they surpassed the cruise ships. Records about bulk carriers are a little bit more difficult to find, but examples like the ore carriers of the Valemax class[1] are well documented. It is a fleet of 35, 360 metres long, ships that can carry up to 380.000 tons of cargo. Even the carriers of liquefied gas are growing. Until now for security reasons the dimensions of the ships put in service were relatively small, the new ones currently on the design board are not as big as a giant cruise ship, but they are much bigger than the carriers currently in service.

The increasing efficiency is not needed only to prepare for the future rise of the cost of fuel oil, but also to accommodate the

[1] https://en.wikipedia.org/wiki/Valemax

constant growth in every shipping sector. From 2009 to 2019 the capacity of the cruise industry has grown by 68%. While maritime trade has been constantly growing for decades except for some small dips during crisis periods, like it happened during the crisis of 2008. Between 2022 and 2023 the capacity of the commercial fleet grew by 70 million dead weight tons[2].

With the increasing size of all the vessels travelling on all major routes, also the chances of two ships, big and difficult to steer, passing close to each other are growing. The Icon of the Seas approaching her home port in Florida may easily cross the route of a giant container ship going to a Northern port.

For now all commercial vessels are still powered by fuel oil, but for how long? The International Maritime Organization spent many years organising many conferences and studies that involved all the member states and then released the "IMO strategy on reduction of greenhouse gas (GHG) emissions from ships"[3]. Which is an euphemism to say that the shipping industry must find an alternative fuel before oil is exhausted. The strategy is full of great promises, predicting a future transition to fully renewable fuels, but in the details it is vague and full of fine print. For the first period the goal is to:

> *uptake of zero or near-zero GHG emission technologies, fuels and/or energy sources to represent at least 5%, striving for 10%, of the energy used by international shipping*

[2] See the statistics on the merchant fleet provided by UNCTAD https://hbs.unctad.org/merchant-fleet/#Ref_HBAEZ5AR

[3] First published in 2021 by the International Maritime Organization, 4 Albert Embankment, London SE1 7SR, www.imo.org

by 2030;

In the documents they released methane is mentioned explicitly only once, when it explains that it will be included in the definition of alternative fuels. The only renewable fuels considered for the final transition are hydrogen, ammonia and biofuels. Hydrogen is even more dangerous than methane and in any case hydrogen storage is still in the research phase, nothing reliable on the commercial scale is available. Ammonia is another fuel that is still in the research phase and biofuels are available in limited quantities. The ships that will be sailing between 2030 and 2040 are already on the design board and shipping lines cannot put all their stakes on technologies that did not get out the research phase. It is doubtful that the final goals declared by the study can really be implemented. What technologies will be adopted by the commercial shipping industry is unclear. It is likely to remain a patchwork of different solutions for several decades, with some ships powered by liquefied gas. On the other hand the choice made by the cruise industry is clear, because the order books are full of ships powered by liquefied gas and those are ships that will remain in service for more than 20 years, few of them even more than 30 years.

The chances that in the future in a busy shipping lane two giant ships will have to pass close to each other, one or both of them powered by liquefied gas, are bound to increase.

5 Rethinking the story of the Titanic

While writing about this argument it is obvious that one of the first things that comes to mind is the Titanic. With a little bit of hindsight and the lessons of the Costa Concordia I began to reconsider all the stories that I heard in the past. Countless of times I have been told that the Titanic was a story of incompetence. The story of a captain, a crew and everybody else who did not take security seriously because they thought that their ship was unsinkable.

That is when I thought: what if in reality the captain and the crew did take security seriously? What if they sighted the iceberg as early as the technology of the time allowed? What if they reacted as quickly as possible, but they could not steer on time such a heavy ship going at full speed?

From those many "what if" came out a scenario that is not so implausible. The Titanic had a displacement of 52,310 tons, which is about 1000 tons more than the Costa Concordia. But with an inefficient power plant it had to carry a lot of coal and water therefore we can assume that the total weight was a lot more. Furthermore, the technology of the engines and the rudder was a century behind, they were much less responsive. With no radar or any other modern navigation aid they could only spot the icebergs when they were within the range of eyesight. It is very reasonable to assume that when they could spot the iceberg it was too late, they had no space to manoeuvre and they could not avoid it.

Many accounts of the sinking state that the officers in charge on the bridge made some mistakes. But considering the difficulty of the manoeuvre probably the result would have been the same with or without any mistake.

With a little bit of hindsight it is even possible to imagine why we the story of the incompetence was repeated so many times. The inertia is calculated via a formula that takes into account the weight and the speed. Here speed matters, the real problem is that the ship was going at full speed in dangerous waters. This is something that is well known, many sources including the official enquiries talk about it. She was going so fast that the iceberg opened many breaches in six watertight compartments and the damage spanned more than a third of the entire ship length. Some accounts tell that the owners of the shipping line asked the captain to go at full speed because they wanted to show the the capability of the ship on its maiden voyage. Even though later historians dismissed the account this is not difficult to believe. Back then ocean liners took about six days to cross the ocean. The fast ships competing for the blue riband could take less than five days. The Titanic was not designed to compete for the blue riband, but on the maiden voyage she had to prove that she was faster than the usual ocean liners because the rich clients travelling for business could not spend too many days at sea and they took notice of the travelling time. Blaming an allegedly incompetent captain was probably a way to discharge the responsibility of the owners.

After the accident there were two official enquiries. Since the survivors were brought to the US and the shipping line was controlled by the American banker J. P. Morgan, the US government

immediately set up an enquiry. But the line was British and the Titanic was registered in Liverpool, therefore the British government set up another enquiry. Both of the enquiries minimized the lax safety. Both of them judged the the insufficient number of lifeboats just standard practice of the time and recommended a change in the legal regulations. The American enquiry judged a standard practice of the time even the high speed in the middle of drifting ice, but that was not true. The British enquiry instead stated that it was reckless in a brief comment, but put all the blame on the captain.

No blame was put on the management and the owners of the shipping line. Since the only ones who were found at fault died in the sinking, the enquiries ended with some legal recommendation and no charges. It seems very convenient. Unfortunately it is still convenient for those who write history, the hypothesis that was made in this chapter will remain just a hypothesis. It does not happen only for the sake of the management, but also because also in that period the preference was for big and massive ships. The ocean liners were way larger than what might have been reasonable considered the technology of the rudders and the other controls. Back then like now it was important to persuade the public that the industry was striving to ensure and protect their safety.

However a point that should be challenged is the notion the captain was an incompetent, he was not. He had a long career and before taking over the Titanic he was the captain of the Olympic, the sister ship of the Titanic. This should be taken as a reminder that every time there is a big blunder and a lot of people are involved, if all the fingers are pointing towards a single person, then it is better to take the story with a pinch of salt and a good dose of scepticism.

Even the jokes about the *Unsinkable ship* should be taken

with a pinch of salt. There is always a big difference between the marketing claims and what people working in the field really know. These jokes are very useful to let people think that the only reason behind one of the deadliest maritime disasters in history is just a series of stupid mistakes that will never be repeated. However considering that the tragedy was also the result of business choices that is hard to believe. I do not know whether at that time the phrase "cost per passenger" was already in use, but that is the logic that they, like the rest of the industry, were following. It is a policy that does have a cost, when you choose to go on a titanic scale tragedies can happen on a titanic scale.

From the cruise industry this chapter might fall into the field of politics, where incompetence is often used as an excuse, but it happens just because the media uses always the same methods. It is like the old say about history, those who do not understand how people were fooled in the past are doomed to be fooled once again.

***

There are no linked references in this chapter because they would have been redundant. The story has been told and re-told a lot of times. Sources have been copied and replicated online many times. Starting from the Wikipedia pages and following the links it would not be difficult to trace all the sources of the facts discussed here. What is changing is only the interpretation of those facts, nothing else.

6 Closing thoughts

Few big cruise lines control almost the entire market and a small group of executives and managers determines the direction that the industry takes. A direction that was encouraged by the abundance of cheap money in the Western financial system and the culture of big bonuses and overblown pay packages. The members of this small group, inebriated by the huge numbers flying around, were eventually caught by the gambling fever, doubling the stakes at every round. Supported by a subservient media system they chose to cut all the corners and go on with their game while few people around dared to raise an eyebrow. Now huge debts burden their accounting, dictate the pace of their operations and determine the technical choices behind the design of the new ships, thus leaving many open questions on the impact they have on the safety of their passengers.

Contrary to common people they are well informed on the trends in the energy sector and the direction that oil prices are going to take in the future[1]. In order to keep their stakes on the table they had no choice, they had to to anticipate the trend. What we are getting as a result are cruise ships between three and four hundred metres long. That in order to turn in one direction need more than a hundred metres of free space on the opposite side, sometimes they need even more than two hundred metres of free space.

[1] Note that I am not talking about the oil price in the next four or five years, I am taking a longer perspective, that is what the managers must do with ships that are still under construction and will remain in service for 20 to 30 years.

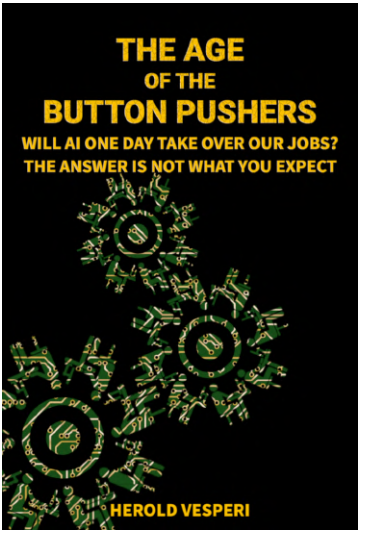
They are heavy and must plan in advance every single manoeuvre. But the perfect execution of each manoeuvre is not guaranteed because the increasing height and surface exposed to the wind is rendering them increasingly sensible and even vulnerable to the unpredictable gusts. The height is increasing because more internal volume is badly needed in order to accommodate more passenger, offer more amenities and striking amusements. But this is all driven by the economy, not by the safety.

At the end of the story we can see that the problem is not the use of gas in itself. But the association of the additional dangers it brings with the sheer size of the latest cruise ships and with the huge number of people they carry around. Unfortunately there are conflicting requirements at play. Safety calls for smaller, more manoeuvrable ships and less people packed together, while energy consumption and costs per passenger call for bigger ships. Someone might say that in this conflict the winner is wild speculation, that would render the idea of the margin by which the second requirements prevails over the first. But it could also be said that the winner is desperation, the desperation of an industry that is caught in a high stakes game and if their clients realised that we are entering into an age of scarcity the entire business could evaporate.

7 Other books from the same author

The Age of the Button Pushers

Available on Xinxii: https://www.xinxii.com/technology-502/the-age-of-the-button-pushers-523176



The future of our jobs is not a mystery. It is the result of a transformation that started a long time ago. It is obvious, clearly understandable, but well hidden behind of curtain of confusion. This book starts from the most asked question: "will AI take over our jobs?" In order to show how misleading it is. Misleading are also all the alarms raised over the power AI, but the real dangers could have even more deleterious consequences, leading to an era where the masses could be trapped in jobs that are alienating, mind numbing and underpaid. Exposing the arguments in a manner understandable by the layman, The Age of the Button Pushers goes trough the fields of computer science, economics and media communication. The whole picture will be reconstructed taking into account the lessons from the past with the changes brought by the industrial revolution, the present

with the consequences of automation, the near future with the risk of an economy dominated by monopolistic giants. Part of the book will be dedicated to all the fabricated stories that dominate the current narrative on the media, highlighting the flaws and the inconsistencies, showing how altogether these stories paint a picture that makes absolutely no sense.

8 Appendix

The four biggest [groups of] cruise lines account for almost 90% of the market. Three of them are going to replaced the old ships with new ones powered by liquefied gas. I decided not to ask questions about it because for the cruise sector it is a relatively new change, any answer could not be proved or disproved with practical arguments based on the past experience.

On the other hand issues like the maintenance of the ships and the safety drills of the crew are an important aspects of the subject discussed in this monograph. I looked for the addresses of the press and media relations of the parent companies and I sent each of them an email with few questions. As of October 2024 none of them bothered to reply, all the questions remain unanswered. Here below is the text of the emails I sent.

The subject of the emails is more or less the same, but the questions had to be adjusted depending on the fleet of each operator and the amount of time the ships works without stopping, that could be deducted by looking at the booking schedules.

The addressee of the third letter is MSC Cruises. This line received little attention in the monograph because they disclose much less information about their financial data and their operations. But due to their weight on the market and the kind of ships they are putting in service they deserved few questions.

8.1 The email with the questions sent to Royal Caribbean

[Omitted salutations]

Anyway I am going to write in general terms about safety in the cruising industry and my questions would also apply to the other subsidiaries. Although I am making specific questions about few ships of Royal Caribbean international the same logic applies to the whole group.

BTW I am writing an article about the cruise industry as a freelance, I currently have no accreditations.

To learn something about your business and about the whole industry I had a look at all the information you released and at your pages with all the FAQ. But there are many details that I could not find. The questions that follow are about the information that I could not find online.

I went to the ticket sales page of your internet site and I had a look at the schedules of some ships and I saw that they work round the clock. For example I noticed that the newly arrived Icon of the Seas in 2025 will stop only for 2 non consecutive weeks. After that I briefly rechecked the schedules of other ships and I noticed similar patterns. Long service time for many years in a row and short stops for maintenance.

1) How often do longer stops for in depth maintenance usually happen? Are they planned or do they happen in case of technical issues? Judging from the history of some old ships, usually after about fifteen years they undergo a major refit. Is that the only long

term stop for maintenance? After that will they restart with the same tight schedule for many years in a row?

2) I assume that the short stops will be used to clean the ship, do small repairs, inspect the electrical systems, inspect the safety equipment and other maintenance activities. How is the available time divided among all the maintenance activities?

3) I read several times, and also in your FAQs that the latest safety rules require the crew to execute periodical training and safety drills including launching the lifeboats. Given the tight schedule I wondered whether these drills happen when the ship is in port while the passengers are on tour or between two cruises. How are such long drills inserted in the tight schedule?

4) If the crew safety drills happen between two cruises it would mean that periodically in a single day the crew would have to: I. Disembark the passengers at the end of a cruise. II. Clean up the ship. III. Execute the long safety drill. IV. Embark the new passengers. V. Execute a safety drill with the new passengers. VI. Leave port for the new cruise. Am I right? How would all these activities fit in a single day?

5) Last question is about a different argument, it is also the reason why I put investors relations in CC. May I ask how long does a ship of the Oasis class needs to pay back all the investments and financial costs? What is the planned pay back time for a ship of the Icon class?

[Omitted email closing and salutations]

8.2 The questions sent to Carnival Corporation

[Omitted salutations]

Anyway I am going to write in general terms about safety in the cruising industry and my questions would apply to the parent company and all the subsidiaries. Although I am making specific questions about few ships they are just examples, the logic applies to the whole group.

BTW I am writing an article about the cruise industry as a freelance, I currently have no accreditations.

To learn something about your business and about the whole industry I had a look at all the information you released and at your pages with all the FAQ. But there are many details that I could not find. The questions that follow are about the information that I could not find online.

I went to the ticket sales pages of some of your internet sites and I had a look at the schedules of some ships. I noticed that they work round the clock. For example from July 2024 to the first half of 2026 the ship Mardì Gras is on a scheduled cruise every single day of the year, except for a night between the 3rd and the fourth of January 2025 and three weeks between the 28th of September and the 15th of October 2025. I assume that this gap period is a stop for maintenance. For the ship Carnival Vista I could not find any gap between July 2024 and the first half of 2026. I checked the schedules of other lines of the group and I saw a similar pattern. AIDANova is available on schedule for the entire 2025. Even the Grand Princess, which already has more than two decades of service

has a maintenance stop in 2024 then is on cruise continuously until 2026 that is the limit for the future bookings.

1) My view is limited to the two years window offered by your booking policy. So what I would like to know is: how often do your ships stop maintenance? I assume that in the three weeks stops that I saw the maintenance work will include cleaning the ship, doing small repairs, inspecting the electrical systems, inspecting the safety equipment and similar activities. How is the available time divided among all the maintenance activities?

2) How often do these ship undergo a longer maintenance stop for a full shakedown? Judging from the history of some old ships, usually after about fifteen years some of them undergo a major refit. Is that the only long term stop for maintenance?

3) I assume that when the ship is in port to let the passengers go on an excursion some generators will be switched off because full power is not needed and some ports provide the electricity. I also assume that there will be some kind of rotation, stopping a different generator each time. On average what is the maximum number of continuous working hours of a generator on a big ship, like one of the Dream or Vista class.

4) I read several times that the latest safety rules require the crew to execute periodical training and safety drills including launching the lifeboats. Given the tight schedule I wondered whether these drills happen when the ship is in port while the passengers are on tour or between two cruises. How are such long drills inserted in the tight schedule?

5) If the crew safety drills happen between two cruises it would mean that periodically in a single day the crew would have to: I. Disembark the passengers at the end of a cruise. II. Clean up the ship. III. Execute the long safety drill. IV. Embark the new passengers. V. Execute a safety drill with the new passengers. VI. Leave port for the new cruise. Am I right? How would all these activities fit in a single day?

6) Last question is about a different argument. May I ask how long does a ship of the Dream Class or Vista Class class need to pay back all the investments and financial costs? What is the planned pay back time for a ship of the Excellence class?

[Omitted final comment and salutations]

8.3 The questions sent to MSC Cruises

[Omitted salutations]

Anyway I am going to write in general terms about safety in the cruising industry and my questions would apply to all the regions where your lines operate. Although I am making specific questions about few ships they are just examples, the logic applies to your entire fleet of cruise ships.

BTW I am writing an article about the cruise industry as a freelance, I currently have no accreditations.

To learn something about your business and about the whole industry I had a look at all the information you released and at your

pages with all the FAQ. But there are many details that I could not find. The questions that follow are about the information that I could not find online.

I went to the ticket sales pages of some of your internet sites and I had a look at the schedules of some ships. I noticed that they work round the clock. For example from July 2024 until the first week of November 2025 the ship MSC World Europa is on a scheduled cruise every single day of the year, I cannot tell what happens later just because later dates fall outside the booking period. However the ship MSC Meraviglia has a longer booking period and I can see that it is scheduled from the 1st of July 2024 until 2nd of May 2025, then there is a gap of two days, then it is working continuously from the fourth of May 2025 until the beginning of May 2026, she is going to operate almost two years in a row with just a 2 days stop.

1) My view is limited to the one/two years window offered by your booking policy. So what I would like to know is: how often do your ships stop maintenance? How long are the maintenance stops? What are the core activities included in the periodic maintenance stops?

2) How often do these ship undergo a longer maintenance stop for a full shakedown?

3) I assume that when the ship is in port to let the passengers go on an excursion some generators will be switched off because full power is not needed. I also assume that there will be some kind of rotation, stopping a different generator each time. On average what is the maximum number of continuous working hours of a

generator on a big ship, like one of the Seaside, Meraviglia or World class.

4) I read several times that the latest safety rules require the crew to execute periodical training and safety drills including launching the lifeboats. Given the tight schedule I wondered whether these drills happen when the ship is in port while the passengers are on tour or between two cruises. How are such long drills inserted in the tight schedule?

5) If the crew safety drills happen between two cruises it would mean that periodically in a single day the crew would have to: I. Disembark the passengers at the end of a cruise. II. Clean up the ship. III. Execute the long safety drill. IV. Embark the new passengers. V. Execute a safety drill with the new passengers. VI. Leave port for the new cruise. Am I right? How would all these activities fit in a single day?

6) Last question is about a different argument. May I ask how long does a ship of the Seaside or Meraviglia Class needs to pay back all the investments and financial costs? What is the planned pay back time for a ship of the World class?

[Omitted final comment and salutations]