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Maritime Security Challenges of Stowaways in Ro-Pax Vessels: An Operational Risk Analysis in the Spanish Maritime System

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ABSTRACT

The stowaway situation aboard commercial ships is an ongoing problem in the shipping industry, and it has many different aspects including operational, legal, economical and safety.
This research will analyse the whole phenomenon from a multi-dimensional point of view by using data collected from Ro-Pax ship operations combined with the applicable international regulations and relevant academic literature.
To investigate the key vulnerabilities that allow unauthorized persons to gain access to ships, especially in high-risk marine areas (Canary Islands, Strait of Gibraltar, Balearic Islands) a qualitative method based on a case study approach and document analysis was used.
The study reveals that despite a large body of regulations governing access to ports (ISPS Code, FAL Convention), there exist considerable gaps between what is required formally and how those requirements can be implemented in practice.
The study also highlights that lack of effective controls over access to ports, inadequate surveillance measures and operational constraints onboard vessels create the conditions for continued occurrence of this phenomenon.
Furthermore, the study emphasizes that addressing this problem requires a two-fold approach; from one side to ensure adequate protection against potential threats for ships and cargo; and from the other hand to respect human rights.
Finally, recommendations are made regarding best practices to prevent unauthorized boarding and increase the level of cooperation among maritime actors while increasing the capacity for training crew members.

1. Introduction.

The growth of globalization, combined with the continued reliance upon maritime transportation as an efficient mode of transporting large volumes of goods globally (approximately 80 percent of all international goods transported) (UNCTAD, 2022), makes it one of the most important modes of international trade today. The reasons for maritime's dominant position are many; but two of the most important reasons include its cost effectiveness compared to other modes of transportation such as trucking and railroads, as well as its ability to carry large amounts of freight over long distances at low costs. In addition to being economically competitive, maritime provides the logistical backbone for coordinating the movement of goods through global supply chains. Nevertheless, the growing complexity of the global maritime system has made it increasingly vulnerable to a wide range of potential threats including both physical/operational risks and human-based security risks (Psaraftis, 2016).

One form of threat facing the modern global maritime sys-

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tem includes the growing number of stowaways on ships. Stowaways represent individuals who hide on board a ship without first obtaining the permission from either the captain/master of the vessel or the owner of the vessel. These individuals can be found on a variety of types of vessels traveling across all parts of the globe. Historically, the existence of stowaways has been a concern for ship owners/operators; however, since World War II, their numbers have grown significantly. According to Article III of the Convention on Facilitation of International Maritime Traffic, a stowaway is defined as "a person who boards a ship without the knowledge or consent of the master or owner" (IMO, 1965). As can be seen from this definition, there exists a clear relationship between the increase in stowaways and weaknesses within existing maritime control and security systems.

Research conducted on stowaways indicates that they often travel on ships because they cannot afford the cost associated with purchasing a ticket and boarding a ship legally. There exist numerous factors that contribute to this inability to purchase legal tickets and board ships. Some of these factors include economic inequality, ongoing conflict around the world, and greater government restriction placed on international mobility (Mountz, 2011; Lutz, 2017). In this regard, maritime transport becomes an alternative for those individuals who lack legal means of travel, taking extreme risks to reach destinations considered safer or offering greater economic opportunities (UNODC, 2018).

From an operational perspective, the presence of stowaways on board causes significant disruptions to the ship's operations. These include the need to manage unauthorised persons in a highly specialised environment, the implementation of additional security measures, and coordination with port and immigration authorities (Talley, 2013). It also generates additional costs for shipowners, relating to the maintenance, custody and repatriation of stowaways (IMO, 2004). Empirical evidence gathered on Ro-Pax vessels shows that these situations can occur with relative frequency on certain maritime routes, particularly those considered high-risk or 'hot routes'.

In the field of maritime security, the adoption of the International Ship and Port Facility Security Code (ISPS Code) represented a significant advance in threat management, establishing a system based on risk assessment and the implementation of security levels (IMO, 2004). However, various authors have pointed out that the effectiveness of this regulatory framework depends largely on its practical application and on coordination between the different actors involved (Cariou & Wolff, 2011; Thai, 2009). In this regard, a gap has been identified between the regulatory design and operational reality, particularly in environments with high migratory pressure (Knapp & Franses, 2009).

The purpose of this paper is to examine the problem of stowaways in maritime transportation – particularly in the context of Roll-On/Roll-Off (Ro-Pax) passenger-cargo vessels in the Spanish marine environment – using a multi-disciplinary research design incorporating both theoretical and practical analyses. As previously stated, the purpose of this research effort is to analyze the problem of stowaways and assess the current state of protections against it in order to better understand the most vulnerable components of those protective systems, evaluate the degree to which existing protections are adequate, and provide recommendations based upon good practice regarding how to improve maritime safety.

Because of its geographical location at the southern edge of Europe, Spain's situation is unique among all European Union member states. The Canary Islands, the Straits of Gibraltar and to some extent the Balearics form critical areas along migratory maritime routes (European Commission, 2017). As such, these areas have become primary locations where migrants arrive via maritime route to enter the EU. The ports located in the Canary Islands are geographically close enough to the African continent so as to create conditions conducive to developing Atlantic migration routes. The resulting increased number of migrant arrivals at these ports creates a burden on both the ports themselves and on the vessel operators involved in providing service within the region (UNODC, 2018). While previous studies have demonstrated that ports serve as not only point-of-entry destinations, but also as a hub through which migrants travel to other destinations beyond the port itself, there appears to be limited information available regarding the nature and frequency of stowaway activity at ports in the Spanish marine environment.

Likewise, while the Strait of Gibraltar is one of the busiest shipping lanes in the world (Rodrigue, 2020), the large volume of commercial traffic presents a challenge to law enforcement agencies attempting to implement and monitor security regulations. For example, both Algeciras Port and the autonomous cities of Ceuta and Melilla operate in close proximity to northern Africa. Additionally, each area experiences a substantial amount of migratory flow. Because of their geographical location relative to northern Africa and the high volume of migratory flow in each region, these two areas are highly susceptible to unauthorized immigration attempts (Bichou, 2004). The presence of numerous stakeholders in these regions combined with the operational pressures inherent in maintaining security create challenges to implementing effective security protocols.

In comparison, while the Balearic Islands experience less of a problem related to stowawys than do the Canary Islands or Strait of Gibraltar, they are not without risk. For instance, a characteristic of Ro-Pax type vessels operating within the Balearic Islands is that they exhibit a high rate of passenger and vehicle turn-over. This feature creates an opportunity for unauthorized individuals to gain access aboard vessels. Furthermore, while access control and cargo inspection may present potential vulnerabilities for such unauthorized access, even when risks appear minimal, failure to employ specific security measures can contribute to an incident occurring (Lam, 2012).

Stowaways are subject to both domestic and international regulations. In addition to establishing responsibilities for masters, owners and port authorities (IMO, 1965; IMO, 2004; European Commission, 2017), these regulations establish a variety of requirements including procedures for reporting stowaways and procedures for handling stowaways once reported.

However, a significant body of literature exists that indicates that having laws or regulations in place alone is insufficient to assure compliance. Rather, successful implementation and oversight of those regulations are required (Yang et al.,

2013).

While stowaway incidents pose serious problems related to security, the problem also carries serious implications from a human rights perspective. Many people engaging in stowaway activities find themselves in extremely vulnerable positions. Consequently, it is incumbent upon crew members and other officials responsible for addressing stowaway issues to treat individuals found aboard ships without authorization with respect and dignity and protect their basic human rights in accordance with conventions such as the Maritime Labour Convention (ILO, 2006). The tension created between protecting human rights and ensuring security adds another level of complexity in managing the problem.

Given this context, the objective of this research project is to conduct a comprehensive assessment of stowaws in maritime transportation focusing specifically on Ro-Pax vessels in the Spanish marine environment. Using a multi-disciplinary research methodology that incorporates theoretical evaluations and empirical assessments based on practical experience gained during operational activities. Specifically, this research will identify vulnerabilities in protection systems; assess the effectiveness of existing protections; and make recommendations for best practices designed to enhance maritime safety.

2. Literature Review.

Stowaways in maritime transportation are also an area of overlap between maritime safety; port security; risk management and the obligations under international maritime law that relate to irregular immigration. While there is less research into the problem of stowaways compared with other maritime-related risks (such as piracy, terrorism by sea and operational accidents), they do represent a continued risk for ship safety and to the operational integrity of ships as well as to the protection of the rights of individuals who have been impacted by their presence.

2.1. Maritime security, port security and the ISPS framework.

Contemporary maritime security is primarily governed by the International Ship and Port Facility Security Code (ISPS Code). In response to terrorist attacks in New York City and Washington DC on Sept. 11, 2001, IMO developed the ISPS Code with the intention of developing a global structure to identify potential dangers and prevent any actions which would have the effect of jeopardizing the safety of vessels and port facilities. The ISPS Code has been implemented at ports worldwide since June 2004.

A key analysis of the ISPS Code is provided by Bichou (2004), who views the code as a risk management system requiring investment into port infrastructure, personnel, training, control procedures and institutional coordination, therefore implying that there are not simply additional regulations for port authority managers to comply with, but a full range of activities that need to take place. Bichou points out that while complying with the requirements of the ISPS Code will require port authorities and operators to incur expenses, these expenditures will contribute positively toward their ability to resist disruption due to terrorism.

Thai (2009) has proposed a conceptual model of effective maritime security consisting of three dimensions: quality management; risk management; and business continuity. This framework offers a valuable tool for analyzing stowaways because it provides a broader view than just a reaction-based model, and frames the problem in the context of an organizational-wide risk management process. Maritime security is not just about physical barriers and surveillance systems – the effectiveness of those systems is dependent upon the existence of well-defined organizational processes; trained staff; adequate communications; and the capability to respond when needed.

Thus, stowaway events provide examples of unauthorized access attempts designed to test the operational effectiveness of vessel and port facility security measures. This empirical evidence is consistent with the literature which argues that port security should not be limited to the formal perimeter of the port, but should extend to the entire ship-port interface and to the physical flows of cargo, vehicles, passengers and authorised personnel.

2.2. Maritime risk management and operational vulnerabilities.

Maritime risk management has been extensively addressed in the literature on maritime safety and transport. Yang, Ng and Wang (2013) point out that quantifying maritime risk requires integrating technical, human, organisational and contextual factors. Their contribution is relevant to the study of stowaways because clandestine access cannot be explained by a single cause, but rather by the interaction of multiple vulnerabilities: insufficient controls, operational pressure, staffing constraints, deficiencies in port surveillance and prior knowledge of the ship's routines.

Liwång, Sörenson and Österman (2015) analyse security challenges on ships operating in high-risk areas and conclude that maritime security requires a combination of preventive measures, continuous risk assessment and adaptation to the operational context. Although their study focuses on broader security threats, such as piracy or armed violence, its framework is applicable to stowaway detection, particularly on routes exposed to migratory pressure or recurrent clandestine entries. The article is published in the WMU Journal of Maritime Affairs, 14, 201–217, and has the DOI 10.1007/s13437-014-0066-9.

In the port sector, Lam (2012) highlights that risk management in maritime logistics must consider not only the traditional risks of delay, damage or disruption to the logistics chain, but also the risks arising from failures in physical and documentary security. This perspective allows stowaways to be interpreted as a disruption to the logistics chain and not merely as a migration issue. A stowaway detected on board can cause delays, intervention by the authorities, repatriation costs, legal liabilities and disruptions to voyage planning.

These ships have many specific obstacles that Ro-Pax ships do not have. Access control is much more difficult when you carry passengers, vehicles and RORO freight. All of these additional elements provide a lot of opportunity for hiding from

surveillance. The base document has identified numerous important potential hiding spots on Ro-Pax ships such as flat racks, refrigerated platforms, containers, chain lockers, ramps, lifeboats, storage areas and accommodations. As well this evidence supports the necessity of modifying your security plan based on the specific ship configuration as opposed to using generic protocols..

2.3. Port control, regulatory implementation and the gap between regulation and practice.

In addition to Knapp and Franses' (2007) findings regarding the differing ways in which inspection regimes operate, although they found theoretically equivalent means of enforcing regulations existed for all inspection regimes. Their research focused on Port State Control rather than Stowaways per se. Nonetheless, the conclusions they reached can be applied to the issue studied here: The effectiveness of a regulatory regime is based upon how well the regulatory regime is implemented, by whom and with what resources. For example, in the case of stowaways, there appears to be an obvious disconnect when formalized Security Plans exist, yet the ports access/exit points, patrols, cargo inspections, or ship/port coordination are deficient.

The empirical data cited within the article clearly shows this disconnect. In particular the ports analyzed - especially those in the Canary Islands, temporarily improved surveillance exists during timeframes of high migratory pressures - e.g. inspecting rafts, checking containers, monitoring terminals, closing gangways and having security personnel present. Nevertheless, persistent shortfalls also appear throughout these ports - i.e., pedestrian access points that lack effective controls, inadequate levels of surveillance during specific times, and shipboard crew limitations that preclude intense surveillance.

These shortcomings demonstrate Bichou's (2004) warning that port security cannot simply be established through the formal approval of plans - instead, port security will require verifiable operational procedures, adequate human resources, and collaboration among relevant stakeholders. As such, stowaways provide a practical perspective on maritime security: It is not enough to establish rules or regulations; those rules or regulations must be evaluated in real-time situations..

2.4. Irregular migration, human vulnerability and the ethical dimension.

Stowaway travel by sea can't simply be seen as a threat to security. It represents the most severe form of irregular movement and human vulnerability. According to Mountz (2011), maritime borders represent a site of convergence for migration control policy, state sovereignty and the experience of precarious movement. In this sense, the ship represents a space of ambiguity; it is simultaneously a commercial structure, a space of complex juridical authority and in some instances, a tool used by individuals who seek to overcome obstacles to migrating.

From the point-of-view of Lutz (2017), which states that irregular migration is rooted in structural inequality and decreasing opportunities for mobility, the same idea could be applied to the maritime sphere in order to understand why so many stowaways have no organized crime motive, but instead operate under conditions of economic necessity, conflict, persecution or a lack of alternative legal options. As stated in the Background Document, there are various dimensions to the reason(s) why people choose to hide themselves aboard ships including economic, humanitarian, legal or due to being unable to afford passage.

As a result of conceptualizing the stowaway as a threat to the safety of the vessel, however, when viewed from a legal / humanitarian perspective, stowaways must also be understood as vulnerable people. The Operational Scenario defining how to treat a stowaway is defined within the Convention on Facilitation of International Maritime Traffic. Subsequent treatment of a stowaway should respect the Fundamental Rights of the individual as well as the Obligations of the Master/Ship Owner/Competent Authorities (IMO 1965).

In addition, similar rights and responsibilities exist through the Maritime Labour Convention, 2006. The MLC primarily focuses on Seafarer Safety and Protection (International Labor Organization [ILO] 2006).

Therefore, a balanced response to both safety and Human Rights issues require preventive measures to limit access strictly while protecting the dignity and rights of identified stowaways. A crew must provide food/water/basic accommodations as well as dignified treatment upon identification of a stowaway. Procedures described in the Background Document reflect these expectations including assessing the stowaway's physical condition; providing identification assistance; provision of food and shelter; and notification to Ship Owners/Competent Authorities.

2.5. Application to the Spanish maritime environment: the Canary Islands, the Balearic Islands and the Strait of Gibraltar.

Spain can be viewed as a particularly interesting country to study given its unique geography, as it serves as Europe's southern maritime boundary and includes diverse marine environments. The Canary Islands, the Balearic Islands, and the Strait of Gibraltar each represent various levels of risk.

Of these three marine regions, the Canary Islands are probably most vulnerable. Due to their proximity to the west coast of Africa and because they serve both as a destination and transit region for migrants, the Canary Islands were identified as a highly susceptible area by the background document. The Canary Island ports of Santa Cruz de Tenerife and Las Palmas experienced an increase in clandestine departures toward the mainland during the large-scale migration wave of 2020-21. Specifically, those Ro-Pax vessels that operate in the nighttime hours while unloading vehicles or transporting wheeled cargo, were targeted for clandestine boarding.

The Strait of Gibraltar represents a completely different scenario. The Strait of Gibraltar is among the world's most congested marine areas with some of the world's busiest ports including Algeciras and border posts such as Ceuta and Melilla. As such, the combination of migratory pressures on these ports;

geographic closeness to northern Africa; and high volume of vessel traffic creates a very complicated operational environment. The baseline report has identified Melilla as one of the most vulnerable ports of entry into the EU. Because Melilla borders Morocco, there are many potential methods available to would-be migrants attempting to enter through this port including attempting to board at the aft end of the vessel; attempting to board at the forward end of the vessel; attempting to climb aboard using mooring lines; or approaching the vessel directly from the water.

The Balearics are clearly a third type of vulnerability. While the Baseline Report does not specifically identify the Balearic Islands as having had significant numbers of stowaways entering the EU via the islands' ports, it is unfair to compare them to either the Canary Islands or the Strait of Gibraltar without first obtaining empirical data. From a preventative perspective however, their busy Ro-Pax traffic; high volumes of passenger and vehicle throughput; and tourism-based economy make it reasonable to include them in an assessment of national vulnerabilities. Liwång et al. (2015) and Yang et al. (2013), authors who have written about risk management suggest that it is justifiable to provide security measures beyond those areas that have historically had problems with migrant smuggling and stowing away.

2.6. Critical review and research gaps.

The literature has shown us that there are basically three conclusions we can draw about what the literature says on maritime security.

First, the global legal frameworks which govern maritime security have been developed by international conventions. There is little doubt that there is an established legal framework based upon the International Ship and Port Facility Security (ISPS) code and the Convention on Facilitation of International Maritime Traffic (FAL). Although the literature suggests that the success of these frameworks will depend upon how they are implemented in practice as well as the availability of resources, and the degree of cooperation among all relevant parties, Bichou (2004), Thai (2009).

Secondly, the issue of stowaways needs to be dealt with from a risk assessment perspective. This is not just a question of ensuring that unauthorized individuals do not gain access to the vessel, it is also one of identifying potential vulnerabilities to assess possible scenarios for stowaways gaining access to a vessel. Crew should receive appropriate training in dealing with stowaways. Finally, each shipping company should establish appropriate measures to deal with stowaways who may be found aboard its vessels. Liwång et al. (2015); Yang et al. (2013).

Finally, there is very limited information in the literature concerning the nature and extent of the problems associated with stowaways on Roll-on/Proll-off (Ro-Pax) vessels within the Spanish maritime context. Much of the existing research is focused on issues related to port security, piracy attacks on vessels engaged in transporting goods along supply chains, controlling immigration into ports etc. As such, few studies exist in the area of how migratory pressures affect the operation of Ro-Pax vessels and the specific risks involved in accessing such vessels. Therefore, the knowledge gained from studying vessels operated by companies in the Canary Islands, and those which travel up and down the Mediterranean Sea provide useful insight into how the problem manifests itself in reality.

Therefore, this thesis seeks to address this identified shortfall using an applied methodology which uses both a regulatory review and analysis of existing scientific literature combined with empirical experience from Ro-Pax operators. The major contribution of this thesis is not intended to develop a theoretical explanation of why stowawys engage in criminal activity however it does seek to identify areas of vulnerability in Spain's Ro-Pax system and propose best practice approaches which could potentially be adopted by other Ro-Pax systems operating under similar conditions.

3. Objectives.

The overall aim of this study is to analyse the issue of stowaways in maritime transport, with a particular focus on Ro-Pax vessels and the Spanish maritime environment, taking into account operational, regulatory and safety perspectives.

Based on this approach, the following specific objectives are established:

- To identify the main operational vulnerabilities that allow stowaways to board Ro-Pax vessels, particularly in high-risk port environments such as the Canary Islands and the Strait of Gibraltar.
- To evaluate the effectiveness of existing maritime security measures, in particular those derived from the ISPS Code, by analysing the gap between the regulatory framework and its practical application.
- To propose a set of operational and organisational best practices aimed at improving the prevention, detection and management of stowaways, adapted to the context of the Spanish port system.

4. Methodology.

The research employs an applied qualitative research design as it lends itself well to the investigation of very complex issues at the operational level. There are many technical, human and organizational factors which can impact upon each other when investigating incidents occurring at the operational level.

a. A case study method was used. This has been developed by way of first hand experience working onboard Ro-Pax type vessels that operate on routes identified as being at a high risk of attack. It allows the researcher to gain an understanding of the detail involved in all types of clandestine boarding, and how the various security measures that are put in place for such incidents are implemented. In addition, this method also facilitates the development of a clear picture of how the processes (procedures), relating to detecting and managing stowaways once they have been detected are implemented.

b. Documentary analysis was undertaken of the International Maritime Organization's (IMO) and National regulatory frameworks. Specifically, the IMO's FAL Convention, ISPS code, and Spain's national laws related to maritime navigation were examined. The purpose of undertaking this documentary analysis was to provide a contextual basis for identifying the responsibilities of all parties (stakeholders) and to enable assessment of how closely aligned the regulatory requirements are to actual operational practices.

c. A thorough search of the relevant scientific literature related specifically to maritime security, risk management, port security and irregular migration was undertaken. The findings of this literature review enabled provision of a theoretical base for interpreting and placing in an appropriate academic context, the findings obtained from the case studies.

d. Direct observation of both the port and on board operations were made. This included a close examination of all access control procedures, monitoring systems (surveillance), cargo inspections, and incident management. Direct observation facilitated identification of specific vulnerabilities and provided a means of cross checking information obtained through other methods.

The use of a combination of methodologies enabled the researchers to investigate the issue of stowaways using an interdisciplinary approach. As a result, the empirical data collected during the fieldwork could be compared directly against both the applicable legislative and regulatory requirements and against existing bodies of knowledge within the relevant disciplines.

5. Results.

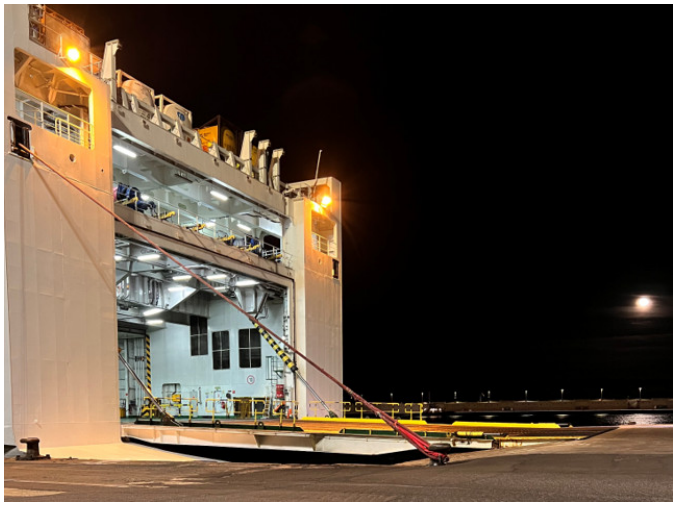
5.1. Vessel Boarding Methods.

Stowaways' boarding strategies vary based upon their knowledge of the Port's physical surroundings and the type of vessel they wish to board. Most common boarding methods include:

- Boarding via the ramp while loading,
- Board through vehicles, trailers or containers,
- Ascending the moorings lines,
- Boarding from the sea via bow or stern sections of the vessel,
- Collaborating externally (port employees, third party personnel).

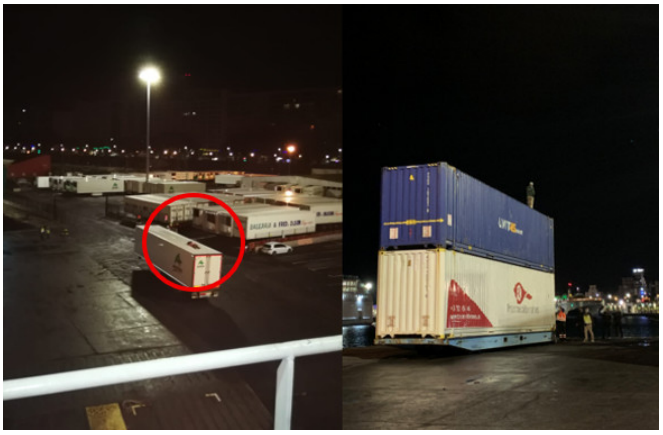
The above methods clearly illustrate that the major problem is at the ship-Port interface area; here the large volume of activity occurring makes an effective examination of every potential access route impossible.

Figure 1: Many stowaways board via the ramp when no one is looking.



Source: Authors.

Figure 2: Stowaway on top of one of the containers during the loading operation.



Source: Authors.

5.2. Stowaway Hiding Places.

On board, once a stowaway is able to gain access to the vessel, he will utilize the complexity of the vessel's layout to find a place to hide which is difficult to check. Common stowaway hiding locations include:

- Cargo deck and platform levels,
- Empty or refrigerated containers,
- Chain locker and steering gear compartment levels,
- Hold and engine room compartments,
- Storage rooms and passenger cabin levels,
- Lifeboats and ramps.

Clearly, this demonstrates that Ro-Pax vessels are very structurally susceptible because there exist many possible open - accessible spaces which require some level of regular monitoring.

Figure 3: A close-up of the gap where the stowaways are hiding in the lorry.

Source: Authors.

Figure 4: Stowaway found in refrigerated containers.

Source: Authors.

5.3. *Factors Which Motivate Stowawys.*

It was confirmed through our research that there are a variety of motivating factors for those who become stowaways. These motives can be categorized into several broad groups:

- Financial – search for better living conditions;
- Humanitarian – war/conflict, persecution etc.;
- Legal – lack of required documents (i.e. passport);
- Physical/logistic – inability to pay for transportation.

The above provides further evidence that the stowaway situation is not just a security related concern but reflects the broader social structural inequities that affect people.

5.4. *Port Control System Flaws.*

Several serious flaws were identified within existing port control systems including:

- Pedestrian access/exit points are inadequately supervised,
- Irregular inspections of entering vehicles,
- Limited port surveillance at nighttime hours,
- Lack of routine cargo checks.

During times of high migratory pressures in Ports like Tenerife and Las Palmas ad hoc improvements in the controls were noted, however, no long-term structural reforms occurred.

5.5. *Impact on Vessel Operations.*

Having stowaways on board has numerous operational implications for the vessel and its crew:

- Increased labor requirements for the crew,
- Must initiate security protocol procedures,
- Coordination with local authorities at the destination port,
- Additional costs for maintaining, repairing and returning the stowaway(s).

Further complicating the matter, when dealing with stowaway issues, the vessel's crew members must weigh and balance the safety needs of the vessel against the stowaway's human rights...

Figure 5: Details of a police operation following the discovery of stowaways on board.

Source: Authors.

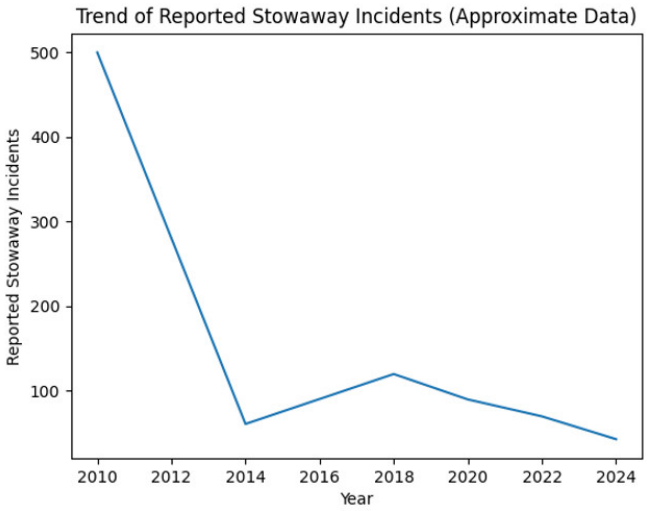
5.6. A quantitative analysis of the phenomenon of stowaways.

A major constraint to analyzing the stowaway phenomenon is the lack of comprehensive, and therefore comparable, data globally. The data that does exist can be analyzed using information from the International Maritime Organization (IMO) via the Global Integrated Shipping Information System (GISIS).

Since 2010, over 4,900 stowaway incidents have been documented by the IMO. The organization has indicated that underreporting exists regarding this issue because some states and/or operators are not required to report incidents. Thus, the accuracy of the numbers provided by the IMO cannot be determined with certainty.

Stowaway incidents are also subject to varying temporal patterns. For instance, in 2014, there were 61 incidents with approximately 120 individuals being stowed away on ships. Since then, while the number of incidents has decreased slightly, the number of individuals being stowed away has increased. According to Intercargo (2024), there are approximately 43 incidents per year, and each typically involves approximately three stowaways. These numbers suggest that the nature of the stowaway phenomenon has changed over time. It appears to have shifted from many smaller-scale stowaway incidents to fewer larger-scale or more organized stowaway incidents. This shift may be related to changes in migrant routes, improved port security practices, and new tactics employed by stowaways.

Figure 6: Reported stowaway incidents (2010-2024).



Source: Compiled by the authors using data from GISIS(2025).

Geographically, most incidents occur within certain areas. Studies have shown that up to 80 percent of all reported incidents involve ports located on the African continent. Therefore, stowaways appear to be closely tied to both the movement of migrants into Europe and the European Union's immigration policies (Gard, 2020; UNODC, 2018). Specifically, given Spain's location near several important transit points between Africa and Europe, namely the Strait of Gibraltar and the Canary Islands, data documenting this trend is directly applicable to Spain.

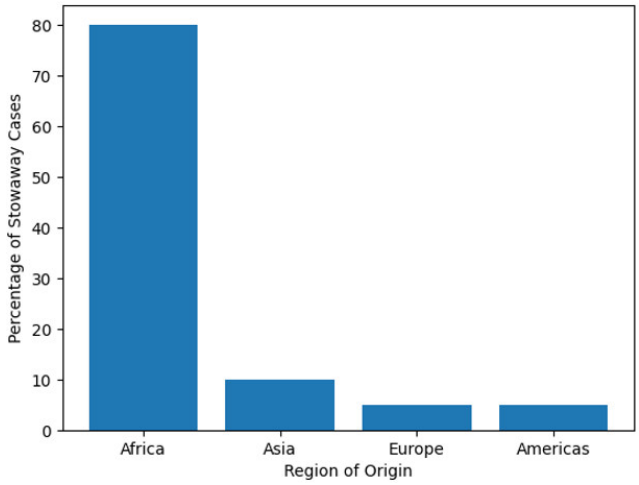
Both the quantitative data discussed above and the qualitative findings in the case study demonstrate that the vulnerability identified – primarily at the ship-port interface – is systemic rather than anecdotal.

The number of reported stowaway incidents has a significant upward trend in the International Maritime Organisation's Global Integrated Shipping Information System (GISSIS) database (2010-2024). The source of the information was both the IMO (2019), and Intercargo (2024).

In terms of geography, stowaway activity is highly concentrated. Many different researchers have reported that the majority of all stowaway incidents occur at ports in Africa. They estimate that approximately 80 percent of all global incidents occurred in Africa (Gard, 2020; UNODC, 2018).

An important implication of these figures is that they demonstrate a strong relationship between the phenomenon of stowaways and the most common irregular migration routes to Europe. Specifically, they highlight connections between West Africa/North Africa and the European continent. In particular, it identifies certain areas of strategic importance for transit for stowaways attempting to board ships headed to Spain/other European nations through the Strait of Gibraltar, and/or the Ca-

Figure 7: Estimated distribution of stowaway incidents by region of origin.



Source: Compiled by the authors using data from UNODC (2018) and Gard (2020).

nary Islands.

On the other hand, an examination of various geographic regions demonstrates a very low rate of stowaway incidents in Asia/Europe/the Americas. This supports our research hypothesis that the primary drivers of the stowaway phenomenon will be geopolitical/socioeconomic rather than strictly operational variables.

These figures were generated by analyzing trends reported in published studies because there is no single source of reliable and accurate global data regarding this topic.

6. Discussion.

The study can be illustrated with the help of the paradigm shown in below:

The findings of this research enable a theoretical understanding of the issues involved through both empirical evidence and literature review.

Firstly, the research supports the argument of a gap between policy and practice regarding the ISPS Code. The Code provides several measures to prevent unauthorized entry (IMO, 2004) into port facilities; however, the results indicate that there is inconsistent implementation of these measures. Similar arguments have been presented previously (Knapp & Franses, 2007; Bichou, 2004) when evaluating regulatory compliance in various "real world" contexts.

Secondly, this research identifies stowaways as a risk management problem. Stowaways use many different tactics to enter and hide on vessels and these tactics are developed in relation to vessel operating practices. Therefore, managing this type of crime will require an ongoing process of identifying risks and adapting security procedures to address those risks (Liwång et al., 2015; Yang et al., 2013).

Lastly, the research indicates that Roll-on/Roll-off (Ro-Pax) vessels operate in an environment which creates unique challenges relative to access to vessels. The large number of vehicle, passenger and cargo movements result in limited opportunities for thorough inspection prior to departure, thereby creating increased opportunity for individuals attempting to board without proper authorization. These characteristics differentiate Ro-Pax vessels from other commercial vessel types (e.g. containerships or dry bulk carriers) which provide much greater control over who can access the ship.

Geographically, the data confirm some regions within Spain represent higher levels of risk compared to others. In particular, the Canary Islands and the Strait of Gibraltar experience significantly larger migration volumes resulting in heightened risk. Additionally, while risk is lower in the Balearic Islands it still exists and therefore warrants consideration. The geographic variation in risk further support the importance of developing localized solutions versus implementing uniform solutions throughout all regions.

Lastly, this research emphasizes two interrelated aspects of the issue of stowaways. On one side, they pose a significant threat to the security of the marine transportation system. On the other side, they involve individuals in precarious circumstances who may be deserving of humanitarian considerations. As such, effective responses to this issue will require a balance between implementing controls to mitigate the security risks posed by stowaways while also respecting the rights of individuals.

Conclusions.

The research conducted in this work enables several conclusions to be drawn which have relevance for both an operational and an academic context.

In the first place, it is clear that the occurrence of stowaways in maritime transportation is no longer a minor issue; it has become a structural problem in some routes and geographic zones. Moreover, its persistence can be attributed to a combination of external factors (uncontrolled migrations; economic inequality), and to internal factors (vulnerabilities in the operational and organizational aspects of shipping).

In the second place, there exists an important body of international regulations concerning maritime security and stowaway management. Nonetheless, the efficacy of these regulations is largely dependent upon their effective implementation. As such, there is clearly a gap between the current regulatory framework as established at the international level and the actual practices employed within the industry.

In the third place, Ro-Pax type ferries are particularly vulnerable to being exploited because of their design and operating parameters. Given this fact, it will be necessary to develop specific preventive measures aimed at minimizing the risks associated with this particular type of ferry. For example, additional scrutiny should be placed on all cargo loaded onto Ro-Pax ferries during loading operations, as well as increased surveillance over critical areas of the vessel while it is underway.

In the fourth place, it was demonstrated through this research that ports play an integral role in preventing stowaway-related incidents. Inadequate control of access into and out of

ports; insufficient surveillance; inadequate inspections of cargo loaded onto ferries departing from ports are among the primary factors that contribute to clandestine boarding of ferries.

In the fifth place, managing stowaways on board requires a balanced approach that simultaneously prioritizes safe operation of the ship and respects the human rights of stowaways. Crew members must therefore be trained not only to identify and respond appropriately when stowaways are detected onboard, but also to provide humane treatment to those individuals who have boarded without permission.

Lastly, the findings of this research support the necessity to transition toward a more comprehensive maritime security paradigm that provides greater integration among ports, ships and governmental agencies responsible for regulating maritime commerce; ongoing training programs for shipboard personnel; and customized security procedures tailored to the unique characteristics of each individual commercial or recreational maritime environment.

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