

# INLAND NAVIGATION IN EUROPE

Marketobservation

2009

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# **Market Observation No. 9**

**Supply and Demand in 2008 and Analysis of the Situation as of  
Mid- 2009**

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*October 2009*

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## FOREWORD

This publication appears at a time when inland navigation is still caught up in the midst of the economic crisis. Although the first signs of a recovery are visible in the maritime ports particularly in the container sector, the inland navigation sector still has to contend with a very low demand for transportation. In the first few months of 2009 the average drop in demand was 25%, and only the mineral oil sector was able to record a rise.

Given that the container sector is closely tied to the development of the global economy, it serves as an early indicator of the demand for transport by inland navigation. The container segment also offers a beacon of hope for inland navigation, since it has long enjoyed high growth rates. That is why this publication homes in on container navigation when tackling the issue of demand for transport. Another new feature is the specific analysis of the Austrian Danube market, particularly the steel sector.

Despite the difficult demand situation new units appeared on the market which had been ordered some while before the crisis. These are mostly being deployed in Western Europe and on the Rhine. Conversely, the reduced incidence of scrapping and sales to the new EU Member States and to third states meant that significantly less capacity was drained from the Western European fleet.

In view of the above it would appear important to examine the development of vessel capacity over recent years in greater detail. It must be ascertained whether the building wave of the past few years served to meet demand or merely to generate surplus capacity. If the latter is true, it is vital to establish whether this over-capacity is structural in nature or is due to circumstances prevailing in the short-term. In order to do this, a model was created to allow for such analyses to take place. However, the first results will only be available in the next publication.

It is widely acknowledged that it is becoming ever harder to find trained personnel to work in inland navigation. There is even a concern that the shortfall in personnel could lead to a bottleneck in the coming years. Workers are needed to provide crews for the newly deployed large units and, at the same time, many inland naviga-

tion operators are set to retire in the years to come. This raises the question as to the level of education and training measures required, and how to make these posts appealing.

In order to respond to these questions, this publication offers a thematic report on the inland navigation labour market and its developments.



# **Thematic Report: Inland Navigation Labour Market**

## I. INTRODUCTION AND PREFACE

The following report deals with the issue of the labour market for inland navigation. For a good many reasons, this topic is plainly of crucial importance for the future of inland navigation.

On the one hand, ongoing technical developments in terms of larger vessels and investments in vessels with new capacity mean a need for extra personnel in all areas of activity covered by inland navigation. In the long-term there is likely to be a slight increase in transport volume, here too implying an ongoing need for extra personnel.

In light of the somewhat unfavourable age structure, a large chunk of the labour force is expected to leave the sector over the next ten to twenty years. Various factors make it no easy task to offset this drop in employment. Against this backdrop, the following monographic report first offers an assessment of the employment situation in Belgium, Germany and the Netherlands. Employment in these countries plays a significant role for the inland navigation market throughout Europe. A following report goes on to address the labour markets of other countries.

As a multinational project, this report has to grapple with the problem of different countries using different terms to designate certain groups of inland navigation operators. For the sake of a linguistically consistent and comprehensible analysis, it is therefore essential to hit upon common terms to describe the same groups of people in different countries.

In this light it was decided that however they were designated in the various countries, self-employed workers in the inland navigation sector would be described as self-employed inland navigation operators. The complementary class of workers would be termed „contract employees“.

There is another distinction to be drawn between nautical and non-nautical personnel. The latter includes catering staff onboard vessels alongside shore-based personnel such as inland navigation operators working in coastal or inland ports. In this report it was decided to use the term „shipboard personnel“ for those in the „nautical“ category. Non-nautical personnel on vessels are referred to as „catering

personnel“, and the remainder of the workforce fall under the term „shore personnel“.

## II. INITIAL APPRAISAL

### 1. General Employment Development and Correlation Between Countries

In addressing the issue of employment in inland navigation, a distinction is to be drawn between contract staff and self-employed operators. Both categories are dealt with together in the following section, but later on the reader will find a disaggregation which provides information on the structural differences between countries and on developments regarding the two categories.

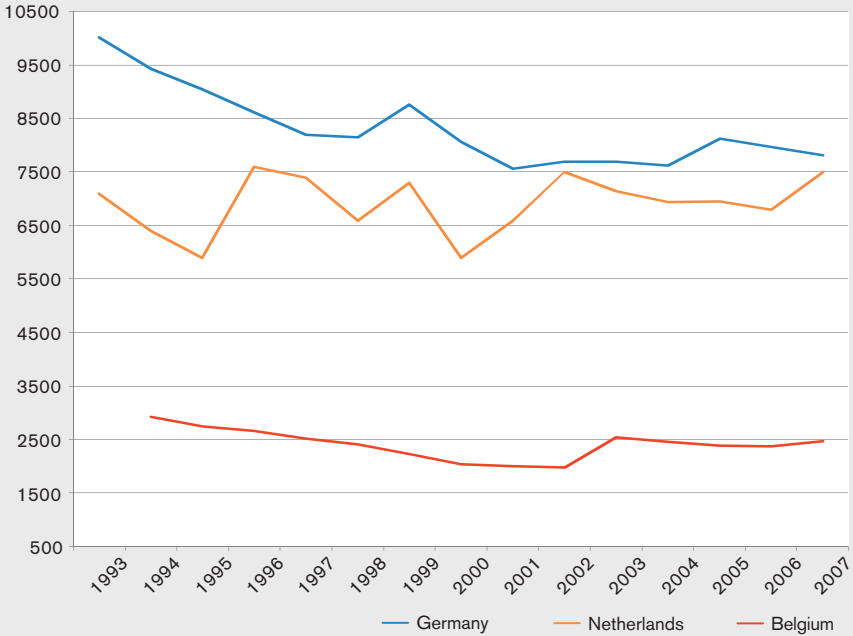
The graph below depicts the employment development of inland navigation for Belgium, the Netherlands and Germany from 1993 till 2007. Employment in Germany dropped markedly in the 90s, although the trend has stabilised in recent years.

In the same timeframe employment in the Netherlands increased slightly. The employment level for Belgium is generally lower than that of the other two countries. Closer analysis reveals a decline until 2000 and a consistent trend thereafter.<sup>1</sup>

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<sup>1</sup> The break in the Belgian time-series for 2002 is explained by the inclusion from 2003 of ancillary female family members as “self-employed operators” in the official statistics.

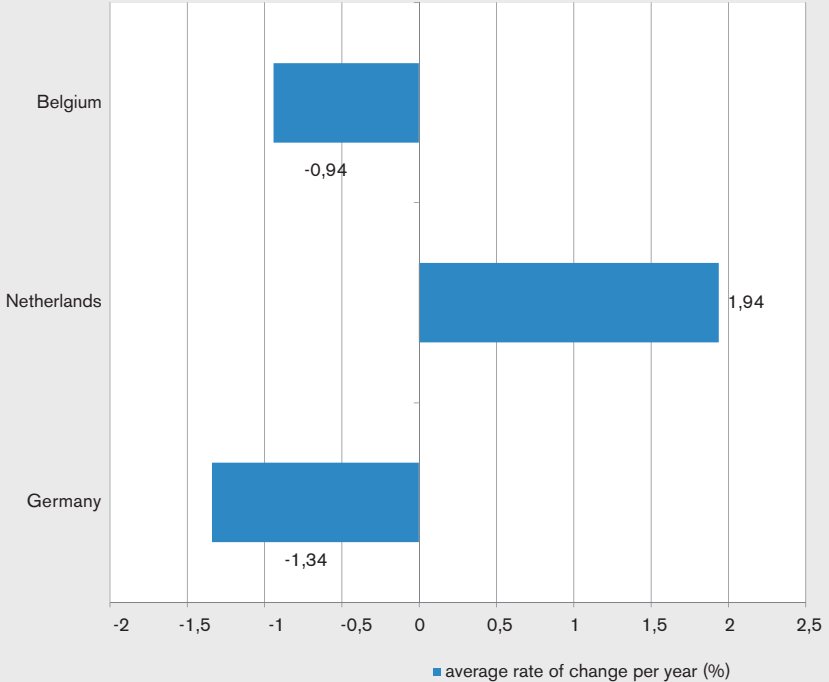
**Figure 1: Employment in inland navigation for Belgium, the Netherlands and Germany**



Source: destatis ; ONSS ; INASTI; CBS

Examination of the overall situation for the period 1995 to 2007 yields a mixed picture: On average there is an annual reduction in employment for Belgium and Germany, as compared to an increase in the Netherlands.

**Figure 2: Average employment development in Belgium, the Netherlands and Germany \***



Source: Calculations by the CCNR Secretariat , \* Period 1995 to 2007

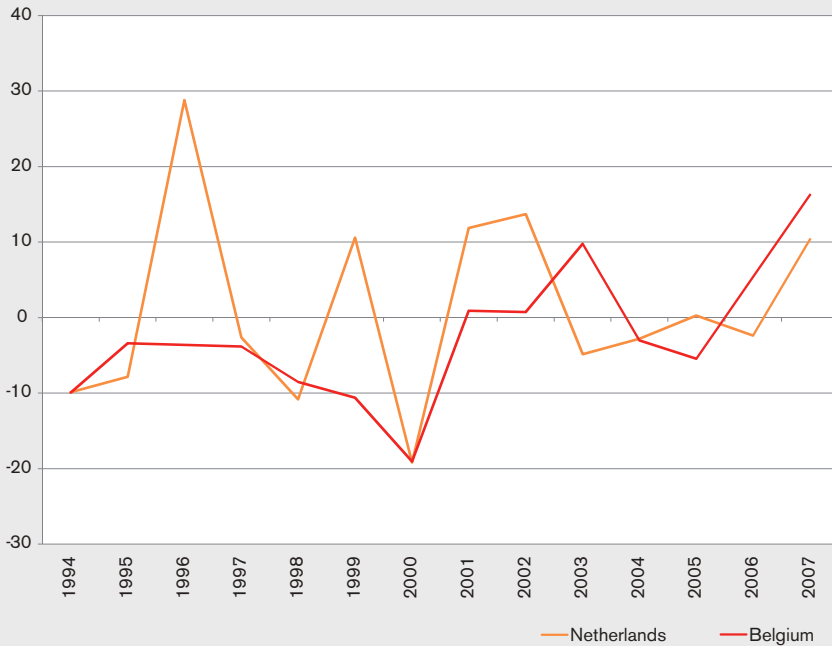
This balance-based approach should not detract from the fact that there are common trends in the employment development of individual countries, especially the Netherlands and Belgium.

The chart below shows the rate of change in employment for both countries. Three main stages can be distinguished.

The first stage comprises the period from 1994 to 2000 where the trend is negative. The second stage could be seen as a phase of recovery until 2004. This is followed by the third stage, characterised by increasing employment.

Curiously enough, these three stages apply to both Belgium and the Netherlands, and there would even seem to be a very positive correlation<sup>2</sup> between the series 'Rate of change for employment in Belgium' and 'Rate of change for employment in the Netherlands'.

**Figure 3: Comparative rates of change for employment in Belgium and the Netherlands**



Source: Calculations by the CCNR Secretariat; \* Rate of change compared to the previous year in %; annual values.

<sup>2</sup> Correlation, defined in statistics as a causally omnidirectional mutual dependence, can be statistically gauged for metrically scaled variables by means of the Bravais-Pearson correlation coefficient. For the two series in question – Belgium and the Netherlands – this amounts to 0.38. This may be perceived as fairly high for stationary series like rates of change.

Broadly speaking, the 'better' employment balance for the Netherlands is illustrated by the upwardly sloping curve, compared to that of Belgium. Until 2000 the curve for Belgium was merely the lower envelope of that for the Netherlands. The common trend is nonetheless plain to see.

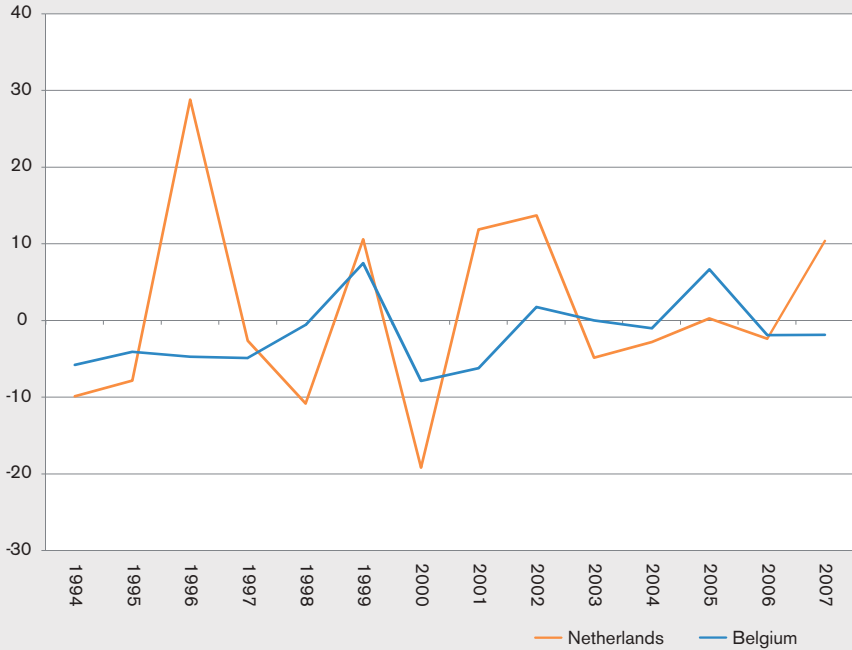
Various factors may serve to clarify this positive correlation. One possible explanation relate to the intensive economic ties between the two countries. Furthermore inland navigation in both countries is greatly influenced by developments in the maritime ports, therefore both are affected in a similar way by upheavals or positive trends in the volume of cargo handled in the coastal ports and via hinterland traffic.

The role played by these factors is shown by the fact that the correlation in employment between Germany and the Netherlands, while positive, is still considerably weaker than that between Belgium and the Netherlands<sup>3</sup>.

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<sup>3</sup> *The Bravais-Pearson correlation coefficient between the Netherlands and Germany is 0.22.*

**Figure 4: Comparative rate of change in employment between the Netherlands and Germany**



Source: Calculations by the CCNR Secretariat; \* Rate of change compared to the previous year in %; annual Values

## 2. Employment by Section and Function

Employment may be divided in various fashions. One possibility is to make a distinction between the market segments for dry cargo transport, tanker transport and passenger navigation. In addition shipboard personnel are to be distinguished from shore-based personnel working in the inland or coastal ports. A further split can be made between contract employees and self-employed inland navigation operators.<sup>4</sup>

<sup>4</sup> This is addressed in greater depth in a special chapter.



For the Netherlands, the graph below shows how the decrease in tanker transport is matched by a reduction in employment. In contrast to dry cargo transport, over the past ten years employment has tended to drop. This can clearly be attributed to the dwindling importance of the transport of mineral oil products. As already indicated in the Market Observation Reports, the transport of mineral oil products – via inland navigation on the Rhine has been decreasing for quite some time.<sup>5</sup>

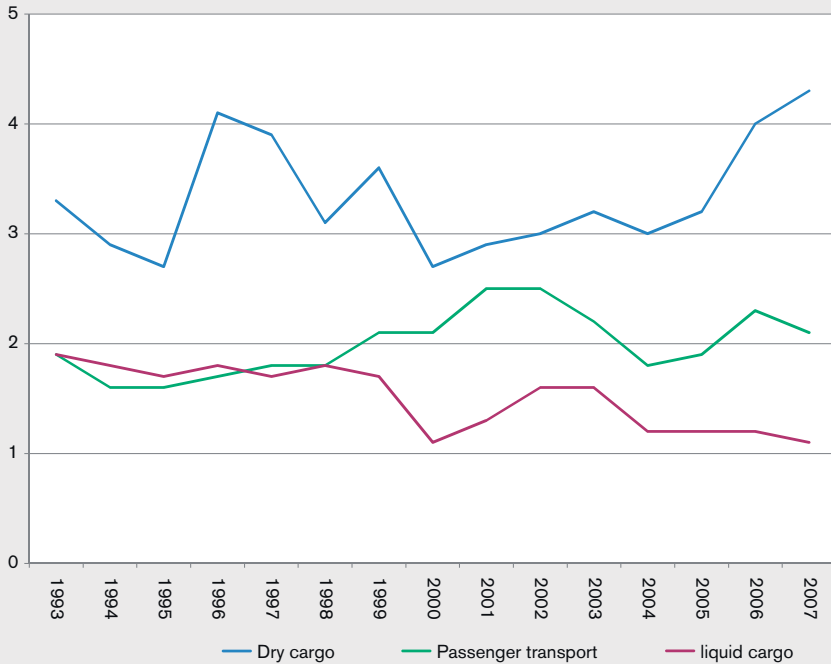
A key reason for the divergent development is to be found in structural factors. Only in recent years did personnel-intensive multi-shift operation gain momentum on dry cargo vessels, which brought about a need for extra workers. This mode of work has been common on tanker vessels for quite some time.

For the Netherlands the increase in employment in the dry cargo segment can only partially be explained by the growing demand for transport in 2005, 2006 and 2007. Much of the explanation is to be found in structural developments such as the introduction of multi-shift operation mentioned above, on larger and newer vessels.

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*5 Compare Market Reports 2008-1, 2008-2. Some increases are either seasonal (winter temperatures) or are due to prevailing circumstances (fluctuating oil prices), as was recently the case. However, these do not counter the long-term downward trend.*

**Figure 5: Employment by market segment in the Netherlands**



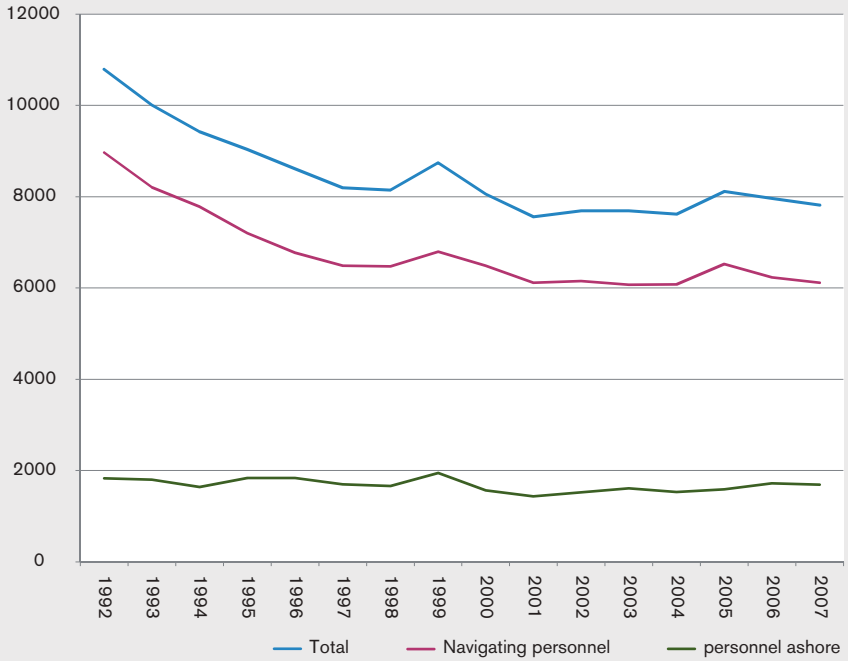
Source: Central Bureau voor de Statistiek (CBS); Y-axis unit: 1 000 people

In the case of Germany, the distinction between shipboard personnel, self-employed inland navigation operators and shore-based personnel reveals that the fall in overall employment has largely gone hand-in-hand with the drop in shipboard personnel.

There was a disproportionately large decrease among the self-employed inland navigation operators<sup>6</sup> who are part of the shipboard personnel. Overall employment in Germany fell by 28% between 1992 und 2007. Shipboard personnel fell by 32 % whilst the number of self-employed inland navigation operators went down by 38 %.

<sup>6</sup> Designated as “vessel owners” in German official statistics.

**Figure 6: Employment in Germany by field of activity\***

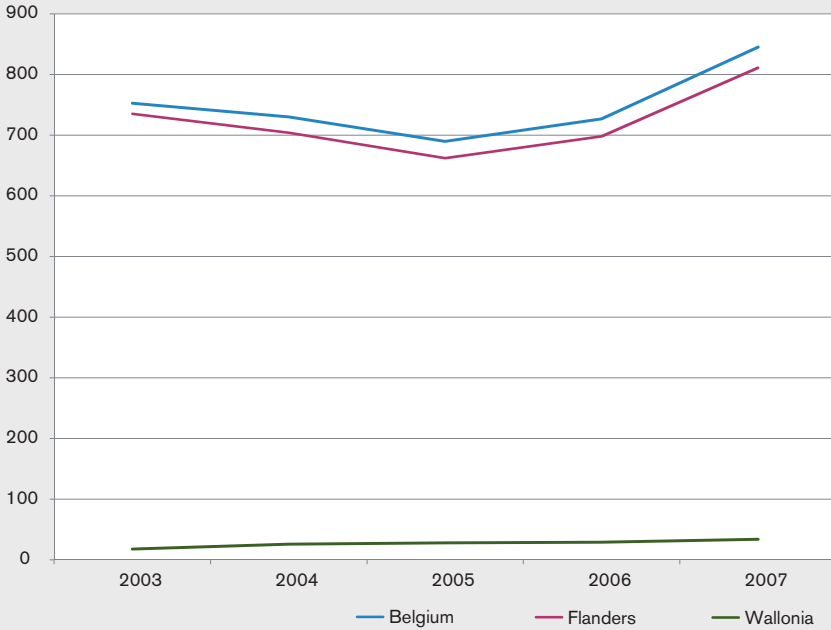


Source: Bundesamt für Güterverkehr; destatis; \* shipboard personnel includes the self-employed inland navigation operators who are not referred to separately here.

	Shipboard personnel	Land personnel	Total
Figure 2008	6122	1690	7812

Finally a regional distinction can help shed some light on the general structures of the sector. In Belgium there is a blatant disproportionality between Flanders and Wallonia. As the graph below shows, the majority by far of employees covered by the social security system are to be found in Flanders.

**Figure 7: Inland navigation employees covered by social security in Belgium by region**



Source: ONSS

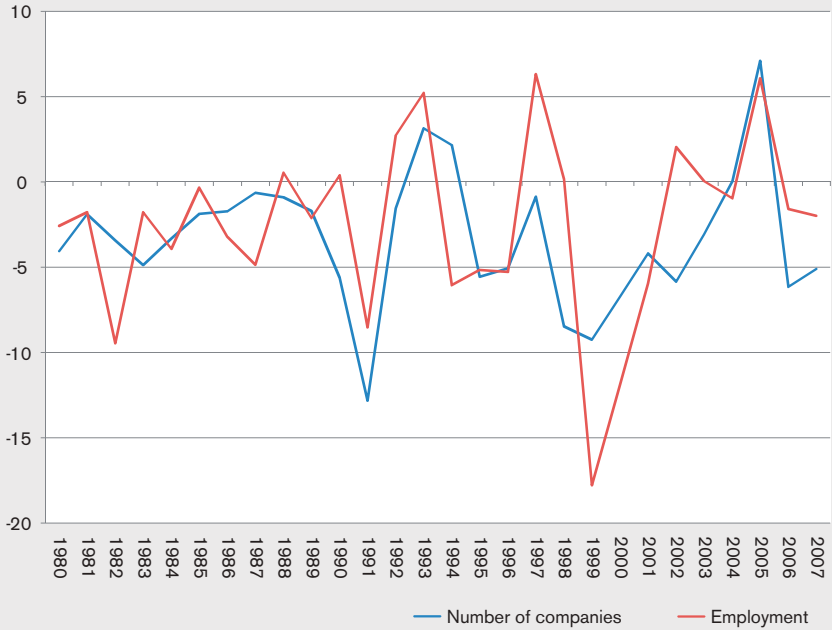
The relationship depicted above can be explained by the importance of the coastal ports of Antwerp and Gent in Flanders and their role in hinterland road haulage.

### 3. Employment and Number of Enterprises

The development of employment in inland navigation is inextricably linked to the changing number of enterprises. For several decades the number of inland navigation enterprises in Germany has been on the wane. During the observation period there has been a parallel decrease in employment.

The precise relationship between the two factors from 1980 on is shown in the following graph. There is clearly a strong correlation between the two factors.<sup>7</sup> There is also a slightly higher degree of fluctuation in the employment developments.

**Figure 8: Rate of change in employment and the number of enterprises in German inland navigation**



Source: destatis; Calculations by the CCNR Secretariat; Rate of change compared to the previous year in %

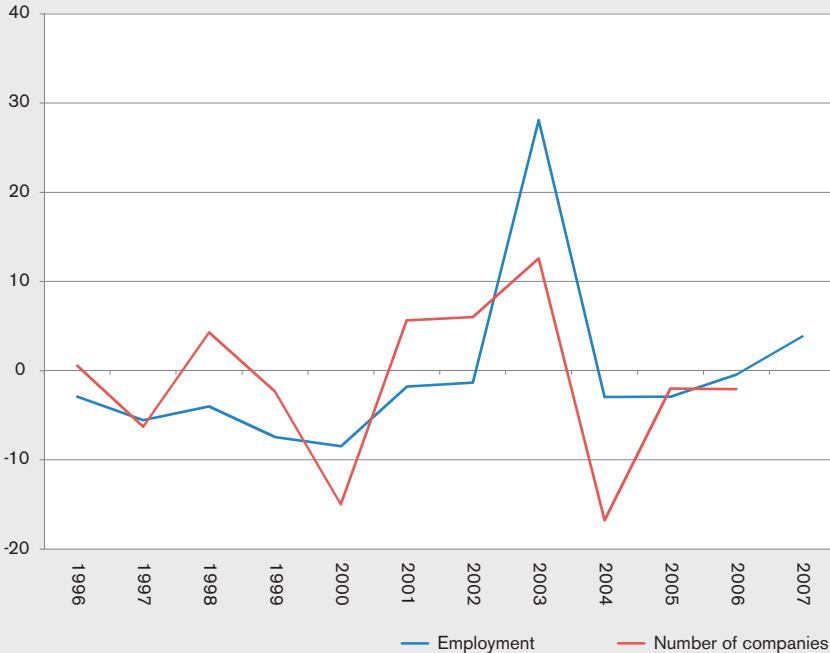
In 2007 there were 1115 inland navigation companies registered in Germany.

<sup>7</sup> The Bravais-Pearson correlation coefficient for both series is 0.57.

For Belgium, there is a similarly strong correlation between employment and the number of enterprises. This is borne out by the next graph although the development of enterprises is slightly earlier than that for employment.

This time-lag is economically plausible and serves to confirm the assertion proven by a swathe of economic studies that employment rates trail behind general developments within the economy. If the number of enterprises drops, institutional reasons dictate that employment will only go down after a certain time has elapsed.

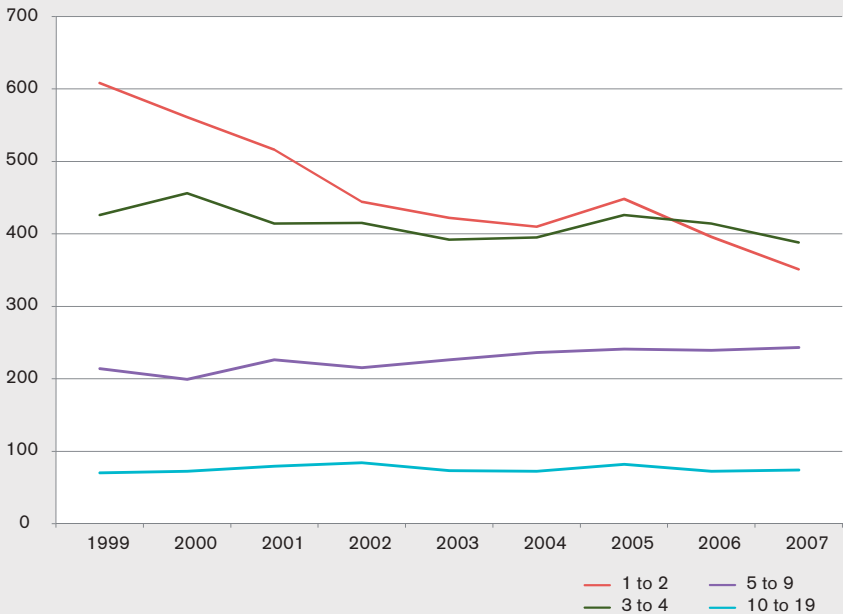
**Figure 9: Rate of change in employment and the number of enterprises in Belgian inland navigation \***



Source: ITB; ONSS; INASTI; \* employment as a whole, including self-employed operators; rate of change compared to the previous year in %

For Germany the contraction of recent years can generally be put down to the widespread disappearance of enterprises with 1 to 4 employees. There was a particularly marked decrease in the number of very small enterprises of up to 2 employees (see graph). For larger enterprises there were no decreases over the entire period.<sup>8</sup> The size-classes of 5-9 and 20-49 employees registered an increase.

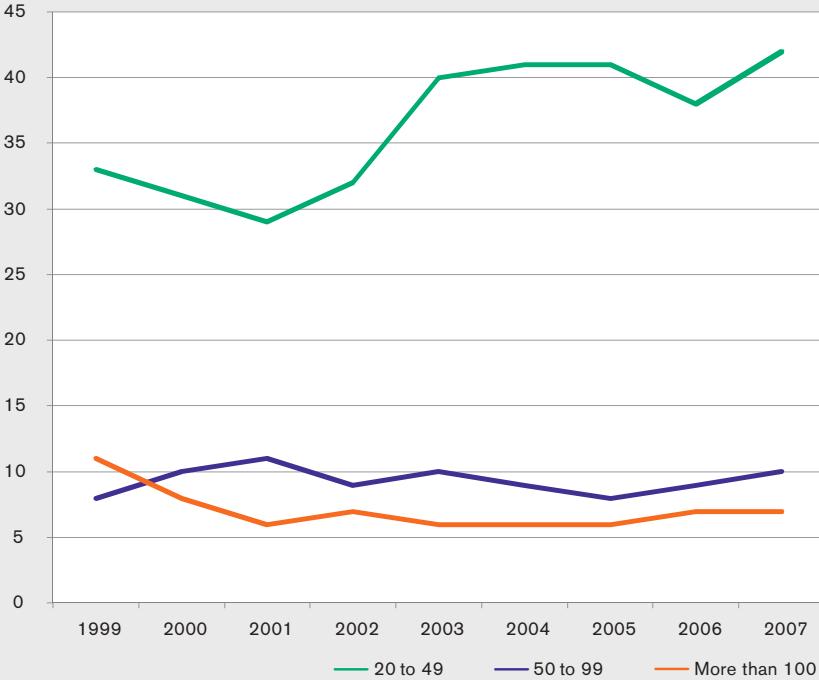
**Figure 10: Number of enterprises in German inland navigation by employee size-class**



Source: destatis; BAG

<sup>8</sup> There is just one exception. The number of enterprises with 100 or more employees fell from 11 to 7 between 1999 and 2007. Nonetheless most of the decrease – from 11 to 8 – happened in 1999 alone.

**Figure 11: Number of enterprises in German inland navigation by employee size-class**



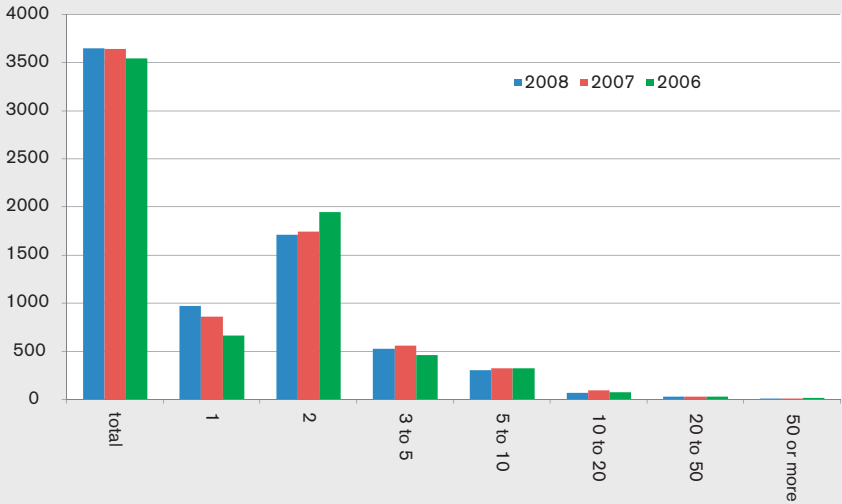
Source: destatis; BAG

Structurally speaking, the Dutch enterprise sector resembles that of Belgium and Germany in that the majority of enterprises are small companies with only a few employees. However, in the period 2006 to 2008, the Netherlands did not undergo a reduction in the number of these enterprises and this had a stabilising effect on the overall development.

The number of enterprises with two employees did drop slightly between 2006 and 2008, though this was countered by a rise in the number of enterprises with just one employee.



**Figure 12: Dutch inland navigation enterprises by number of employees**



Source: Central Bureau voor de Statistiek

In absolute terms, the Dutch figure of 3650 enterprises for 2008 was more than three times as high as Germany (1115 in 2007). For Belgium, the significance of small enterprises can be gleaned from the number of enterprises with only one vessel. There were around 1000 such “one-ship companies” in 2006 making this size-class the most common by far. The number of such enterprises did drop between 2003 and 2006. All other size-classes either remained stable or registered moderate increases.

It would therefore appear that the contraction in the number of enterprises for Belgium, and more particularly in Germany, can mostly be attributed to the disappearance of smaller operators. It is likely that the decrease in employment in both countries is also down to the reduction in small enterprises. This is due to the close empirical correlation between the changing number of enterprises and the number of employees, as can be seen in the Figures.

A cause underlying the crisis of small enterprises could be the problem of succession.<sup>9</sup> The fact that a retiring inland navigation operator is able to sell his vessel off may mean he has less incentive to train somebody to take his place or invest in the future. These factors have a doubly negative effect on the continued existence of the enterprise.

A second potential cause lies in disadvantages in tapping into economies of scale<sup>10</sup>. These tend to represent a key competitive advantage for inland navigation compared to rail and road, since the larger cargo capacity offers cost benefits. Nonetheless small operators are less able to exploit these economies of scale than large enterprises.

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<sup>9</sup> See also: BAG (2009), p. 3 and p. 26.

<sup>10</sup> *Economies of Scale in the transport sector refer to cost advantages in the bulk conveyance of cargo, particularly bulk goods. Inland navigation is better able to draw on these economies of scale since ships have a greater load capacity than railway trucks or HGVs.*

### III. IMPORTANT STRUCTURAL CHARACTERISTICS OF THE LABOUR MARKET FOR INLAND NAVIGATION

In order to gauge the future evolution of the labour market, it is essential to have knowledge about the age structure of the employees. It is also vital to assess the situation and trends as regards training and to get a feel for the importance of foreign employees in the labour market, and predict how their role will develop. The size of the enterprise is also a critical indicator.

#### 1. Age Structure

The age structure is an important determining factor affecting future demand for workers in a given sector of industry. This is all the more relevant for inland navigation since its demographics are rather unfavourable when compared to other branches of industry.

In examining the age structure, some shortcomings must be accepted due to the lack of comprehensive statistics. In the case of Germany and Belgium data are restricted to those workers paying into the social security, meaning most, though not all inland navigation employees are caught by the statistics.<sup>11</sup>

For the Netherlands the reference parameter was statistics on holders of registers of service. The problem is that not all inland navigation employees active in the Netherlands have a Dutch register of service. This applies especially to Eastern European operators. In addition, some holders of registers of service are no longer active in the sector.<sup>12</sup>

In the light of these obstacles, it is to be noted that Germany has the least propitious age structure of the three. In 2007 39.1 % of its inland navigation employees

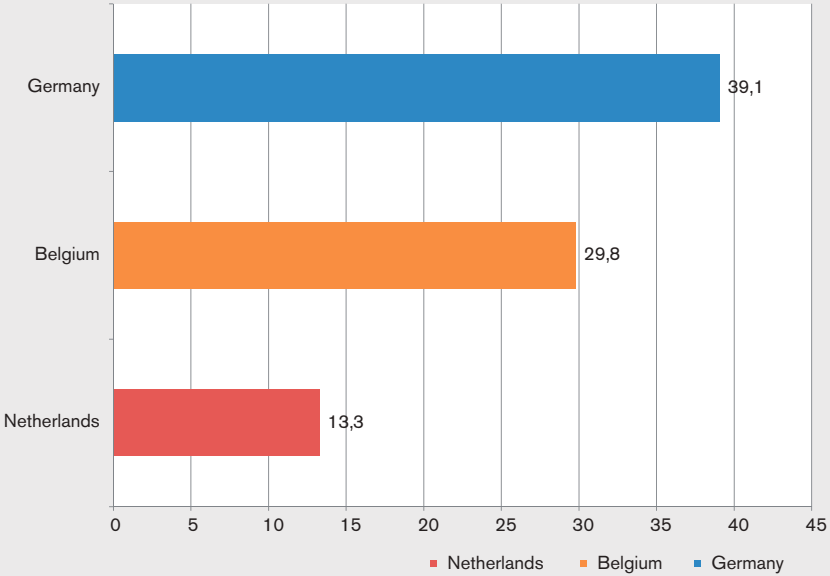
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<sup>11</sup> *In 2008 in Germany there were around 6.8m so-called 'short-time jobs' meaning either limited-term employment or low-paid jobs. In the latter case remuneration must not regularly exceed EUR 400 per month. Workers within this limit are exempt from paying social insurance contributions and thus are not caught by the statistics on social security contributors.*

<sup>12</sup> *Oral information from Kantoor Binnenvaart and CBRB from 29.07.2009.*

were over 50. The proportion of over 50s in the wider economy was 28.8 %.<sup>13</sup> The chart below provides an overview of the results for the three countries.

**Figure 13: Proportion of those aged 50-65 employed in inland navigation (%)**



Source: ONSS, Bundesagentur für Arbeit, Bundesamt für Güterverkehr, Inspectie Verkeer en Waterstaat; Stichting Afvalstoffen en Vaardocumenten Binnenvaart

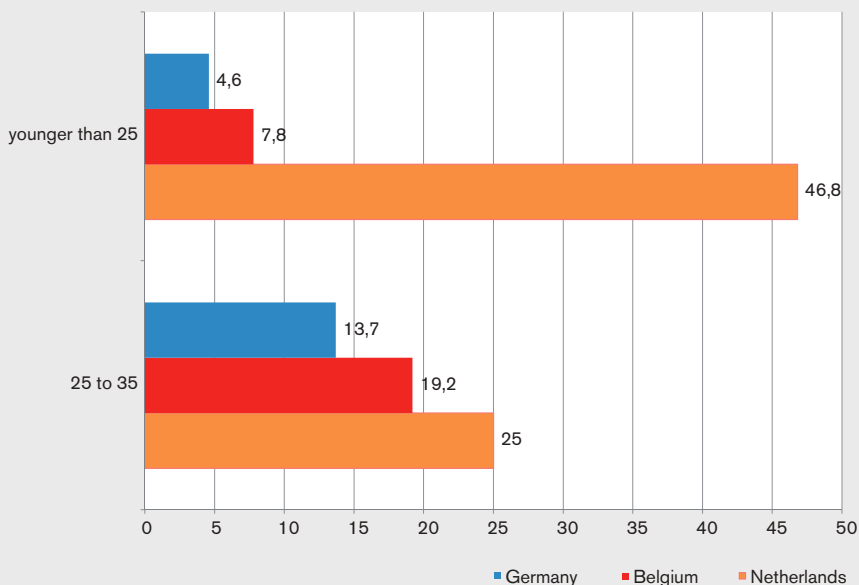
The 39.1 % in the over- 50 age-band for Germany corresponds to 728 people.

Conversely the above results seem to suggest that the proportion of young employees would be highest in the Netherlands. This idea is borne out by the next graph which also shows that the lack of new entrants to German inland navigation is relatively acute.

13 Source: Bundesagentur für Arbeit

This is in sharp contrast to the considerable number of young workers under 25 in the Netherlands. Belgium occupies an intermediate position but, like Germany, suffers from an unfavourable age structure.

**Figure 14: Representation of age-groups < 25 and 25 - 35 in inland navigation employment (%)**



Source: Bundesagentur für Arbeit; ONSS; Inspectie Verkeer en Waterstaat; Stichting Afvalstoffen en Vaardocumenten Binnenvaart; Stichting Nederland Maritiem

Overall, with the exception of the Netherlands, it can be noted that those employed in the inland navigation sector are much older on average than those employed in the economy as a whole.

## 2. Contract Employees versus Self-Employed Operators

The statistical implementation of this data is based on various sources. For Belgium, data on the number of self-employed inland navigation operators are derived from information provided by the National Institute for the Social Insurance of Self-Employed People (INASTI), whereas figures for contract workers are given by the State Social Security Authority the ONSS. For Germany and the Netherlands the data source is the National Statistical Institute, destatis and the CBS respectively.<sup>14</sup>

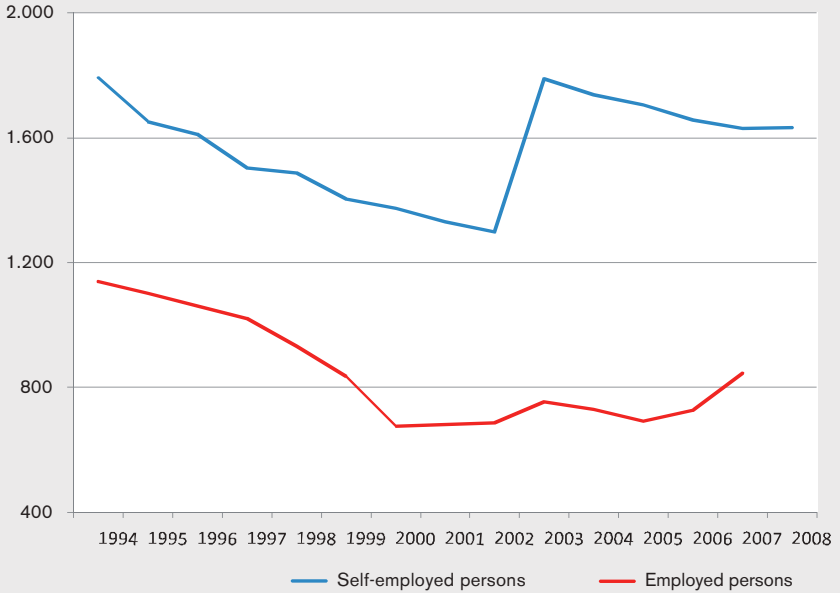
There is a wide difference in the proportions between Belgium and Germany. The number of self-employed inland navigation operators in Belgium is higher than the number of contract workers while the opposite is true of Germany. These disparities are due to the different structures within the sector. The dominant role played by inland navigation on the Rhine in Germany means that there are more shipping companies there which often employ a higher number of boatmen and boatmasters. Conversely the sector in Belgium plays host to far more small enterprises.

The abrupt break in the time series for self-employed inland navigation operators in Belgium is down to a change in statistical definitions. From 2003 onwards, ancillary family members – in practice often the wives of the boatmasters – were assimilated in the number of self-employed, thereby boosting their figure. However, since 2003 the downward trend has continued.

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<sup>14</sup> For the Netherlands a distinction is drawn between natural persons and legal entities. Thus natural persons can be identified as self-employed inland navigation operators. The German National Statistical Institute, the Statistisches Bundesamt, distinguishes between vessel owners and other employees. The former are perceived as self-employed inland navigation operators and the latter are classed as contract workers.

**Figure 15: Contract workers and self-employed inland navigation operators in Belgian inland navigation**

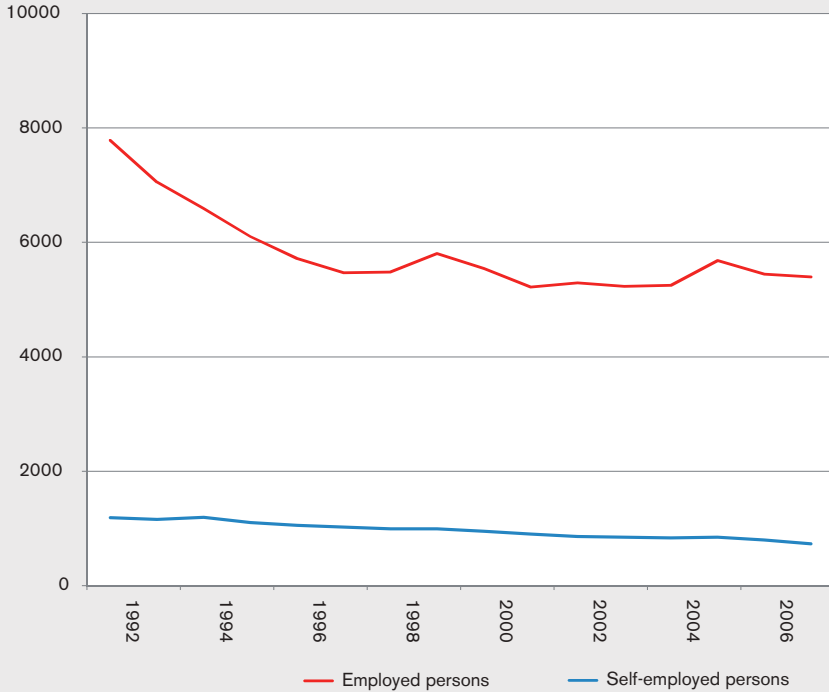


Source: ONSS; INASTI

In Belgium in 2007 1629 self-employed inland navigation operators and 845 contract workers were registered.

The graph below depicts all onboard personnel in Germany and the proportion of self-employed inland navigation operators among them, including ancillary family members. The number of contract workers can thus be gleaned from the difference between the two curves. This difference is plainly higher than the figure for self-employed inland navigation operators.

**Figure 16: Self-employed inland navigation operators and other onboard personnel in German inland navigation\***

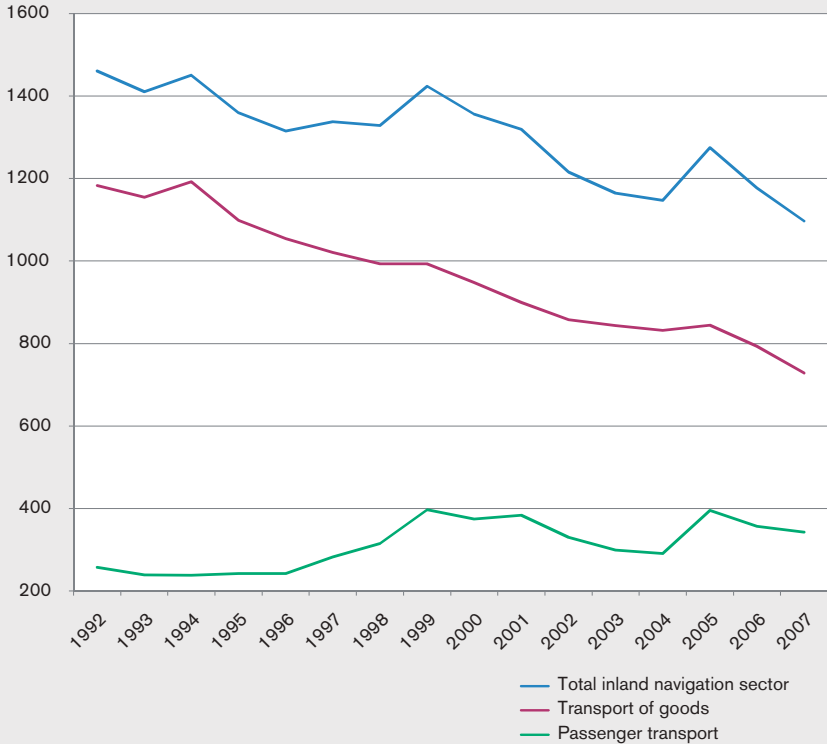


Source: destatis \*Self-employed operators are a segment of the onboard personnel.

Detailed inspection shows that the number of German inland navigation operators engaged in the commercial transport of cargo on a self-employed basis is declining whilst their fellows in the passenger transport sector are increasing in the face of the general trend. This can only temper rather than halt the general downward trend.



**Figure 17: Number of self-employed inland navigation operators in Germany by sector of activity**

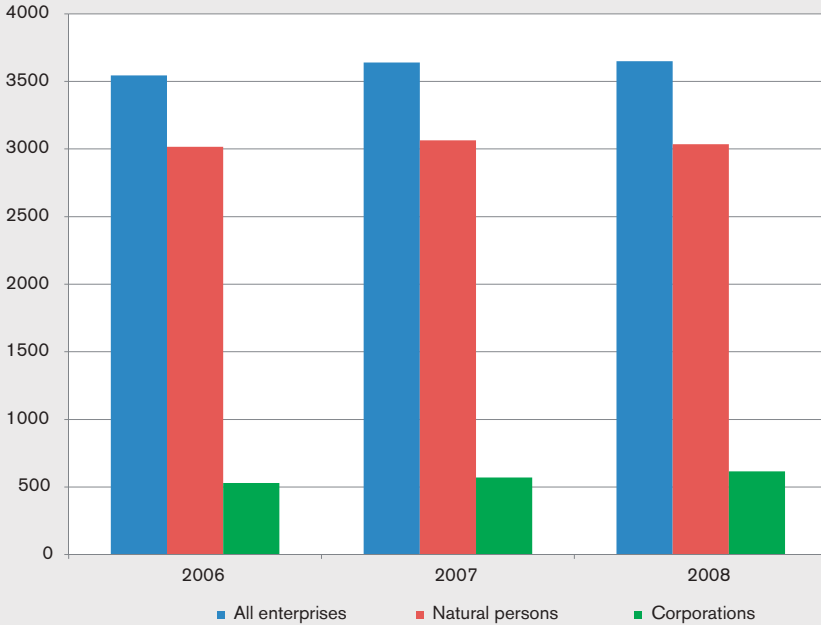


Source: Bundesamt für Güterverkehr; destatis

Dutch official business statistics indicate that the self-employed operators are clearly in the majority compared to the other enterprises, which are classed as legal entities under the official terminology.<sup>15</sup>

<sup>15</sup> Possible forms of legal entities (legal forms) particularly include associations, PLCs, limited liability companies or cooperatives.

**Figure 18: Self-employed operators and other enterprises in Dutch inland navigation**



Source: Central Bureau voor de Statistiek

From this standpoint the bulk of inland navigation companies in the Netherlands would appear to consist of self-employed operators. Statistics on registers of service paint things rather differently but both sets of statistics show self-employed operators as being in the majority.

### 3. Foreign Personnel

A factor which has a key bearing on the future need for labour is the participation of foreign workers in the labour market.<sup>16</sup> On the one hand they are required to react to a sudden short-term need for labour, which may come about because of short-term fluctuations in the demand for transport. On the other hand, a consistently high or steadily increasing participation of foreign workers may mean there is less incentive to organise training and ongoing education.

Various sources were called upon to estimate the proportion of foreign personnel. The data for Belgium are based on figures for Flanders provided by the Department for Labour and Social Affairs of the Flemish Government.<sup>17</sup> Since Flanders accounts for the vast majority of employment in the Belgian inland navigation sector (see the corresponding Figure), these data are a very solid indicator for the country as a whole.

For Germany the employment statistics of the Federal Labour Agency the Bundesagentur für Arbeit yield information on workers covered by the social security system broken down by nationality and sector of the economy, including inland navigation.<sup>18</sup>

	Foreigners from the EU	Foreigners from outside the EU	Total
Germany	846	328	1.174
Netherlands	167	172	339

In the Netherlands the nationality of the personnel is recorded indirectly by the Ministry of Transport through the number of registers of service. Nonetheless, not all boatmasters are compelled to hold a Dutch register of service, especially if they hold a Rhine Patent. A distribution of nationalities on the basis of registers of serv-

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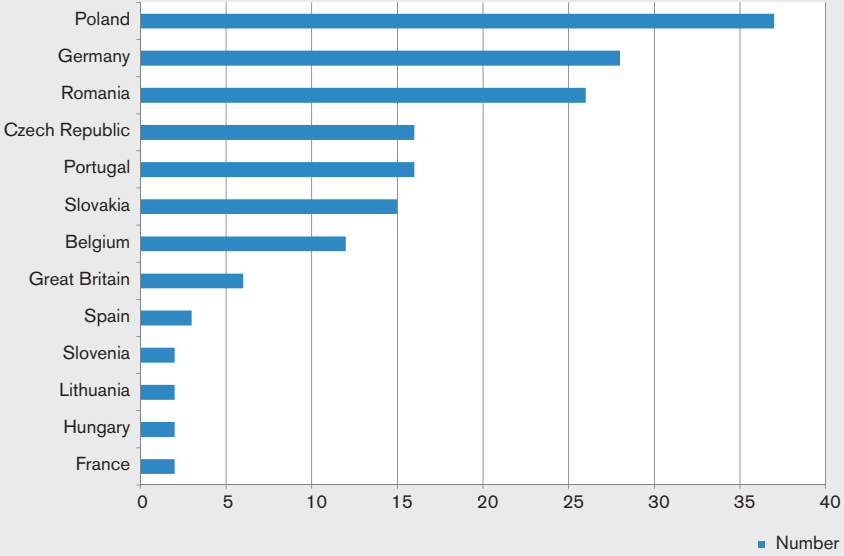
<sup>16</sup> Here foreign workers are those who are not perceived as national workers by the company employing them.

<sup>17</sup> Vlaamse Overheid / Department Werk en Sociale Economie

<sup>18</sup> Inland navigation is presently covered by WZ codes 503 (transport of persons by inland navigation) and 504 (transport of goods by inland navigation).

ice can therefore only provide a very hazy reflection of reality.<sup>19</sup> Further indications as to the proportion of foreigners are contained in a sample survey conducted on part of the Dutch inland navigation enterprises in 2008.<sup>20</sup>

**Figure 19: Foreigners from the EU in Dutch inland navigation \***



Source: *Inspectie Verkeer en Waterstaat*; \* according to statistics on registers of service

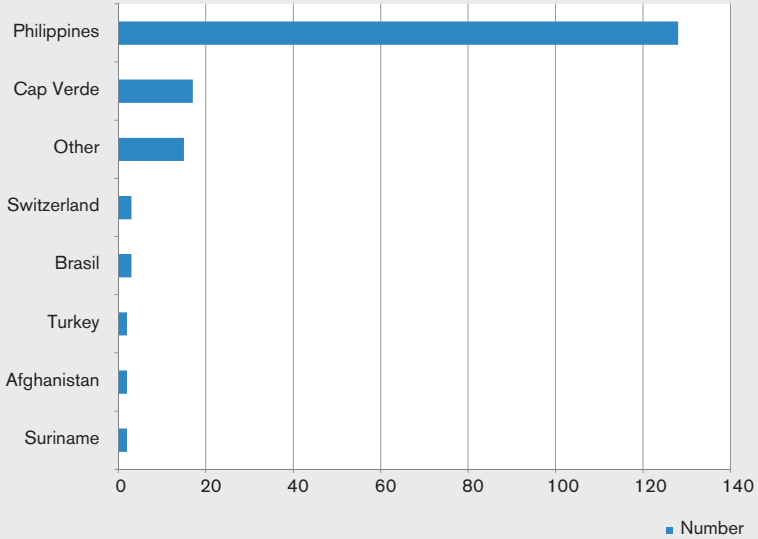
Measuring the proportion of foreigners on the basis of registers of service yields a figure of 13.6% for 2008. Foreigners from within the EU account for 6.7% and those from outside make up 6.8%, so both have equal weight. The precise distribution of specific nationalities is laid out in the two bar-charts below. It is striking that the largest contingent of foreign workers by far is that of the Philippines. The second most numerous group are the Poles, followed by the Germans, Romanians

19 *Stichting Nederland Maritiem (2008)*

20 *Stichting Nederland Maritiem (2008)*

and Czechs. Aside from the Philippines, there are no other non-EU countries of relevance.

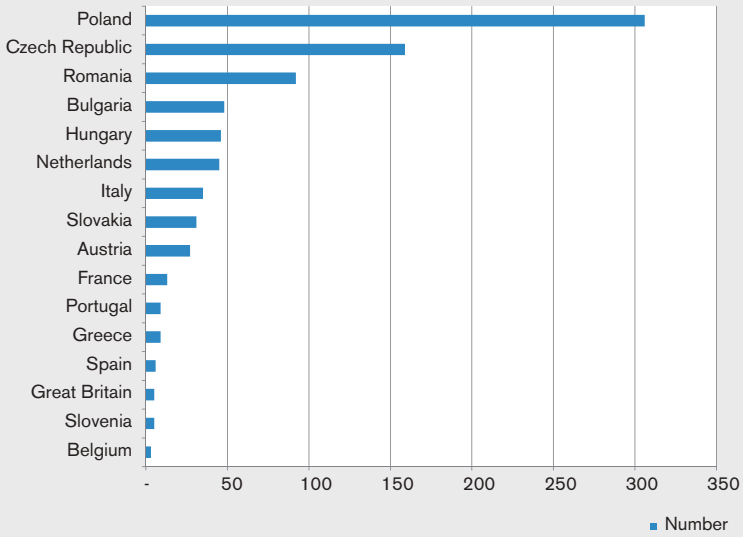
**Figure 20: Foreigners from outside the EU in Dutch inland navigation\***



Source: *Inspectie Verkeer en Waterstaat*; \* according to statistics on registers of service

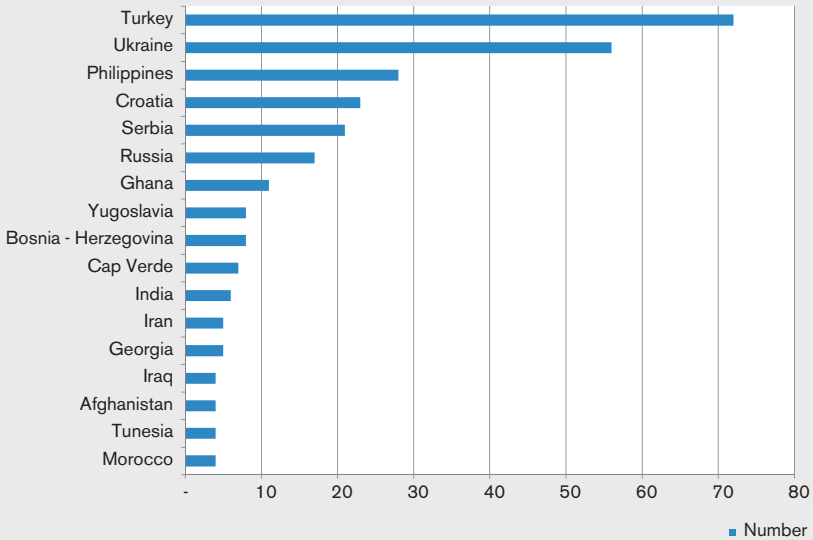
For Germany the statistics from the Federal Labour Agency the Bundesagentur für Arbeit give the following distribution for employment of foreigners in 2008. Given that the values are comparatively high it should be pointed out that these figures capture all inland navigation employees covered by the social security system, whereas the Dutch statistics cover only a part of the employees.

**Figure 21: Foreigners from the EU in German inland navigation \***



Source: Bundesagentur für Arbeit \* as of 30.06.2008

**Figure 22: Foreigners from outside the EU in German inland navigation\***



Source: Bundesagentur für Arbeit \* as of 30.06.2008

Workers from Central and Eastern Europe such as Poland, the Czech Republic, Romania, Bulgaria and Hungary are at the forefront in Germany and this tallies with the estimates of the Federal Agency for the Transport of Goods, the Bundesamt für Güterverkehr.<sup>21</sup> Among the foreigners from outside the EU, the Turks take first place, followed by the Ukrainians. Asian workers - from the Philippines - do not play as great a role here as they do in maritime navigation and inland navigation in the Netherlands.

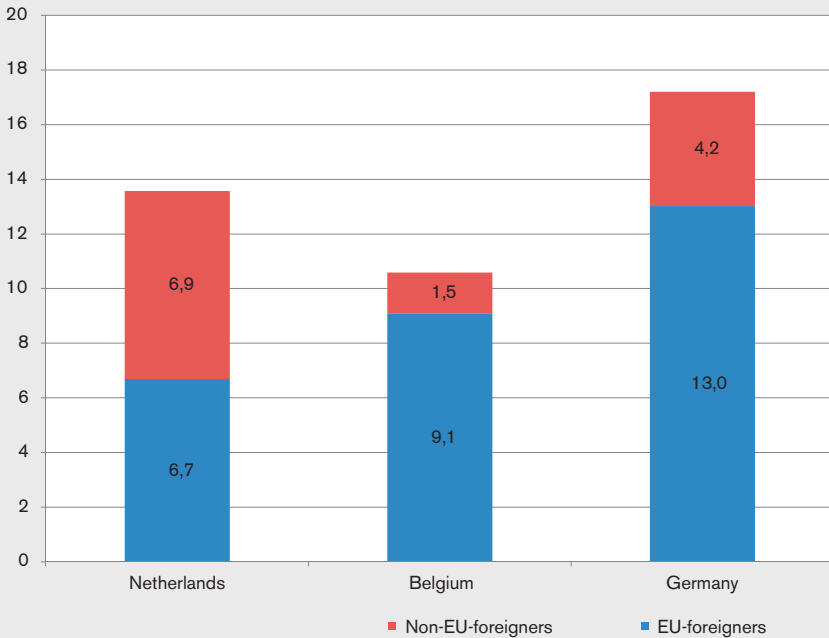
Globally it can be said that in the three countries in question, the proportion of foreigners in inland navigation exceeds the average in the wider economy. Thus at the end of 2008, the overall proportion of foreign employees covered by the social security in Germany was 6.9%, but for inland navigation the proportion of foreign-

<sup>21</sup> See Bundesamt für Güterverkehr (2009), p. 11.

ers was around 17%. Similar, if less pronounced, differences can be observed in Belgium and the Netherlands.

Once more it should be stressed that extreme caution is to be exercised in construing the values set out in the following bar-chart, primarily due to divergent national survey methods. In the Netherlands distribution by nationality is done on the basis of registers of service whereas in Belgium and Germany reference is made to all employees covered by social security. Other estimates come out with a higher proportion of foreigners for the Netherlands. Since there is a clear divergence in these values, they are recorded in the successive table for purposes of comparison.

**Figure 23: Proportion of foreign workers in inland navigation (in %)**



Source: *Bundesagentur für Arbeit; Vlamse Overheid; Inspectie Verkeer en Waterstaat; België: Figures for 2007; Netherlands, Germany: Figures for 2008*



The values in the table below are the results of a survey covering the sector in the Netherlands<sup>22</sup> conducted in 2008 and encompassing around 10% of the inland navigation companies in that country. It indicates a significantly higher proportion of foreigners, though the proportion of foreigners from outside the EU is lower.

**Table 1: Estimated proportion of foreigners in Dutch inland navigation \***

Year	Total proportion	EU foreigners	Non-EU foreigners
2000	10	4	6
2002	20	9	11
2006	24	22	2
2007	21	18	3

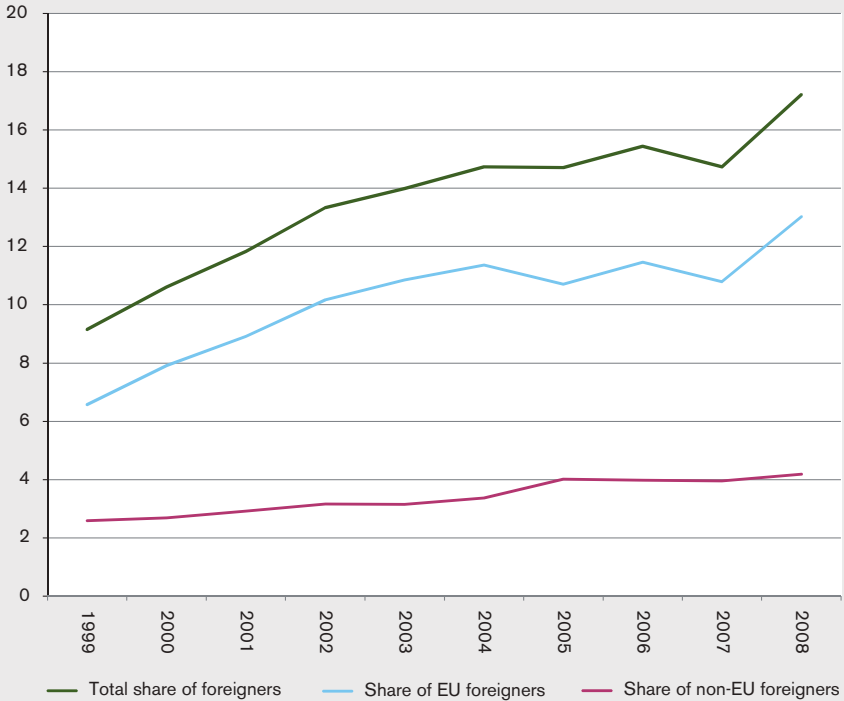
*Source: Stichting Nederland Maritiem; values in %; \*Estimate based on a sample survey*

Seen over the course of time, the proportion of foreign workers has increased as is shown by the above table and the graph below for Germany, which once again refers to employees covered by the social security.

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<sup>22</sup> *Alongside the proportion of foreigners, this empirical survey also addressed a host of other aspects relevant to inland navigation in the Netherlands.*

**Figure 24: Proportion of foreigners among workers covered by social security in German inland navigation**



Source: Bundesagentur für Arbeit; values in %

#### 4. Training and New Entrants

The organisation of training and the means of accessing work on an inland navigation vessel differ between the various countries and indeed within these countries which have different education systems. It is nonetheless possible to pinpoint three different professions on an inland navigation vessel which require three different levels of training to gain the necessary qualification.

These jobs are:

- boatman<sup>23</sup>
- helmsman
- boatmaster<sup>24</sup>

The course to become a boatman is the basic training underpinning the other two stages. The course to become a helmsman requires further theoretical knowledge as well as practical experience in the tasks performed on an inland navigation vessel. As well as gaining a deeper grasp of nautical and technical aspects, the further training also demands knowledge of economics. The following summary lists the schools and training centres in Belgium, Germany and the Netherlands. The number of graduates per annum is of especial interest for the labour market and is derived from estimates based on surveys carried out by the CCNR Secretariat among the school heads and course leaders.

## Belgium

Belgium has two schools of inland navigation, one for each part of the country. The school in Wallonia is in Huy near Liège and follows the principal of a vocational training college – the pupils therefore begin their training at age 15 and take their sailor's exam after two years. After a further two years they may take their boatmasters's exam. At 19 they must accumulate greater practical experience in order to take the exam to gain a Rhine Patent at 21. The sticking point is that many graduates fail to become boatmen since the job does not pay enough in Belgium.

In Flanders training begins at age 12 and finishes at 18. In the first two years the emphasis is placed on core competences (maths, geography, languages, etc) and only later does the focus switch to skills specific to inland navigation (seamanship, nautics, technology, etc). After four years of training the student can take the boatman's exam and it is possible, after another two years, to take the helmsman's exam.

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<sup>23</sup> In Germany, the qualification gained through entry-level training is officially referred to as that of "inland navigator" ("Binnenschiffer"). In an international context this profession is designated by the term "boatman".

<sup>24</sup> The boatman is also known as a "captain", though this term is more prevalent in maritime navigation.

The graduates work on vessels throughout Europe and sometimes on shore. They generally work as helmsmen or boatmasters in tanker or dry cargo transport in various European countries – mostly Belgium, Germany, the Netherlands, and recently also in Eastern Europe.

**Table 2: Inland navigation training institutions in Belgium**

Name	Location	Training offered	Number of registered students	No. of graduates per annum
Ecole Polytechnique de Huy – CEFA Batellerie	Huy / Prov. Liège	Boatman boatmaster	About 40-50	12-15 boatmen 3-4 boatmasters
KTA Zwijndrecht Cenflumarin	Zwijndrecht near Antwerpen	Boatman helmsman	around 75 for inland navigation	10-15 (helmsman)

*Source: Information provided by the schools and compiled by the CCNR Secretariat*

## Netherlands

Of the three countries, the Netherlands has the most schools and thus the greatest training capacity. There are currently three schools providing training in the various inland navigation professions.

There are various paths to becoming a boatman. One involves attending what is known as a “secondary school” lasting four years and ending at 16. Only once they reach 16 do pupils familiarise themselves with the day-to-day tasks onboard ship. An example of a “secondary school” is the training unit in Harlingen where 200 pupils are learning to be boatmen.

The second path is provided by a vocational training college attended from age 16 and lasting two years. This differs from a “secondary school” in that a twin-track approach is taken whereby the pupils actually work on a vessel during their course as well as attending theory classes. There is both a “secondary school” and a vocational training college in Ijmuiden.

Further training to become a helmsman also follows this twin-track approach. Around 70% of the helmsmen trained in Ijmuiden and Harlingen work in the navigation on the Rhine, 20% work in the ARA ports and 10% are employed exclusively

in the Netherlands. Thereafter once further theoretical training and practical experience is acquired, the pupils can take the test to become a boatmaster and so be entitled to set up their own company. This is why the curriculum includes economics.

The capacities of the schools are listed in the table below. It should be noted that the number of graduates per annum is derived arithmetically from the number of pupils per school and the length of training. Thus the figure of 60 graduates from the vocational training college in IJmuiden is arrived at by taking the number of registered students (120) and the two-year duration of the course. ( $1/2 * 120 = 60$ )

**Table 3: Inland navigation training institutions in the Netherlands.**

Name	Location	Training offered	Number of registered students	No. of graduates per annum
Maritim Academie Harlingen	Harlingen / Prov. Friesland	Boatman helmsman boatmaster	around 200 (secondary school)	50 – 60 (mostly helmsmen)
Maritiem Academie IJmuiden	IJmuiden / Prov. Noord-Holland	Boatman helmsman boatmaster	Secondary school: around 100 Voc. Training college: around 120	Secondary school: 25 (mostly helmsmen) Voc. training college: 60 (mostly helmsmen)
Maritiem Instituut de Ruyter	Viissingen / Prov. Zeeland	Boatman helmsman	ca. 60	10 (boatmen) 10 (helmsmen)
Scheepvaart en Transport College	Rotterdam	Boatman helmsman boatmaster	226 (boatmen) 316 (helmsmen)* 87 (boatmasters)	100 (boatmen) 110 (helmsmen)** 20 (boatmasters)

Source: Information provided by the schools and compiled by the CCNR Secretariat

\*Inc. 87 training places for the course to become a mooring operative for maritime vessels in coastal ports. In this course the apprentice also gains a certificate as a mooring operative for inland navigation. \*\* Inc. boatmen.

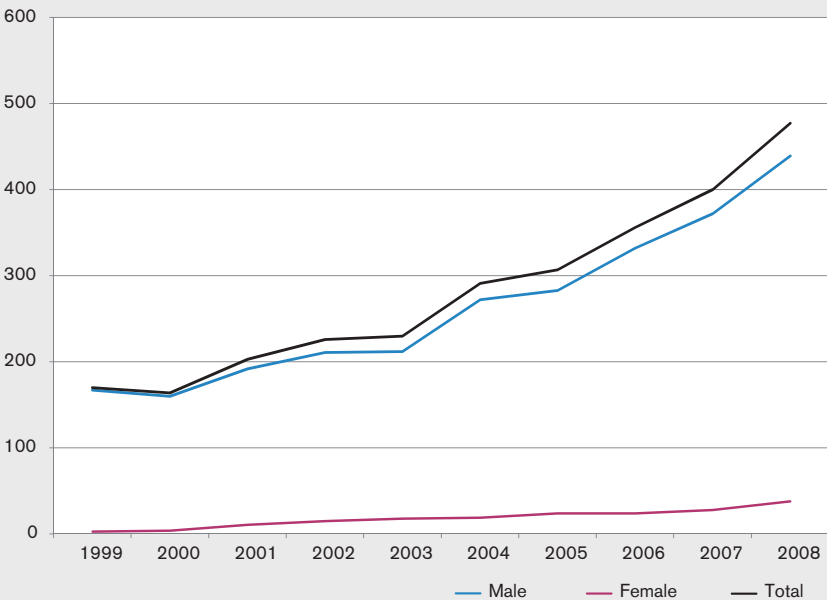
Alongside the schools listed in the table there is a central exam centre, the CBR Examen Centrum in Rijswijk where anyone, regardless of the qualifications they have gained previously can take the boatmaster's exam.

## Germany

The course to become a boatman lasts three years and follows the twin-track system. The main thrust of the course to become a helmsman is time spent on-ship to build up sufficient practical experience.

The requisites for promotion to boatmaster are to be at least 21, have at least four year's experience on an inland navigation vessel and to pass various patent exams at a waterways and navigation directorate.

**Figure 25: Number of trainees in German inland navigation**



Source: DIHK; German Inland Navigation Employers Association

The graph above shows an increase beginning in 1999 which indicates headway in the recruitment of new candidates. This view is reinforced by the next graph which depicts the number of exams passed and failed. In 2007 162 apprentices passed their exam – virtually a threefold improvement on 2003. This is a considerable increase in a fairly brief timeframe.

Theory training takes place in one of the two inland navigation schools the Schifferberufskolleg Rhein in Duisburg or the Berufsschule für Binnenschifffahrt in Schönebeck near Magdeburg. The Schifferberufskolleg Rhein has close organisational ties to the nearby Rhine training vessel which has a sailing simulator and is used both for training during the school course and for ongoing training – various patent tests.

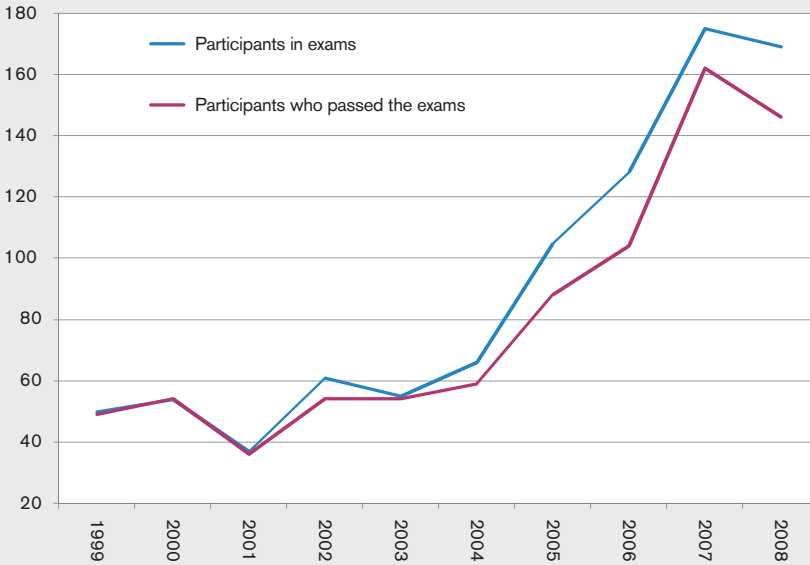
**Table 4: Inland navigation training institutions in Germany**

Name	Location	Training offered	Number of registered students	No. of graduates per annum
Schiffer- Berufskolleg Rhein	Duisburg	Boatman	310 (2008)	around 80-90 (2008)
Berufsbildende Schulen des Salzlandkreises	Schönebeck near Magdeburg	Boatman	ca. 100	ca. 30

*Source: Information provided by the schools and the German Inland Navigation Employers Association (ADB), compiled by the CCNR Secretariat*

The number of female apprentices has increased disproportionately over the past few years. The number of training posts occupied by women doubled between 2004 and 2008 whilst the number of posts taken up by men went up by a “mere” 61%. Overall, the inclusion of women seems a promising source for further new recruits.

**Figure 26: Number of exam candidates in German inland navigation**



Source: DIHK; German Inland Navigation Employers Association

## **IV. FORECASTS FOR THE INLAND NAVIGATION LABOUR MARKET**

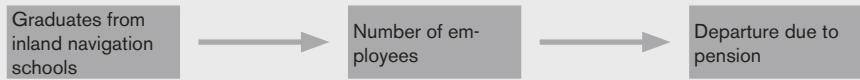
### **1. Background**

The aim of this section is to use the swathe of available data to draw conclusions of the future staffing needs for inland navigation in the countries examined. The age structure in inland navigation is of prime importance in this forecast. Among other things it gives an indication as to how many people are set to leave the labour market in the coming years.

The situation as regards training is also of relevance. The estimated number of graduates from inland navigation schools allows predictions to be made as to the entry of new workers in the coming years.



The relationship is shown in the following diagram:



Source: *Diagram by the CCNR Secretariat*

In addition, the number of employees needed per vessel has increased markedly due to investments in fresh vessel capacity. The number of employees per vessel has therefore clearly risen since 2000 which may be attributed to the introduction of new multi-shift operations which has proven an economic necessity in light of the high level of technical development of new vessels.

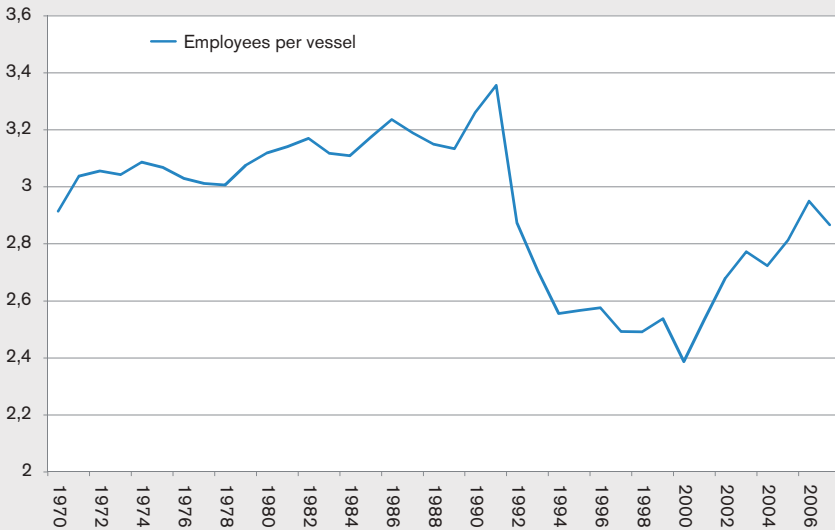
The Bundesamt für Güterverkehr in Germany and the association 'Nederland Maritiem' in the Netherlands have both indicated that the manpower required per vessel has risen over recent years owing to investments in fresh vessel capacity and more intensive usage of vessels.<sup>25</sup>

The graph below shows the relationship between the number of employees and the number of vessels in Germany from 1970 which can be taken as a yardstick for personnel intensity.

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<sup>25</sup> See: *Bundesamt für Güterverkehr (2009); Nederland Maritiem (2008), p.48.*

**Figure 27: Employees per vessel in German inland navigation**



Source: destatis

Until the end of the 1980s personnel intensity was on an upward trend. The dip around 1990 was due to German reunification and the consequent integration of the Eastern German fleet. The number of employees did not by any means increase to the same extent as the fleet, which led to a lower personnel intensity. The start of the present decade brought a fresh increase, which can partly be accounted for by the trend towards larger vessels which are put to more intensive use.

It must nonetheless be admitted that the increasing personnel intensity could partly be down to a reduction in employment which would be the case if the number of vessels did not decrease to the same extent.

## 2. Number of Graduates and Retirees

A comparison of the number of graduates with the number of retirees can lead to a shortfall or a surplus on the labour market. This means that in some countries the pool of potential graduates produced by the schools is not enough to ensure a consistent level of employment.

Obviously this would lead to an unfavourable situation for inland navigation, given the negative side-effects, the most striking of which would be a loss of market share should a lack of personnel mean that the demand for transport cannot be fulfilled in the long-term.

In making calculations, several assumptions must be made. One has to do with the age structure which here was established on the basis of jobs covered by the social security system. Since this does not take account of the self-employed, it must be assumed that their age structure is not greatly at odds with that of contract employees.<sup>26</sup>

A second assumption regards the training situation. The idea that a graduate goes on to take up a post in inland navigation is certainly justified in most cases. However, a trend may emerge whereby graduates pursue other career paths for various reasons. There are indications that the rate of fluctuation increases as the employees get older.

Finally the question arises as to whether the employment of foreign personnel will rise further in the future. The manifest increase over recent years undoubtedly points in this direction.

Nonetheless, there are indications to the contrary. For example, in a survey of the Dutch inland navigation sector from 2008, 71% of respondents ventured that the employment of foreign labour would not increase any further.<sup>27</sup> This view has been taken as a working hypothesis for further calculations and all the assumptions led to the establishment of a multi-stage calculation.

At present in Germany the 50-65 age group makes up around 40% of the inland navigation workforce. This means that 3125 people or 40% of those currently em-

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26 *The same assumption was made by the Bundesamt für Güterverkehr in a study on the personnel situation in inland navigation. See: BAG (2009), p. 12.*

27 *Stichting Nederland Maritiem (2009), p. 103.*

ployed will retire in the next fifteen years. Assuming that there is an even distribution among the various ages, this will mean a loss of 208 retirees per annum.

According to data from the German Inland Navigation Employers Association in 2008 146 students passed the boatman's exam. Training activity has risen markedly in recent years. The schools themselves provide a somewhat lower figure of around 120 boatmen per year.<sup>28</sup> Whatever figure is accurate, the current number of graduates is still not sufficient to compensate for the estimated annual retirement rate of 200.

So, in spite of a considerable increase over the past few years, the training activities in German inland navigation still fall wide of the mark if the aim is to maintain the status quo in terms of employment.

For Belgium the numerical situation is much the same. Current overall employment amounts to 2474 as of 2007. 29,8 % (around 30 %) of these workers are aged between 50 and 65, meaning that about 742 of them will retire in the coming 15 years.

Once more the assumption is that these workers are evenly distributed among the various ages. The upshot of this reasoning is that about 50 people per year would retire on reaching pension age.

This figure of 50 retirees is in contrast to the 30 to 35 graduates from the two inland navigation schools. In the case of Belgium too, it would appear that the level of training activity required to maintain the status quo has yet to be attained.

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*28 It might be possible to explain these differences through candidates sitting the exam more than once.*

## V. AN (INITIAL) ASSESSMENT

From the chapters so far the imperative conclusion is that the main cause behind the decrease in employment in inland navigation is the negative development of small enterprises.

This derives on the one hand from the empirical correlation between employment and the number of companies which can plainly be seen in the graphs for Germany and Belgium.

Another decisive element is the fact that in both Belgium and Germany it is only the number of small enterprises that has dwindled while other company size classes did not suffer a decline. Taking these two facts jointly, the imperative conclusion is that the decline in employment can be explained by the falling number of small enterprises.

One of the causes mooted for the decline in small entrepreneurs was the problem of succession. This complex problem is further exacerbated by the fact that, at least in Belgium and Germany, the current age structure means that a significant chunk of the workforce will soon enter retirement.

The recruitment of new entrants is therefore at the heart of the future debate. In recent years training activities in the German inland navigation schools has been stepped up significantly. Despite this, the annual cohort of graduates is still not enough to replace the retiring labour-force.



# **The Inland Navigation Market in 2008 and the Start of 2009**

# ANALYSIS OF DEMAND FOR TRANSPORT

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## 1. ECONOMIC GROWTH: DEVELOPMENT AND PROSPECTS

At the end of last year and the start of this, the world economy was in the grip of contracting forces, the like of which had scarcely been seen before. Steel production rapidly decreased by half, global trade tailed off markedly and the only remaining supporting element was private consumption.

In the first two quarters the overall EU-27 economy fell by around 5% compared to the previous year. France, which has a fairly robust level of private consumption and is less dependent on exports, was less struck by the crisis. Here economic performance decreased by a 'mere' 3.4% in the first quarter and 2.6% in the second quarter compared to the previous year.

In export-intensive economies like Germany or the Netherlands, the decline was more acute. For Germany price-adjusted GDP dropped by 6.7% in the first quarter and 5.9% in the second quarter compared to the previous year.

The economies of most Central and Eastern European countries were even more adversely affected by the crisis. In the second quarter Austrian GDP fell by 4.4 % compared to the previous year, that of Hungary by 7.4 %, Slovakia by 5.3 % and Romania by 8.8 %.

Generally the situation stabilised by mid-2009 with moderate upward trends. Exports offer one glimmer of hope. In May And June the export of goods in the Eurozone countries rose for the first time compared to the previous month, following constant monthly decreases from August 2008 on.



Another hopeful signal is the unexpected 0.3% rise in second-quarter GDP reported by two major EU-27 countries, France and Germany. However, most other countries registered no such increase.

In the Eurozone the index of new orders in June was 3.1% higher than in the previous month. The index was nonetheless 25% down on the figure for the year before.

In addition, survey results from the German Ifo-Institut indicate better prospects for the next six months. This survey involved 1 000 experts from 92 countries. The prospects for Eastern Europe remain gloomy.

All in all; these positive indicators should not detract from the fact that the recovery process will be lengthy and subject to relapses. The world economy is only likely to get back on track as of 2010, which is something European economic performance will benefit from. This should entail an increase in exports to Asia to the benefit of export-dependent countries such as Germany and Switzerland.

## **2. TRANSPORT VOLUME: DEVELOPMENT AND PROSPECTS**

Inland navigation is still suffering greatly under the crisis which has made itself felt in virtually all transport segments owing to the downward trend in global trade, the steel industry, the chemical industry and a host of other branches.

The volume of transport is, though, set to profit from the expected upturn in international trade next year, especially with Asia. A considerable proportion of container traffic in German or Swiss ports involves cargo for export which will benefit from a pick-up in the economic situation.

Furthermore, European exporters like Switzerland or Germany will profit from the rising Chinese demand for European consumer goods. This trend goes hand-in-hand with a shift in the import-export ratio for container traffic between Europe and Asia.

## 2.1 Agricultural Goods

The transportation of agricultural goods on German waterways dropped by 7% up to May compared to the same time last year. The trend up to April was significantly worse. There was a strong regressive trend in both maritime and inland ports.

Handling of cereals in Antwerp fell by 20% compared to the year before. There was a drop of one million tons in the handling of bulk agricultural products (cereals, seeds, ingredients for feed) in the coastal port of Rotterdam. Here the importation of agricultural products generally plays a more important role than exports. In the first half of the year, imports declined by 18% in the wake of a very fruitful European harvest.

The inland port of Basel recorded a 45% fall in the reception of agricultural products for the first semester compared to the previous year. Here again, reception of cargo is generally more important than dispatch.

The root cause for the decrease in both maritime and inland transport is the good 2009 harvest. This year the German cereal harvest was 8% above the multi-annual average which means less imports and in turn less need for transport via inland waterways.

The decrease in foodstuffs and feed amounted to 13 % for France and 7% for Germany.

## 2.2 Iron and Steel Sector

### A) Ores and Scrap Metal

In the first months of 2009, the transportation of ores and scrap metal was still hit head-on by the crisis. Between January and May, German steel production sank by 44% compared to the same period last year. The decline was even worse in France.

The transportation of ores and scrap metal did not escape unscathed, registering a 39% drop in Germany compared to the previous year. Since almost the entire transport volume is borne by the Rhine, this result is also applicable to inland navigation

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on the Rhine. The transportation of ores and scrapmetal on French waterways dipped by 30%.

The situation in the steel industry picked up somewhat in the second quarter of 2009. Sales volumes and prices began to recover, given that companies using steel had depleted their stocks and now had to order more in. The demand for steel should therefore increase somewhat in the second half of the year.

Major steel concerns such as ArcelorMittal (Luxembourg), Voest Alpine (Austria) and ThyssenKrupp (Germany) have reactivated their blast-furnaces due to the pick-up in demand for steel. For example, ArcelorMittal announced at the start of August that it would re-commission four steel blast-furnaces including those in Liège (Wallonia, Belgium), Thionville (Lorraine in France) and Bremen (Germany).

## **B) Iron and Steel Products**

In the period until May, the quantity of iron and steel products on German waterways decreased by 39%. France registered a similarly disappointing 42% drop. It should however be remembered that this development occurred in the wake of a 44% downturn in German steel production and an even steeper decline in that of France.

The assumption for the remainder of 2009 is that the situation will stabilise and there will be a slight increase. This will be helped along by the recovery in demand for steel, boosted largely by the scrapping premiums in the car industry. The Austrian steel industry likewise turned stable at the end of the first quarter of 2009, though it is running at a low level.

## **2.3 Energy Sector: Solid Mineral Fuels**

The transportation of solid fuels on German inland waterways rose by 1.6% between January and May compared to the year before. Indeed, the increase up to April was 7.6%. This may be partly attributed to the harsh winter which entailed a heightened demand for steam coal in February and March. Imports of heating coal to Germany thus rose by 8% in February and 16% in March compared to the previous year.

Nonetheless, it should not be forgotten that domestic coal extraction in Germany fell again last year by 4m tons to around 17m tons<sup>29</sup> which lead to an increase in imports. Last year, 14.7m tons of coal arrived in German maritime ports - 600 000 tonnes more than the year before. Most coal, 23.2m tons however arrived in Germany from the ARA ports aboard inland navigation vessels. The dependency on coal imports has thus boosted transport on the Rhine. It can thus be asserted that increasing imports of coal and meteorological effects offset the decline in transport caused by the crisis in the steel industry.

The picture for French waterways is rather different as the volume of solid fuels transported fell by 21% in the first semester. It must, though, be borne in mind that the structure of energy supply in France is very different from that of Germany. Hard coal plays a subordinate role in the French energy mix. In addition, France has already withdrawn from coal-mining, so coal-extraction will no longer yield any influence.

Almost all of France's coal imports are used for steel production.<sup>30</sup> A heightened demand for coal in the energy sector brought about by the weather will not therefore make up for the losses in the steel industry. This led to a contraction in the demand for the transportation of coal on French inland navigation vessels.

## 2.4 Construction Materials

In 2008 the transportation of construction materials and raw minerals accounted for 20.5 % of overall volume in inland navigation on the Rhine and was therefore the largest cargo segment in terms of quantity.

In the first semester of 2009 the building sector was still in the thrall of the crisis. Even though most sites remained in operation, there was a 15% drop in the order books of the German construction industry. This had a knock-on effect on transport by inland navigation which by May had fallen by almost 27% compared to the previous year. France suffered a similarly pronounced decrease.

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<sup>29</sup> VDKI

<sup>30</sup> See. *Market Observation Report 2008-1*, p. 37.

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The first effects of the short-term emergency measures implemented by governments, largely involving transport infrastructure projects, are likely to be felt only in the course of 2009.

## **2.5 Chemical Products and Fertilisers**

The transportation of chemical products on German inland waterways dropped by 25% between January and May compared to the same period the year before. Examination of the individual months shows that the largest fall was in January with 40%. In April and May the decline compared with the previous year was somewhat smaller. Over the entire first semester in France the drop was 40%, a figure comparable to that for the steel segment.

Among all cargo groups fertilisers registered the most acute fall in demand for transport. Up to May the decline was 44% for Germany and 45% for France.

In the first semester the turnover of leading European chemicals firms was, on average, 20% of the level from the previous year. Although the chemicals sector did recover slightly in the second quarter, a more radical improvement is not in the offing. A recovery in transport levels can therefore not be expected in 2009 as this will only happen when the industry as a whole picks up steam, which is likely to be the case in 2010 at the earliest.

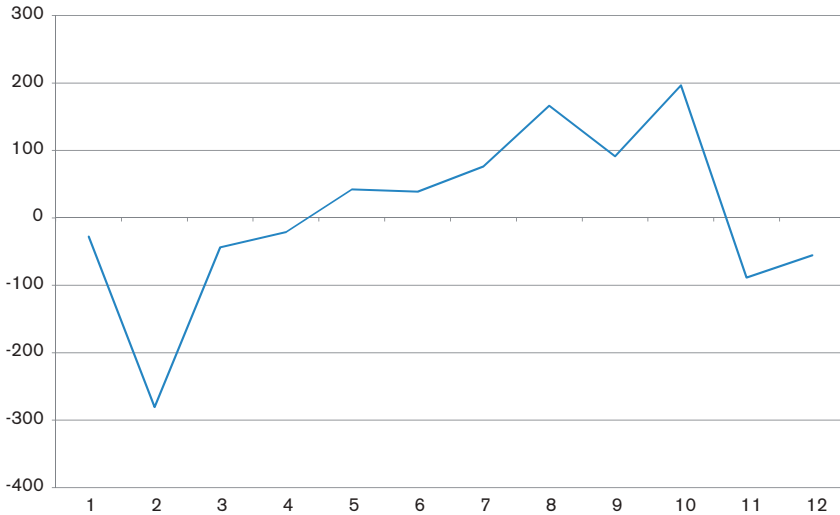
## **2.6 Energy Sector: Mineral Oil Products**

Although the transportation of petroleum and mineral oil products rose by about 6.5% over the course of 2008, in the first semester of 2009 it was on a slightly downward path. Up to May volume fell by 0.6% compared to the foregoing year on German waterways and by 16.1% on those of France.

This may be down to the fact that in autumn most warehouses were full due to low prices so that the demand for 2009 was covered to a large extent. This is supported by the realisation that transport tends to reach its seasonal peak in autumn, as illustrated by the graph below. Transport levels generally increase between February

and October before tailing off again. This pattern<sup>31</sup> is most readily explained by the laying-in of stocks which reaches its seasonal peak in autumn.

**Figure 28: Seasonal development of transport of mineral oil products (Rhine)**

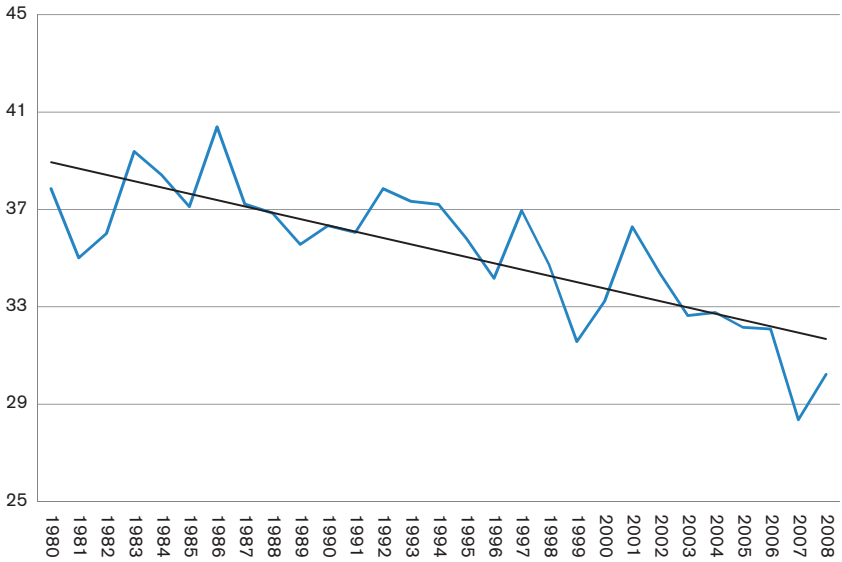


Source: destatis, Calculations by the CCNR

Another reason for the slight decrease compared to the previous year is a long-term negative trend in this area of transport. This trend is presumably due to consumers of heating oil trying to save energy, but also reflects the bolstered technical efficiency of various consumption processes.

<sup>31</sup> The seasonal development depicted here is based on mean values for the period 2000 to 2008.

**Figure 29: Transport of mineral oil products on the Rhine (million tons)**

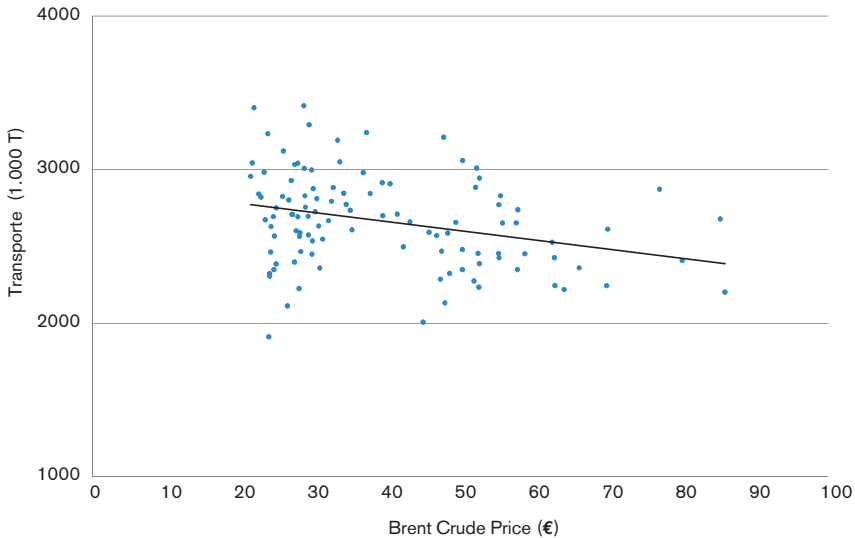


Source: destatis, Calculations by the CCNR

This trend is eclipsed by other magnitudes including, alongside seasonal factors, the winter temperature in a given year, the status of oil prices, and the water level on the Rhine.

The following graph clearly shows a downward trend, indicating that the transport of mineral oil products usually reacts in a negative fashion to an increase in the price of crude. Monthly data for the period January 2000 to December 2008 were used to generate the scatter diagram.

**Figure 30: Influence of oil price on the transport of mineral oil products (Rhine)**



Source: destatis, Intercontinental Exchange (ICE), Calculations by the CCNR

A rising water level has a mildly positive effect on transportation, due to the inverse relationship between water levels and barge freight rates: A rising water level is often followed by a decrease in barge freight rates, which stimulates transport demand (all other explanatory variables being equal).

## 2.7 Containers

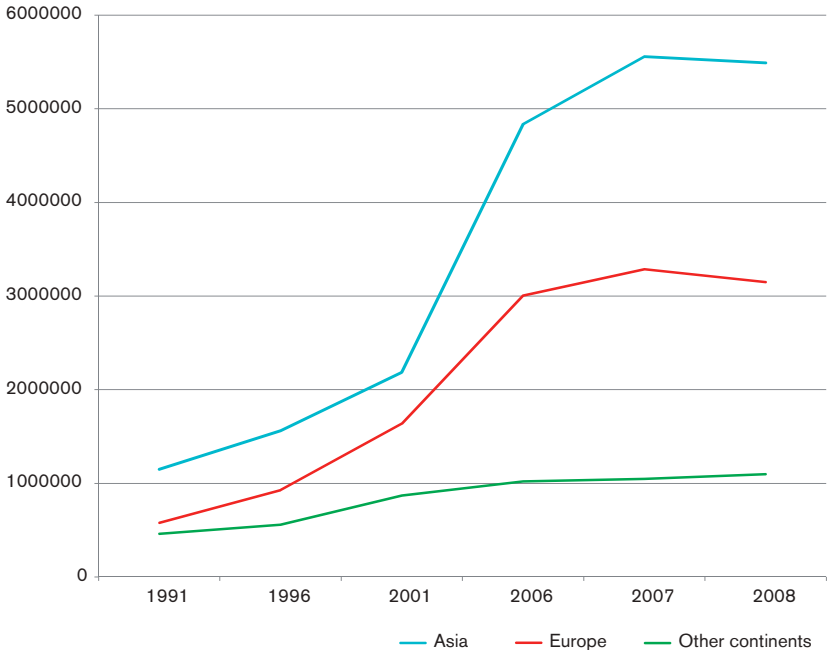
### A) Introduction

Globalisation is characterised by an expansion of trade between Europe and Asia and this is reflected in the regional distribution of global container traffic. As the graph below demonstrates, the worldwide growth in container traffic, which became even more intense at the beginning of the decade, is largely attributable to Europe and Asia.



In light of the following graph it comes as no surprise that in 2007 three Chinese ports - Shanghai, Hong Kong and Shenzhen - found their way into the list of the six largest container ports in the world, the others being Singapore in Asia, Busan in South Korea and Rotterdam in the Netherlands.

**Figure 31: Container handling by continent (TEU)**



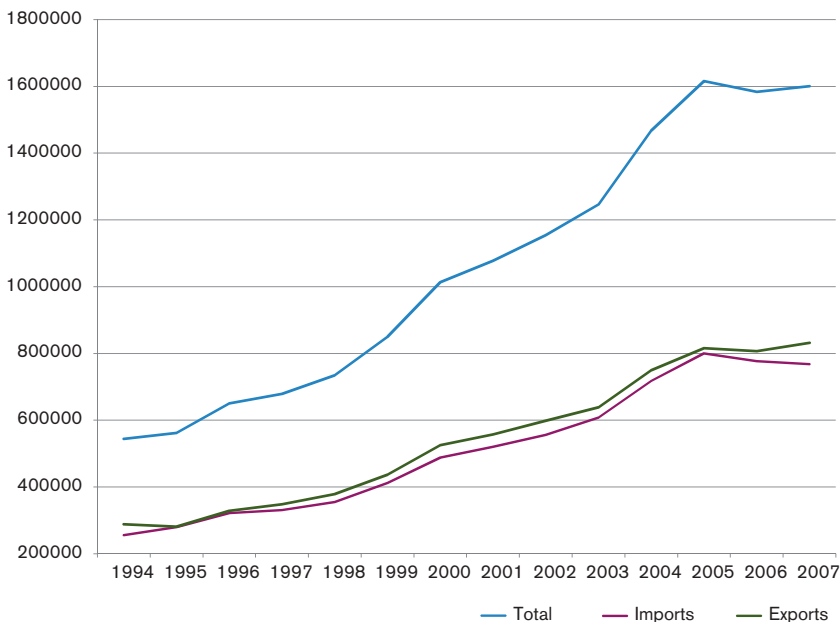
Source: HPA / Hafen Hamburg Marketing

Some of the containers arriving at Rotterdam and other European maritime ports are not rerouted to the hinterland but are instead consigned by sea to Baltic countries like Russia or the Scandinavian states. This feeder traffic, also dubbed 'transshipment' is particularly significant in the German coastal ports of Hamburg and Bremen. This is because Hamburg is the easternmost port in the Northern Range and thus offers geographical advantages for this feeder traffic.

Feeder traffic is also prevalent in the western ports – in 2008, 28% of container handling in the port of Rotterdam was feeder traffic and 72% of the containers handled either came from the hinterland or went on to be transported there. In recent years there has been a mild increase in the level of feeder traffic in Rotterdam, which totalled 23.8 % in 2004.

This notwithstanding, inland navigation has certainly been able to benefit from rising container traffic in hinterland transport, as the graph below shows. There are, however, some obstacles to comprehensive use of the inherent potential of container traffic.

**Figure 32: Container traffic in navigation on the Rhine (TEU)\***



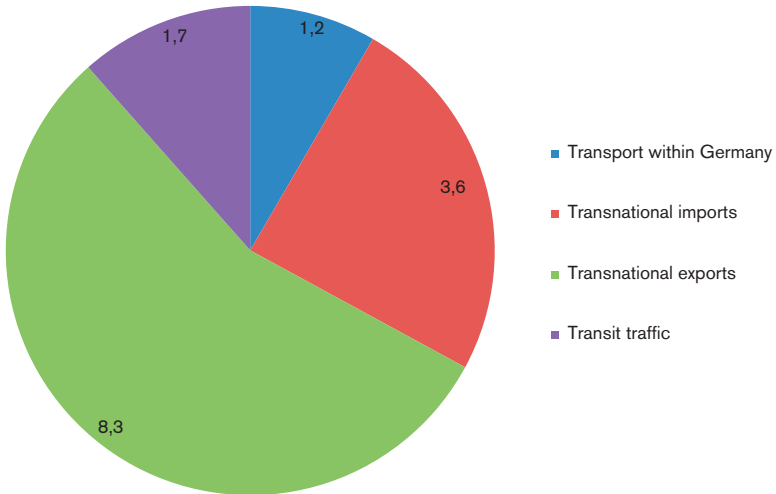
Source: destatis; \* traditional Rhine: areas of the Rhine up to the Dutch border

On the one hand, capacity bottlenecks in the western coastal ports mean there is a delay in processing inland navigation vessels. Maritime vessels are often dealt with as a priority which means inland vessels have to wait. This time-lag is often out of kilter with the strict schedules imposed by container services.

The reason behind the presently limited capacity of container traffic on waters such as the Elbe and the Danube is the lack of river infrastructure. Bridges of insufficient height often impede the three-tier transportation of containers, which would be necessary from an economic standpoint.

This pie-chart shows the division of container transport by mode of transport for Germany in 2008. Cross-border traffic is the most significant form of transport and reflects the importance of containers for the transportation of high-end export goods.

**Figure 33: Container traffic in Germany by mode**



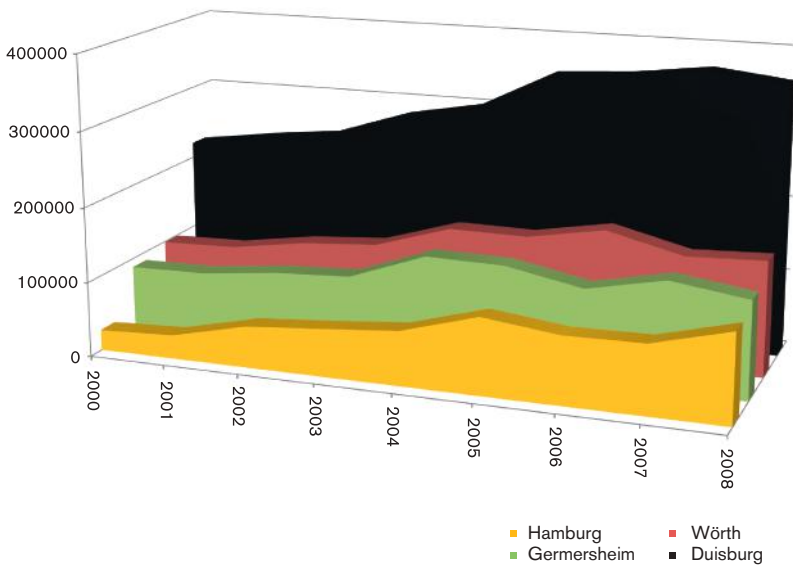
Source: destatis ; Data in million tons; \* partial estimate

## B) Important inland container ports

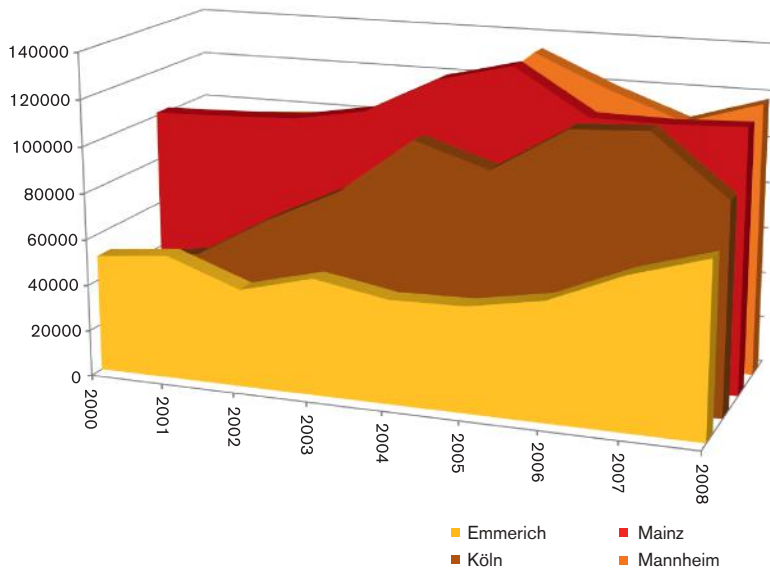
### Germany

The two charts below show the development of container handling in the eight most significant inland container ports in Germany. With the exception of Hamburg, all of the eight ports are on the Rhine.

**Figure 34: Container handling in selected German inland ports\***



Source: destatis; \*These are the four most important inland ports for containers in Germany;  
Data in TEU



Source: destatis; \*This is the second half of the eight most important inland ports for containers

The ports of Wörth and Germersheim situated between Mannheim and Karlsruhe are the most important German ports in the container segment after Duisburg. Owing to dynamic growth at the start of the decade, the inland port of Cologne was able to become one of the eight most important inland ports for containers in Germany. Container trans-shipment in the port of Emmerich has likewise undergone a marked increase.

In the first two months of 2009 the total volume of container traffic on German waterways dropped 23.2% compared to the previous year. Leaving aside empty containers, the reduction in TEU was 10% and the drop in tons transported was 16.5%.

With regard to transport as a whole, it was cross-border consignments which suffered the greatest fall, even with the exemption of empty containers. This is largely

a reflection of the lull in German exports in the wake of the decline in the global economy.

### France

The following table shows the container volume of the five most important French inland ports. The port of Gennevilliers is on the Seine north of Paris. In this comparison Strasbourg together with Mülhausen is the second Rhine port. The Rhone (Lyon) is represented alongside the Seine and the Rhine, as is the North French canal network by Prouvy on the Belgian border.

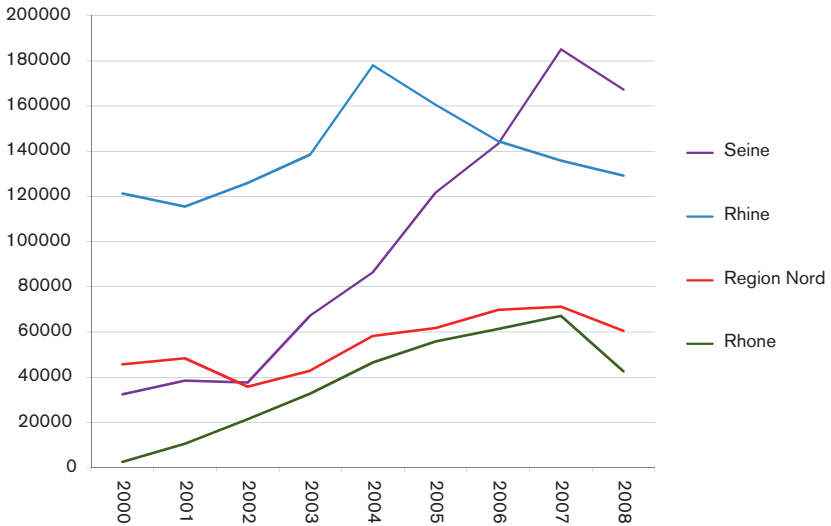
**Table 5: Container handling in key French inland ports**

	2008	2007	Change 2008 / 2007
Gennevilliers (near Paris)	77 405	81 826	- 5,4%
Strasbourg	74 845	79 836	- 6,3%
Lyon	37 461	58 008	- 35,4%
Mülhausen	52 981	53 893	- 1,7%
Prouvy* (near Valenciennes)	24 409	26 810	- 9,1%

Source: VNF; \* Estimate ; only hinterland traffic in the maritime ports; data in TEU

For container traffic on French waterways the following development, divided into main regions, can be observed.

**Figure 35: Container traffic in France by region**



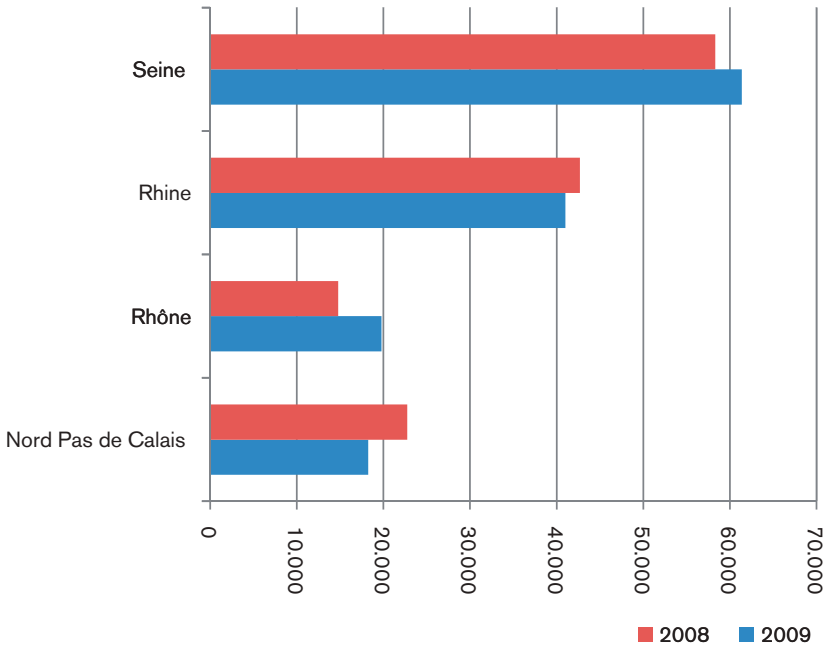
Source: VNF; data in TEU

It is worth noting that the French stretch of the Rhine has lost some of its importance since 2004 whilst traffic on the Seine has risen markedly. The negative development of the Rhine is mostly down to handling losses in the port of Mulhouse which kicked in a few years ago when a major car company stopped shipping vehicles for export to overseas.

In contrast, transport on the Seine has been very much on the rise. This is set to continue and will gain momentum with the completion of the Seine-North Europe Canal in 2015. This will serve as a link between Paris and the industrial centres and conurbations of Belgium and the Netherlands and will further promote the Seine as a traffic artery.

Container transport in France went up by 1.4% in the first four months of 2009 compared to the previous year, though there were pronounced regional differences. The Rhone area underwent clear growth, whilst the northern and eastern French waterway network (Nord-Pas-de-Calais and Rhine) suffered a drop.

Figure 36: Container traffic in France by region (January to April 2008/2009)



Source: VNF

### Switzerland

There are four inland ports in Basel specialising in different classes of cargo. Container handling is concentrated in the port of Kleinhüningen, though some takes place in Birsfelden. In 2008 waterside container handling amounted to 92,464 TEU, meaning a fall of 11.4 % compared to the year before. The bulk of the containers handled were laden - the figure for 2008 was 37 218 TEU compared to 45,038 TEU the previous year. This decline reflects the fall in exports as a result of the economic crisis. Exports are as important for Swiss container ports as they are for German inland ports.



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The first half of 2009 once more brought a significant decrease compared to the year before. All six months saw a drop of between 15 % and 21 %, bar March when the result of the previous year was equalled.

Comparing these developments with the multi-annual trend shows that handling in the first quarter of 2009 was at a normal long-term level. In the second quarter, however, container handling was significantly lower than in the last few years

### **C) Containers carried via inland navigation in the hinterland of coastal ports**

The market share of waterways for containers in Rotterdam is currently around 30 %, in Antwerp 28 %, in Le Havre and Hamburg just 9 % and 3% respectively. In Rotterdam the market share of waterways has remained largely consistent over recent years, with hardly any change since 2001. This is also due to the delays in processing inland navigation vessels referred to above. This time-lag engenders long waiting times which undermine the competitiveness of inland navigation with road and rail.<sup>32</sup>

In Rotterdam container transport per inland vessel in hinterland and feeder transport amounted to 2.33m TEU in 2008. Belgium and Germany are by far the most significant countries of origin and destination for the consignment and reception of containers. Other important countries are Switzerland and France. Antwerp and Rotterdam share the same key countries of origin and destination for container shipments. In the first half of 2009 the reception of containers fell by 16 % and consignment by 22 %.

Last year, the transportation of containers in the hinterland of Hamburg climbed 29 % to 119 000 TEU. The increase is considerable but waterways have yet to play a major role. Politicians in Hamburg are nonetheless in favour of boosting their share of the modal split. There are already several scheduled container services linking the

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<sup>32</sup> Compare particularly the July 2009 study of the Dutch Ministry of Transport, Public Works and Water Management entitled '*Binnenvaart en Containerlogistiek*', which deals with this issue comprehensively.

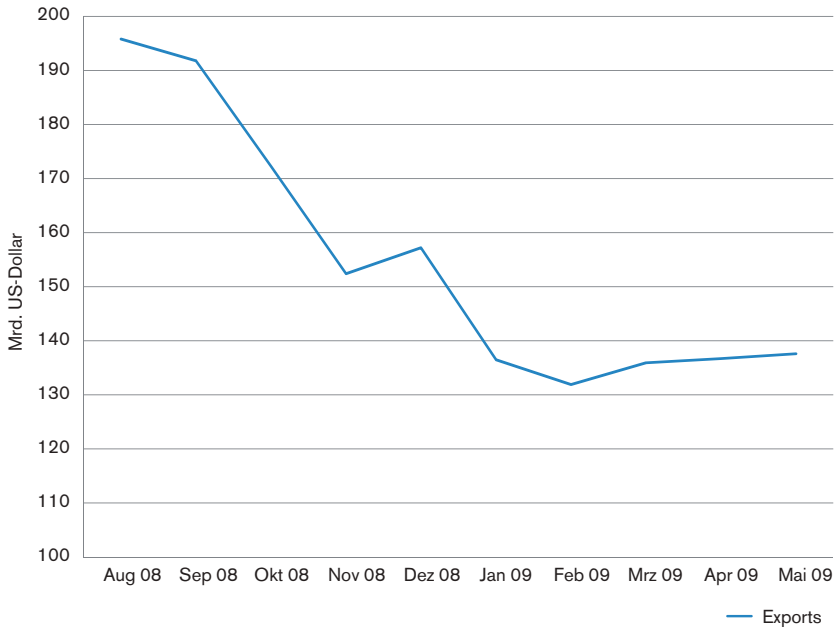
city to ports on the Elbe through to the Czech Republic, and to ports on the Elbe-Seiten Canal and the Mittelland Canal. August 2009 saw the inauguration of the first inland navigation line for container transport between Hamburg and Berlin.

### Outlook

Maritime container transport is closely intertwined with world trade and the international economic situation. Current forecasts assume that it will only regain its 2008 level in 2012 or 2013. It is also possible that the growth rates of the past ten years will no longer be attained.

Key international trade indicators appeared to be slightly on the ascendant as of mid-2009. The dip in global trade petered out in spring and the situation stabilised. Thereafter, slight growth was observed. It will, though, take some time before the previous level is attained once more.

**Figure 37: Exports of goods from Eurozone countries**



Source: OECD; seasonally adjusted, nominal, i.e. not adjusted for inflation

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Nonetheless, alongside the re-establishment of international trade which is so vital to container transport, structural shortcomings in the processing of inland navigation vessels in maritime ports must be resolved in order to further encourage the transportation of containers by inland vessels.

When it comes to the scope of the potential modal shift in favour of the waterways, estimates have been produced for the port of Rotterdam. According to a study<sup>33</sup> presented to the Dutch Ministry of Transport there is particular competition between inland navigation and road and rail within a 60 to 400km radius of coastal ports. The waterways could capture extra market share from its two competitors in this geographically delimited area which boasts a transport volume of about 470 000 TEU. If inland navigation were to fully conquer this market volume, its share of the modal split would rise from 30% to approximately 36%.

### **3. TRANSPORT ON THE AUSTRIAN DANUBE**

#### **3.1 General Structure of Inland Navigation in Austria**

In 2008, 11.2m tons of cargo was transported on the Austrian section of the Danube. Comparison with the volume of transport on the Rhine (207.5m tons in 2008) shows the relative weight of this volume.

In structural terms imports from abroad far exceed exports on the Austrian Danube. Transit traffic is also very relevant, whereas domestic traffic is very meagre. The vast majority of transit traffic comes from the countries to the east.

Most imports also come from the eastern neighbours, crossing the Slovak-Austrian border near Bratislava to be conveyed upstream to Linz. In contrast, westward imports from across the German border are far less numerous.

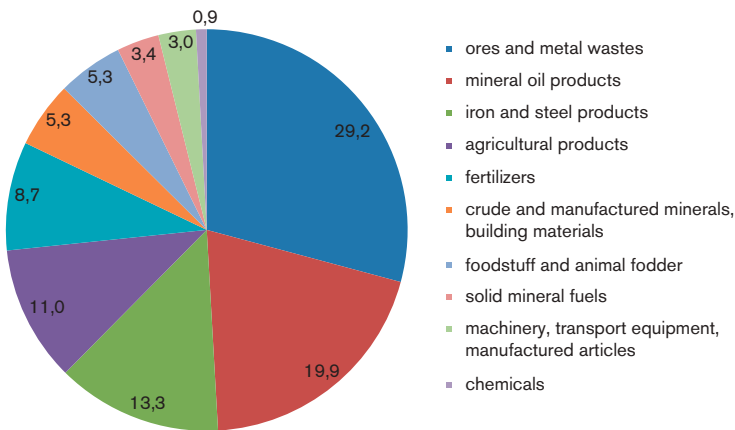
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<sup>33</sup> PRC (2007), *Beleidsstrategie Binnenvaart – Een landelijke markt- en Capaciteitsanalyse. Rotterdam*, cited in: *Ministerie van Verkeer en Waterstaat (2009); ‘Binnenvaart en Containerlogistiek’, Juli 2009*

An examination of total imports for 2008 shows that upstream transport was six times as high as that headed downstream.<sup>34</sup> For exports the east-west ratio is somewhat more balanced, though east-west traffic still clearly prevails.<sup>35</sup>

As to the significance of individual segments, the following pie-chart shows that ore and scrap metal waste account for almost one-third of the total, with petroleum and mineral oil products making up 20%.

**Figure 38: Distribution of transport volume on the Austrian Danube in %**



Source: Statistik Austria; Figures for 2008

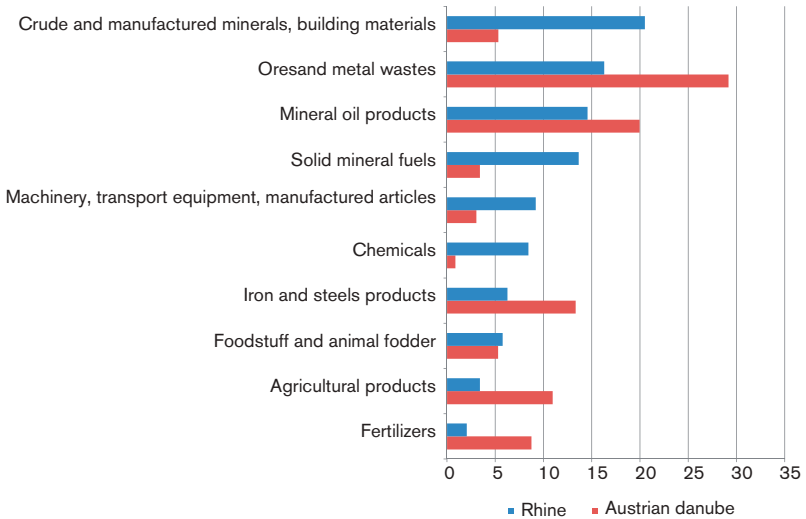
These are followed by iron and steel products at 13.3 %. Aside from agriculture and forestry, the other segments are not at all significant. This is especially true of chemical products which amount to less than one percent. The general upshot is that Austrian inland navigation plainly focuses on the iron and steel industry and petroleum and mineral oil products

<sup>34</sup> Calculations based on *Via Donau (2009)*, p. 8.

<sup>35</sup> In 2008 2.9m tons of exports were transported upstream to Germany and 4.02m tons of exports headed downstream to Slovakia and Hungary.

The bar-chart below shows the relative weight of individual groups of goods for the Austrian Danube and for inland navigation. These are percentages which apply to the entire volume of transport on the Austrian Danube and the Rhine. The figures therefore only reflect the significance of the various groups within the given river system.

**Figure 39: Relative weight of groups of goods on the Danube and the Rhine**



Source: Statistik Austria, destatis; Data in % of the volume of transport in question

The below-average importance of vehicles and machines is probably due to the fact that container transport is still fairly underdeveloped on the Danube.

The enormous significance of ores, scrap metal, and iron and steel products mean that these should be looked into in greater depth.

### 3.2 Iron and Steel Sector

Austrian steel production primarily involves the oxygen steel procedure, which enjoys a market share of 91 %.<sup>36</sup> This requires coal and ores as raw materials. The Linz-based firm voestalpine Stahl GmbH uses this procedure for 100% of its output (specifically the Linz-Donawitz procedure). Linz is by far the most important steel-producing area in the country.

The Danube port of Linz plays a pivotal role in the logistics of the Austrian iron and steel industry. This Austrian inland navigation port handles nearly 99 % of all ores and scrap metal and 57 % of metal products. Linz is thus the largest inland port in Austria ahead of Vienna, Enns and Krems.<sup>37</sup>

The port enables the resident steel industry to procure part of its raw materials via the Danube. According to voestalpine Rohstoffbeschaffungs-GmbH approximately 50% of import needs (around 2.5 to 3m tons per annum) are met by inland navigation vessels. Most of the ores come from ports in the Ukraine and Slovakia, meaning that transport is largely upstream.<sup>38</sup> The majority of coking coal arrives in Linz by rail.

The share of waterways for end-products is lower and here the steel industry on the Danube does not differ from that on the Rhine. The market share for finished steel products in Linz in 2009 was as follows: rail 62 %; HGV 24 %; inland navigation 14 %.<sup>39</sup> In the view of Logistik Service GmbH which, as a subsidiary of voestalpine Stahl GmbH is responsible for the delivery of steel goods, the share of the modal split enjoyed by inland navigation could rise if the water conditions stay consistently good.

Whilst Linz is the main inland port for iron and steel, Vienna is the principal port of call for mineral oil products. The inland port of Vienna accounts for about half of all

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<sup>36</sup> Source: Eurofer; for comparison - share in Germany 69 %, in France 63 %, in Belgium 75%.

<sup>37</sup> Source: Statistik Austria

<sup>38</sup> Source: Via Donau

<sup>39</sup> Source: Logistik Service GmbH

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handling of mineral oil products in Austrian inland navigation. With an 80% share of handling, mineral oil products are by far the most important cargo for the port.

Steel production has drastically decreased in Austria as in Germany, France and other countries, owing to the economic crisis. Between October 2008 and February 2009 production fell from 706 000 tons to 349 000 tons – a reduction of almost half.<sup>40</sup> Spring 2009, however, heralded a recovery and a rise in production.

Linz notwithstanding, part of Austrian steel production takes place in the Steiermark, far away from any navigable rivers. However, given that the annual steel production in Linz accounts for roughly two-thirds of overall domestic steel output, a fairly close correlation between Austrian steel production and the transportation of metals and ores on the Danube is to be expected.

This is borne out by econometric calculations indicating that a rise of one percent in Austrian steel production went hand-in-hand with a 0.65% increase in the transport of ores and scrap metal on the Danube. These calculations drew on quarterly figures from the first quarter of 2004 through to the first quarter of 2009. Steel production is therefore seen to wield a great deal of influence on the quantity of ores and metals transported.

#### **4. HANDLING IN PORTS AND THE SHARE OF INLAND NAVIGATION IN THE MODAL SPLIT**

The global economy was already on the wane in spring 2008 and by August that year it was on the brink of collapse. This served to stifle demand among all modes of transport and the fallout is most visible in the drop in handling volumes in maritime ports which, as multimodal interfaces, are directly affected by any contraction in international trade.

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<sup>40</sup> Source: Eurofer

Despite the dwindling demand for transport the total amounts transported in Germany during 2008 rose by 1.5% to 3.7b tons. However, it was only the volumes conveyed by road and rail which registered a growth as inland navigation transported 3.3m tons less than in 2007. This corresponded to a decline of 1.3 % to 245.7m tons.

Since rail and road registered moderate growth of 2.8 % and 1.6 % at the same time, the market share of inland navigation in Germany further declined in 2008. It dropped under the 10% mark for the first time, reaching a low of 9,8 %. Road haulage claimed 72.5 %, and cargo by rail accounted for 17.7 %. The market share of waterways had still been 10.0 % the year before.

#### 4.1 Maritime Ports

The following table shows the six most important coastal ports of the Hamburg-Le Havre Range and the volume of cargo handled in 2008.<sup>41</sup> Total handling is split into groups of goods according to the NSTR codes.<sup>42</sup> This overview is to be read as a condensed overview of information on maritime transport whose aim is to shed light on developments in handling and in transport at inland ports. It is by no means a complete analysis of all maritime ports.

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41 *The most relevant ports depend to some degree on the group of goods. For example, the list above omits Bremen, as its importance is largely restricted to the container segment.*

42 *The group of goods 'Vehicles, machines and other finished and semi-finished products' is missing. Since these goods are often transported in containers, the container segment has been added to the table below.*



**Tabelle 6: Handling in key maritime ports in 2008 (million tons)**

	Agricultural products	Foodstuffs and feed	Solid fuels	Petroleum and mineral oil products	Ores and scrap metals	Iron, steel and metals	Rocks, soils, building materials	Fertilisers	Chemical products
Rotterdam	10,3	**	28,2	159	43,5	7,07	12	0,05	35,7
Antwerp	1,0	2,2	9,9	29,5	7,5	10,5	1,8	3,8	9,4
Amsterdam	8,7	9,5	17,4	31	0,8	0,7	5,8	1,1	2,4
Hamburg	6,5	-	5,2	12,9	10	0,7	3,4	2,2	2,7*
Gent	1,4	3,6	4,2	3,2	5,9	2,8	1,6	1,2	0,6
Le Havre	-	1,8	2,7	47,8	-	-	0,2	-	12,5

Source: Maritime ports, Nationale Havenraad; Data for containers in million TEU; - = no data; \* estimate; \*\* see agricultural products.

The following table gives the three most relevant maritime ports for each group of goods. It also contains a comparison of container handling figures.

**Table 7: Ranking of maritime ports for selected cargo segments\***

	<b>Position 1</b>	<b>Position 2</b>	<b>Position 3</b>
Agricultural products	Rotterdam (10,3)	Amsterdam (8,7)	Hamburg (6,5)
Foodstuffs and feed**	Rotterdam (10,3)	Amsterdam (9,5)	Gent (3,6)
Solid fuels	Rotterdam (28,2)	Amsterdam (17,4)	Antwerp (9,9)4
Petroleum and mineral oil products	Rotterdam (159)	Le Havre (47,8)	Amsterdam (31)
Ores and scrap metal	Rotterdam (43,5)	Hamburg (10)	Antwerp (7,5)
Iron, steel and metals	Antwerpen (10,5)	Rotterdam (7,07)	Gent (2,8)
Rocks, soils, building materials	Rotterdam (12)	Amsterdam (5,8)	Hamburg (3,4)
Chemical products	Rotterdam (35,7)	Le Havre (12,5)	Antwerp (9,4)
Fertilisers	Antwerp (3,8)	Hamburg (2,2)	Gent (1,2)
Containers*	Rotterdam (10,8)	Hamburg (9,7)	Antwerp (8,66)

Source: CCNR from information provided by the ports; \* incl. handling in 2008, data in million tons, except for containers: data in million. TEU; \*\* for Rotterdam identical to the segment 'agricultural products'

These comparisons mostly show Rotterdam to be the largest maritime port. The ports of Antwerp, Amsterdam and Hamburg also fulfil an important role.

### **Developments in the First Half of 2009**

The following is a description of how handling at the maritime ports has developed, according to the different segments of goods. Generally only the most important port for the segment in question is analysed.

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### **A) Agricultural products, foodstuffs and feed, and fertilisers**

Agricultural products play a particularly important role for imports in Rotterdam. Cattlefeed makes up about 90 % of handling. In the first half of 2009 handling of both incoming and outgoing cargo fell by around 18 % compared to the previous year. The decrease in imports can also be ascribed to the good harvest in Europe.

In Antwerp the result for handling of cereals was 20 % below that of the previous year. In Hamburg the handling of cereals for export clearly rose compared to the year before.

The handling of fertilisers in the first half fell in Antwerp, the key port for these goods, by 49 % a reduction of nearly half.

### **B) Solid fuels**

In the first half of 2009, the handling of coal in the port of Rotterdam dipped by 14% compared to the previous year. The principal cause was the blatant lull in demand for coking coal in the steel industry, leading to the closure of six of the fifteen blast-furnaces in Germany. The drop in the handling of coal was even more pronounced in Antwerp at 43%.

### **C) Petroleum and mineral oil products**

The segment of mineral oil products was mostly spared the fallout of the economic crisis. There was frequent growth due to a number of reasons such as the relaxation in prices and the completion of new terminals. This was the case in three of the four ports with the highest rate of handling, to wit Rotterdam, Antwerp and Amsterdam. In Rotterdam the handling of mineral oil products went up by 18.5 %, in Antwerp by 5% and in Amsterdam by 25%. The increase in Amsterdam is also attributable to the completion of a new handling terminal.

After Rotterdam, Le Havre is the second most important maritime port for petroleum and mineral oil products. These goods account for about 70 % of handling of liquid bulk goods. In the first six months the handling of crude was -1.4 % down on 2008.

#### **D) Ores and scrap metal**

The decrease in ores and scrap metal was enormous due to the faltering steel production. In Rotterdam the drop in exports was 65.6 %. In Antwerp there was a similarly serious decline of 61.4 %.

#### **E) Iron, steel and metals**

Antwerp is the most significant maritime port for this segment in the North Range and suffered a fall of 41.2 %.

#### **F) Rocks, soils, building materials**

In the first half, the port of Antwerp handled 25% less building materials than in the same period the year before.

#### **G) Chemical products**

In the first half of the year, Rotterdam handled about one quarter fewer basic chemicals than in the previous year. In Antwerp, handling decreased by around 10 %.

#### **H) Containers**

In the first quarter of 2009 container traffic in the port of was 24.3 % below the level of the previous year. The situation deteriorated in the second quarter, leading to a first-half decline of, 28.7 %. The most marked decrease was on routes in the Baltic Basin (Russia -58 %, Sweden -28.5 %, Finland -41 %). Traffic with China sank by 27 %.

In Rotterdam the fall was 13 %, for Amsterdam 40 %. This was mostly the upshot of fewer imports from Asia. In Antwerp, the volume dropped by 17.7% from 52 million tons last year, to less than 43 million tons in the period from January to June 2009. The fall in terms of TEU was 18.5%.

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## 4.2 Inland Ports

The following text deals with the development of handling in the most significant ports of the Rhine for 2008 and the first half of 2009 and does so on the basis of the kinds of cargo handled (mineral oil products, containers, coal, etc.). The handling data is meant to afford an insight into the latest market developments. This is, however, not a comprehensive description of all inland ports

### Function of Inland Ports

Inland ports are junctions for international logistics in terms of handling and distribution with their own sphere of geographical influence that may range from the local to the European level. International traffic is dominant in the larger ports, often because of a structural link with the maritime ports. Traffic flows and cargo quantities are to a great extent determined by links to one or more maritime ports. This means there are many forms of collaboration at the level of the ports and the carriers.

### Brief Description of the Largest Inland Ports on the Rhine

The port of Duisburg is the biggest inland port in Europe. If the private ports are brought into the equation, then in 2008 inland navigation handling amounted to over 51m tons, of which 41m tons were cargo. In 2006, 90 % of traffic was foreign (with the Netherlands accounting for 78 %). The port of Duisburg is thus the most “international“ of all ports on the Rhine.

In the port of Cologne mineral oil products play the most important role, followed by chemical products. In 2008, 10.2m tons of cargo were handled using inland navigation vessels. The port is a popular destination for cruise ships as well as cargo vessels.

The Mannheim-Ludwigshafen port complex plays host to the chemical giant BASF and is therefore among the Top 3 biggest ports on the German stretch of the Rhine (the port of Mannheim is also distinguished by its handling of coal and foodstuffs). In 2008 this twin port handled 16.3m tons.

The Neuss-Düsseldorf port complex is the fruit of a merger and now spans both banks of the Rhine. Its handling activities cover a wide range of cargo, the foremost of which are foods, construction materials and logistical items. In 2008 handling totalled 20m tons.

The port of Karlsruhe mostly conducts transport operations for the refineries, but also has its own container terminal and a dock to handle coal for power stations and to deal with inward and outward freight for the local cement factories. In 2008 handling amounted to 6.5m tons.

The most important cargo items handled by the French port of Strasbourg are mineral oil products, gravel and agricultural products. In 2008, 8.4m tons were handled by inland navigation vessels. Strasbourg is also a popular destination for cruise ships. The German port of Kehl which deals with ores and metals is very nearby and handled 3.9m tons in 2008.

The port of Basel (another destination for cruise ships) is the gateway to Switzerland, as it is the conduit for 15 % of the country's imports and exports, and for a massive 40 % of all imports of mineral oil products, which constitute the main product group. In 2008 it handled 7.2m tons.

Source: the various inland ports

**Table 8: Summary table (2008, in million tons transported by inland navigation vessel)**

	Agricultural products	Foodstuffs and feeds	Solid mineral fuels	Petroleum and mineral oil products	Ores and scrap metal	Iron, steel and non-ferrous metals	Rocks, soils and building materials	Fertilisers	Chemical products	Other goods and assemblies	Total handling (million tons)	Compared to 2007 (%)
Duisburg*	0	0	6,2	4,6	1,5	5,2	1,0	0	see mineraloil segment	9,8	28,31 rail/vessel	-3,8
Cologne	0,1	0,1	0,1	5,3	0,3	0,1	1,3	0	2,1	0,8	10,2	-8
Neuss-Düsseldorf	0,3	2,6	0,3	0,9	1,4	0,2	2,2	0	0,5	1,4	10	-0,1
Mannheim-Ludwigshafen	0,4	1,9	2,7	2,6	0,5	0,2	1,9	1	4,5	0,8	16,4	0
Karlsruhe	0,1	0	1	3,9	0,1	0,2	0,4	0	0,6	0,2	6,5	1,4
Strasbourg	1,1	0,4	0	2,4	0,1	0,1*	3,4	0,1	0,2	0,8	8,4	-4,6
Basel	0,4	0,5	0,2	3,0	0,1	1,0	0,6	0,2	0,9	0,2	7,2	1,5

Source: the various inland ports: (\*) Excluding private ports; (\*\*) In 2008 handling in all German inland ports fell (281m tons) minus 1.9%.<sup>43</sup>

**Table 9: Specialisation of the ports (2008, in million tons transported by inland navigation)**

	Position 1	Position 2	Position 3
Solid mineral fuels	Duisburg (6,2)	Mannheim (2,7)	Karlsruhe (1,0)
Petroleum, mineral oil products	Cologne (5,3)	Duisburg (4,6)	Karlsruhe (3,9)
Ores and scrap metals	Duisburg (1,5)	Mannheim (0,4)	Cologne (0,3)
Rocks, soils and building materials	Strasbourg (3,4)	Cologne (1,3)	Duisburg (1,0)
Agricultural products and fertilisers	Strasbourg (1,2)	Basel (0,6)	Mannheim (0,3)
Foodstuffs and feed	Mannheim (1,9)	Basel (0,5)	Strasbourg (0,4)
Iron, steel and non-ferrous metals	Duisburg (5,2)	Basel (1,0)	Mannheim/Karlsruhe (each 0,2)
Chemical products	Ludwigshafen (3,2)	Cologne (2,1)	Mannheim (1,3)
Containers	Duisburg (9,8)	Strasbourg/ Cologne (about 0,8)	Mannheim (0,7)

Source: the various inland ports

## Developments in the First Half of 2009

The following is a description for Mannheim, Strasbourg and Basel of developments in the different types of cargo in the first half of 2009 compared with the previous year. Where possible a link is made to developments in handling at the maritime ports.

### A) Agricultural products

The lull in the importation and handling of this sort of cargo in the maritime ports is reflected in the low levels of handling in the key inland ports. Handling dropped by 44.3 % in Basel and by 21.6% in Mannheim. Strasbourg meanwhile achieved a 3 % increase.



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## **B) Foodstuffs**

Much the same applies here as to agricultural products. In general there was a decline due to the low imports via maritime ports. Handling fell by 9.6 % in Basel and by 5.8% in Mannheim, whereas Strasbourg recorded an increase of 11 %.

## **C) Solid fuels**

In Rotterdam a decline was already detectable. In Mannheim, the second largest port for this product, there was a corresponding drop 20.3 %. In Basel, though, handling rose by 31.3 %.

## **D) Oil and mineral oil products**

The pronounced increase in the handling of mineral oil products in the maritime ports passed over to the inland ports. In the first half of the year, handling in Basel went up by 64.2 % (incoming traffic in fact rose by 70 %) and in Mannheim by 120 %. In Strasbourg there was, however, a mild decrease of 2.8 %.

## **E) Ores and scrap metals**

As in the major maritime ports, the handling of these goods was on a downward trend owing to the recession. Handling in Basel fell by 46.8 %, in Strasbourg by 26 % and in Mannheim by 8.9 %.

## **F) Iron, steel and non-ferrous metals**

In tune with the development in Antwerp, the major port for this kind of cargo, significantly less handling took place elsewhere - Basel fell by 52.6 %, Strasbourg by 86 % and Mannheim by 46.4 %.

## **G) Rocks, soils and building materials**

As in the maritime ports, especially Antwerp, there was a decrease in handling with Basel losing 28.5 %, Strasbourg 54 % and Mannheim 22.5 %.

## **H) Fertilisers**

In the inland ports of Basel (-54.3 %), Strasbourg (-46.5 %) and Mannheim (-25 %), which specialise in this cargo as shown in the table, there was less handling.

### I) Chemical products

Significantly less handling took place in the coastal ports and both Basel and Mannheim saw their handling fall by approximately a third (-30.8 % and -33.6 % respectively). Strasbourg, however, recorded a rise of 16 %.

### J) Containers

There was already a clear drop in the number of containers at the maritime ports. Basel and Mannheim likewise showed a negative development of respectively -20.1 % and -30 %. Strasbourg recorded some growth.

## 5. ASSESSMENT

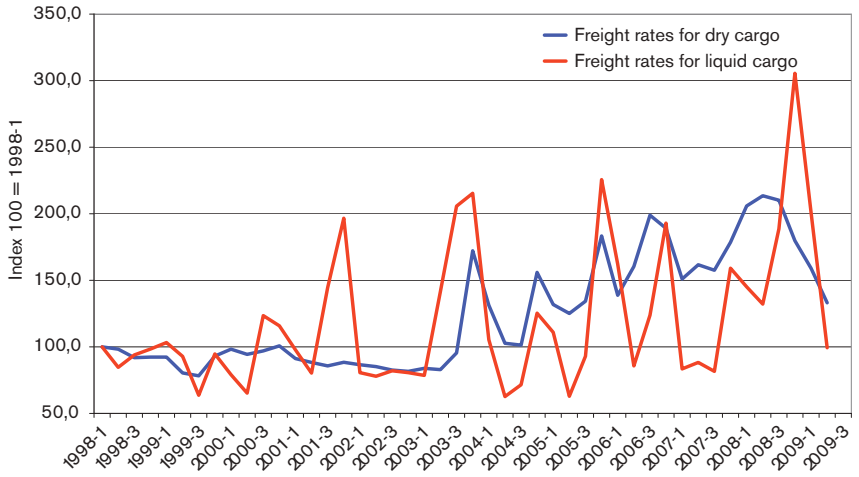
The decline in demand for transport since the second half of 2008, which intensified in the initial months of 2009 and expanded to all branches of industry, led to a decrease in cargo rates for dry cargo transport as illustrated in the graph below. At the start of 2009 cargo rates for tanker transport also dropped sharply, though some of the fall is seasonal in nature. The highest volumes of mineral oil products are usually transported in autumn and the beginning of winter, after which there is regularly less demand for transport in the first few months of the year.

Since the end of 2008, the dry cargo transport sector has been grappling with very weak demand and a corresponding drop in cargo rates. In the first half of 2009 many vessels often stayed in dock because there were no transport orders.

As of autumn 2009 this situation is all the more worrying for the sector, since there was still no hope of a clear and swift restoration of demand.

Should such a dearth of orders persist, it will inevitably entail serious consequences for navigation companies, especially if their business is committed to making loan repayments to fund investments.

**Figure 40: Development of cargo rates**



Source : NEA

# ANALYSIS OF THE VESSELS USED FOR TRANSPORT

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## 1. STRUCTURE OF THE EUROPEAN FLEETS

At least in Western Europe improvements in the registration of national fleets make it possible to pinpoint the “deployable” fleet, or those vessels which can sail immediately since as they hold the mandatory inspection certificate.

Generally it is to be noted that in the European inland fleet the number of vessels is decreasing but the deployable capacity is on the up. This trend can be explained by the regular use of large new units and the departure from the fleet of small units which are converted into accommodation or sold to third states in the EU. Some vessels are also scrapped.

In 2008 the structure of the European cargo and tanker fleet was as follows:

**Table 10: West European dry cargo fleet\***

	under 1500 T	1500 - 2500	2500 - 3500
Number	76 %	14 %	10 %
Tonnage	51 %	23 %	26 %

Source: Vessel register / CCNR Secretariat; \* Belgium, Germany, France, Luxembourg, Netherlands, Switzerland

**Table 11: West European tanker fleet\***

	under 1500 T	1500 - 2500	2500 - 3500
Number	53 %	27 %	20 %
Tonnage	23 %	34 %	43 %

Source: Vessel register / CCNR Secretariat; \* Belgium, Germany, France, Luxembourg, Netherlands, Switzerland

The structure of these fleets is heavily influenced by the structure of navigation on the Rhine.

The other European inland navigation fleets have a different structure. The proportion of lighter barges is significantly higher and self-propelled barges are almost all small and medium-sized units. There are only a few self-propelled tankers since European tanker traffic is mostly concentrated on the Rhine.

New buildings are used virtually only on the Rhine and the Mittelland Canal area and the older smaller units are sold to the states of Eastern Europe.

## **2. SALES BETWEEN STATES**

In 2008 Germany sold 43 small lighter barges to the Eastern European States, especially Poland, Bulgaria and Romania. Most of the units sold had a capacity of 50 to 600 tons. In addition, some self-propelled barges and tankers with a capacity of 500 to 1 500 tons were passed on to these fleets.

It should be noted that more and more vessels are conducting transportation in Germany and on the Rhine under an Eastern European flag. Even if they are sold, these vessels may in fact still be active on the Western European market.

Most sales of self-propelled barges and tankers take place between Western European states, particularly when it comes to larger and relatively new units.

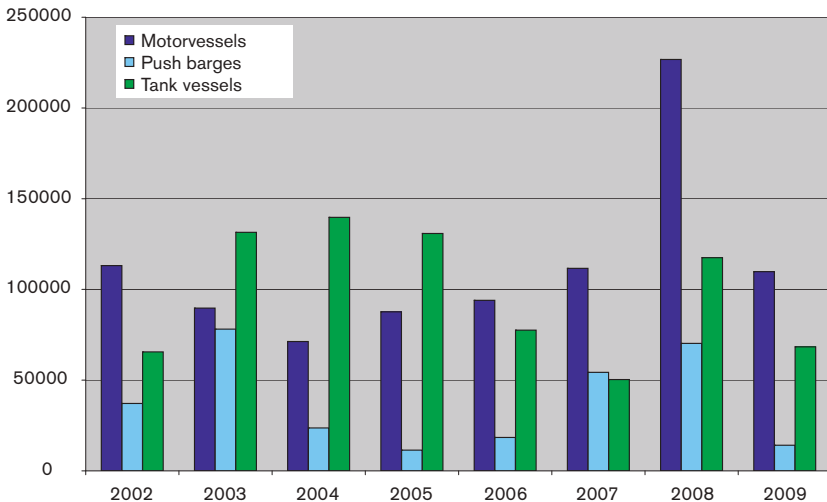
### 3. NEW CARGO CAPACITY ON THE MARKET

2008 was a record year for the deployment of new buildings on the market and this is true for both dry cargo and tanker transport. Both segments conveyed twice as much capacity to the market as in the previous years.

In 2009 new buildings should continue apace despite the economic crisis, because a great many vessels had already been ordered by the end of 2008 and it was not possible to cancel all these orders.

Thus since the beginning of the year, 39 self-propelled barges with a capacity of about 110 000 tons entered service. For tanker transport 31 self-propelled tankers with a capacity of 68 000 tons had already entered service.

**Figure 41: New cargo capacity on the market (in tons)**



Source: IVR

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This leads to the prediction that, though the growth in new cargo capacity in 2009 may not equal the record level of 2008, it will still significantly exceed the average of recent years, for both self-propelled barges and tankers.

The situation of lighter barges is somewhat different, given the drop in vessels entering service. Only five new vessels entered dry cargo transport.

The average size of newly commissioned vessels is still rising with an average of 3 500 tons for self-propelled barges. Only 3 units with a capacity of 1 600 to 1 900 tons entered service.

As regards tankers, six units with a capacity of between 1 500 and 1 700 tons entered service in 2009. It should be noted that this segment regularly sees the entry to the market of vessels weighing over 5 000 tons. These are largely, though not exclusively used for the bunkering of maritime vessels in the large coastal ports.

In so doing, these units only rarely take a hand in the traditional tanker transport market and so do not exert a direct influence on the cargo capacity of that market.

In 2009 2 new pusher tugs were built as against 7 in 2008.

The pace of new buildings of passenger vessels has remained fairly consistent since the start of the year with 7 new units. On the one hand the same situation pertains in this market as in the cargo transport market with the fulfilment of existing orders despite the economic crisis. On the other, the demand for transport on this market has not been severely impaired by the present economic situation

## **4. SCRAPPING OF INLAND VESSELS**

Since the completion of structural improvements only a few vessels per annum are scrapped. All scrapping yards are located in the Netherlands

The data available on this indicate a total of 11 self-propelled tankers and barges scrapped in the Netherlands in 2007. The figure for 2008 is 13.

The table below lists the scrapping operations registered in Germany:

**Table 11: Vessels scrapped in Germany**

	2007			2008		
	Number	Tonnage	Tonnage new building	Number	Tonnage	Tonnage new building
Self-propelled barges	2	1144	3584	4	2720	7979
Pushers/pushed barges	4	3325	4321	5	2112	18699
Self-propelled tankers	0	0	5170	1	1000	12398

*The level of scrapped tonnage did not vary greatly between 2007 and 2008. Nonetheless, scrapped tonnage is not relevant in comparison with the tonnage of new commissions.*



## Section 3

# WATER LEVELS AND OPERATING CAPACITY

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In 2008 and in the first eight months of 2009 the water levels on the most important waterways of Europe were such that vessels generally enjoyed optimum draught. Up to autumn 2008 there was still a high demand for transport which could be met thanks to these favourable water levels.

The seasonal trends can be discerned on the graphs below, and were not characterised by any extremes in 2008 and 2009.

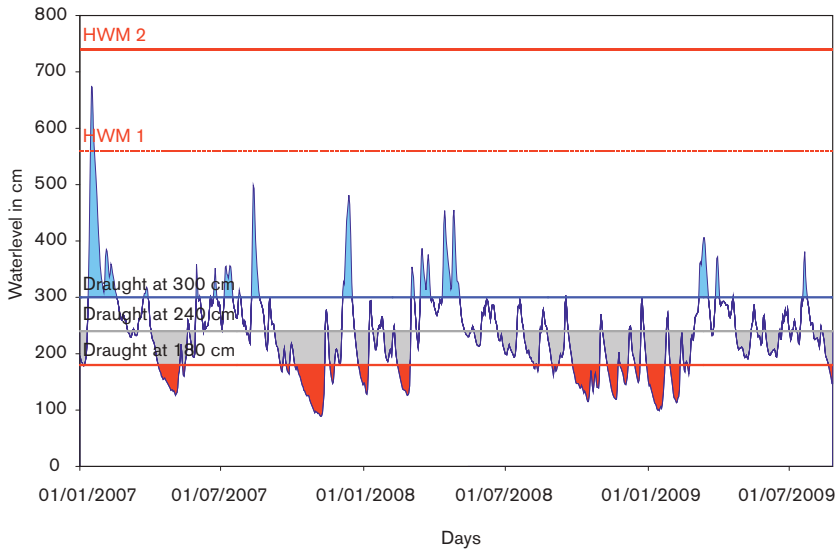
In winter 2008-2009 navigation was halted for a number of days on part of the waterways described (in January 2009) , but it was only on the Main-Danube axis that this situation persisted.

## 1. WATER LEVELS ON THE RHINE

During 2008 no extreme developments were observed in water levels on the Rhine. In general inland navigation on the Rhine was able to fulfil the still buoyant demand for transport up to autumn 2008 thanks to optimum loaded draughts.

Likewise in the first eight months of 2009, water levels did not present an obstacle to navigation although the demand for transport was, alas, very meagre.

**Figure 42: Water levels in Kaub**

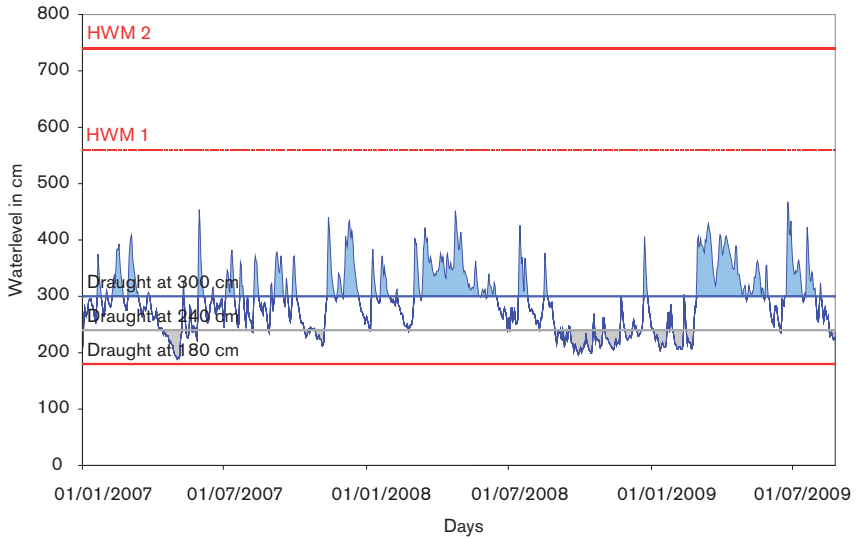


Source : BAFG

## 2. WATER LEVELS ON THE UPPER DANUBE

Until autumn 2008 water levels were reasonably conducive to a profitable load capacity for vessels. However, in autumn there was a water shortage which limited the draught of larger units until February 2009.

**Figure 43: Water levels in Hofkirchen**



Source : BAFG

In 2009 the situation was satisfactory till August thanks to a rainy summer.

### Interruption to Navigation Due To Ice

In the winters 2006/2007 and 2007/2008 there was no disruption to navigation on the Main-Danube axis due to ice.

In January and into February 2009 the link between the Main and the Danube was disrupted for 31 days on account of ice on the Rhine-Main-Danube Canal.

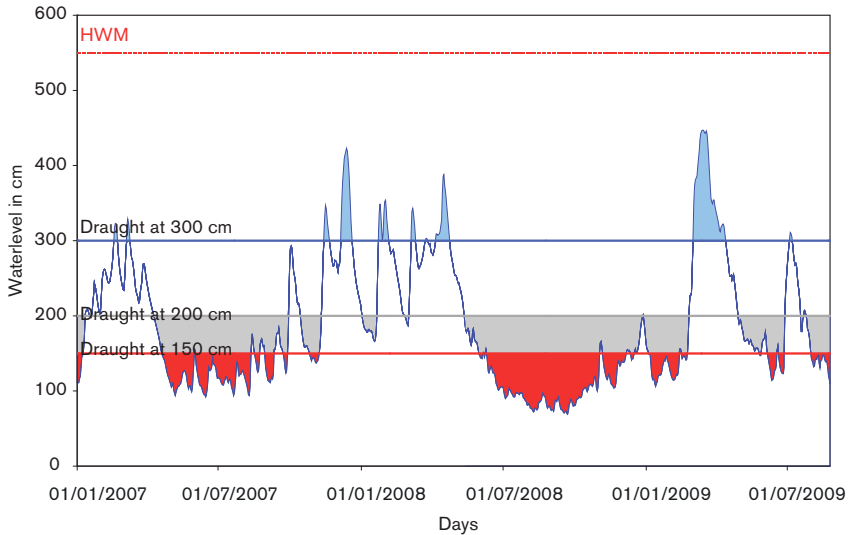
## 3. WATER LEVELS ON THE ELBE

Once again for the Elbe in Magdeburg an average draught of up to 200 cm in could only be obtained about 35 % of the time and a draught of up to 150 cm only around 64 % of the time. The insufficient summer water levels, largely caused by

lack of rainfall is a particular obstacle to the development of inland navigation north of Magdeburg, especially on the Upper Elbe.

In mid- January 2009 navigation on the Elbe was disrupted for several days by ice.

**Figure 44: Water levels in Magdeburg**



Source: BAFG

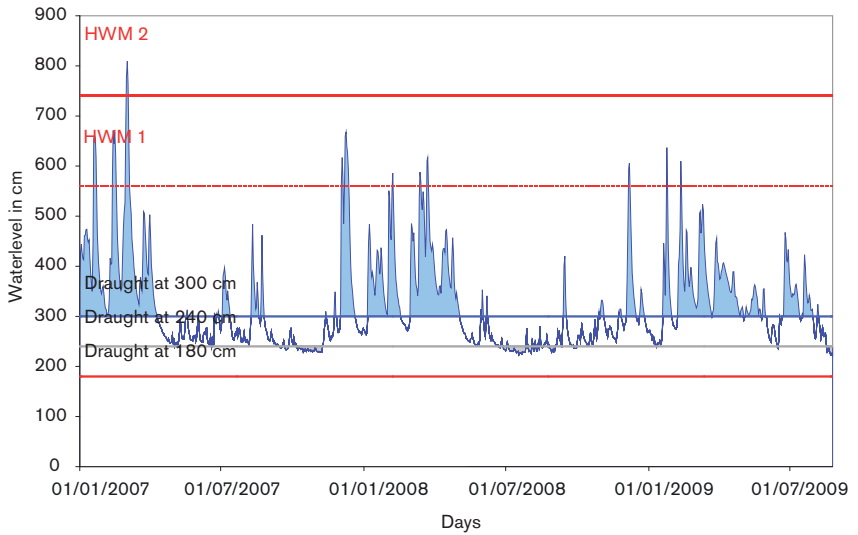
The figures demonstrate that water levels on the Elbe in the first eight months of 2009 were better than in 2008 and 2007. This was due to the abundant rain in spring and early summer which delayed the water shortage until August. There will therefore be a notably shorter summer low-water period in 2009.

In 2008 the low-water periods, which occur almost exclusively in summer, were particularly tenacious.

## 4. WATER LEVELS ON THE MOSEL NEAR TRIER

In terms of the loaded draught of vessels, the water levels of the Mosel near Trier in 2008 were average. In 2009 a rainy start to the summer meant that the usual summer water shortage only made itself felt in August.

**Figure 45: Water levels in Trier**



Source : BAFG

# CONCLUSIONS

## Labour Market

People often complain of a reduction in employment in inland navigation and analysis shows that this is mostly due to a drop in the numbers of self-employed vessel operators, in Germany and Belgium especially. Larger enterprises meanwhile are reporting a growing need for personnel owing to the steadily increasing size of vessels. The demands on crewmembers are therefore getting ever higher in line with technical developments and this means a need to adjust training courses accordingly

The age structure indicates that in the coming 15 years, nearly 30% of Western European inland navigation operators are set to retire, so enough people need to be trained each year to ensure that crews are replaced. Although the number of apprentices in Western Europe is increasing, there are still too few of them to cover the vacancies left by retirees.

It is already plain that many employees are coming over from Eastern Europe to fulfil the need in Western European countries. Even this workforce is insufficient and workers from third countries have to be called in to ensure that the minimum crew complement is attained. In this light, and especially against the backdrop of the crisis, the key question is how to recruit new entrants to Western European inland navigation.

## Demand for Transport

The demand for transport which was on an upward curve until summer 2008 fell markedly towards the end of that year. In the first few months of 2009 cargo transport by inland navigation decreased by an average of 21%, while container transport declined by 30%. Only the transportation of coal underwent a slight increase. It is to be hoped that the crisis reached its nadir over the summer. In the key maritime ports a slight rise in activity is discernible. There is a plan to re-commission several blast-furnaces in Western Europe due to a recovery in demand for steel. Still, these signals do not spell an end to the economic crisis, nor do they clearly augur a rise in demand for transport.

## Transport Fleets/ New Buildings

Since the beginning of 2009 many new buildings entered the market in the face of a weak demand for transport. Since the start of the year more self-propelled vessels have been deployed than in the whole of 2007 in both tanker transport and dry cargo transport. It is most unlikely that the record of 2008 will be equalled. Only a few pusher barges came onto the market.

In spite of this, the expectation is that the wave of new buildings will soon draw to a close once outstanding orders have been fulfilled. For dry cargo transport at least, there seem to be no fresh orders. Tanker transport may evolve differently, since this segment is in a restructuring phase. Currently only a few ships are scrapped, most of them small.

Small vessels are presently being sold to the states of Eastern Europe. This vessel capacity is thus removed from those potentially active in the Western fleet. This does not necessarily mean that the vessels have withdrawn from the market, given the growing number of vessels with an Eastern European flag conducting transport in Western Europe.

## Economics

Cargo rates for both dry cargo and tanker transport decreased significantly in the first two quarters of 2009, owing partly to unsatisfactory water levels, but due more particularly to a low demand for transport.

The economic crisis has now held sway for almost a year and, like all other modes of transport, inland navigation must accept a decline in demand for transport. In economic terms this entails a steep drop in yields through small cargoes and low volumes. This leads to difficulties for the companies. The banks have acknowledged this and thus granted their inland navigation clients deferrals in loan repayments.

Despite these measures in certain sectors, more and more inland navigation companies are coming up against difficulties. Even though for some weeks now there have been signs that the crisis has passed its lowest ebb, it is still hard to predict how long it will persist. The time factor is vital for many companies as their survival depends on a swift end to this crisis.

# ANNEX 1

## Status of new buildings as of end of August 2009

Vessel type	2002			2003			2004		
	Number	Tonnage	kW	Number	Tonnage	kW	Number	Tonnage	kW
Self-propelled barges	45	113114	56138	34	89676	41894	28	71326	34400
Cargo pushers	29	37180		28	78156		14	23636	
<b>Total</b>	<b>74</b>	<b>150294</b>	<b>56138</b>	<b>62</b>	<b>167832</b>	<b>41894</b>	<b>42</b>	<b>94962</b>	<b>34400</b>
Self-propelled tankers	22	65548	30547	45	131455	50332	54	139718	61236
Tank lighters	2	178		1	1800		3	2427	
<b>Total</b>	<b>24</b>	<b>65726</b>	<b>30547</b>	<b>46</b>	<b>133255</b>	<b>50332</b>	<b>57</b>	<b>142145</b>	<b>61236</b>
Pushers	2		1276	0		0	1		992
Tugs	3		11670	1		279	1		177
<b>Total</b>	<b>5</b>		<b>12946</b>	<b>1</b>		<b>279</b>	<b>2</b>		<b>1169</b>
Cabin vessels	17		13251	10		7238	5		4021
Excursion vessels	9		4834	1		1566	1		662
<b>Total</b>	<b>26</b>		<b>18085</b>	<b>11</b>		<b>8804</b>	<b>6</b>		<b>4683</b>

Vessel type	2005			2006			2007		
	Number	Tonnage	kW	Number	Tonnage	kW	Number	Tonnage	kW
Self-propelled barges	34	87645	27490	33	93985	26637	35	111655	31460
Cargo pushers	12	11401		18	18385		29	54336	
<b>Total</b>	<b>46</b>	<b>99046</b>	<b>27490</b>	<b>51</b>	<b>112370</b>	<b>26637</b>	<b>64</b>	<b>165991</b>	<b>31460</b>
Self-propelled tankers	46	130860	43736	28	77565	24637	23	50333	16534
Tank lighters	2	2527		0	0	0	0	0	0
<b>Total</b>	<b>48</b>	<b>133387</b>	<b>43736</b>	<b>28</b>	<b>77565</b>	<b>24637</b>	<b>23</b>	<b>50333</b>	<b>16534</b>
Pushers	0		0	0		0	1		0
Tugs	0		0	0		0	0		0
<b>Total</b>	<b>0</b>		<b>0</b>	<b>0</b>		<b>0</b>	<b>1</b>		<b>0</b>
Cabin vessels	5		6280	4	1644	3186	2		1816
Excursion vessels	5		2832	2	1959	2244	1		1570
<b>Total</b>	<b>10</b>		<b>9112</b>	<b>6</b>	<b>3603</b>	<b>5430</b>	<b>3</b>		<b>3386</b>



Vessel type	2008			2009		
	Number	Tonnage	kW	Number	Tonnage	kW
Self-propelled barges	68	226750	92944	39	109805	53626
Cargo pushers	38	70260		5	14134	
<b>Total</b>	<b>106</b>	<b>297010</b>	<b>92944</b>	<b>44</b>	<b>123939</b>	<b>53626</b>
Self-propelled tankers	47	117500	31870	31	68380	20984
Tank lighters	0	0		0	0	
<b>Total</b>	<b>47</b>	<b>117500</b>	<b>31870</b>	<b>31</b>	<b>68380</b>	<b>20984</b>
Pushers	3		1684	2		882
Tugs	3		0	0		0
<b>Total</b>	<b>6</b>		<b>1684</b>	<b>2</b>		<b>882</b>
Cabin vessels	3		5092	7		7215
Excursion vessels	6		3092			
<b>Total</b>	<b>9</b>		<b>8184</b>	<b>7</b>		<b>7215</b>

Source: IVR and the CCNR Secretariat

## ANNEX 2

### Cargo capacity

31.12.2008	Self-propelled barges			Cargo pushers			Total dry cargo transport		
	Units	Tonnage	Output	Units	Tonnage	Output	Units	Tonnage	Output
	No.	T	kW	No.	T	kW	No.	T	kW
Germany	919	1158532	534481	875	905123		1794	2063655	534481
Austria (2004)	5	7058		54	84807		59	91865	0
Belgium	845	1037129	700796	222	434169		1067	1471298	700796
France	869	542647	177914	420	472791		1289	1015438	177914
Luxembourg	11	10321	5402	0	0		11	10321	5402
Netherlands	2847	3585872	1778334	696	1358782		3543	4944654	1778334
Switzerland	17	29960	15664	3	5646		20	35606	15664
Poland	107	64668	30208	428	217219		535	281887	30208
Czech Rep.	44	43520	19120	173	86450		217	129970	19120
Slovakia	14	20697	11013	133	215624		147	236321	11013
Hungary	3	3669					3	3669	0
Romania	289	350637	6065	602	1074545		891	1425182	6065
Bulgaria	15	11451	11311	150	74893		165	86344	11311
total	5985	6866161	3290308	3756	4930049		9741	11796210	3290308

31.12.2008	Self-propelled tankers			Tank lighters			Total tank transport		
	Units	Tonnage	Output	Units	Tonnage	Output	Units	Tonnage	Output
	No.	T	kW	No.	T	kW	No.	T	kW
Germany	393	679241	342834	47	53118		440	732359	342834
Austria (2004)	5	5601	0	15	22055		20	27656	0
Belgium	189	309167	190532	7	11737		196	320904	190532
France	34	42938	9978	49	76848		83	119786	9978
Luxembourg	16	27754	13838	2	8435		18	36189	13838
Netherlands	654	977429	552874	33	58091		687	1035520	552874
Switzerland	47	113091	50326	2	4042		49	117133	50326
Poland	41	19894	9358	10	6425		51	26319	9358

Czech Rep.	0	0	0	0	0		0	0	0
Slovakia	3	3669	2041	30	45949		33	49618	2041
Hungary	1	1235	0	2	4043		3	5278	0
Romania	9	18040	883	0	0		9	18040	883
Bulgaria	0	0	0	0	0	0	0	0	0
total	1392	2198059	1172664	197	290743		1589	2488802	1172664

	Tugs			Pushers			total		
	Units	Tonnage	Output	Units	Tonnage	Output	Units	Tonnage	Output
	No.	T	kW	No.	T	kW	No.	T	kW
Germany	139		27654	227		121571	366	0	149225
Austria (2004)	0		0	10		9200	10	0	9200
Belgium	0		0	101		58374	101	0	58374
France	0		0	0		0	0	0	0
Luxembourg	0		0	15		12729	15	0	12729
Netherlands	214		60439	431		222440	645	0	282879
Switzerland	1		353	4		1398	5	0	1751
Poland							0	0	0
Czech Rep.							98	0	27000
Slovakia	0		0	36		40570	36	0	40570
Hungary							0	0	0
Romania	45		12641	31		6997	76	0	19638
Bulgaria	25		10930	24		28083	49	0	39013
total	424		112017	879	0	501362	1303	0	613379

## GLOSSARY

**20-foot Equivalent Units (TEUs):** Unit of measurement for registering containers according to their dimensions and for the description of the capacity of container vessels and terminals. One ISO 20-foot container (20 feet long and 8 feet wide) corresponds to 1 TEU.

**ARA ports:** Abbreviation for the three major European ports of Amsterdam, Rotterdam and Antwerp.

**Downstream navigation:** navigation downriver

**Downstream:** Refers to the part of an inland waterway located between a given point and the embouchure or confluence.

**Draught:** Height of the immersed part of a vessel; thus draught affects the loading level.

**Dry hold:** Used for the transport of dry cargo.

**Econometric ratio:** Estimated ratio between two or more values (e.g. production of steel, transport on inland waterways, imports of coal, etc.) on the basis of statistical data, using electronic calculation procedures. This estimate is used in making forecasts.

**Electric steel:** Electric steel is produced by melting down scrap metal using electric arc technology.

**Freight:** Refers to goods being transported or the price of transport.

**Handling:** Trans-shipment of goods from one means of transport to another.

**Hold:** Compartment covering the larger part of a commercial vessel, for the storage of cargo to be transported.

**Inland navigation / inland waterways transport:** Transport of goods or persons on board a vessel intended for transport on a given network of inland waterways.

**Inland waterway:** Navigable inland waterways that may be used with a normal load by vessels with a minimum deadweight of 50 tonnes. Inland waterways include navigable rivers, lakes and canals.

**Offer of transport or of capacity:** Total loading capacity of the available fleet, expressed in tonnes.

**Oxygen steel:** Steel produced from iron ore and coal using blast-furnace technology, passing through a number of stages (injection of oxygen, etc).

**Production/yield:** The notion of production/yield as used in this publication is intended to define in index form the activity of inland waterways transport, taking into account a given level of demand and the freight rates applied on the market.

**River/sea transport:** Transport of goods on board a river/sea vessel (seagoing vessel designed for use on inland waterways), carried out entirely or partly on the inland waterways network.

**Service:** Refers to the service of the transport of goods, expressed in tonnes/kilometre.

**Tanker hold:** Used for the transport of cargo in tankers.

**Tonnes/kilometre (Tkm):** Unit of measurement for transport services, corresponding to the transport of one tonne over one kilometre of an inland waterway. Determined by multiplying the volume carried in tonnes by the distance travelled in kilometres.

**Transshipment:** Unloading of a cargo from one seagoing freight vessel and loading onto another seagoing freight vessel, even if the cargo has remained on land for any length of time before the transport continues.

**Upstream navigation:** Navigation travelling upstream.

**Upstream:** Refers to the part of an inland waterway located between a given point and the source.

**Water conditions:** Height of the water in a river or canal, in cm.

## Information Sources:

### International Organisations

EUROSTAT  
OECD  
DANUBE KOMMISSION  
MOSEL COMMISSION

### Member State Authorities

Bundesagentur für Arbeit (Germany)  
Bundesanstalt für Gewässerkunde (Germany)  
Bundesamt für Güterverkehr (Germany)  
Central Bureau voor de Statistiek, CBS (Netherlands)  
Destatis (Germany)  
Hamburg Port Authority, HPA (Germany)  
Inspectie Verkeer en Waterstaat, IVW (Netherlands)  
Institut National d'Assurances Sociales pour Travailleurs Indépendants, l'INASTI (Belgium)  
Ministerie van Verkeer en Waterstaat (Netherlands)  
Nationale Havenraad (Netherlands)  
Office National de Sécurité Sociale, ONSS (Belgium)  
Statistische Ämter des Bundes und der Länder (Germany)  
Statistik Austria (Austria)  
Stichting Afvalstoffen & Vaardocumenten Binnenvaart, SAB (Netherlands)  
Stichting Nederland Maritiem, (Netherlands)  
Via Donau (Austria)  
Vlaamse Overheid, Department Werk en Sociale Economie (Belgium)  
Voies Navigables de France (France)  
WSD Süd-West (Germany)  
WSD-OST (Germany)

### Organisations Under Private Law

Institut pour le Transport par Batellerie (ITB), Bruxelles, Belgium  
IntercontinentalExchange (ICE), Atlanta, USA  
Logistik Service GmbH Linz, Austria  
Voestalpine Rohstoffbeschaffungs-GmbH Linz, Austria  
NEA Consulting, Zoetermeer, Netherlands

### Inland Navigation Organisations

ADB  
CBRB  
EBU  
ESO  
IVR  
Kantoor Binnenvaart

### Industry Organisations

Deutscher Industrie- und Handelskammertag (DIHK)  
EUROFER  
Verein der deutschen Kohleimporteure (VDKI)

### Ports

Amsterdam  
Antwerpen  
Basel  
Duisburg  
Gent  
Hamburg  
Karlsruhe  
Köln  
Le Havre  
Ludwigshafen  
Mannheim  
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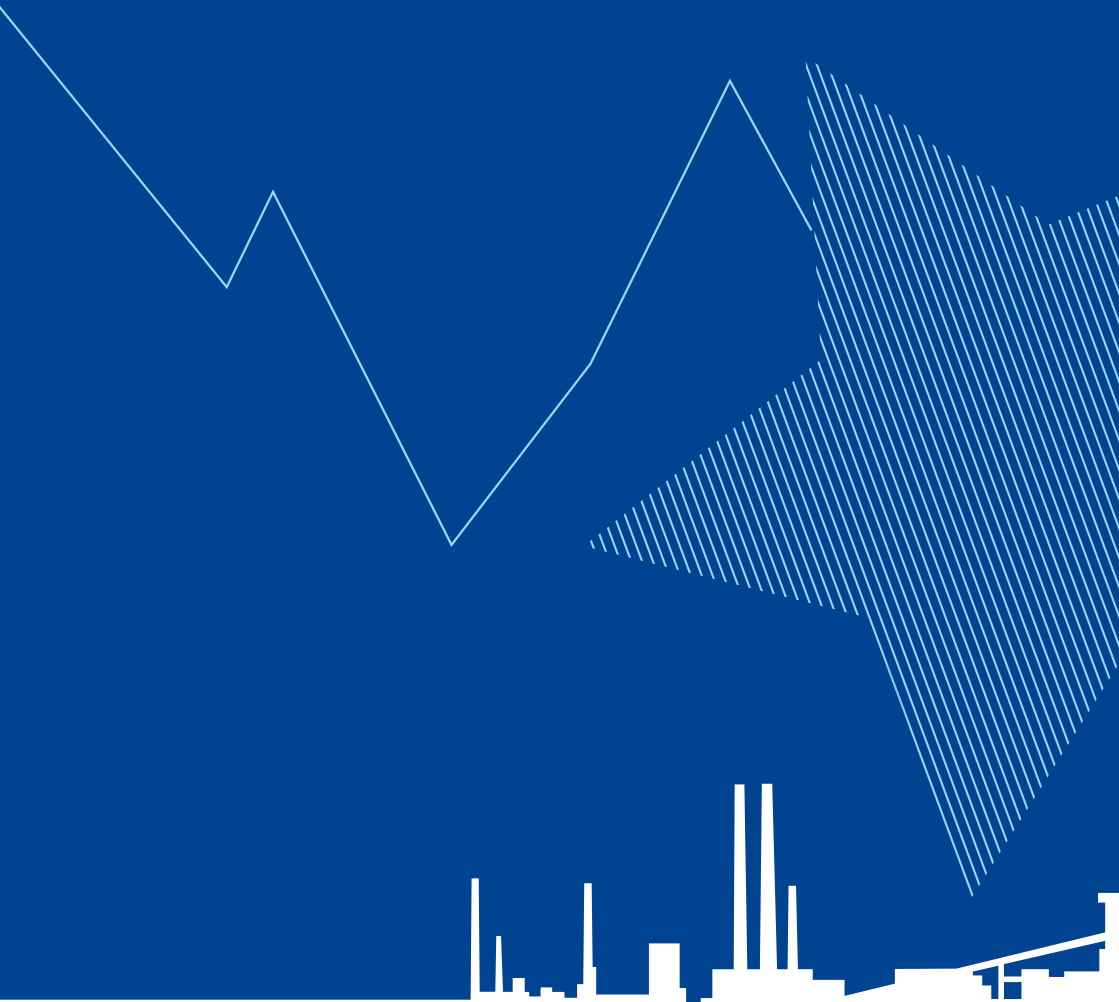
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