

Killer Whale Attacks (1)

From the Gibraltar Strait to Biscay

– Analysis –

version 10/10/2023



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Introduction

WARNING !

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The current subject is a living one. Please [download the last update](#) of this document. Modified text is marked with its date in superscript that way ⁽²⁰²³⁻⁰⁹⁻¹⁷⁾.

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Who's who



I am Pierre Lang, born in Brussels (1951), Polytechnic School (Free University of Brussels), solo sailor, 40000 miles sailed in Europe between Greenland and Greece (2006-...)

I designed my sailboat Thoè with Gildas Plessis (French naval architect) in 1999-2000. I took a very active part to her construction. As a consultant, I surveyed the construction of her sister ship Tara (2004). Thoè won the first price of the wooden boat challenge at the La Rochelle boat show (France, 2001).

I took part in humpback and blue whales research in Iceland from 2013 to 2018. It is the reason why I own a hydrophone that I used to record possible deterring sounds in this study.

Comments or questions can be sent to me: plang@irisoft.be – www.thoe.be

Interactions vs. Attacks

Since 2020, one or more groups of orcas have been attacking some boats, mainly sailboats. They are called interactions. Humans often refer to them as attacks because they are perceived as aggressively by sailors. Yet, it doesn't appear that orcas act aggressively. But from the point of view of sailors, they are *attacks*, because rudders of many boats were destroyed and three boats sank. This chapter is about:

- The behaviour of killer whales.
- Recommendations generally made to sailors.
- My analysis of the sound frequencies used by killer whales (echolocation system and hearing ability) and boats (motor, propellers, depth sounder, pinger used in the hope of scaring killer whales away).
- The protocol that I decided to put in place to avoid the risks linked to interaction with killer whales (stealth navigation, chosen route, devices in the event of interaction or attack).

Alfredo López Fernandez

This document has been read and partially annotated by Alfredo López Fernandez (University of Aveiro, [Grupo de Trabajo Orca Atlántica](#) – GTOA), mainly regarding the behaviour of killer whales. His remarks are presented in *italics preceded by his initials ALF*.

ALF only speaks Spanish. He replied to me using Google Translate from Spanish into French. These multiple translations have, of course, some drawbacks...

Orca interactions with boats

We don't know why, since 2020, killer whales have been attacking the rudders of boats. When the rudder is destroyed, they leave. If the boat is no longer manoeuvrable, it must request a tow. The rudder surface disappears in whole or in part. The sometimes the rudder shaft can break. The connection between the rudder tube and the hull can also break if it is not strong enough (the rudder tube is a tube rising above the water level inside the boat, in which the rudder shaft is passing). In this case, the attack can also lead to a leak. It seems that killer whales exclusively attack rudders.

Thoè has two rudders. They are generously dimensioned as well as the assembly of their rudder tube. Thoè's helm system is behind the watertight wall that separates the rudder system from the saloon. Thoè is

built in three watertight sections, plus a crash box in the bow. In the event of a leak aft, it would not extend forward. It could be spread with a pump.

There were several boats to be repaired and two or three sank, but no one was injured. During the attacks, no testimony alludes to a belligerent attitude of the killer whales. Currently, this concerns the area stretching from the Strait of Gibraltar to the northwest coast of Spain. Killer whales move north during the season following the migration of red tuna. The following hypotheses could explain this behaviour:

- **Training.** In hunting, killer whales pursue tuna and would attack their caudal fin (tail). They would teach the technique to their offspring by training on the rudders, vertical like the hind fin of tuna (in cetaceans, this fin is horizontal).

Fixed ALF: Orcas don't hunt so they don't mistake the boat for fish or whales. They know exactly what the boat looks like and how it works.

- **Revenge.** Many media have falsely attributed to Alfredo López Fernández, a Galician researcher (University of Aveiro, GTOA), the idea that a female killer whale, called White Gladis, suffered serious injuries from a boat during illegal fishing. To protect themselves from the danger that the boats now represent in their eyes, the orcas would attack their rudders.

Correction from ALF: Of course I NEVER talked about revenge, cetaceans don't hold grudges. This comment is the interpretation of a non-professional journalist, in no case can I speak of revenge, I know cetaceans and I know that they are not recognizable, so I cannot say.

A former Icelandic fisherman told me of a killer whale revenge. An orca had been shot by a fisherman who believed the orcas were stealing his fish (other fishermen considered the orcas to be their allies, as they showed where schools of herring were). Following the assassination, the other killer whales destroyed the fisherman's nets by violently ramming through them. The fisherman had to return to port to repair his nets and/or buy new ones. Then he went back to fishing. The orcas again destroyed his nets. This scenario happened four times in a row, always with the same boat!

Note ALF: I don't believe in the story of the vengeful orca with the fisherman.

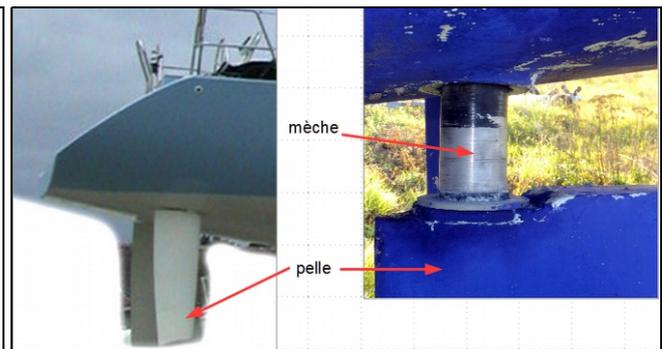
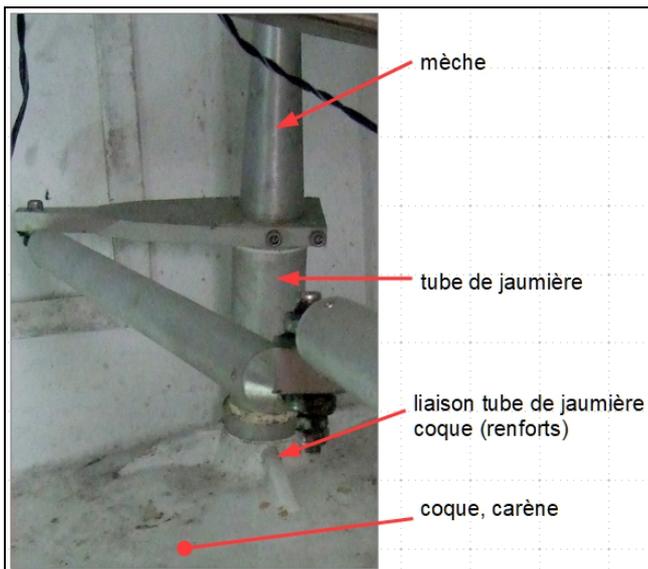
- **Game.** It should be noted that animals hunt only on condition that their prey brings them more energy than that which they expend to catch it. Orcas wouldn't attack rudders just for fun...

I have long believed that wild animals don't just play for fun. I have to remember though that I have seen dolphins actually playing in big waves. It was 2011 when Thoè was heading downwind towards the Strait of Gibraltar, in heavy seas. They waited to find themselves on top of a wave, to then surf just below its surface (men surf just above the surface!) When they hit the bottom of the wave, they leapt into the air as if happy with their glide. Then they would stop and wait until they were at the top of the next wave. This game lasted more than three quarters of an hour, while I enjoyed the show and took photographs.

Correction of ALF: Although among the multiple behaviours that make up an interaction, there is also the game, but what they do is not a game at all, it is a routine of culture and identity.

Rudders

The following photographs relate to the design of the rudders.



- The top of the rudder tube (under the wick arm) is above the water level so that it does not rise to invade the space.
 - The rudder blade is attached to its wick. It has a hydrodynamic wing shape with the trailing edge at the rear. The wick is in the front.
- The wick passes through the hull (bearing), in the rudder tube whose internal diameter is greater than that of the wick. The end of the wick is at deck level (bearing).

The method of construction depends on the shipyard and the resistance that it envisages. In the case of Thoè, everything is solid (marine plywood, no foam, etc.). The hull is 30 mm thick. The assembly of the rudder tube and the hull is reinforced by gussets. It is laminated with fibreglass and epoxy.

How to mechanically destroy a rudder?

The question is how to destroy a rudder.

- **Kicking.** In this case, it is a question of hitting the rudder blade, near its trailing edge.

If the rudder is in the axis of the road, it starts by pivoting (this can cause violent movements of the wheel helm or the tiller). You have to let go to avoid risking an injury or a fracture.

If the rudder is already or is coming to a stop (or is blocked by another means), then a strong torque is exerted in the blade and between the blade and the stock. In general, the blade is built on two or three perpendicular bars attached to the wick. They are not sized to withstand the effort of a 3-tonne animal hitting the rudder abeam.

Twist. The blade itself is not sized to withstand torsional stresses between top and bottom. It can break like when you twist a strip of cardboard.

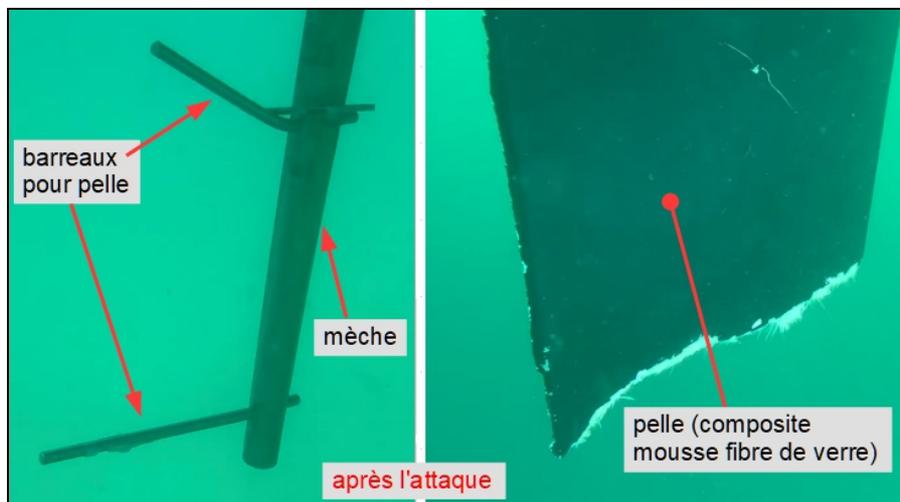
Bending. If a huge force is applied close to the wick (a tube or a rod generally made of aluminium), it undergoes a significant bending stress which can cause it to bend.

Breakup. This bending torque is taken up by the hull and the rudder tubes. The stock/hull assembly is of the "beam embedded at one of its ends" type. The assembly may break at the level of the hull. This can result in a waterway which is almost necessarily significant. You need a high flow pump to spread it. The bilge pumps usually installed as standard on sailboats cannot keep up. In some cases, rescuers brought a high-flow pump by helicopter.

Note from ALF: This is one of the biggest problems with sailboats, and one that orcas reveal the insecurity of a very expensive boat. This is the reason for the three sunken ships.

In summary :

- The blade breaks by twisting.
- The wick can be deformed by bending.
- The hull and the rudder tube can give rise to a leak.
- **Bite and gnaw.** A blade made of a composite sandwich (inside in light and not very dense foam covered with a laminated skin based on fibreglass) is certainly more fragile than a solid shovel made up (like those of Thoè) of solid plywood covered with fibreglass and epoxy lamination.
- A combination of both mechanisms.



How does the orca does?



Pushing the lower side of the rudder to turn it⁽²⁰²³⁻⁰⁹⁻¹⁷⁾



Touching the lower edge
Ocean Race 2023

www.youtube.com/watch?v=E1rgcI2jUJY

According to ALF, killer whales NEVER bite the rudder, we have seen it on over 20 boats examined by a diver before someone touched them, there are no teeth marks on the rudders, it can have them in other places because they try to sense if something is hard or soft but certainly don't bite to break it.

It must therefore be deduced that the damage resulted from twisting of the blade, bending of the wick and rupture of the rudder tube / hull connection.

What about statistics ?²⁰²³⁻⁰⁹⁻²¹

Some sites or organizations (Cruising Association, GTOA, etc.) tried to compute some probabilities about which boats are attacked or which system could avoid attacks. The conclusions are not meaningful, following me, because there are huge bias.

- **No attack ?** People who did not experience an attack are not sending reports. If they tried some deterring systems, it is very difficult to know which they used successfully because they tried maybe many things. It remains unknown if they deterred the orcas or if the orcas just decided to leave.
- **Insurance ?** Some people do not send reports because they think that their insurance could not pay the repair in case of orcas attack.
- **No damages ?** Some people are just happy to have no damages and do not report.
- **Forbidden deterring systems.** If they are using some deterring system or another forbidden technique (firecrackers, pingers, toxic matter, etc.), they do not report attacks.
- **Failing pingers ?** If they are using an expensive pinger and they are attacked anyway, they are (maybe) sending a report to explain that this system does not work and send a claim to the manufacturer. We never know if they used this device the right way. The Banana Pinger has been developed for the fishing activities. The manufacturer (FISHTEK Marine) does not warrant any result and does not explain how to use it. So how are the users using it ?
- **Useless reports.** They are too few reports to compute valid statistics. A lot of details are missing in the reports which are often written after a stressful experience.

Consequences

- **False conclusion.** As we mainly get failing experiences, the percentage of the failure compared to the number of received reports is generally large. So the false conclusion is that any deterring system does not work !
- **Impossible computation.** To get valid statistics, we should get the percentage of unsuccessful experiences compared to the number of devices in circulation during the same period of time. As this number is unknown, it is very difficult to compute the efficiency of a given system.
- **Invalid hypothesis.** Imagine the manufacturer of a device sold 200 units. He got about 20 negative reports and 0 positive one. It is false to conclude that this device does not work at all, because users are not reporting successful experiences. So the manufacturer decides to assume that there are 180 successful experiences and claims that the efficiency of his device is 90 %. This is overestimated ! The number of interactions is less than 180, because many boats do not meet orcas and, sometimes, the orcas had not intention to attack a boat !
- **Bad percentages.** ??? FAUX If we compute, for example, the number of attacked of boats with a black underwater colour compared to the number of attacks, the percentage will not be meaningful, because it depends on the (unknown) proportion of such boats in the total.

Rudder protection and basic recommendations

Put the rudders in a "cage"



Chain hanging on the aft



Chain hanging on the side



The starboard chain is long enough to add a chain on the aft

With my friend Étienne, we decided to trick the killer whales' echolocation system by protecting the rudders with a chain hanging behind and on the side of them. For Thoè, I collected two pieces of chains normally used to drop the aft anchor. One end is moored to the aft mooring cleat, which is laterally in front of the rudder. The other end is attached to a mooring cleat which is on the quarterdeck, in front of the rudder. The chain therefore takes the form intermediate between a U and a V. There are two chains, 8 mm and 10 mm approximately 5 metres in length. They will hang in the water to port and starboard more or less in the axis ± 1.5 m behind the rudders.

Bubble curtains 2023/10/07

Some sea industrial sites are installing bubble screens or curtain to avoid whales to approach. It looks to be a friendly way to protect whales and human installation at the same time.

The problem by using it to protect the rudder of a boat is that the boat must stay still. The hose or the pipe used to distribute the air bubbles would not stay in place while the boat is sailing even at a low speed.

Also, consider to have an air compressor and accessories (pipes, valves, etc.) on board and putting this system into the water in rough sea. It is for sure too expensive and too difficult to use.

Repellents

- **Make noise.** NOAA recommends hitting a 2.5 metres long tube with a hammer. This is the result of a hunting technique used in various places around the world, which consists of pushing cetaceans towards the shore and then killing them.

Reference: *Hunting cetaceans with sound: a worldwide review*. Robert L. Brownell, Jr., Douglas, P. Nowacek, Katherine Ralls. U.S. Department of Commerce Publications, Agencies and Staff of the U.S. Department of Commerce

Some recommend throwing away:

- **Sand.** This technique would have been used several times by a Portuguese fisherman. According to them, orcas avoid sandy waters to protect their blowhole and they move away. Sand in the eyes and in the vent (nose) would not be appreciated by the attackers. We can understand that! It's about throwing one or more handfuls of sand over the rudder.

Testimony : www.yacht.de/special/seenot/wal-attacken-eine-handvoll-sand-als-wirksamer-schutz-gegen-orcas

Note from ALF: Another false appreciation of boaters and fishermen, sand does not displease them for this, but for the mirror effect it produces against its echolocation. Soon they will learn to avoid the sand by seeing that they can pass through its surface like the mirror door in fantasy movies. In any case, it is illegal to throw anything at orcas.

- **Bleach.** This would scare the orcas away. I am suspicious of this new use of bleach. As soon as we encounter a problem, we think that this miracle product would be and will be THE solution! Thank you Ernest Solvay.

Note from ALF: It's harmful to the environment and to the orcas, I repeat, it's illegal to throw anything at the orcas.

Reverse

- It would seem that reversing the engine deters the orcas from attacking the rudder. It was advised. This is not unanimous.

Note from ALF: Reverse is contemplated in Portuguese law but not in Spanish law, only as a safety measure and with no intention of harming orcas. It doesn't always work.

Choice of route

- Navigating in shallow areas of 20 to 40 metres was advised.

Note from ALF: This is not a guarantee of anything, but there are indeed less shallow depth interactions.

Pumps

- You need a high-flow pump to spread a large waterway. The bilge pumps usually installed at the factory, which have a low flow rate, are not suitable for a waterway.

Software

Smartphone applications and websites are used to learn about or identify events concerning killer whales in the area concerned. They seem to me unfriendly and of limited usefulness, because the available data do not (currently) allow determining an avoidance strategy. On smartphones, there is no information about the shape of the boats that have been attacked (type of boat, long or short keel, colour of underwater paint, skipper comments, etc.)

The Cruising Association (CA), associated with GT Orcas, manages the detailed testimonies of killer whale / boat interactions.

- **GT Orcas and Orcinus** : see Google Play.
- **GT Orcas** : www.orcaiberica.org et www.facebook.com/OrcaIberica
- **Cruising Association** : www.theca.org.uk/orcas/fr. Very detailed reports (not always up to date?)
- **Ocas @ Portugal & Spain** : www.orcas.pt – www.orcas.pt/last-weeks (private project)
www.facebook.com/groups/435540734439160/posts/792662225393674
- **Ministerio : de Transportes, Movilidad y Agenda Urbana** (Seguridad marítima y contaminación)
www.mitma.gob.es/marina-mercante/seguridad-maritima-y-contaminacion.
- **Google Earth** ? I developed a prototype interface between Cruising Association data and Google Earth. The interface is much more user-friendly and practical, month by month, over the period 2022-2023. This includes not only the testimonies of the interactions, but also the route followed by a virtual orca according to the date and time of the successive interactions (in reality there are several orcas not individually identified). To develop this application, it will be necessary to be able to have the data in importable form rather than laboriously copying & pasting it from the website.
Download : www.thoe.be/files/2022-01-2023-05-orcas-interactions.kml (Janurai 2022 / May 2023)
Save locally and double click on the file to open it in Google Earth.

Note from ALF: I haven't seen all of the virtual killer whale's journeys in detail, but we do know that in 2022 they were separated into at least six groups between the Straits and Brittany.

Audio analysis

Echo sounder

- **Echopilot:** 200 kHz (inaudible to killer whales)
- **Raymarine:** 50 to 200 kHz (there are dual frequency systems). The 50 kHz frequency is audible and carries further.
- Other brands: inquire.

Pingers

Note from ALF: Regulations in Spain and Portugal only allow pingers in fishing operations. Used on sailboats, they are not effective against killer whales, they produce chronic noise pollution and an attraction effect.

A pinger is a torpedo-shaped electronic accessory that must be towed by the boat at the depth of the rudders. It emits, for example, every 4 seconds a powerful sound of about 145 decibels. The frequency of this sound should be in the same range as that which is audible to the target, the orca, which ranges from 60 Hz to 120 kHz (for humans it is ± 50 Hz to 20 kHz if its hearing is in perfect condition).

In water visibility is greatly reduced. Marine mammals use sound like we use radar. Each species uses different frequencies. Some cannot be heard by humans:

- Blue whales: 10 à 40 Hz. The lower the frequency, the further a sound goes. Blue whales can communicate across an ocean.
- Orcas: ± 2 à 13 kHz.
- Harbour porpoises: 100 à 150 kHz. These are the highest frequencies of cetaceans. It can react to frequencies from 75 Hz to 150 kHz.

The principle consists in scrambling the echolocation system that they use to orient themselves and hunt or deafen them to make them abandon their project and flee.

The *Whale-PAL* pinger we bought with my friend Étienne is worth €500. Torpedo-shaped, it is preceded by a hydrodynamic module that keeps it under water. It was sold to us by Boris Culik, a German teacher. It was tested in Denmark by Magnus Wahlberg, a researcher I had the opportunity to meet in Iceland on a research project concerning the underwater recording of blue whales.

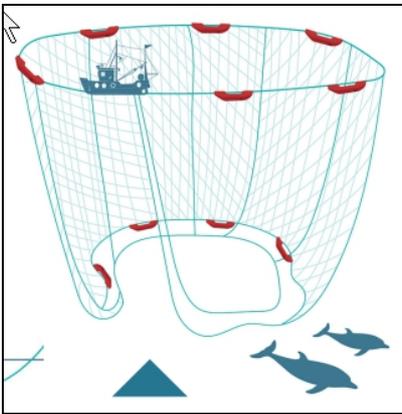
Other pingers are used by anglers to avoid catching dolphins. They are regularly suspended from the nets. These inexpensive pingers cost around \$100. To the average user, a pinger is a pinger! So he buys the cheapest. If these have a reduced effectiveness vis-à-vis orcas, we can understand why, by an abusive generalization, the pingers are sometimes all lumped together and deemed ineffective. These models are designed to be hung from fishing nets. The yachtsman who uses them adds a lead weight so that they remain under water when they are towed by their boat, without being able to control precisely at what depth they stay.

Some experts say pingers attract killer whales instead of repelling them. If an orca is nearby, the loudness can (hopefully) scare it away. But when the animal is far away, it can bear the sound, and approach. In this case, the pinger could be considered to indicate at the very least the presence of a ship nearby. The orcas quickly learn this and head for the boat.



Pinger pour éloigner les orques (Whale-PAL v2)

Frequencies: 10 to 160 kHz @ 145 dB with a range of 200 metres.
www.f3mt.net/whale---pal.html.



Pinger to keep dolphins away

The various pingers used to keep dolphins away from fishing nets, which some boaters use while sailing, emit from 50 kHz to 120 kHz, 40 kHz, etc. They must be spaced 100 to 200 metres apart depending on the model.

www.isifish.fr

www.isifish.fr/en/portfolio_page/fishtek-marine

www.isifish.fr/wp-content/uploads/2013/10/Banana-Pinger-FR.pdf

www.fishtekmarine.com

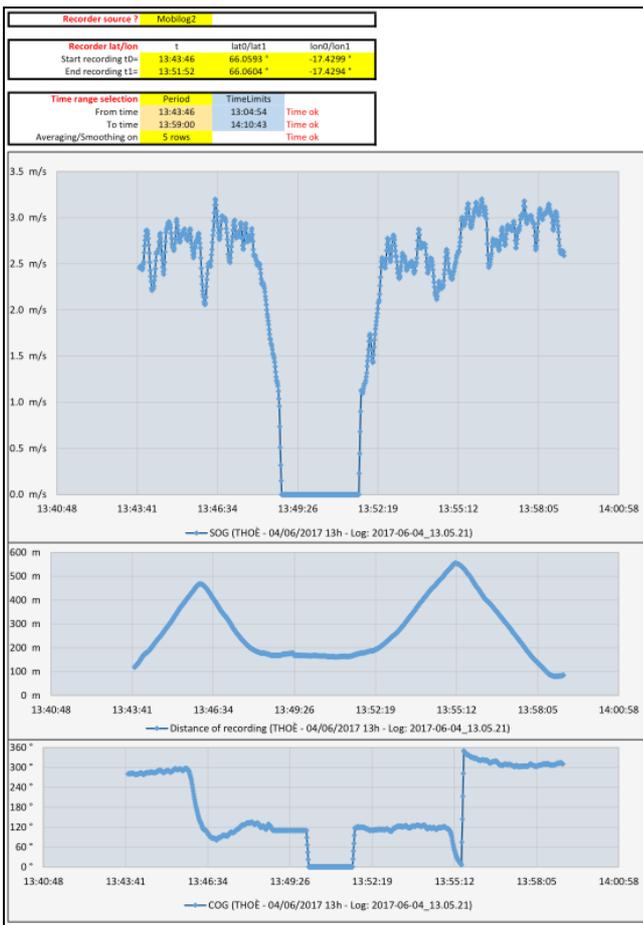
www.fishtekmarine.com/reduce-cetacean-bycatch

www.fishtekmarine.com/wp-content/uploads/2021/08/EN_Anti-Depredation-Pinger_techspeg.pdf

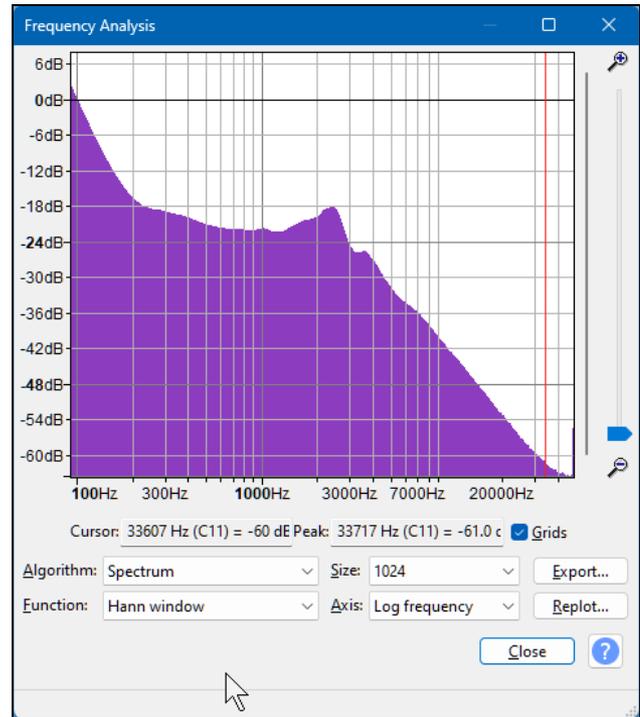
Drive train

Thoè was recorded on June 4, 2017, in Husavik (Iceland). It was within the framework of research on the sound emissions of various boats, mainly fishing boats suitable for whale watching, fast semi-rigid boats, two electric propulsion boats, Thoè (13 m sailboat recorded from a tender), a cruise ship, etc.

In total, we had made about a hundred recordings. We wanted to establish a relationship between the design of the propulsion train of ships and their underwater noise pollution (it is absurd to think that underwater noise has any relationship with that which we perceive on board). Unfortunately, this project did not succeed due to a lack of resources.



The boats were recorded in three phases: boat approaching and sailing away with one phase in place, engine idling, inverter in neutral. Thoè had moved 600 metres away from the hydrophone.

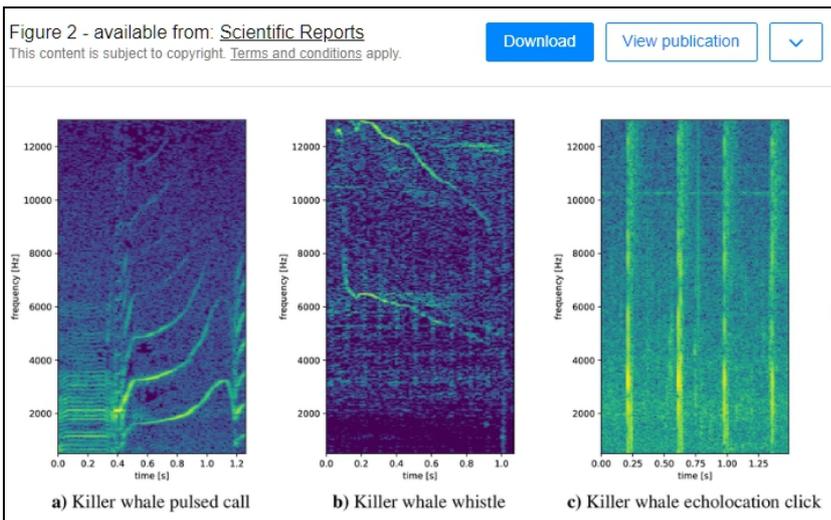


Thoè's analysis shows that its frequency range is from 100 Hz to 30 kHz.

Killer whales

Frequencies used

The fact that an orca (and other cetaceans) uses particular frequencies for echolocation does not imply that it does not hear other frequencies! In fact, she can hear engines (usually low frequencies) and some sounders.



This histogram shows the frequencies used by killer whales according to their function:

- 2 and 4 kHz pulsed call
- whistle from 5 to 7 kHz and from 9 to 13 kHz
- echolocation click from 2 to 13 kHz.

The range of frequencies that the orca can hear is significantly wider. It extends from 60 Hz to 120 kHz.

Réf: <https://seaworld.org/animals/all-about/killer-whale/senses/#:~:text=Early%20studies%20published%20in%201972,from%2060%20to%20120%20kHz.>

www.researchgate.net/figure/Spectrograms-of-three-characteristic-killer-whale-sounds-sampling-rate-441-kHz_fig2_334744413

Orcas vs Motors/Propellers

The conclusion is obvious: Thoè emits frequencies in the range of those orcas can hear. This observation is valid for most motorized boats. Since these are relatively low frequencies, they propagate far. It's obvious that boats sailing under power do signal their presence!

Orcas vs Sounder

Orcas can hear echo sounders that use frequencies below 120 kHz, which is not always the case with basic echo sounders. These frequencies do not propagate very far. However, why not turn it off when you don't need it?

The protocol of the skipper of Thoè

The following provisions result from the previous analysis and some published recommendations.

Navigate in stealth mode

Engine. The available testimonies show that 2/3 of the attacks take place when the boat is motoring or motor sailing. Some testimonies indicate the stopping of the engine and the end of the attack. But when the engine was started again, the attack started again ⇒ the noise or the vibrations of the engine attract the orcas.

Note from ALF: They are not "attracted", but the orcas know where the 100 ships around them are, and choose one of them. Therefore, if we had silent boats, interactions would be reduced. But they've performed with sail-only boats, so noise isn't the only motivation.

Echo sounder. Some recommendations say to turn off the sonar. Unless we are mistaken, this one often emits at a frequency much higher than that of cetaceans. This is also the reason why the sounder can only measure depths of about 100 metres. Other comments indicate that sonar has no impact on attacks. In fact, we have seen that it depends on the type of sonar!

- If the sounder transmits frequency can be adjusted, it should be set above 120 kHz (typically 200 kHz).
- Thoè is equipped with two sounders.

A Raymarine measures the depth under the boat. This is what is discussed in the previous paragraph. In principle, it switches on automatically with all navigation instruments. Limited to depths of ± 120 metres, it most likely broadcasts at 200 kHz. Raymarine also produces two frequency sounders: 50 kHz and 200 kHz. Doubt may persist. The specifications must be checked.

An Echopilot is more limited in depth (± 40 metres, which exceeds the requirements – documented frequency of 200 kHz). It can analyse the profile of the bottom in front of the boat. I therefore consider that it duplicates the previous one. This can be turned off. This is justified in a way by the precautionary principle.

⇒ The frequency of 200 kHz is much higher than that audible by killer whales (120 kHz).

Stimulation. Dolphins are known to like to race or swim ahead or in the wake of sailboats. They are curious and playful. Videos show killer whales racing RIBs at over 20 knots. We can therefore assume that they are also looking for this kind of playful encounters.

Conclusion

My idea is therefore not to signal the presence of Thoè from a distance.

The engines and especially the propellers make noise. The echo sounder too. Pingers too. A boat under sail at a reasonable speed does little. I think Thoè under sail is very quiet below 4 knots. Above this speed, the hull entrains air, which could be the source of noise. I decided to limit the noise that Thoè transmits in the water as much as possible:

- No motor (sailing or standby).
- Stay away from motorized boats. Don't sail near a boat that might attract killer whales!
- No depth sounder (or only when necessary). In case of risk and as a precaution, the Raymarine sonar cables will be detached.
- No pinger (only during an attack).
- Sailing at maximum 4 knots.

Choice of route

- **Sail near the coast.** Sailing ± 1 mile from the coast, soundings permitting.
⇒ Less risk of encountering killer whales. It is not zero, but practically negligible.

- ⇒ Closer to emergency services, if necessary (this can happen: repairs with large pumps, towing).
- ⇒ Close to the coast. To take refuge at shallow depths. For the extreme case where you have to abandon the boat (we are within reach of the tender). This case has never arisen since the killer whales attack sailboats.
- ⇒ Near the coast, the noise of the boat can be confused with the background sound of the shore, the surf and other coastal noises.

- **Navigate at shallow depth.** Make way in shallow depths of 20 to 30 metres maximum.
 - ⇒ Less risk of encounter.
 - ⇒ Possibility, at the sight of killer whales, of moving quickly towards shallower depths (recent recommendation) and even of dropping anchor at 5 metres and waiting for the killer whales to leave.
- **Sail only.** If there is no wind, wait for it to rise.
- **Sailing by day.** This makes it easy to spot orcas from afar before they approach and to put other arrangements into action before a possible attack.
- **Stay away from motorized boats.** Don't sail near a boat that might attract killer whales!

In case of danger

- Turn off the autopilot.
- Notify the Coast Guard.
- Prepare available pumps and protective devices.
- Be ready to drop the anchor.

In case of attack

Switching off the autopilot (important!) When engaged, the pilot keeps the rudder in order to follow the imposed course. The rudder is therefore blocked. A violent blow to the rudder can damage the helm / rudder transmission system by forcing it.

Release the helm (1). The main reason is not to be injured by the violent movements triggered by an attack from the rudders.

Release the helm (2). Another reason, debatable, is that if the helmsman tries to resist, it will cause the orca to use more force. I don't share this remark, the helm will soon find itself fully abutting, port or starboard. It is then blocked and all the forces are immediately supported by the rudder and the boat.

Dampen the helm? I am in favour of mooring the helm in the neutral position using elastic ropes (8-10 mm bungee cord). After each attack, the rudder would straighten up. Blows to the rudder would be cushioned. This initiative has no downside.

Note from ALF: If the rudder has a spring that would prevent it from being forced past its angle, that's fine. If he gets back on track, that's good too. If you put up a little pro resistance without a fight, be good for the killer whales. But the same is not enough in bladed rudders as they rely on their tip and leverage.

How does a killer whale react when encountering a "soft" rudder/obstacle?

ALF Response: We don't know but maybe even if it affects his action, he will repeat it more times, he may stop later. Even so, there will be times when it senses the axis and breaks underneath. Often breaks are caused by handling, but I'm sure sometimes they hit it to break it under the axle with the intention of stopping the boat for good.

Make noise. It is an American recommendation from NOAA (unless I am mistaken) and other sources to rule out cetaceans. The idea is to plunge a 2.5-metre-long steel bar into the water and hit it with a hammer.

On Thoè, you can also hit the gantry that supports the solar panels at the stern, and even the heads of the rudder stocks themselves (they are at the helmsman's feet).

Tow chains. It's about disrupting the orcas' echolocation system by letting chains hang behind the rudders.

Put the pinger in the water. If you are stationary, you should let it hang a maximum of 2 metres deep at the edge of the transom (the manufacturer of the pinger says that if the boat is stationary, you must let the pinger go down to ± 2 metres at the depth of the rudders. If you are under way, you have to drag it behind the boat (recommended speed: 4 knots).

Towing other objects: a piece of old sail, large fenders, long stragglers, etc.

Throw sand? It should be near the rudder to disturb the echolocation capabilities of the orca..

Filming. The camera installed on the aft gantry can be used and controlled at the chart table using software, to film the interaction. The fins and spots on the body are used to identify killer whales.

Possible role of the engine

If you are not motoring \Rightarrow switch off the engine.

Make way? According to the latest news (www.trans-ocean.org/Bericht-lesen/ArticleId/6790/Neue-Empfehlungen-f-252-r-die-Orca-Gebiete), the option would be to go straight ahead, as fast as possible, at shallow depths. This is only possible if you are already relatively close to the coast. The killer whale takes 10 to 30 minutes to complete its work. You must therefore already be within 2 miles of a shallow area. Nevertheless, this confirms the strategy of sailing less than 1 to 2 miles from the coast in relatively shallow depths.

Stop the boat? One of the recommendations is or was to stop the boat. The speed of the boat would be an exciting factor for the orca/boat game and an aggravating factor for blows to the rudders. Some defend the idea that the faster you go the more you push the orca to participate in its game of pursuit, like a cat running after a piece of wool, if you wave it.

Making circles ? If nothing helps to get the orcas away, I will try to use this strategy under engine at a fast speed. Let the boat making short circles (helm full on one side) until it get some positive effect (or not). The idea is to try to fool the orcas echolocation, as the rudder will go away all the time when they approach from it.

Backtrack. Backing up with switchbacks had been advised. This is an option to try if you stop the boat.

End of attack

- Wait 30 minutes. When the orcas give up and leave, wait before restarting the engine (otherwise the noise of the engine may call them to order).
- Report the interaction. www.theca.org.uk/orcas/interaction-report-form/en

Abandonment of the boat

This eventuality never arose.

- Prepare the tender: engine and petrol cans.
- Prepare the life raft (untie its ties)
- Portable VHF, Epirb, etc.
- Boat and person papers in a waterproof bag.
- Computer and external hard drive in a waterproof bag.
- Cameras in a waterproof bag.
- Water bottles, cookies, chocolate, etc. stowed in containers concealed in the helm seat.

Don't panic!

There was only material damage. No injuries.



*A Norwegian family who was attacked twice in Galicia, in front of the rudder (Yacht magazine)
Apparently not too traumatized!*

Ref : <https://www.yacht.de/special/seenot/wal-attacken-wiederkehrender-albtraum-norveger-erneut-von-occas-angegriffen>

https://media.delius-klasling.de/dk-wassersport/images/dpr_auto,fl_progressive,f_auto,c_fill,g_face:auto,h_600,w_1068/q_auto:eco/yacht/Orca-AngriffGalizien2022_124136_f5d87fe645bf59fb2baa190f5e5aebfe/wal-attacken-wiederkehrender-albtraum-norveger-erneut-von-occas-angegriffen