

Unfinished orchestras - Safety in fragmented towing and passenger vessel operations

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Interorganizational collaboration is increasingly common in maritime operations, but the safety implications for seafarers working across organizational and contractual boundaries remain insufficiently understood. The aim of this study is therefore to explore safety challenges for seafarers who work within maritime segments with high interorganizational collaboration. The study targets passenger vessels and towing vessels. Across cases, seafarers reported hazards linked to conflicting priorities between owners, charterers, and subcontractors; unpredictability and variability arising from shifting plans and fragmented decision-making. The findings highlight how language, manning practices, hierarchy, customer efficiency and information flow gaps become challenging. Passenger vessels, in particular, can benefit from clearer structures and better integration of planning and communication practices. The study shows that safety in fragmented maritime operations depends on how organizations coordinate aims, share information, manage variability, and support resilient frontline decision-making. These results contribute to a broader understanding of safety in distributed maritime systems and demonstrate a need for contractual clarity, improved communication, and practices that sustain continuity and predictability across organizational boundaries.

Keywords: Maritime safety, interorganizational operations, cooperation, passenger vessels, towing vessels, towing, safety management, relations, qualitative study.

1. Introduction

Seafarers often work in organizations or operations where interorganizational collaboration is required. From other industries such as mining, construction, petroleum and manufacturing, it is well known that interorganizational work can increase the risk of unwanted events and accidents (Milch & Laumann, 2016; Nygren et al., 2017; Valluru et al., 2020). For example, safety climate within the host organization has been found to influence safety for contractors, including workplace injuries and turnover (Lee et al., 2024).

Maritime safety has been studied from many angles, but consequences for seafarers from

hazards related to the added complexity that comes with cooperation and dependencies between organizations are not well understood. The aim of this study is therefore to explore safety challenges for seafarers who work within maritime segments characterized by high interorganizational collaboration. Our study targets passenger vessels and towing vessels.

2. Interorganizational operations and safety in the maritime domain

Interorganizational operations include operations where multiple companies are involved and where work processes require collaboration of

employees across organizational boundaries (Milch & Laumann, 2016). Interorganizational collaboration is in many cases the result of companies outsourcing parts of their core services or production process. An important reason for outsourcing is to maximize profits (Hayes & Tillement, 2022). In addition, with rapid change in many industries, there is also an increasing need for specialized services and technologies which are not available in-house (Hätönen & Eriksson, 2009). In the maritime domain, however, collaboration is not limited to outsourcing arrangements. Rather, collaboration is frequently a structural characteristic of operations, for example during cargo handling in ports (Meléndez & Goerlandt, 2025) or when transporting large and complex structures, where multiple organizations must coordinate their activities to complete a single operation (Jafarpour Hamedani & Khedmati, 2024).

Interorganizational operations in the maritime domain have not been sufficiently researched (Herrera et al., 2025). These operations are rarely linear and can take many different forms. Collaboration may occur between partner organizations such as shipowners, charterers and manning agencies, as well as between employee groups working side-by-side on board vessels or on different vessels collaborating in an operation (Dong et al., 2017; Ljung & Oudhuis, 2016).

Work on board vessels can be characterized as occurring within a highly self-sufficient work community that depends on extensive cooperation and coordination. Consequently, a shared understanding of tasks, roles, and situational conditions is essential during operations (Kongsvik et al., 2020). At the same time, the maritime domain can be understood as a tightly coupled and complex socio-technical system (Dekker, 2019; Perrow, 1999). From a safety science perspective, both operational collaboration and strategic coordination represent activities that, if not deliberately managed, may introduce vulnerabilities and increase the risk of operational disruptions and accidents (Hayes & Tillement, 2022; Kongsvik et al., 2025; Milch & Laumann, 2016; Österman et al., 2020; Størkersen et al., 2017).

3. Method

Semi-structured interviews with 10 participants were conducted during 2025. An interview guide

with questions based on literature reviews was used. Main topics included work tasks, collaboration, framework conditions and measures for improvement. Interviews were done by two researchers, using Teams video meetings with transcription.

Informants were recruited through the researchers' networks and openly available information online. Informants' positions included captains, HSEQ managers and authorities. They mainly worked for companies operating out of Norway and Sweden, though most companies also had an international market. To address the topics from multiple points of view in terms of roles and responsibilities, some informants were recruited from the same ship or company. The employees were interviewed separately.

For the analysis presented in this paper, interview transcriptions were categorised manually by the researchers with aims of identifying key safety challenges for the seafarers. Quotes used in the paper are translated from Swedish and Norwegian to English.

The Norwegian Agency for Shared Services in Education and Research (Sikt) has reviewed the study's compliance for regulations protecting the privacy of participants.

3.1 Limitations of the study

This paper is part of an ongoing study. Due to the limited number of informants as well as relevance outside the empirical context not being considered at this point, the material is not suited for generalizations.

4. Results

The first subsection introduces the passenger vessel and towing vessel operations, while the rest of the section describes the most central topics emerging in the interviews: conflicting priorities and unpredictability in operations.

4.1. Interviewees' descriptions of operations

The vessel types covered in this paper typically experience interorganizational cooperation in different manners. Passenger vessels participate in interorganizational cooperation related to the operation of each single vessel and when loading and unloading in ports, while towing vessels mostly interact with other vessels.

A passenger vessel is operated by a company (which usually sells tickets, plans schedules, etc.). This company can charter the vessel from a vessel owner and is therefore referred to as the charterer. It is common for the charterer to hire crew from a third company to operate the vessel. Crews on passenger vessels typically consist of two groups; an operating crew, which is responsible for navigation, cargo handling, machinery and safety, and a catering crew serving the passengers. Depending on the vessel size and segment type within passenger vessels, the crew can be hired from one, two or more ship management or crewing companies.

Towing vessels mostly operate on missions supporting a ship to or from port (ship assist) or moving large structures (specialized towage). Regularly, more than one towing vessel is involved. Ship assist is usually a routine operation which is organized between the ship operator and the office of the towing vessel company. Communication between the ship and the towing vessel is established shortly before the operation commences. The ship's captain is assisted by a pilot when required.

Specialized towage is not a routine operation, and extensive planning precedes the execution. Here, a company, which owns or has interests in the structure being moved, hires a subcontractor to plan and supervise the operation on their behalf. Several towing vessels are involved, and there is a tow master managing the operation directing the tugboats – the amount of force and direction of their actions. One or more pilots are accompanying the tow master if the operation takes place in an area where this is required. It is important that the tow master has a good overview of the situation, and they are therefore usually situated at some high point of the structure being moved. A typical example of a special towage is a so-called rig move, where an oil rig is towed or transported on a float-on float-off vessel. The stakes in such operations can be high, and the cost of delays or accidents can be several orders of magnitude larger than the cost of the operation. This motivates thorough planning and engaging extensive resources in the operation to minimize risks and maximize effectiveness.

Towing vessels from more than one company can participate in the same operation, and the tow master can be hired independently of the towing vessels.

4.2 Conflicting priorities between the actors

The interviewees describe how the companies involved in the operations cooperate, and that their priorities are not always aligned. These misalignments appear both between formal partner organizations (e.g., shipowners, charterers, and manning agencies) and between employee groups working side-by-side on board.

4.2.1 Language and manning practices

Several interviewees describe tension between the priorities of external crewing companies and the safety-related communication needs on board. Some crewing companies are perceived as prioritizing “accessible workforce” and cost efficiency, sometimes at the expense of adequate language skills. This creates operational risks for ship management and crews:

“The biggest challenge is that not everyone speaks good English... And when the language isn't there, it becomes a safety risk... If it's not possible to communicate, they can't stay on board.” (Human Resources, Passenger vessels)

In addition, the use of an external crewing company is seen as contributing to extensive change of crew members, which undermines continuity, competence, and relationship-building between groups working on the same vessel:

“You drain the competence bank completely, and then we have to build it up again. It becomes heavy work.” (Captain, Passenger vessel)

Some describe situations where newly hired personnel signed off work tasks they had not performed, because of insecurity and fear of not being rehired:

“You sign off that you've done things even though you maybe haven't, because you didn't understand but didn't want to ask, because you're afraid you won't be allowed to come back.” (Human Resources, Passenger vessels)

4.2.2 Hierarchy and decision-making

Many of the interviewees talk about cultural differences in how crewmembers interact with authority. It is said that some groups avoid questioning decisions or raising concerns, even when this affects safety:

“They didn't dare say anything... They just did what they're told... They had no security at all in their employment. [...] it takes time to build a

relationship and create a sense of safety.” (Human Resources, Passenger vessels)

On passenger vessels, officers experience large differences between the operating crew and other personnel onboard:

“We’re relatively confident... but they’d never say anything if something’s wrong.” (Chief officer, Passenger vessel)

This affects reporting, safe work, and emergency preparedness:

“They don’t report deviations... they could go to their own manager to write something, but I don’t think they’d do it.” (Chief officer, Passenger vessel)

“It’ll never work in an emergency, because you have to trust that they can think independently... They want very clear instructions from the start, because they’re not used to thinking independently.” (Chief officer, Passenger vessel)

4.2.3 Safety versus customer efficiency

Several tensions are described between vessel crew and charterer. Some charterers can focus on operational outputs (arrival time, bollard pull, or general availability) while vessel crews emphasize safe operations, time, and competence.

“We try to maintain a relatively high standard on our vessels... but most customers just want a tug with a certain bollard pull at a certain time. That’s all they want.” (HSEQ 3, Towing vessel)

For passenger vessels, the interviewees highlight disagreements over responsibility for maintenance costs and standards:

“Who should cover the cost?... [The charterer] wants everything to be top-notch but doesn’t want to pay for it.” (Chief officer, Passenger vessel)

The interviewees describe situations where they have been pushed to start operations earlier than they considered safe, meaning the customer created a direct time pressure:

“Customers are very eager to get things started and get us in position, and then sometimes we have to put our foot down and say no, we must wait until conditions improve.” (Skipper, Towing vessel)

This pressure is especially noticeable around “point of no return” stages:

“When the loading started... once it was fully aboard the barge, that was it: The point of no return.” (Skipper, Towing vessel)

Several interviewees described low acceptance for taking additional time, even when it was operationally justified.

Efficiency is also highly valued during loading and unloading of passenger vessels:

“When you see these vessels load and unload it’s like a music instrument, like an orchestra where everything needs to move at a certain pace to work and even the slightest disturbance will cause a problem. (...) A chief officer giving orders to sailors loading together with stevedoring services. They have to make the cooperation work. It’s a risky and dangerous industry.” (Maritime Authority)

4.2.4 Many organizations involved

Some operations involve multiple organizations with overlapping or unclear responsibilities. Interviewees highlight that safety becomes more challenging when more stakeholders are involved in decision-making:

“Safety becomes a bigger challenge the more stakeholders are involved... not the professional stakeholders like divers or tugboats, but the ones who want to decide things.” (HSEQ 1, Towing vessel)

Towing vessel operations for offshore clients involve several layers of authority:

“It was [the coordinating company] that decided when we would go out. (...) An [oil major] was on top of it all, and they are very strict on safety and that things should be done properly.” (Skipper, Towing vessel)

4.2.5 Aligned aims

Despite the frictions described above, many interviewees also point at situations where aims are aligned. This is particularly true for towing vessels, and around safety learning and joint debriefing:

“We were very happy when they contacted us and wanted us to join the debrief... It makes it easier to talk together in the future.” (HSEQ 1, Towing vessel)

“For us, there can’t be too much focus on safety.” (HSEQ 2, Towing vessel)

4.3 Unpredictability

In all interviews, unpredictability is highlighted as a challenge affecting safety, costs, operational quality, and the ability to plan. Conditions such as

weather are unpredictable in nature, but interviewees say that unpredictability also comes from organizational factors—such as late information, poor communication channels, unclear responsibilities, and limited crew involvement in planning.

4.3.1 Weather and real-time demands

Weather changes can alter plans and require immediate adjustments to mitigate hazard:

“We try to avoid that, because it’s outside the weather parameters. But if you have two tankers connected, and the weather turns bad, then they must separate—otherwise we have an environmental disaster in front of us.” (HSEQ 3, Towing vessel)

Several interviewees emphasized the captain’s formal right to stop operations when conditions are unsafe:

“If our captains see that we can’t carry out the job, they say stop. All crews have the mandate to stop an operation that isn’t safe.” (HSEQ 3, Towing vessel)

“The only time I know there’s been discussion [between charterer and shipowner] is when the weather’s bad, because the legislation says the captain decides whether we sail or not—and we stick firmly to that.” (Human Resources, Passenger vessels)

Some have, however, experienced that this authority has been questioned, which adds pressure:

“Where I worked before, it wasn’t like that. Then people talked a lot about the ‘cowardly captains’ who didn’t dare. So it’s much better to have this routine, with more people involved and statistics and numbers—it becomes a safer decision.” (Human Resources, Passenger vessels)

Changes in conditions between operations can also be a barrier, hindering the usefulness of planning and preparations:

“Often there are a lot of meetings with the port or in port for these Ropax ferries – there are a lot of accidents. Then you have continuous meetings with the stevedoring services and come up with ground rules. This often works well in theory, but in practice this is a very dynamic sector.” (Authority repr.)

4.3.2 Operations with little room for planning

Towing vessel operations are described as particularly time-critical. Unlike cruise or cargo

operations, which may plan a voyage over many days, towing vessels often receive tasks with minimal notice:

“Planning a voyage from A to B can take 7–10 days on a cruise ship to be completely sure about duties, weather, and traffic. But on a tugboat you can get a phone call that you must go somewhere five minutes ago, and then you must adapt the voyage planning—while still keeping safety.” (HSEQ 2, Towing vessel)

“This operation goes on 24 hours a day, and often with very short notice. We may be told this afternoon that a ship-to-ship operation is planned for tomorrow.” (HSEQ 3, Towing vessel)

Because things happen quickly, experience and foresight are seen as critical:

“Experience means everything, especially on a tugboat, because things happen fast and there’s a lot of force involved.” (Skipper, Towing vessel)

The pursue of assignments also contributes to time pressure:

“We’re on the spot [...] Things happen suddenly... just as I was doing handover, the office called. They had to go on a rig move almost immediately... It can be within the hour.” (Skipper, Towing vessel)

Several interviewees highlight that coordination activities require sufficient time before operations. Without this, misunderstandings can occur in time-critical phases:

“Some talk can happen on the radio, but they arrive very shortly before departure—the pilots are busy.” (Skipper, Towing vessel)

4.3.3 Information flow gaps

Many interviewees describe uncertainty caused by incomplete or delayed information sharing. In passenger vessel operations, the crews do not always receive updates on personnel changes or passenger-related incidents:

“You should have that information before the vessel leaves the quay the first time... They’ve gotten better, but not all information reaches our table.” (Captain, Passenger vessel)

“A passenger became ill... The duty officer’s responsible for medical care on board, but they didn’t get the information because the catering crew tried to solve it themselves. An ambulance arrived and they didn’t know why. It was miscommunication, or no communication.” (Human Resources, Passenger vessel)

Also, within teams, clear communication is key.

"You can see when people look like question marks, so I ask them. Everyone has struggled with that at some point." (Skipper, Towing vessel)

Communication channels can also be rigid or impractical, causing delays:

"They never speak with the chief officer or cargo officer, only with the captain... Even if the chief officer sends an email, they still go back to the captain, and he must explain again how things are." (Captain, Passenger vessel)

4.3.4 Late involvement of operational personnel

A recurring challenge for the towing vessel crews is that they become involved too late in planning:

"Often we're not involved until very late in the planning... Sometimes we get a good heads-up, but other times the booking comes one day and the operation may happen the next morning." (HSEQ 3, Towing vessel)

At other times, involvement worked well:

"Before a topside or rig comes in, our tug captains are invited to a review of the plan. There's an opportunity to ask questions and discuss weather windows." (HSEQ 3, Towing vessel)

4.3.5 Predictability through direct interaction

Also, regarding predictability, the towing vessel interviews result in lessons learned. Some customers engage actively and directly with towing vessel crews before operations:

"I think it's very good when customers come onboard and see what's going on. They get insight, and we get dialogue." (Skipper, Towing vessel)

Several examples show that good communication can reduce unpredictability. Some towing vessel operators describe positive cooperation routines:

"We have regular meetings between the company, our tug captains, and the pilots. We go through upcoming operations, accidents, incidents, and discuss what we can do differently next time." (HSEQ 3, Towing vessel)

Closed-loop communication is seen as an important measure:

"It's a fool-proof method—you repeat what was said, and it is confirmed." (HSEQ 2, Towing vessel)

4.3.6 Reducing time pressure

Some companies actively plan buffers into operations to reduce time pressure:

"When planning operations, we include safety margins, extra days, things like that—to ensure we have the time and space to make decisions, for example to wait for better weather." (HSEQ 2, Towing vessel)

In some types of critical assignments, customers can accept waiting time to reduce pressure:

"If it's an important project, like a big rig going into the yard, they book us in advance and start paying just for us to wait... The tugs are dedicated to that job." (HSEQ 3, Towing vessel)

Most of the seafarers, however, express that to get sufficient time to prepare or do a job, is utopian.

5 Discussion

Here we discuss the presented safety issues in interorganizational operations, including similarities and differences between towing and passenger vessels.

5.1 Structures competing with safety

The interviewees describe differing priorities and conflicting goals between owners, charterers, manning agencies, and onboard groups, as is recognizable from the canon of safety research (such as Rasmussen, 1997). In passenger vessel operations, the conflicting aims appear as disagreements about standards, costs, and the time available for upkeep. In towing, it concerns staying available on short notice while still operating within safe limits. Across both sectors, time pressure is described as a constant condition that weakens judgment and communication. This aligns with the ETTO (Efficiency-thoroughness trade-off) principle, which describes how one often needs to balance efficiency and thoroughness (Hollnagel et al., 2006). In addition, mechanisms presenting themselves as *unpredictability* for those working on the vessels, can also be seen as *variability*, which is a central concept in the resilience engineering literature (Hollnagel, 2013).

The patterns found in our study results also resemble findings from research on outsourcing and interorganizational safety, where economic and contractual pressures can blur responsibilities and weaken safety coordination (Hayes & Tillement, 2022). Similar challenges appear in the passenger vessel cases with shifting schedules, unclear responsibilities, and poor information flow. Charterers can further exert strong commercial

pressure through instructions and time limits, while crews remain responsible for safe operation (Størkersen et al., 2017). This reflects the interviewees' descriptions of unclear authority when weather deteriorates or schedules tighten.

The data also indicate loss of competence due to turnover and staff rotation. Aviation research finds similar risks when outsourcing and cost pressure increase turnover and reduce continuity (Bağcı & Gereke, 2019). This mirrors the “drained competence bank” noted in our material.

5.2 Passenger vessel crews: lessons learned

Passenger vessel crews report ongoing frictions with charterers and service staff: expectations for appearance and comfort without matching resources, uneven involvement of onboard decision makers, and language or authority gaps between deck and service staff from different organizations. They describe clear safety problems such as role confusion, for example when catering staff handle serious incidents without informing deck, or when the charterer question captains' decision to not sail. These issues are related to known outsourcing challenges like fragmented decision rights, KPI-driven standards misaligned with real conditions, and unclear “who pays decides” arrangements (Hayes & Tillement, 2022; Milch & Laumann, 2016; Österman et al., 2020; Størkersen et al., 2024).

Crews also struggle with rest and watchkeeping routines, and communications from shore, increasing the chance of miscommunication in multilingual, multi-employer crews. Other maritime literature also highlights this risk (such as Nævestad et al., 2023).

5.3 Towing vessels: Close to oil majors

Towing vessel crews experience more aligned goals with their customers, especially in larger high-stake operations (rig moves, ship-to-ship operations). Here, financial and liability risks are clear, and this supports planned buffers, structured briefings, and acceptance of captains' “stop” decisions. These practices meet the international standards developed for this sector. Interviewees describe resilient practices, that also are supported by the resilience literature (Herrera et al., 2025), such as pre-job meetings with pilots and tow masters, closed-loop communication,

scenario-based simulator training, and early crew briefings with opportunities to provide feedback for plans and confirm weather windows.

5.4 Structures supporting safety

Towing operations show more safety enhancing routines than the passenger cases. However, the results from the passenger sector indicate potential to adopt similar mechanisms, such as standardized pre-operation briefings involving service staff departments, clear communication routes for medical and safety events, and short, role-specific procedures. Earlier research stress on-board relationships between crew and service staff as important for safety (Ljung & Oudhuis, 2016). In our interviews we find intentions to create better relationships between the different crews working on the vessels.

Contract design can also support safety if it includes for example standby or buffer time, defined responsibilities for maintenance and information flow. In the towing vessel cases, standby charter and structured pre-briefs help turn efficiency expectations into time for coordination. Similar contracts may benefit passenger operations, where service standards and operational limits often clash (Österman et al., 2020). Explicit HSE requirements and time allocations tied to actual work can reduce conflicts and the tendency to “borrow” time from crew rest.

6. Concluding remarks

Safety and risk factors in interorganizational maritime operations are understudied. Our interviews suggest that how well safety in such fragmented operations are managed depends on how the organizations align their aims, allocate time, involve the right personnel, and communicate. The sectors examined have different ways of collaborating across organizations and perform different types of operations which contribute to constraints in relation to collaboration across organizational boundaries. However, in both sectors the need for overarching structures within which adjustments can safely be made are seen as important. The towing vessel interviews show that some interorganizational operations can be made more predictable through contractual buffers, clear responsibilities, preparation and established communication methods. On the other hand, the passenger vessel crewmember responsible for

safety must compensate for lack of such safety structures, when working across language barriers, regularly having to train new crew and withstanding pressures to sail in bad weather.

Returning to the metaphor in the title of this paper, we can say the score of an orchestra corresponds to the contracts and procedures that guide safe performance, while the conductor represents management responsible for the safe operation. When the score and conductor fail to provide stable cues, even skilled musicians struggle to stay coordinated, illustrating how structural weaknesses translate into operational risk.

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