Seafarers' Statistics in the EU

Statistical review (2021 data from the STCW-IS as provided by 31 December 2022)

EMSA.2021-JB4902
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Executive Summary

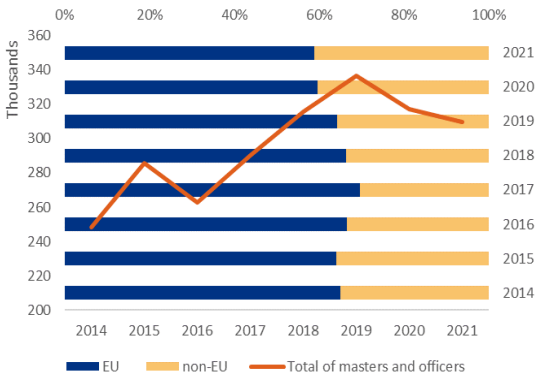
The main objective for gathering information on certificates and endorsements issued to seafarers by the EU Member States is to use it as a primary source of data for statistical analysis in support of the EU Member States, the Commission and the European Parliament in policy making.

It should be stressed that the data and analysis included in this statistical review do not refer to masters and officers actively serving on board ships. This review is based on data extracted from certificates and endorsements registered by EU Member States[1], Iceland and Norway until 31 December 2021. This data, which was transferred and recorded in the STCW Information System (STCW-IS) by 31 December 2022, represents a snapshot of the European labour market in terms of the number of seafarers holding valid certificates and endorsements in 2021.

The data included in the STCW-IS shows that by end-2021, 182,207 masters and officers held valid certificates of competency (CoC) issued by EU Member States[1] while another 127,452 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 2021 saw a little less than 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 2021, by order of magnitude, were Greece, Poland, Norway, Croatia and Italy. In addition, the five EU Member States that had more masters and officers holding EaRs issued, also by order of magnitude, were Malta, Cyprus, Portugal, Norway and the Netherlands. Finally, the five non-EU countries which had more masters and officers holding CoCs recognised by EU Member States were the Philippines, Ukraine, the Russian Federation, India and Turkiye.

From the overview for the period 2014-2021, it can be observed that from 2016 until 2020, 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. This trend was interrupted in 2020 due to Brexit and in 2021 due to the COVID-19 pandemic. Nevertheless, the overall figures remained broadly stable in terms of distribution by country issuing the original CoC, by masters and officers by department, capacity, gender and age.



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. As such, in 2021 and within the EU, there is an indication that over 3,000 officers acquired a CoC as 'OOW 500 GT or more' or 'OEW 750 kW or more' for the first time.

This year, the review contains a brief comparison between the supply of and estimated demand for masters and officers to crew vessels registered under EU Member State flags (see section 2.5.7). Over the years, the number of masters and officers holding valid CoCs issued by EU Member States, has generally been 40% higher than the estimated number of masters and officers crewing the European fleet, indicating that hypothetically, the EU supply of masters and officers could be sufficient to satisfy the demand on said fleet. In reality, a significant number of masters and officers holding CoCs issued by non-EU countries are engaged on board the EU Member States' fleet (even if on their own, they were not sufficient in number to crew the fleet, with the exception of engineer officers holding non-EU CoCs). This suggests that at least some of those holding CoCs issued by EU Member States are either working on board vessels registered under other flags or are working in the maritime industry ashore. Notwithstanding this, caution should be exercised in deriving any conclusion from the results presented. Ideally any conclusion taken shall be confirmed by/compared with any data as may be available, in relation to the employability of seafarers.

[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 (EU) 2022/993 of the European Parliament and of the Council of 8 June 2022 on the minimum level of training of seafarers [3].

Article 27 of Directive (EU) 2022/993, establishes that "the Member States shall communicate the information referred to in Annex III" and 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 2021, and received in the STCW-IS by 31 December 2022. This eighth review presents a snapshot of the number of seafarers holding valid certificates and endorsements in 2021. It should be noted that since the available data – as extracted from the national registers held by EU Member States – did not include any information on whether the certificate holders were active or not, it was not possible to determine how many of them were working on board vessels during 2021.

Since 2020, the actions taken worldwide as a result of the Coronavirus outbreak posed a serious challenge for Administrations to allow the continued training and certification of seafarers in accordance with the STCW Convention. Within this context, IMO provided guidance relating to the certification of seafarers through Circular Letter No.4204/Add.5/Rev.1, of 2 April 2020. According to it, Administrations were "encouraged to take a pragmatic and practical approach with regard to the extension of certificates, including medical certificates and endorsements, as strictly necessary". One of the approaches adopted was for the issuing Administrations to use their prerogative of extension of validity of the certificates and endorsements to seafarers that needed such certification to continue being on board or to embark. This may have affected to some extent the data on certificates included in the national registers held by EU Member States and received in the STCW-IS by not fully mirroring their real status and validity. This factor is mentioned in the sections of the report, whenever deemed relevant and necessary.

It is also to be noted that, having ceased to be an EU Member State following Brexit, since 2020 the United Kingdom had no more the obligation to provide information on its certificates and endorsements issued and consequently, the last data received concerned 2019. Therefore, for the purpose of this report, the United Kingdom is 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.

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 the estimation of market demand 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

[2] EUR-Lex - 02002R1406-20161006 - EN - EUR-Lex (europa.eu)
[3] EUR-Lex - 32022L0993 - EN - EUR-Lex (europa.eu)

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 2021 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 having different genders among different countries, a query was developed to identify and correct these inconsistencies.

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 and comparable, criteria were established and followed throughout all statistical reviews when converting the data during the coding process.

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 (General Interest Public Related Documents - Documents - STCW - emsa.europa.eu) 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, compiled and analysed by EMSA in its encrypted format.

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 III to Directive (EU) 2022/993 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 eight 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 State 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.

Over the years, some elements applied to treat and/or analyse the data were improved or had to be adjusted to new realities. For example, one of the last features to be introduced was the possibility to extract the number of masters and officers holding CoCs issued by EU Member States, which had their data transferred into the STCW-IS for the first time. In the coming years this would allow the opportunity to get a better insight on the profile, even if in a limited way, of those entering the seafaring career in Europe.

In addition, as already mentioned in section 1.2 above, 2021 was an atypical year due to the Coronavirus outbreak which might have distorted the figures for masters and officers holding valid certificates. When considering numbers in the following sections, it should in fact be borne in mind that these figures may not include an indeterminate number of masters and officers whose certificates, despite not having been registered in the STCW-IS as valid during 2021, might have retained their validity as a result of the pragmatic measures taken by the EU Member States when revalidating certificates during the pandemic period. In this regard, Appendix F presents the number of masters and officers holding CoCs and/or EaRs expiring in 2020 that might have been extended; this should be taken into consideration throughout the report.

[4] EUR-Lex - 02002R1406-20161006 - EN - EUR-Lex (europa.eu)
[5] EUR-Lex - 32018R1725 - EN - EUR-Lex (europa.eu)

Nevertheless, given the more realistic view that emerges through the build-up of data collected over the years, increasingly reliable trend analysis and forecasting is possible and is included in this review in section 2.5. This section also includes a brief comparison between the supply (number of masters and officers available to serve on board EU Member State flagged vessels) of and demand for masters and officers (estimated number) to crew the vessels registered under EU Member State flags.

As an anticipation of what will be presented in the following sections, it can be observed that from 2016 until 2020, 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 these numbers in absolute terms was noted. In parallel, a decrease in the cumulative number of vessels under the flags of EU Member States (EU fleet) was also observed. In 2021 this decrease persisted in the wake of the Covid-19 pandemic, as already discussed above. Consequently, this is a topic that warrants further analysis in the coming years.

Figure 2-1 below shows that, 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 26,000 masters and officers between 2019 and 2021.

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 by 10% and remained unchanged in 2021. Half of this increase may be attributed to the inclusion of the United Kingdom in the non-EU countries category. 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 distribution by nationalities following Brexit. In 2020, India and the United Kingdom left the top 10 list of countries with most nationals available to serve as masters and officers on board EU Member State flagged vessels. The drop of India from that top list was mainly due to the fact that most Indian nationals held a UK CoC. In general terms, a certain stability in the European maritime labour market still prevails, suggesting a continued ability of such market to attract new entrants who have replaced those leaving the seafaring career. As such, in 2021 and within the EU, there is an indication that over 3,000 officers acquired a CoC as ‘OOW 500 GT or more’ or ‘OEW 750 kW or more’ for the first time.

The report provides a more detailed analytical snapshot of the individual elements of this overview as of 2021, followed by a summary overview 2014-2021 on the numbers of masters and officers.

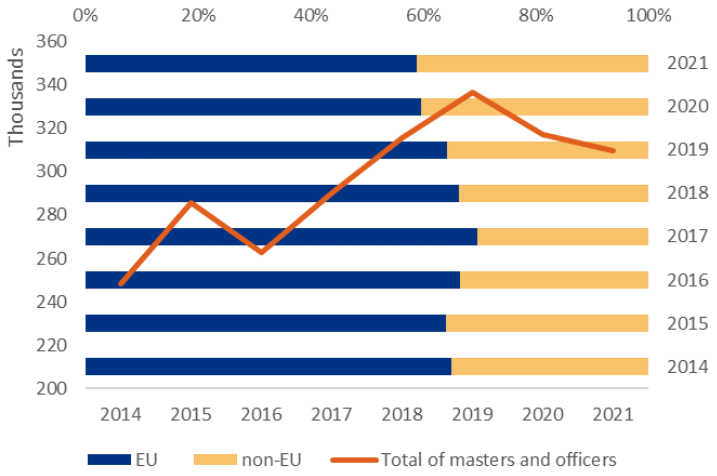

Figure 2-1 Masters and officers available at EU level over the years per country issuing the original CoC

2.1 Masters and officers holding valid certificates of competency in 2021

2.1.1 Total

The total number of masters and officers holding valid CoCs at EU level was 182,207. Of these, 4.29% held CoCs entitling them to serve in both the Deck and Engine Departments. In addition, just a very limited number of them

(0.07%) held CoCs issued by more than one EU Member State. Finally, 3.58% of these masters and officers were identified as having been reported to the STCW-IS for the first time.

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]:

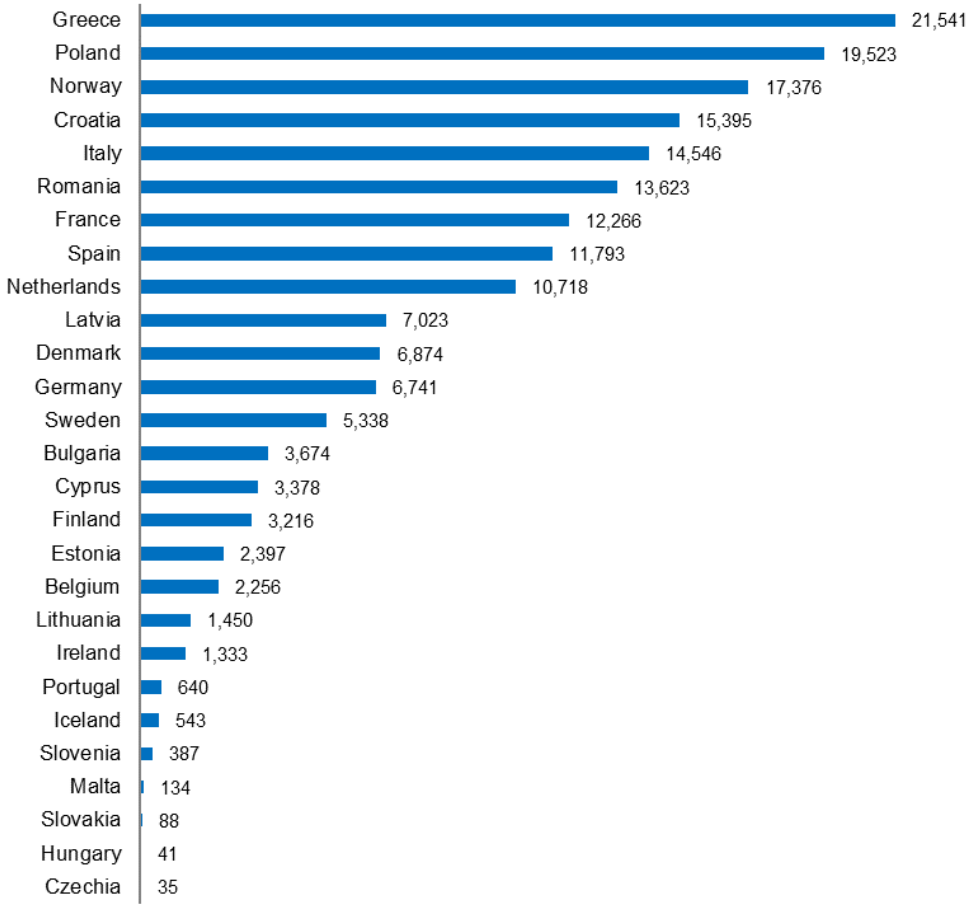

Figure 2-2 Masters and officers holding valid CoCs per EU Member State

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 41% 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.

[6] Luxembourg does not issue CoCs.

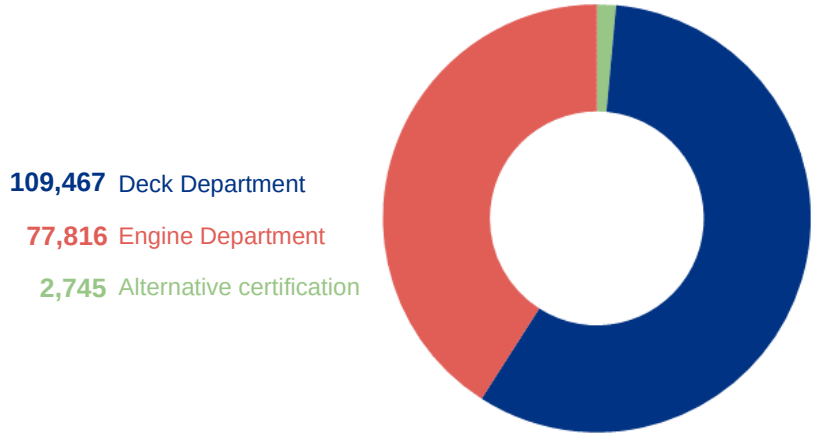

Figure 2-3 Distribution of masters and officers holding valid CoCs by department

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

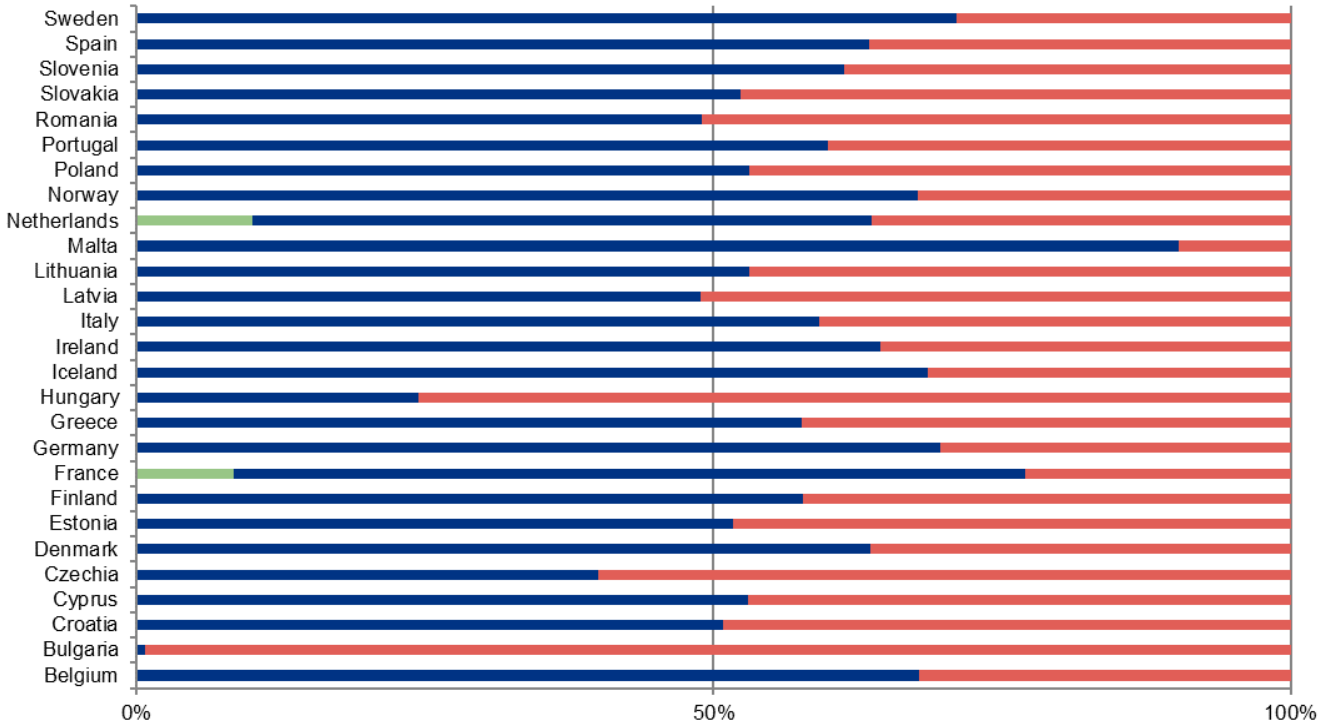

Figure 2-4 Distribution of masters and officers holding valid CoCs by department in each EU Member State

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

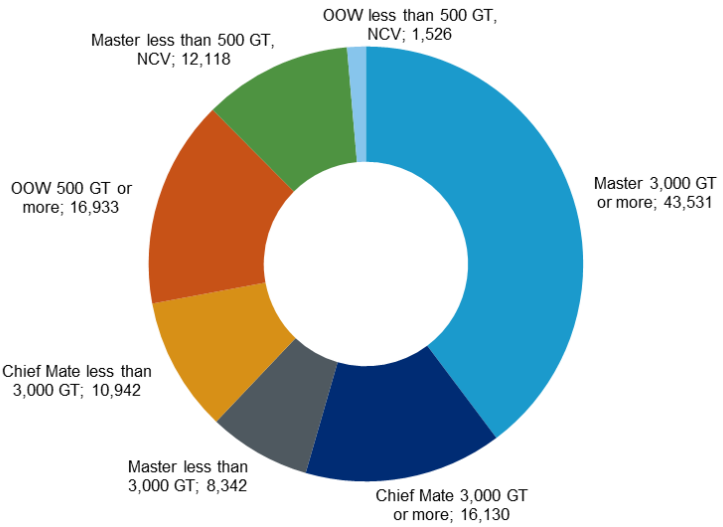

Figure 2-5 Distribution of masters and deck officers holding valid CoCs by deck capacity

The data in Figure 2-5 shows that 54.50% 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 to those already shown in Figure 2-5, the following could be stated:

- Only 3.07% 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 8.71% when analysing just those entitled to serve at management level on ships of less than 3,000 GT; and
- 11.04% of the deck officers were entitled to serve on ships with a limited gross tonnage different to that established in Chapter II of the STCW Convention (different than 500 or 3,000 GT).

In addition, among those entitled to serve as ‘OOW 500 GT or more’, 9.50% of them were identified as having had their data transferred to the STCW-IS for the first time.

2.1.4.2 Distribution by engine capacity

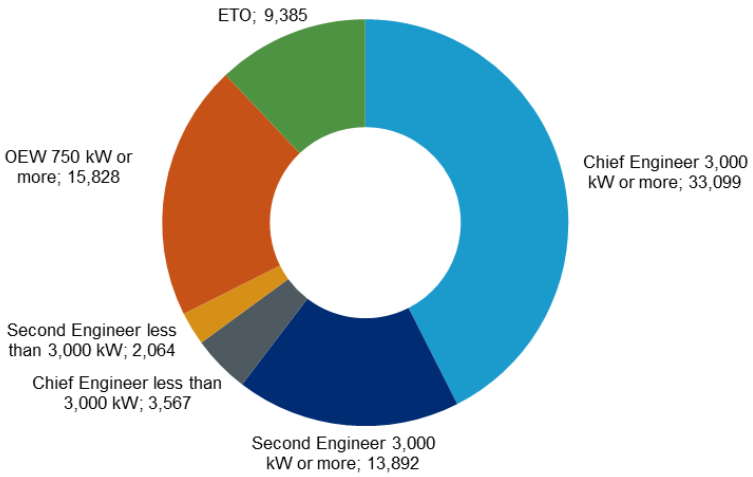

Figure 2-6 Distribution of engineer officers holding valid CoCs by engine capacity

The data in Figure 2-6 shows that 60.39% 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 to those already shown in Figure 2-6, the following could be stated:

- Only 3.91% of the engineer officers were restricted to service in a limited area of navigation. This percentage increased to 10.60% when analysing just those entitled to serve at management level on ships of less than 3,000 kW;
- 24.02% of the engineer officers were restricted to operate a specified type of propulsion machinery installation; and
- 4.23% 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).

In addition, among those entitled to serve as 'OEW 750 kW or more', 11.05% of them were identified as having had their data transferred to the STCW-IS for the first time.

2.1.5 Gender distribution

The information on gender was available for 168,951 masters and officers, representing 92.72% 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 2.40% ± 0.08% compared to 97.60% ± 0.08% of male masters and officers.

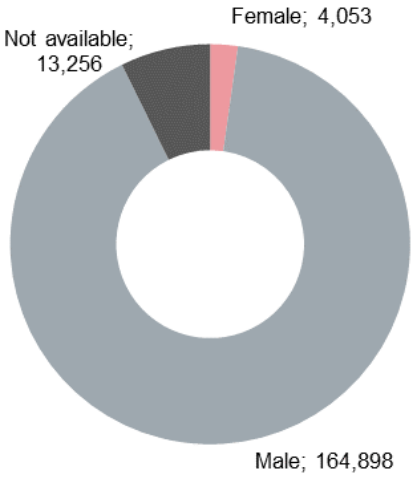

Figure 2-7 Gender distribution of masters and officers holding valid CoCs

The information presented in Figure 2-8 below 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 (86.78%) were entitled to serve in the Deck Department.

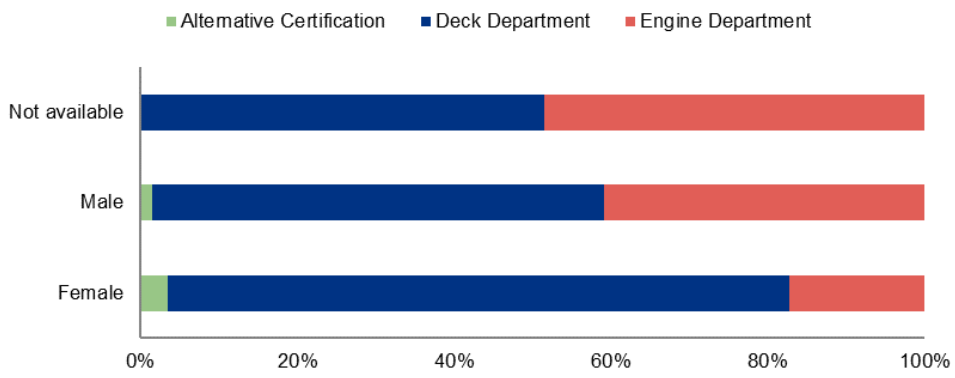

Figure 2-8 Distribution of masters and officers holding valid CoCs by department and by gender

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

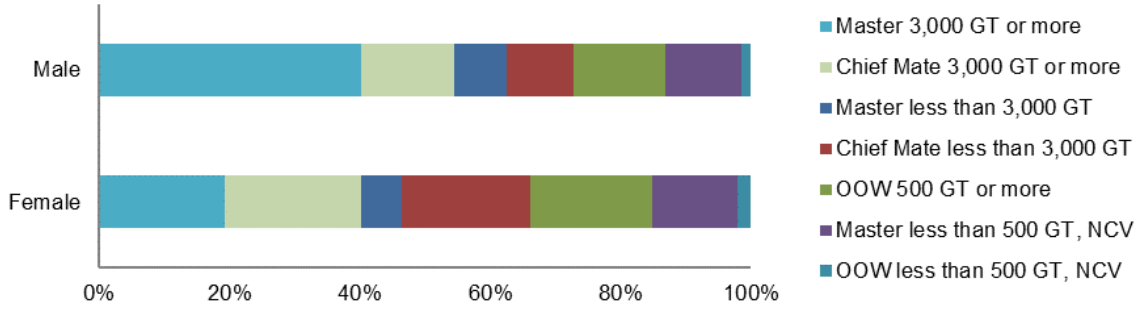

Figure 2-9 Distribution of the deck capacities of masters and deck officers holding valid CoCs by gender

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' (20.84%), 'Chief Mate less than 3,000 GT' (19.73%) and 'Master 3,000 GT or more' (19.33%), capacities representing 59.91% 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' (40.29%), 'Chief Mate 3,000 GT or more' (14.18%) and 'OOW 500 GT or more' (14.13%), capacities representing 68.59% of the total number of male masters and officers entitled to serve in the Deck Department.

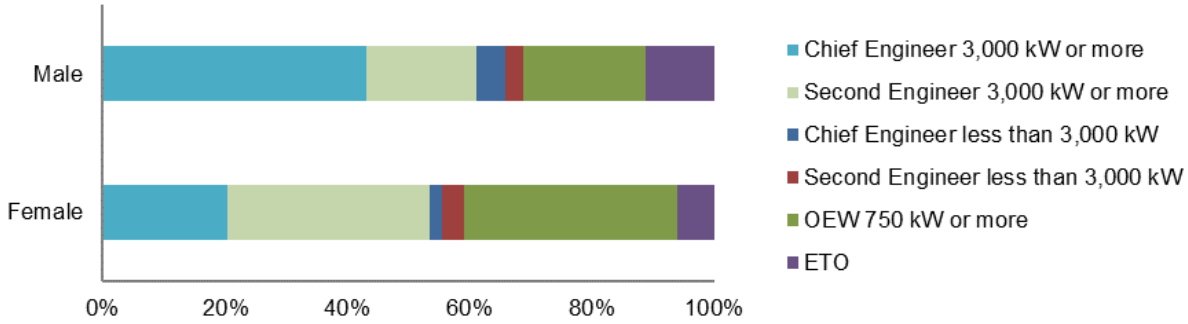

Figure 2-10 Distribution of the engine capacities of engineer officers holding valid CoCs by gender

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' (34.95%), 'Second Engineer 3,000 kW or more' (33.12%) and 'Chief Engineer 3,000 kW or more' (20.42%). These capacities represented 88.48% 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' (43.20%), 'OEW 750 kw or more' (20.22%) and 'Second Engineer 3,000 kW or more' (17.92%). These capacities represented 81.35% of the total number of male officers entitled to serve in the Engine Department.

When analysing the number of masters and officers which had their data transferred into the STCW-IS for the first time, it can be stated with a level of confidence of 99% that the percentage of female masters and officers was 3.64% ± 0.44%. The main capacity in which these female officers were entitled to serve was 'OOW 500 GT or more' (37.56%), while the main capacity for in which male officers were entitled to serve was 'OEW 750 kW or more' (27.12%).

2.1.6 Distribution by nationality

The information on nationality was available for 176,372 masters and officers, representing 96.80% of the total number of officers at EU level holding a CoC.

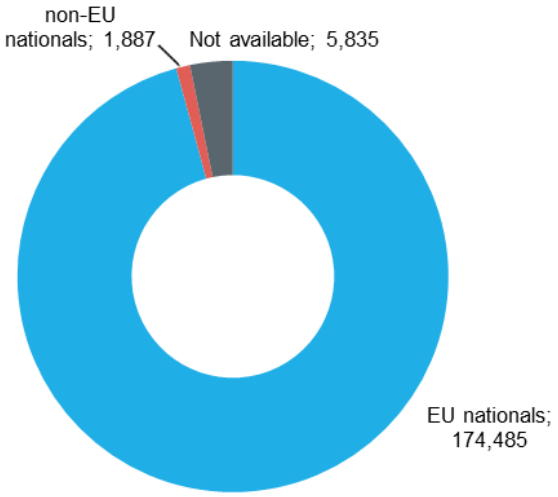

Figure 2-11 Nationality distribution of masters and officers holding valid CoCs

In addition to nationals of the EU Member States, 1,887 nationals of 85 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 results that 16 were located in Europe, 18 in Asia, 30 in Africa, 17 in the Americas and 4 in Oceania.

The distribution of the non-EU nationals holding valid CoCs issued by the EU Member States presented in Figure 2-12 shows that 62.53% of them were nationals of countries located in Europe.

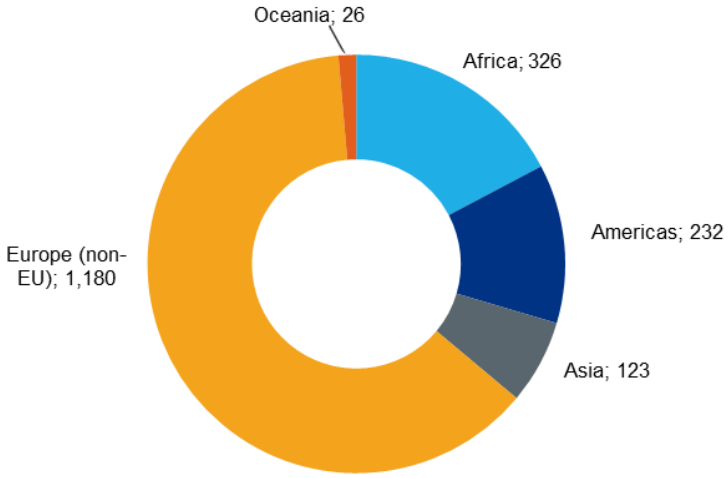

Figure 2-12 Nationality distribution of non-EU nationals holding valid CoCs issued by EU Member States by region of origin

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 4,737 masters and officers, all other age groups had a relatively uniform distribution, each counting between 18,050 and 28,500 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

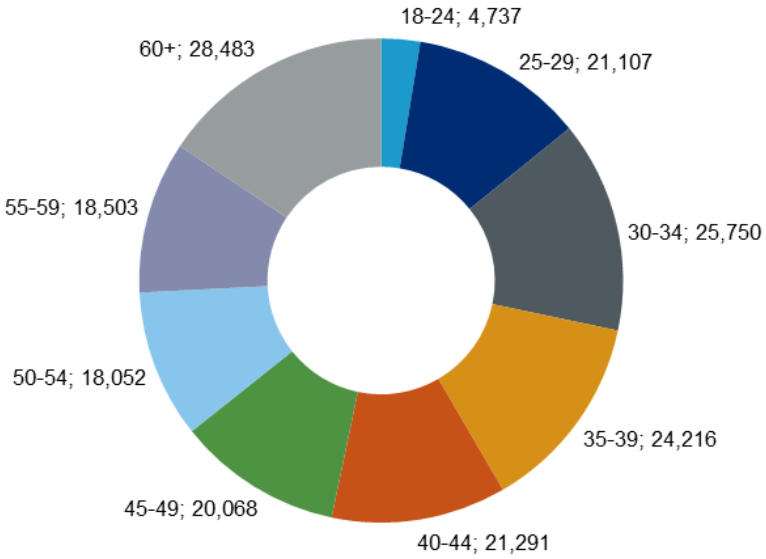

Figure 2-13 Age distribution of masters and officers holding valid CoCs

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

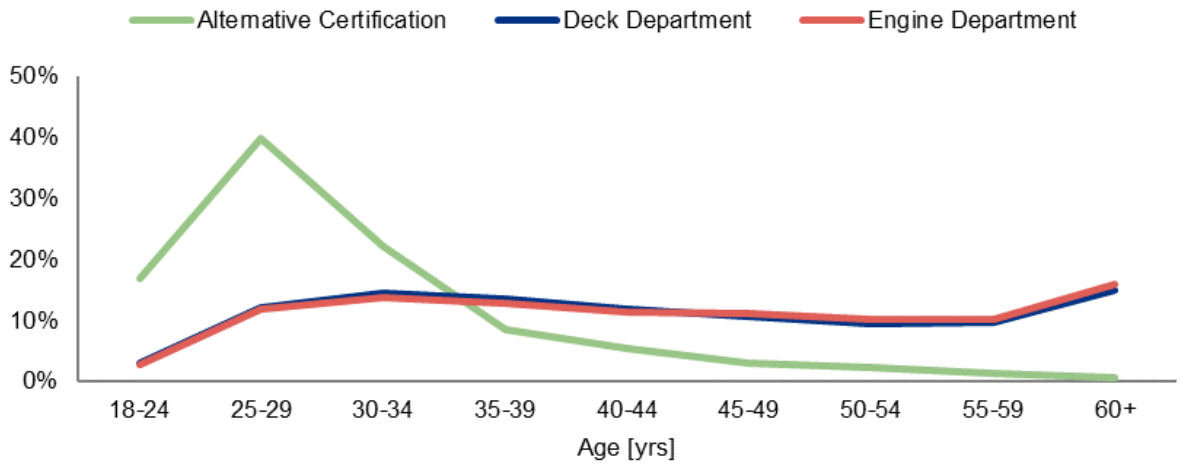

Figure 2-14 Age profile of masters and officers holding valid CoCs per department

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

- 78.83% 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 year age group;
- 55.03% of masters and deck officers and 52.50% of the engineer officers were younger than 45 years of age.

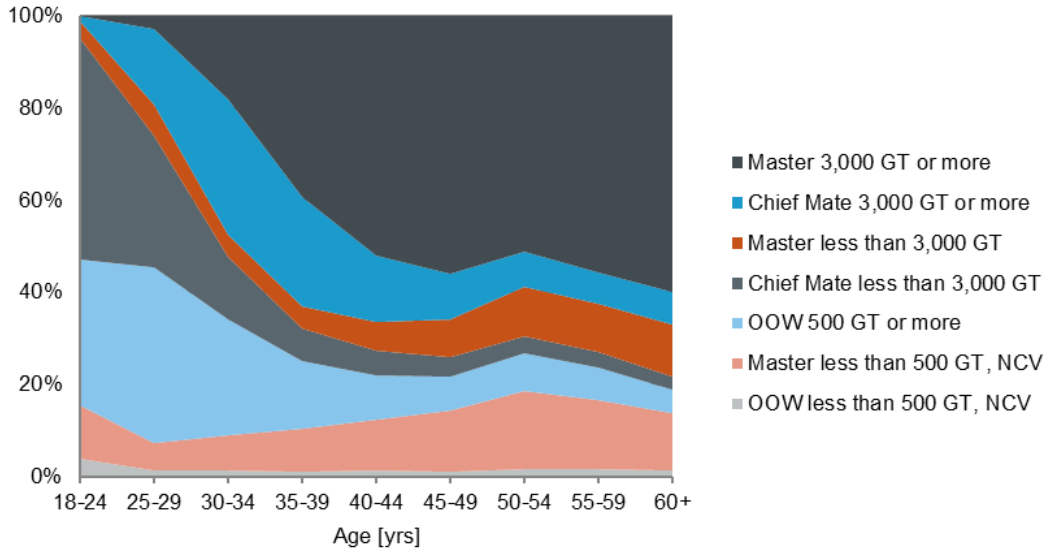

Figure 2-15 Distribution of masters and deck officers holding valid CoCs by age groups

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

- 63.65% of those entitled to serve as ‘Master 3,000 GT or more’ were 45 years old or older;
- 64.71% of those entitled to serve as ‘Chief Mate 3,000 GT or more’ were younger than 40 years of age;
- 60.49% of those entitled to serve as ‘Master less than 3,000 GT’ were 45 years old or older;
- 68.68% of those entitled to serve as ‘Chief Mate less than 3,000 GT’ were younger than 35 years of age;
- 60.09% of those entitled to serve as ‘OOW’ 500 GT or more were younger than 35 years of age;
- 57.39% of those entitled to serve as ‘Master less than 500 GT, NCV’ were 45 years old or older; and
- 55.64% of those entitled to serve as ‘OOW less than 500 GT, NCV’ were younger than 45 years of age.

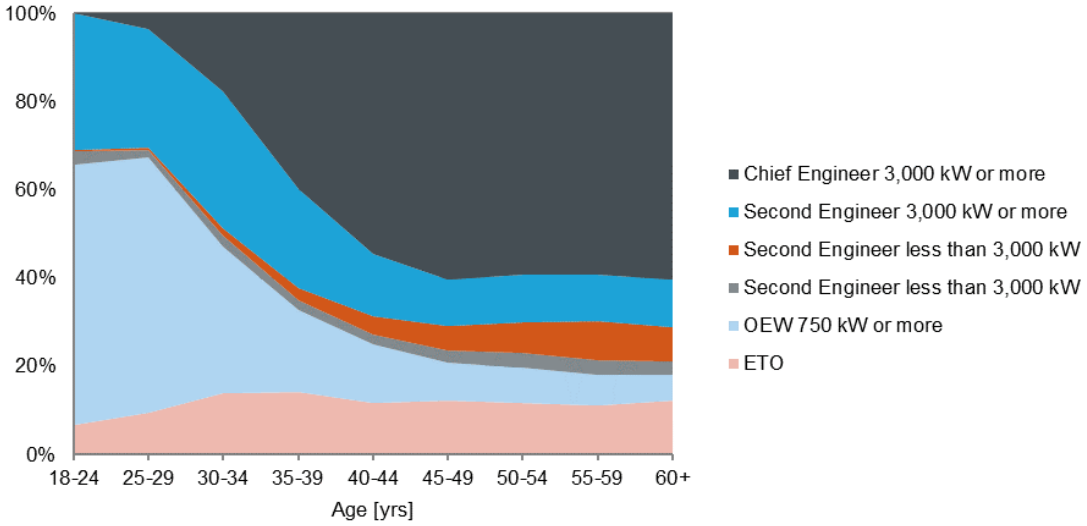

Figure 2-16 Distribution of engineer officers holding valid CoCs by age groups

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

- 66.83% of those entitled to serve as ‘Chief Engineer 3,000 kW or more’ were 45 years old or older;
- 62.63% of those entitled to serve as ‘Second Engineer 3,000 kW or more’ were younger than 40 years of age;
- 61.20% of those entitled to serve as ‘Chief Engineer less than 3,000 kW’ were 50 years old or older;
- 56.20% of those entitled to serve as ‘Second Engineer less than 3,000 kW’ were 45 years old or older;
- 64.35% of those entitled to serve as ‘OEW 750 kW or more’ were younger than 35 years of age; and
- 58.27% 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 35.3 years, while that for male masters and officers was 44.3 years;
- 72.66% 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 41.36%;
- the average age of female masters and deck officers (35.4 years) was higher than the average age of the female engineer officers (33.4 years).

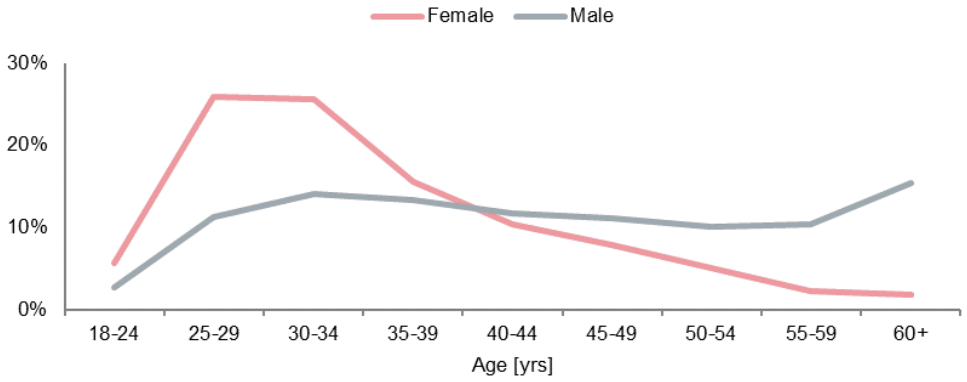

Figure 2-17 Age profile of masters and officers holding valid CoCs per gender

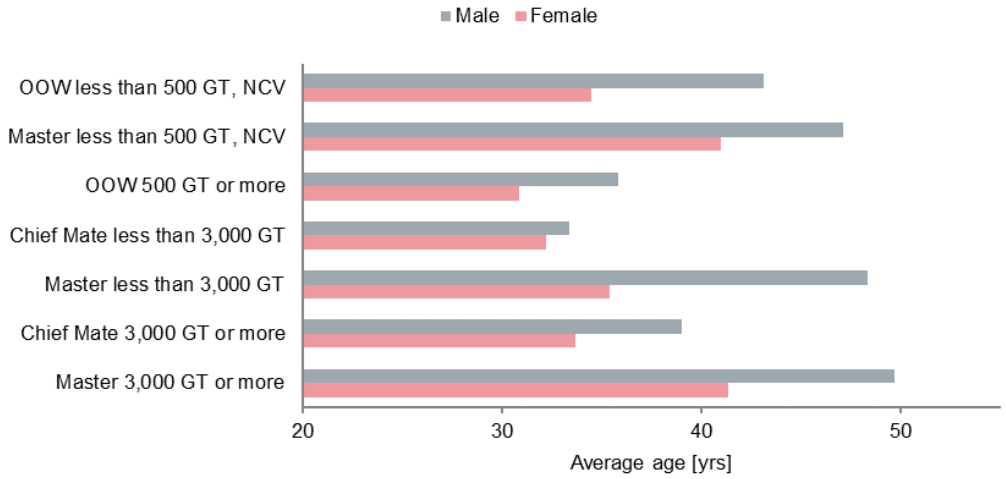

Figure 2-18 Average age of masters and deck officers holding valid CoCs per gender by deck capacity

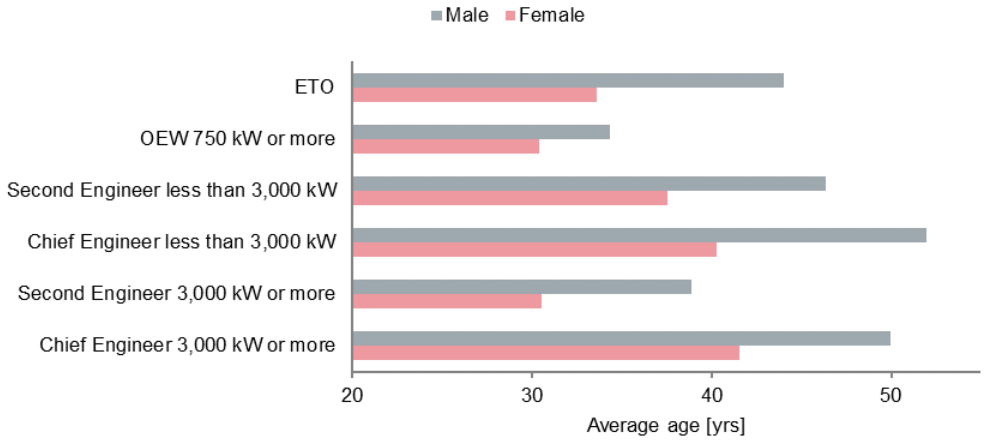

Figure 2-19 Average age of engineer officers holding valid CoCs per gender by engine capacity

Reviewing the age profile of the masters and officers which had their data transferred to the STCW-IS for the first time, the following conclusions could be stated:

- Their average age was 35.1 years. When analysing them per gender, while the average age of male officers was 35.6 years, that of the female officers was 29.7 years;
- Considering those entitled to serve as 'OOW 500 GT or more' and 'OEW 750 kW or more', their average age was around 28.5 years. However, when dividing them by gender, the average age of female officers was 27 years whereas for male officers that remained invariable on the 28.5 years.

2.2 Masters and officers who in 2021 held valid endorsements attesting recognition

2.2.1 Total

The total number of masters and officers holding valid EaRs at EU level was 174,064, with 0.06% of them entitled to serve in both the Deck and Engine Departments. In addition, 9.67% of them held more than one EaR issued by different EU Member States.

A review of the distribution by group of countries issuing the original CoC, reveals that 46,660 masters and officers held original CoCs issued by EU Member States which were recognised through endorsement by other EU Member State (25.61% of the total number of masters and officers holding valid CoCs as per section 2.2.1). In addition, 127,452 held original CoCs issued by non-EU countries and 0.03% held original CoCs issued by both EU Member States and non-EU countries.

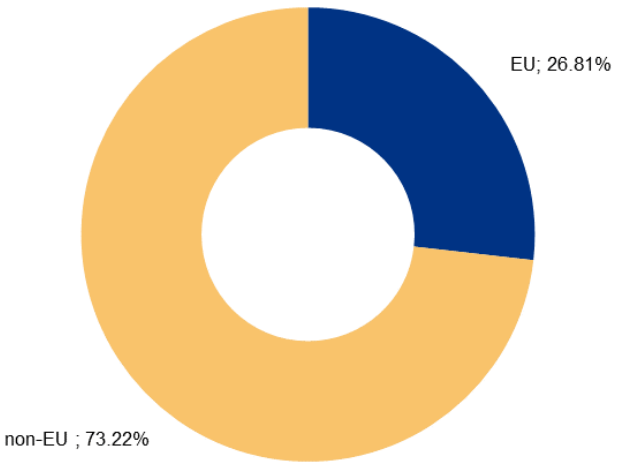

Figure 2-20 Distribution of masters and officers holding valid EaRs by countries issuing the original CoC

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, Hungary and Slovakia did not issue EaRs.

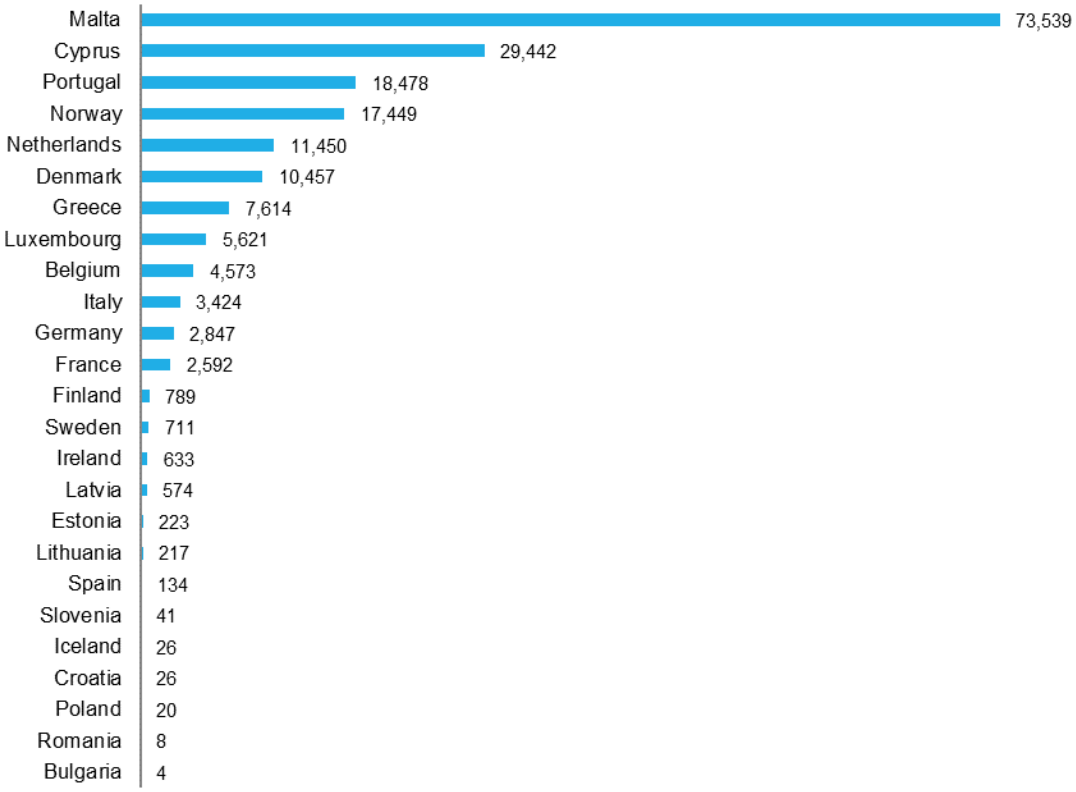

Figure 2-21 Masters and officers holding valid EaRs per EU Member State

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

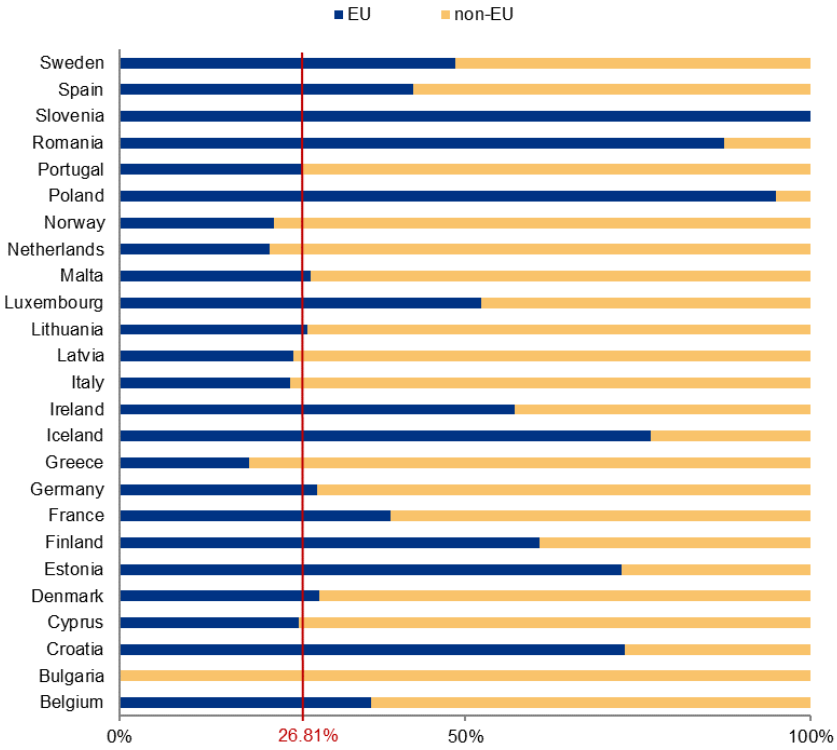

Figure 2-22 Distribution of masters and officers holding valid EaRs recognising original CoCs issued by EU and non-EU countries

2.2.3 Distribution by countries issuing the original CoCs

The name of the country that issued the original CoC was respectively available for 174,061 masters and officers, who represented almost 100% 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.

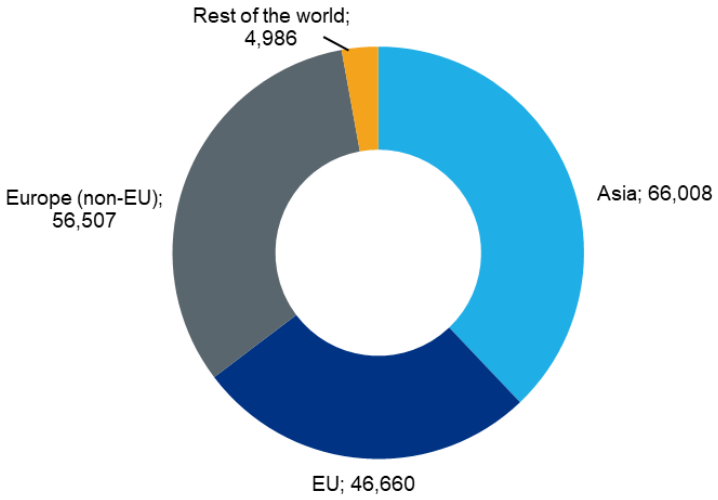

Figure 2-23 Distribution of masters and officers holding valid EaRs by region of the country issuing the original CoC

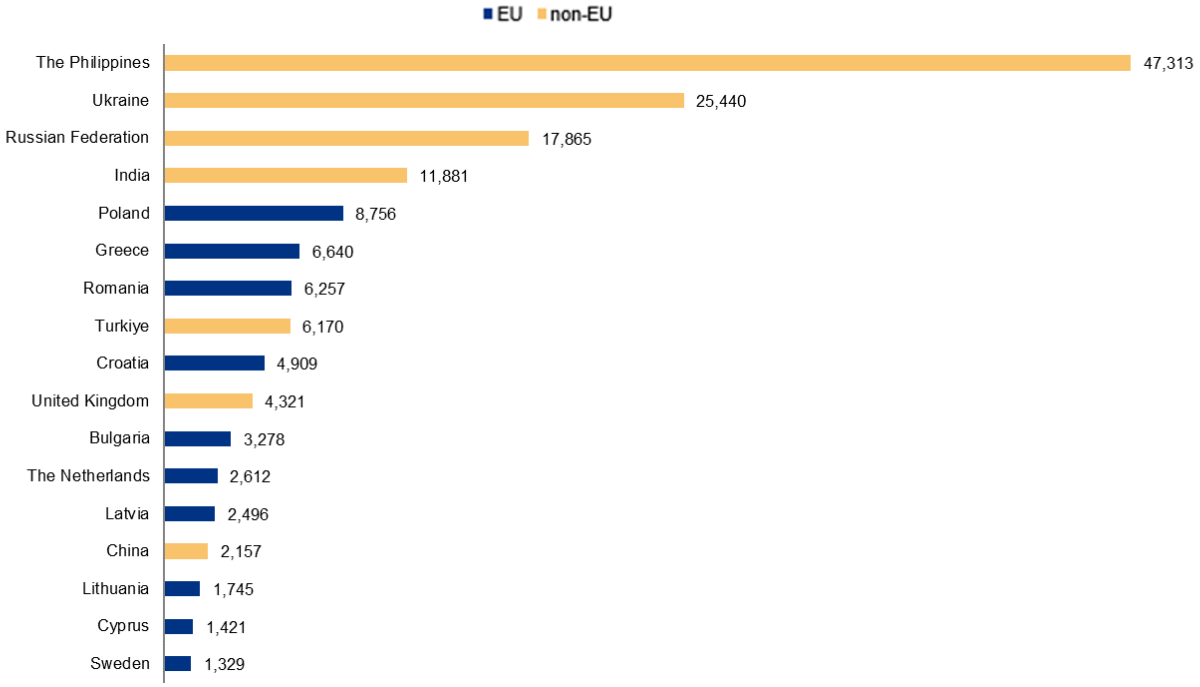

Figure 2-24 Countries issuing the original CoCs registering more than 0.75% of masters and officers holding valid EaRs

The masters and officers registered with valid EaRs in 2021 held original CoCs issued by 87 countries. Figure 2-24 identifies the 17 countries – ten EU Member States and seven non-EU countries – which provided for 88.81% 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.

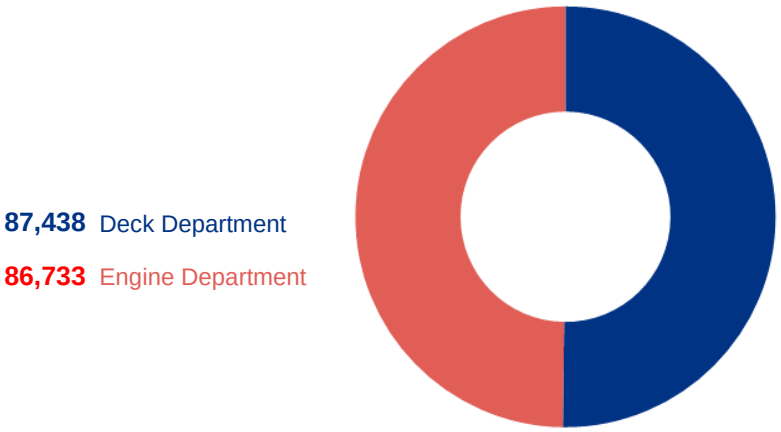

Figure 2-25 Distribution of masters and officers holding valid EaRs by department

The figure illustrates that the number of masters and officers entitled to serve in the Deck Department was only 0.81% higher than the number of officers entitled to serve in the Engine Department.

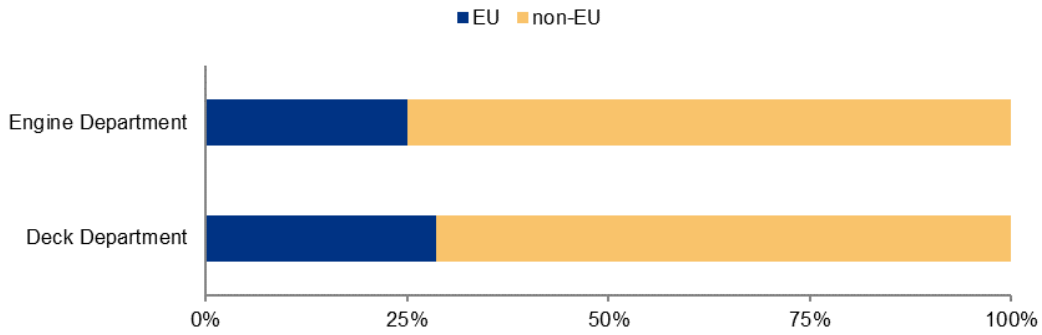

Figure 2-26 Distribution of masters and officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by department

The ratio between masters and officers holding original CoCs issued by EU Member States and those holding original CoCs issued by non-EU countries, shown in Figure 2-26 follows a pattern for both the Deck (29% to 71%) 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 2021, 97.90% were entitled to serve on ships of 3,000 GT or more. In addition, the data also indicated that 59.42% 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.

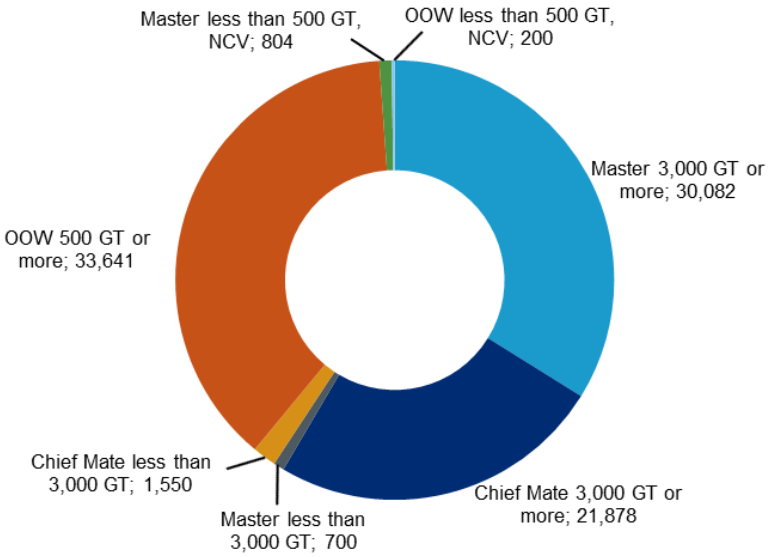

Figure 2-27 Distribution of masters and deck officers holding valid EaRs by deck capacity

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 29% to 71%. 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).

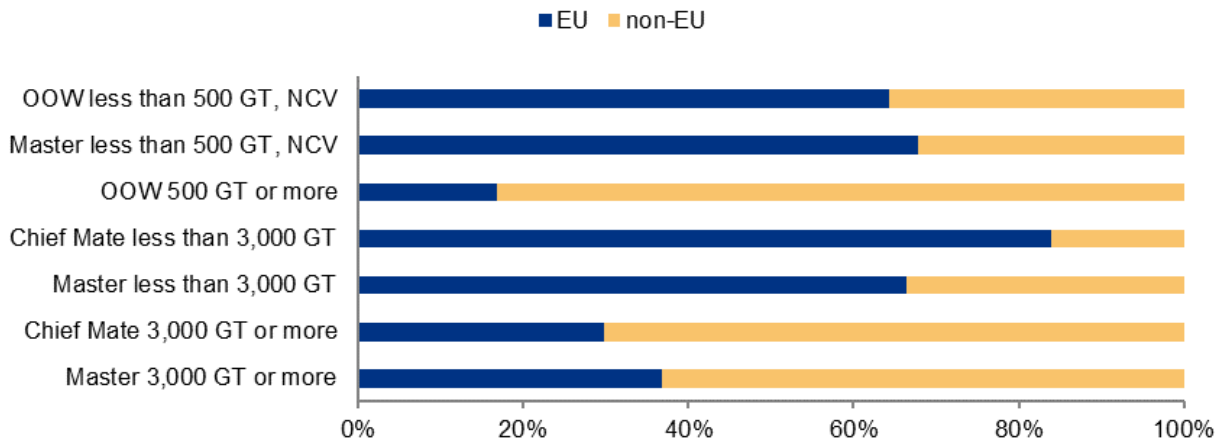

Figure 2-28 Distribution of masters and officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by deck capacity

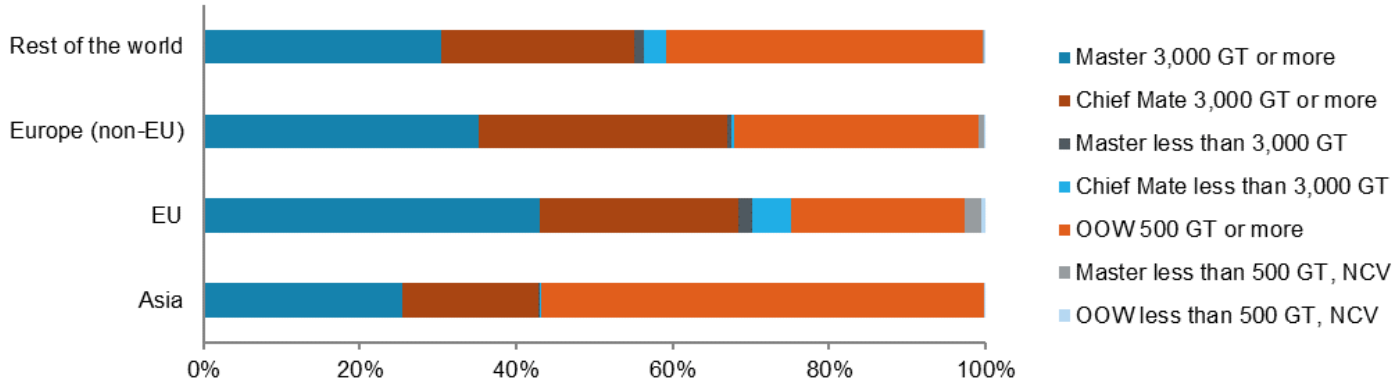

Figure 2-29 Distribution of the deck capacities of masters and deck officers holding valid EaRs by region of the country issuing the original CoC

The majority of masters and deck officers having their original CoCs 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 (see Figure 2-29).

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, 98.73% 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 53.71% 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 23.61% being limited in terms of type of propulsion machinery.

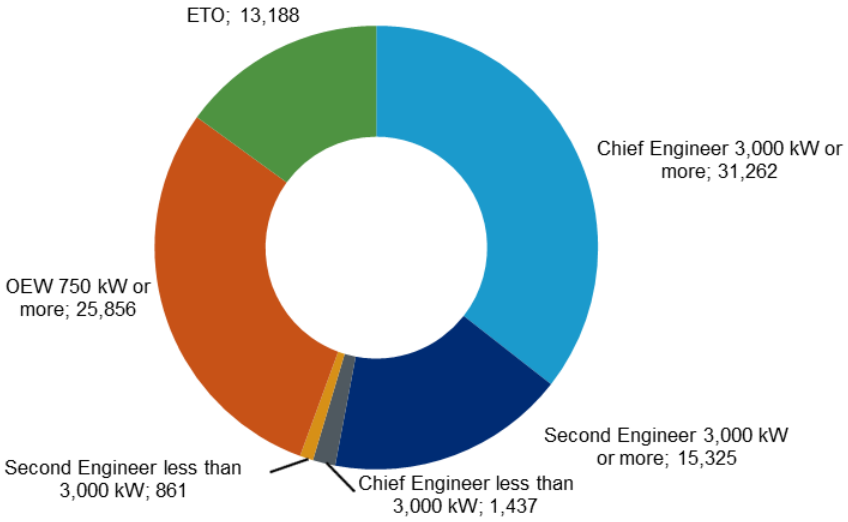

Figure 2-30 Distribution of engineer officers holding valid EaRs by engine capacity

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).

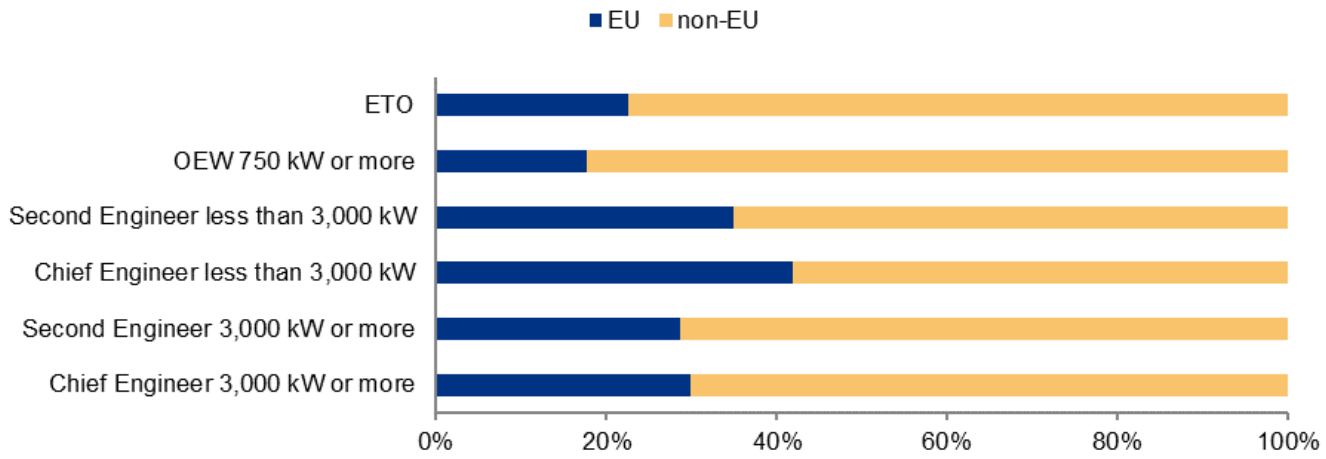

Figure 2-31 Distribution of engineer officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by engine capacity

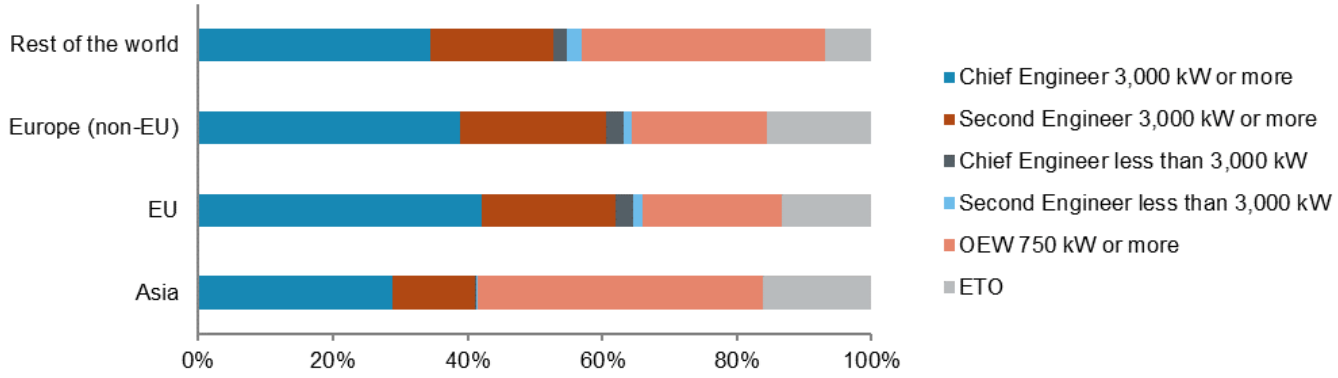

Figure 2-32 Distribution of the engine capacities of engineer officers holding valid EaRs by region of the country issuing the original CoC

The majority of the engineer officers having original CoCs 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 (see Figure 2-32).

2.2.6 Gender distribution

The information on gender was available for 174,015 masters and officers that represented 99.97% of the total number of those holding valid EaRs in 2021 at EU level.

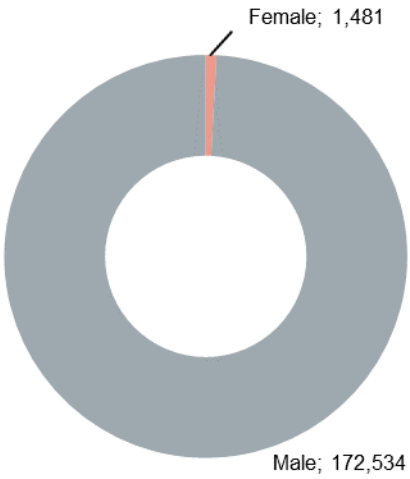

Figure 2-33 Gender distribution of masters and officers holding valid EaRs

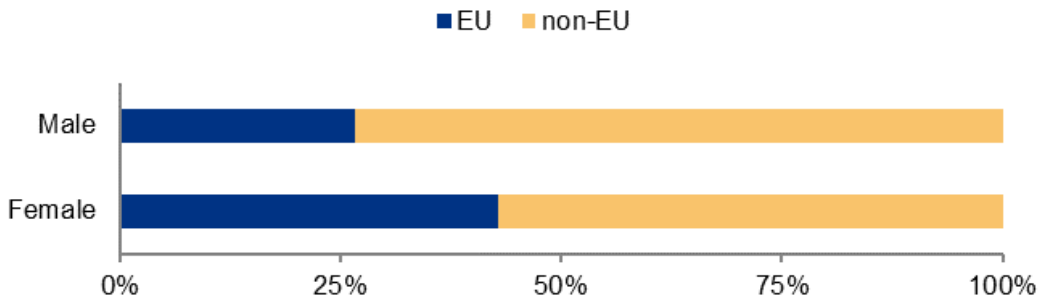

Figure 2-34 Distribution of masters and officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by gender

As regards the total number of female masters and officers holding valid EaRs, 42.88% of them held original CoCs issued by EU Member States, followed by 22.42% who had their original CoCs issued by countries located in Europe.

2.2.7 Age distribution

The average age of masters and officers holding valid EaRs was 41.5 years. Consideration of the average age per country issuing the original CoCs reveals that the average age of masters and officers holding CoCs issued by the EU Member States was 43.6 years, while that of those holding original CoCs issued by non-EU countries was 40.8 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 (27% to 73%), the distribution by age groups shows a deviation, especially for masters and officers younger than 25 years of age and for those older than 54, as presented in Figure 2-36.

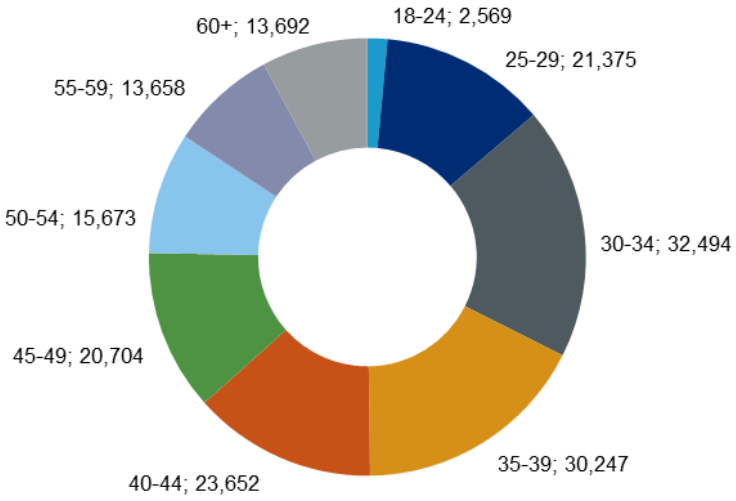

Figure 2-35 Age distribution of masters and officers holding valid EaRs

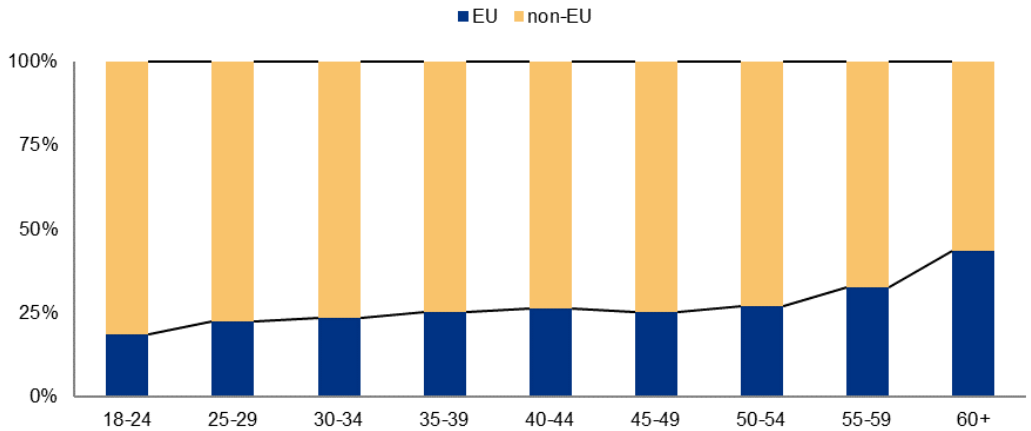

Figure 2-36 Distribution of masters and officers holding valid EaRs by EU and non-EU countries issuing the original CoC and by age group

The data presented in

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

- in both departments there are few officers younger than 25 years of age;
- 53.78% of 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.

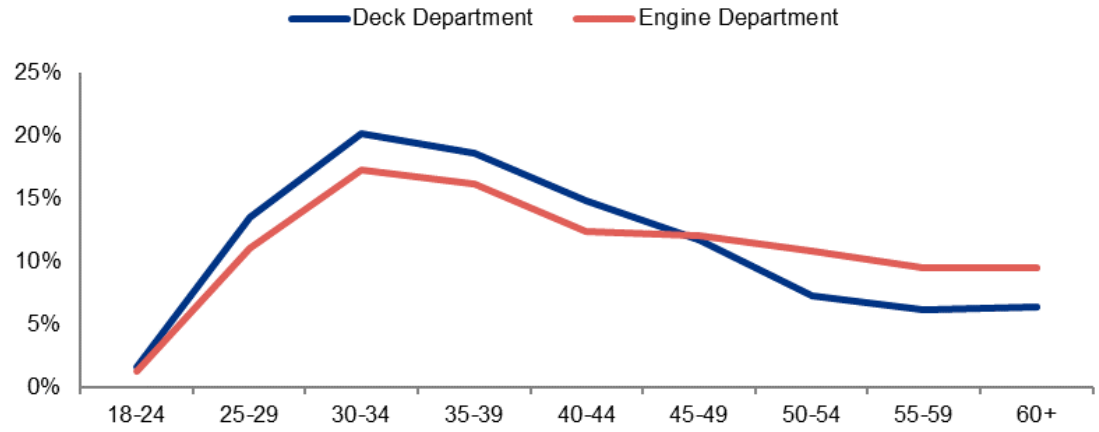

Figure 2-37 Age profile of masters and officers holding valid EaRs per department

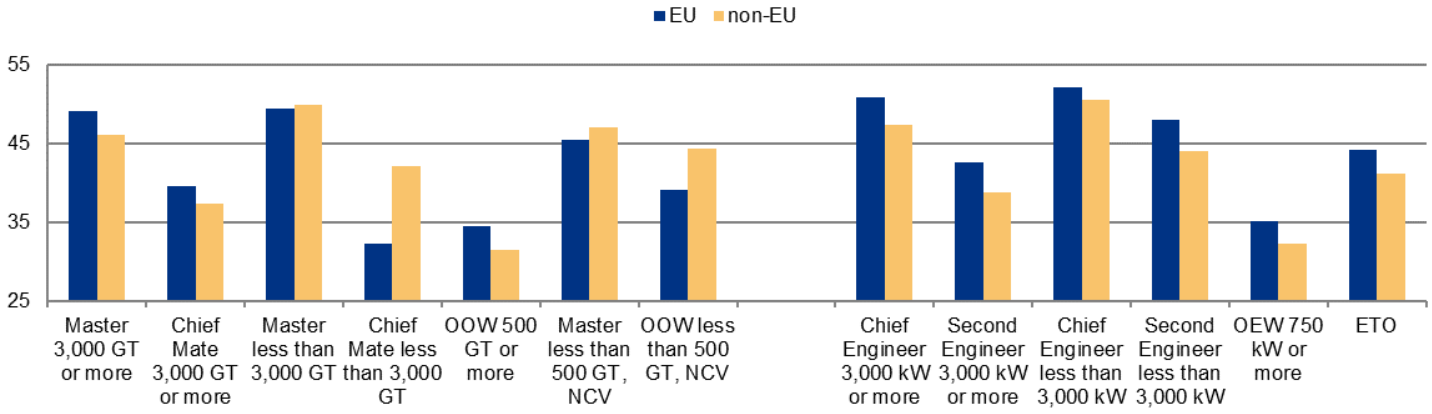

Figure 2-38 Average age of officers holding valid EaRs per EU and non-EU countries issuing the original CoC by capacity

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 those holding EaRs endorsing capacities limited in gross tonnage and/or limited in area of navigation.

2.2.8 Distribution by nationality

The information on nationality was available for 161,241 masters and officers, representing 92.63% of the total number of officers at EU level holding EaRs which were nationals of 129 countries. The distribution of these countries of origin by region[10] does not show a significant deviation from the review on countries issuing the original CoCs.

2.3 Masters and officers available to serve on board EU Member State flagged vessels in 2021

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 2.1 and 2.2.

[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 2-39 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 309,597 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.

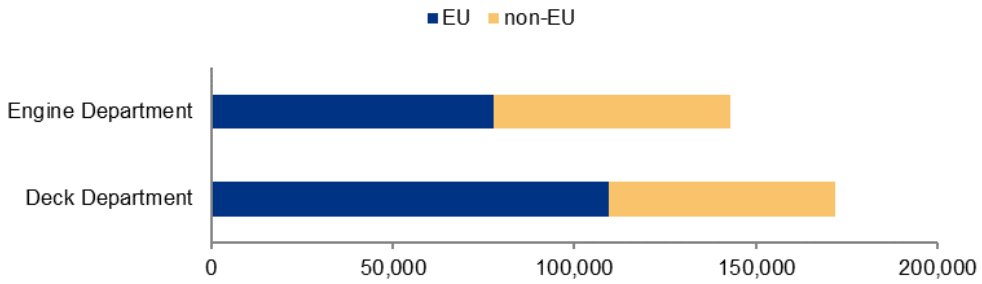

Figure 2-41 Distribution of masters and officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC and by department

The number of masters and officers available to serve in the Deck Department (171,852) was 20% higher than the number of officers available to serve in the Engine Department (142,857). 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 41% 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 (4.3%) 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 (75% and 20% 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

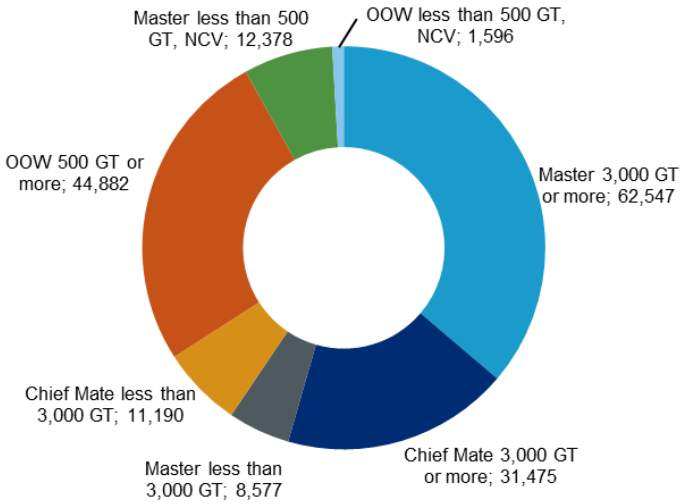

Figure 2-42 Distribution of masters and deck officers available to serve on board EU Member State flagged vessels by deck capacity

The information in Figure 2-42 shows that 54.71% (94,022) 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 500 GT or more' the ratio was 38% to 62%. This is presented in Figure 2-43.

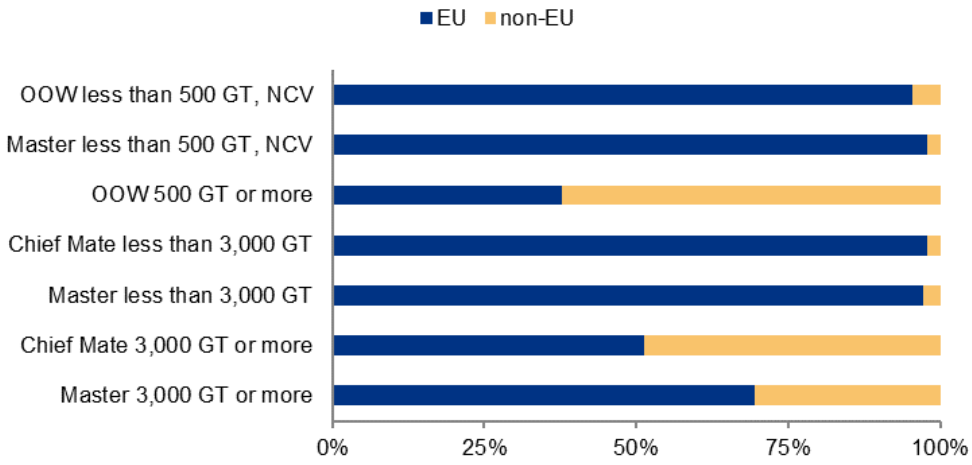

Figure 2-43 Distribution of masters and deck officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC and by deck capacity

2.3.3.2 Distribution by engine capacity

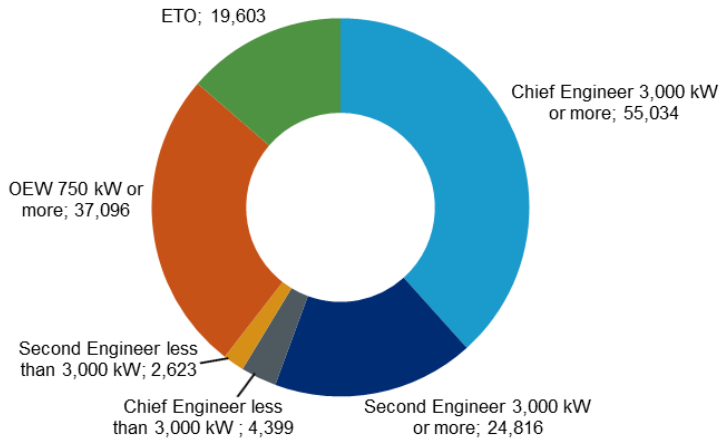

Figure 2-44 Distribution of engineer officers available to serve on board EU Member State flagged vessels by engine capacity

The information in Figure 2-44 shows that 55.90% (79,850) 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 54% to 46%, it changed significantly for officers entitled to serve on board ships limited in propulsion power where more than 78% were holders of CoCs issued by EU Member States. In the case of those officers entitled to serve as 'OEW 750 kW or more' the ratio was 43% to 57%. This is illustrated in Figure 2-45.

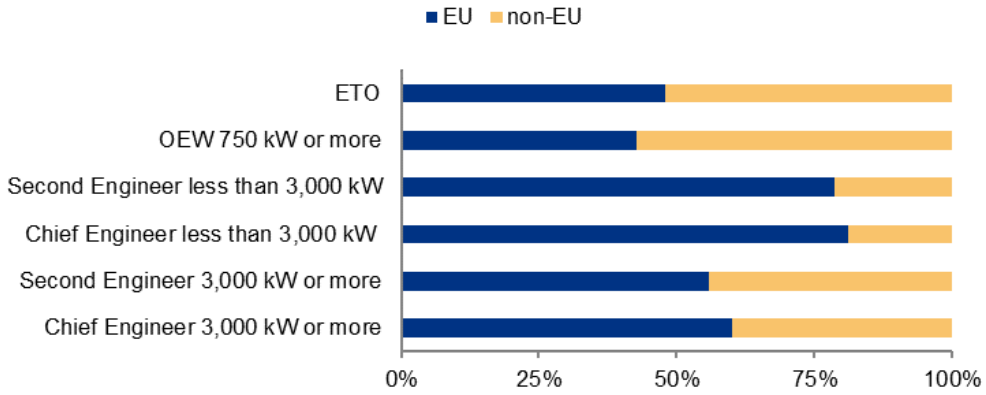

Figure 2-45 Distribution of engineer officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC and by engine capacity

2.3.4 Gender distribution

The information on gender was made available for 296,291 masters and officers representing 95.70% of the total number of those available to serve on board EU Member State flagged vessels.

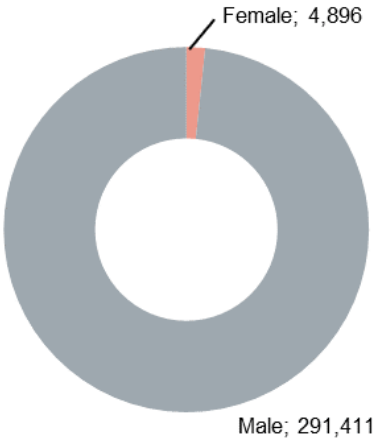

Figure 2-46 Gender distribution of masters and officers available to serve on board EU Member State flagged vessels

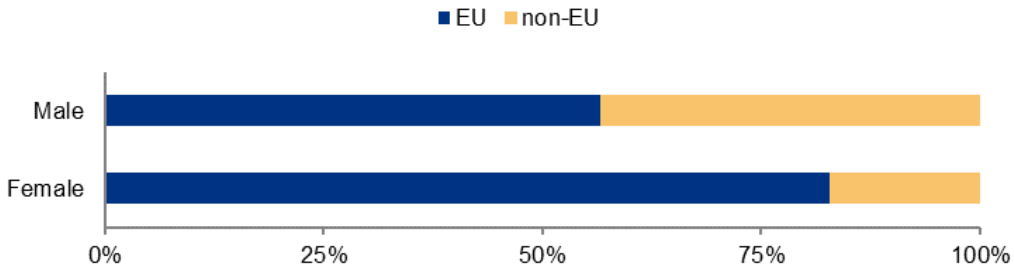

Figure 2-47 Distribution of masters and officers available to serve on board EU Member State flagged vessels by EU and non-EU countries issuing the original CoC and by gender

Masters and officers whose gender was known were predominantly males. Female masters and officers represented 1.65% of the total number of officers available, with 82.78% 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 2.40% of their total, while for CoCs issued by non-EU countries they represented 0.66% of their total.

2.3.5 Distribution by nationality

The information on nationality was made available for 293,567 masters and officers, representing 94.82% 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 141 countries, with the distribution by region[11] as presented in Figure 2-48.

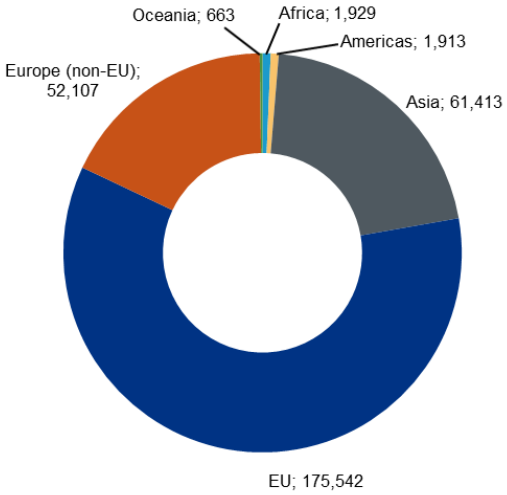

Figure 2-48 Nationality distribution of masters and officers available to serve on board EU Member State flagged vessels by geographical region according to nationality

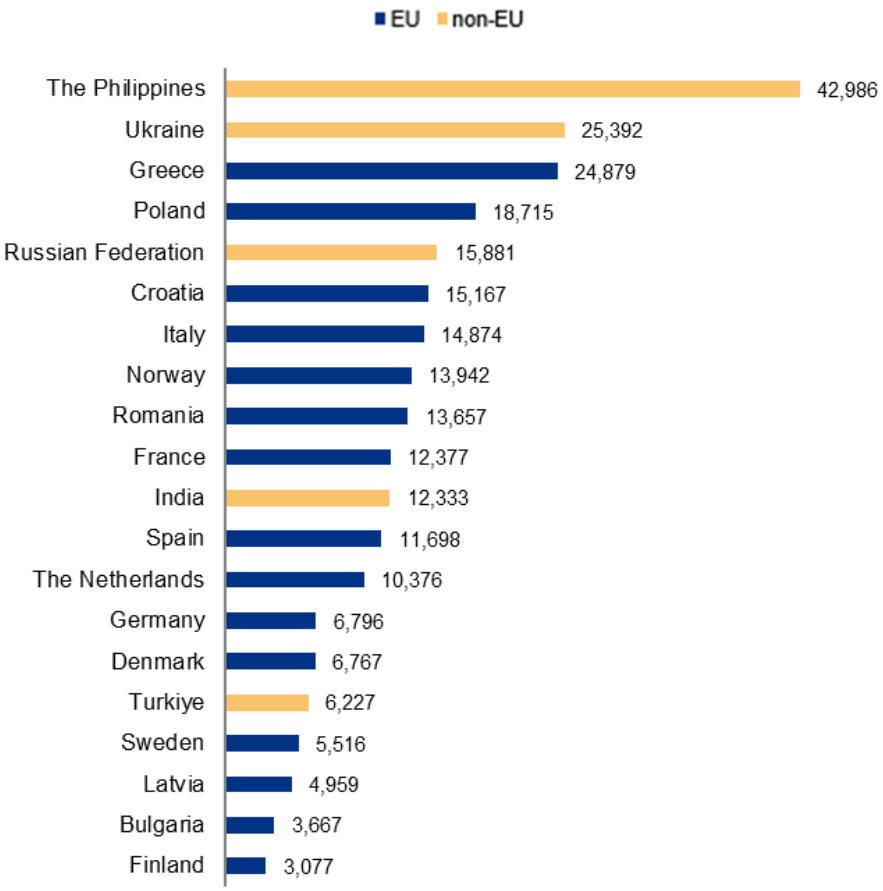

Figure 2-49 Countries whose nationals represented more than 0.75% of the total number of masters and officers available to serve on board EU Member State flagged vessels

[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

The data in Figure 2-49 identifies the 20 countries whose nationals represented 86.98% 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 40.8 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.

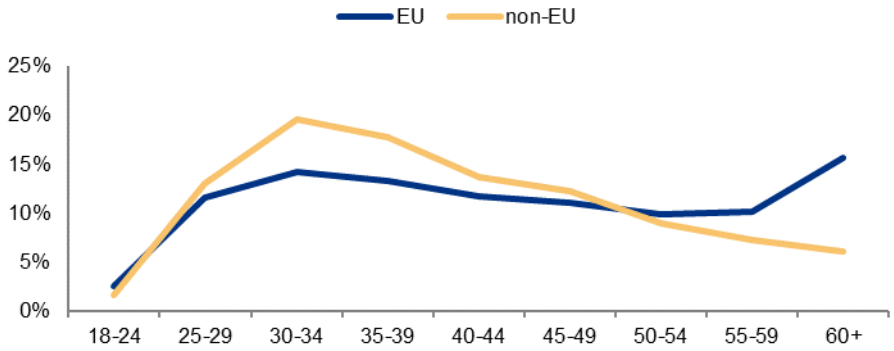

Figure 2-50 Age profile of masters and officers available to serve on board EU Member State flagged vessels per EU and non-EU countries issuing the original CoC

The highest average age was identified for masters and for chief engineers, as presented in Figure 2-51.

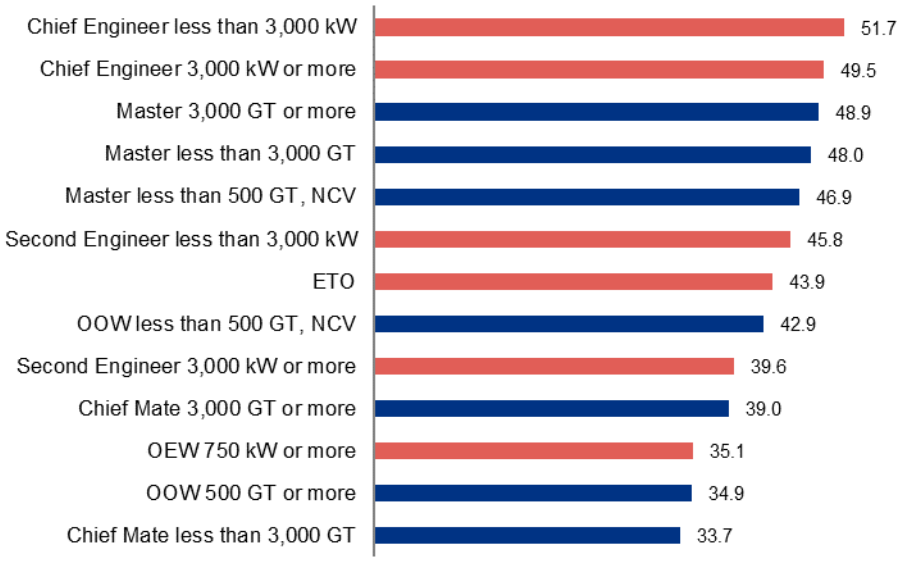

Figure 2-51 Average age of masters and officers available to serve on board EU Member State flagged vessels per deck and engine capacities

A variation ranging between 0.1 and 2.7 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 2021

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 (EU) 2022/993 but was voluntarily provided by 16[12] EU Member States.

2.4.1 Total

The total number of ratings holding valid CoPs in 2021 in the 16 EU Member States reporting such data was 75,516 with 5.75% 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.

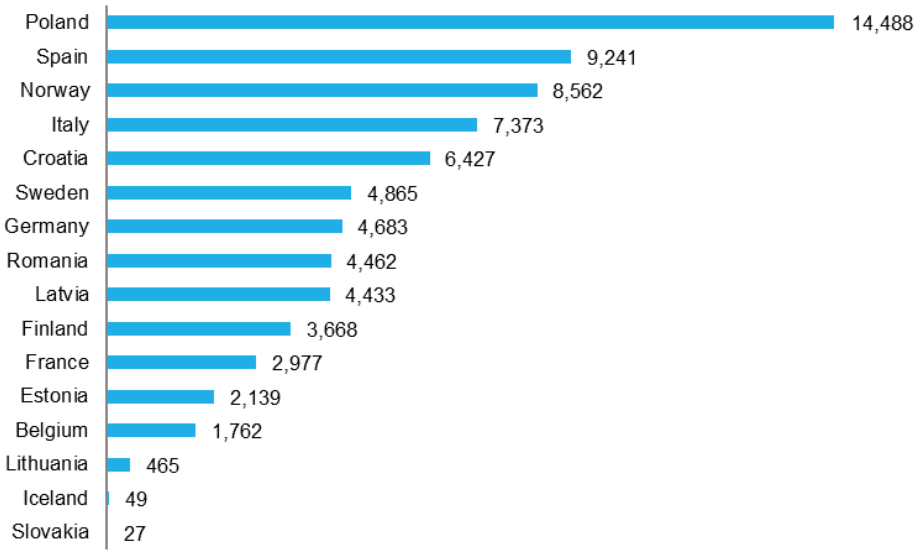

Figure 2-52 Ratings holding valid CoPs per EU Member State

2.4.3 Distribution by department

The distribution by department in 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 86.31% higher than the number of ratings entitled to serve in the Engine Department (Chapter III of the STCW Convention). It also shows that 5.22% of them were qualified under Chapter VII, Alternative Certification, of the STCW Convention.

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

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

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.

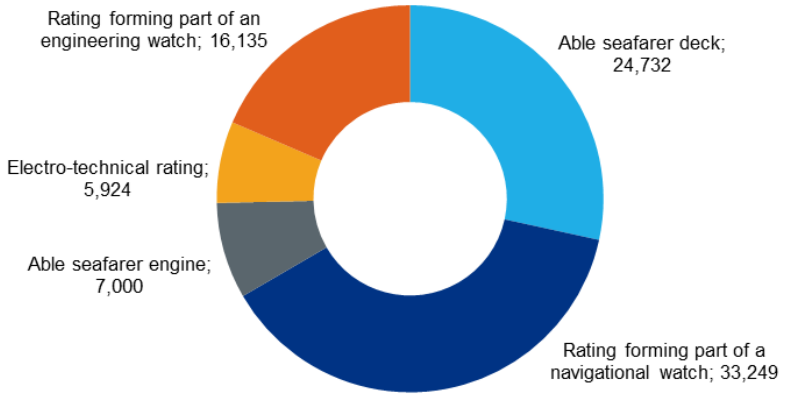

Figure 2-54 Distribution of ratings holding valid CoPs by capacity

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 67.30% for deck and 60.85% for engine.

2.4.5 Gender distribution

The information on gender was made available for 61,882 ratings representing 81.95% 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 3.71% ± 0.22%.

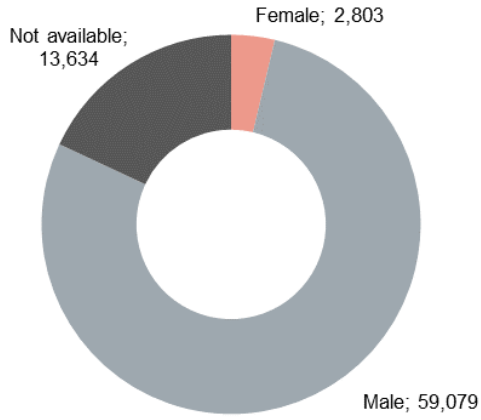

Figure 2-55 Gender distribution of ratings holding valid CoPs

2.4.6 Distribution by nationality

The review of the data showed that, except for 8.69% where nationality was not available, ratings holding valid CoPs were nationals from 106 countries (28 EU Member States and 78 non-EU countries). The review also showed that 88.71% 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 41.6 years. Except for the age groups 25-34 and 60+, all other groups registered similar distributions between 8.66% and 10.04%. The average age for female ratings was 33.2 years, while that for male ratings was 42.2 years. 77.35% of all female ratings were younger than 40 years of age while the percentage of male ratings in the same age group was 47.27%.

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

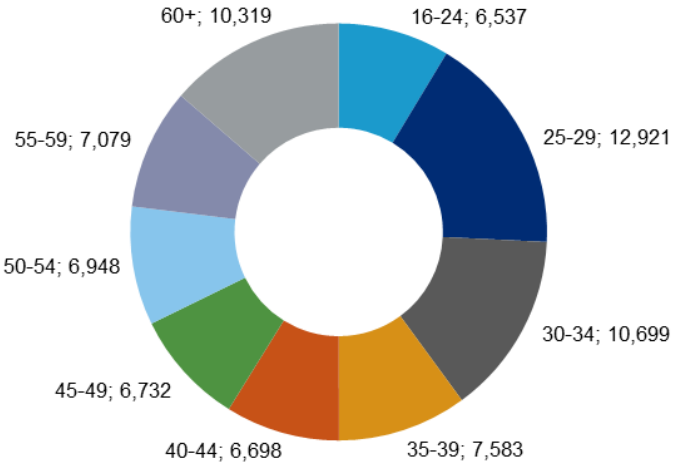

Figure 2-56 Age distribution of ratings holding valid CoPs

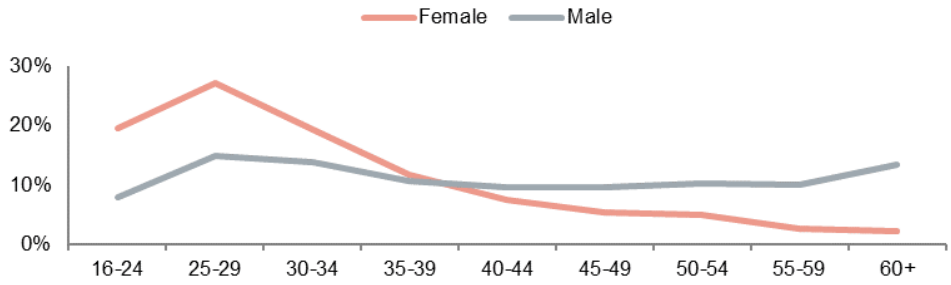

Figure 2-57 Age profile of ratings holding valid CoPs per gender

2.5 Masters and officers - summary overview 2014-2021

This section presents a compilation of the data received during the last eight years, with the objective of providing a broader picture of 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 forecasts are made using linear regression and exponential triple smoothing (ETS) algorithm methods[13]. Related values calculated can be found in Appendix D.

Nevertheless, as already mentioned, the pragmatic approach adopted by Administrations relating to the certification of seafarers to circumvent the COVID-19 outbreak might have distorted the figures on certified masters and officers. To this effect, the movements in 2021 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.

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

One of the last two sub-sections under this chapter intends to ascertain whether the outcome of the Brexit impact presented in the previous statistical review report has been confirmed. The other intends to evaluate the supply (number of masters and officers available, as per section 2.3) in relation to the demand of masters and officers (estimated values) to crew the vessels registered under EU Member State flags.

2.5.1 Countries issuing the original CoCs

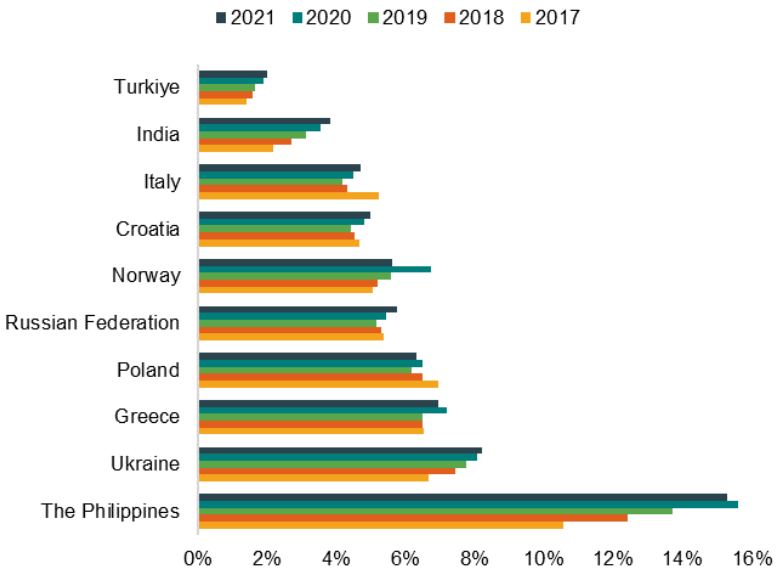

Figure 2-58 Top 5 EU and top 5 non-EU countries issuing the original CoCs

The five non-EU countries (India, the Russian Federation, the Philippines, Turkiye 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 eight 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 and 2021).

For EU Member States, 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 2021. 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.

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 Norway, which entered in this top 3 once the United Kingdom left the Union, it can be observed that, except for 2020, its numbers have remained broadly unchanged throughout the years and a slight increase could be expected.

[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).

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, as already referred in last year's report, 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 most likely surface only when data from 2022 is received and analysed in future reports.

Regarding those holding CoCs issued by the Philippines, the percentage of masters and officers available to serve on board EU Member State flagged vessels increased since 2017 and stabilised in 2021. Nevertheless, a slight growth could be expected in the coming years.

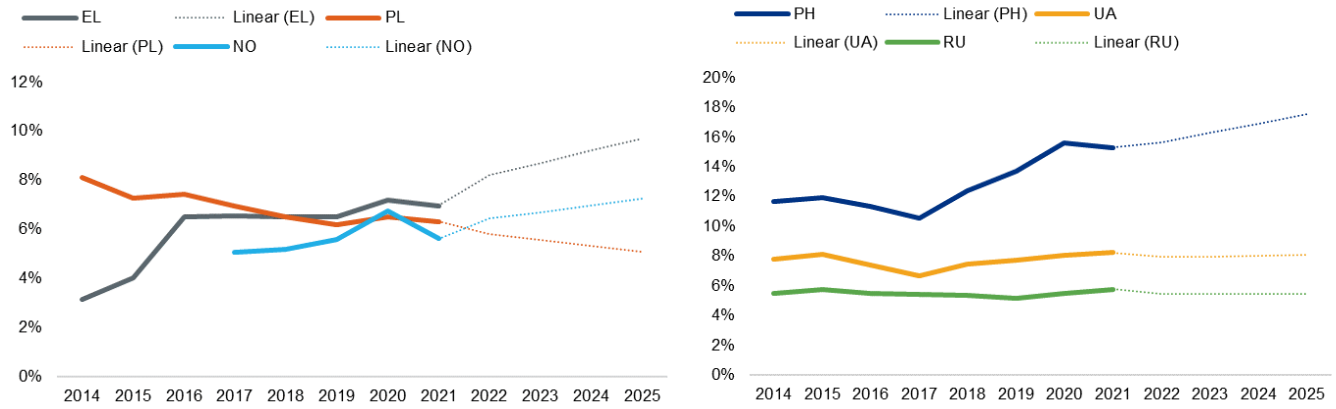

Figure 2-59 Overview with forecast for the next years of masters and officers holding CoCs issued by the top 3 EU and top 3 non-EU countries

2.5.2 Department - level of responsibility

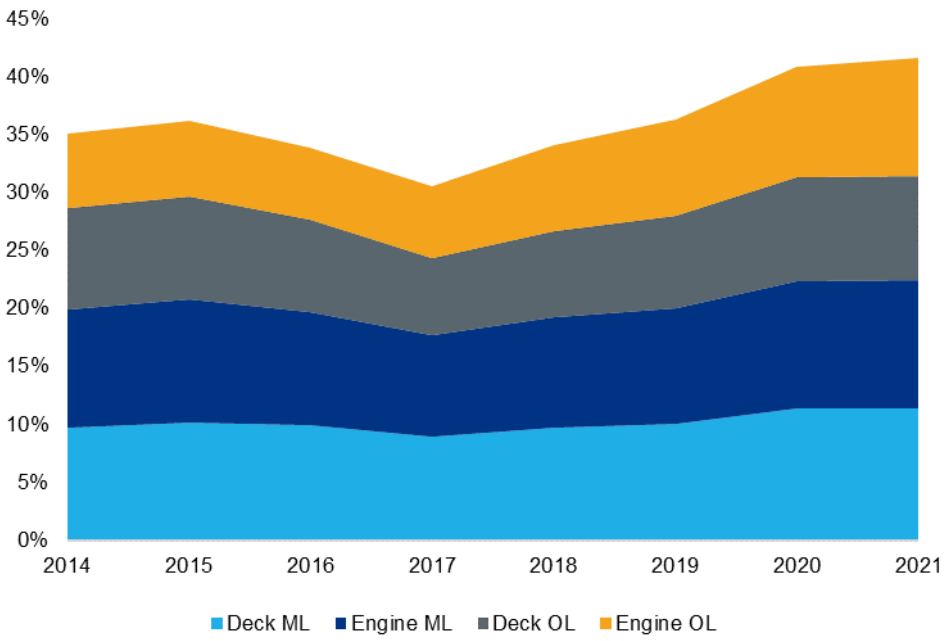

Figure 2-60 Officers at management and operational level holding CoCs issued by non-EU countries

The total percentage of masters and officers holding CoCs issued by non-EU countries recognised by EU Member States has been on the increase since 2017. Moreover, an analysis of these figures per department and level of responsibility indicates that this increase has been verified in both departments and levels of responsibility.

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 three years, a slight increase is still expected for officers entitled to serve in the engine department at operational level.

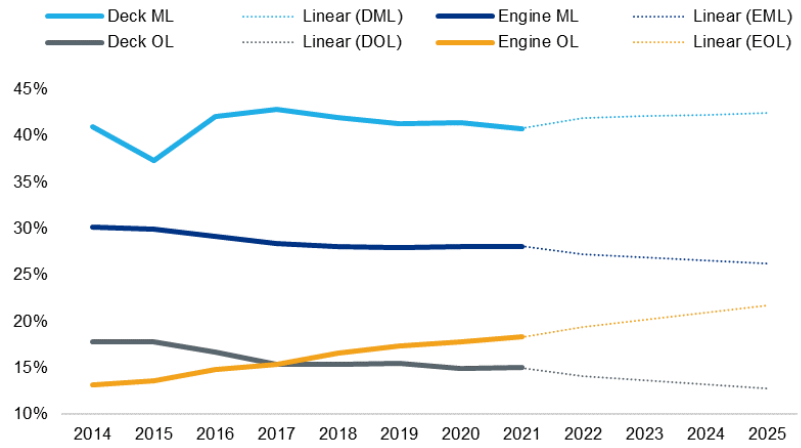

Figure 2-61 Overview with forecast for the next years of officers at management and operational level available to serve on board EU Member State flagged vessels

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.

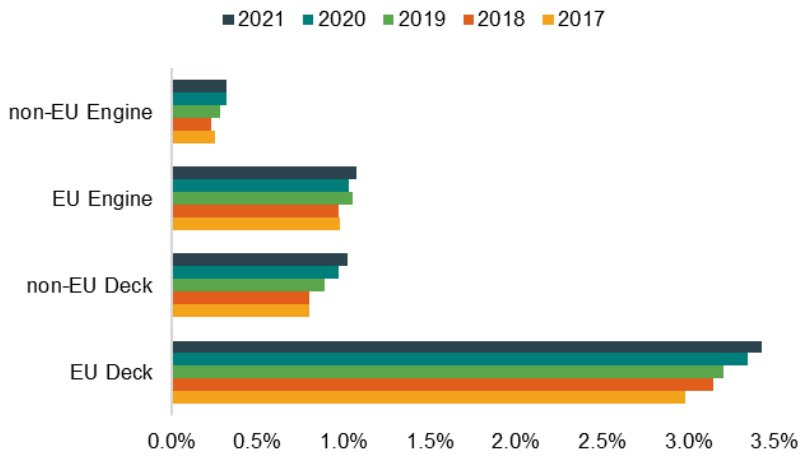

Figure 2-62 Female officers per department holding CoCs issued by EU and non-EU countries

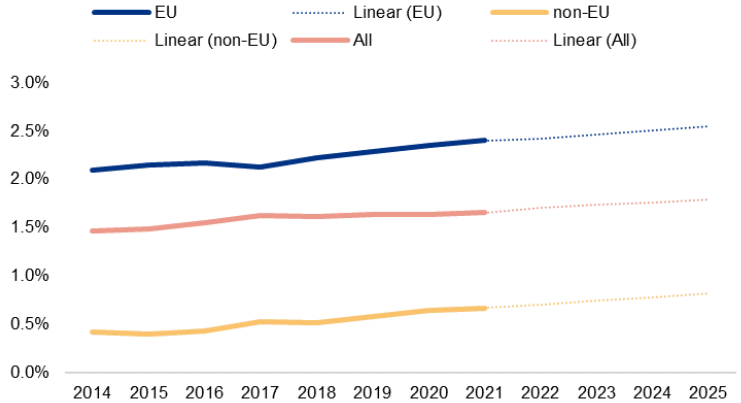

Figure 2-63 Overview with forecast for the next years of female officers available to serve on board EU Member State flagged vessels

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

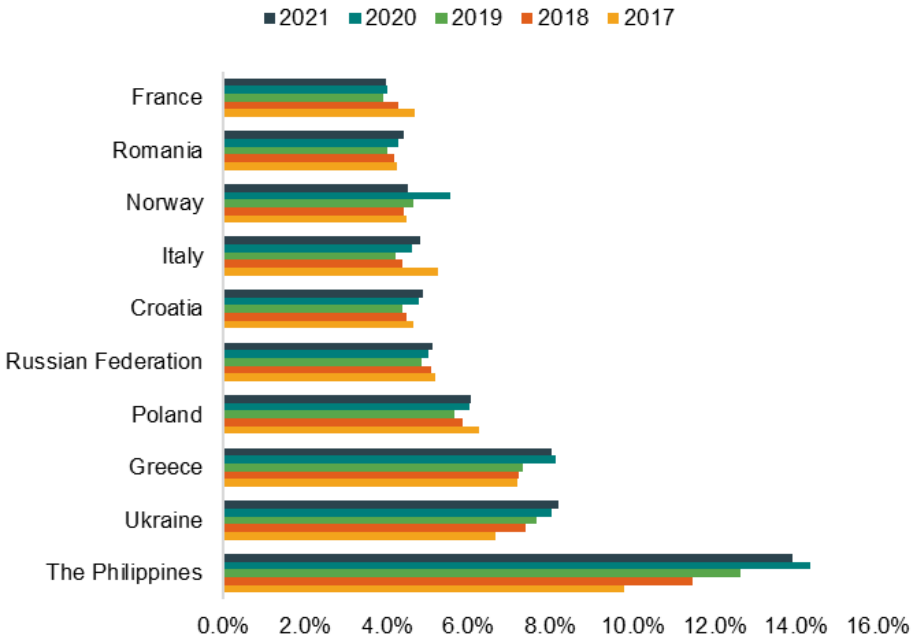

Figure 2-64 Top 10 nationalities of masters and officers available to serve on board EU member State flagged vessels

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 since 2020 was the exclusion from this list of the United Kingdom and India that had always formed part of it.

Figure 2-65 below indicates a certain stability in the coming years related to the geographical region according to the nationality of the masters and officers. Also indicates, 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.

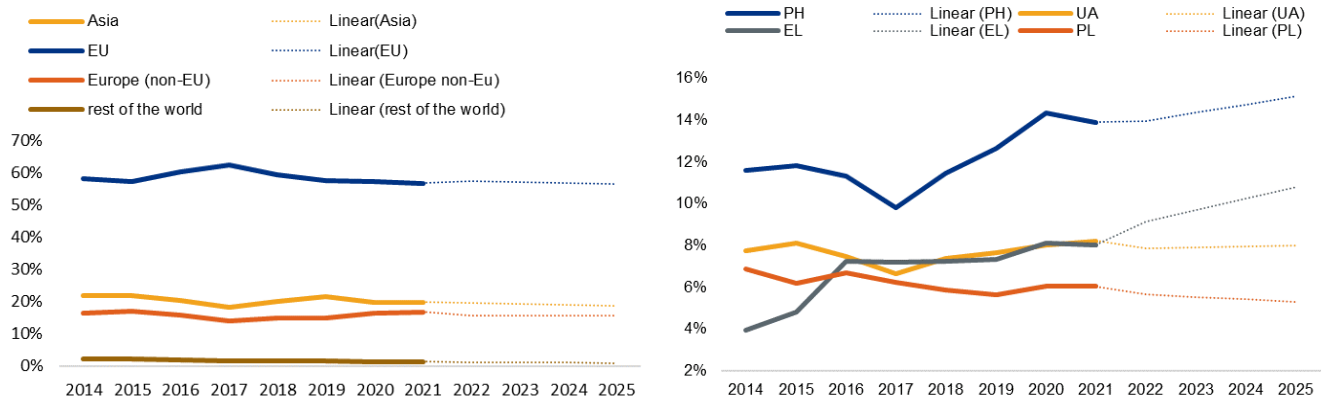

Figure 2-65 Overview with forecast for the next years of the nationalities of masters and officers available to serve on board EU Member State flagged vessels

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.

Figure 2-67 suggests that, as already foreseen in the last three 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.

The reasons for the continuous indication of increase in the average age of the officers holding CoCs at operational level, already mentioned in the previous year's report, might be of interest to further explore. Whether this might indicate that the candidates for the issue of their first CoC take longer to fulfil the requirements for certification or, if already certified, whether they follow a longer path to a management level CoC, could be an area for further research and analysis in the future.

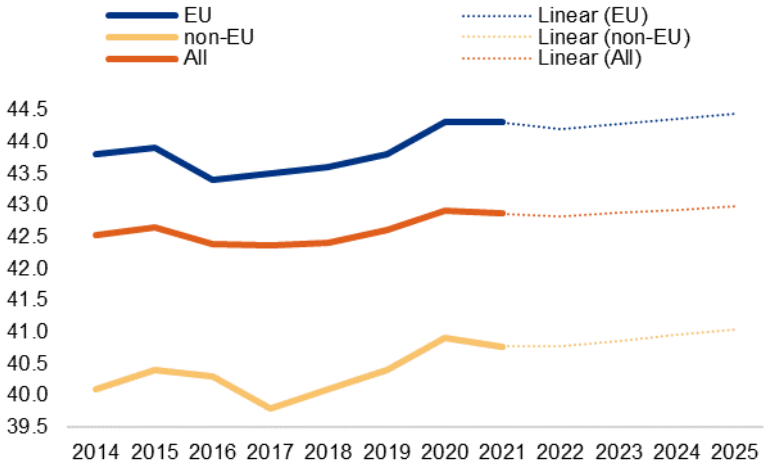

Figure 2-66 Overview with forecast for the next years concerning the average age of masters and officers available to serve on board EU Member State flagged vessels

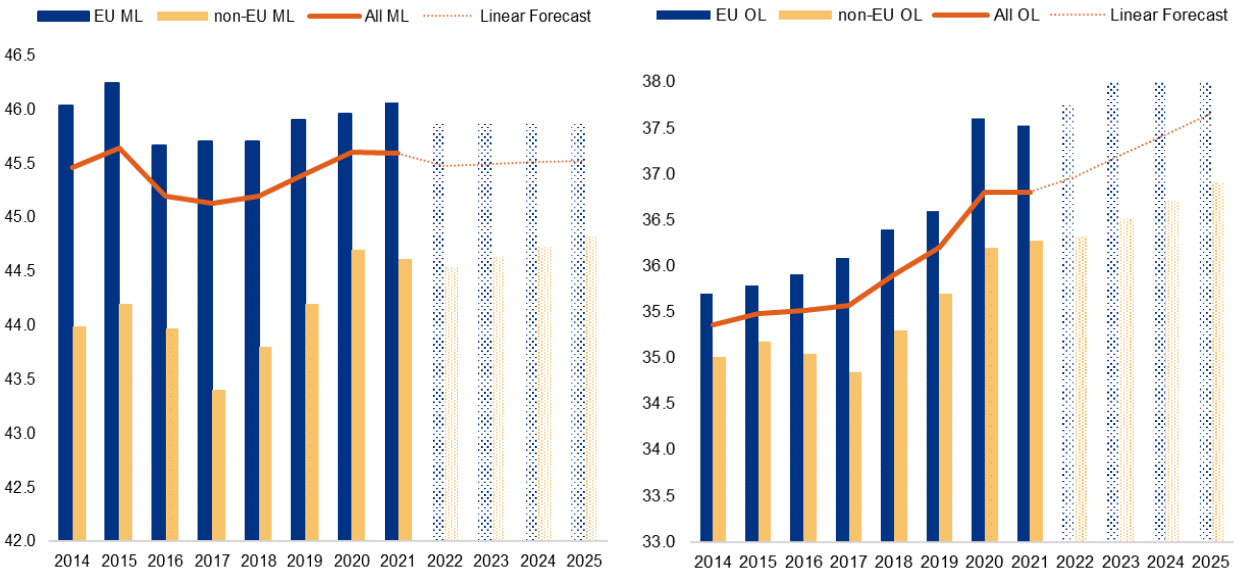

Figure 2-67 Overview with forecast for the next years concerning the average age of officers at management and operational level available to serve on board EU Member State flagged vessels

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.

The 2020 statistical review report stated that 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. The analysis of the figures in 2021 indicate that the outcome described can be sustained.

2.5.7 Estimated number of masters and officers to crew EU Member State flagged vessels versus the number of masters and officers available

As already mentioned in section 1, the data on masters and officers – as extracted from the national registers held by EU Member States – did not include any information on whether the holders of the certificates were active or not. Therefore, it has not been possible to determine how many of them have been working on board vessels over the years. Notwithstanding this, a link was established between the number of certified officers and the number of vessels registered under EU Member State flags (hereinafter referred to as the EU fleet). By comparing the number of masters and officers available to serve on board the EU fleet - compiled over the years in EMSA's statistical review exercises – with the estimated number of masters and officers actually crewing said fleet, an insight regarding the employability in the EU tonnage can be provided, contributing to determine at least whether the supply of those certified at EU level aligns with the demand for officers to crew the EU fleet.

The estimated number of masters and officers to crew the EU fleet, as presented below, was attained from data available in the MARINFO database[14]. The number of vessels registered under EU Member State flags and the average number of officers on board, which was based on available crew list information, was extracted from this database. While considering that most commonly, masters and officers work 6 to 8 months per year on board, a need for 2 crews to complement on 1 vessel or 3 crews to complement on 2 vessels was assumed. In addition, the numbers were increased by 10% to cater for any contingent unavailability of such officers forming part of the complement. The values considered as necessary to crew the EU fleet from 2016 to 2021 - in the proportion of 3 crews to 2 vessels - reached from these assumptions, can be found in Appendix E.

As illustrated in Figure 2-68, and when considering the aggregate number of masters and officers holding valid CoCs issued by EU Member States and EaRs endorsing CoCs issued by non-EU countries, the number of masters and officers available over the years has been more than double the estimated number of those needed to crew the EU fleet.

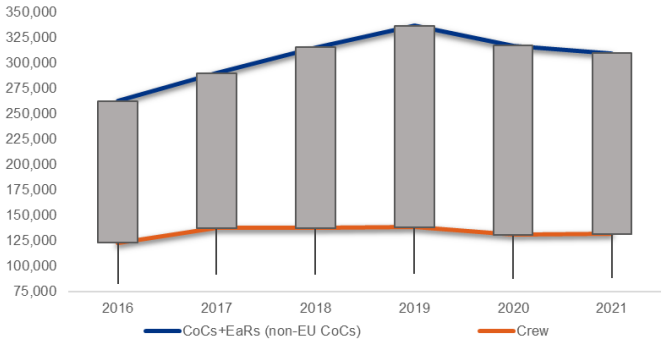

Figure 2-68 Overview concerning the number of officers available to serve on board EU Member State flagged vessels and the estimated number of those needed to crew the EU fleet

[14] Data provided by S&P Global (former IHS Markit & Trade)

When reviewing solely the number of masters and officers holding valid CoCs issued by EU Member States, these have been 40% higher than those estimated to crew the fleet, indicating that hypothetically, the EU supply of masters and officers could have been sufficient to meet the demand from the EU fleet should all available holders be active at sea.

In reality, a significant number of masters and officers holding CoCs issued by non-EU countries are engaged on board the EU fleet (even if on their own, they were not sufficient in number to crew the fleet). This suggests that at least some of those holding CoCs issued by EU Member States are either working ashore or employed under other world fleets.

When analysing exclusively the number of masters and officers holding EaRs, it has been noticed over the years that around 25% of masters and officers holding CoCs issued by EU Member States also held EaRs issued by other EU Member States. This might indicate that the holders of such endorsements were, most likely, working in the EU fleet. As can be inferred from Figure 2-69 presented below, these officers, together with those holding EaRs issued by EU Member States recognising CoCs issued by non-EU countries, have been sufficient in number to crew the EU fleet.

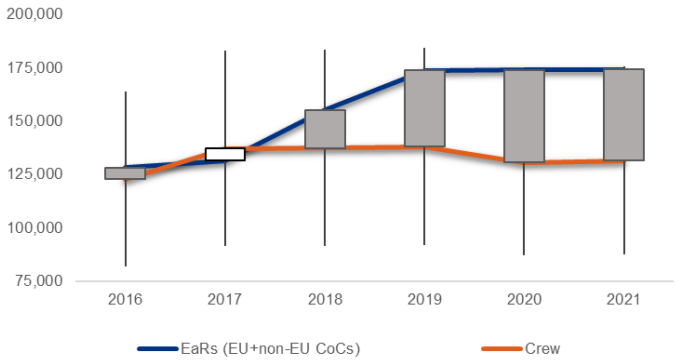

Figure 2-69 Overview concerning the number of officers holding EaRs issued by EU Member States and the estimated number of those needed to crew the EU fleet

When breaking down the number of officers by department (deck and engine), the emerging scenario is similar to that established above when analysing numbers of masters and officers holding CoCs issued by EU Member States and/or EaRs. The exception is for those engineer officers holding non-EU CoCs. Regarding these engineer officers, there is an indication that since 2020 they have been sufficient in number to crew the EU fleet as far as concerns the engine department.

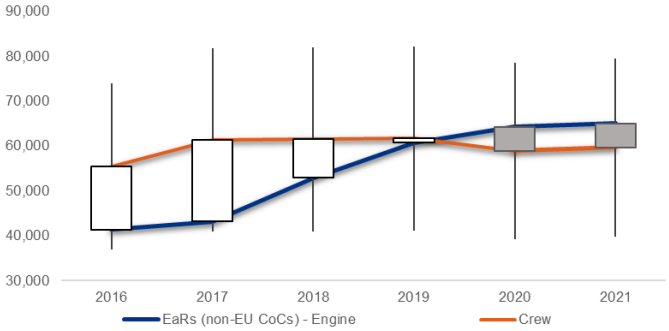

Figure 2-70 Overview concerning the number of engineer officers holding EaRs issued by EU Member States recognising non-EU CoCs and the estimated number of those needed to crew the EU fleet

Pursuant to these results, it would be interesting if further elements of information could help ascertain whether the above mentioned scenario is mainly attributed to engineer officers with EU CoCs working on board vessels flying non-EU flags or to many of them working in the maritime industry ashore (even if they hold a valid CoC).

Finally, caution should be exercised in deriving any conclusion from the results presented, which should ideally be confirmed by/compared with any data as may be available, in relation to the employment of seafarers in the EU maritime industry.

Appendix A Data on masters and officers holding valid CoCs in 2021

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	1273	0	0	0	0	0	0	0	0	1471	0	0	0	0	0	0	0
Deck	1532	28	1788	14	4742	4449	1238	12419	7828	1870	10319	7834	10	861	377	8664	769	3429	121	7905	11769	10360	383	6678	3881	239	46
Engine	727	3646	1590	21	2063	2551	1159	9127	4508	1368	3473	7573	31	474	173	5974	681	3595	13	5336	5615	9167	257	6949	1584	151	42
Total[15]	**2256**	**3674**	**3378**	**35**	**6741**	**6874**	**2397**	**21541**	**11793**	**3216**	**12266**	**15395**	**41**	**1333**	**543**	**14546**	**1450**	**7023**	**134**	**10718**	**17376**	**19523**	**640**	**13623**	**5338**	**387**	**88**

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	605	13	1248	13	2817	1953	574	4287	1833	1041	1584	3285	2	351	159	3892	163	1300	48	3116	6344	4649	150	2367	1638	100	11
Chief Mate 3,000 GT or more	185	3	429	1	603	202	267	2564	673	246	593	1108	0	195	2	1120	214	805	11	881	1179	2330	79	1766	648	24	2
Master less than 3,000 GT	23	2	11	0	20	410	23	367	2099	11	245	574	4	4	126	644	0	108	2	542	2781	123	24	14	155	32	0
Chief Mate less than 3,000 GT	15	0	1	0	3	358	21	4369	1993	4	291	165	0	16	2	72	22	44	0	2447	242	159	8	23	686	3	0
OOW 500 GT or more	424	9	99	0	599	166	292	577	1230	537	565	1995	4	189	34	2652	360	1078	59	29	290	3036	110	2488	0	80	33
Master less than 500 GT, NCV	235	1	0	0	615	740	55	255	0	22	6900	537	0	105	53	255	4	85	0	641	933	0	8	20	666	0	0
OOW less than 500 GT, NCV	45	0	0	0	85	620	6	0	0	9	141	170	0	1	1	29	6	9	1	249	0	63	4	0	88	0	0
Total	**1532**	**28**	**1788**	**14**	**4742**	**4449**	**1238**	**12419**	**7828**	**1870**	**10319**	**7834**	**10**	**861**	**377**	**8664**	**769**	**3429**	**121**	**7905**	**11769**	**10360**	**383**	**6678**	**3881**	**239**	**46**

[15] 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	252	1509	991	11	1416	879	671	3465	1848	630	1486	2361	19	152	140	2783	131	1337	0	2115	3685	3838	112	2277	927	65	7
Second Engineer 3,000 kW or more	68	695	432	0	299	201	218	1349	389	76	587	1110	0	109	6	600	175	816	0	2588	847	1611	19	1385	284	27	1
Chief Engineer less than 3,000 kW	119	47	0	0	10	219	32	253	1028	51	265	577	3	9	9	378	0	126	0	52	173	177	12	6	9	13	0
Second Engineer less than 3,000 kW	17	18	1	0	0	22	12	364	465	8	91	189	0	40	1	50	12	61	0	570	0	102	4	8	21	8	0
OEW 750 kW or more	271	643	163	0	258	512	134	3353	737	465	994	1448	1	95	16	1900	241	890	13	11	0	1631	88	1574	343	17	30
Electro-technical Officer	0	734	3	10	80	718	92	343	41	138	50	1888	8	69	1	263	122	365	0	0	910	1808	22	1699	0	21	4
Total	**727**	**3646**	**1590**	**21**	**2063**	**2551**	**1159**	**9127**	**4508**	**1368**	**3473**	**7573**	**31**	**474**	**173**	**5974**	**681**	**3595**	**13**	**5336**	**5615**	**9167**	**257**	**6949**	**1584**	**151**	**42**

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	102	8	30	0	306	221	22	424	702	152	589	55	0	47	9	213	15	45	12	238	396	77	28	123	238	1	1
Male	2154	3666	3348	35	6435	6653	2375	21117	11091	3064	11677	15340	41	1285	534	14333	1435	6978	122	10290	16980	6381	612	13500	5100	386	87
Not available	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	190	0	13065	0	0	0	0	0

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

Region[16] 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	62	1	3	0	2	7	0	0	31	4	60	50	0	38	0	1	0	0	0	4	0	59	3	0	0	0	1	**326**
Americas	142	0	0	0	1	2	1	0	32	2	5	10	0	4	0	0	0	1	0	21	7	0	4	0	0	0	0	**232**
Asia	4	0	1	0	0	8	0	0	1	1	1	14	0	44	0	0	0	0	1	39	1	7	0	0	1	0	0	**123**
Europe (non-EU)	7	6	4	0	27	106	370	0	17	5	14	41	0	64	1	0	26	341	2	9	10	97	0	29	2	2	0	**1180**
Oceania	0	0	0	0	1	2	0	0	0	1	0	0	0	15	0	0	0	2	0	4	0	1	0	0	0	0	0	**26**
Total	**215**	**7**	**8**	**0**	**31**	**125**	**371**	**0**	**81**	**13**	**80**	**115**	**0**	**165**	**1**	**1**	**26**	**344**	**3**	**77**	**18**	**164**	**7**	**29**	**3**	**2**	**1**	**1887**

[16] 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	48	4	22	0	68	81	21	1221	135	75	507	203	0	57	6	693	86	116	20	883	216	76	11	140	42	6	0
25≤age<30	366	243	237	0	542	668	162	3960	1085	330	1322	1469	1	215	14	2230	424	752	25	1677	1860	1664	66	1348	408	31	11
30≤age<35	397	368	495	0	1098	852	248	3825	1401	415	1818	2116	1	209	50	2276	323	871	37	1322	2186	2192	85	2523	597	36	22
35≤age<40	272	481	323	1	1007	627	339	3573	1310	404	1826	2123	0	181	48	1702	274	1101	15	1037	1900	2769	95	2145	605	48	22
40≤age<45	213	457	130	1	778	611	248	2396	1662	421	1696	2333	0	155	41	1415	128	854	9	953	1724	2551	68	1829	585	44	7
45≤age<50	211	590	52	2	564	704	251	1741	1827	386	1672	1992	0	165	54	1463	68	844	7	1124	1987	2200	71	1439	624	41	4
50≤age<55	220	516	94	2	636	787	239	1250	1475	332	1502	1442	0	117	78	1335	41	635	2	1143	2088	1695	50	1704	644	39	2
55≤age<60	276	451	501	5	708	912	358	1613	1484	356	1157	1547	10	71	82	1402	45	747	1	1137	1826	2026	49	1094	619	39	9
age≥60	253	564	1524	24	1340	1632	531	1962	1414	497	766	2170	29	163	170	2030	61	1103	18	1442	3589	4350	145	1401	1214	103	11
Total	**2256**	**3674**	**3378**	**35**	**6741**	**6874**	**2397**	**21541**	**11793**	**3216**	**12266**	**15395**	**41**	**1333**	**543**	**14546**	**1450**	**7023**	**134**	**10718**	**17376**	**19523**	**640**	**13623**	**5338**	**387**	**88**

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	462	1094	608	232	149	85	61	36	18	**2745**
Deck	3313	13286	15941	14820	12880	11748	10407	10772	16300	**109467**
Engine	2113	9289	10698	9928	8824	8658	7962	7960	12384	**77816**
Total[17]	**4737**	**21107**	**25750**	**24216**	**21291**	**20068**	**18052**	**18503**	**28483**	**182207**

[17] 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	2	386	2911	5811	6713	6566	5329	6018	9795	**43531**
Chief Mate 3,000 GT or more	37	2180	4670	3550	1844	1176	803	729	1141	**16130**
Master less than 3,000 GT	126	911	750	699	810	965	1123	1108	1850	**8342**
Chief Mate less than 3,000 GT	1587	3762	2166	1046	676	501	377	367	460	**10942**
OOW 500 GT or more	1049	5092	4034	2168	1272	869	851	771	827	**16933**
Master less than 500 GT, NCV	383	770	1202	1387	1421	1542	1770	1629	2014	**12118**
OOW less than 500 GT, NCV	129	187	216	163	154	133	164	162	218	**1526**
Total	**3313**	**13286**	**15941**	**14820**	**12880**	**11748**	**10407**	**10772**	**16300**	**109467**

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	0	323	1892	3948	4815	5222	4709	4716	7474	**33099**
Second Engineer 3,000 kW or more	653	2511	3311	2225	1232	913	876	836	1335	**13892**
Chief Engineer less than 3,000 kW	4	49	191	280	366	494	535	702	946	**3567**
Second Engineer less than 3,000 kW	70	139	253	223	219	231	266	268	395	**2064**
OEW 750 kW or more	1244	5394	3548	1856	1154	749	636	540	707	**15828**
Electro-technical Officer	142	873	1504	1397	1042	1055	943	899	1530	**9385**
Total	**2113**	**9289**	**10698**	**9928**	**8824**	**8658**	**7962**	**7960**	**12384**	**77816**

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	229	1046	1039	631	420	319	206	89	74	**4053**
Male	4440	18644	23216	21901	19267	18271	16685	17098	25376	**164898**
Not available	68	1417	1495	1684	1604	1478	1161	1316	3033	**13256**
Total	**4737**	**21107**	**25750**	**24216**	**21291**	**20068**	**18052**	**18503**	**28483**	**182207**

Appendix B Data on masters and officers holding valid EaRs in 2021

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
EU Member State	1664	0	7613	812	3012	162	1425	57	479	1015	19	363	20	842	61	2944	144	20278	2474	3880	19	4878	7	346	41
non-EU country	2909	4	21834	2035	7447	61	6189	77	310	1579	7	272	6	2584	158	2678	430	53265	8979	13574	1	13605	1	366	0
Not available	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Total[18]	**4573**	**4**	**29442**	**2847**	**10457**	**223**	**7614**	**134**	**789**	**2592**	**26**	**633**	**26**	**3424**	**217**	**5621**	**574**	**73539**	**11450**	**17449**	**20**	**18478**	**8**	**711**	**41**

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

Country issuing the original CoC	Deck Department		Engine Department		Total[19]
	Number	Percentage	Number	Percentage	Number
EU Member State	25048	53.68%	21687	46.48%	46660
non-EU country	62415	48.97%	65068	51.05%	127452
Total[20]	**87438**	**50.23%**	**86733**	**49.83%**	**174064**

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
Chief Engineer 3,000 kW or more	759	0	6014	460	1588	53	993	27	162	336	8	128	3	756	39	1056	75	12471	2184	3302	4	3757	2	133	9
Second Engineer 3,000 kW or more	448	0	2428	238	837	11	724	6	66	237	4	56	1	339	30	558	46	6845	997	1372	2	1555	1	36	2
Chief Engineer less than 3,000 kW	76	0	3	16	27	13	0	1	6	22	0	9	1	22	11	77	36	568	304	298	0	0	0	0	0
Second Engineer less than 3,000 kW	37	0	16	7	16	1	1	2	4	6	0	1	0	84	5	30	10	533	39	85	0	0	0	0	2
OEW 750 kW or more	655	0	3822	391	2436	19	1364	34	99	446	1	33	4	617	21	610	42	11000	1296	2475	0	2093	0	86	1
Electro-technical Officer	391	0	2408	338	66	9	1418	2	8	340	1	7	0	473	22	427	4	5410	246	1389	0	1588	0	36	0
Total	**2363**	**0**	**14682**	**1449**	**4964**	**106**	**4499**	**72**	**345**	**1385**	**14**	**234**	**9**	**2291**	**128**	**2755**	**213**	**36752**	**5066**	**8907**	**6**	**8987**	**3**	**291**	**14**

[18] 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
[19] The sum of the columns may not be equal to the total because some officers held EaRs for both Deck and Engine Departments
[20] 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
Master 3,000 GT or more	780	0	6218	116	1100	37	721	4	117	214	8	141	3	255	34	1282	148	13517	1536	1928	11	3940	4	205	10
Chief Mate 3,000 GT or more	473	0	3182	366	1207	19	877	1	44	318	0	126	7	208	32	660	86	7863	2734	3308	1	2221	1	36	3
Master less than 3,000 GT	67	0	29	27	19	9	0	2	13	21	0	21	2	13	4	85	44	366	0	0	0	0	0	0	5
Chief Mate less than 3,000 GT	62	0	66	29	32	4	2	2	2	16	0	10	0	12	1	57	13	1173	0	82	1	0	0	0	7
OOW 500 GT or more	757	4	5277	860	3006	19	1523	51	232	640	4	101	5	393	18	746	69	13641	2067	3201	1	3343	0	179	0
Master less than 500 GT, NCV	77	0	0	5	94	27	0	1	30	4	0	1	1	209	0	38	1	305	36	0	0	0	0	1	5
OOW less than 500 GT, NCV	2	0	0	2	41	2	0	1	8	0	0	0	0	48	0	8	0	29	13	47	0	0	0	0	0
Total	**2217**	**4**	**14771**	**1404**	**5495**	**117**	**3122**	**62**	**446**	**1213**	**12**	**400**	**18**	**1138**	**89**	**2874**	**361**	**36806**	**6385**	**8546**	**14**	**9499**	**5**	**421**	**30**

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[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	
Belgium	0	0	63	8	5	0	54	0	0	173	0	0	0	26	0	590	0	126	232	6	0	14	0	1	0	**1200**
Bulgaria	228	0	391	30	28	0	39	0	0	57	0	1	0	108	0	78	0	2179	86	93	0	381	0	0	0	**3278**
Croatia	525	0	499	65	165	0	44	15	1	94	0	3	1	0	0	860	13	2121	307	658	0	370	0	1	1	**4909**
Cyprus	0	0	0	0	2	0	792	0	0	1	0	0	0	0	0	1	0	769	1	0	0	8	0	1	0	**1421**
Czechia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	8	0	0	0	**19**
Denmark*	5	0	41	12	0	3	0	0	1	1	0	0	1	0	4	4	1	59	135	581	0	3	1	56	0	**432**
Estonia	11	0	204	16	19	0	0	1	349	2	0	4	0	5	18	15	71	130	162	92	0	161	0	8	0	**1110**
Finland	0	0	51	1	19	79	1	0	0	0	0	0	2	0	0	0	7	31	25	110	0	19	3	177	0	**494**
France	36	0	41	3	0	0	0	4	0	0	0	0	1	0	0	150	0	218	25	3	0	6	0	0	0	**474**
Germany	12	0	146	0	109	28	2	1	2	1	0	0	0	22	0	33	2	332	146	20	1	265	0	14	1	**1011**
Greece	4	0	1299	0	3	0	0	0	1	2	0	0	0	2	0	6	0	5490	17	3	0	49	0	1	0	**6640**
Hungary	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	11	0	0	0	**18**
Iceland	0	0	1	2	17	14	0	0	0	0	0	0	0	0	6	0	1	6	11	79	9	0	0	2	0	**147**
Ireland	2	0	42	0	15	0	0	0	2	1	0	0	0	1	0	1	0	31	20	13	1	4	0	1	0	**121**

[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	
Italy	1	0	89	2	5	0	0	5	1	8	0	0	0	0	0	47	0	840	16	6	0	69	0	0	0	**1056**
Latvia	50	0	327	29	245	28	7	2	4	84	0	3	1	69	18	32	0	934	259	476	0	251	0	25	0	**2496**
Lithuania	44	0	507	47	174	8	1	10	4	13	0	37	10	28	0	131	35	264	327	163	1	371	0	7	0	**1745**
Malta	0	0	1	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	**10**
Netherlands	598	0	554	109	73	0	0	3	28	24	8	2	0	0	11	580	3	777	0	54	8	29	2	4	31	**2612**
Norway	0	0	107	3	15	0	0	1	15	1	1	0	0	0	0	5	0	124	22	0	0	6	1	23	0	**309**
Poland	107	0	2346	424	1042	0	15	1	12	71	2	311	3	0	1	170	8	2394	348	1099	0	1719	0	18	8	**8756**
Portugal	0	0	6	2	9	4	0	1	0	0	0	0	0	0	0	0	0	32	7	48	0	0	0	0	0	**108**
Romania	30	0	481	38	576	0	462	4	4	469	2	0	1	558	2	232	0	3131	265	103	0	971	0	6	0	**6257**
Slovakia	0	0	5	4	7	0	0	0	0	1	0	0	0	0	0	0	0	13	0	0	0	21	0	0	0	**42**
Slovenia	1	0	46	1	1	0	0	8	0	1	6	0	0	18	0	6	1	42	9	4	0	28	0	0	0	**140**
Spain	11	0	298	5	23	1	1	0	0	11	0	1	0	5	0	12	0	374	39	27	0	137	0	2	0	**892**
Sweden	0	0	67	11	463	0	0	1	55	0	0	1	0	0	0	0	0	70	29	663	0	4	0	0	0	**1329**

*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[22]
	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	
Algeria	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**
Argentina	87	0	6	0	0	0	0	8	0	0	0	0	0	0	0	86	0	96	0	78	0	1	0	0	0	**342**
Australia	7	0	133	3	90	0	1	0	0	1	0	1	0	1	0	39	0	173	13	456	0	56	0	0	0	**892**
Azerbaijan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	377	0	0	0	3	0	0	0	**383**
Bangladesh	7	0	21	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	**38**
Brazil	0	0	10	1	100	0	19	0	0	0	0	0	0	0	0	13	0	0	0	207	0	19	0	0	0	**365**
Cabo Verde	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	**12**
Canada	2	0	7	0	16	0	1	0	0	2	0	0	0	0	0	1	0	39	10	62	0	2	0	0	0	**139**

[22] 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[22]
	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	
Chile	0	0	2	0	0	0	0	5	0	0	0	0	0	0	0	1	0	0	0	6	0	0	0	0	0	**14**
China	0	0	245	30	206	0	10	0	5	1	0	0	0	0	0	6	0	960	101	549	0	168	0	0	0	**2157**
Cote D´Ivoire	0	0	0	0	0	0	0	0	0	79	0	0	0	0	0	41	0	0	0	0	0	0	0	0	0	**103**
Cuba	0	0	29	0	70	0	14	35	0	0	0	0	0	2	0	0	0	91	0	0	0	38	0	0	0	**250**
Egypt	1	0	259	6	7	0	0	0	0	15	0	0	0	0	0	112	1	528	0	0	0	99	0	0	0	**1004**
Ethiopia	0	0	20	2	1	0	1	0	0	0	0	0	0	0	0	2	1	48	0	0	0	68	0	0	0	**133**
Georgia	6	0	129	0	10	0	102	0	0	4	0	0	0	10	0	0	0	615	0	0	0	42	0	0	0	**860**
Ghana	2	0	53	2	9	0	0	0	0	0	0	0	0	0	0	45	0	52	0	11	0	9	0	0	0	**169**
Hong Kong	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	0	0	**8**
India	406	0	871	0	2678	0	57	0	0	85	0	0	0	423	0	243	0	4497	95	1895	0	1137	0	0	0	**11881**
Indonesia	8	0	251	0	11	0	4	0	0	28	0	0	0	0	0	85	0	294	367	48	0	135	0	0	0	**1161**
Iran, Islamic Republic of	2	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	**21**
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	**43**
Jamaica	100	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	3	0	0	0	**116**
Japan	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	**7**
Jordan	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	172	0	0	0	4	0	0	0	**180**
Korea, Republic of	0	0	8	1	1	0	0	0	1	0	0	0	0	0	0	0	0	349	0	4	0	1	0	0	0	**364**
Lebanon	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	88	0	0	0	0	0	0	0	**89**
Madagascar	0	0	0	0	0	0	0	0	0	51	0	0	0	0	0	51	0	0	0	0	0	0	0	0	0	**68**
Malaysia	2	0	25	0	0	0	0	0	0	1	0	0	0	0	0	7	0	50	0	37	0	3	0	0	0	**123**
Mexico	1	0	23	2	11	0	0	3	0	0	0	0	0	0	0	5	0	0	0	0	0	3	0	0	0	**43**
Montenegro	1	0	249	1	12	0	5	0	0	0	0	0	0	0	0	25	0	667	12	48	0	217	0	0	0	**1115**
Morocco	0	0	65	0	0	0	0	0	0	16	0	0	0	0	0	5	0	0	0	0	0	2	0	0	0	**82**
Myanmar	0	0	81	5	24	0	0	0	0	9	0	0	0	0	0	1	0	509	0	107	0	110	0	0	0	**795**
New Zealand	4	0	52	1	32	0	0	0	0	2	0	0	0	0	0	5	0	90	50	102	0	18	0	0	0	**335**
Nigeria	1	0	7	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**22**
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	**1**

Country issuing the original CoC	EU Member State issuing the EaR																									Total[22]
	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	
Pakistan	0	0	30	0	0	0	2	0	0	0	0	0	0	0	0	0	0	104	0	0	0	16	0	0	0	**147**
Panama	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	**6**
Peru	0	0	59	0	0	0	0	15	0	0	0	0	1	0	0	2	0	240	0	5	0	301	0	0	0	**585**
Russian Federation	278	0	4196	382	349	44	270	0	26	92	0	172	3	37	132	300	296	6490	2840	1679	0	2511	0	1	0	**17865**
Senegal	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	**10**
Serbia	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	**4**
Singapore	7	0	59	0	172	0	0	0	0	5	0	0	0	0	0	19	0	271	11	99	0	63	0	0	0	**686**
South Africa	0	0	9	0	79	0	0	0	0	0	0	0	0	0	0	15	0	0	12	4	0	7	0	0	0	**121**
Sri Lanka	1	0	101	3	37	0	0	0	0	0	0	0	0	0	0	0	0	397	0	19	0	189	0	0	0	**664**
The Philippines	477	1	8419	1041	2253	0	4081	0	250	663	5	1	2	1853	0	623	0	17906	2327	6371	0	2728	0	362	0	**47313**
Tunisia	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	13	0	10	0	0	0	0	0	0	0	**41**
Turkiye	0	0	7	5	17	0	0	0	1	0	0	0	0	0	0	61	0	5887	4	1	0	420	0	0	0	**6170**
Ukraine	1375	3	5443	544	560	14	1611	0	13	430	2	12	0	0	25	774	130	10747	2739	855	0	4959	1	0	0	**25440**
United Kingdom	132	0	755	7	709	0	14	2	13	43	0	86	0	258	0	88	2	1375	315	487	1	228	0	3	0	**4321**
United States	2	0	15	2	8	0	0	0	0	0	0	0	0	0	0	0	0	65	2	19	0	0	0	0	0	**113**
Uruguay	0	0	3	0	0	0	0	9	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	**15**
Viet Nam	0	0	135	0	0	0	0	0	0	0	0	0	0	0	0	3	0	75	73	18	0	42	0	0	0	**340**

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	1438	11793	17553	16237	12915	10262	6302	5415	5523	**87438**
Engine	1132	9608	14960	14029	10748	10453	9381	8247	8175	**86733**
Total[23]	**2569**	**21375**	**32494**	**30247**	**23652**	**20704**	**15673**	**13658**	**13692**	**174064**

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	68	1543	4367	4899	5530	4986	4669	5198	**31262**
Second Engineer 3,000 kW or more	32	900	4043	3788	1999	1512	1222	996	833	**15325**
Chief Engineer less than 3,000 kW	0	16	91	150	177	209	225	235	334	**1437**
Second Engineer less than 3,000 kW	7	72	191	145	90	97	69	76	114	**861**
OEW 750 kW or more	903	7641	7298	3501	1869	1722	1323	954	645	**25856**
Electro-technical Officer	191	1020	2086	2330	1862	1489	1659	1409	1142	**13188**
Total	**1132**	**9608**	**14960**	**14028**	**10748**	**10453**	**9381**	**8247**	**8176**	**86733**

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	2	101	1666	4874	5890	5670	3939	3765	4175	**30082**
Chief Mate 3,000 GT or more	39	1388	6315	5822	3429	2222	1196	824	643	**21878**
Master less than 3,000 GT	0	4	38	83	90	103	119	124	139	**700**
Chief Mate less than 3,000 GT	79	554	424	187	77	74	51	43	61	**1550**
OOW 500 GT or more	1317	9813	9338	5440	3509	2189	957	616	462	**33641**
Master less than 500 GT, NCV	1	29	105	128	120	124	106	103	88	**804**
OOW less than 500 GT, NCV	3	31	32	42	33	18	20	14	7	**200**
Total	**1438**	**11793**	**17553**	**16237**	**12915**	**10262**	**6302**	**5415**	**5523**	**87438**

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

Table 2-20 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	82	567	441	192	98	48	23	13	17	**1481**
Male	2487	20804	32044	30044	23549	20651	15647	13638	13670	**172534**
Not available	0	7	15	17	7	6	5	7	5	**69**
Total	**2569**	**21375**	**32494**	**30247**	**23652**	**20704**	**15673**	**13658**	**13692**	**174064**

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

Region[24] 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	672	9052	13526	11724	9521	8929	5612	3955	3017	**66008**
EU	479	4773	7602	7654	6216	5207	4264	4485	5980	**46660**
Europe (non-EU)	1373	6908	10206	10030	7336	6154	5412	4835	4253	**56507**
Rest of the World	45	645	1178	866	592	427	394	390	449	**4986**
Total	**2569**	**21374**	**32494**	**30247**	**23652**	**20704**	**15672**	**13658**	**13691**	**174061**

[24] 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 2021

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	36	864	1143	760	214	771	5	3465	106	2208	5847	5430	1324	2564	3
Rating forming part of a navigational watch	1288	1968	769	5717	826	1874	3385	25	2583	264	1014	728	9891	1260	1647	11
Able seafarer engine	0	16	860	473	436	117	198	2	1216	19	835	950	553	723	604	1
Rating forming part of an engineering watch	355	491	0	3442	618	1183	1559	24	1179	82	571	189	4400	1567	465	11
Electro-technical rating	0	129	73	197	388	184	1535	0	655	21	49	1187	375	932	200	1
Dual-purpose rating (VII)	203	2148	0	0	1588	0	0	0	0	0	0	0	0	0	0	0
Total[25]	**1762**	**4683**	**2139**	**9241**	**3668**	**2977**	**6427**	**49**	**7373**	**465**	**4433**	**8562**	**14488**	**4462**	**4865**	**27**

[25] 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 2022 and 2023

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[26]	PH	UA	EL	PL	RU	HR	IT	NO	IN	TR
2022										
Linear Forecast	15.64%	7.92%	8.19%	5.81%	5.45%	4.73%	4.68%	6.43%	3.73%	1.73%
ETS Forecast	15.99%	8.26%	7.54%	5.92%	5.45%	4.77%	4.63%	7.23%	4.01%	1.78%
ETS Confidence bound (±)	1.98%	0.98%	1.61%	0.63%	0.37%	0.41%	1.09%	1.12%	0.57%	0.48%
2023										
Linear Forecast	16.27%	7.97%	8.69%	5.56%	5.44%	4.73%	4.71%	6.70%	3.91%	1.71%
ETS Forecast	16.62%	8.31%	8.04%	5.68%	5.44%	4.76%	4.66%	7.44%	4.19%	1.76%
ETS Confidence bound (±)	2.67%	1.32%	2.17%	0.71%	0.37%	0.42%	1.13%	1.12%	0.77%	0.48%

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[27]	Deck ML	Engine ML	Deck OL	Engine OL
2022				
Linear Forecast	41.90%	27.21%	14.05%	19.38%
ETS Forecast	42.41%	27.73%	14.52%	19.38%
ETS Confidence bound (±)	3.11%	0.52%	0.99%	0.42%
2023				
Linear Forecast	42.08%	26.87%	13.60%	20.17%
ETS Forecast	42.59%	27.39%	14.07%	20.17%
ETS Confidence bound (±)	3.11%	0.74%	1.33%	0.42%

[26] 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

[27] 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[28]	EU	Non-EU	All
2022			
Linear Forecast	2.42%	0.70%	1.70%
ETS Forecast	2.42%	0.70%	1.68%
ETS Confidence bound (±)	0.07%	0.03%	0.05%
2023			
Linear Forecast	2.46%	0.74%	1.73%
ETS Forecast	2.46%	0.80%	1.71%
ETS Confidence bound (±)	0.07%	0.04%	0.07%

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[29]	PH	EL	UA	PL	RU	HR	IT	RO	FR	NO
2022										
Linear Forecast	13.93%	9.16%	7.87%	5.66%	4.80%	4.66%	4.79%	4.56%	3.65%	5.07%
ETS Forecast	14.36%	8.64%	8.23%	5.70%	4.73%	4.70%	4.74%	4.52%	3.53%	5.61%
ETS Confidence bound (±)	2.10%	1.52%	0.96%	0.63%	0.35%	0.40%	1.08%	0.42%	0.61%	1.00%
2023										
Linear Forecast	14.34%	9.70%	7.92%	5.54%	4.70%	4.65%	4.83%	4.68%	3.45%	5.18%
ETS Forecast	14.77%	9.18%	8.28%	5.58%	4.63%	4.69%	4.78%	4.64%	3.34%	5.87%
ETS Confidence bound (±)	2.82%	2.04%	1.29%	0.65%	0.35%	0.40%	1.11%	0.52%	0.61%	1.01%

[28] 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
[29] 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[30]	Asia	EU	Europe (non-EU)	rest of the world
2022				
Linear Forecast	19.47%	57.43%	15.72%	1.26%
ETS Forecast	19.72%	56.46%	16.75%	1.26%
ETS Confidence bound (±)	2.29%	3.69%	2.02%	0.14%
2023				
Linear Forecast	19.24%	57.16%	15.70%	1.15%
ETS Forecast	19.48%	56.19%	16.72%	1.15%
ETS Confidence bound (±)	2.30%	4.97%	2.72%	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[31]	EU	Non-EU	All
2022			
Linear Forecast	44.2	40.8	42.8
ETS Forecast	44.4	40.8	42.9
ETS Confidence bound (±)	0.5	0.5	0.3
2023			
Linear Forecast	44.3	40.9	42.9
ETS Forecast	44.5	40.9	43.0
ETS Confidence bound (±)	0.7	0.5	0.4

[30] 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

[31] 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[32]	EU ML	non-EU ML	All ML	EU OL	non-EU OL	All OL
2022						
Linear Forecast	45.9	44.5	45.5	37.7	36.3	37.0
ETS Forecast	45.9	44.7	45.6	37.8	36.5	37.0
ETS Confidence bound (±)	0.4	0.7	0.4	0.5	0.5	0.4
2023						
Linear Forecast	45.9	44.6	45.5	38.0	36.5	37.2
ETS Forecast	45.9	44.8	45.6	38.1	36.7	37.3
ETS Confidence bound (±)	0.4	0.9	0.5	0.6	0.7	0.5

[32] 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

Appendix E Overview - Crew 2016-2021

Table 2-30 Estimated number of masters and officers to crew EU Member State flagged vessels

Crew[33]	2016	2017	2018	2019	2020	2021
Deck	67405	75873	75874	76448	71763	71950
Engine	55469	61406	61550	61708	58920	59671
Total	122874	137279	137424	138156	130684	131622

[33] The values represent 3 crews complement needed for each 2 vessels increased in 10%.

Appendix F COVID-19 - Masters and officers holding CoCs/EaRs expiring in 2020

Table 2-31 Masters and officers holding CoCs and/or Ears expiring in 2020 that might have been extended by prerogative, in light of the IMO Circular Letter No.4204/Add.5/Rev.1

Cert. Type	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	Total[34]
CoC	182	123	149	3	610	550	234	2,297	756	240	1,557	433	0	92	4	615	409	0	1,033	5	309	4,769	1,732	29	555	414	23	6	**17128**
EaR[35]	535	0	5895	0	596	1,090	38	1,423	29	105	413	2	0	118	8	716	19	1,049	110	12,613	1,801	2837	3	2,436	2	58	3	0	**29570**

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

[35] These numbers encompass EaRs issued to holders of CoCs issued by both EU and non-EU countries

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