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## Pilotage services in Turkey; key issues and ideal pilotage

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### ABSTRACT

Previous studies have identified fundamental problems of pilotage organisations: pressure on commerce, improper working conditions, increasing traffic volume, and vessel size. Questioning the needs of pilots, the most important actors in pilotage services, is a key issue to ensure the safety of navigation in restricted waterways. This study, which conducts questionnaires and interviews with 71 pilots, reveals the structure of pilotage organisations and the profiles of pilots in Turkey. The survey examines pilot training infrastructure, professional experience, working conditions, tug services, pilot boats, accommodation facilities, and opportunities from operational, economic, and environmental constraints. The results indicate positive and negative aspects of existing pilotage organisations in Turkey in order to develop an ideal organisational model for pilotage in Turkey.

### ARTICLE HISTORY

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## 1. Introduction

Pilotage is a profession based on knowledge and experience. The most important component of pilotage is the manager of the operation, that is, the pilot. A marine pilot knows all the local effects that may endanger the safety of navigation and collaborates between the port authorities, vessel traffic services, tugs, and mooring teams. Communication between vessels and land is easier today and more efficient because the pilot is a native language speaker. Pilots are also sailors/mariners, who collaborate with the vessel's crew in order to give navigational advice to captains (Kuronen & Tapaninen 2010; Lapalainen et al. 2014). Pilotage services may seem like special services for shipping companies, but they can also be considered a public service because of the potential for major damage in the event of maritime accidents.

Human error is a major cause of maritime accidents, particularly collision and grounding accidents (Moore & Bea 1993; Rasmussen 1997; Harrald et al. 1998; Antao & Soares 2006; Kujala et al. 2009; Uğurlu et al. 2015a, 2015b). Collision and grounding accidents mostly occur in narrow channels and during berthing/unberthing manoeuvres (Uğurlu et al. 2015c). Based on an examination of accidents in Istanbul Strait, 92.8% of the vessels involved did not have pilots on board during the accidents (Ece 2012). Thus, the most important measure to deal with restricted waterways should be to obtain

pilotage support, and thereby to avoid human error involved in marine accidents.

Seaways account for 60% of world trade (UNCTAD 2014). Maritime transport has grown rapidly in the last decade. The deadweight capacity growth rate in the last decade is 49.7% (Equasis 2004, 2014). This growth in seaborne trade has led to a concentration of maritime traffic in narrow waterways, such as straits, canals, and docks, and this makes it difficult to manoeuvre ships (Drouin & Heath 2009; Nuutinen & Norros 2009). Concentration of maritime traffic has affected pilots, making pilotage more challenging and complex (Van Erve & Bonnor 2006).

There are no international regulations regarding pilot training and pilotage organisations. Local regulations are mostly national recommendations. The International Maritime Organization (IMO) and International Maritime Pilots' Association (IMPA) prepared a joint resolution in 2003 including training of pilots, operation procedures, certification, and documentation of pilots (IMO&IMPA 2004). Another important advisory regulation regarding pilotage organisations is the International Standard for Maritime Pilot Organizations (ISPO). Administered by Dutch Pilots, Lloyds Register, and European Maritime Pilots' Association (EMPA). The ISPO includes recommendations on such issues as organisational structure of the pilotage concept, training stan-

dards, and qualifications of pilots. Fourteen pilotage organisations from eight countries are responsible for regulating the recommendations contained in the ISPO. ISPO standards are issued annually and are supervised by member pilotage organisations (ISPO 2015).

This study investigates pilots' profile and structure of pilotage organisations in Turkey. It analyses educational infrastructure of pilots, professional experience, working conditions, towing services, pilot boats, accommodation facilities, and operational, economic, and environmental constraints.

## 2. Literature review

The structure of pilotage organisations has been studied infrequently in the literature (Ceyhun & Özbağ 2014; Lappalainen et al. 2014). Previous studies that have contributed to shaping and developing the structure of this study are presented below.

Darbra et al. (2007) investigated the safety culture and risk perceptions of 77 pilots in Australia and New Zealand, representing the membership of 20% of pilotage organisations in those countries. The survey included questions about professional background of pilots, safety culture, risk perceptions, and dangers of navigation and pilotage. The study concluded there are structural problems in pilotage organisations in Australia and New Zealand, the most important being commercial pressure on pilots, which has negative impact on task management, especially in coastal waters. Therefore, the authors argued that commercial pressure on pilots should be reduced and argued for a confidential system to report defects and deficiencies identified by pilot. Reported problems should not be perceived as shortcomings, but instead transformed into a reporting system with an appropriate safety culture. They argued that standard passage plans could be developed for coastal navigation, and deficiencies could be corrected with standard education.

Andresen et al. (2007) investigated the relationship between job satisfaction and unusual working hours of pilots in seven European countries through feedback from 434 pilots. They concluded that dense and irregular working conditions reduced job satisfaction and caused physical and social problems, while structural deficiencies in pilotage organisations caused pressure on pilots, leading to fear of job loss and affecting job satisfaction. They recommended improvements in working conditions.

Rhodes and Gil (2003) prepared a guideline for fatigue management for Canadian pilots, including such aspects as sleep, biological clock, irregular working hours, and coping strategies. They revealed requirements for the

human body in order to understand fatigue management and identified conditions leading to fatigue and job dissatisfaction. The study made recommendations about managing fatigue and improving job satisfaction.

Many researchers from different parts of the world have demonstrated fundamental problems of pilotage organisations, and have attempted to present solutions (Lützhöft & Nyce 2006; Bruno & Lützhöft 2009; Wild 2011; Ceyhun & Özbağ 2014). Previous studies have shown that commercial pressures, inadequate working conditions, increasing traffic volume, and vessel size are the main problems of pilotage organisations. Determining the needs of pilots is one of the most important factors to ensure the safety of navigation in restricted waterways.

## 3. Examples of structures of pilotage organisations from different countries

### 3.1. Germany

The Pilotage Law and Regional Pilotage Decrees control such issues as boundaries of pilotage areas, management style, functioning of pilotage organisations, pilotage fees, health standards, and pilot training. Pilots are employed in seven regions under the control of the Ministry of Transport. Each region is organised as an association, each with its own chairman, which constitute the Federal Maritime Pilots Room. All pilotage stations and pilot boats are owned by the German Government, except Wismar, Rostock, and Stralsund regions.

There are three categories of pilots in Germany: regular, offshore, and harbour. Pilotage certificates for normal and offshore pilots are issued by the Federal Republic of Germany, and those of harbour pilots by port authorities. All licensed pilots automatically become members of the regional associations (IMPA 2015).

Qualification requirements are an unlimited ship master license and 2 years of work on board. In addition, periodical medical reports are necessary. As well as theoretical and practical training, pilot candidates must undergo 6-month internships under the supervision of experienced pilots (Andresen et al. 2007). In their first 6 months, they are permitted to work on ships up to 170 m long; between 6 and 9 months, on ships up to 220 m; between 9 and 12 months on ships up to 260 m, and between 12 and 18 months on ships up to 310 m, after which they can work on all ships. The age limit for pilots is 65 years. Pilots are on duty for 270 days on average per year. Pilots are required to be on duty if they are not sick or on leave. The working schedule is an in-line system arranged according to vessel traffic. When a pilot returns from pilotage duty, he/she goes to the end of the task list. Pilots can be on duty up to 50 h per week (IMPA 2015).

Their salaries closely match those of ship captains in Germany but are not fixed and depend on the number of ships for pilotage (IMPA 2014).

### 3.2. Australia

The Navigation Act controls maritime safety in Australia. In 2002, operation of pilotage organisations became regulated. In addition, recommendations were developed for marine accidents and deal with such issues as pilotage operations, pilotage zones, pilot training, and determination of quality standards. The functioning of pilotage organisations is controlled by the Australian Maritime Safety Authority (AMSA) (AMSA 2012). Pilotage services are carried out by commercial companies, independent contractors, port operators, and public institutions. Lack of federation structure in Australia has increased commercial pressure on pilots. A survey-based study by Darbra et al. (2007) indicated that 53% of Australian pilots were exposed to commercial pressure, and a majority of pilots were dissatisfied with their income level. The mandatory retirement age for Australian pilots is 70 years.

A pilot is required to have a captain's license for ships or more than 3000 GT. There are three pilot categories: limited, unlimited, and chief. To achieve higher licences, pilots must complete adequate numbers of transit passages as determined by the AMSA, must pass written and oral exams and psychometric assessments, and must pass such tests as fatigue management (AMSA 2014).

Work schedules are organised by an AMSA fatigue risk management system; a task-list cycle should not be more than 28 days, and pilots cannot have more than five consecutive nightshifts. Individual pilotage organisations ensure workload equality pilots by conducting shift scoring: if a pilot works for 6 h or more, the rest period cannot be less than 8 h (AMSA 2015).

### 3.3. Japan

The Pilotage Act states that pilotage service in a particular region must be provided an officially licensed pilot who is a member of a union. There are 35 pilotage regions in Japan. In 2007, all these regions were under the control of the Japanese Federation of Pilots Associations (JFPA). Monitoring of pilotage services, determination of regulatory needs, research on technical issues, and accident prevention training are provided by JFPA subcommittees. Regional pilotage associations are independent organisations whose main tasks are pilot training, guidance, managing pilotage offices, provision of pilotage, and fee collection.

The Pilotage Act designates three competencies: class 1, 2, and 3. Class 1 is the highest qualification, for which it is necessary to work on board (3000 GT or more) for at least 2 years as a captain, complete class 1 training successfully (9 months of training, of which 4 months is practical), and pass physical, written, and oral examinations by the Minister of Land, Infrastructure Transport and Tourism. The training period for a Class 2 license is 18 months or can be earned by working for 2 years on vessels over 3000 GT as a captain or unlimited chief officer. There is a 30-month training period for the Class 3 license, or it can be earned by working as a captain on vessels of 1000 GT for 1 year.

Pilots in Japan are regarded as self-employed workers. Their income varies by license type and number of pilotage services performed. According to the Pilotage Act, tug needs are assessed differently in Japan's 35 regions and are determined in accordance with a technical committee report. Unlike the system in Turkey and many European countries, tug type and quantity are determined by pilotage regions according to environmental conditions, vessel traffic, and vessel tonnage (JPA 2014).

### 3.4. United States

The Pilotage Act in the United States (US) gives each state its own system and laws. Pilot licenses are issued by pilotage commissions, represented by ship owners, port managers, pilots, environmental protection organisations, and government authorities. Commissions manage such tasks as pilot selection, training, audit, licensing, and accident investigation.

In accordance with federal law, all ships sailing between two US ports, oil tankers, and barges carrying dangerous goods are obliged to use pilot service certified by the federal government. The US Coast Guard audits pilotage organisations.

To qualify for training, pilots must have navigation and tug experience. The apprenticeship programme lasts 4–7 years. Training is undertaken by experienced pilots. Each state is responsible for employing sufficient numbers of pilots for safe and effective pilotage service. Pilotage organisations in each state should supply their own equipment, prepare their own training programmes, and arrange their own shifts. Pilots are self-employed, and have independent decision-making powers. Each port has a guiding organisation, and safety is paramount (APA 2014).

Working schedules vary by region or port. For example, pilots of Seattle Puget Sound Pilot Station are on duty for 15 days and rest for 13 days. Pilots are assigned to work in chronological order. Between two pilotage

operations, pilots must have a minimum 6-hour resting period (PSP 2014).

### 3.5. Turkey

There is no pilotage law in Turkey. Instead, port regulations govern the pilotage system, pilot competencies, training, certification, and working schedule. There are 38 pilotage regions. Pilotage services are provided by companies in a cooperative structure of public institutions, private port companies, and pilotage companies.

There are two qualifications available: pilot (ships up to 20,000 GT) and senior pilot (all ships for which they are authorised). A pilot requires an unlimited master license, should sail for 1 year as a master, needs basic pilot training (5 days), should work for 6 months as a trainee pilot, and should complete a 6-month internship under supervision of an experienced pilot. In addition, pilots must take periodical medical tests (TC 2010). Pilotage organisations are free to arrange their own shift schedules, and thus, there are different schedules.

## 4. Methodology and data

This study attempts to determine positive and negative aspects of pilotage organisations in Turkey, in order to create an effective pilotage organisation model. For this purpose, a questionnaire was applied to pilots. While preparing the survey, a report prepared by Darbra et al. (2007) was referred to. To test the comprehensibility of the questionnaire, pilots in nearby provinces and the Turkish Maritime Pilots' Association (TMPA) were consulted. In this manner, the questionnaire was finalised and optimised. To increase the number of participants, questionnaires were emailed to 350 pilots who are members of the association. However, insufficient responses were received. Thus, the authors attempted to expand the number of responses and attended a maritime pilots' symposium entitled 'Emergency Management in the Turkish Straits'. Thus, the number of participants was brought to the desired level with 71 questionnaires responses (feedback rate of 20%). Cronbach's alpha test was applied ( $\alpha = .842$ ) and proved high reliability of the survey. Reliability, frequency, and  $\chi^2$  analyses were applied to the questionnaire using SPSS v.16.0.

The questionnaire consists of personal information, working schedule, job satisfaction, current situation, and pilot expectations and non-conformity. The personal information section consists of demographic questions for pilot identification. In the working schedule section, pilots are question about their working/resting hours and satisfaction levels. In the job satisfaction section,

questions were asked about professional expectations, propensity to leave the job, and stress-related diseases. The current situation section asked questions about opportunities of pilotage organisations (equipment, tools, etc.), content of pilot training, and satisfaction levels. In the final section, non-conformity and pilots' future expectations were investigated by open-ended questions.

- (a) Personal Information
  - Frequency distribution and valuation of pilots' age
  - Frequency distribution and valuation of the university from which they graduated
  - Frequency distribution of types of pilotage, and assessment
  - Frequency distribution and valuation of pilotage organisations
- (b) Working Schedule
  - Valuation of shifts
  - Valuation of period of stay on board
  - Valuation of average number of vessels pilotaged per day
  - Frequency distribution and valuation of resting hours and recreation facilities
  - Frequency distribution and valuation of the effect of work intensity on working performance
  - Frequency and valuation of maximum continuous pilotage service
- (c) Job Satisfaction
  - Frequency distribution and valuation of affordability of tangible expectations
  - Frequency distribution and valuation of willingness to work again as a ship captain
  - Frequency distribution and valuation of disability reports due to industrial accidents
  - Frequency distribution and valuation of stress-related illnesses
- (d) Current Situation
  - Frequency and valuation of tug satisfaction of pilots
  - Frequency distribution and valuation of pilot boat satisfaction of pilots
  - Frequency distribution and valuation of satisfaction with basic pilot training
  - Valuation of necessity for reorganising training periods
- (e) Expectations and non-conformity
 

this section, pilots were asked to interpret the current situation of their pilotage organisations. In addition, they were asked to identify non-conformity and to make suggestions about how to improve conditions.

## 5. Results

### 5.1. Personal information

The average age of Turkish maritime pilots surveyed is 46 years and the vast majority (21.1%) were above 50 years old while 2.8% were between 27 and 32 years old. Of the surveyed pilots, 95.8% had graduated from maritime university (maritime schools) and 4.2% from high schools, indicating that pilots in Turkey have a high level of maritime education.

Participants' average service period is 3.9 years as a captain and total sea service time (experience on board) is 11.2 years. According to the survey data, Turkish maritime pilots meet or exceed the recommended minimum of 6 years of sea service of the European Maritime Pilots Association (EMPA) (EMPA 2015). As Table 1 shows, pilots' average service period in their pilotage organisations is 7 years.

According to the TMPA, 350 pilots are registered with the association, of which 125 work in the public sector. There are two pilotage types in Turkey: strait and port. Most of them work as strait pilots in the public sector. As Figure 1 shows, 47 of the surveyed pilots are port pilots, 24 are strait pilots, while 53.5% work in private organisations, and 46.5% in public organisations. Private organisations comprise private port operators, organisations of private/legal persons, cooperative enterprises

founded by pilots, and private institutions that do not working mainly on the pilotage.

### 5.2. Working schedule

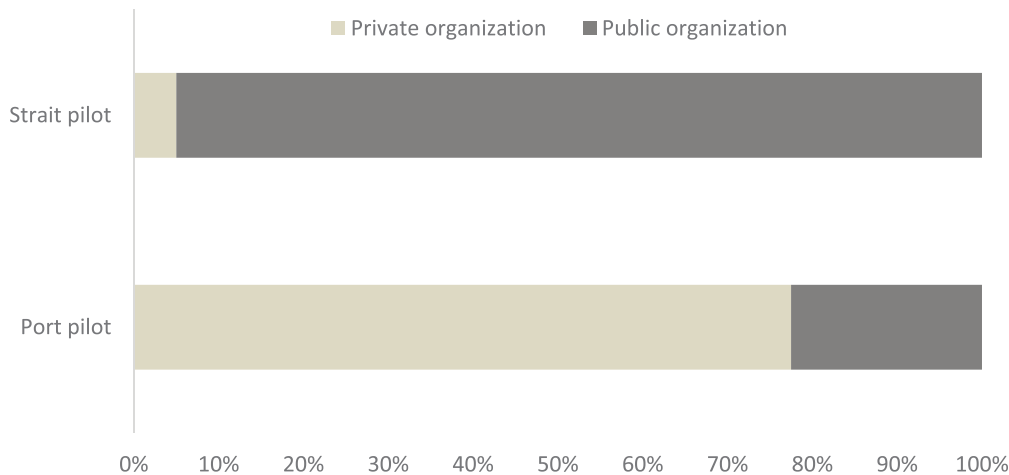
Working schedule or job rotation is one of the factors affecting fatigue management, maritime pilot performance, and accidents and damage (Squire 2007). There are different working schedules in public and private sectors (Table 2). In Istanbul Strait, which has many maritime pilots, a system of 2 days of work/4 days of rest is applied; in the Port of Istanbul, a system of 4 days of work/8 days of rest is applied; while in Canakkale Strait, a system of 4 days of work/8 days of rest is implemented. Shift systems in private organisations vary by port. Generally, pilotage organisations arrange working schedules based on pilot experience.

Maritime pilots stated that duration of stay on board depends on ship density. In the public sector, duration of stay ranged from 8 to 10 h. In the private sector, especially in busy ports, duration was at least 10 h (Figure 2).

There are on average 4.29 vessels per pilot per day. TMPA members stated that at a meeting of the EMSA (European Maritime Safety Agency), their ideal working schedule was defined as 8 h per day, and the ideal number of ships per pilot as 3.7/3.8 vessels. However, it is found that 55% of maritime pilots work 8 h or more

**Table 1.** Frequency distribution of the service period of pilots as a captain or maritime pilot.

Service period as captain (years)	Frequency (f)	Percentage	Service period as maritime pilot (years)	Frequency (f)	Percentage
1–3	34	47.8	1–3	17	23.9
4–6	18	25.3	4–6	10	14.1
7–10	10	14.1	7–10	14	19.7
11–14	4	5.6	11–14	13	18.3
15 and above	5	7.0	15 and above	17	23.9
Total	71	100	Total	71	100



**Figure 1.** Frequency distribution of pilots according to type of pilotage.

**Table 2.** Maritime pilot shift schedules.

Shift schedule	Frequency (f)	Percentage
One maritime pilot	4	5.6
System organised by shifts	6	8.4
1 day of work/1 day of rest	3	4.2
2 days of work/2 days of rest	2	2.8
2 days of work/4 days of rest	18	25.3
3 days of work/6 days of rest	6	8.4
4 days of work/8 days of rest	27	38
6 days of work/6 days of rest	2	2.8
7 days of work/7 days of rest	2	2.8
14 days of work/14 days of rest	1	1.4
Total	71	100

per day. In this study, only 35% of maritime pilots stated they were satisfied with rest periods and facilities. The satisfaction rate with rest periods and opportunities for public sector pilots is less than that for private sector pilots [ $\chi^2(4) = 11.319, p < .05$ ].

### 5.3. Job satisfaction

The majority (83%) of maritime pilots argued that the 1-year on-board requirement to become a maritime pilot in Turkey is insufficient and that minimum period should be 2 years. Of the participants, 69% declared they would not work as a captain again, 16.9% were unsure, and 14.1% declared they would. Maritime pilots stated that commercial-political pressures and low salaries negatively affect performance. Only 35% of participating maritime pilots stated they were satisfied with their salaries. Salaries of Turkish maritime pilots are far below European standards. The salaries of the highest paid maritime pilots in Turkey are the same as or even lower than those of newly graduated officers' in Turkish vessels. Furthermore, there is no incentive system for maritime pilots in

Turkey and maritime pilots have fixed salaries that do not vary with number of ships pilotaged. This negatively affects pilot's performance.

Regarding stress-related illness, 52% of respondents declared that they had one or more stress-related diseases. The most common disorders are insomnia, high blood pressure, excessive nervousness, and stomach disorders.

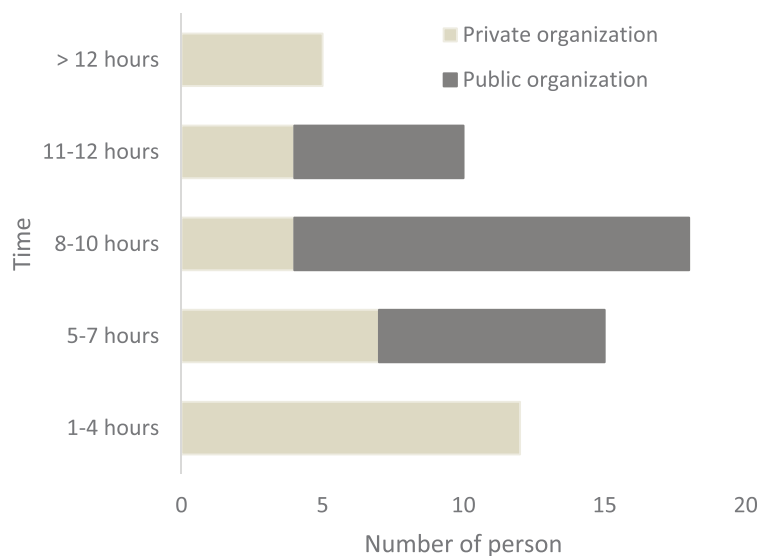
### 5.4. Current situation

Tugs are a key factor in successful pilotage operations (Wild 2011). In Turkey, the number of tugs and pull vessels used in pilotage operations are determined by gross tonnage of ships. In addition, it is necessary to use additional tugs for ships carrying dangerous cargo. In the survey, 39.4% of maritime pilots stated they were not satisfied with tugboats; pilots within private organisations were most dissatisfied [ $\chi^2(4) = 10.337, p < .05$ ]. Meanwhile, 47.8% of maritime pilots, most of them working in small rural organisations, were dissatisfied with pilot boats.

## 6. Fundamental problems

Based on the interviews and survey results, this study divides pilotage problems into two groups: pilot training and qualifications, and administrative matters. Administrative problems are lack of technical infrastructure, working schedules, legal regulations, and structure of pilotage organisations. The main problems are as follows.

- In Turkey, pilotage services are lack of standardisation.
- Turkey has no federation-style arrangements for pilotage, as well as Germany and Japan.

**Figure 2.** Distribution of pilots' working hours by structure of pilotage organisation.

- There are commercial and political pressures on pilotage organisations, and the decision-making process does not work independently in most organisations.
- There are no restrictions on the number of vessels pilotaged over a 24-h period, and it entirely depends on pilotage organisations' decisions. There are too many daily pilotaged vessels in private organisations and a little less in public organisations.
- There are inadequate numbers of maritime pilot in some companies, and many small private pilotage companies have only one pilot, although public companies fare better.
- There is no standardisation related to shift schedules the survey data show nine different systems. Further research on this issue is required.
- Why are maritime pilots exempted from the International Labour Office-Maritime Labour Convention (ILO-MLC) 2006 in terms of working hours?
- If maritime pilots are seafarers, then why the International Convention on Standards of Training, Certification and Watchkeeping for seafarers (STCW) does not mention about them, and why there is no regulations regarding them? In restricted waters where maritime accidents occur frequently, maritime pilots are the most important supporters of captains and play an important role in ensuring safe navigation.
- There are some deficiencies in maritime pilot training programmes, such as basic pilotage, model vessel, simulator, and refresher training.
- Each pilotage organisation has its own fixed salary and there are no payment incentives, such as for number or difficulty of ships pilotaged.
- There are serious insufficiencies in social facilities and amenities for maritime pilots, especially in small organisations. The main problems are accommodation, nutrition, infrastructure, ventilation, and hygiene.
- Dissatisfaction by harbour pilots is greater than that of strait pilots.
- Unlike European maritime pilots, those in Turkey face pressure that makes it difficult to make decisions independently. In addition, maritime pilots are stressed by the risk of contract termination, which negatively affects performance.

## 7. Discussion and recommendations

- The general opinion of maritime pilots is that it is necessary to gather all pilotage organisations under a single association. Pilots argue that competition is a bad thing for pilotage organisations. According to the survey results, the ideal type of pilotage
- is possibly a federation structure as in the Netherlands and Germany, which would eliminate commercial and political pressure on organisations and enable decisions to be made independently. While the independence of organisations is important, the commercial interests of the largest port operators may predominate. In such a structure, port operators may worry that maritime pilots intentionally slow or cancel manoeuvres. Therefore, any framework governing a federation-style association must be determined very well.
- Standardisation is needed for pilotage organisations. However, it is quite difficult to ensure standardisation at national and international levels owing to the nature of the profession. When Europe, Asia, and USA, are examined, it can be understood that standardisation is ensured regionally. The general opinion of pilots is that regional standards would be much better. Thus, common requirements for pilotage organisations should be identified and standards should be established accordingly. In addition, if necessary, regional standards could be created.
  - Given the interview and survey results that maritime pilots consider 1 year of sea service insufficient, service time should increase to at least 2 years. Experienced personnel achieve better results in emergencies. Moreover, it is necessary to determine lower and upper age limits for maritime pilots.
  - There is widespread support, both among experienced maritime pilots and some studies (Hadley & Pourzanjani 2003), that not every captain should be a maritime pilot. Special tests should be applied to qualify as a maritime pilot, including aptitude tests and other vocational tests.
  - Social opportunities for small organisations should be improved, such as infrastructure facilities, ventilation, lighting, accommodation facilities, hygiene, web communication, and sport facilities. In addition, technical and physical characteristics of pilot stations should be defined in regulations. Organisations should be subjected to internal and external audits periodically, and deficiencies must be fixed.
  - An independent control mechanism should be established to check the functioning of pilotage organisations.
  - Half of pilots stated they were dissatisfied with the current training system. Thus, it is necessary to change the training system and the Netherlands, Denmark, or France could be useful models. No matter which model is chosen, a single-centred approach with a pilotage training school should be avoided (there is no such school in any country in the world). After training, trainees should be examined, and only those



who pass should be entitled to continue to practical training.

- There is a single level of education for job promotion in Turkey. Common opinion on this matter is that single-level education is better to avoid complications.
- The rule in Turkey that a maritime pilot candidate should pilotage 160 vessels in order to complete practical training should not be applied to all ports. This number could be increased for private ports, or manoeuvres may be varied (e.g. certain types of vessels, and day/night manoeuvres). This problem could be eliminated by establishing regional pilotage organisations.
- In pilotage training, tugboat usage should be taught in practice. Simulation-aided training may be useful.
- Maritime pilots working hours are not subjected to the ILO/MLC 2006. Whether Turkish maritime pilots should be governed by this was the subject of intensive debate within the EMSA meeting referred to in Section 4.2; the participants argued that maritime pilots should not be subjected to the ILO/MLC 2006. Pilotage is a profession that demands constant attention; therefore, if the ILO/MLC 2006 work and rest hours were applied, pilots would be tired. On the other hand, international, national, or at least regional standards should be defined for pilots' working hours. In this regard, Germany, Australia, UK, and France could be utilised as examples.
- Maximum numbers of piloted vessels and maximum duration of manoeuvres should be determined for each pilot. If these limits are exceeded in mandatory situations, there should be overtime payment to pilots. Such applications are important issues for job satisfaction. The number of pilots employed in the pilotage organisation and the working/resting hours of pilots should be determined according to national or regional legislation.
- Administrations should set limits of manoeuvrability according to type of pilotage, type of ship, traffic density, and tensile strength of tug.
- Standards of pilot boats should be improved.
- Structural features of ports, fenders, navigation buoys, and depth should be suitable for vessels to be pilotaged.
- Should pilotage and tug services be combined or separated? If separated, competition between tug services would increase and thereby, quality of service might increase. In this case, how could tension between pilots and tug captains be eliminated?
- According to Article 45 of the German Pilotage Act, pilotage is a profession that requires high qualifications. Therefore, maritime pilots should receive high salaries and should have decent social benefits (IMPA

2014). As this issue affects pilots in provincial organisations in particular, in order to protect their rights, it would be appropriate to determine a minimum salary scale.

## 8. Conclusion

Pilotage organisations are an important issue regarding pilotage. The structure and functioning of organisations is very important. There are no specific regulations governing pilotage organisations in Turkey. A pilotage organisation law should be implemented urgently after considering the opinions of experts, organisations, and associations. In Turkey, as well as Germany, the Netherlands, and the United States, it is necessary to establish pilotage organisation inspection boards so that standardisation can be achieved. Continuity of standards could be provided through such boards. In developed countries, pilotage organisations are engaged only in pilotage services, collecting revenues, and making their own investments. Thus, they are specialised in pilotage. In Turkey, pilotage services are generally secondary services, depending on port operations. These organisations redirect pilotage income to other fields. In addition, they make no investment in pilotage area, unless it is essential.

The aim of this study is to present the actual situation of Turkish maritime pilots, and to make proposals for improvement with the aim of improving pilotage quality. Turkish maritime pilots, in reports issued by the EMSA, are reported as having the lowest accident rates.

Findings and results of this study should be considered not only just for Turkey but also in general. Based on the results of this study, in order to achieve an ideal pilotage organisational structure, things to do at the international level are listed below:

- Federation type of structure should be provided for pilotage organisations. Such a structure will eliminate the commercial and political pressure on pilotage organisations, and will provide the ability to decide independently.
- International, national, and regional standardisation should be provided for all organisations.
- Experience is very important for pilots. Therefore, compulsory sea service and ship experience are imperative and essential.
- Each master should not be a marine pilot. Aptitude test must be applied to become a pilot,
- National/international control and supervision mechanism should be established in order to check the infrastructure and operation of the pilotage organisations.

- The provision of a minimum standardisation for improvements in housing and social facilities.
- The creation of pilot educational institutions under the auspices of the pilotage federations for education of marine pilots.
- Providing international standardisation for pilotage licenses (levels and qualifications).
- Combined education should be given including simulator, tug boats, model ships, and real manoeuvres; that education should be away from one-centred training.
- International level legal tug arrangements should be done for the area to be served and type of ship to be served.
- High standard pilot boats.
- Marine pilots' working hours should be included in the scope of the STCW Convention, and reasonable working and resting hours should be determined,
- Payment of satisfactory salaries to pilots, and promotion (extra payment according to number or difficulty of ships pilotaged) system should be brought.

After this study, existing shortcomings and dangers may reveal by examining pilot profiles, organisational structure, harbour structures, and equipment. According to the identified shortcomings and risks; providing recommendations at the international level is extremely important in terms of improving the organisational structure of the guidance.

Among the IMO's objectives are clean oceans and seas, and safe, secure, and efficient transportation. In order not to compromise these clear and precise objectives, it is necessary for Turkey to enact regulations to ensure internationally accepted standards. In addition, controls must be enforced strictly in order to ensure continuity. It should be noted that maritime accidents and disasters affect not only the immediate concerned parties, but all people living in a region. Maritime pilots are hidden heroes unknown to the public and their roles need to be recognised.

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No potential conflict of interest was reported by the authors.

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