RE WWay
Research & Education in Inland Waterway Logistics

LOGISTIKUM
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READER – LEGAL ASPECTS OF INLAND NAVIGATION

Extract of relevant passages from the „Manual of Danube Navigation", viadonau (2019) and of other relevant sources.

Pictures: viadonau in Manual on Danube Navigation (2019), p 79, 106

The future of mobility

The future development of the mobility system is defined by national and European transport policies. This is achieved by determining basic objectives and strategies as well as by their implementation in important infrastructure and innovation projects. Based on this, the co-functioning of transport modes is promoted and negative consequences of mobility are reduced.

In addition to the target of safeguarding a high level of accessibility, the focus in Europe is clearly oriented toward sustainable and energy-efficient **transport**. Inland waterway transport can substantially contribute to this purpose because it is environmentally friendly, safe and has plenty of spare capacity. Due to these facts, inland waterway transport has, in recent years, become more and more perceived as an attractive transport option by politicians and economists. This is supported by European and national action programmes.

This chapter describes the **core objectives and strategies of European and national transport policies** which are of relevance to inland navigation. These objectives and strategies are predominantly of a basic, recommendatory character. Their further specifications are achieved by means of various action programmes and regulations at both European and national level. The main **sectoral provisions** (e.g. fairway parameters, environment, River Information Services) are dealt with in more detail in the respective chapters of this manual.

The implementation of transport-related strategies is supported by funds of the European Union as well as by national budgets and funding schemes. In addition, the EU is striving to better integrate private stakeholders into the financing of projects.

@ Detailed information on the European transport policy together with strategies and regulations are available on the web portal of the European Union: europa.eu/european-union/topics/transport_en

@ European funding database for inland waterway transport: https://eibip.eu/funding/

The digital waterway

As a cross-sectoral issue, digitalisation is among the most significant challenges currently facing Danube navigation. Digitalisation in this regard is defined as **digital transformation**, the adaptation of business models and supply chains as a continuous change process precipitated by the increasingly widespread use of digital technologies and their connectivity.

Besides progressive digitalisation in a broader sense, the activities of the European Union are focused in particular on international connectivity. At European level, digitalisation is assigned a high priority within the **Digital Single Market Strategy** (DSM), which includes inland navigation within the transport sector.

The **Digital Inland Waterway Area** (DINA) initiative by the European Commission addresses specific issues of inland navigation within the Digital Single Market Strategy, while the European Commission's **Digital Transport and Logistics Forum** (DTLF) supports matters of digitalisation in the transport and logistics sectors that affect the various transport modes.

This handbook contains examples of many relevant activities that are currently contributing to improvements in the economic efficiency, safety and environmental performance of Danube navigation:

@ Detailed information on the EU Digital Single Market Strategy: ec.europa.eu/digital-single-market

@ Working document by the Commission services on digital inland navigation: ec.europa.eu/transport/sites/transport/files/legislation/swd20180427-digital-inland-navigation.pdf

@ Website of the Digital Transport and Logistics Forum: www.dtlf.eu

- **Waterway activities** (e.g. waterway asset management systems, lock management, signing of waterway, riverbed surveys, water level management)
- **Landside activities** (digitalisation of processes and services at ports and terminals)
- **On-board activities** (e.g. digital monitoring of the vessel's operating data, automatic course tracking, collective measurement of fairway data on board vessels)
- **River Information Services** (e.g. fairway information services, transport information and management, notices to skippers, electronic reporting)

In addition, **potential future developments** are being analysed and shaped at European level by means of cooperation between infrastructure operators, shipping companies, logistics service providers and scientific institutions. The development of automated vessels (connected & automated transport) is among the ongoing efforts in collaboration with maritime navigation. The potential of new organisational forms (synchro-modality) and the possible influence of current trends (IoT – Internet of Things, physical internet, blockchain) on Danube navigation are being analysed in cooperation with the logistics sector in order to include inland navigation within multimodal logistics chains.

Besides continued development of the River Information Services, a variety of organisations in the Danube states are active in these fields and are preparing further steps in the area of digitalisation.

Source: viadonau/Christian Wurzer

State-of-the-art buoys in use

Transport policy framework at European level

Overarching objectives and strategies

The EU strategy **Europe 2020**, which was adopted in 2010, describes the essential overarching (transport) policy objectives and strategies of the European Union for the year 2020. Accordingly, the strategy also provides the policy framework for the further development of inland navigation (European Commission, 2010a).
In a rapidly changing world, the EU is aiming for growth which is:

- **smart** (through effective investments in education, research and innovation),
- **sustainable** (thanks to a decisive move towards a low-carbon economy and competitive industry) and
- **inclusive** (with a strong emphasis on job creation and poverty reduction).

@ Further information on the Europe 2020 strategy is available on the website of the European Commission: https://bit.ly/2gEXPR2

The process will be steered on the basis of five policy objectives, which will enable the measurement of its implementation. The fields of **climate change and energy** together with **research and development** are of particular relevance to inland navigation. In the field of climate change and energy, objectives have been set to cut greenhouse gas emissions in the range of 20 to 30% in comparison to 1990, to raise the share of renewable energy to 20% and to boost energy efficiency by 20%. For research and development in Europe, 3% of the gross domestic product of the EU will be made available. The European Commission publishes ongoing monitoring reports on the indicators, which are accessible online (refer to the link in the margin).

The European Commission's 2011 **White Paper on Transport** titled 'Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system' (European Commission, 2011) sets ambitious objectives for reducing oil dependency and CO_2 emissions. The latter should be reduced by 60% by 2050 in comparison to 1990.

The White Paper recognises inland navigation as an energy-efficient transport mode and encourages the raising of its share in the modal split.

The following **goals of the White Paper** are specifically relevant for inland navigation:

- 30% of road freight over 300 kilometres should shift to other transport modes such as waterway transport by 2030, and more than 50% by 2050. This shall be facilitated by efficient and green multimodal transport corridors. The Danube is part of such a corridor within the scope of the EU's trans-European transport network (TEN-T), i.e. core network corridor No. 10 'Strasbourg – Danube'.
- A fully functional and EU-wide multimodal TEN-T core network shall exist by 2030, with an extended network of high quality and high capacity by 2050 with a corresponding set of information services. Special relevance is given to the European ports in their function as interfaces between the transport modes.
- Equivalent management systems for land and waterway transport (River Information Services – RIS) shall be deployed.

- The principles of 'user pays' and 'polluter pays' shall be fully applied in the transport sector and a higher level of engagement by the private sector should be encouraged. This shall contribute to the elimination of distortion, generate revenue and ensure financing for future transport investment.

The objectives of the White Paper shall be achieved by means of a **roadmap of 40 project activities**. For Danube navigation, relevant project activities include the creation of a multimodal core network, the establishment of a suitable framework for inland navigation and the development of multimodal freight transport backed by telematics systems ('e-freight').

The European Commission published an implementation report on the White Paper in 2016 (European Commission, 2016).

@ Further information on the 2011 White Paper on Transport is available on the website of the European Commission: https://ec.europa.eu/transport/themes/strategies/2011_white_paper_en

Source: viadonau/Johannes Scherzer

Objectives and strategies relating to inland navigation

The second **Action Programme for the Promotion of Inland Waterway Transport of the European Commission** (towards quality inland waterway transport – NAIADES II) (European Commission, 2013a) defines the strategic inland navigation policy of the European Union until 2020 in the five thematic areas of infrastructure, markets, fleet, jobs and skills as well as River Information Services. The programme continues the efforts of the first Action Programme (NAIADES).

@ Website of the NAIADES II Action Programme https://ec.europa.eu/transport/modes/inland/promotion/naiades2_en

NAIADES II is designed to augment the capacity utilisation of inland waterways along with the sustainability of inland navigation in Europe. The European Commission published the NAIADES II Mid-term Progress Report in 2018, setting out the progress in the five areas until 2017 (European Commission, 2018b). It provides a positive assessment and describes the next necessary steps.

PLATINA II (Platform for the Implementation of NAIADES II) was installed as a platform for the coordinated implementation of the strategies and measures of the NAIADES II Action Programme in 2013-2016. The initiative was implemented by numerous organisations from several European countries and by the European

Commission, resulting in key milestones such as an analysis of external costs of inland navigation or standards for ship simulators in the training of captains, as well as promoting the dissemination of good practices in the area of waterway management.

The NAIADES II Action Programme, as well as the results of the implementation platform PLATINA II, have **positively influenced the perception of inland navigation** not only at a European and national political level but also in the European navigation sector. Crucial preconditions for promoting this sustainable transport mode have been developed and will serve as an essential basis for work in the coming years.

In 2018, the European Commission published an analysis of the term '**good navigation status**' in relation to waterways. This involved agreeing on a common definition of a 'good navigation status' and its implications for Europe's waterways in a process of dialogue with important representatives of inland navigation, as well as with the environmental sector (European Commission, 2018a).

@ Website of the NAIADES II implementation platform PLATINA II:
https://www.danube-navigation.eu/projects/platina-ii-platform-for-the-implementation-of-naiades

Transport policy framework in the Danube region

EU Strategy for the Danube Region

The **Strategy of the European Union for the Danube Region (EUSDR)** has been in force since 2011 (European Commission, 2010b). It is a macro-regional strategy comprising the 14 Danube countries, among them EU Member States, accession candidates and third countries. Additionally, a large number of stakeholders are involved in the process of the strategy's implementation.

i Danube countries participating in the Strategy for the Danube Region are: Germany, Austria, Czech Republic, Slovakia, Slovenia, Hungary, Romania, Bulgaria, Croatia, Serbia, Montenegro, Bosnia and Herzegovina, Ukraine and Moldova.

@ Web platform of the Strategy for the Danube Region:
www.danube-region.eu

The strategy is intended to be implemented until 2020 on the basis of an action plan which rests on four pillars: Connecting the Danube Region, Protecting the Environment in the Danube Region, Building Prosperity in the Danube Region and Strengthening the Danube Region. For each pillar, distinct objectives and actions have been specified by the EU and the Danube countries.

The four pillars are further divided into eleven priority areas. Austria and Romania are jointly coordinating **Priority Area 1a – To improve mobility and multimodality: Inland waterways**.

@ Web platform of Priority Area 1a – To improve mobility and multimodality: Inland waterways:
https://www.danube-navigation.eu

Six thematic working groups were set up for the systematic and coordinated implementation of objectives within Priority Area 1a and in order to discuss implementation initiatives and projects with the relevant stakeholders in the Danube region:

- WG 1 – Waterway Infrastructure & Management
- WG 2 – Ports & Sustainable Cargo Transport
- WG 3 – Fleet Modernisation
- WG 4 – River Information Services
- WG 5 – Education & Jobs
- WG 6 – Administrative Procedures

Based on periodic evaluation, target achievement will be measured and roadmaps for implementing specific measures will be adapted accordingly.

Belgrade Convention

The **Convention Regarding the Regime of Navigation on the Danube** was signed by all Danube riparian states ('Belgrade Convention' of 1948). Its main objectives are to safeguard the freedom of navigation on the Danube for all states as well as to oblige the Danube states to maintain their sections of the Danube waterway to a navigable condition.

The signatory states of the Belgrade Convention are Bulgaria, Germany, Croatia, Moldova, Austria, Romania, Russia, Serbia, Slovakia, Ukraine and Hungary.

Source: INTERACT

Area of application of the Danube Strategy

The implementation of the Belgrade Convention, together with adherence to its provisions, is supervised by the **Danube Commission** which is based in Budapest. The Commission is made up of the signatory states of the Belgrade Convention.

Further information about the Danube Commission, including the text of the Belgrade Convention:
www.danubecommission.org

Danube River Protection Convention

The International Commission for the Protection of the Danube River (ICPDR) was founded in 1998 and is located in Vienna. The dedicated aim of the ‚Danube River Protection Commission' is the implementation of the **Convention on Cooperation for the Protection and Sustainable Use of the Danube River** ('Danube River Protection Convention') as well as that of the Water Framework Directive (WFD) of the European Union in the Danube region. The signatories of this convention – along with members of the commission – are 14 Danube states and the European Union.

Further information about the Danube River Protection Commission and the Danube River Protection Convention:
www.icpdr.org

Information about the EU Water Framework Directive:
ec.europa.eu/environment/water/water-framework

The Danube River Protection Convention is of relevance to inland navigation, because river engineering measures have an effect on the hydromorphological situation and/or the natural composition of ecological communities. Besides its impact on hydromorphology, navigation can influence riverine landscapes in other ways, for instance through pollution or wave-slap.

Source: viadonau/Robert Tögel

Win-win for navigation and ecology by integrative waterway infrastructure projects on the Danube

Framework Agreement on the Sava River Basin

Further information on the Sava River Basin Commission, including the text of the Framework Agreement on the Sava River Basin:
www.savacommission.org

The Sava river is one of the most important navigable tributaries of the Danube. The International Sava River Basin Commission (ISRBC) was founded in 2005 in order to implement the **Framework Agreement on the Sava River Basin (FASRB)**, which was signed by the four Sava riparian states Serbia, Bosnia and Herzegovina, Croatia and Slovenia in 2002. The commission pursues the following goals:

- Establishment of an international regime of navigation on the Sava river and its navigable tributaries
- Establishment of sustainable waterway management, including the integrated management of surface and ground water resources
- Implementation of measures to prevent or limit hazards such as floods, ice, droughts and accidents involving substances hazardous to water

Transport policy framework in Austria

BMVIT Action Programme for the Danube 2022

The 'Overall Transport Plan for Austria' sets out the objectives and policies of Austrian transport planning until 2025 for all transport modes.

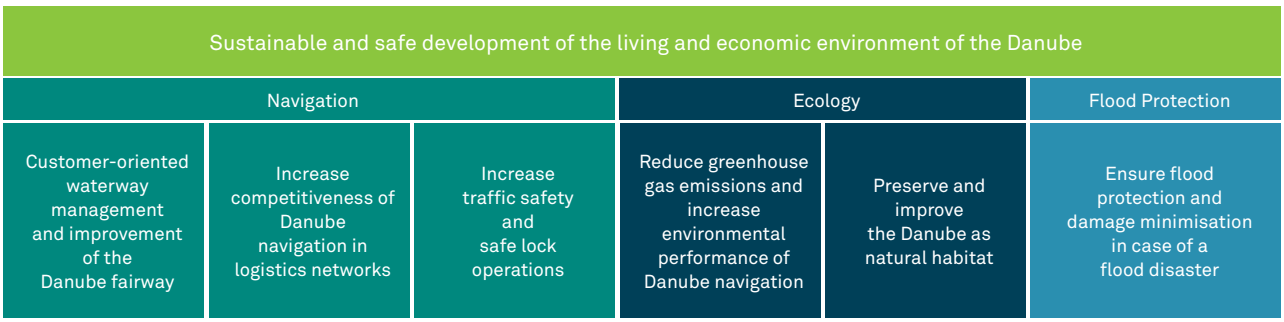
The detailed basis for the Austrian navigation policy is defined until 2022 in the **Action Programme Danube** (APD) (Federal Ministry for Transport, Innovation and Technology, 2015), whose objectives, for the first time, apply equally to ecology and flood protection in addition to navigation itself. By proceeding in this way, the programme reflects the multifunctional character of the Danube and uses synergies between these three fields of action. The programme is being implemented by viadonau – Österreichische Wasserstraßen-Gesellschaft mbH, together with the Federal Ministry for Transport, Innovation and Technology, as well as in close cooperation with the relevant stakeholders.

The action programme's six impact objectives (as shown in the diagram below) will be implemented in 23 measures, each of which contributes to one, two or all three fields of action. Underlying the efforts is the intention to continue strengthening inland navigation within the overall system of Austrian transport – also based on the European guidelines. The measures included in the action field of inland navigation refer to the areas of waterway infrastructure, lock operations, provision of user information (River Information Services), transport development, fleet modernisation and knowledge management. These thematic areas are discussed in more detail in the individual chapters of this manual.

Scheduled to run until 2022, numerous projects and initiatives will contribute to achieving these objectives or have already been implemented successfully. Annual progress reports provide information on the Action Programme's current implementation status.

@ For more information about the Action Programme Danube and its progress reports: www.bmvit.gv.at/verkehr/schiff-fahrt/binnen/aut/apd.html

@ For more information about the individual implementation activities within the Action Programme Danube: www.viadonau.org/unternehmen/aktionsprogramm-donau/massnahmen/



Source: viadonau

The objectives of the Action Programme Danube until 2022

@ European funding database for inland waterway transport: https://eibip.eu/funding/

@ For more information about the legal framework in regard to inland navigation in Austria, visit the website of the Federal Ministry for Transport, Innovation and Technology: https://www.bmvit.gv.at/verkehr/schifffahrt/recht/index.html

National funding schemes

In addition to the strategic and legal framework, Austria is also initiating **funding pools for specific topics** at national level that are designed to complement the European funding programmes to drive the development of inland navigation in Austria. The **current Austrian funding schemes** are accessible in the **European funding database for inland navigation**.

Legal framework for inland navigation in Austria

The legal provisions for inland navigation in Austria are defined by European regulations and their transposition into national law on the one hand and by the specific national legislation on the other.

Waterways Act (Federal Law Gazette I 177/2004)

The Waterways Act sets out the tasks and organisation of the Federal waterway administration in Austria, viadonau – Österreichische Wasserstraßen-Gesellschaft mbH, a subsidiary of the Federal Ministry for Transport, Innovation and Technology. The strategic planning, control and monitoring of the administration of federal waterways rests with the Federal Ministry for Transport, Innovation and Technology itself.

By law, all measures carried out on expanses of water must be implemented with the greatest possible care for the environment. Waterways must be planned, constructed and maintained in such a way that they can be used safely by all stakeholders with due consideration of and according to all laws pertaining to navigation.

Navigation Act (Federal Law Gazette I 62/1997)

The Navigation Act sets out the framework for navigation on Austrian waters and contains regulations concerning waterways, shipping facilities, commercial navigation laws, ship authorisation, ship command and schools for skippers.

International and European contacts

Danube Commission (DC)

International organisation of the Danube riparian states for regularising Danube navigation

www.danubecommission.org
secretariat@danubecom-intern.org
H-1068 Budapest, Benczúr utca 25
+36 1 461 80 10

International Commission for the Protection of the Danube River (ICPDR)

International organisation comprising 14 member countries and the EU for promoting environmentally sound development in the Danube region

www.icpdr.org
secretariat@icpdr.org
A-1220 Vienna, Wagramer Straße 5
+43 1 260 60 5738

European Commission: Mobility and Transport

Directorate-General for shaping and implementation of the European Union's transport policies

ec.europa.eu/transport
move-infos@ec.europa.eu
B-1040 Brussels, Rue J.-A. Demot 24-28
+32 2 29 9 11 11

European Commission: Environment

Directorate-General for shaping and implementation of the European Union's environmental policies

ec.europa.eu/environment
via the online contact form
B-1160 Brussels, Avenue de Beaulieu 5
+32 2 29 9 11 11

Central Commission for the Navigation of the Rhine (CCNR)

International organisation of the Rhine riparian states for regularising Rhine navigation

www.ccr-zkr.org
c.cnr@ccr-zkr.org
F-67082 Strasbourg, Place de la République 2
+33 3 88 52 20 10

International Sava River Basin Commission (ISRBC)

International organisation of the Sava riparian states for regularising Sava navigation and sustainable water management

www.savacommission.org
isrbc@savacommission.org
HR-10000 Zagreb, Kneza Branimira 29/II
+38 5 1488 69 60

European Commission: Regional Policy

Directorate-General for shaping and implementation of the European Union's regional policies

ec.europa.eu/regional_policy
via the online contact form
B-1160 Brussels, Avenue de Beaulieu 5
+32 2 29 9 11 11

UNECE Working Party on Inland Water Transport

Working Party of the United Nations Economic Commission for Europe (UNECE) on inland navigation

www.unece.org/trans/main/sc3/sc3.html
sc.3@unece.org
CH-1211 Geneva 10, Palais des Nations
+41 22 917 2401

International Transport Forum (ITF) of the OECD

Intergovernmental organisation made up of 54 members, 'think tank' for international transport policies

www.internationaltransportforum.org
contact@itf-oecd.org
F-75775 Paris, rue André Pascal 2
+33 1 45 24 97 10

Pro Danube International

Network of private businesses to promote the competitiveness of Danube logistics

www.prodanube.eu
office@prodanube.eu
A-1020 Vienna, Handelskai 265
+43 1 890 6647 11

European Skippers Organisation (ESO)

European special interest group of private inland shipping entrepreneurs

www.eso-oeb.org
via the online contact form
NL-3331 Zwijndrecht, Scheepmakerij 320
+31 78 78 20 565

Internationale Vereniging het Rijnschepenregister (IVR)

International association for the representation of the mutual interests of inland navigation and the insurance sector in Europe

www.ivr.nl
info@ivr-eu.com
NL-3011 Rotterdam, Vasteland 78
+31 10 411 60 70

Waterborne Technology Platform

Technology and research platform of the European navigation sector

www.waterborne.eu
waterborne@seaeurope.eu
B-1000 Brussels, Rue de la Loi 67
+32 2 230 2791

European Barge Union (EBU)

European special interest group of ship owners and operators

www.ebu-uenf.org
info@ebu-uenf.org
NL-3011 Rotterdam, Vasteland 78
+31 10 798 98 80

Inland Navigation Europe (INE)

Independent platform for national regional waterway management and promotional agency for inland navigation in Europe

www.inlandnavigation.eu
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+32 2 553 62 70

European Federation of Inland Ports (EFIP)

Special interest group of inland ports in Europe

www.inlandports.eu
info@inlandports.be
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Austrian contacts

Supreme Navigation Authority (OSB) within BMVIT

Department within the Austrian Federal Ministry for Transport, Innovation and Technology;
in charge of general, legislative and intergovernmental affairs relating to navigation in Austria

www.bmvit.gv.at/verkehr/schifffahrt
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IGÖD

Community of interest of public Danube ports in Austria

www.igoed.at
lehr@hafenwien.com
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PRO Danube AUSTRIA

Former Austrian Waterway and Navigation Association; special interest group

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Navigation professional guild in the WKÖ

Federal representation of the professional guild for navigation (professional association of the bus industry, navigation, aviation) in the Austrian Chamber of Commerce

www.wko.at/bus-luft-schiff
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A-1045 Vienna, Wiedner Hauptstrasse 63A
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viadonau

Österreichische Wasserstraßen-Gesellschaft mbH;
Federal agency responsible for waterway management in Austriah

www.viadonau.org
office@viadonau.org
A-1220 Vienna, Donau-City-Strasse 1
+43 5 04321 1000

Classification of inland waterways

@ Working Party on Inland Water Transport of the UNECE's Inland Transport Committee: www.unece.org/trans/main/sc3/sc3.html

A **waterway** is a body of surface water serving as a route of transport for goods and/or passengers by means of vessels. Navigable inland transport routes are called inland waterways. Natural inland waterways are provided by **rivers** and **lakes**, whereas **canals** are artificial waterways.

In order to create the most uniform conditions possible for the development, maintenance and commercial use of Europe's inland waterways, in 1996 the Inland Transport Committee of the United Nations Economic Commission for Europe (UNECE) adopted the **European Agreement on Main Inland Waterways of International Importance** (AGN) (United Nations Economic Commission for Europe, 2010). The Agreement, which came into force in 1999, constitutes an international legal framework for the planning of the development and maintenance of the European inland waterway network and for ports of international importance, and is based on technical and operational parameters.

By ratifying the Agreement, the contracting parties express their intention to implement the coordinated plan for the development and construction of the so-called E waterway network. The **E waterway network** consists of European inland waterways and coastal routes which are of importance for international freight transport, including the ports situated on these waterways.

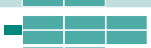
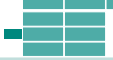
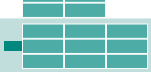
E waterways are designated by the letter 'E' followed by a number or a combination of numbers, whereby main inland waterways are identified by two-digit numbers and branches by four- or six-digit numbers (for branches of branches). The **international waterway of the Danube** is designated as **E 80**, and its navigable tributary the **Sava**, for example, as **E 80-12**.

Waterway classes are identified by Roman numbers from I to VII. **Waterways of class IV or higher** are of economic importance to international freight transport. Classes I to III identify waterways of regional or national importance.

The class of an inland waterway is determined by the **maximum dimensions of the vessels** which are able to operate on this waterway. Decisive factors in this respect are the **width** and **length** of inland vessels and convoys, as they constitute fixed reference parameters. Restrictions regarding the **minimum draught loaded** of vessels, which is set at 2.50 metres for an international waterway, as well as the **minimum height under bridges** (5.25 metres in relation to the highest navigable water level) can be made only as an exception for existing waterways.

The following table shows the parameters of international **waterway classes based on type of vessels and convoys** which can navigate the waterway of the respective class.

Motor cargo vessels						
Type of vessel: general characteristics						
Waterway class	Designation	Max. length L (m)	Max. width B (m)	Draught d (m)	Deadweight T (t)	Min. height under bridges H (m)
IV	Johann Welker	80-85	9.5	2.5	1,000-1,500	5.25 / 7.00
Va	Large Rhine vessel	95-110	11.4	2.5-2.8	1,500-3,000	5.25 / 7.00 / 9.10
Vb	Large Rhine vessel	95-110	11.4	2.5-2.8	1,500-3,000	5.25 / 7.00 / 9.10
VIa	Large Rhine vessel	95-110	11.4	2.5-2.8	1,500-3,000	7.00 / 9.10
VIb	Large Rhine vessel	140	15.0	3.9	1,500-3,000	7.00 / 9.10
VIc	Large Rhine vessel	140	15.0	3.9	1,500-3,000	9.10
VII	Large Rhine vessel	140	15.0	3.9	1,500-3,000	9.10

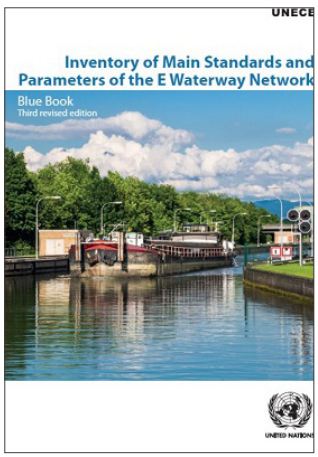
Pushed convoys						
Type of convoy: general characteristics						
Waterway class	Formation	Length L (m)	Width B (m)	Draught d (m)	Deadweight T (t)	Min. height under bridges H (m)
IV		85	9.5	2.5-2.8	1,250-1,450	5.25 / 7.00
Va		95-110	11.4	2.5-4.5	1,600-3,000	5.25 / 7.00 / 9.10
Vb		172-185	11.4	2.5-4.5	3,200-6,000	5.25 / 7.00 / 9.10
VIa		95-110	22.8	2.5-4.5	3,200-6,000	7.00 / 9.10
VIb		185-195	22.8	2.5-4.5	6,400-12,000	7.00 / 9.10
VIc		270-280	22.8	2.5-4.5	9,600-18,000	9.10
		195-200	33.0–34.2	2.5-4.5	9,600-18,000	9.10
VII		275-285	33.0–34.2	2.5-4.5	14,500-27,000	9.10

Source: United Nations Economic Commission for Europe, 2010

Waterway classes according to the AGN

In 1998, the UNECE Inland Transport Committee first published an **Inventory of Main Standards and Parameters of the E Waterway Network**, the so-called 'Blue Book', as a supplement to the AGN (United Nations Economic Commission for Europe, 2012). The 'Blue Book' contains a list of the current and planned standards and parameters of the E waterway network (including ports and locks) as well as an overview of the existing infrastructural bottlenecks and missing links. This publication, which supplements the AGN, allows for the monitoring of the current state of implementation of the agreement on an international basis.

@ 'Blue Book' database:
www.unece.org/trans/main/sc3/bluebook_database.html



Modernisation of the inland waterway fleet

Framework conditions

Based on centuries of experience, Danube navigation has adapted to the predominant fairway conditions on the river. This is also in line with the legal traffic regulations, because according to the '**Convention Regarding the Regime of Navigation on the Danube**' from the Danube Commission (§ 1.06 – Utilisation of the waterway) cargo vessels must in principle be adapted to the conditions of the waterway (and its facilities) before they are permitted to navigate it (Danube Commission, 2010).

Nevertheless, in order to further exploit existing potential in the field of ship design, hydrodynamic parameters such as shape, propulsion and manoeuvrability are being continuously optimised. However, technical innovations can only contribute to the further optimisation of cargo vessels within the **given physical and economic limitations** – the overall system of vessel-waterway must be kept in view and what is technically possible combined with what is economically viable. Cargo shipping must remain economically competitive if it is to survive the fierce competition with road and rail – only those transport operations on the Danube that have a competitive price-performance ratio are ever carried out.

Modernisation potential

The average age of the European inland waterway fleet is rather high. New vessels are often built according to standard designs that were developed decades ago. Numerous technical alternatives exist to improve the existing fleet in regard to its hydrodynamics as well as the engine systems.

With regard to hydrodynamics, improved propulsive efficiency and manoeuvrability, as well as reduced resistance (modification of the ship's hull), are the most important factors and can be achieved with already existing technologies. With regard to **engine systems**, the most important areas for modernisation are the reduction of fuel consumption and exhaust gas emissions, as well as compliance with strict emission regulations.

Source: Ludovic Péron

Twin-screw propulsion with ducted propellers

Improvement of propulsive efficiency and manoeuvrability

A reduction in fuel consumption can be achieved by improving the propulsive efficiency of the vessel or by reducing its resistance in water. The **propulsive efficiency** can, for example, be increased by the following technologies:

- **Ducted propeller (Kort nozzle):** A propeller that is fitted with a nonrotating nozzle, which improves the open water efficiency of the propulsive device. The advantages of the ducted propeller include increased efficiency, better course stability and lower susceptibility to damage caused by foreign bodies.

- **Z-drive (SCHOTTEL rudder propeller):** A rudder propeller is a robust combination of propulsion and steering devices, whereby the drive shaft is deflected to the propeller twice at an angle of 90° giving it the form of a Z. As the underwater components can be turned through 360°, the system enables maximum manoeuvrability. Other advantages include optimum efficiency, economical operation, space-saving installation and simple maintenance.

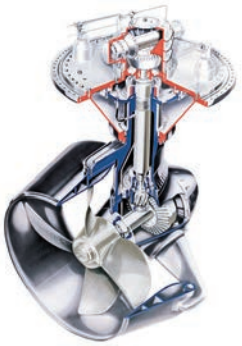
- **Azipod propulsion devices:** This system consists of a rotating gondola that hangs below the ship's stern and that fulfils both propulsion and steering functions. The propeller is powered by an electric motor arranged in the gondola. The advantages of the propulsion gondolas include, among other things, reduced exhaust gas emissions, fuel savings due to improved hydrodynamic efficiency, good manoeuvring properties, flexible machinery layout and improved use of space in the standard configuration.

- **Controllable pitch propeller:** The pitch of the propeller blades of a controllable pitch propeller can be adjusted to the existing operating conditions leading to achievement of the maximum open water efficiency.

- **Adjustable tunnel:** A device at the stern of the vessel consisting of fins which can be folded down to create a tunnel in the direction of the propeller. This prevents air suction in shallow water operation in a partly loaded condition with the result that the propeller remains fully functional, even if operated in extremely shallow water.

- **Pre-swirl duct:** The purpose of this device is to improve the incoming flow to the propeller resulting in increased propeller efficiency and a reduction in the propeller loading (and as a result a possible cavitation), in vibrations and in fuel consumption.

- **Propeller boss cap fins:** An energy-saving device that breaks up the hub vortex that forms behind the rotating propeller. This reduces the torque of the propeller and increases fuel efficiency by three to five percent.



SCHOTTEL rudder propeller (Z-drive)

Source: Schottel GmbH

The **manoeuvrability** of a vessel can sometimes be improved by applying simple measures. These measures include adding end plates to the rudder or increasing the rudder area, resulting in an increased rudder force. Studies have shown that the rudder area is one of the most important parameters for course keeping and the turning abilities of a ship.

Many rudder shapes and improvement measures have been developed over the years in order to improve manoeuvring efficiency and increase navigation safety.

Below are a few examples:

- **Schilling rudder:** A high-performance fishtail rudder whose single piece construction with optimised shape and no moving parts improves both course keeping and vessel control characteristics.

Source: Brosen

Bow thruster

- **Flap rudder:** These rudders consist of a movable rudder with a trailing edge flap (comparable to an aerofoil with a flap) which enable a much higher lift per rudder angle and a 60 to 70% higher maximum lift compared to conventional rudders.
- **Bow thruster:** Water is taken up from underneath the vessel using the help of vertically mounted propellers (propeller shafts). The water is guided into one or two channels at an angle of 90° by a drum rotating at 360° making the vessel manoeuverable. A major advantage of this system is that maximum thrust can be achieved with minimum draught without any parts protruding through the ship's hull.
- **Articulated coupling:** An articulated coupling between a pusher and a pushed lighter comprising a hydraulically operated flexible coupling to facilitate steering in sharply meandering sections of the waterway.
- **Dismountable bow filling for coupled vessels:** The gap between a pusher and a pushed lighter impacts on smooth flow around the formation. The installation of a flexible bow filling between the pusher and the lighter is a simple way of reducing vortex formation and separation.

Improvement of emission characteristics

It would appear that **diesel engines** will remain the most common form of propulsion for inland navigation in the medium term. In the long term, it is conceivable that **gas-powered engines** and fuel cells may be used as well. They have great potential to enable a significant reduction in the emissions of inland vessels.

Legislation addressing the issue of emissions has become increasingly strict in recent years, and green standards are now more and more important as competitive advantages.

Publication of Directive 2009/30/EC laid a foundation for the improvement of environmental performance of inland navigation. Since 1 January 2011, this Directive has **limited the sulphur content in all fuels** used for inland navigation in the European Union to 0.001 percent (10 ppm). Hence, the fuel that is currently used is virtually sulphur-free, which has led to negligible levels of sulphur dioxide emissions. Particle emissions have also been cut noticeably as a result. Moreover, this fuel enables the installation of extremely effective emission reduction technologies.

The thresholds imposed by Regulation (EU) 2016/1628 have been applicable since 1 January 2018 and 1 January 2019.

Regulation (EU) 2016/1628 defines the **thresholds for exhaust emissions in new engines**. The mandatory thresholds are very strict, which will probably necessitate the installation of emission reduction technologies such as exhaust gas after-treatment by selective catalytic reduction (SCR) and particle filters. The first mandatory threshold for the particle count has also been introduced (engines with a performance P ≥ 300 kW).

The CCNR levels describe the emission thresholds published by the Central Commission for the Navigation of the Rhine (CCNR). For more information, visit the CCNR website at: https://www.ccr-zkr.org/

The European Commission has since started discussing **voluntary environmental standards** that might be applied to vessels that are currently in operation. Standards like this already exist in Belgium and the Netherlands. The Green Award indicates their compliance. Vessels that have received this Award can receive reductions in port fees of up to 30 percent. Another example is the Port of Rotterdam, which from 2025 will only admit vessels whose engines satisfy the requirements of CCNR II at least.

Current legislation means that inland shipping operations are already virtually sulphur-free. In future they will be free of exhaust gas emissions and also produce lower emissions of greenhouse gases. New vessels will represent a quantum leap in regard to environmental performance. A major challenge in the years ahead will be to improve the green credentials of the current fleet.

It is therefore necessary to **optimise engines** in regard to their **fuel consumption and exhaust gas emissions**. The diesel engines currently in operation in inland waterway transport are emission-optimised engines and their specific fuel consumption is approximately 0.2 kg/kWh. This value has remained unchanged for several years due to the fact that nitric oxide emissions had to be reduced at the expense of fuel consumption. The average age of a ship's engine before its replacement is around 15 years or more. If you compare this to the average service life of truck engines, which is five years, it is obvious that it will take much longer to fulfil emission standards in inland navigation.

Possible measures for reducing the emission characteristics of ship engines include the following:

- Reduction in sulphuric oxide emissions:
  - Low-sulphur fuel

- Reduction in hydrocarbon and carbon monoxide emissions:
  - Diesel oxidation catalysts (require low-sulphur fuel)

- Reduction of nitric oxide emissions:
  - Exhaust gas recirculation (requires low-sulphur fuel)
  - Humidification of engine inlet air
  - In-cylinder water injection
  - Use of an emulsion comprising water and fuel
  - Selective catalytic reduction (i.e. injection of a reduction agent for the effective removal of nitric oxide emissions)

- Reduction of particulate matter emissions:
  - Particulate matter filters (PMF, require low-sulphur fuel)

According to the results of international research projects and experiments, the most effective techniques regarding the reduction of engine emissions and fuel consumption are:

- Engines for liquefied natural gas (LNG)
- Low-sulphur fuel
- Diesel oxidation catalysts (require low-sulphur fuel)
- Selective catalytic reduction
- Particulate matter filters
- Fuel-efficient travel, for instance by using an Advising Tempomat (ATM – a computer-assisted system giving information about the most economical speed and minimum fuel consumption of the ship's engines based on prior inclusion of the calculation for limitations of the navigated waterway)

The first applications using **hydrogen** and **fuel cells** in inland navigation (e.g. the ZemShip) have since been released. There are also ongoing discussions on the introduction of **fully electric drive systems**, although this is associated with challenges in regard to the supply infrastructure, regulatory matters, storage capacity, size of the storage medium, charging time, range of the vessel and ultimately a reduction in the currently inefficient costs of the technology that need to be overcome.

Crew members on inland vessels

An inland vessel is operated by a crew comprising of different members with different competencies and tasks. The **minimum crew** for inland vessels and the **composition of the crew** depends on the size and equipment of the vessel and on its operating structure.

Recommendations with respect to the crew of inland vessels can be found in Chapter 23 of **Resolution No. 61 of the United Nations Economic Commission for Europe**

(UNECE) concerning the technical requirements for inland vessels (United Nations Economic Commission for Europe, 2011). The minimum crew number and composition as well as the competencies of crew members are regulated by national legislation along the Danube. On the Rhine, the relevant requirements are laid down by the Rhine Vessel Inspection Regulations (Central Commission for the Navigation of the Rhine, 2018b).

Overview of crew members

The crew prescribed for the respective operating modes must be on board the vessel at all times while it is travelling, with due consideration of worktime and rest period regulations. Departure is not permitted without the prescribed number of minimum crew. The number of members of the minimum crew for motor cargo vessels, pushers and vessel convoys depends on the length of the vessel or convoy and the respective **mode of operation**.

The following distinctions are made for modes of operation:

- **A1**: Daytime navigation for maximum 14 hours within a period of 24 hours
- **A2**: Semi-continuous navigation for not more than 18 hours within a period of 24 hours
- **B**: Continuous navigation for 24 hours and more

The **minimum crew** required for safe operation of a vessel can consist of various crew members which are specified in detail in the following table:

Captain (boatmaster)	Sole person responsible on the vessel in matters of expertise and staff, holder of a captain's certificate and hence entitled to operate a vessel on the sections of the waterway indicated in the certificate	
Helmsman	Assists the captain	
Deck crew	Complete crew with the exception of the engineering staff; carries out various assistant tasks during the journey; consists of:	
	Boatswain	Intermediate superior for the deck crew
	Crewman/woman	Subordinate member of the deck crew
	Ordinary seaman (ship's boy)	Member of the crew still undergoing training
	Deckhand	Untrained beginner
Engineer/ Engine-minder	Monitors and maintains the propulsion motor and the necessary concomitant systems	
Pilot	Instructs the captain on board in certain nautically difficult stretches of the route (requires certification)	

Source: viadonau

Crew members and their tasks

Source: viadonau/Reinhard Reidinger

Crewmen connecting a tank lighter

Discharge book and ship's log/logbook

Each nautical member of the minimum crew must be able to **demonstrate their technical qualifications and suitability for a function on board** by presenting a discharge book. For crew members in possession of a boatmaster certificate (ship master's certificate), these qualifications will replace the discharge book. The boatmaster must make regular entries of travel times and routes in the discharge books of crew members.

The boatmaster is also responsible for keeping the ship's log/logbook. It contains records of the voyages conducted by a vessel and its crew, as well as details concerning worktimes, breaks and daily and weekly rest periods.

Seeking to modernise inland navigation, to continue reducing the administrative workload and to make certification less vulnerable to manipulation, efforts are currently under way to replace proof of qualification, discharge books and ship's logs kept in a paper form with **electronic professional IDs and electronic on-board devices**. For this purpose, the European Commission will submit to the European Parliament and Council its assessment of forgery-proof, electronic discharge books, ship's logs and professional IDs by 17 January 2026.

Education and further training for inland navigation

Education and further training differs greatly between the individual Danube countries, as well as in Europe as a whole. The approaches vary from very practical concepts with no obligation to attend a training institute, through to the award of academic qualifications. Some countries have several courses of education running parallel to each other.

Introduced in January 2018, Directive (EU) 2017/2397 creates a common framework to guarantee **minimum professional qualifications in the area of inland navigation**. This Directive defines the requirements and procedures for the award of certificates of qualification and their mutual recognition in the Member States. The qualifications apply to persons involved in the operation of a vehicle on the inland waterways of the European Union.

@ Information on education, training and certification in inland navigation is provided on the website of Education in Inland Navigation: www.edinna.eu

EDINNA, the association of inland waterway navigation schools and training institutes in Europe, provides an overview of the training opportunities in Europe on its website. EDINNA supports the European Commission in its efforts to harmonise education and its certification in inland navigation.

Storage of chemical products

Types of contract and transport solutions

Transport companies offer cargo space either in its entirety (full load) or as part of the available cargo hold (part load). However, the freight contract concluded with the client can also apply to the transport of individual 'packages'. This is known as general cargo transport. The transport of heavy and oversized goods (project cargo) differs from traditional shipping of general cargo primarily due to the need for special vessel and transhipment equipment and long-term transport planning.

Conventional bulk cargo transport on the Danube usually takes the form of **contract trips**, meaning several trips on the basis of a contract for a specific period of time. Contract trips are often agreed for a longer period in the form of an annual contract. This type of transport has the following characteristics:

- An agreed annual total quantity, whereby the time of the transport operations involved as well as the size of the part deliveries is not specified (this allows for the prevention of goods being transported during low-water periods)
- Transport of full loads by motor cargo vessels or pushed convoys
- More generous timeframes regarding arrivals and departures
- Transport of the goods between one port of loading and one port of discharge
- Involvement of just one consignor and one consignee

In addition to contract trips, ship transports are also carried out on the spot market, which means on the basis of a freight contract that is concluded for individual trips or ship loads according to the current market prices.
Spot transport has the following characteristics:

- Conclusion of a freight contract (contract of carriage) applicable to a full, part or package good load
- Specification of fixed delivery times (in part involving contractually agreed payment of penalties)
- Fiercer competition before conclusion of the contract, because several quotes from different transport companies are generally obtained at short notice
- Regular involvement of several actors (for instance forwarders, agencies)

Decreasing shipment sizes and an increasing number of suppliers and customers means that a high degree of punctuality and reliability with regard to departure and arrival times is expected. **Multimodal liner services** offer a solution in this case. Like passenger ships or regular-service buses, the cargo vessels of a liner service travel according to a fixed timetable to specific ports in which the cargo is generally transhipped for further transport by truck or rail. The flexibility in the formation of pushed convoys enables the simultaneous transport of different types of goods (for instance rolling goods, containers or bulk cargo) and helps to counterbalance disparity of traffic, i.e. different transport volumes on the route travelled.

Liner services on a waterway are distinguished by the following features:

- Agreed departure and arrival times according to a fixed timetable
- Accessibility of the services for all players in the market
- Possibility of shipping part loads (for instance 10 containers)
- Concept for adhering to the timetables even in the event of nautical restraints (replacement services by rail or road could be necessary)

Business management and legal aspects

Cargo owners and logistics service providers always select the mode of transport based on the **price-performance ratio** for each individual consignment. Planning ability, reliability, transport duration and the handling of transport damage are regarded as the primary components of such performance. This section provides an overview of the individual parts of the **transport cost calculation** for the inland vessel.

In addition, a detailed description of the most important legal regulations pertaining to inland waterway transport is also provided. It is intended to offer a brief overview of the latest legal framework conditions applicable for Danube navigation.

Basic principles of an inland navigation calculation

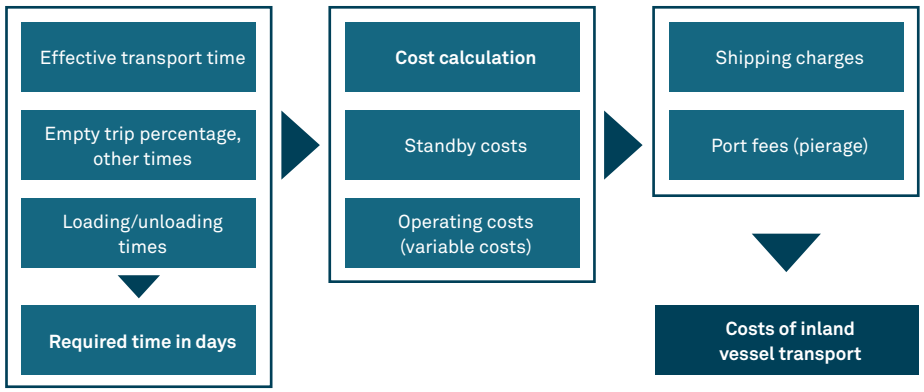
A difference is generally made between two types of costs for a transport by inland vessel, depending on whether the costs are fixed or variable: **Standby costs** and **operating costs**. Both cost types are dependent to a large extent on individual factors and framework conditions such as the bunker costs or maximum draught loaded, and therefore need to be calculated, as far as possible, on the basis of current values. The composition of the fleet and the underlying organisation also play a key role here.

The chart on the following page illustrates the cost structure of an inland waterway transport from the port of departure to the port of discharge excluding the costs for transhipment, pre- and end-haulage.

As limiting factors, both the draught loaded and the maximum available cargo space volume play a key role when planning a transport.

Where inland waterway cargo transport is concerned, the available fairway depth and, therefore, the **possible draught loaded** of a cargo vessel is a decisive economic criterion in shipping operations. A fairway depth of 10 cm, for example, corresponds to a load of between 50 and 120 tons, depending on the size of the cargo vessel used. Higher draughts loaded, and therefore better load factors of the vessels used, reduce transport costs per ton drastically. Therefore, the continuous availability of suitable fairway depths is a crucial criterion for the competitiveness of inland navigation. The critical points are not reached until after 5 to 10 days on the long-distance transports. As it is difficult to predict water levels, the possible draught loaded during loading (departure) of the vessel cannot be determined exactly and a safety margin is therefore usually necessary. The safety margin is based on the empirical values of the shipping company.

In addition to the currently possible immersion depth, the shipping company must also determine whether the **maximum available cargo hold volume** is sufficient to take the planned size of the cargo. The specific weight of the cargo indicates the ratio of the weight force to volumes and therefore also the utilisation of the available space in the cargo hold.



Source: viadonau

Schematic overview of the cost calculation

Calculation of transport times

The **effective transport time** is determined by the speed of the vessel, the flow velocity of the body of water as well as the number of locks and time spent for lockage. Lockage from Vienna westwards generally takes approximately 40 minutes or approximately 1.5 hours travelling eastwards downstream from Vienna.

The following **table of travel times**, which takes the Austrian Danube port of Linz as the start and end point, has been calculated for typical types of vessel or convoy using the travel times for the most important routes in the Danube Corridor. They include times for lockage but exclude intermediate stops at ports, delays caused by unfavourable nautical conditions and waiting times at borders. The mode of operation for all types of vessel and convoy is considered as continuous navigation for 24 hours per day with the exception of the 1,350 ton motor cargo vessel, which is usually operated for 14 hours a day.

Empty trips occur primarily due to disparate traffic, i.e. transport of goods that takes place in only one direction – upstream or downstream. But they may also be caused by different transport flows between two regions. Another key reason for empty trips is the fact that the loading and unloading ports for subsequent transports are often far apart. Empty trips can vary according to the different sections of the route or the different companies and are incorporated into the transport time as surcharge rates.

Other unproductive times occur due to unplanned waiting caused by lightering (in other words when the cargo of a ship has to be divided among several vessels due to shallow water) or due to blockages of navigation in the case of ice or high water levels.

Loading and unloading times vary greatly from one case to another. They depend on the transhipment facilities and their availability at the respective ports.

Direction

Travel time in hours				Distance in km	Port	Number of locks	Travel time in hours			
4-unit pushed convoy	2-unit pushed convoy	MCV 2,000 tons	MCV 1,350 tons				MCV 1,350 tons	MCV 2,000 tons	2-unit pushed convoy	4-unit pushed convoy
	174	161	172	1,454	Ghent	62	159	149	165	
	170	157	168	1,419	Antwerp	61	155	145	161	
	163	151	160	1,325	Amsterdam	61	149	140	154	
	163	151	161	1,336	Rotterdam	58	147	138	152	
	145	135	142	1,119	Duisburg	58	135	127	141	
	119	113	113	835	Mainz	58	119	111	125	
	115	109	109	808	Frankfurt	56	116	108	122	
	43	41	41	380	Nuremberg	17	55	47	55	
	26	25	25	280	Kelheim	8	39	31	39	
	23	22	22	242	Regensburg	6	33	26	34	
	14	13	13	153	Deggendorf	4	21	17	21	
				0	**Linz**	0				
2	2	2	2	19	Enns	1	3	2	3	3
7	6	6	6	73	Ybbs	3	10	8	10	11
13	10	10	10	133	Krems	4	17	14	17	19
20	17	17	17	211	Vienna	7	27	22	27	30
26	22	22	22	263	Bratislava	7	36	30	37	41
42	37	37	37	491	Budapest	8	60	51	61	70
51	45	45	45	652	Baja	8	75	63	76	88
61	54	54	54	798	Vukovar	8	90	76	91	106
67	60	60	60	878	Novi Sad	8	99	85	100	117
73	65	65	65	978	Belgrade	8	109	93	110	128
98	88	88	88	1,340	Vidin	10	142	120	140	164
115	103	103	103	1,639	Giurgiu	10	167	140	163	191
135	121	121	121	2,007	Reni	10	197	164	192	224
142	128	128	128	2,131	Sulina	10	208	173	201	236
133	120	119	120	1,891	Constanța	12	190	159	185	216
139	125	125	125	2,074	Izmail	10	203	169	197	231
141	127	127	127	2,120	Kiliya	10	207	172	200	235

Direction

Source: viadonau

Table of travel times from/to Linz (MCV = motor cargo vessel)

Cost categories

The following **ship parameters** should be taken into account and calculated on the basis of current values when working out the cost of a ship transport:

- Size and capacity of the vessel, as well as draught and possible draught loaded
- Age and condition of the ship to be used
- Flag under which the ship is registered
- Operator structure (independent ship owner, shipping company)
- Mode of operation (operating time 14, 18 or 24 hours a day)
- Crew (number, qualification, type of contract)

Standby costs are the costs for maintaining a vessel ready for use, not taking operating costs into account and that fall due even while the vessel is stationary. These include, for example, crew wages, maintenance and repairs, amortisation of the vessel or interest and insurance.

Operating costs are costs incurred during operation of the vessel, i.e. dependent on the number of kilometres or hours travelled. These include, for example, bunker and lubricant costs, commission for brokering the contract or dues and fees.

Inland vessels are normally driven by combustion engines and use gasoil as fuel. **Average fuel consumption** is dependent on three factors: the utilisation of the vessel (due to loading limitations), the parity of traffic (empty trips) and the prevailing fairway depths (shallow water resistance).

Nautical conditions (impounded sections, free-flowing sections, characteristic current velocities) also have an impact on fuel consumption in each individual case. Fuel prices are linked to the price of oil and can therefore fluctuate considerably.

As the section of the Danube from Kelheim to Sulina is defined as an international waterway, in compliance with the 'Convention Regarding the Regime of Navigation on the Danube' dated 18 August 1948 (Belgrade Convention), and can therefore be used free of charge by navigation, it is not subject to any **navigation dues**. The 63-km Sulina Canal used almost exclusively by sea-river or seagoing vessels is an exception. The Romanian River Administration of the Lower Danube charges dues calculated per ton deadweight of a vessel for maintenance purposes.

The authorities charge dues for infrastructure maintenance on national waterways that do not fall under the Belgrade Convention. This applies to the Ukrainian Bystroe arm (maritime stretch of the Danube) and to the Romanian Danube-Black Sea Canal (links the Danube to the Black Sea and the seaport of Constanța at Cernavodă).

Port fees are charged for the use of the port basin and also frequently for waste disposal, power connections or drinking water supply, and are calculated according to the volume of transhipped cargo.

@ Other calculations of the estimated travel time between two selected ports on the Rhine-Main-Danube-axis can be made using the Travel Time Calculator at:
www.danube-logistics.info/travel-time-calculator

More information concerning the Danube Commission and the Belgrade Convention can be found in the chapter 'Objectives and strategies'.

Operative cost management

Full-costing systems for calculating the daily rates for keeping a vehicle on standby are traditionally widespread in inland navigation. This entails registering and adding

up of all periodic individual and overhead costs – e.g. costs for the crew, amortisation and insurance – and dividing the total by the number of operating days in the given period. Costs calculated in this way are called daily standby costs and are average values or **fixed costs** incurred independent of the contract.

In addition, operating costs per travelled hour are charged for specific routes and types of vessel. These are **variable costs** that can be added to each individual contract.

Variable vessel costs include:

- Fuel and lubricant costs
- Costs for non-permanently employed crew members, e.g. temporary workers
- Route-dependent costs, e.g. costs for pilots
- Commissions for brokering the contract
- Charges, e.g. shipping tolls or port fees
- Costs for cleaning the vessel

A contract is not accepted on principle unless the standby and operating costs, i.e. the fixed and variable costs, are covered and a profit over and above this amount can be generated.

If no such contract can be found for a vessel, a transport price can also be accepted if it is higher than the variable costs but lower than the fixed costs. This means that at least a sum can be achieved that will cover the fixed costs, which is known as the **contribution margin**. Any commercial activity will only increase losses if the transport price is lower than the variable costs.

Legal regulations and agreements

As the majority of transport on the Danube waterway involves cross-border transport, international agreements play a vital role in the structuring of concluded transport contracts and the contractual and liability aspects involved. The following section outlines in detail three international agreements that have a great impact on inland waterway transport.

The **Budapest Convention on the Contract for the Carriage of Goods by Inland Waterway (CMNI)** is an international convention that harmonised the legal provisions governing contracts for the cross-border transport of cargo on inland waterways for the very first time. The convention was concluded on 22 June 2001 under the patronage of the Central Commission for the Navigation of the Rhine, the Danube Commission and the United Nations Economic Commission for Europe and came into force on 1 April 2005 (Central Commission for the Navigation of the Rhine et al., 2000). The convention applies to all contracts of carriage for transporting cargo

by inland waterway where the port of loading or the port of discharge is located in a state that is party to the convention. It regulates the general rights and obligations of the contractual parties, primarily those of the freight carrier, the consignor and the consignee. In general, the convention includes regulations pertaining to

- type and content of the transport documents,
- liability in the event of loss or damage to cargo during transport and
- circumstances and situations that allow exemption from liability.

All Rhine and Danube riparian states have ratified the Budapest Convention, with the exception of Austria. Therefore, from a purely legal perspective, the provisions of this convention are applied to all cross-border transfers, as either the port of loading or discharge is located within the CMNI territory and the regulations are hence valid.

The **Bratislava Agreements** are a collection of contracts under private law whose purpose is to regulate the cooperation among shipping companies operating on the Danube. Among these, the **Agreement on General Conditions for the International Carriage of Goods on the River Danube** is of particular importance. This regulates the rights and obligations of shippers and shipping companies in connection with the carriage of goods. Although the formally prescribed customer order sheet for transport is still provided for in the agreement, it no longer has any bearing on day-to-day practice. The most important provisions of the agreement pertain to the drawing up of transport documents, the accepting and handing over of the cargo to be transported, loading and unloading of vessels, calculating freight charges, liability, impediments to contract performance, the exercise of rights of lien and dealing with complaints. In recent years the regulations of the Bratislava Agreements have increasingly receded into the background and have given way to the CMNI.

The transport of hazardous goods by inland vessel is regulated by the **European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)**. This agreement encompasses all hazardous goods and specifies whether or not these can be transported by inland vessel. There are special regulations for the approved hazardous goods concerning the following points:

- Classification of the goods, including allocation criteria and review procedures
- Use of packaging, tanks and containers for bulk cargo
- Shipping procedures (e.g. marking and labelling)
- Regulations concerning the loading, transport, unloading and other handling of goods
- Regulations concerning a ship's crew, equipment, operation and documentation
- Regulations for shipbuilding

Source: viadonau

Legal aspects of combined transport

European and international legal regulations

An important step in enhancing the use of combined transport has been achieved through the adoption of a **Directive on the establishment of common rules for certain types of combined transport of goods between Member States** by the European Union (European Commission, 1992). This directive aims to increase the attractiveness of combined transport by liberalising pre- and end haulage. Consequently, the main focus is set on simplifying cross-border transport. In addition, tax benefits for combined transport are included.

The Member States of the European Union decided to introduce common infrastructure policies in the early 1990s, which led to the creation of the TEN-T networks as the legal framework in 1996. The TEN-T guidelines have been revised several times, and Regulation No 1315/2013 is the most current version. At the same time, the Connecting Europe Facility (CEF) defines rules for the award of Union funds for the TEN-T networks (Regulation No 1316/2013).

Moreover, further important regulations beyond European level now exist. In the area of inland waterway transport, the **Budapest Convention on the Contract for the Carriage of Goods by Inland Waterway** (CMNI) is applicable. For cross-border and international road transport, the regulations of the **Convention on the Contract for the International Carriage of Goods by Road** (CMR) are mandatory (for Austria: Federal Law Gazette 138/1961). International regulations for rail traffic are enshrined in the Uniform Rules Concerning the Contract for International Carriage of Goods by Rail (CIM).

The international CMR convention supports the use of a **consignment note** to simplify cross-border transportation. A consignment note is a transport document regulating the legal relationship between the carrier and the consignor. Information on the consignor, the consignee, the points of loading and unloading, cargo and delivery conditions are documented. Consignment notes can be utilised for road traffic, rail traffic and inland waterway transport. However, the use of a bill of lading is more common for inland waterway transport.

The **TIR Carnet** is an international customs document which simplifies formalities in international road transport and for monitoring the cross-border transport of goods. However, it is only used if non-EU countries are also involved in the transport route. Basically, the TIR procedures are mainly designed for road traffic, but can also be used for combined transport (road-rail or road-waterway), when at least one part of the transport route is carried out by road.

Specific regulations regarding inland waterway transport are described in more detail in the chapter 'Logistics solutions: The market for Danube navigation'.

German versions of the international agreements on goods transport are available on the website of the German Society for Transport Law (DGTR): www.transportrecht.org

Website of the United Nations Economic Commission for Europe on the TIR (Transports Internationaux Routiers) Convention: www.unece.org/tir

Legal provisions in Austria

The EU Directive concerning the establishment of common rules for certain types of combined transport of goods between Member States (European Commission, 1992) was implemented in Austria with the Regulation on the exemption of cross-border combined transport from the approvals procedure ('Kombifreistellungs-Verordnung', Federal Law Gazette II 399/1997). Within the framework of national legislation, the following legislative acts in their most recent version are of particular significance to combined transports:

- **Motor Vehicles Act (KFG)** ('Kraftfahrgesetz', Federal Law Gazette 267/1967)
- **Road Traffic Code (StVO)** ('Straßenverkehrsordnung', Federal Law Gazette 159/1960)
- **Railways Act (EisbG)** ('Eisenbahngesetz', Federal Law Gazette 60/1957)
- **Navigation Act (SchFG)** ('Schifffahrtsgesetz', Federal Law Gazette I 62/1997)

Special provisions, especially those that provide for special considerations in combined transport for Austria (e.g. exceptions from the ban on night-time driving), are found in the following section.

Promotion of combined transport

@ An overview of funding programmes for inland navigation in Europe is contained in the European Funding Database: https://eibip.eu/funding/

Numerous transport policy measures have been taken to encourage the use of combined transport. This is aimed at guaranteeing an early shift towards environmentally friendly modes of transport – meaning a shift from truck to ship or railway. Ways of achieving the enforced use of combined transport consist of various **funding schemes** on a national and international scale as well as **fiscal and regulatory measures.**

Source: viadonau

Combined transport by vessel and truck

@ Website of the International Union of Combined Road-Rail Transport Companies (UIRR): www.uirr.com

An important European organisation operating in the field of combined transport of rail and road is the **International Union of Combined Road-Rail Transport Companies** (UIRR). The UIRR aims to promote the modal shift by means of combined transport and also serves as a contact point for questions in this field. The association is a registered interest group with the European Parliament and the European Commission.

Promotion of combined transport in Austria

Financial subsidies: Special funding programmes are made available under certain circumstances by the Federal Ministry for Transport, Innovation and Technology to provide financial support for the investment and operating costs of combined transports (e.g. terminal support or the innovation programme Combined Cargo Transport).

Vehicle tax concessions: Vehicles registered in Austria that engage exclusively in in pre- and end-haulage transport to the closest technically suitable combined transport terminal are exempted entirely from vehicle tax (Motor Vehicles Tax Act, Federal Law Gazette 449/1992).

Exemption from the ban on night-time driving: Trucks with a maximum permissible weight of more than 7.5 tons are not permitted to drive between 10:00 pm and 5:00 am; excepted from this provision are tours undertaken in combined transport along precisely defined stretched between border crossings (Road Traffic Code, Federal Law Gazette 159/1960 and Ordinance, Federal Law Gazette 1027/1994).

Exemption from the ban on weekend and public holiday driving: As a rule, trucks with a maximum permissible weight of more than 3.5 tons are not permitted to drive between 3:00 pm and 12:00 am on Saturdays or between 12:00 am and 10:00 pm on Sundays and public holidays; excepted from this provision are tours undertaken in combined transport within the vicinity of defined railway stations and ports (Road Traffic Code, Federal Law Gazette 159/1960 and Ordinance, Federal Law Gazette 855/1994).

Exemption from the ban on driving to facilitate holiday traffic: Trucks or articulated vehicles with a maximum permissible weight of more than 7.5 tons are not permitted to drive between 8:00 am, i.e. 10:00 am and 3:00 pm on all Saturdays in the holiday months of July and August; excepted from this provision are tours undertaken in combined transport from or to the closest combined transport terminal (Travel Ban Calendar, Federal Law Gazette II 110/2017).

Compensation of payloads: An increase in the total weight of a vehicle from 40 to 44 tons is possible in pre- and end-haulage runs within combined transport (Motor Vehicles Act, Federal Law Gazette 267/1967).

Liberalisations: Cross-border pre- and end-haulage is liberalised for vehicles registered in EEA states and possessing a community license (Ordinance, Federal Law Gazette II 399/1997). In addition, bilateral authorisation is not required for pre- and end-haulage on road corridors leading to and from the six major rolling road terminals in Austria.

Rest periods on rolling and floating roads: According to EU regulations (Regulation (EC) No 561/2006 and the Working Hours Act, Federal Law Gazette 461/1969), the time that truck drivers spend on rolling or floating roads counts toward the mandatory rest periods.

@ Details about the mentioned subsidies and benefits as well as further information can be found on the website of the Federal Ministry for Transport, Innovation and Technology: www.bmvit.gv.at/verkehr/gesamtverkehr/kombiverkehr/foerderung.html

The European Green Deal

The goal of the European Union is to become worlds first climate-neutral continent until 2050. Therefore an action plan with key actions was elaborated to reach this goals.

An overview of this key action can be found in the source below. In this documents also special actions concerning sustainable and smart mobility can be found. Among others goals are to elaborate a new/revised proposal for a Directive on combined transport as well as initiatives to increase the capacity of railways and inland waterways and also to better manage them.

Additionally stricter standards for air pollutant emission for combustion-engine vehicles will be elaborated.[1]

Transport Insurances

Goods transport insurance is intended to cover the interest in the goods measurable in money; it is therefore aimed at the risks of transport and storage (=interest in integrity). Naturally, this interest accrues to the party who would suffer the damage, i.e. usually the sender or the recipient, depending on the ownership of the goods at the time of transport. Specifically, the risks to the goods are insured during transport, so it is a pure goods (transport) insurance, which in a certain way includes an interest in preserving the goods. The freight forwarder and the carrier are not obliged to take out goods transport insurance without an order from the consignor, but they do have a duty to provide advice, as they are supposed to represent the interests of the consignor in the best possible way - especially if the consignor is obviously inexperienced.

In contrast to goods transport insurance, **carrier liability insurance** is a pure liability insurance. As already mentioned, it must be taken into account as a differentiating factor who has a special interest in the respective insurance. The target group for transport liability insurance (or otherwise called carrier liability insurance) are forwarders, carriers and warehouse keepers to insure their liability risk for damage to goods during their period of custody. In addition to classic damage to goods, the scope of cover usually also includes damage caused by delay and damage due to gross negligence. In contrast to goods transport insurance, which insures the owner (shipper or recipient) (=interest in integrity), transport liability insurance thus protects the forwarder, carrier or warehouse keeper against any claims for damages by the shipper/recipient in the event of damage occurring in connection with the transport, which are usually covered by the transport liability insurance through the insurer. In Austria there is no legal obligation to take out transport liability insurance.[2]

[1] European Commission, Annex to the Communication on the European Green Deal Roadmap - Key actions, https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap_en.pdf. [10.08.2020]

[2] Thume, Versicherungen des Transports - Einführung, TranspR (2006), 1 (3-4).