Seafarers' Statistics in the EU

Statistical review (2020 data from the STCW-IS as provided by 31 December 2021)

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EMSA

Executive Summary

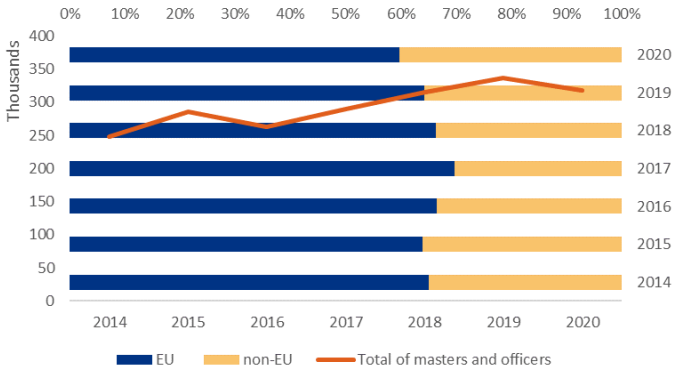
The amendments to Directive 2008/106/EC introduced by Directive 2012/35/EU established a mechanism for gathering information on certificates and endorsements issued to seafarers by the EU Member States. The objective was to use it as a primary source of data for statistical analysis in support of the EU Member States, the Commission and the European Parliament in policy making.

The statistical review presented in this report is based on data extracted from certificates and endorsements registered by EU Member States[1], Iceland and Norway until 31 December 2020. This data, which was transferred and recorded in the STCW Information System (STCW-IS) until 31 December 2021, represents a snapshot of the European labour market in terms of the number of seafarers holding valid certificates and endorsements in 2020.

The data included in the STCW-IS shows that by end-2020, 189,278 masters and officers held valid certificates of competency (CoC) issued by EU Member States[1] while another 127,958 masters and officers held original CoCs issued by non-EU countries with endorsements issued by EU Member States attesting their recognition (EaR). Overall, the end of 2020 saw almost a third of a million masters and officers as potential manpower to serve on board EU Member State flagged vessels.

The five EU Member States that had more masters and officers holding CoCs issued by them in 2020 were the Greece (22,779), Norway (21,404), Poland (20,629), Croatia (15,324) and Italy (14,271). In addition, the five EU Member States that had more masters and officers holding EaRs issued were Malta (74,926), Cyprus (31,266), Norway (17,038), Portugal (16,988) and the Netherlands (11,819). Finally, the five non-EU countries which had more masters and officers holding CoCs recognised by EU Member States were the Philippines (49,461), Ukraine (25,597), the Russian Federation (17,313), India (11,231) and Turkey (6,091).

From the overview for the period 2014-2020, it can be observed that in the past three years the absolute number of masters and officers holding CoCs and EaRs and of ratings holding CoPs – and thereby of those available to serve on board EU Member States flagged vessels – has been on the increase. This trend was interrupted in 2020 due to Brexit in January of that year. Nevertheless, the overall figures remained broadly stable in terms of distribution by country issuing the original CoC. The figures remained stable also in terms of distribution of masters and officers by department, capacity, gender and age with the exception of nationalities. Following Brexit, India and the United Kingdom left the top 10 of countries whose masters and officers nationals were available to serve on board EU Member State flagged vessels. Yet, in general terms, a certain stability in the European maritime labour market prevails and might continue to indicate the ability of such labour market to attract new entrants who have replaced those leaving the seafaring career.



[1] Austria does not issue certificates and endorsements to seafarers and therefore is excluded from this report.

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List of Abbreviations

CoC	Certificate of Competency
CoP	Certificate of Proficiency
EaR	Endorsement attesting the recognition of a foreign certificate of competency
EC	European Commission
EFTA	European Free Trade Association
EMSA	European Maritime Safety Agency
ETO	Electro-technical Officer
ETS	Exponential Triple Smoothing
EU	European Union
GT	Gross Tonnage
kW	kilowatts
ML	Management level
NCV	Near Coastal Voyages
OEW	Officer in charge of an engineering watch
OL	Operational level
OOW	Officer in charge of a navigational watch
STCW Convention	The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended
STCW-IS	STCW Information System, hosted and managed by EMSA

1. Introduction

1.1 Legal background

The EMSA Founding Regulation[2] establishes in its Article 2 that "The Agency shall facilitate cooperation between the Member States and the Commission in gathering and analysing data on seafarers, provided and used in accordance with Directive 2008/106/EC of the European Parliament and of the Council of 19 November 2008 on the minimum level of training of seafarers [3]".

Article 25a of Directive 2008/106/EC, as amended, establishes that "information shall be made available by Member States to the Commission on a yearly basis and in electronic format and shall include information registered until 31 December of the previous year". Norway and Iceland (Members of the European Free Trade Association States) are similarly bound by this obligation. This data is recorded in the STCW Information System (STCW-IS), developed and hosted in EMSA.

1.2 Data collection, analysis and beneficiaries

The statistical review presented in this report is based on data extracted from certificates and endorsements registered by EU Member States, Norway and Iceland until 31 December 2020, and received in the STCW-IS until 31 December 2021. This seventh review presents a snapshot of the number of seafarers holding valid certificates and endorsements in 2020. It should be noted that since the data – as extracted from the national registers held by EU Member States – did not include any information on whether the holders were active or not, it was not possible to determine how many of them were working on board vessels during 2020.

Having ceased to be an EU Member State following Brexit, the United Kingdom had no more the obligation to provide information on its certificates and endorsements issued and consequently, for 2020 such data was not received. This will happen in the coming years. Therefore, for the purpose of this report, the United Kingdom will be treated as a third country from 2020 onwards and any information regarding seafarers holding certificates of competency issued by the UK will only be available within the context of related endorsements issued by the EU Member States attesting the recognition of said certificates. Naturally, this development affects the comparability of data gathered throughout the years. Nonetheless, this factor is taken into account and reflected in the 2014-2020 summary overview of masters and officers, under section 2.5.

Due to the inclusion of data from Norway and Iceland, where the wording EU or EU Member State(s) appears in respect of information from 2017 onwards, this is to be taken as including Norway and Iceland.

The main beneficiaries of this statistical review are the EU Member States, the Commission and the European Parliament for policy-making purposes. Ship owners and ship operators may continue to derive added value in terms of knowing the magnitude of manpower available in the EU to crew their vessels. The information provided in this review is also intended to be useful to maritime education and training institutions in the EU and could facilitate estimating market needs for their services. Researchers may also be interested in some of the statistical outputs, as well as seafarers and the organisations that represent them.

1.3 Accuracy

The information in this review must be qualified by the limitation in EMSA's ability to gauge the margin of error in the data extraction processes undertaken at EU Member States' level. Some inconsistencies were in fact identified during the validation phase at EMSA, demonstrating that in some cases seafarers' names and/or document numbers might have been registered as different strings by different EU Member States. Upon request, EMSA also proceeded to the replacement of previous years' data in cases where inconsistencies were detected by the EU Member States themselves. As with previous reviews, corrections were also made in the 2020 reported data on seafarers' gender when different genders were attributed to the same seafarer within the same country. In the case of seafarers reported as holding different genders between different countries, a query was developed to identify and correct these inconsistencies.

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32002R1406
[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0106

The original data received from the EU Member States included fields such as gender, nationality and capacity together with its associated limitations. The information in these fields was made available as free text and consequently had to be encoded to ensure the harmonisation and comparability of data. In order to estimate the human error introduced through this process, an automatic sample was selected from the data made available by each EU Member State and was validated by a different operator at EMSA, thus maximising the widest possible number of errors to be identified during the verification process. The dimension of the sample was established by the formula:

$$n = \frac{z^2 * 0.25 * N}{(N-1) * E^2 + 0.25 * z^2}$$

where,

n – is the dimension of the sample (number of documents to be randomly selected);

N – is the total number of documents belonging to the selected country;

z – is the level of confidence;

E – is the maximum amplitude of the error.

A level of confidence of 90% (z = 1.645) and an amplitude of error (E) of 1% were established for the evaluation of the errors introduced by human intervention during the coding process. This ensured a negligible level of error when coding the free text received into STCW-IS internal values, especially when considering that every identified error is consequently corrected not only within the sampled data but also in the whole data set.

1.4 Coherence and comparability

The information considered in this review comprised data from 26 EU Member States (Austria does not issue certificates and endorsements to seafarers) and two EFTA countries (Norway and Iceland).

It is to be noted that while measures have been taken to safeguard information subject to data protection (please see 1.6 below), said measures still maintained intact the possibility for data in its encrypted form to be analysed and compared.

In order to ensure comparability of the data received from various sources, all data was subject to a coding process, which ensured that all fields received as free text were linked to predefined internal values.

Taking into account the diversity of the capacities established by the national manning regulations, the information received on capacities in which the seafarers were entitled to serve, together with their associated limitations, was converted during the data coding at EMSA into generic capacities as defined by the STCW Convention. In order to keep the data coherent, EMSA established rules when converting the data during the coding process, that were applied throughout all statistical reviews.

It is to be noted that in the case of masters and officers, their total does not tally with the sum of the total number of masters and deck officers plus the total number of engineer officers. The reason for this is that some masters and officers may hold certificates for both the Deck and the Engine Departments. Furthermore, because a person may hold certificates/endorsements issued by different EU Member States, the sum of the number of masters and officers registered by individual EU Member States may not be equal to the total number of masters and officers at EU level.

1.5 Accessibility and clarity, dissemination format

User access to information featured in this report is restricted to the content of this written report. EU Member States retain all property rights to the information in its raw data format and could amend their data at any time before its processing began. Detailed statistics may be compiled by EMSA upon request from the European Commission and the EU Member States, based on agreed terms of reference.

This report is published on the STCW-IS portal (https://portal.emsa.europa.eu/web/stcw) and on the EMSA website.

1.6 Confidentiality

All publicly available statistics fully comply with the obligations established in Article 4 of EMSA's Founding Regulation[4], as amended and Regulation (EU) 2018/1725[5] of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data. In order to ensure the safeguarding of personal information subject to data protection, EMSA developed and made available to the EU Member States, Norway and Iceland an anonymisation software module which converts all personal data – such as seafarer's name, seafarer's unique identifier and certificate/ endorsement number – extracted in its raw format from the national registries, into anonymous strings of characters by using a powerful encryption algorithm. The data anonymised at source is received and compiled by EMSA in its encrypted format.

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32002R1406
[5] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32018R1725

2. Statistical processing

The data subject to this review was extracted from the national registries on certificates and endorsements issued to seafarers and maintained by the EU Member States. Taking into account the diversity of technologies used to register such data, each EU Member State developed a data extractor module to retrieve the information established in Annex V to Directive 2008/106/EC in a structured format defined by the technical specifications made available by EMSA. As noted above, the data extracted was subject to a preliminary validation process to ensure consistency and to an encryption process by which all personal data was made anonymous at the EU Member State site.

Only documents with a valid status were considered (in principle, an EU Member State may provide information on all documents registered, including those suspended, cancelled, declared lost or destroyed).

For the last seven years, EMSA has compiled the data received to allow the possibility of having a wide picture on the number of masters and officers available to serve on board EU Member States flagged vessels. These include those holding CoCs issued by EU Member States and those holding EaRs issued by EU Member States recognising non-EU CoCs. A broader view on the number of masters and officers holding EaRs recognising CoCs issued by other EU Member States and on the number of ratings holding CoPs was also possible.

However, some elements applied to treat and/or analyse the data were improved or had to be adjusted to new realities, as was the case with the inclusion of data from Norway and Iceland in the group of EU Member States, initiated in 2017 and, on the other hand the exclusion of the United Kingdom from the group in this year's report (2020).

Nevertheless, given the more accurate view that is possible to identify through the build-up of data collected over the years, trend analysis and forecasting are included in this review in section 2.5. This section also includes a brief analysis of the impact of Brexit on the availability of masters and officers to serve on board EU Member States flagged vessels.

As an anticipation of what will be presented in the following sections, it can be observed that in the past three years the absolute number of masters and officers holding CoCs and EaRs and of ratings holding CoPs – and thereby of those available to serve on board EU Member State flagged vessels – had been on the increase. However, due to Brexit, in 2020, this trend was interrupted and a decrease in the absolute number of masters and officers available to serve on board EU Member States flagged vessels was verified. This is in line with the decrease verified in the total number of vessels under the flag of an EU Member State (EU fleet). Consequently, this is a topic that warrants further analysis in the coming years.

From Figure 2-1 below, between 2016 and 2019 there was an increase of more than 70,000 masters and officers nominally available to serve on board EU Member State flagged vessels. This was followed by a decrease of 19,000 masters and officers between 2019 and 2020.

However, it should be noted that between 2017 and 2020 the percentage of masters and officers holding CoCs issued by non-EU countries has increased by10%. Half of this increase may be justified by the inclusion of the United Kingdom in the group of non-EU countries. Notwithstanding this, the overall figures in terms of distribution by country issuing the original CoC remained broadly stable.

Apart from that, when reviewing the numbers of masters, officers and ratings per type of certificate held, the figures remained stable in terms of distribution by department, capacity, gender and age. The exception was the nationalities (please refer to section 2.3 and the compiled overview in section 2.5). Following Brexit, India and the United Kingdom left the top 10 of countries whose masters and officers nationals were available to serve on board EU Member State flagged vessels. The drop of India from that top list is mainly due to the fact that most Indian nationals held a UK CoC. Nevertheless, in general terms a certain stability in the European maritime labour market still prevails which might continue to indicate the ability of such labour market to attract new entrants who have replaced those leaving the seafaring career.

The report provides a more detailed analytical snapshot of the individual elements of this overview as of 2020, followed by a trend analysis and forecasting, including an impact analysis of Brexit.

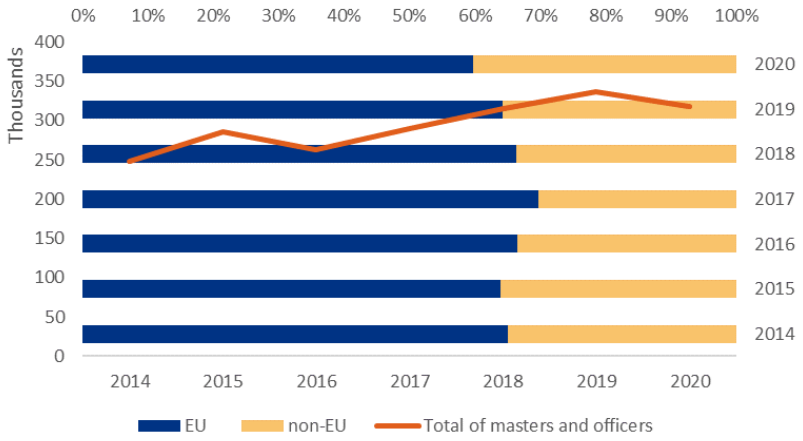

Figure 2-1 Masters and officers available at EU level over the years per country issuing the original CoC

2.1 Masters and officers holding valid certificates of competency in 2020

2.1.1 Total

The total number of masters and officers holding valid certificates of competency (CoC) at EU level was 189,278. Of these, 4.12% held CoCs entitling them to serve in both the Deck and Engine Departments. In addition, just a very limited number of them (0.06%) held CoCs issued by more than one EU Member State.

2.1.2 Distribution by EU Member State

The data in Figure 2-2 shows the distribution of masters and officers as registered by EU Member State[6]:

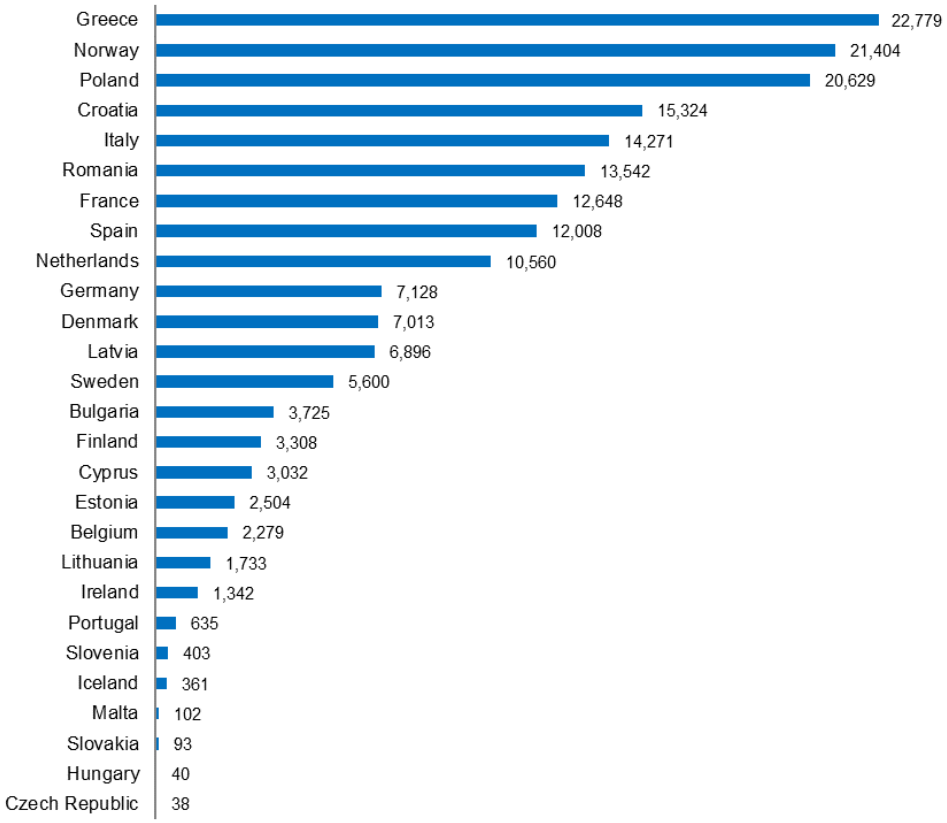

Figure 2-2 Masters and officers holding valid CoCs per EU Member State

[6] Luxembourg does not issue CoCs.

2.1.3 Distribution by department

The number of masters and officers holding valid CoCs in each department is presented in Figure 2-3. It illustrates that the number of masters and officers entitled to serve in the Deck Department (Chapter II of the STCW Convention) was 42% higher than the number of officers entitled to serve in the Engine Department (Chapter III of the STCW Convention). The officers grouped under 'Alternative certification' (Chapter VII of the STCW Convention) were reported as holding a multipurpose capacity.

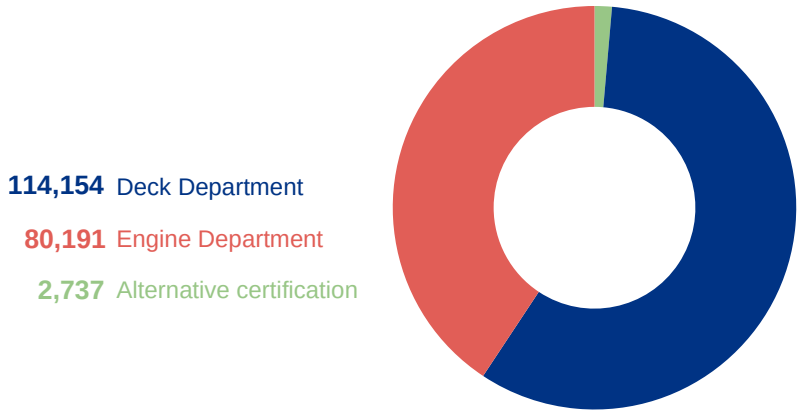

Figure 2-3 Distribution of masters and officers holding valid CoCs by department

The distribution by department within each EU Member State is presented in Figure 2-4.

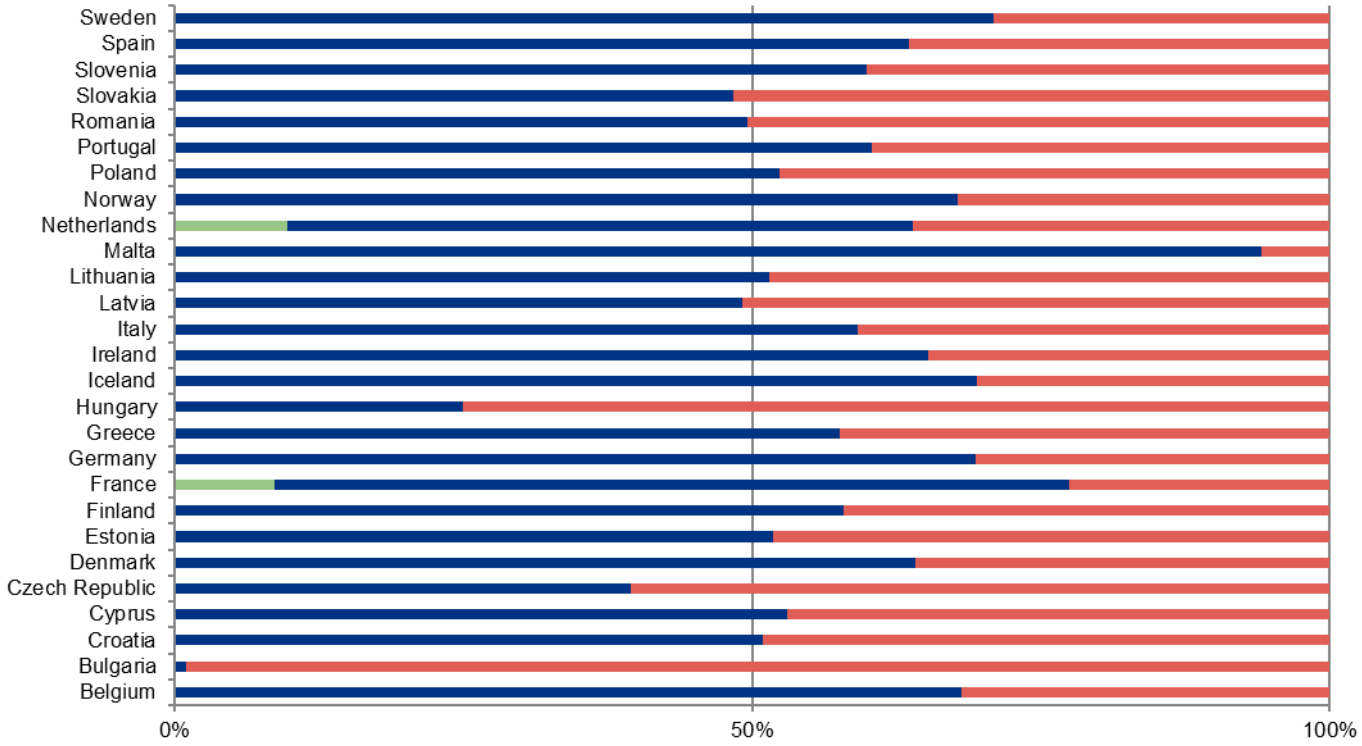

Figure 2-4 Distribution of masters and officers holding valid CoCs by department in each EU Member State

2.1.4 Distribution by capacity

Taking into account that EU Member States do not use the same terms to refer to capacities in their manning regulations, all capacities reported in the CoCs have been linked to the generic capacities established in Chapters II

and III of the STCW Convention, in order to establish a common platform for data comparability. The review was conducted separately for the Deck and the Engine Departments. The total number of masters and officers was established by counting each person in his/her highest capacity.

2.1.4.1 Distribution by deck capacity

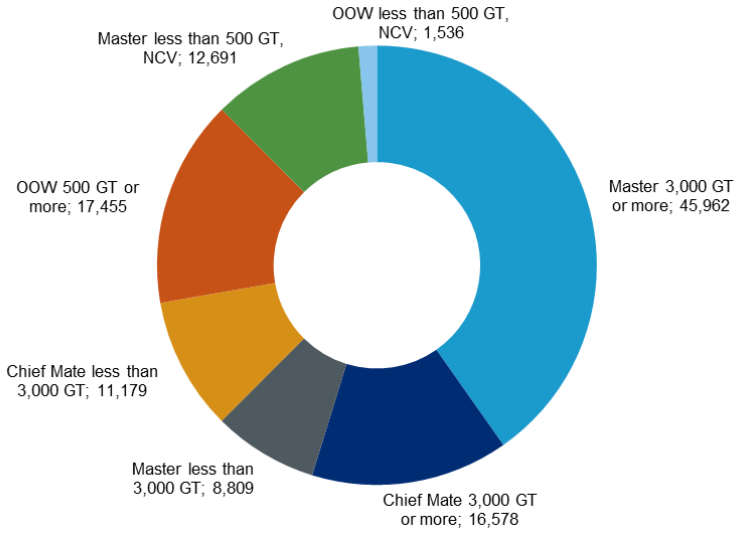

Figure 2-5 Distribution of masters and deck officers holding valid CoCs by deck capacity

The data in Figure 2-5 shows that 54.79% of the deck officers were entitled to serve at management level on ships of 3,000 GT or more.

When analysing the limitations included in the CoCs in terms of area of navigation and gross tonnage in addition of those already shown in Figure 2-5, the following could be stated:

- Only 3.16% of the deck officers entitled to serve on ships of 500 GT or more were restricted to service in a limited area of navigation. This percentage increased to 9.22% when analysing just those entitled to serve at management level on ships of less than 3,000 GT; and
- 11.24% of the deck officers were entitled to serve on ships with a limited gross tonnage different than that established in Chapter II of the STCW Convention (different than 500 or 3,000 GT).

2.1.4.2 Distribution by engine capacity

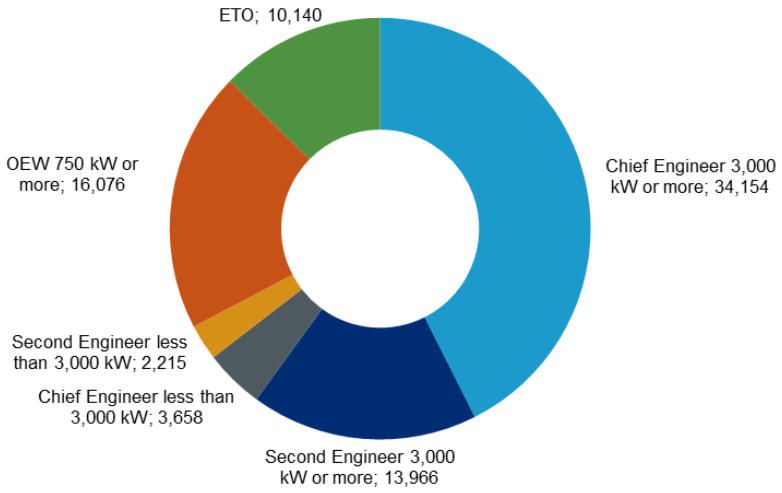

Figure 2-6 Distribution of engineer officers holding valid CoCs by engine capacity

The data in Figure 2-6 shows that 60.01% of the engineer officers were entitled to serve at management level on ships of 3,000 kW or more.

When analysing the limitations included in the CoCs in terms of area of navigation, type of engine and propulsion power in addition of those already shown in Figure 2-6, the following could be stated:

- Only 3.72% of the engineer officers were restricted to service in a limited area of navigation. This percentage increased to 9.89% when analysing just those entitled to serve at management level on ships of less than 3,000 kW;
- 24.50% of the engineer officers were restricted to operate a specified type of propulsion machinery installation; and
- 4.25% of the engineer officers were entitled to serve on ships with a limited propulsion power different than that established in Chapter III of the STCW Convention (different than 750 or 3,000 kW).

2.1.5 Gender distribution

The information on gender was available for 174,559 masters and officers, representing 92.22% of the total number of officers at EU level holding a CoC.

Considering the total number of masters and officers whose gender was known, it can be stated with a level of confidence of 99% that the percentage of female masters and officers was 2.35% ± 0.09% compared to 97.65% ± 0.09% of male masters and officers.

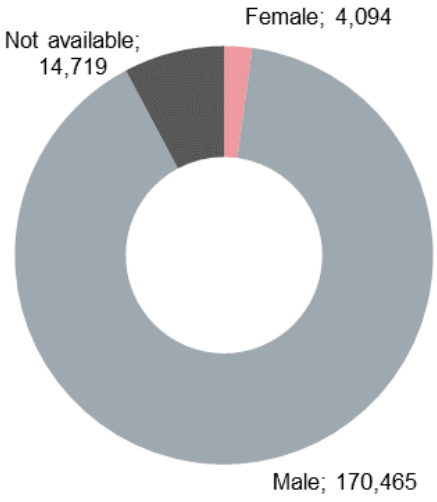

Figure 2-7 Gender distribution of masters and officers holding valid CoCs

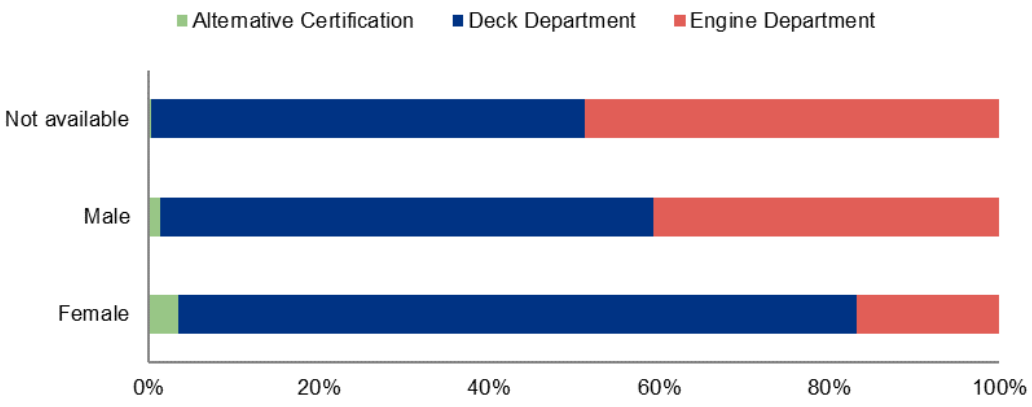

Figure 2-8 Distribution of masters and officers holding valid CoCs by department and by gender

The information presented in Figure 2-8 shows that male masters and officers follow a general distribution by department (60% entitled to serve in the Deck Department and 40% entitled to serve in the Engine Department) while most female masters and officers (86.98%) were entitled to serve in the Deck Department.

The distribution of the capacities of masters and deck officers holding valid CoCs by gender is presented in Figure 2-9.

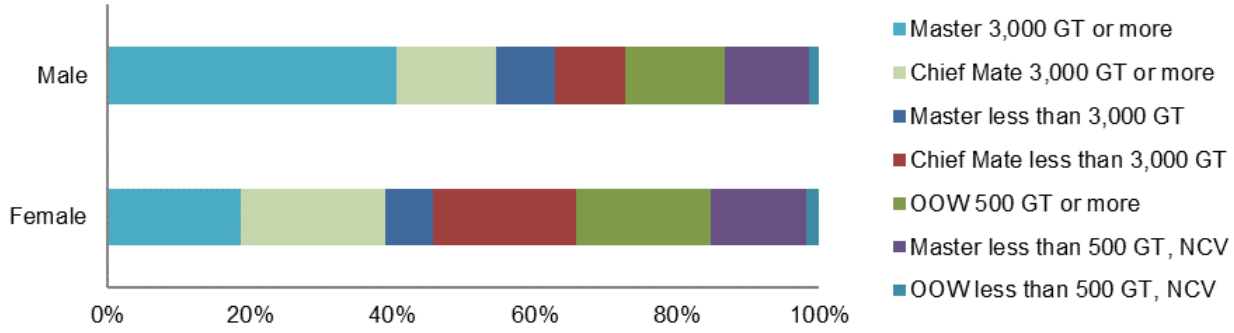

Figure 2-9 Distribution of the deck capacities of masters and deck officers holding valid CoCs by gender

As illustrated in Figure 2-9, the three main capacities in which female officers were entitled to serve were ‘Chief Mate 3,000 GT or more’ (20.33%), ‘Chief Mate less than 3,000 GT’ (20.13%) and ‘OOW 500 GT or more’ (19.04%), capacities representing 59.51% of the total number of female masters and officers entitled to serve in the Deck Department. The three main capacities in which male masters and officers were entitled to serve were ‘Master 3,000 GT or more’ (40.71%), ‘OOW 500 GT or more’ (14.01%) and ‘Chief Mate 3,000 GT or more’ (13.98%), capacities representing 68.70% of the total number of male masters and officers entitled to serve in the Deck Department.

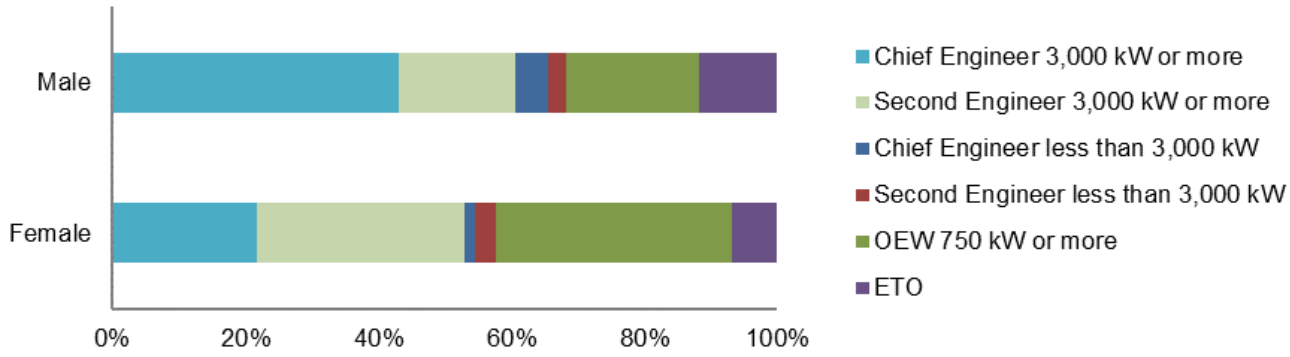

Figure 2-10 Distribution of the engine capacities of engineer officers holding valid CoCs by gender

As illustrated in Figure 2-10, the three main capacities in which female officers were entitled to serve in the Engine Department were ‘OEW 750 kW or more’ (36.65%), ‘Second Engineer 3,000 kW or more’ (31.11%) and ‘Chief Engineer 3,000 kW or more’ (21.76%). These capacities covered 88.52% of the total number of female officers entitled to serve in the Engine Department. The three main capacities in which male officers were entitled to serve in the Engine Department were ‘Chief Engineer 3,000 kW or more’ (43.13%), ‘OEW 750 kw or more’ (19.95%) and ‘Second Engineer 3,000 kW or more’ (17.52%). These capacities represented 80.60% of the total number of male officers entitled to serve in the Engine Department.

2.1.6 Distribution by nationality

The information on nationality was available for 182,370 masters and officers, representing 96.35% of the total number of officers at EU level holding a CoC.

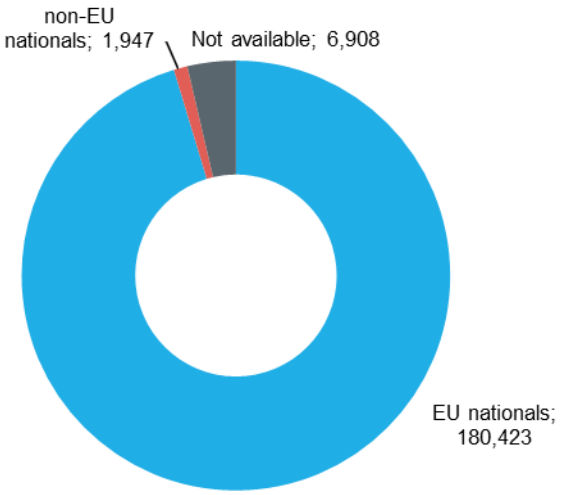

Figure 2-11 Nationality distribution of masters and officers holding valid CoCs

In addition to nationals of the EU Member States, 1,947 nationals of 87 non-EU countries held valid CoCs as masters or officers issued by EU Member States. When grouping these non-EU countries by region[7], it occurs that 16 were located in Europe, 18 were located in Asia, 32 were located in Africa, 17 were located in the Americas and 4 were located in the Oceania.

The distribution of the non-EU nationals holding valid CoCs issued by the EU Member States presented in Figure 2-12 shows that 63.69% of them were nationals of countries located in Europe.

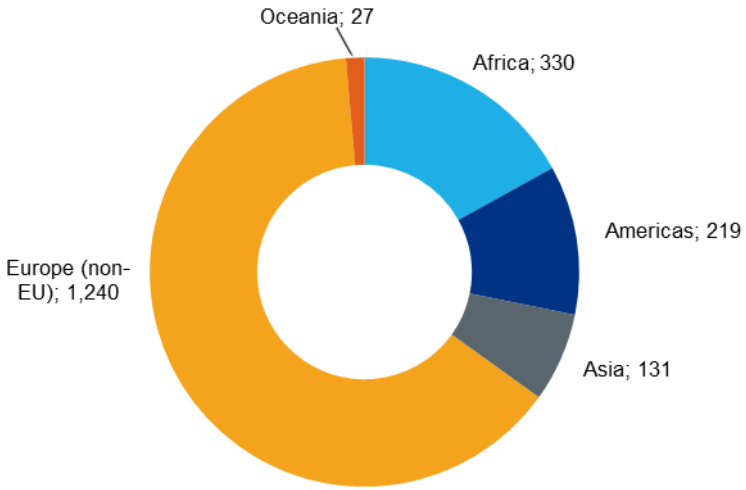

Figure 2-12 Nationality distribution of non-EU nationals holding valid CoCs issued by EU Member States by region of origin

2.1.7 Age distribution

The average age of masters and officers holding valid CoCs was 44.3 (years). Whereas the under 25 age group counted 5,221 masters and officers, all other age groups had a relatively uniform distribution, each counting between 18,800 and 29,100 masters and officers, which represented 10% to 15% of the total number.

[7] The grouping of countries per regions was based on the “Standard country or area codes for statistical use” established by the United Nations and the list of European countries established by the EU

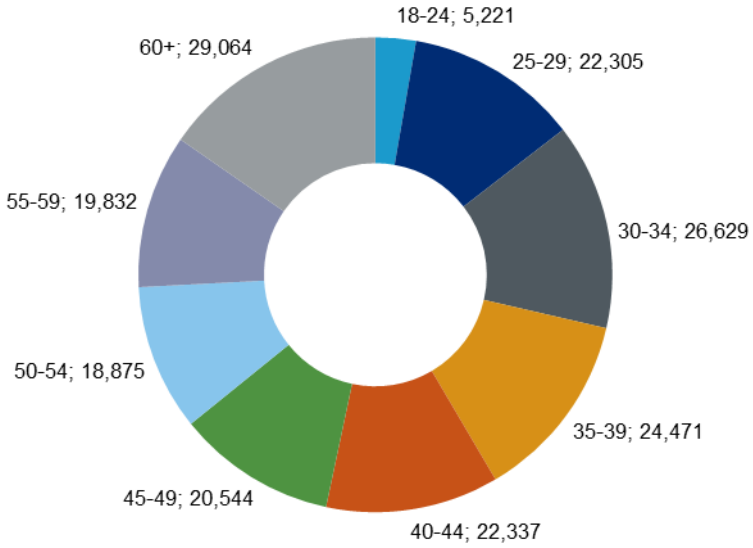

Figure 2-13 Age distribution of masters and officers holding valid CoCs

The age profile per department is presented in Figure 2-14.

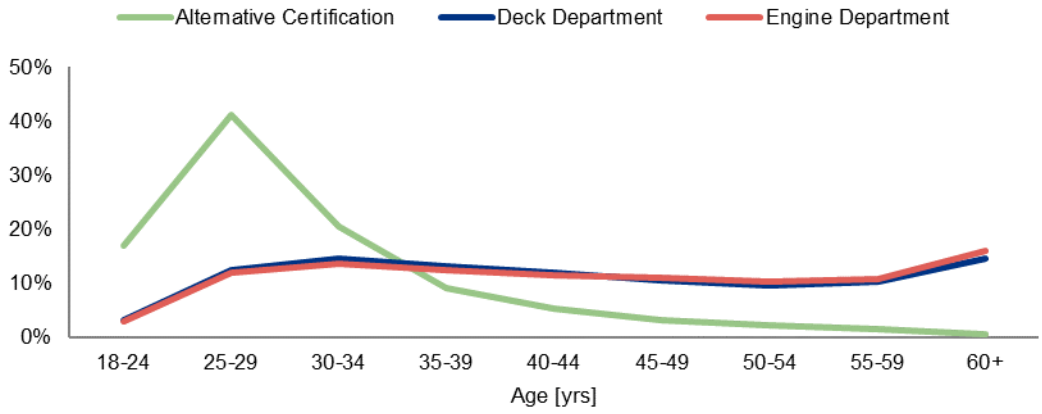

Figure 2-14 Age profile of masters and officers holding valid CoCs per department

Reviewing the data in Table 2-7 of Appendix A, the following conclusions could be stated:

- 78.37% of officers holding certificates issued under Chapter VII, 'Alternative certification' of the STCW Convention were younger than 35 years of age;
- The masters and officers certified under Chapter II (Deck Department) and Chapter III (Engine Department) of the STCW Convention were evenly distributed throughout the age groups other than the 18-24 years of age group;
- 55.19% of masters and deck officers and 52.33% of the engineer officers were younger than 45 years of age.

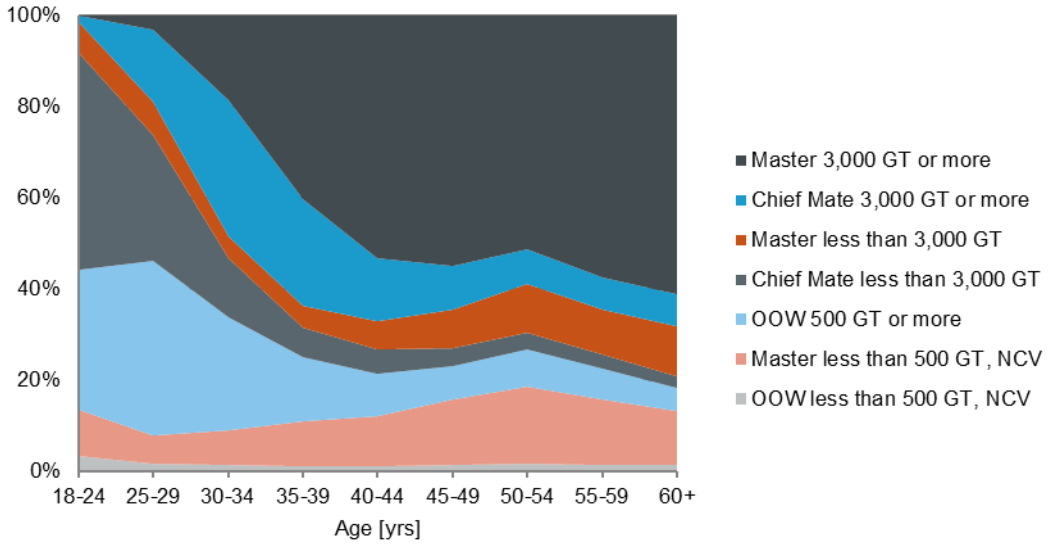

Figure 2-15 Distribution of masters and deck officers holding valid CoCs by age groups

Considering the highest capacity in which masters and deck officers were entitled to serve:

- 63.29% of those entitled to serve as 'Master 3,000 GT or more' were 45 years old or older;
- 64.85% of those entitled to serve as 'Chief Mate 3,000 GT or more' were younger than 40 years of age;
- 58.35% of those entitled to serve as 'Master less than 3,000 GT' were 45 years old or older;
- 50.26% of those entitled to serve as 'Chief Mate less than 3,000 GT' were younger than 30 years of age;
- 61.23% of those entitled to serve as 'OOW' 500 GT or more were younger than 35 years of age;
- 56.73% of those entitled to serve as 'Master less than 500 GT, NCV' were 45 years old or older; and
- 55.79% of those entitled to serve as 'OOW less than 500 GT, NCV' were older than 40 years of age.

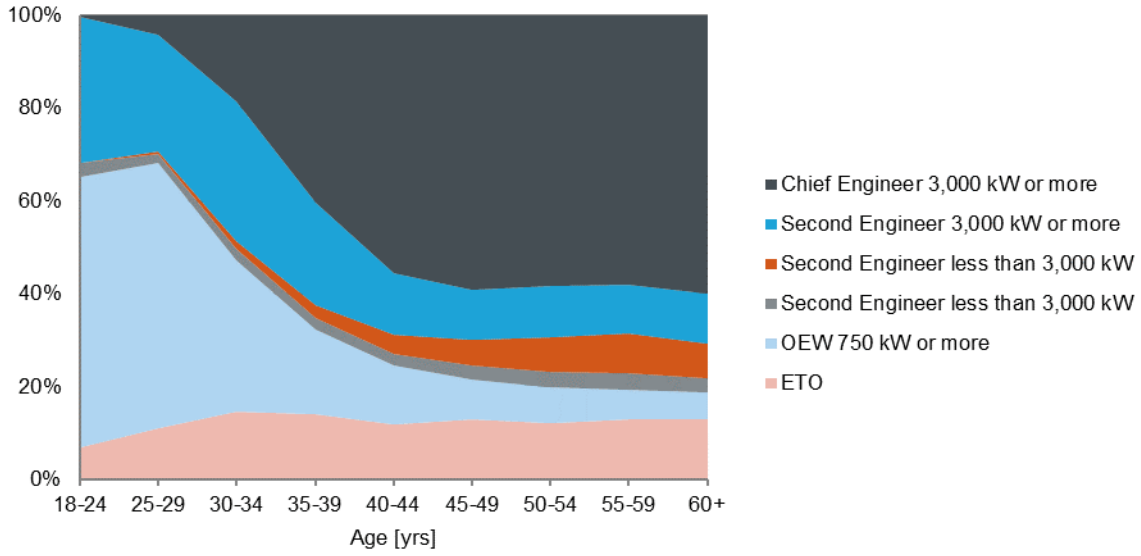

Figure 2-16 Distribution of engineer officers holding valid CoCs by age groups

Considering the highest capacity in which the engineer officers were entitled to serve:

- 66.13% of those entitled to serve as 'Chief Engineer 3,000 kW or more' were 45 years old or older;
- 61.79% of those entitled to serve as 'Second Engineer 3,000 kW or more' were younger than 40 years of age;
- 62.00% of those entitled to serve as 'Chief Engineer less than 3,000 kW' were 50 years old or older;
- 55.26% of those entitled to serve as 'Second Engineer less than 3,000 kW' were 45 years old or older;

- 64.64% of those entitled to serve as 'OEW 750 kW or more' were younger than 35 years of age; and
- 58.65% of those entitled to serve as 'ETO' were older than 40 years of age.

Figure 2-17 presents the age profile per gender, while Figure 2-18 and Figure 2-19 present the average age per capacity for each of the two gender groups. These figures indicate that:

- the average age for female masters and officers was 35.0 years, while that for male masters and officers was 44.2 years;
- 73.52% of female masters and officers were younger than 40 years of age, while the percentage of the male masters and officers in the same age group was only 41.39%;
- the average age of female masters and deck officers (35.1 years) was higher than the average age of the female engineer officers (33.0 years).

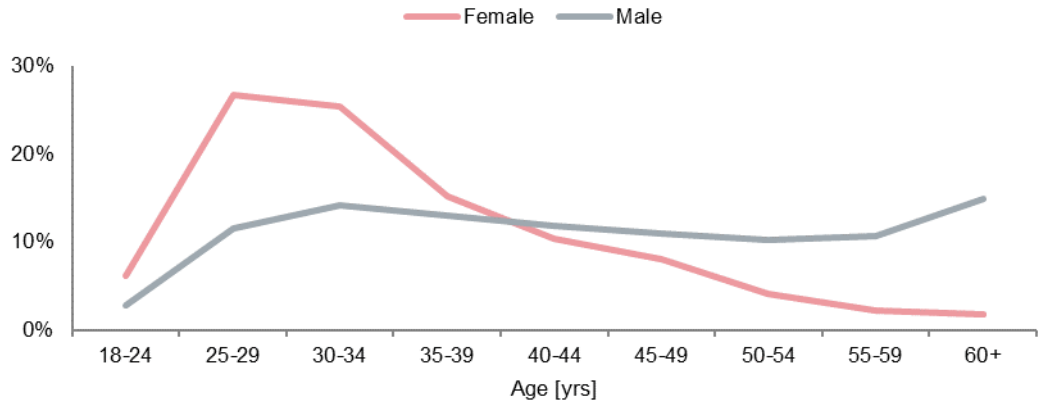

Figure 2-17 Age profile of masters and officers holding valid CoCs per gender

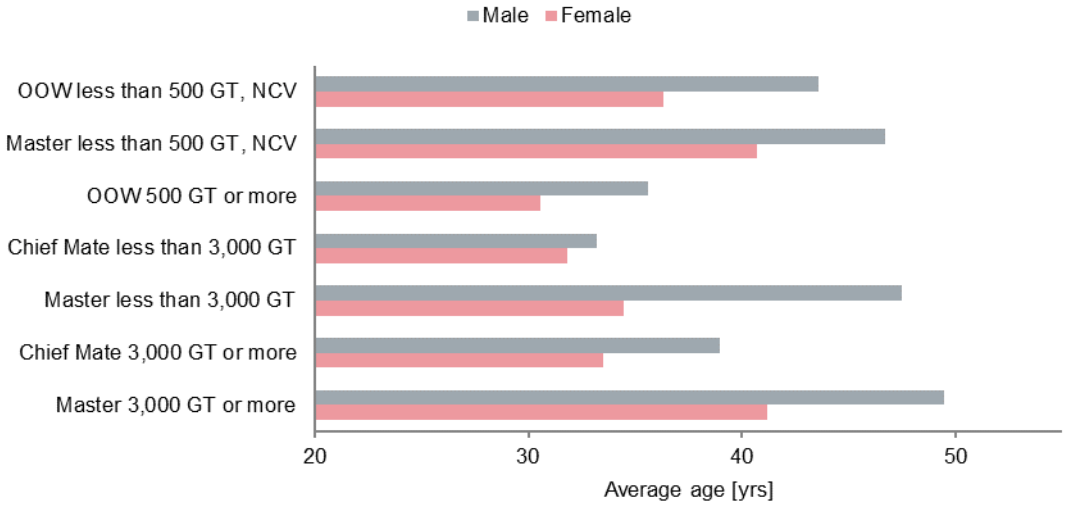

Figure 2-18 Average age of masters and deck officers holding valid CoCs per gender by deck capacity

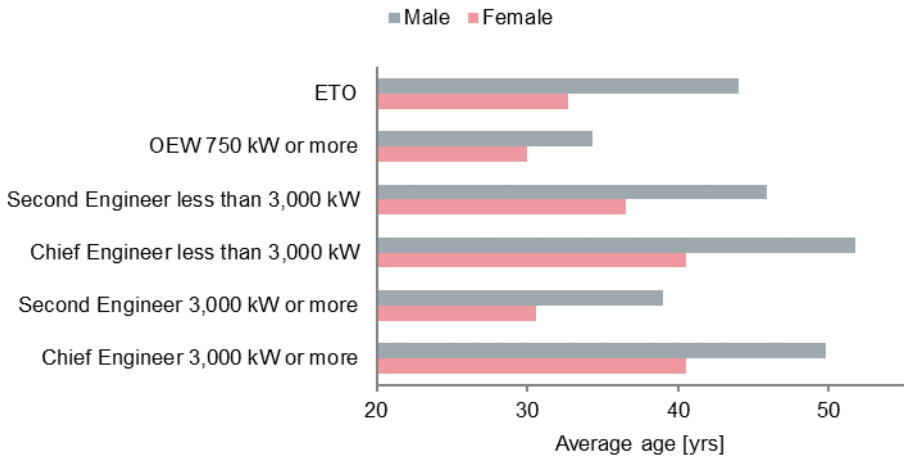

Figure 2-19 Average age of engineer officers holding valid CoCs per gender by engine capacity

2.2 Masters and officers who in 2020 held valid endorsements attesting recognition

2.2.1 Total

The total number of masters and officers holding valid EaRs at EU level was 174,021, with 0.07% of them entitled to serve in both the Deck and Engine Departments. In addition, 9.85% of them held more than one EaR issued by different EU Member States.

Reviewing the distribution by group of countries issuing the original CoC, 46,097 masters and officers held original CoCs issued by other EU Member States (24.35% of the total number of masters and officers holding valid CoCs as per section 2.2.1), 127,958 held original CoCs issued by non-EU countries and 0.02% held original CoCs issued by both EU Member States and non-EU countries.

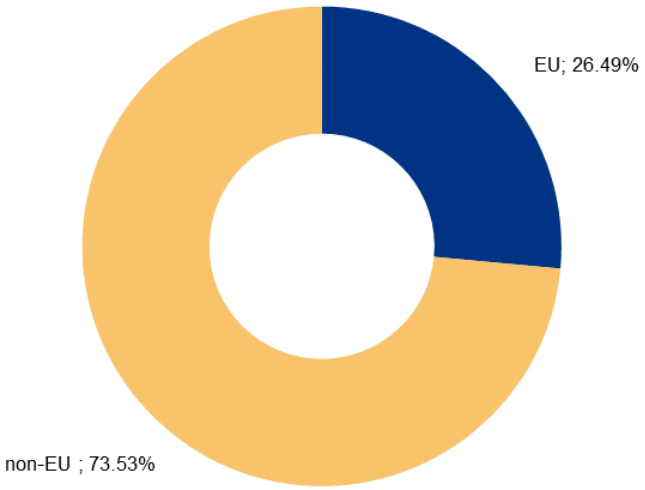

Figure 2-20 Distribution of masters and officers holding valid EaRs by countries issuing the original CoC

2.2.2 Distribution by EU Member State

The distribution of the number of masters and officers holding valid EaRs issued by EU Member State[8] is presented in Figure 2-21.

[8] Czech Republic and Hungary do not issue EaRs.

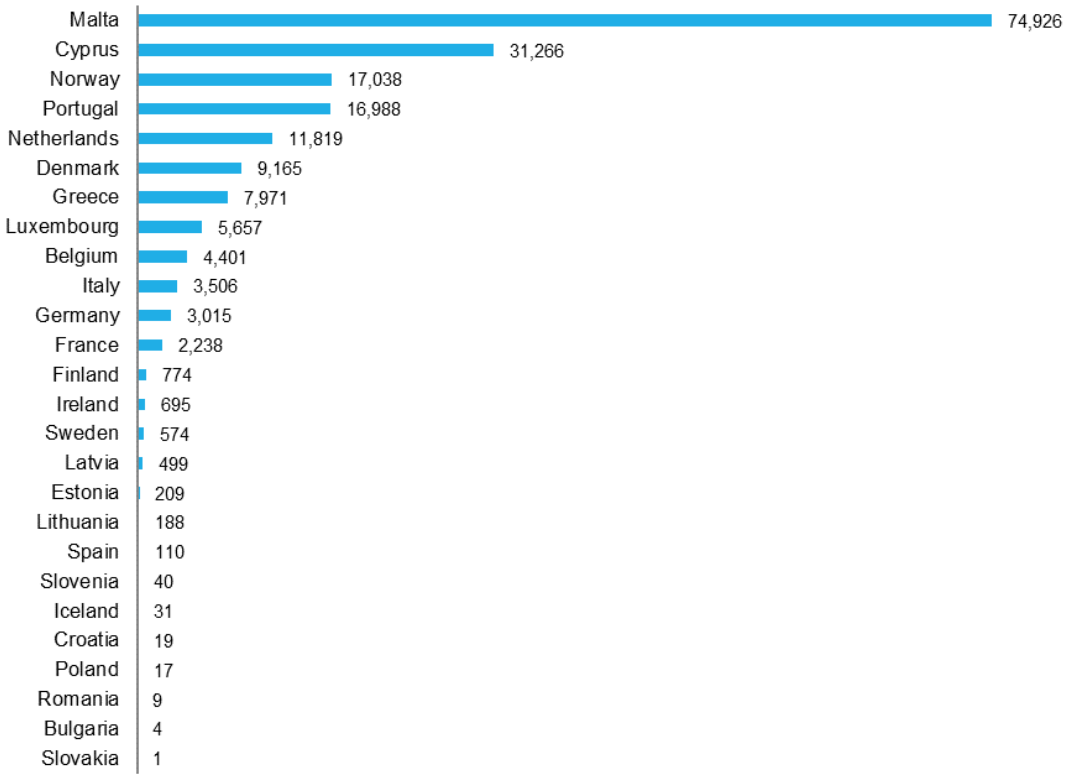

Figure 2-21 Masters and officers holding valid EaRs per EU Member State

The distribution of the masters and officers holding valid EaRs endorsing original CoCs issued by EU and non-EU countries is presented in Figure 2-22.

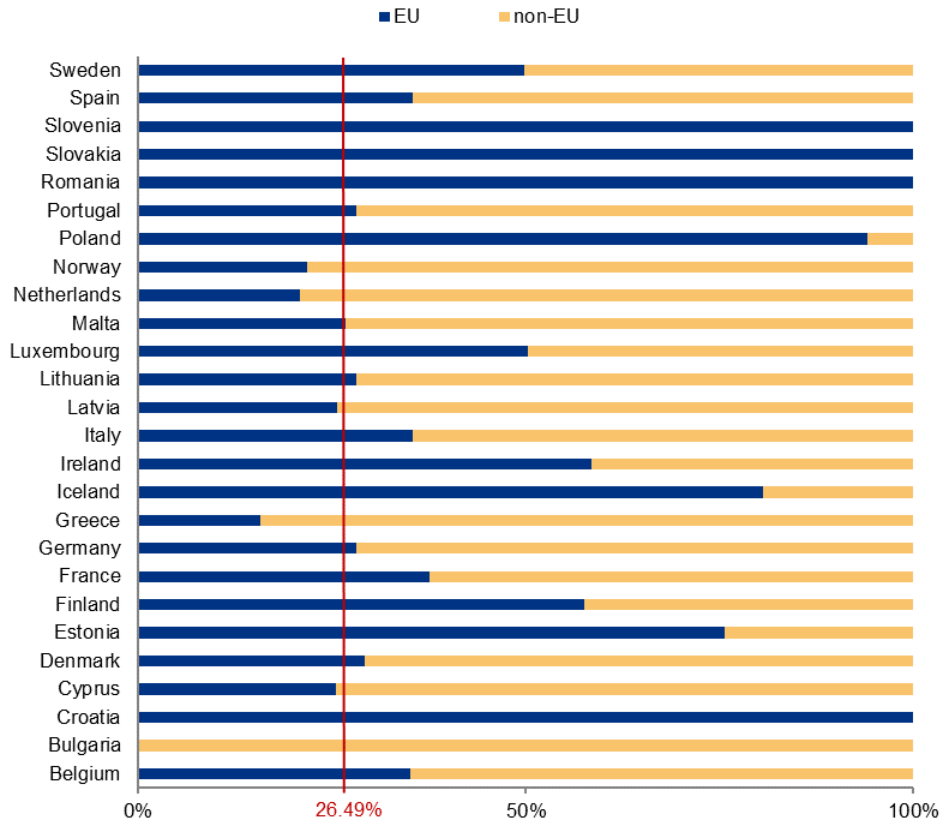

Figure 2-22 Distribution of masters and officers holding valid EaRs recognising original CoCs issued by EU and non-EU countries

2.2.3 Distribution by countries issuing the original CoCs

The information on the name of the country that issued the original CoC was available for 174,012 masters and officers, which represented 99.99% of the total number of masters and officers holding valid EaRs at EU level. Figure 2-23 shows the distribution of masters and officers holding valid EaRs by region[9] where the respective countries issuing the original CoC are located.

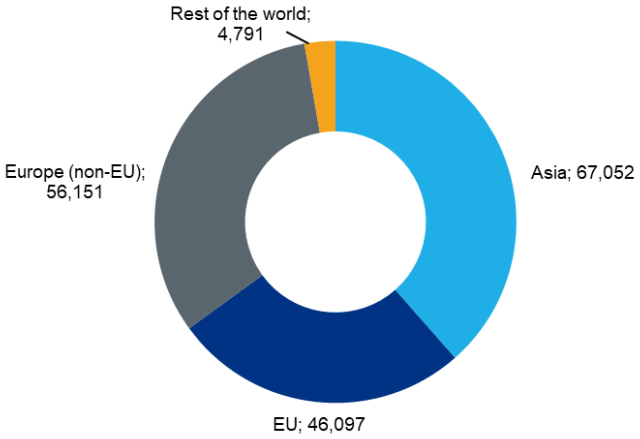

Figure 2-23 Distribution of masters and officers holding valid EaRs by region of the country issuing the original CoC

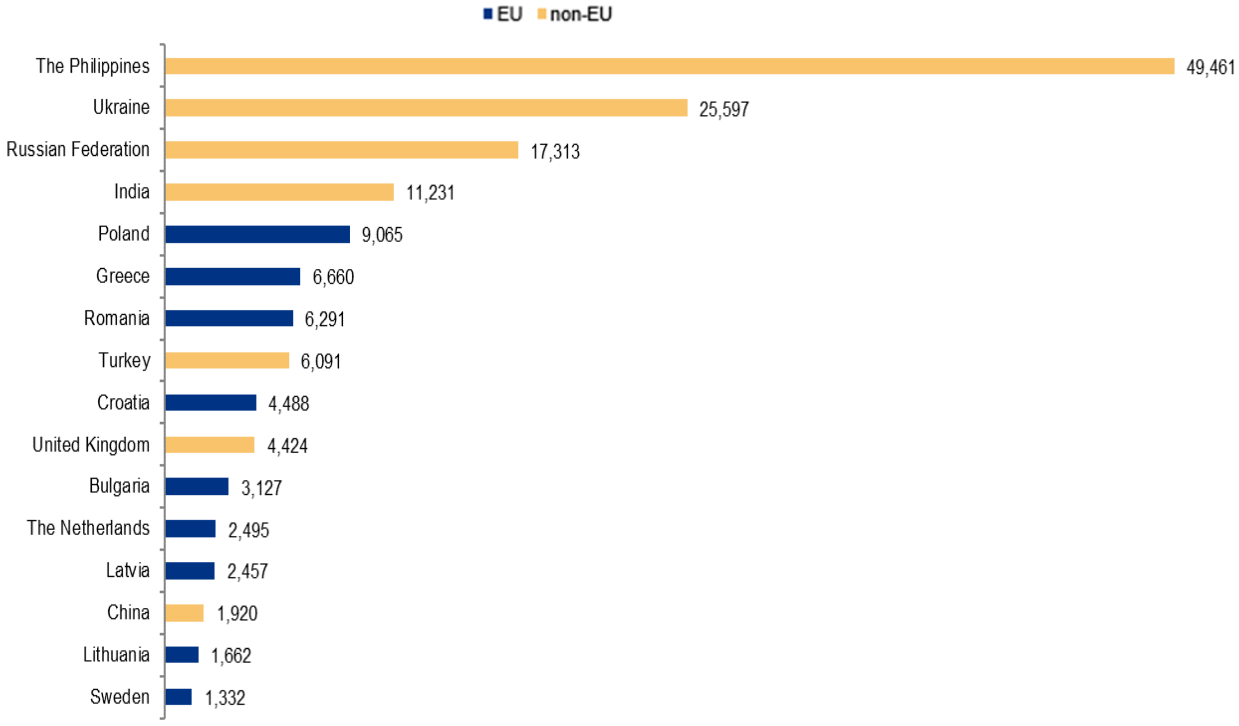

Figure 2-24 Countries issuing the original CoCs registering more than 0.75% of masters and officers holding valid EaRs

The masters and officers registered with valid EaRs in 2020 held original CoCs issued by 87 countries. Figure 2-24 identifies the 16 countries – nine EU Member States and seven non-EU countries – which provided 88.27% of the total number of masters and officers holding valid EaRs at EU level. Table 2-15 and Table 2-16 of Appendix B present a more detailed list of countries issuing the original CoCs.

[9] The grouping of countries per regions was based on the “Standard country or area codes for statistical use” established by the United Nations and the list of European countries established by the EU

2.2.4 Distribution by department

The departments in which the holders of EaRs were entitled to serve are presented in Figure 2-25.

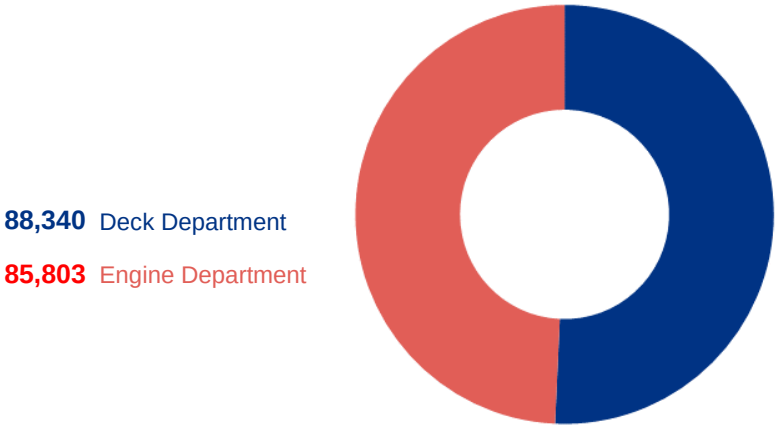

Figure 2-25 Distribution of masters and officers holding valid EaRs by department

The figure illustrates that the number of masters and officers entitled to serve in the Deck Department was only 2.96% higher than the number of officers entitled to serve in the Engine Department.

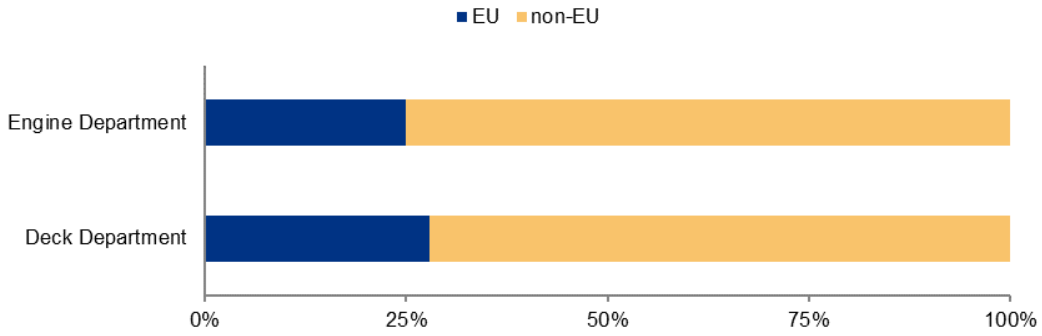

Figure 2-26 Distribution of masters and officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by department

The ratio between the masters and officers holding original CoCs issued by EU Member States and those holding original CoCs issued by non-EU countries follows a pattern for both the Deck (28% to 72%) and the Engine (25% to 75%) Departments, which is similar to the general distribution presented in Figure 2-20.

2.2.5 Distribution by capacity

Taking into account that EU Member States do not use the same terms to refer to capacities in their manning regulations, all capacities reported in the original CoCs have been linked to the generic capacities established in Chapters II and III of the STCW Convention, in order to establish a common platform for data comparability. The review was conducted separately for the Deck and the Engine Departments. The total number of masters and officers was established by counting each person in his/her highest capacity.

2.2.5.1 Distribution by deck capacity

The information in Figure 2-27 shows that, out of the total number of masters and deck officers holding valid EaRs in 2020, 97.85% were entitled to serve on ships of 3,000 GT or more. In addition, the data also indicated that 59.51% of them were entitled to serve at management level on ships of 3,000 GT or more, with less than 0.3% of their EaRs being limited in terms of tonnage and/or navigation area.

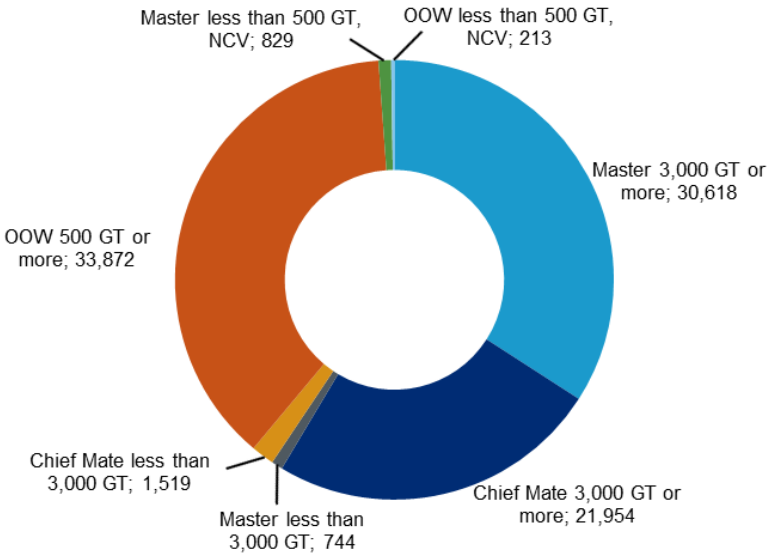

Figure 2-27 Distribution of masters and deck officers holding valid EaRs by deck capacity

The ratio between the masters and officers holding valid EaRs endorsing CoCs issued by EU Member States and those holding CoCs issued by non-EU countries was 28% to 72%. Nevertheless, the majority of masters and officers entitled to serve on board ships limited in tonnage or navigation area held CoCs issued mainly by EU Member States (see Figure 2-28).

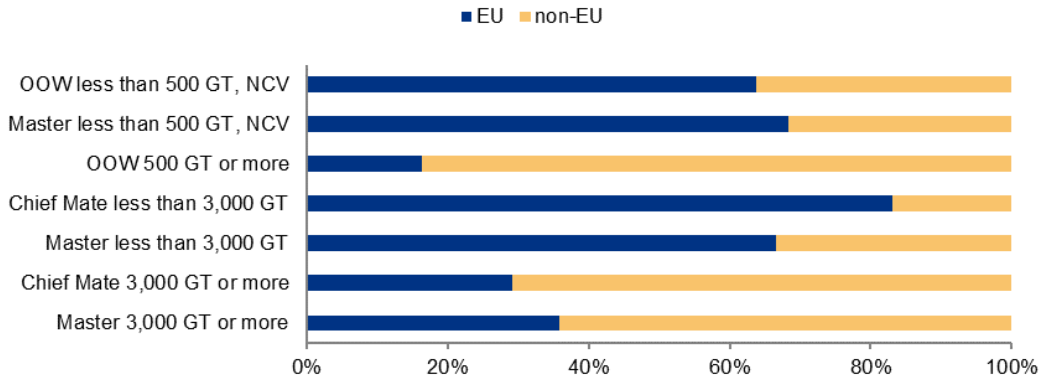

Figure 2-28 Distribution of masters and officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by deck capacity

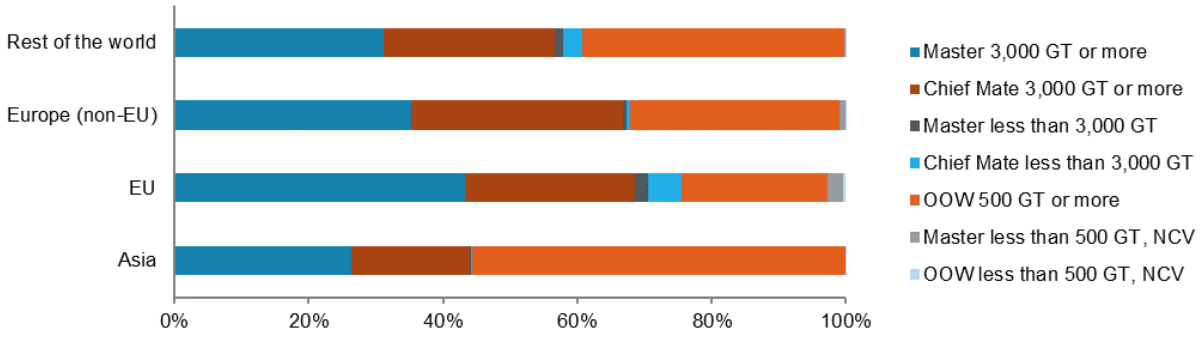

Figure 2-29 Distribution of the deck capacities of masters and deck officers holding valid EaRs by region of the country issuing the original CoC

The majority of masters and deck officers having their original CoC issued by Asian countries held EaRs entitling them to serve at operational level. Deck officers with original CoCs issued by countries in other parts of the world held, in their majority, EaRs entitling them to serve at management level.

2.2.5.2 Distribution by engine capacity

The information in Figure 2-30 shows that, out of the total number of engineer officers holding valid EaRs, 98.62% were entitled to serve on ships powered by main propulsion machinery of 3,000 kW propulsion power or more. In addition, the data also indicated that 55.09% of the engineer officers were entitled to serve at management level on ships powered by main propulsion machinery of 3,000 kW propulsion power or more, with less than 0.5% of their EaRs being limited in terms of propulsion power or area of navigation and 24.27% being limited in terms of type of propulsion machinery.

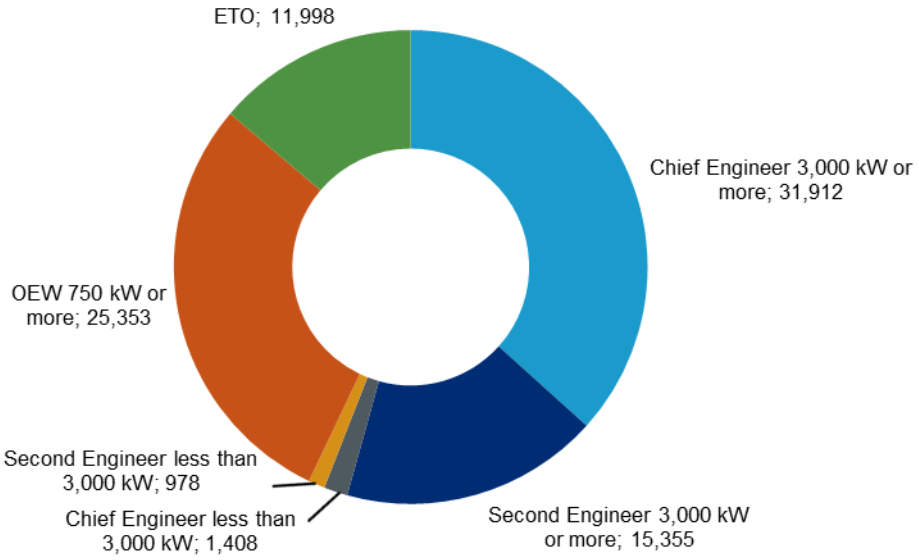

Figure 2-30 Distribution of engineer officers holding valid EaRs by engine capacity

The ratio between the engineer officers holding CoCs issued by EU Member States and those holding CoCs issued by non-EU countries was 25% to 75%. Nevertheless, this pattern was not clearly followed by those entitled to serve on board ships limited in propulsion power (see Figure 2-31).

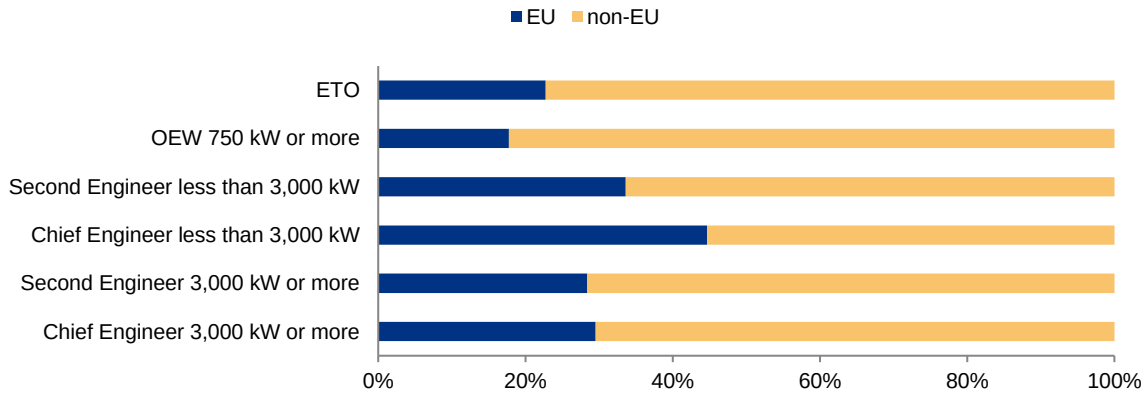

Figure 2-31 Distribution of engineer officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by engine capacity

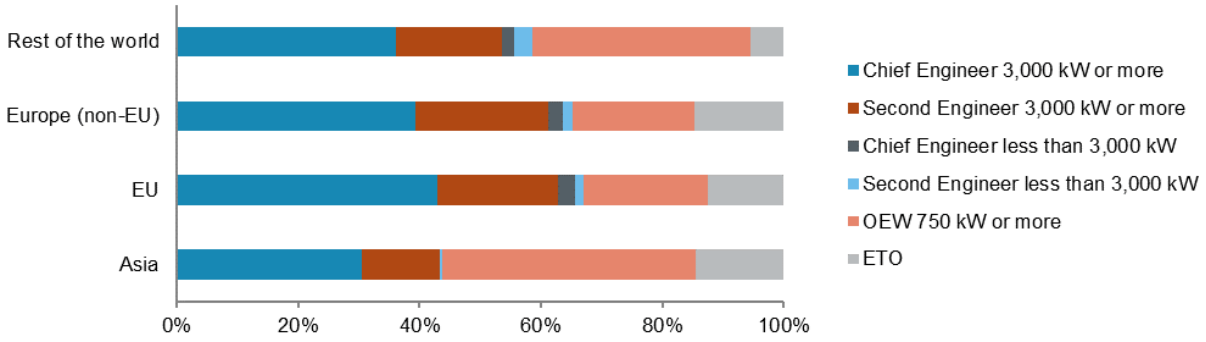

Figure 2-32 Distribution of the engine capacities of engineer officers holding valid EaRs by region of the country issuing the original CoC

The majority of the engineer officers having the original CoC issued by Asian countries held EaRs entitling them to serve at operational level. Engineer officers with CoCs issued by countries located in other parts of the world held, in their majority, EaRs entitling them to serve at management level.

2.2.6 Gender distribution

The information on gender was available for 173,470 masters and officers that represented 99.68% of the total number holding valid EaRs in 2020 at EU level.

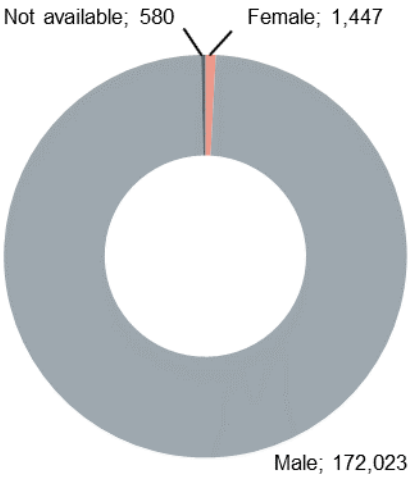

Figure 2-33 Gender distribution of masters and officers holding valid EaRs

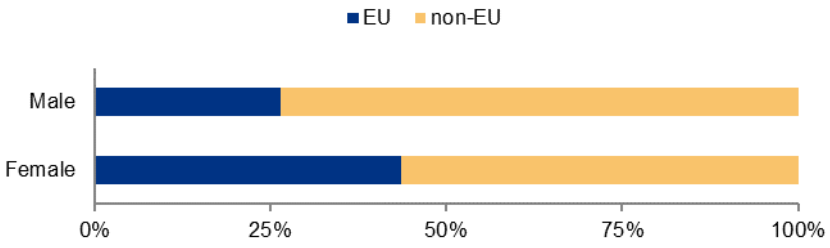

Figure 2-34 Distribution of masters and officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by gender

It was noted that 43.61% of the total number of female masters and officers holding valid EaRs held original CoCs issued by EU Member States, followed by 21.98% who had their original CoCs issued by countries located in Europe.

2.2.7 Distribution by nationality

The information on nationality was available for 162,327 masters and officers, representing 93.28% of the total number of officers at EU level holding EaRs which were nationals of 124 countries. The distribution of these countries per region[10] of origin does not show a significant deviation from the review on countries issuing the original CoCs.

2.2.8 Age distribution

The average age of masters and officers holding valid EaRs was 41.6 years. Reviewing the average age per country issuing the original CoCs, the average age of masters and officers holding CoCs issued by the EU Member States was 43.8 years, while of those holding original CoCs issued by non-EU countries was 40.9 years.

Considering the ratio between the masters and officers holding valid EaRs endorsing CoCs issued by the EU Member States and those holding valid EaRs endorsing CoCs issued by non-EU countries (26% to 74%), the distribution by age groups shows a deviation, especially for the masters and officers younger than 25 years of age and for those older than 59 as presented in Figure 2-36.

The data presented in Table 2-17 of Appendix B and in Figure 2-37 indicates that:

- In both departments there is a few number of officers younger than 25 years of age;
- 53.25% of the masters and officers holding valid EaRs for the Deck Department were younger than 40 years of age;
- the number of engineer officers was higher than the number of masters and deck officers for all age groups over 44 years of age.

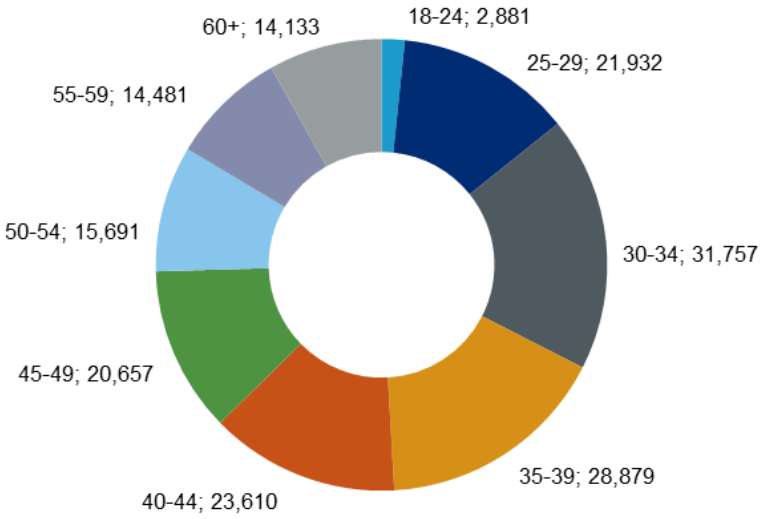

Figure 2-35 Age distribution of masters and officers holding valid EaRs

[10] The grouping of countries per regions was based on the “Standard country or area codes for statistical use” established by the United Nations and the list of European countries established by the EU

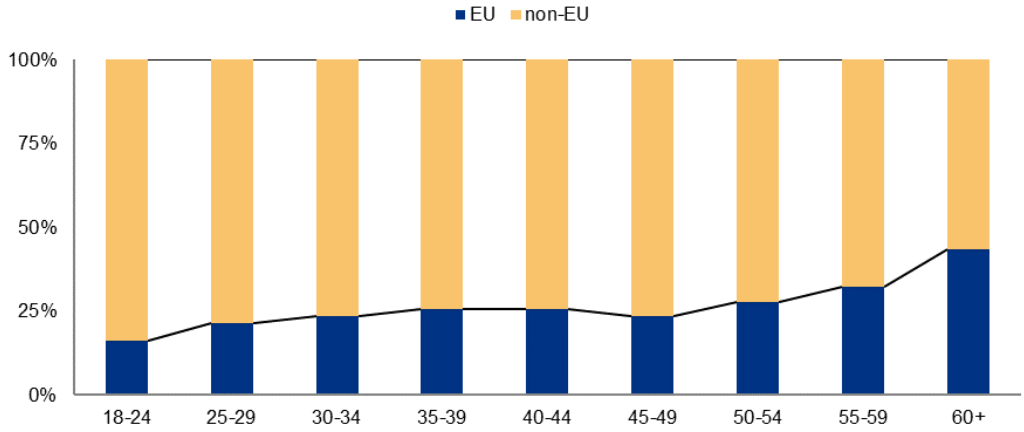

Figure 2-36 Distribution of masters and officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by age group

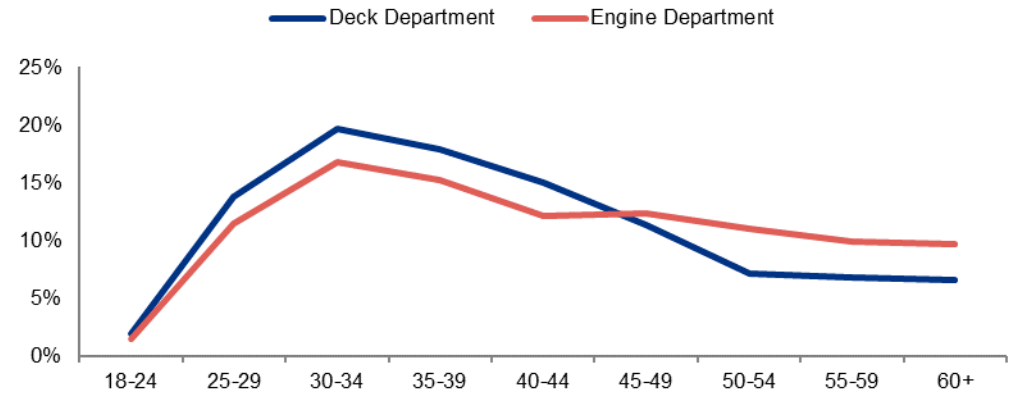

Figure 2-37 Age profile of masters and officers holding valid EaRs per department

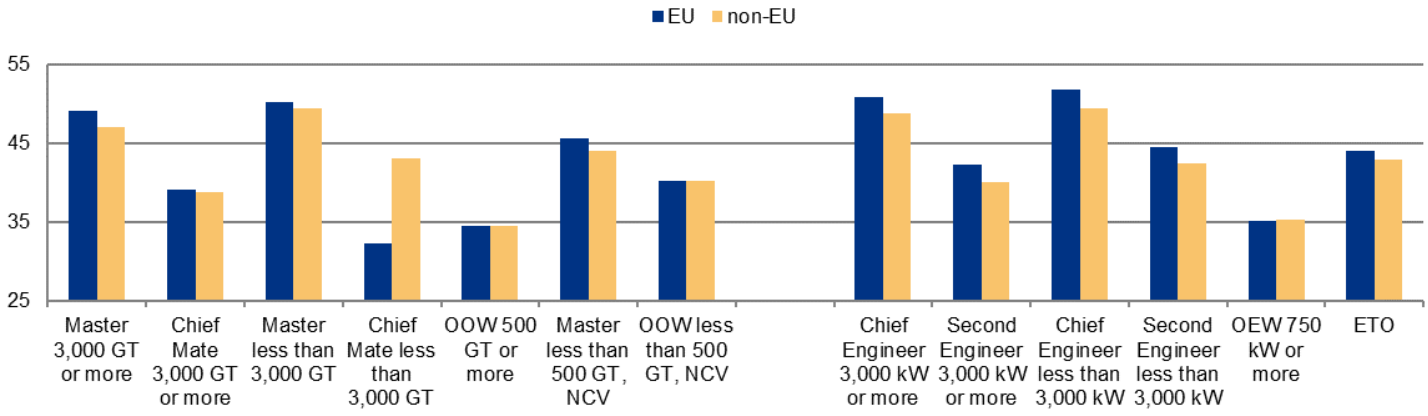

Figure 2-38 Average age of officers holding valid EaRs per EU and non-EU countries issuing the original CoC by capacity

The graphs in Figure 2-38 indicate that the average age of masters and officers was slightly higher for those holding original CoCs issued by EU Member States, except for chief mates holding EaRs endorsing capacities limited in gross tonnage.

2.3 Masters and officers available to serve on board EU Member State flagged vessels in 2020

Figure 2-39 aggregates the number of masters and officers holding valid CoCs and EaRs. This encompasses EaRs issued to holders of CoCs issued by both EU and non-EU countries analysed in sections 2.2 and 2.3.

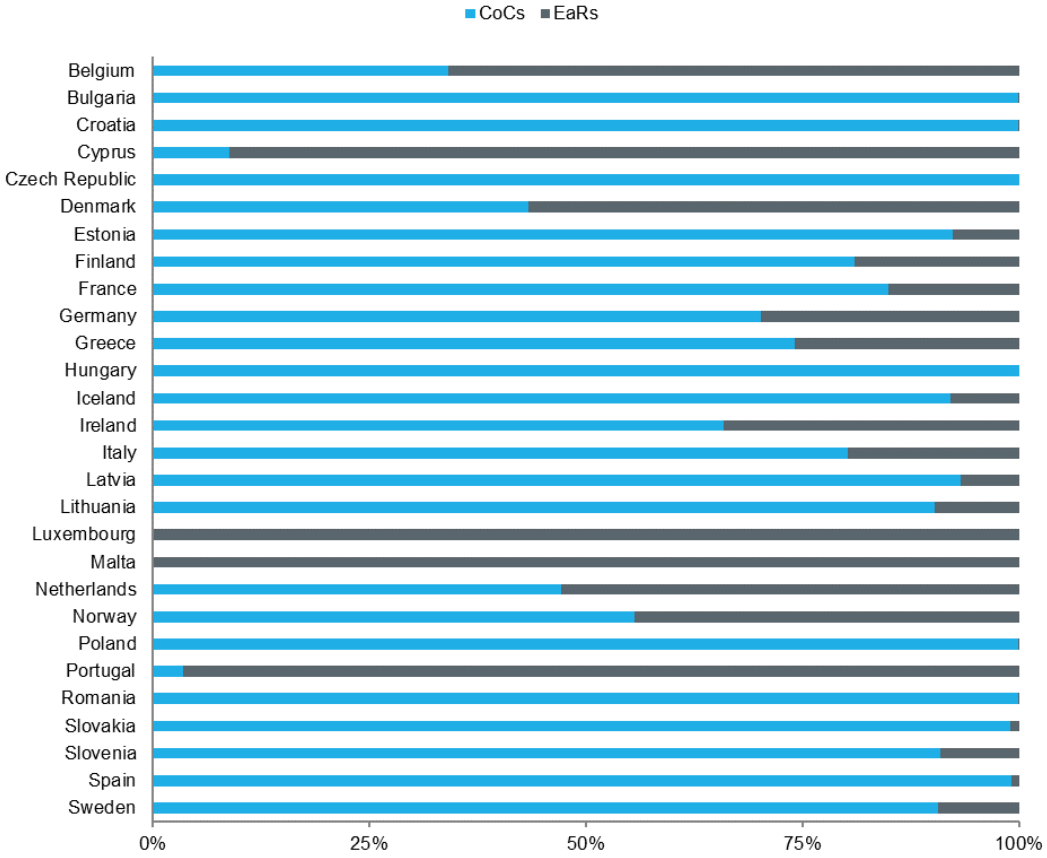

Figure 2-39 Masters and officers holding valid CoCs or EaRs per EU Member State

2.3.1 Total

The total number of masters and officers available to serve on board EU Member State flagged vessels was 317,236, distributed as presented in Figure 2-40. It included the masters and officers holding valid CoCs issued by EU Member States and the masters and officers holding valid EaRs issued by EU Member States recognising CoCs issued by non-EU countries.

Figure 2-40 Distribution of masters and officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC

2.3.2 Distribution by department

Figure 2-41 presents the distribution by department of masters and officers available to serve on board EU Member State flagged vessels. It excludes officers holding original CoCs issued by EU Member States under Chapter VII 'Alternative Certification' of the STCW Convention because no officers from non-EU countries held EaRs for such certification.

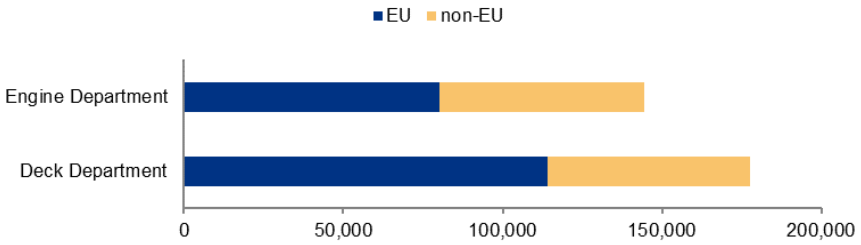

Figure 2-41 Distribution of masters and officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC and by department

The number of masters and officers available to serve in the Deck Department (177,801) was 23% higher than the number of officers available to serve in the Engine Department (144,535). This percentage changes depending on whether the CoCs were issued by EU Member States or non-EU countries. In the first case, the number of masters and officers available to serve in the Deck Department was 42% higher than the number of officers available to serve in the Engine Department. When CoCs were issued by non-EU countries the number of master and officers available to serve in the Engine Department was higher (1.1%) than the number of officers available to serve in the Deck Department.

In both Deck and Engine Departments, the number of officers holding valid CoCs issued by EU Member States and available to serve on board EU Member State flagged vessels was higher than those holding CoCs issued by non-EU countries (79% and 25% higher for Deck and Engine Departments, respectively).

2.3.3 Distribution by capacity

Taking into account that EU Member States do not use the same terms to refer to capacities in their manning regulations, all capacities reported in the CoCs have been linked to the generic capacities established in Chapters II and III of the STCW Convention, in order to establish a common platform for data comparability. The review was conducted separately for the Deck and the Engine Departments. The total number of masters and officers was established by counting each person in his/her highest capacity.

2.3.3.1 Distribution by deck capacity

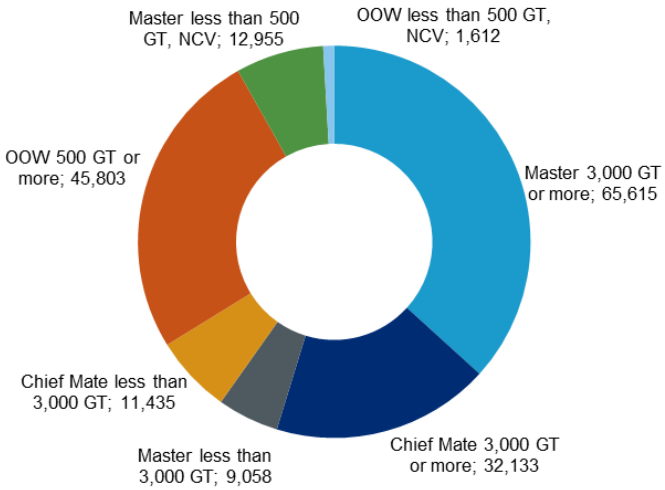

Figure 2-42 Distribution of masters and deck officers available to serve on board EU Member State flagged vessels by deck capacity

The information in Figure 2-42 shows that 54.98% (97,748) of the total number of available masters and deck officers were entitled to serve at management level on ships of 3,000 GT or more.

Although the ratio between masters and deck officers holding CoCs issued by EU Member States and those holding CoCs issued by non-EU countries was 64% to 36%, it changed significantly for masters and officers entitled to serve on board ships limited in gross tonnage or area of navigation where more than 95% were holders of CoCs issued by EU Member States. In the case of those officers entitled to serve as OOW the ratio was 38% to 62%. This is presented in Figure 2-43.

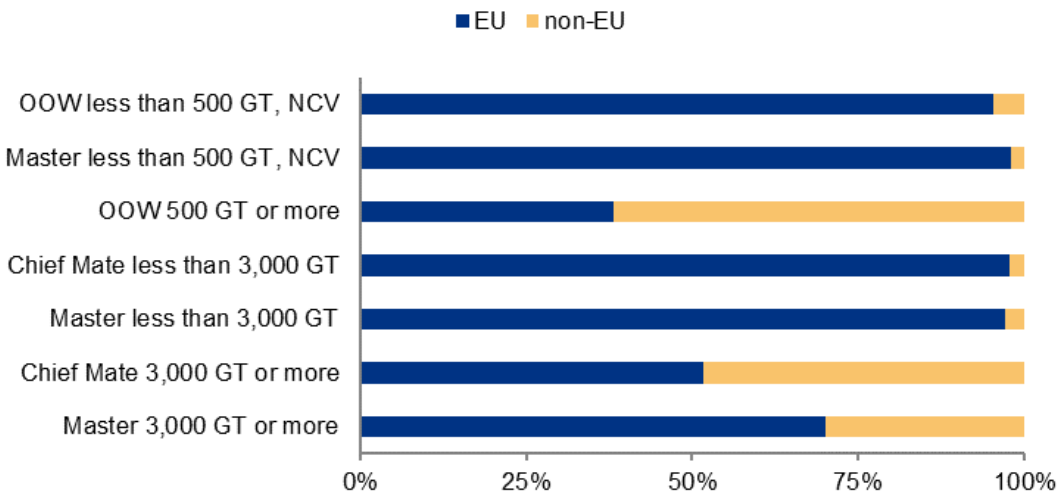

Figure 2-43 Distribution of masters and deck officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC and by deck capacity

2.3.3.2 Distribution by engine capacity

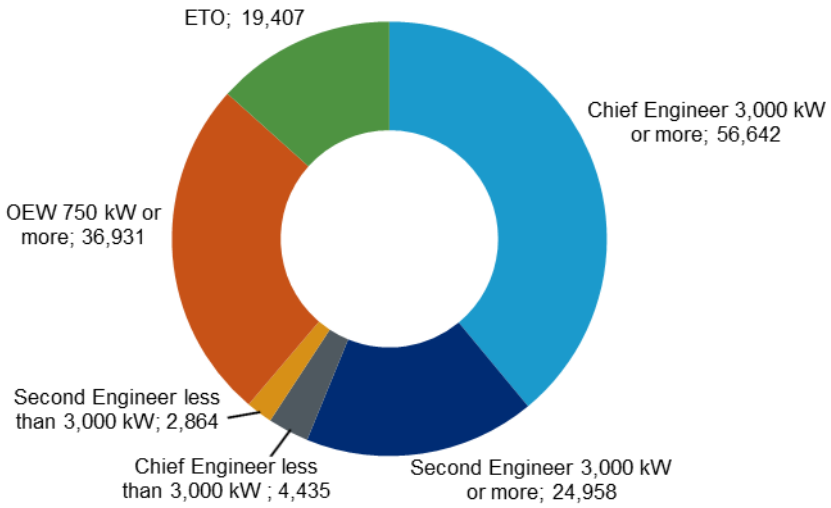

Figure 2-44 Distribution of engineer officers available to serve on board EU Member State flagged vessels by engine capacity

The information in Figure 2-44 shows that 56.46% (81,600) of the engineer officers were entitled to serve at management level on ships powered by main propulsion machinery of 3,000 kW propulsion power or more.

Although the ratio between engineer officers holding CoCs issued by EU Member States and those holding CoCs issued by non-EU countries was 55% to 45%, it changed significantly for officers entitled to serve on board ships limited in propulsion power where more than 77% were holders of CoCs issued by EU Member States. In the case of those officers entitled to serve as OEW the ratio was 44% to 56%. This is illustrated in Figure 2-45.

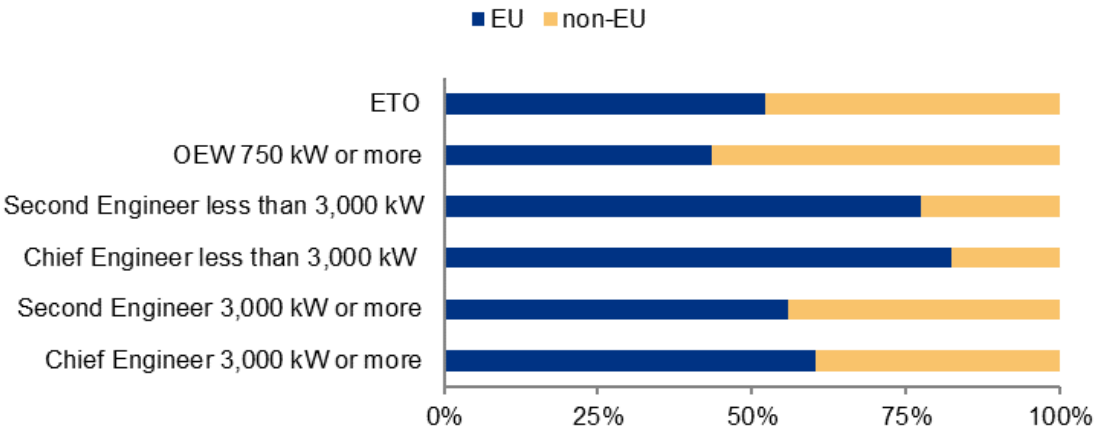

Figure 2-45 Distribution of engineer officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC and by engine capacity

2.3.4 Gender distribution

The information on gender was made available for 301,976 masters and officers representing 95.19% of the total number of those available to serve on board EU Member State flagged vessels.

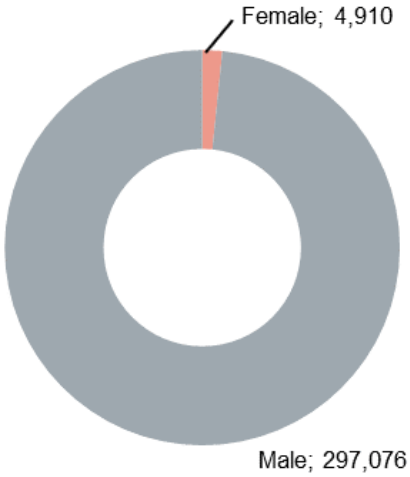

Figure 2-46 Gender distribution of masters and officers available to serve on board EU Member State flagged vessels

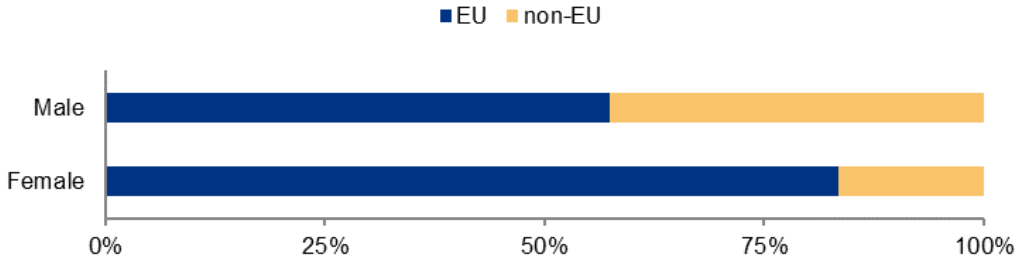

Figure 2-47 Distribution of masters and officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC and by gender

Masters and officers whose gender was known were predominantly males. Female masters and officers represented 1.63% of the total number of officers available, with 83.38% of them holding CoCs issued by EU Member States.

Within the total number of masters and officers holding valid CoCs issued by EU Member States and available to serve on board EU Member State flagged vessels, female masters and officers represented 2.35% of their total, while for CoCs issued by non-EU countries they represented 0.64% of their total.

2.3.5 Distribution by nationality

The information on nationality was made available for 301,134 masters and officers, representing 94.92% of the total number of officers available to serve on board EU Member State flagged vessels. It also showed that the masters and officers were nationals of 140 countries, with the distribution by region[11] as presented in Figure 2-48.

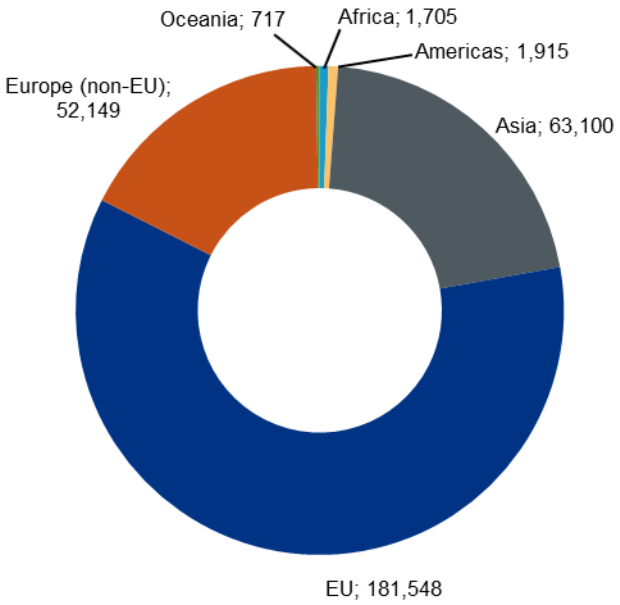

Figure 2-48 Nationality distribution of masters and officers available to serve on board EU Member State flagged vessels by geographical region according to nationality

[11] The grouping of countries per region was based on the “Standard country or area codes for statistical use” established by the United Nations and the list of European countries established by the EU

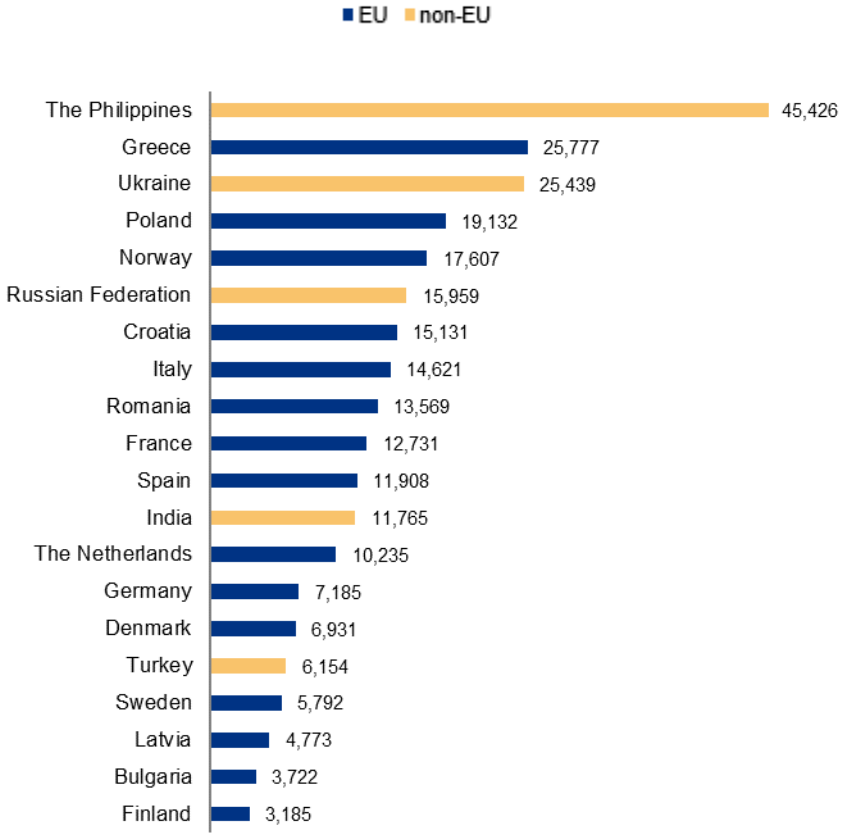

Figure 2-49 Countries whose nationals represented more than 0.75% of the total number of masters and officers available to serve on board EU Member State flagged vessels

The data in Figure 2-49 identifies the 20 countries whose nationals represented 87.33% of the total number of masters and officers available to serve on board EU Member State flagged vessels.

2.3.6 Age distribution

The average age of all masters and officers available to serve on board EU Member State flagged vessels was 42.9 years. The average age of masters and officers holding CoCs issued by EU Member States was 44.3 years, while for those holding original CoCs issued by non-EU countries, it was 40.9 years.

The age profile, per country issuing the original CoC, grouped under EU or non-EU in Figure 2-50, shows that those holding EU CoCs were more evenly distributed throughout the age groups than those holding non-EU CoCs.

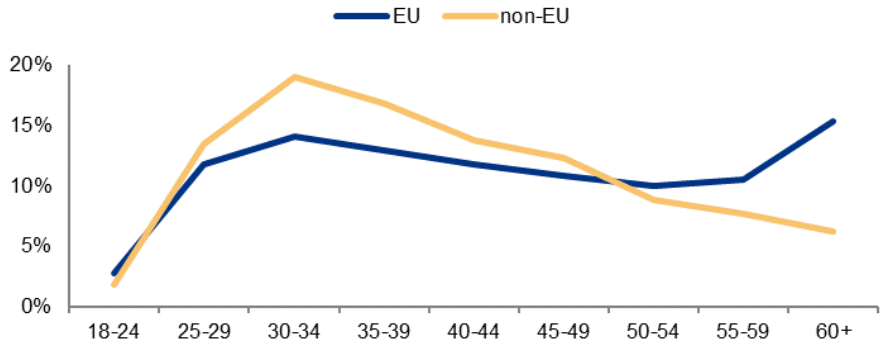

Figure 2-50 Age profile of masters and officers available to serve on board EU Member State flagged vessels per EU and non-EU countries issuing the original CoC

The highest average age was identified for Masters and for Chief Engineers, as presented in Figure 2-51.

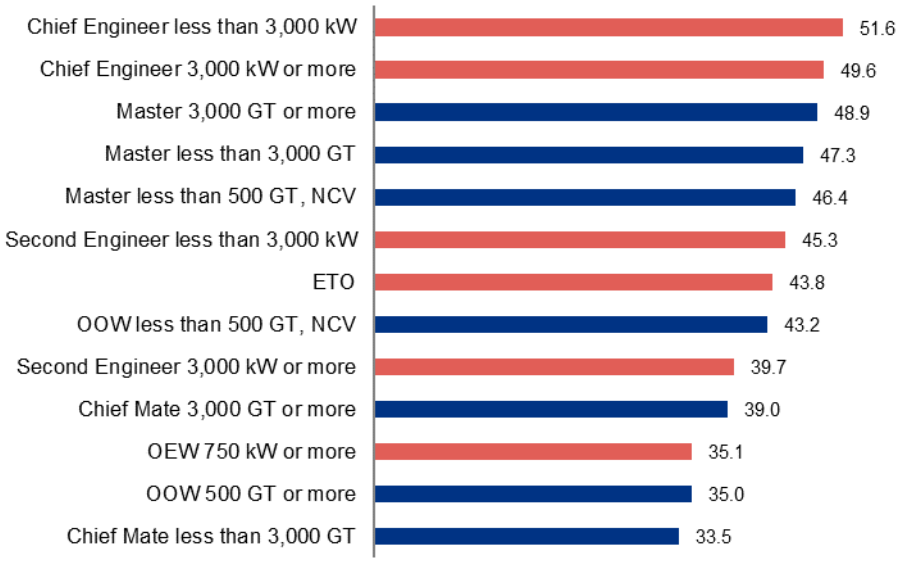

Figure 2-51 Average age of masters and officers available to serve on board EU Member State flagged vessels per deck and engine capacities

A variation ranging between 0.1 and 2.5 years in the average age was noticed for all those holding CoCs entitled to serve on ships of 3,000 GT/kW or more, either at management or operational level, issued by EU Member States and non-EU countries. In all of those, with the exception of the OEWs and Second Engineers, the highest average age was found in holders of CoCs issued by EU Member States.

2.4 Ratings holding valid certificates of proficiency in 2020

The data presented below is based on the information provided on certificates of proficiency (CoP) issued to ratings under regulations II/4, II/5, III/4, III/5, III/7 and VII/2 of the STCW Convention. The submission of this data is not mandatory under Directive 2008/106/EC but was voluntarily provided by 16[12] EU Member States.

2.4.1 Total

The total number of ratings holding valid CoPs in 2020 in the 16 EU Member States reporting such data was 74,813 with 6% of them entitled to serve in both the Deck and the Engine Departments.

2.4.2 Distribution by EU Member State

The distribution of the number of ratings holding valid CoPs by EU Member State is presented in Figure 2-52.

[12] The 16 EU Member States that voluntarily provided data on ratings are listed in figure 2-52.

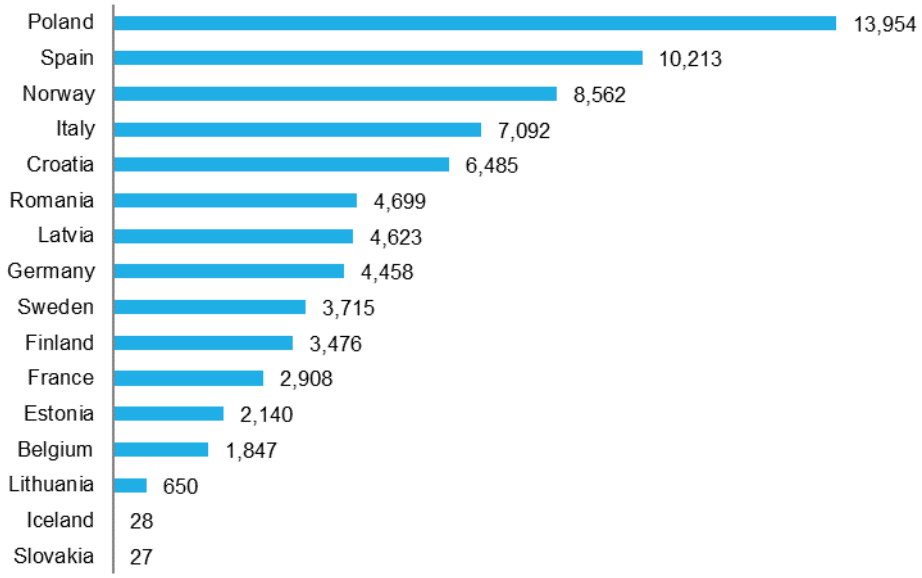

Figure 2-52 Ratings holding valid CoPs per EU Member State

2.4.3 Distribution by department

The distribution by department on which the ratings were entitled to serve is presented in Figure 2-53. It shows that the number of ratings entitled to serve in the Deck Department (Chapter II of the STCW Convention) was 84.03% higher than the number of ratings entitled to serve in the Engine Department (Chapter III of the STCW Convention). It also shows that 5.06% of them were qualified under Chapter VII, Alternative Certification, of the STCW Convention.

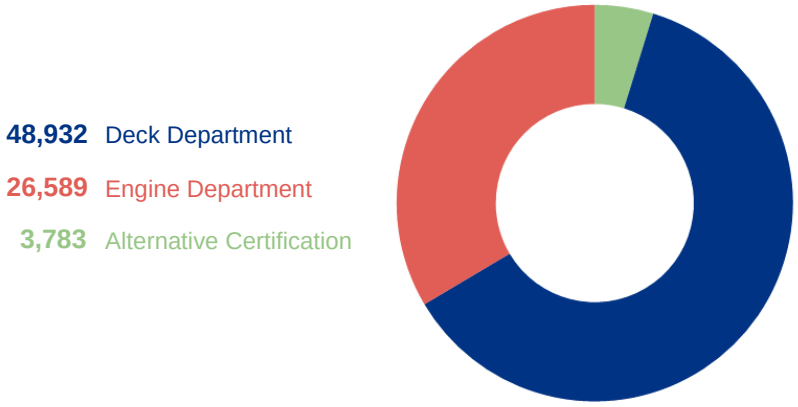

Figure 2-53 Distribution of ratings holding valid CoPs by department

2.4.4 Distribution by capacity

The distribution of ratings by capacity is illustrated in Table 2-22 of Appendix C. Taking into account that EU Member States do not use the same terms to refer to capacities in their manning regulations, all capacities reported in the CoPs have been linked to the generic capacities established in Chapters II and III of the STCW Convention, in order to establish a common platform for data comparability. The review was conducted separately for the Deck and the Engine Departments, even if compiled in Figure 2-54. The total number of deck and engineer ratings was established by counting each person per department.

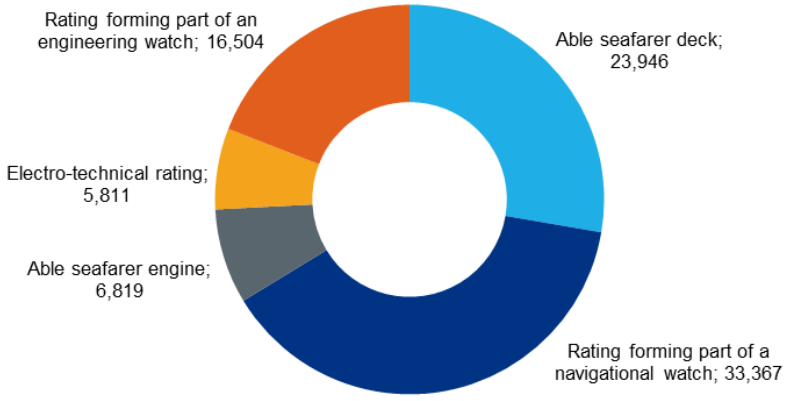

Figure 2-54 Distribution of ratings holding valid CoPs by capacity

The information shows that the majority of ratings either of deck or engine were entitled to serve as ratings forming part of a watch, being 68.19% for deck and 62.07% for engine.

2.4.5 Gender distribution

The information on gender was made available for 61,602 ratings representing 82.34% of the total number of the ratings reported as holding valid CoPs.

The information shows that the ratings holding valid CoPs were predominantly male. Considering the data provided as a sample of the total number of ratings at EU level, it can be stated with a level of confidence of 99% that the percentage of female ratings was 3.37% ± 0.22%.

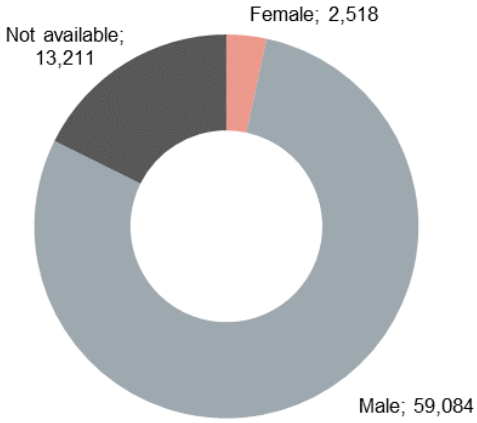

Figure 2-55 Gender distribution of ratings holding valid CoPs

2.4.6 Distribution by nationality

The review of the data showed that, except for 8.91% where nationality was not available, ratings holding valid CoPs were nationals from 102 countries (28 EU Member States and 74 non-EU countries). The review also showed that 88.47% of the ratings were nationals of the same EU Member State providing the data (see section 2.4.2).

2.4.7 Age distribution

The average age of ratings holding valid CoPs was 41.2 years. Except for the age groups 25-34 and 60+, all other groups registered similar distributions between 9.05% and 9.98%. The average age for female ratings was 33.1

years, while that for male ratings was 41.8 years. 77.01% of all female ratings were younger than 40 years of age while the percentage of male ratings in the same age group was 47.63%.

The age profile of ratings per gender is presented in Figure 2-57.

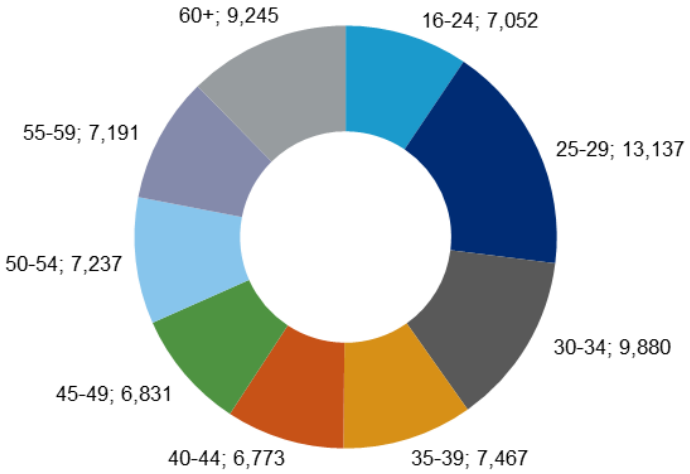

Figure 2-56 Age distribution of ratings holding valid CoPs

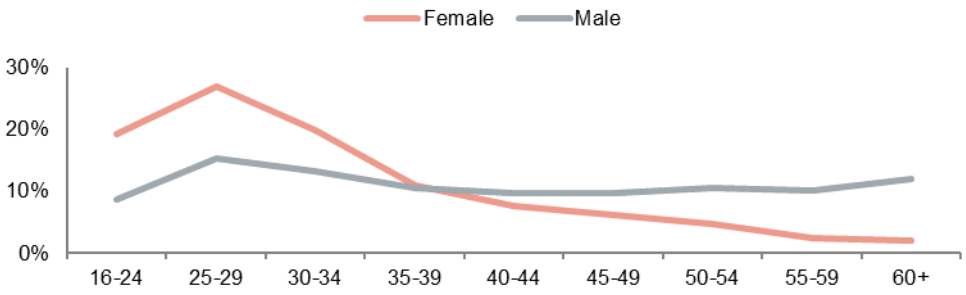

Figure 2-57 Age profile of ratings holding valid CoPs per gender

2.5 Masters and officers - summary overview 2014-2020

This section presents a compilation of the data received during the last seven years and until 2020, with the objective of providing a wide picture on the number of masters and officers available to serve on board EU Member State flagged vessels. As previously mentioned, some elements applied to treat and/or analyse the data were continuously improved or had to be adjusted to new realities, such as the inclusion of data received from EFTA countries since 2017 or the withdrawal of the United Kingdom from the EU in 2020. The analysis in this section takes into account such changes in an effort to provide the most accurate view possible and makes forecasts using linear regression and exponential triple smoothing (ETS) algorithm methods[13]. Related values calculated can be found in Appendix D.

In the following sub-sections, the clustered horizontal bar graphs just include five years' data for a better clarity of the said graphs. All others will include all the years available.

The inclusion of data received from Iceland and Norway as from 2017 was a positive development and an important contribution to a more robust consolidated data set. Nevertheless, the comparative analysis presented in the graphs concerning the countries issuing the original CoCs and the masters' and officers' nationalities, does not include data

[13] The linear regression method is suited for small and simple data sets that do not have enough historical data. The Exponential Triple Smoothing (ETS) algorithm is best suited for non-linear data models by smoothing out minor deviations in past data trends, detecting seasonality patterns and establishing confidence intervals (in this case, a level of confidence of 95% was used).

received from Iceland and Norway until five years' data is collected from these two countries (which will occur in next year's report), to ensure solidity and consistence of the figures.

The last sub-section under this chapter intendeds to provide a view of the Brexit impact on the availability of masters and officers to serve on board EU Member State flagged vessels.

2.5.1 Countries issuing the original CoCs

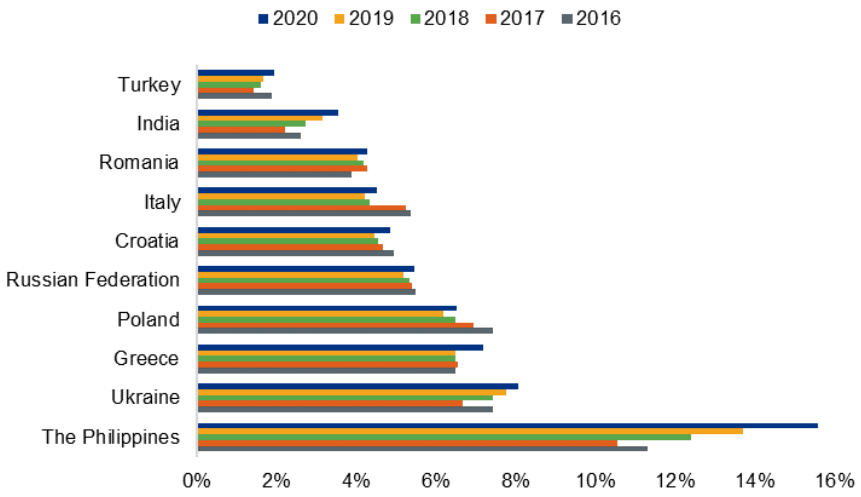

Figure 2-58 Top 5 EU and top 5 non-EU countries issuing the original CoCs

The five non-EU countries (India, the Russian Federation, the Philippines, Turkey and Ukraine) which had more masters and officers having their CoCs recognised by EU Member States (see Figure 2-58 above) have retained the top spots throughout the last seven years. The total percentage of these masters and officers among those available to serve on board EU Member State flagged vessels has varied, over the years, between 26% (in 2017) and 35% (in 2020).

For EU countries, the situation has been more fluid, with the top five spots being occupied by different countries over recent years. Figure 2-58 features the five EU Member States that occupied the top ranking in 2020. It is to be noted that Greece has replaced the United Kingdom, which, in all previous years had occupied the first spot. Also, upon introduction of its data, Norway immediately ranked in this list. Nevertheless, as explained above (see the introduction of section 2.5), its data is not being included yet.

Figure 2-59 below presents the forecast for the coming years in relation to the percentage of masters and officers holding CoCs issued by the top 3 EU and the top 3 non-EU countries. In terms of linear forecast and similarly to what was previously estimated, a slight decrease regarding Poland and an increase for Greece continues to be suggested. As regards Croatia, which entered in this top 3 ranking once the United Kingdom left the Union, it can be observed that it has remained broadly unchanged throughout the years and it is expected to continue as such.

As regards the non-EU countries, the percentage of masters and officers holding CoCs issued by the Russian Federation and by Ukraine has remained broadly unchanged. Based on this trend, estimates for the coming years do not foresee any significant change in this respect. However, the current conflict in Ukraine may lead to possible deviations from these estimations. Factors like difficulties with seafarer repatriation (and disembarkation) and with certificate renewal and related training could possibly affect seafarer availability and recruitment by shipowners. Nevertheless, this picture will surface only when data from 2022 is received and analysed in future reports.

Regarding those holding CoCs issued by the Philippines, their percentage of masters and officers available to serve on board EU Member State flagged vessels increased in the last three years and a slight growth is also foreseen for the coming years.

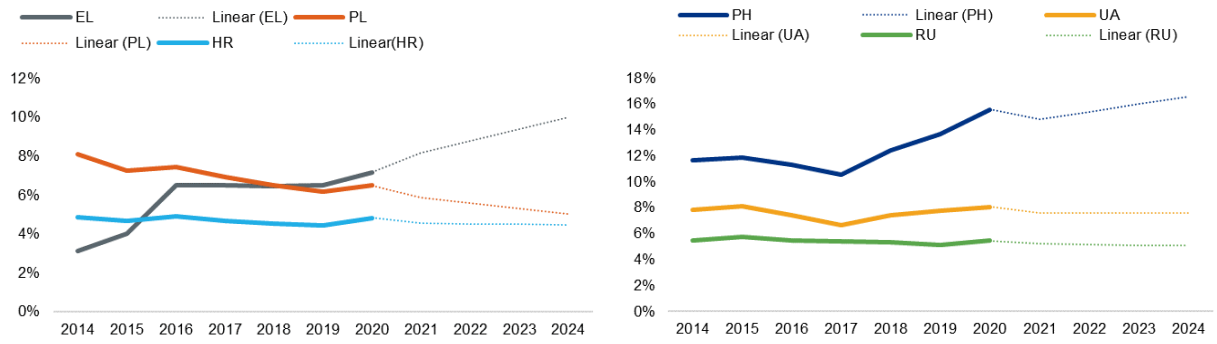

Figure 2-59 Overview with forecast for the next years of masters and officers holding CoCs issued by the top 3 EU and top 3 non-EU countries

In Figure 2-58 and Figure 2-59 above, the increase in percentages observed in 2020 for all countries when compared with previous years, may prima facie be interpreted as an effective growth in the number of masters and officers holding CoCs issued by those countries. This conclusion however does not take into account that in 2020, the magnitude and composition of the population against which such percentages are calculated was significantly affected by the exclusion of the CoCs and Endorsements issued by the United Kingdom. To this effect, the movements in 2020 need to be interpreted in this light, while related forecasts and underlying assumptions would need to be tested and confirmed in the coming years in order to resume consistency in trends.

2.5.2 Department - level of responsibility

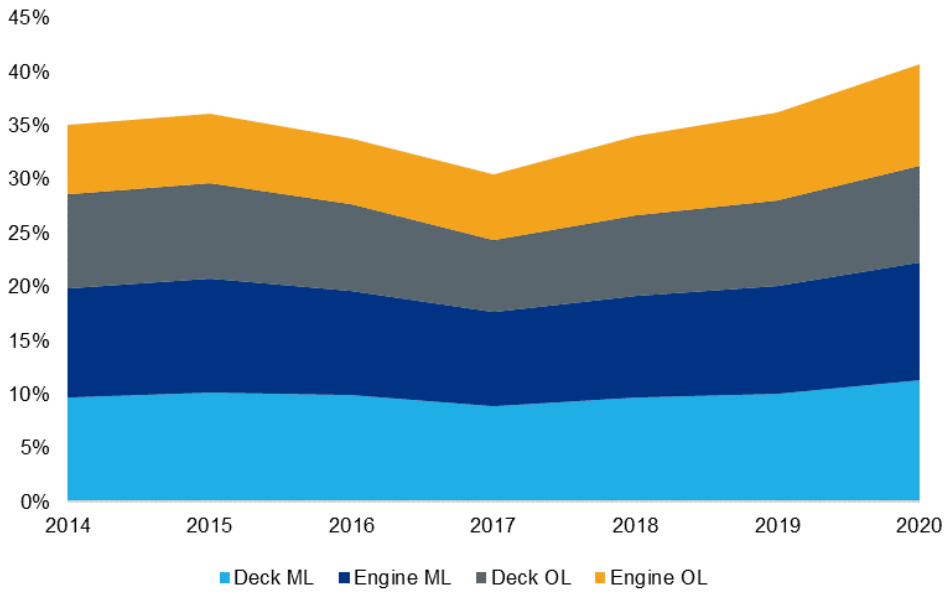

Figure 2-60 Officers at management and operational level holding CoCs issued by non-EU countries

The total percentage of masters and officers holding CoCs issued by non-EU countries recognised by EU Member States increased when compared with the values of the previous three years. Moreover, an analysis of these figures per department and level of responsibility indicates that the percentages in both departments and levels of responsibility slightly increased. For 2020, one must keep in mind the considerations already mentioned above in relation to how United Kingdom (see section 2.5.1) data affected population size and distribution. In this case, the addition of EaRs issued to UK CoCs to the non-EU masters and officers' numbers may be one of the factors contributing to the growth on the number of masters and officers holding CoCs issued by non-EU countries recognised by EU Member States.

As regards the percentage of masters and officers available to serve on board EU Member State flagged vessels, **Error! Reference source not found.** below shows that, similarly to what was estimated in the last two years, a slight increase is still expected for officers entitled to serve in the engine department at operational level.

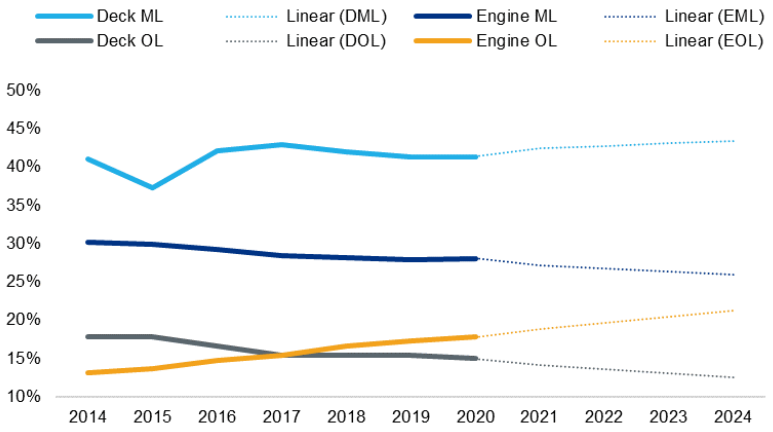

Figure 2-61 Overview with forecast for the next years of officers at management and operational level available to serve on board EU Member State flagged vessels

2.5.3 Female officers

As presented in Figure 2-62 below, the majority of female officers continues to be made up of those who hold CoCs issued by EU Member States entitling them to work in the deck department.

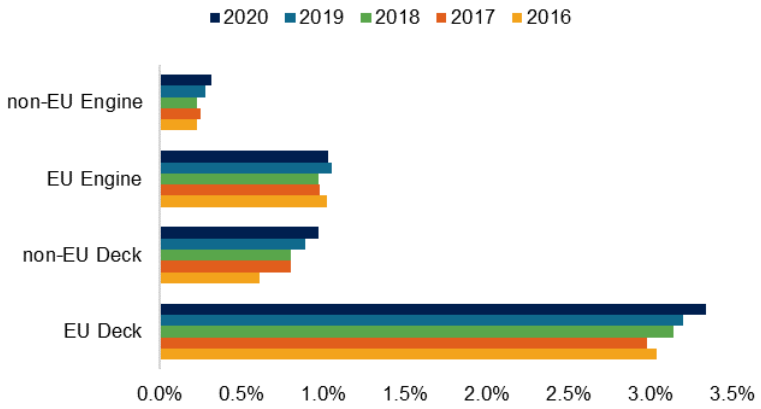

Figure 2-62 Female officers per department holding CoCs issued by EU and non-EU countries

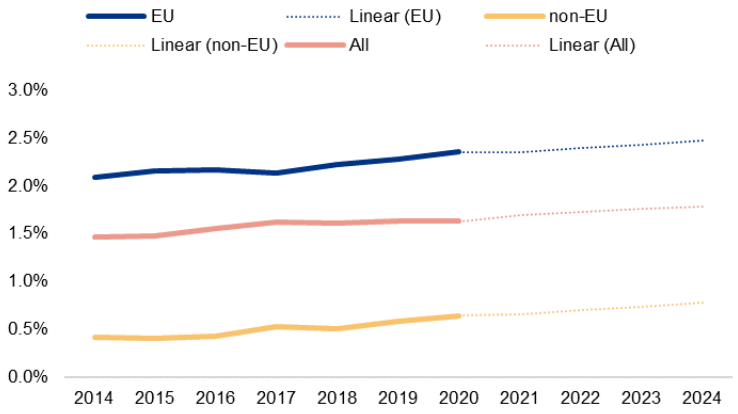

Figure 2-63 Overview with forecast for the next years of female officers available to serve on board EU Member State flagged vessels

As illustrated in Figure 2-63, the percentage of female officers globally (EU and non-EU) is expected to continue increasing in the coming years. However, it continues to be unlikely that globally females will reach the 2% of the total number of masters and officers already available to serve on board EU Member State flagged vessels; this percentage denotes the proportion of female participation currently achieved in the EU as indicated in the said Figure.

2.5.4 Nationality

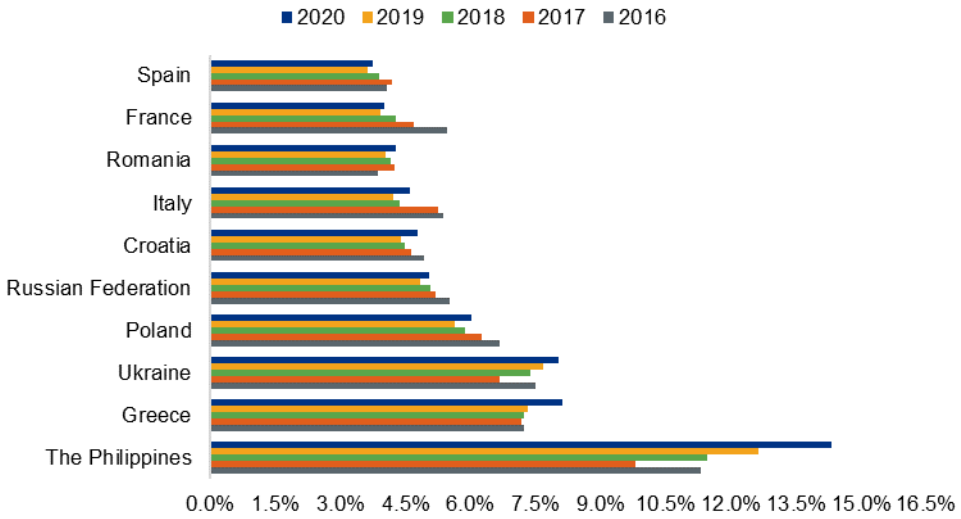

Figure 2-64 Top 10 nationalities of masters and officers available to serve on board EU member State flagged vessels

The 10 nationalities which had more masters and officers available to serve on board EU Member State flagged vessels have remained broadly the same for the past years. The exception in 2020 was the re-inclusion of France and Spain in this top ten instead of the United Kingdom and India that had always formed part of the list. It should be noted that Norway would have featured in this list since 2018 had its data been included for the purpose of this review (see the introduction of section 2.5).

Figure 2-65 below continues to indicate that nationals from EU Member States will potentially increase and that the Philippines will continue to be the country from where there will be more nationals among the masters and officers available to serve on board EU Member State flagged vessels.

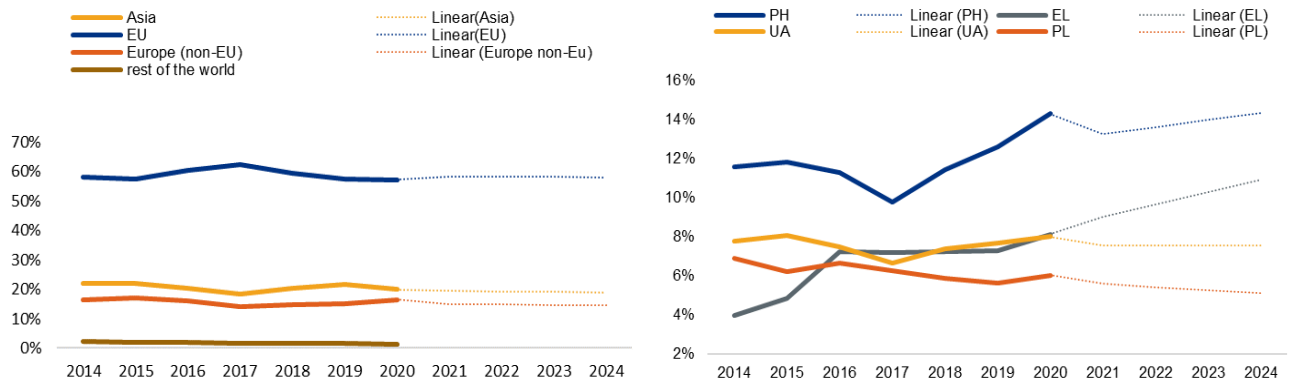

Figure 2-65 Overview with forecast for the next years of the nationalities of masters and officers available to serve on board EU Member State flagged vessels

Once more, in Figure 2-58 and Figure 2-59 above, the increase in percentage observed in 2020 for all countries when compared with previous years, may create an erroneous understanding of the real growth of nationals from those countries due to the exclusion of the United Kingdom from the 2020 data (see section 2.5.1).

2.5.5 Age

The average age of masters and officers available to serve on board EU Member State flagged vessels has remained stable throughout the years and this prospects to continue, without any indication of an increase in the coming years. Along the years, the variation in the average age has not reached more than a one year difference, only registered for masters and officers holding non-EU CoCs between 2017 and 2020.

Figure 2-67 suggests that, as already foreseen in the last two years, there is no indication that the average age of masters and officers holding CoCs at management level, either issued by EU or non-EU countries will increase. This may suggest that younger officers of a lower rank are progressing in the seafaring career. However, for officers holding CoCs at operational level indications persist that the average age will continue to slightly increase.

Considering this continuous indication of increase in the average age of the officers holding CoCs at operational level, it might be interesting to further explore what are the possible reasons for this. For instance, whether this might be an indication that the candidates for the issue of their first CoC take longer to fulfil the requirements for certification or, if already certified, follow a longer path to a management level CoC. This could be an area for further research and analysis in the future.

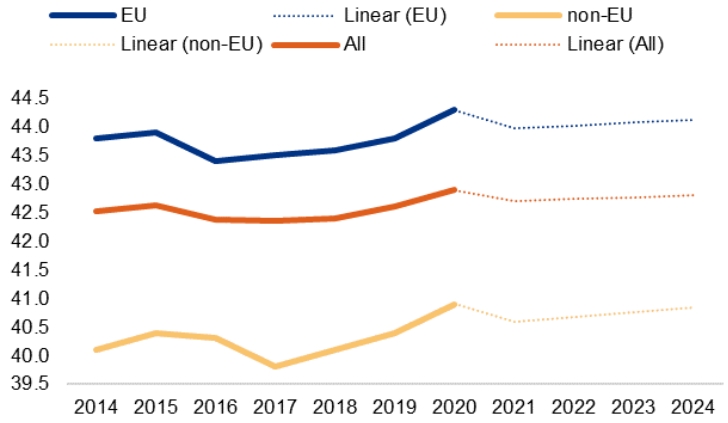

Figure 2-66 Overview with forecast for the next years concerning the average age of masters and officers available to serve on board EU Member State flagged vessels

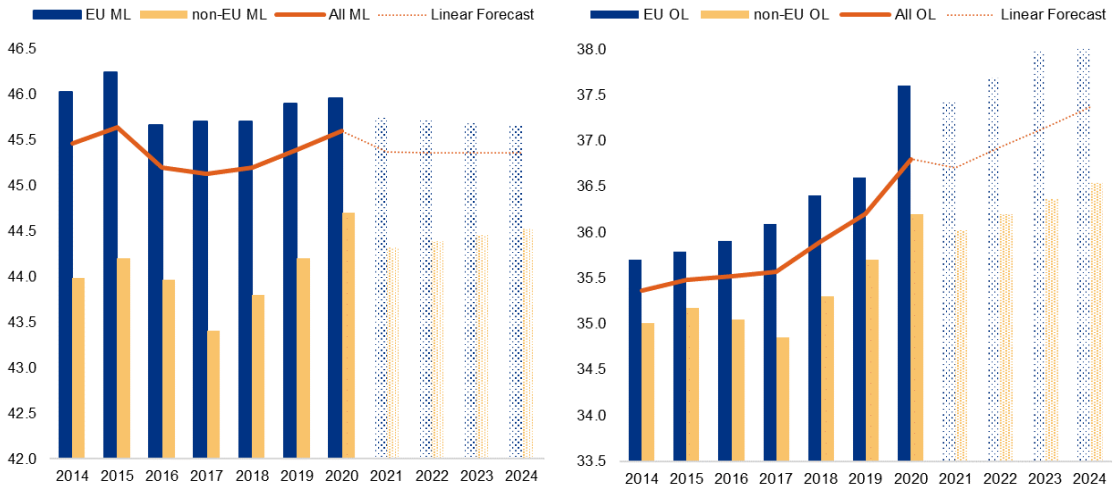

Figure 2-67 Overview with forecast for the next years concerning the average age of officers at management and operational level available to serve on board EU Member State flagged vessels

2.5.6 Brexit impact on the availability of masters and officers to serve on board EU Member State flagged vessels

The statistical reviews presented for the years 2014 to 2019 included data extracted from certificates and endorsements registered by the United Kingdom as an EU Member State. However, due to the withdrawal of the United Kingdom from the EU in 2020, its data is not considered in this context anymore for the purpose of this analysis. Instead, as from 2020, seafarers holding UK CoCs are considered as non-EU seafarers who can only serve on board EU Member State flagged vessels provided their certificates are recognised through an endorsement by the concerned EU Member State.

Until 2019, the United Kingdom had always been the EU Member State with the highest number of masters and officers holding valid CoCs (an average of 30,000 master and officers per year, representing around 15% of the total number of those holding CoCs at EU level). In addition, over the years, the United Kingdom was always included in the top ten countries issuing endorsements attesting the recognition either to EU CoCs or non-EU CoCs (an average of 12,000 masters and officers per year, 50% of which were holders of EU CoCs and other 50% holders of non-EU CoCs. In 2019, represented 6% of the total number of those holding EaRs at EU level).

When comparing the total number of masters and officers holding valid CoCs in 2020 at EU level with the ones in 2019, a decrease of 12% in the number of masters and officers was registered.

As regards the total number of masters and officers holding valid EaRs at EU level, in 2020 no decrease was noted. Instead, a very slight increase was noted (0.13% higher than in 2019). Still, when breaking down such increase by country issuing the original CoC endorsed at EU level and comparing it with the 2019 numbers, it was noted that there was a decrease of 13% in the number of holders of EU CoCs recognised by other EU Member States. Instead, for masters and officers holding endorsements recognising CoCs issued by non-EU countries, an increase in 6% was verified. Half of this swing can be attributed to Brexit, whereby masters and officers holding endorsements attesting the recognition of UK CoCs moved in 2020 from the group of EU issuing countries to the group of the non-EU issuing countries.

When reviewing the number of masters and officers holding endorsements issued by EU Member States attesting the recognition of UK CoCs, it was possible to verify that this remained generally unchanged over the years (an average of around 4,000 per year) with no increase being observed in 2020.

Finally, a look at the wider picture of total number of masters and officers available in 2020 to serve on board EU Member State flagged vessels shows that this decreased by 7% when compared to 2019 equivalents. This being a consequence of Brexit, it should however be seen as a movement parallel to the decrease of around 9% verified in the total number of vessels under EU Member State flags similarly as a consequence of Brexit. These movements will be followed in the coming years.

Nevertheless, the figures in terms of distribution by department, capacity, gender and age remained broadly unchanged except for those related to nationality. Until 2019, the United Kingdom and India were part of the top 10 countries whose nationals were available to serve on board EU flagged vessels. The removal of India from that top list is justified by the fact that the majority of Indian masters and officers held a UK CoC. A number of nationals from other Asian countries also held UK CoCs. When reviewing solely the nationalities of masters and officers holding EU CoCs, it can be observed that during the past six years between 6% and 8% of the holders were nationals of countries located in Asia. However, due to Brexit, in 2020 this percentage was almost reduced to zero as can be verified in Figure 2-68 below.

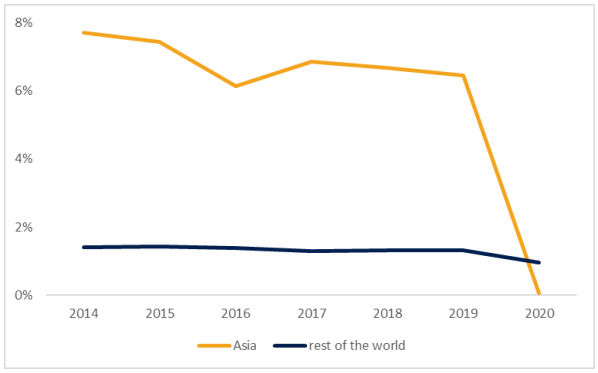

Figure 2-68 Impact on the percentage of non-EU nationals holding EU CoCs

Therefore, apart from the decrease in terms of absolute number of masters and officers available to serve on board EU flagged vessels and a significant decrease in the number of nationalities of those holding CoCs issued by EU Member States, no further impact caused by Brexit was identified.

An analysis of these figures in the coming years, will be a good opportunity to ascertain whether this outcome is sustained or whether other ramifications might emerge.

Appendix A Data on masters and officers holding valid CoCs in 2020

Table 2-1 Distribution of masters and officers by departments and EU Member States

Department	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IS	IT	LT	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK
Alternative certification	0	0	0	0	0	0	0	0	0	1	1342	0	0	0	0	0	0	0	0	1394	0	0	0	0	0	0	0
Deck	1553	35	1606	15	4989	4568	1299	13121	7989	1925	10749	7806	10	876	254	8501	893	3392	96	7788	14509	10813	383	6719	4061	243	45
Engine	727	3690	1426	23	2210	2556	1206	9661	4584	1403	3515	7530	30	468	112	5864	841	3505	6	5184	6903	9820	252	6829	1666	163	48
Total[14]	**2279**	**3725**	**3032**	**38**	**7128**	**7013**	**2504**	**22779**	**12008**	**3308**	**12648**	**15324**	**40**	**1342**	**361**	**14271**	**1733**	**6896**	**102**	**10560**	**21404**	**20629**	**635**	**13542**	**5600**	**403**	**93**

Table 2-2 Masters and deck officers registered by EU Member States

Capacity	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IS	IT	LT	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK
Master 3,000 GT or more	621	11	1195	14	2941	1950	609	4838	1857	1100	1613	3219	2	342	86	3735	201	1281	38	3098	8061	4899	147	2302	1699	106	11
Chief Mate 3,000 GT or more	191	6	347	1	652	131	296	2650	635	215	589	1146	0	207	1	1151	247	779	11	851	1533	2450	83	1703	677	24	2
Master less than 3,000 GT	22	3	7	0	27	414	11	374	2101	9	272	572	4	6	109	657	0	102	2	523	3259	101	21	10	170	34	0
Chief Mate less than 3,000 GT	16	1	0	0	3	336	19	4469	2075	4	292	176	0	16	0	78	22	47	0	2402	273	162	6	23	756	3	0
OOW 500 GT or more	423	12	57	0	668	279	295	530	1321	570	559	1987	4	195	22	2604	410	1089	44	27	338	3138	114	2663	0	76	32
Master less than 500 GT, NCV	233	2	0	0	609	809	60	260	0	17	7301	524	0	109	35	255	6	84	0	660	1045	0	7	18	667	0	0
OOW less than 500 GT, NCV	47	0	0	0	89	649	9	0	0	10	123	182	0	1	1	21	7	10	1	227	0	63	5	0	92	0	0
Total	**1553**	**35**	**1606**	**15**	**4989**	**4568**	**1299**	**13121**	**7989**	**1925**	**10749**	**7806**	**10**	**876**	**254**	**8501**	**893**	**3392**	**96**	**7788**	**14509**	**10813**	**383**	**6719**	**4061**	**243**	**45**

[14] The sum of the rows may not be equal to the total because some officers held CoCs for both Deck and Engine Departments

Table 2-3 Engineer officers registered by EU Member States

Capacity	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IS	IT	LT	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK
Chief Engineer 3,000 kW or more	242	1507	915	11	1531	592	665	3811	1783	669	1474	2315	19	145	90	2690	194	1319	0	2084	4638	4131	107	2201	954	69	7
Second Engineer 3,000 kW or more	67	667	355	0	311	118	255	1298	378	79	599	1200	0	112	2	611	198	786	0	2468	1069	1655	22	1366	317	32	1
Chief Engineer less than 3,000 kW	117	39	0	0	10	188	20	272	1115	48	247	572	2	12	8	397	0	117	0	32	200	225	13	4	8	13	0
Second Engineer less than 3,000 kW	16	19	2	0	0	12	16	415	513	8	110	200	0	43	1	55	16	59	0	584	0	103	6	9	20	8	0
OEW 750 kW or more	285	650	151	0	277	431	149	3372	765	467	1042	1435	1	92	11	1867	278	852	6	16	0	1825	83	1600	367	19	35
Electro-technical Officer	0	808	3	12	81	1215	101	493	30	132	43	1808	8	64	0	244	155	372	0	0	996	1881	21	1649	0	22	5
Total	**727**	**3690**	**1426**	**23**	**2210**	**2556**	**1206**	**9661**	**4584**	**1403**	**3515**	**7530**	**30**	**468**	**112**	**5864**	**841**	**3505**	**6**	**5184**	**6903**	**9820**	**252**	**6829**	**1666**	**163**	**48**

Table 2-4 Distribution of gender groups by EU Member States

Gender	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IS	IT	LT	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK
Female	101	9	21	0	315	215	25	431	703	153	598	48	0	46	5	193	19	43	10	218	475	73	23	123	247	0	1
Male	2178	3716	3011	38	6813	6798	2479	22348	11305	3155	12050	15276	40	1296	356	14078	1714	6853	92	9563	20929	6616	612	13419	5353	403	92
Not available	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	779	0	13940	0	0	0	0	0

Table 2-5 Non-EU nationals holding CoCs issued by EU Member States

Region[15] of Origin	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IS	IT	LT	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	Total
Africa	65	1	2	0	1	7	0	0	32	4	68	40	0	42	0	1	0	0	0	6	0	59	1	0	0	0	1	**330**
Americas	137	0	0	0	1	2	1	0	30	2	6	6	0	4	0	0	0	1	0	21	7	0	1	0	0	0	0	**219**
Asia	7	0	2	0	0	8	0	0	1	1	1	13	0	50	0	0	0	0	0	39	1	8	0	0	0	0	0	**131**
Europe (non-EU)	10	7	3	0	27	109	394	0	17	4	13	39	0	71	1	0	31	373	2	9	11	87	0	28	2	2	0	**1240**
Oceania	0	0	0	0	1	2	0	0	0	0	1	0	0	16	0	0	0	2	0	4	0	1	0	0	0	0	0	**27**
Total	**219**	**8**	**7**	**0**	**30**	**128**	**395**	**0**	**80**	**11**	**89**	**98**	**0**	**183**	**1**	**1**	**31**	**376**	**2**	**79**	**19**	**155**	**2**	**28**	**2**	**2**	**1**	**1947**

[15] The grouping of countries per regions was based on the "Standard country or area codes for statistical use" established by the United Nations and the list of European countries established by the EU

Table 2-6 Age distribution by EU Member States

Age	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IS	IT	LT	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK
age<25	44	16	6	0	83	73	26	1360	178	80	490	247	0	76	4	668	109	125	18	887	450	106	12	106	53	4	0
25≤age<30	403	269	164	0	611	692	176	3958	1160	344	1458	1535	1	207	17	2280	457	803	22	1651	2308	1777	70	1450	445	35	17
30≤age<35	358	424	378	0	1213	851	280	3892	1370	410	1890	2070	1	217	38	2228	338	895	27	1306	2746	2280	85	2621	660	41	22
35≤age<40	303	470	229	1	1023	604	350	3527	1352	440	1890	2153	0	178	41	1579	261	1037	7	1012	2421	2835	80	2002	617	47	22
40≤age<45	204	501	101	1	744	648	229	2679	1835	435	1739	2403	0	162	28	1477	138	867	8	994	2068	2570	74	1764	633	44	6
45≤age<50	226	583	44	3	629	732	263	1786	1738	375	1754	1808	0	152	34	1472	98	800	3	1131	2606	2129	69	1453	627	43	3
50≤age<55	220	505	113	2	663	851	253	1599	1549	339	1528	1478	1	111	56	1333	73	583	1	1151	2479	1658	48	1601	652	38	4
55≤age<60	289	435	548	7	735	903	376	1977	1556	369	1163	1576	10	65	51	1405	103	730	0	1101	2308	2241	56	1200	600	44	8
age≥60	232	522	1449	24	1427	1659	551	2001	1270	516	736	2054	27	174	92	1829	156	1056	16	1327	4018	5033	141	1345	1313	107	11
Total	**2279**	**3725**	**3032**	**38**	**7128**	**7013**	**2504**	**22779**	**12008**	**3308**	**12648**	**15324**	**40**	**1342**	**361**	**14271**	**1733**	**6896**	**102**	**10560**	**21404**	**20629**	**635**	**13542**	**5600**	**403**	**93**

Table 2-7 Age distribution by departments

Department	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Alternative certification	463	1124	558	250	145	88	57	38	14	**2737**
Deck	3655	14163	16560	15081	13539	12081	10967	11564	16544	**114154**
Engine	2291	9609	10908	9938	9214	8820	8199	8500	12712	**80191**
Total[16]	**5221**	**22305**	**26629**	**24471**	**22337**	**20544**	**18875**	**19832**	**29064**	**189278**

[16] The sum of the rows may not be equal to the total because some officers held CoCs for both Deck and Engine Departments

Table 2-8 Age distribution for masters and deck officers

Capacity	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Master 3,000 GT or more	5	459	3115	6073	7219	6658	5642	6675	10116	**45962**
Chief Mate 3,000 GT or more	51	2236	4919	3545	1864	1162	827	793	1181	**16578**
Master less than 3,000 GT	249	1040	791	720	869	999	1183	1142	1816	**8809**
Chief Mate less than 3,000 GT	1736	3883	2152	976	723	495	398	367	449	**11179**
OOW 500 GT or more	1122	5463	4103	2128	1260	891	891	790	807	**17455**
Master less than 500 GT, NCV	377	883	1289	1482	1460	1741	1862	1651	1946	**12691**
OOW less than 500 GT, NCV	115	203	198	163	152	139	174	157	235	**1536**
Total	**3655**	**14163**	**16560**	**15081**	**13539**	**12081**	**10967**	**11564**	**16544**	**114154**

Table 2-9 Age distribution for engineer officers

Capacity	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Chief Engineer 3,000 kW or more	4	400	2024	4017	5122	5230	4788	4944	7625	**34154**
Second Engineer 3,000 kW or more	722	2419	3288	2200	1225	953	914	882	1363	**13966**
Chief Engineer less than 3,000 kW	5	59	184	280	378	484	592	726	950	**3658**
Second Engineer less than 3,000 kW	69	172	270	238	242	262	276	305	381	**2215**
OEW 750 kW or more	1337	5495	3559	1813	1167	765	634	559	747	**16076**
Electro-technical Officer	154	1064	1584	1391	1084	1132	996	1086	1649	**10140**
Total	**2291**	**9609**	**10908**	**9938**	**9214**	**8820**	**8199**	**8500**	**12712**	**80191**

Table 2-10 Age distribution by gender group

Gender	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Female	254	1095	1038	623	423	329	168	90	74	**4094**
Male	4871	19643	24014	22017	20216	18689	17479	18173	25363	**170465**
Not available	96	1567	1577	1831	1698	1526	1228	1569	3627	**14719**
Total	**5221**	**22305**	**26629**	**24471**	**22337**	**20544**	**18875**	**19832**	**29064**	**189278**

Appendix B Data on masters and officers holding valid EaRs in 2020

Table 2-11 EU and non-EU countries issuing the original CoCs per EU Member States issuing the EaRs

Country issuing the original CoC	BE	BG	CY	DE	DK	EE	EL	ES	FI	FR	HR	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK
EU Member State	1544	0	7968	850	2685	158	1253	39	446	842	19	406	25	1241	53	2844	128	20066	2461	3709	16	4777	9	286	40	1
non-EU country	2857	4	23299	2165	6480	51	6718	71	329	1397	0	289	6	2270	135	2813	371	54862	9361	13324	1	12215	0	288	0	0
Not available	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0
Total[17]	**4401**	**4**	**31266**	**3015**	**9165**	**209**	**7971**	**110**	**774**	**2238**	**19**	**695**	**31**	**3506**	**188**	**5657**	**499**	**74926**	**11819**	**17038**	**17**	**16988**	**9**	**574**	**40**	**1**

Table 2-12 EU and non-EU countries issuing the original CoCs per departments

Country issuing the original CoC	Deck Department		Engine Department		Total[18]
	Number	Percentage	Number	Percentage	Number
EU Member State	24710	53.60%	21474	46.58%	46097
non-EU country	63647	49.74%	64344	50.29%	127958
Total[19]	**88340**	**50.76%**	**85803**	**49.31%**	**174021**

Table 2-13 Engineer officers holding EaRs registered by EU Member States

Capacity	BE	BG	CY	DE	DK	EE	EL	ES	FI	FR	HR	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK
Chief Engineer 3,000 kW or more	732	0	6525	492	1488	48	1110	31	151	331	5	141	2	797	35	1095	61	13050	2289	3305	3	3458	1	105	12	1
Second Engineer 3,000 kW or more	417	0	2571	251	719	12	726	6	69	209	3	56	3	376	33	546	40	7019	1028	1365	2	1441	1	22	1	0
Chief Engineer less than 3,000 kW	79	0	4	24	28	11	0	0	6	20	0	15	1	17	10	77	38	557	305	257	0	0	0	2	0	0
Second Engineer less than 3,000 kW	40	0	19	4	18	2	0	3	3	5	0	0	0	99	3	29	8	597	48	114	0	0	0	0	2	0
OEW 750 kW or more	626	0	3984	425	2234	15	1500	26	106	326	1	41	3	553	17	574	37	10837	1352	2367	0	1918	0	83	1	0
Electro-technical Officer	345	0	2276	316	50	5	1352	0	3	274	0	11	0	392	15	383	3	4887	258	1194	0	1384	0	29	0	0
Total	**2237**	**0**	**15374**	**1511**	**4533**	**93**	**4688**	**66**	**338**	**1164**	**9**	**264**	**9**	**2234**	**113**	**2703**	**187**	**36888**	**5279**	**8588**	**5**	**8200**	**2**	**241**	**16**	**1**

[17] The sum of the rows may not be equal to the total because some officers held EaRs recognising original CoCs issued by EU Member States and non-EU countries
[18] The sum of the columns may not be equal to the total because some officers held EaRs for both Deck and Engine Departments
[19] The sum of the rows may not be equal to the total because some officers held EaRs recognising original CoCs issued by EU Member States and non-EU countries

Table 2-14 Master and deck officers holding EaRs registered by EU Member States

Capacity	BE	BG	CY	DE	DK	EE	EL	ES	FI	FR	HR	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK
Master 3,000 GT or more	742	0	6800	121	952	40	675	4	109	193	6	144	2	262	27	1322	129	14177	1560	1948	9	3611	6	154	9	0
Chief Mate 3,000 GT or more	453	0	3299	373	1035	17	863	1	32	303	0	117	11	261	27	672	74	8141	2762	3309	1	2037	1	35	3	0
Master less than 3,000 GT	73	0	37	28	14	8	0	3	12	24	0	29	4	50	4	91	34	365	0	0	0	0	0	0	5	0
Chief Mate less than 3,000 GT	64	0	63	27	30	5	1	3	1	10	0	19	0	15	1	50	10	1153	0	79	1	0	0	0	5	0
OOW 500 GT or more	744	4	5704	954	2470	20	1757	31	244	545	4	123	5	406	16	772	63	13986	2168	3101	1	3154	0	150	0	0
Master less than 500 GT, NCV	90	0	0	5	88	23	0	1	27	5	0	0	1	226	0	50	2	302	35	0	0	0	0	1	5	0
OOW less than 500 GT, NCV	4	0	0	3	46	3	0	1	13	0	0	0	0	57	0	8	0	20	17	41	0	0	0	0	0	0
Total	**2169**	**4**	**15902**	**1510**	**4633**	**116**	**3295**	**44**	**438**	**1080**	**10**	**432**	**23**	**1276**	**75**	**2962**	**312**	**38065**	**6541**	**8454**	**12**	**8799**	**7**	**340**	**27**	**0**

Table 2-15 EU Member States and EFTA countries issuing original CoCs endorsed by other EU Member States

Country issuing the original CoC	EU Member State issuing the EaR																									Total[20]
	BE	BG	CY	DE	DK	EE	EL	ES	FI	FR	HR	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	
Belgium	0	0	51	9	2	0	48	0	0	151	0	0	0	37	0	623	0	145	252	3	0	11	0	1	0	0	**1224**
Bulgaria	205	0	369	25	21	0	40	0	0	48	0	1	0	110	0	68	0	2078	80	103	0	339	0	0	0	0	**3127**
Croatia	472	0	528	56	115	0	35	3	0	72	0	3	1	0	0	765	21	1895	305	626	0	326	0	0	1	0	**4488**
Cyprus	0	0	0	0	0	0	601	0	0	1	0	0	0	0	0	1	0	717	1	0	0	8	0	0	0	0	**1212**
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	7	0	0	0	0	**21**
Denmark*	4	0	54	10	0	3	0	0	1	1	0	0	1	0	4	5	1	66	123	584	0	3	1	50	0	0	**884**
Estonia	7	0	215	19	17	0	1	0	326	3	0	7	0	6	17	11	63	141	167	83	0	164	0	4	0	0	**1108**
Finland	0	0	56	1	19	77	1	0	0	0	0	0	2	0	0	1	6	34	33	118	0	21	3	139	0	0	**477**
France	34	0	42	3	0	0	0	2	1	0	0	0	2	1	0	164	0	233	36	2	0	4	0	0	0	0	**508**
Germany	6	0	154	0	130	23	2	2	1	0	0	0	0	58	0	42	3	346	145	28	1	320	0	3	1	0	**1121**
Greece	5	0	1379	0	2	0	0	0	0	3	0	0	0	1	0	6	0	5446	14	3	0	47	0	1	0	0	**6660**
Hungary	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	11	0	0	0	0	**16**
Iceland	0	0	1	2	16	13	0	0	0	0	0	0	0	0	6	0	1	3	17	73	7	0	0	0	0	0	**139**

[20] The sum of the columns may not be equal to the total because some officers held EaRs issued by different EU Member States

Country issuing the original CoC	EU Member State issuing the EaR																									Total[20]
	BE	BG	CY	DE	DK	EE	EL	ES	FI	FR	HR	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	
Ireland	1	0	39	0	12	0	0	0	2	1	0	0	0	2	0	1	0	36	20	14	0	4	0	1	0	0	**122**
Italy	1	0	71	2	5	0	0	3	1	5	0	0	0	0	0	39	0	679	6	4	0	68	0	0	0	0	**869**
Latvia	50	0	316	31	198	25	6	2	5	97	0	3	1	82	17	33	0	970	268	443	0	247	0	24	0	0	**2457**
Lithuania	44	0	479	44	127	8	0	11	2	12	0	40	11	39	0	132	27	297	308	162	1	356	0	5	0	0	**1662**
Malta	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	**6**
Netherlands	558	0	564	102	70	0	0	1	27	31	8	2	1	0	9	509	2	755	0	52	7	22	2	4	28	0	**2495**
Norway	0	0	138	5	20	0	0	1	15	1	1	0	0	0	0	0	0	192	23	0	0	6	3	25	0	0	**412**
Poland	105	0	2582	475	952	0	15	1	11	80	1	348	5	0	1	202	2	2711	323	972	0	1662	0	19	9	1	**9065**
Portugal	0	0	12	2	8	4	1	1	0	0	0	0	0	0	0	0	0	35	5	46	0	0	0	0	0	0	**114**
Romania	42	0	499	43	504	0	499	2	2	330	2	0	1	895	0	225	0	2982	266	98	0	990	0	7	0	0	**6291**
Slovakia	0	0	6	6	5	0	0	0	0	1	0	0	0	0	0	0	0	14	0	0	0	19	0	1	0	0	**42**
Slovenia	1	0	57	1	1	0	0	9	0	1	7	0	0	5	0	6	1	48	9	3	0	30	0	0	0	0	**145**
Spain	10	0	305	3	20	3	2	0	0	3	0	1	0	5	0	15	0	368	40	32	0	129	0	2	1	0	**886**
Sweden	0	0	52	12	441	5	0	1	52	1	0	1	0	0	0	0	0	74	27	700	0	4	0	0	0	0	**1332**

*Includes Faroe Islands

Table 2-16 Non-EU countries, recognised at EU level or under the process of recognition, issuing original CoCs endorsed by EU Member States

Country issuing the original CoC	EU Member State issuing the EaR																									Total[21]
	BE	BG	CY	DE	DK	EE	EL	ES	FI	FR	HR	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	
Algeria	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
Argentina	94	0	9	0	0	0	0	6	0	0	0	0	0	0	0	62	0	83	0	89	0	1	0	0	0	0	**321**
Australia	6	0	154	2	77	2	2	0	0	1	0	1	1	1	0	45	0	192	16	433	0	45	0	0	0	0	**881**
Azerbaijan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	454	0	0	0	2	0	0	0	0	**459**
Bangladesh	1	0	27	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	**33**
Brazil	0	0	34	1	104	0	7	0	0	3	0	0	0	0	0	12	0	0	3	250	0	25	0	0	0	0	**433**

[21] The sum of the columns may not be equal to the total because some officers held EaRs issued by different EU Member States

Country issuing the original CoC	EU Member State issuing the EaR																									Total[21]
	BE	BG	CY	DE	DK	EE	EL	ES	FI	FR	HR	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	
Canada	2	0	10	0	19	0	1	0	0	1	0	0	0	0	0	1	0	44	9	62	0	2	0	0	0	0	**148**
Cape Verde	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	**10**
Chile	0	0	9	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	1	4	0	0	0	0	0	0	**19**
China	0	0	224	22	187	0	4	0	0	3	0	0	0	0	0	0	0	873	99	500	0	126	0	0	0	0	**1920**
Cote D´Ivoire	0	0	0	0	0	0	0	0	0	67	0	0	0	0	0	41	0	0	0	0	0	0	0	0	0	0	**88**
Cuba	0	0	32	0	64	0	14	39	0	0	0	0	0	2	0	0	0	100	0	0	0	52	0	0	0	0	**273**
Egypt	1	0	213	3	3	0	0	1	0	5	0	0	0	0	0	107	1	516	0	1	0	88	0	0	0	0	**909**
Ethiopia	0	0	19	2	0	0	1	0	0	0	0	0	0	0	0	0	1	21	0	0	0	57	0	0	0	0	**94**
Fiji	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Georgia	5	0	124	0	4	0	94	0	0	2	0	0	0	7	0	0	0	568	0	0	0	40	0	0	0	0	**792**
Ghana	2	0	46	2	4	0	0	0	0	0	0	0	0	0	0	40	0	37	0	9	0	8	0	0	0	0	**139**
Hong Kong	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	0	0	0	**8**
India	403	0	907	0	2225	0	71	0	0	93	0	0	0	485	0	236	0	4459	124	1855	0	890	0	0	0	0	**11231**
Indonesia	7	0	247	0	7	0	8	0	0	17	0	0	0	0	0	66	0	281	371	35	0	129	0	0	0	0	**1101**
Iran, Islamic Republic of	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	**9**
Israel	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	**43**
Jamaica	96	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	2	0	0	0	0	**112**
Japan	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	**10**
Jordan	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	0	0	0	4	0	0	0	0	**174**
Korea, Republic of	0	0	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	424	0	0	0	1	0	0	0	0	**436**
Lebanon	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	82	0	0	0	0	0	0	0	0	**83**
Madagascar	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	48	0	0	0	0	0	0	0	0	0	0	**64**
Malaysia	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	9	0	57	0	31	0	2	0	0	0	0	**124**
Mexico	1	0	22	2	2	0	0	2	0	0	0	0	0	0	0	6	0	0	0	0	0	2	0	0	0	0	**33**
Montenegro	0	0	259	0	3	0	1	0	0	0	0	0	0	0	0	23	0	650	9	52	0	176	0	0	0	0	**1059**
Morocco	0	0	62	0	0	0	0	0	0	18	0	0	0	0	0	6	0	0	0	0	0	2	0	0	0	0	**83**
Myanmar	0	0	86	9	9	0	0	0	0	6	0	0	0	0	0	1	0	539	0	56	0	116	0	0	0	0	**772**

Country issuing the original CoC	EU Member State issuing the EaR																									Total[21]
	BE	BG	CY	DE	DK	EE	EL	ES	FI	FR	HR	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	
New Zealand	5	0	55	1	31	1	0	0	0	1	0	0	0	0	0	8	0	89	65	101	0	11	0	0	0	0	**350**
Nigeria	1	0	6	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**27**
Oman	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Pakistan	0	0	56	0	0	0	3	0	0	0	0	0	0	0	0	0	0	73	0	0	0	12	0	0	0	0	**139**
Panama	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	**6**
Peru	0	0	66	0	0	0	0	10	0	0	0	0	1	0	0	2	0	210	0	5	0	259	0	0	0	0	**517**
Russian Federation	280	0	4329	373	293	33	242	0	24	86	0	177	4	20	114	315	274	6574	2924	1339	0	2185	0	1	0	0	**17313**
Senegal	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	**9**
Serbia	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	**4**
Singapore	8	0	56	0	131	0	0	0	0	4	0	0	0	0	0	16	0	234	11	92	0	52	0	0	0	0	**591**
South Africa	0	0	12	0	51	0	0	0	0	0	0	0	0	0	0	7	0	0	11	3	0	4	0	0	0	0	**87**
Sri Lanka	0	0	110	4	25	0	0	0	0	0	0	0	0	0	0	0	0	358	0	20	0	159	0	0	0	0	**607**
The Philippines	472	1	9359	1171	2038	0	4618	0	278	582	0	4	0	1463	0	748	0	19024	2486	6623	0	2641	0	284	0	0	**49461**
Tunisia	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	12	0	10	0	0	0	0	0	0	0	0	**39**
Turkey	0	0	10	3	12	0	0	0	1	0	0	0	0	0	0	70	0	5855	4	0	0	323	0	0	0	0	**6091**
Ukraine	1358	3	5772	561	515	11	1634	0	11	380	0	10	0	0	20	832	95	11217	2808	809	0	4548	0	0	0	0	**25597**
United Kingdom	107	0	727	9	670	1	17	1	14	32	0	97	0	292	0	87	0	1513	342	496	1	206	0	3	0	0	**4424**
United States	2	0	18	1	14	0	0	0	0	0	0	0	0	0	0	0	0	70	1	23	0	0	0	0	0	0	**129**
Uruguay	0	0	3	0	0	0	0	9	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	**14**
Viet Nam	0	0	145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	77	0	0	35	0	0	0	0	**314**

Table 2-17 Age distribution of holders of EaRs by departments

Department	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Deck	1652	12182	17397	15812	13204	10063	6273	5962	5795	**88340**
Engine	1231	9779	14387	13085	10417	10605	9430	8525	8344	**85803**
Total[22]	**2881**	**21932**	**31757**	**28879**	**23610**	**20657**	**15691**	**14481**	**14133**	**174021**

[22] The sum of the rows may not be equal to the total because some officers held EaRs for both Deck and Engine Departments

Table 2-18 Age distribution for engineer officers holding EaRs

Capacity	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Chief Engineer 3,000 kW or more	2	74	1552	4255	4909	5666	4991	4946	5517	**31912**
Second Engineer 3,000 kW or more	22	937	4150	3560	1912	1608	1287	1039	840	**15355**
Chief Engineer less than 3,000 kW	0	12	99	149	168	196	235	252	297	**1408**
Second Engineer less than 3,000 kW	6	94	211	148	121	97	84	88	129	**978**
OEW 750 kW or more	1018	7773	6682	3177	1828	1819	1385	1026	645	**25353**
Electro-technical Officer	186	1002	1966	2038	1617	1351	1565	1274	999	**11998**
Total	**1231**	**9779**	**14387**	**13085**	**10417**	**10605**	**9430**	**8525**	**8344**	**85803**

Table 2-19 Age distribution for masters and deck officers holding EaRs

Capacity	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Master 3,000 GT or more	4	102	1765	4895	5963	5586	3850	4095	4358	**30618**
Chief Mate 3,000 GT or more	42	1502	6588	5506	3402	2164	1198	890	662	**21954**
Master less than 3,000 GT	0	7	44	98	85	108	134	129	139	**744**
Chief Mate less than 3,000 GT	102	527	404	164	92	66	54	52	58	**1519**
OOW 500 GT or more	1503	10082	8827	5319	3711	2137	997	766	530	**33872**
Master less than 500 GT, NCV	0	42	110	123	138	135	105	91	85	**829**
OOW less than 500 GT, NCV	4	35	45	31	34	14	23	16	11	**213**
Total	**1652**	**12182**	**17397**	**15812**	**13204**	**10063**	**6273**	**5962**	**5795**	**88340**

Table 2-20 Age distribution of officers holding EaRs by gender group

Gender	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Female	95	570	402	175	90	52	22	27	14	**1447**
Male	2786	21284	31282	28607	23444	20533	15622	14395	14070	**172023**
Not available	0	83	82	101	77	74	50	61	52	**580**
Total	**2881**	**21932**	**31757**	**28879**	**23610**	**20657**	**15691**	**14481**	**14133**	**174021**

Table 2-21 Age distribution by region of the country issuing the original CoC

Region[23] of the country issuing the original CoC	age<25	25≤age<30	30≤age<35	35≤age<40	40≤age<45	45≤age<50	50≤age<55	55≤age<60	age≥60	Total
Asia	953	9462	12699	11376	9906	9088	5626	4385	3557	**67052**
EU	463	4737	7439	7368	6055	4885	4345	4683	6122	**46097**
Europe (non-EU)	1426	7068	10502	9388	7117	6285	5322	5003	4040	**56151**
Rest of the World	40	663	1131	764	543	410	410	411	419	**4791**
Total	**2881**	**21929**	**31757**	**28878**	**23609**	**20656**	**15690**	**14479**	**14133**	**174012**

[23] The grouping of countries per regions was based on the "Standard country or area codes for statistical use" established by the United Nations and the list of European countries established by the EU

Appendix C Data on ratings holding valid CoPs in 2020

Table 2-22 Ratings holding CoPs registered by EU Member States

Capacity	BE	DE	EE	ES	FI	FR	HR	IS	IT	LT	LV	NO	PL	RO	SE	SK
Able seafarer deck	0	35	880	1102	727	147	728	5	3402	159	2267	5847	5189	1290	2171	3
Rating forming part of a navigational watch	1319	1847	777	6664	728	1874	3516	10	2425	355	1124	728	9565	1455	971	11
Able seafarer engine	0	15	849	450	423	98	190	2	1181	19	871	950	518	756	498	1
Rating forming part of an engineering watch	385	476	0	4011	558	1183	1650	17	1096	139	622	189	4200	1711	258	11
Electro-technical rating	0	128	72	179	373	173	1492	0	626	20	45	1187	353	991	172	1
Dual-purpose rating (VII)	242	2056	0	0	1485	0	0	0	0	0	0	0	0	0	0	0
Total[24]	**1847**	**4458**	**2140**	**10213**	**3476**	**2908**	**6485**	**28**	**7092**	**650**	**4623**	**8562**	**13954**	**4699**	**3715**	**27**

[24] The sum of the rows may not be equal to the total because some ratings held CoPs for both Deck and Engine Departments

Appendix D Overview – Forecast for 2021 and 2022

Table 2-23 Forecast for the next two years of masters and officers holding CoCs issued by the top 5 EU and top 5 non-EU countries

Forecast -Year[25]	PH	UA	EL	PL	RU	HR	IT	RO	IN	TR
2021										
Linear Forecast	14.81%	7.61%	8.20%	5.86%	5.23%	4.57%	4.62%	4.46%	3.34%	1.58%
ETS Forecast	16.04%	8.07%	7.79%	5.91%	5.10%	4.62%	4.54%	4.38%	3.65%	1.57%
ETS Confidence bound (±)	2.03%	1.00%	1.61%	0.61%	0.29%	0.32%	1.17%	0.45%	0.60%	0.45%
2022										
Linear Forecast	15.40%	7.61%	8.81%	5.58%	5.18%	4.53%	4.64%	4.58%	3.48%	1.53%
ETS Forecast	16.64%	8.07%	8.40%	5.63%	5.30%	4.59%	4.57%	4.50%	3.79%	1.51%
ETS Confidence bound (±)	2.74%	1.00%	2.17%	0.63%	0.29%	0.32%	1.20%	0.56%	0.81%	0.45%

Table 2-24 Forecast for the next two years of officers at management and operational level available to serve on board EU Member State flagged vessels

Forecast -Year[26]	Deck ML	Engine ML	Deck OL	Engine OL
2021				
Linear Forecast	42.40%	27.17%	14.12%	18.80%
ETS Forecast	42.77%	28.10%	14.17%	18.64%
ETS Confidence bound (±)	3.37%	0.56%	0.83%	0.38%
2022				
Linear Forecast	42.72%	26.76%	13.60%	19.63%
ETS Forecast	43.08%	28.17%	13.65%	19.69%
ETS Confidence bound (±)	3.38%	1.20%	0.83%	0.38%

[25] The values presented are the % of master and officers holding CoCs issued by the specific country among the total number of masters and officers available to serve on board EU Member State flagged vessels for the year forecasted
[26] The values presented are the % of officers by department and level of responsibility among the total number of masters and officers available to serve on board EU Member State flagged vessels for the year forecasted

Table 2-25 Forecast for the next two years of female officers available to serve on board EU Member State flagged vessels

Forecast -Year[27]	EU	Non-EU	All
2021			
Linear Forecast	2.35%	0.66%	1.69%
ETS Forecast	2.36%	0.67%	1.66%
ETS Confidence bound (±)	0.07%	0.07%	0.06%
2022			
Linear Forecast	2.39%	0.70%	1.72%
ETS Forecast	2.40%	0.71%	1.70%
ETS Confidence bound (±)	0.07%	0.08%	0.08%

Table 2-26 Forecast for the next two years of the top 10 nationalities of masters and officers available to serve on board EM Member State flagged vessels

Forecast -Year[28]	PH	EL	UA	PL	RU	HR	IT	RO	FR	ES
2021										
Linear Forecast	13.27%	9.04%	7.55%	5.58%	4.74%	4.50%	4.70%	4.47%	3.73%	3.67%
ETS Forecast	14.53%	8.74%	7.70%	5.65%	4.66%	4.55%	4.63%	4.39%	3.65%	3.65%
ETS Confidence bound (±)	2.19%	1.54%	0.93%	0.57%	0.32%	0.31%	1.15%	0.45%	0.66%	0.29%
2022										
Linear Forecast	13.63%	9.66%	7.55%	5.43%	4.61%	4.46%	4.73%	4.59%	3.52%	3.61%
ETS Forecast	14.89%	9.36%	7.70%	5.49%	4.66%	4.51%	4.66%	4.52%	3.44%	3.58%
ETS Confidence bound (±)	2.94%	2.07%	0.93%	0.58%	0.32%	0.31%	1.19%	0.56%	0.66%	0.33%

[27] The values presented are the % of female officers among the total number of masters and officers holding CoCs issued by EU or non-EU countries or available to serve on board EU Member State flagged vessels for the year forecasted

[28] The values presented are the % of master and officers nationals of the specific country among the total number of masters and officers available to serve on board EU Member State flagged vessels for the year forecasted

Table 2-27 Forecast for the next two years of the nationalities by region of origin of masters and officers available to serve on board EM Member State flagged vessels

Forecast -Year[29]	Asia	EU	Europe (non-EU)	rest of the world
2021				
Linear Forecast	19.59%	58.40%	14.98%	1.31%
ETS Forecast	19.85%	57.14%	15.08%	1.28%
ETS Confidence bound (±)	2.42%	3.93%	1.81%	0.14%
2022				
Linear Forecast	19.34%	58.28%	14.80%	1.19%
ETS Forecast	19.60%	57.01%	14.90%	1.16%
ETS Confidence bound (±)	2.43%	5.29%	1.81%	0.14%

Table 2-28 Forecast for the next two years concerning the average age of masters and officers available to serve on board EU Member State flagged vessels

Forecast -Year[30]	EU	Non-EU	All
2021			
Linear Forecast	44.0	40.6	42.7
ETS Forecast	44.3	40.6	42.9
ETS Confidence bound (±)	0.5	0.6	0.3
2022			
Linear Forecast	44.0	40.7	42.7
ETS Forecast	44.4	40.7	43.0
ETS Confidence bound (±)	0.7	0.6	0.4

[29] The values presented are the % of master and officers nationals of countries included in the specific region of origin among the total number of masters and officers available to serve on board EU Member State flagged vessels for the year forecasted
[30] The values presented are the average age of masters and officers among the total number of masters and officers holding CoCs issued by EU or non-EU countries or available to serve on board EU Member State flagged vessels for the year forecasted

Table 2-29 Forecast for the next two years concerning the average age of officers at management and operational level available to serve on board EU Member State flagged countries

Forecast -Year[31]	EU ML	non-EU ML	All ML	EU OL	non-EU OL	All OL
2021						
Linear Forecast	45.8	44.3	45.4	37.4	36.0	36.7
ETS Forecast	45.8	44.7	45.4	37.8	36.3	37.3
ETS Confidence bound (±)	0.4	0.7	0.4	0.6	0.5	0.3
2022						
Linear Forecast	45.7	44.4	45.4	37.7	36.2	36.9
ETS Forecast	45.8	44.8	45.4	38.1	36.5	37.9
ETS Confidence bound (±)	0.4	1.0	0.4	0.8	0.7	0.6

[31] The values presented are the average age of officers by department and level of responsibility among the total number of masters and officers holding CoCs issued by EU or non-EU countries or available to serve on board EU Member State flagged vessels for the year forecasted

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