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Annual Report on Danube Navigation in Austria | viadonau

Key data on Danube navigation 2016[1]

Transport volumes

9.1 million tons (+5.5%)

- Import: 4.3 million tons (–0.6%)
- Export: 2.0 million tons (+12.0%)
- Transit: 2.2 million tons (+19.5%)
- Domestic: 0.6 million tons (–10.5%)

Transport performance

9.3 billion tkm (+11.3%)
8,448 loaded journeys (–2.4%)

- Within Austria: 2.0 billion tkm (+8.7%)
- Outside Austria: 7.3 billion tkm (+12.0%)

Waterside transhipment at Austrian ports and transhipment sites

7.5 million tons (+0.6%)

- Ores and metal waste: 2.4 million tons (+4.1%)
- Petroleum products: 1.5 million tons (+1.8%)
- Crude and manufactured minerals, building materials: 1.1 million tons (–2.2%)
- Metal products: 0.8 million tons (+34.2%)
- Fertilisers: 0.7 million tons (–8.3%)
- Agricultural and forestry products: 0.6 million tons (–5.1%)
- Other goods: 0.4 million tons (–26.6%)

Vessel units locked through Austrian Danube locks

93,298 vessel units[2] (+3.5%)

- Freight transport: 51,603 units (+1.6%)
- Passenger transport: 41,695 units (+6.0%)

Passenger transport (including estimation)

1.2 million passengers (+5.1%)

- Liner services: 705,000 passengers (+5.2%)
- River cruises: 415,000 passengers (+7.8%)
- Non-scheduled services: 110,000 passengers (–4.4%)

Accidents

23 traffic accidents with damage

- Personal injuries: 0 death, 2 slightly injured
- Damage to property: 5 ship to ship, 1 grounding incident, 17 incidents with damage to riverbanks and facilities, 0 ship sunk

Availability of the waterway

366 days
15 year average: 357 days

- Closures due to high water: 0 days
- Closures due to ice: 0 days

[1] Changes from 2015 are given as percentages in brackets.
[2] Convoys and individual vessels.

Source: Statistics Austria; Supreme Navigation Authority at the Federal Ministry for Transport, Innovation and Technology; Federal Office of Transport; miscellaneous passenger transport operating companies; viadonau

Contents

Editorial note: Small variations of the figures within this annual report to Statistics Austria's figures may arise due to rounding differences.

Promoting strengths objectively
Development of multimodal transport

JÖRG LEICHTFRIED
Federal Minister for Transport,
Innovation and Technology

A modern infrastructure is the prerequisite for the success of Austria as a business location. Rail, road and the Danube waterway are the arteries of our modern society. These connect both people and Austria with future markets and provide us with the things that are important for our daily existence. But the Danube is not just a waterway. Its unique feature is its diverse use as an energy source, recreational area and habitat for innumerable animals and plants.

With the bmvit's Action Programme for the Danube, we are creating the ideal basis for increasing the role of inland shipping in a responsible way and for enhancing the preconditions for attractive economic incentives in terms of a European strategy for the Danube area. To achieve this, we are working together with viadonau to help companies to modernise their fleets in an environmentally friendly manner and utilise new technologies. Emphasis is simultaneously being placed on developing new markets for commodity groups that are particularly suitable for inland waterway transport; these include renewable raw materials, recycling products and building materials. In doing this we are making inland shipping a strong partner in multimodal transportation and, at the same time, providing a real alternative for environmental and sustainable economic activity in the Danube region.

Building for the future
Maintenance safeguards environment

Building blocks can only fulfill their purpose if they are combined with others to create a functioning unit. This is also the case with the waterway. An intact natural environment, along with a vibrant economic area, makes the Danube a sensitive structure consisting of many building blocks both large and small. Whether it is needs-based waterway management, revitalisation projects, day-to-day maintenance work or projects to promote economic incentives along the Danube, by linking these many different elements in an expedient way we are building a stable future for one of the most varied habitats in Europe.

During the course of many dedicated projects, we continue to learn from the river, sharpening our focus on solutions that allow space for both people and the natural habitat to develop and prosper. In today's world we know that even small, forward-looking measures can have a great impact. This can be seen at Bad Deutsch-Altenburg, Petronell and Witzelsdorf where we have been able to ensure adequate water depths by adopting an innovative approach towards maintenance – such as the restructuring of groynes – which significantly reduces the amount of gravel that has to be dredged annually. Such measures are safeguarding inland navigation whilst simultaneously preserving the unique nature of the Danube and its environment for future generations.

HANS-PETER HASENBICHLER
Managing Director
of viadonau

BALANCE SHEET VIADONAU

Tailor-made development
Customers confirm success

“Customer orientation means for us knowing today what’s required tomorrow. As a consequence, we are constantly in dialogue with our customers. This is the only way to create target-group-specific information and precise services. This strengthens not only us but also the shipping industry.”

EVA MICHLITS
Head of Corporate Communication

The past year has clearly shown that the better waterway management, renaturation and international information and transport infrastructure projects interact with one another, the more positively the development of the Danube region can be organised. Accurate and proactive measures are a particularly important prerequisite for the creation of good conditions for shipping (even in the most difficult of conditions) and the sustainable protection of the natural environment of the Danube. For this purpose, viadonau is pursuing a new customised development approach to the east of Vienna with a catalogue of measures that include precise maintenance and renaturation activities.

At the beginning of 2017, groynes were optimized and the ford was refurbished on the Danube at Bad Deutsch-Altenburg to ensure that the fairway can be safely used by shipping throughout the year, particularly during the winter months. Around 6,800 tons of armoured blocks were installed at five groynes. The success of this strategy has already been confirmed by pilot projects at Witzelsdorf and Petronell, where the number of young fish has increased considerably since the innovative refurbishment of the groynes.

Not only the natural environment but also the economy requires optimal fundaments. To this end, viadonau is currently committed to three transport infrastructure projects along the Danube as part of the European Union’s Danube Transnational Programme. Whereas Danube STREAM focuses on cross-border information for infrastructure, ENERGY BARGE concentrates on on specific logistical concepts for the transportation of biomass used for energy production in the Danube region. The objective of Danube SKILLS is to promote competences in nautical education and public development services for logistics on the Danube.

viadonau’s constant commitment is reflected in current levels of customer satisfaction. In a survey carried out at the end of 2016, around 90% of respondents gave top scores for maintenance and lock services. Information services provided by viadonau were also assessed as being up-to-date, comprehensive and useful. This positive development on the Danube is reflected in the company‘s reputation. Business partners and mayors took part in a reputation analysis in 2016 and also rated viadonau as a reliable and service-oriented service provider with a clear strategy.

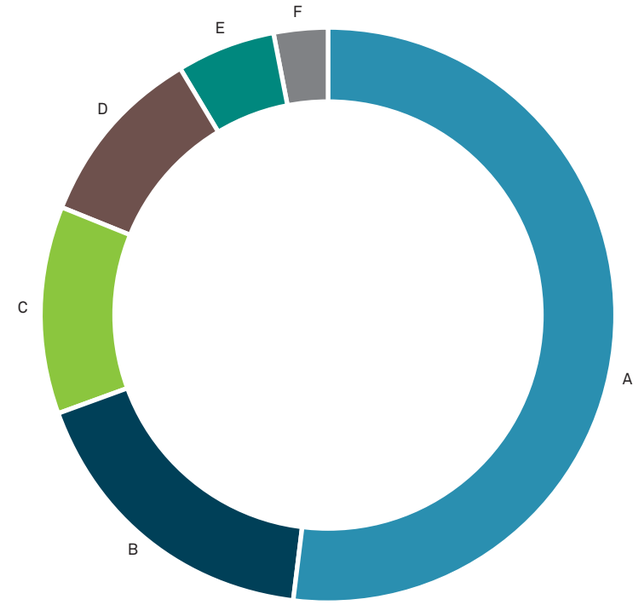
FIGURES_DATA_FACTS

Cost of core tasks viadonau 2016

F
Other
2.8%
882,012 Euros

E
Real estate
5.6%
1,741,335 Euros

D
Development and innovation
10.4%
3,233,276 Euros



A
Infrastructure management
52.2%
16,188,486 Euros

B
Traffic management
17.6%
5,455,598 Euros

C
Flood control
11.4%
3,547,943 Euros

The Austrian waterway operator viadonau ...

- maintains 350 kilometres of waterways
- locks through more than 90,000 vessels per year
- maintains 500 kilometres of towpaths
- cares for 800 kilometres of riverbank
- manages around 15,000 hectares of real estate
- operates the navigation information system DoRIS (Donau River Information Services) on the Austrian Danube with 23 base stations and a central control point
- manages 300 kilometres of flood protection dams
- protects more than 600,000 inhabitants with flood protection facilities between Vienna and the Slovakian border

FIGURES_DATA_FACTS

Freight transport on the Austrian Danube 2013–2016

10,709,847 tons
2013

10,121,726 tons
2014

8,599,354 tons
2015

9,071,478 tons
2016

Minimum continuously available fairway depths on the free-flowing stretches of the Danube 2016

Wachau
Below 2.5 m
2%

East of Vienna
Below 2.5 m
11%

Wachau
Above 2.5 m
98%

East of Vienna
Above 2.5 m
89%

Passengers on the Austrian Danube 2016

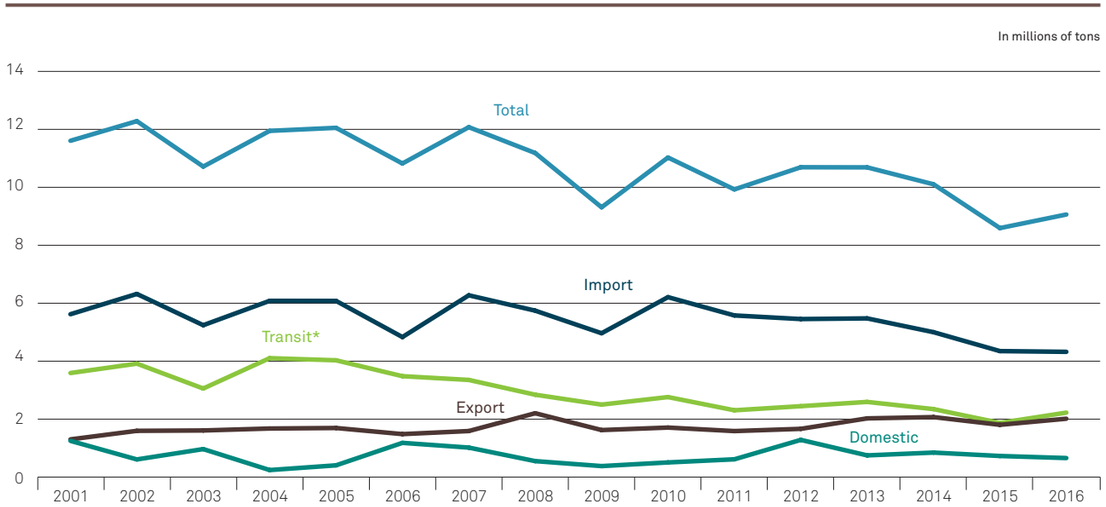
705,000
Liner services

415,000
River cruises

110,000
Non-scheduled services

FIGURES_DATA_FACTS

Freight traffic on the Austrian Danube 2001–2016



Transport volumes in tons	Import	Export	Transit*	Domestic	Total
2016	4,299,854	1,975,592	2,187,190	608,842	9,071,478
2015	4,325,020	1,763,975	1,830,024	680,335	**8,599,354**
2014	4,982,130	2,031,587	2,309,212	798,797	**10,121,726**
2013	5,461,830	1,987,404	2,559,494	701,119	**10,709,847**
2012	5,438,844	1,623,701	2,411,351	1,240,111	**10,714,007**

* Due to a lack of statutory resources, there are no complete records for transit data for the years 2004 and 2005. Since 2005 figures have been extrapolated by Statistics Austria.

Source: Statistics Austria, adapted by viadonau

TRANSPORT VOLUMES

Slight increase in total volumes
Strong growth for transit

In 2016 almost 9.1 million tons of goods were transported on the Austrian section of the Danube. Better fairway conditions led to an increase of 5.5% or almost 0.5 million tons compared to the previous year. There was a clear plus in transit traffic volumes for agricultural and forestry products as well as fertilisers. Exports, particularly the transportation of metal products, were also up.

The total transport performance (the product of transport volume and distance travelled) in the federal territories increased by 8.7% to just under 2 billion ton-kilometres. The entire transport capacity, both within and outside of Austria, rose by 11.0% to 9.3 billion ton-kilometres. The number of trips made by loaded vessels on the Austrian section of the Danube decreased slightly by 2.4% (from 8,658 to 8,448).

Cross-border freight traffic (the sum of export, import and transit) recorded an increase of 6.9% or more than 0.5 million tons compared to 2015. The strongest increase in transport volumes on the Austrian Danube was recorded for transit traffic (around 19.5% or approximately 357,000 tons). Exports also saw an increase in the volume of goods transported (approximately 12.0% or just under 212,000 tons).

In contrast, import and domestic traffic decreased slightly: domestic traffic on the Danube waterway – which had the smallest share of the transport volume in 2016 with 6.7% – fell by a substantial 10.5% or almost 71,500 tons to 608,842 tons. Import volumes decreased only slightly, by 0.6% or 25,166 tons to approximately 4.3 million tons. Imports continue to account for the largest share of total transport.

- Transport volumes increased in 2016 due to improved fairway conditions
- Total transport volumes increased by 5.5%
- 19.5% increase in transit traffic on the Danube

PORT TRANSHIPMENT

Stabilisation of total volumes
Increase at voestalpine and in Vienna

"One of our most important objectives is to strengthen freight transport by inland vessels. Together with the Austrian Danube ports, we are raising awareness of the potential of the Danube for multimodal transport. Transhipment figures for 2016 confirm this positive trend on the Danube."

ULF MEINEL
Project Manager Transport Development

In 2016, a total of 7.5 million tons of goods were handled waterside at Austrian Danube ports and transhipment sites. Compared to 2015, this represents a slight increase (0.6% or 43,461 million tons).

With a total handling volume of around 3.3 million tons, the port of voestalpine in Linz was once again the most quantitatively significant port on the Danube in Austria in 2016. Compared to 2015, the volume of goods handled increased by 6.2% or 190,468 tons. The port had a share of 43.4% of the total waterside transhipment of all ports and transhipment sites on the Austrian Danube.

The other private ports and transhipment sites (Aschach, the heavy-cargo port at Linz, Mauthausen, Ardagger, Pöchlarn, Pischelsdorf, Korneuburg and Bad Deutsch-Altenburg) were in second place with just under 1.4 million tons and 18.6% of the total volume of goods handled at Austrian loading and unloading points. A detailed analysis of the other ports and transhipment sites is not possible due to data protection laws.

The Port of Vienna (Freudenau, Lobau and Albern along with the transhipment sites Lagerhaus and Zwischenbruecken) recorded a total of almost 1.1 million tons in waterland transhipment in 2016. This is a sharp increase in volumes compared to the previous year (around 10.1% or 97,948 tons). The Port of Vienna accounted for 14.2% of total waterside transhipment in the Austrian section of the Danube in 2016.

Compared with the previous year, a slight decrease of 1.6%, or approximately 11,500 tons, in goods handled was registered at the commercial port and the oil port owned by Linz AG. With a total volume of 719,261 tons, the two ports owned by Linz AG accounted for 9.6% of all goods loaded and unloaded at Austrian ports and transhipment sites.

In contrast to this generally positive trend, the ports of Enns and Krems both recorded a decrease in transhipment volumes. With just under 600,000 tons, the Port of Enns accounted for 8.0% of the total volume of goods handled on the Austrian Danube. This represents a decrease of 16.9% compared to 2015. The Port of Krems also recorded a decrease in volume of 12.8% or just under 69,000 tons compared to the previous year. This port's share of total volumes of goods transhipped in Austria amounted to 6.2% with 467,349 tons.

The downward trend in the volume of goods handled was reversed in 2016 as a result of more favourable water conditions, leading to a partial recovery and an increase in the use of the Danube waterway as a transportation route. Nevertheless, this increase in transport volumes had only a negligible effect on Austrian transhipment figures due to the fact that a substantial proportion of the increased volume of transport was attributed to transit traffic.

FIGURES_DATA_FACTS

Waterside transhipment at Austrian Danube ports and transhipment sites 2016

F
Krems
6.2%
467,349 tons
(–12.8%)

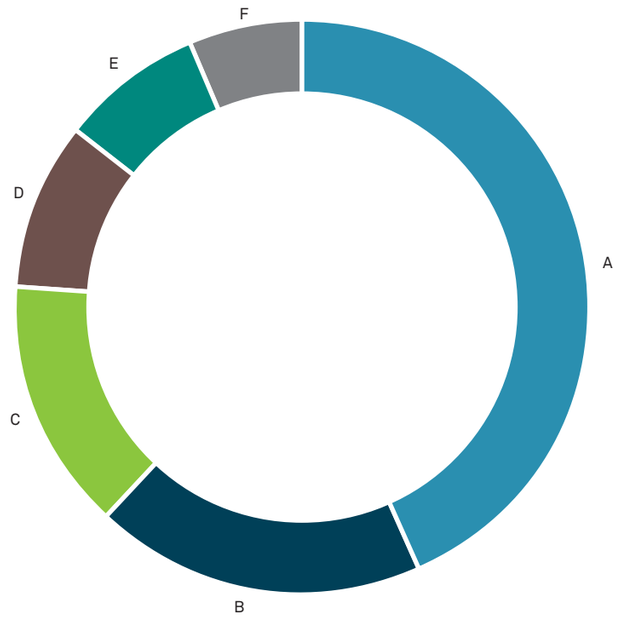
E
Enns
8.0%
596,066 tons
(–16.9%)

D
Linz AG[4]
9.6%
719,261 tons
(–1.6%)

A
Linz voestalpine[1]
43.4%
3,250,248 tons
(6.2%)

B
Others[2]
18.6%
1,392,674 tons
(–3.0%)

C
Port of Vienna[3]
14.2%
1,067,529 tons
(10.1%)

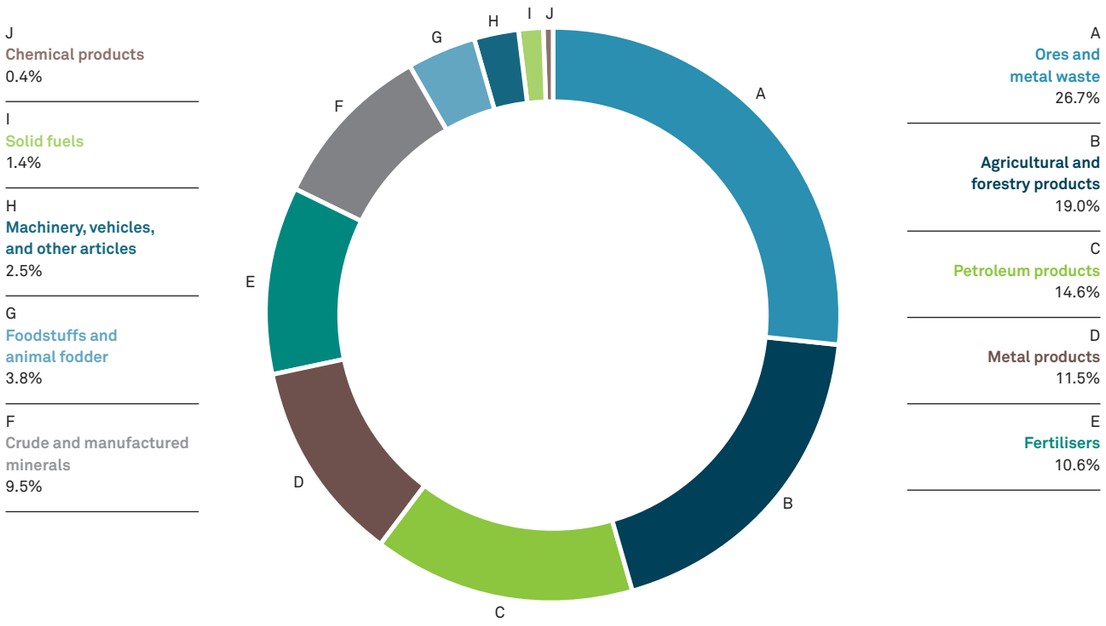


[1] Including waterside transhipment at Industrie Logistik Linz GmbH.
[2] Other ports and transhipment sites include: Aschach, the heavy cargo port at Linz, Mauthausen, Ardagger, Pöchlarn, Pischelsdorf, Korneuburg and Bad Deutsch-Altenburg.
[3] The three ports of Freudenau, Albern and Lobau (oil port) and the two transhipment sites Lagerhaus and Zwischenbrücken have been grouped together to compile the total turnover figures for the Port of Vienna.
[4] Data from both the commercial port and the oil port in Linz have been grouped together to compile the total turnover figures for the Port of Linz.

Source: Statistics Austria, adapted by viadonau

FIGURES_DATA_FACTS

Transport volumes by commodity groups on the Austrian Danube 2016



Goods classification according to NST/R*	Domestic	Import	Export	Transit	Total 2016	Change
Agricultural and forestry products	–	472,143	156,506	1,098,552	1,727,201	8.5%
Foodstuffs and animal fodder	573	188,769	57,659	98,990	345,991	–7.2%
Solid fuels	358	120,872	1,973	6,999	130,202	–41.5%
Petroleum products	302,591	543,697	389,035	88,571	1,323,894	5.8%
Ores and metal waste	1,026	2,406,819	10,759	–	2,418,604	4.0%
Metal products	–	167,585	591,597	286,365	1,045,547	27.5%
Crude and manufactured minerals, building materials	302,295	228,879	233,740	92,593	857,507	4.7%
Fertilisers	1,999	151,473	502,841	305,465	961,778	2.3%
Chemical products	–	504	3,411	30,546	34,461	139.3%
Machinery, vehicles and other articles	–	19,111	28,071	179,109	226,291	–6.7%
Total	**608,842**	**4,299,852**	**1,975,592**	**2,187,190**	9,071,476	**5.5%**

* NST/R = Standard Goods Classification for Transport Statistics/revised.

Source: Statistics Austria, adapted by viadonau

COMMODITY GROUPS

Gains for chemical products
Ores and metal waste strongest group

Ores and metal waste remained the strongest commodity group in 2016, with more than 2.4 million tons and an increase of 4.0% over the previous year. The share of the total volume was 26.7%.
Agricultural and forestry products accounted for 19.0% of the total volume, corresponding to more than 1.7 million tons. Over 60% of the total volume can be attributed to transit traffic, while no domestic transport for this commodity group was recorded in 2016.

With a plus of 5.8% or 72,830 tons compared to the previous year, petroleum products recorded a total volume of 1,323,894 tons. This was mainly attributed to an increase in imports and exports. The share of the total volume of goods transported was 14.6%.
Metal products recorded the second strongest growth rate of all product groups for the reported year with 27.5%. A sharp increase was observed in exports, rising by 186,741 tons. With a share of 11.5% or 1,045,547 tons, metal products were the fourth strongest group.

After a decline of 10.5% in 2015, transportation of fertilisers recorded a slight increase (+2.3%) in 2016. A total of 961,778 tons, mainly in export and transit, were transported on the Austrian Danube.
Crude and manufactured materials, along with building materials accounted for 9.5% or 857,507 tons of total volumes shipped. This represents a plus of 38,670 tons and corresponds to a growth rate of 4.7% compared to the previous year.

Volumes of foodstuffs and animal fodder transported on the waterway continued to decline in 2016. A decrease of 7.2% or 26,828 tons resulted in a total transport volume of 345,991 tons.
A share of 2.5% or 226,291 tons was recorded for the commodity group machinery, vehicles and other articles. A decrease of 6.7% corresponded to 16,372 tons. Imports were mainly affected by this reduction.

The strongest decline recorded was in solid fuels with a drop of 41.5%. A total of 92,432 tons less were transported on the Danube - mainly in exports. The share of the total volume of goods transported was 1.4%. Despite a significant increase of 139.3%, chemical products were in 2016, as in 2015, the group with the lowest transport volumes. However, due to strong growth in transit transport, chemical products recorded a volume of 34,461 tons.

- Ores and metal waste, with more than 2.4 million tons, the strongest commodity group

PASSENGER TRANSPORT

Strong increase in passenger numbers
Eleven new river cruise ships

- 7.8% more passengers on river cruises
- Increase of 5.2% for liner services
- Eleven new cruise ships in operation on the Danube

In 2016, passenger transport on the Austrian stretch of the Danube was able to record an increase in numbers for the third year running. A total of approximately 1,230,000 passengers were transported, representing a plus of 5.1% in comparison to 2015.

The number of river cruises also continued to rise in 2016, exceeding last year's record with 415,000 passengers transported (+7.8% compared to 2015). A total of eleven newly constructed vessels were brought into service on the Austrian section of the Danube, thereby increasing the number of cabin vessels to 168 (+3.7%). In total, 4,619 journeys (+6.3%) were completed. Due to the continuing growth of the existing fleet, the capacity for river cruises increased to 31,082 passengers (+16.6%), this corresponds to an average of 185 passenger places per ship.

In 2016, liner services carried approximately 705,000 people (+5.2% compared to 2015). The DDSG Blue Danube Schiffahrt GmbH recorded a total of 248,300 passengers (+8.9%) transported in the Wachau and Vienna. 144,274 passengers (+12.7%) were transported between Vienna and Bratislava on the two Twin City Liners. 45,706 passengers (+4.8%) took advantage of the services offered by Donau-Schifffahrts-Gesellschaft mbH (formerly known as Donau Touristik). The Slovakian and Hungarian hydrofoil ships, operating between Vienna and Bratislava and Vienna and Budapest, transported a total of 29,852 passengers (–4.0%).

Non-scheduled services carried approximately 110,000 passengers in 2016 (–4.3% compared to 2015). The DDSG Blue Danube Schiffahrt GmbH carried 53,700 passengers (+2.7%) on theme, special and charter cruises. The MS Kaiserin Elisabeth (owned by the Donau-Schiffahrts-Gesellschaft mbh) recorded 12,984 (–25.9 %) passengers on non-scheduled trips, and the MS Stadt Wien, owned by the shipping company Wilhelm Stift GmbH, carried around 6,020 passengers (+35.3%). The MS Donaunixe and the MS Maria, owned by Donauschiffahrt Ardagger GmbH, recorded approximately 5,300 passengers (+12.8%)

Passenger traffic volumes for companies, which carried less than 5,000 passengers in 2016, are not reported separately here, and there are no figures available for this reporting period for other scheduled and non-scheduled services operated on the Austrian section of the Danube.

FIGURES_DATA_FACTS

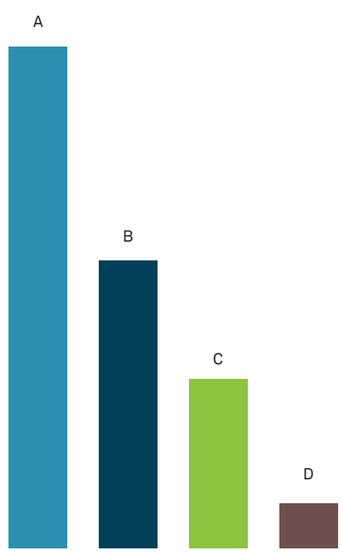
Passengers on the Austrian Danube 2016[1]

A
Total
1,230,000

B
Liner services
705,000

C
River cruises
415,000

D
Non-scheduled services
110,000



Dockings and passengers at passenger ports in Vienna[2]	Dockings ships	% to previous year	Passengers processed	% to previous year
2016	7,337	+7.8	668,805	+6.6
2015	6,805	–1.6	627,194	+4.6
2014	6,916	–	599,549	–

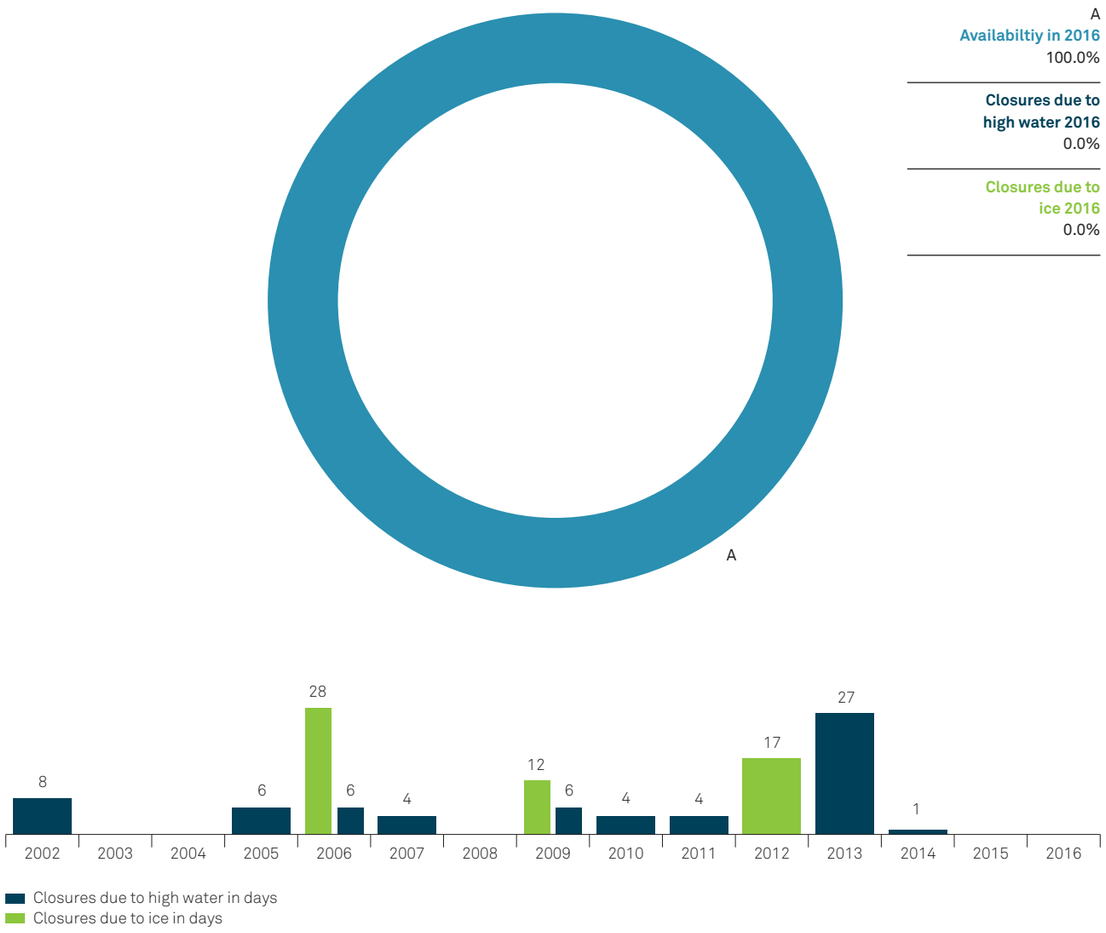
1 Due to the fact that passenger traffic on the Danube ceased to be statistically compiled in Austria in 2003 (due to a change in legislative basis), the above figures include additional estimates in passenger numbers on liner services and non-scheduled traffic, based on an assumed average capacity utilisation of 40% on passenger ships. The calculation of the total number of passengers on cabin vessels is based on the number of trips these ships made through the locks at Aschach and Freudenau, with an assumed average capacity utilisation of 75%, whereby a deduction of 30% for double counting has been estimated.

2 Landing stages at Handelskai, Danube Canal and Nussdorf, including cabin vessels and the Twin City Liners.

Sources: DDSG Blue Danube Schiffahrt GmbH, Donauschiffahrt Ardagger GmbH, Donauschiffahrt Wurm + Köck GmbH & Co. OHG, DSGL – Donau-Schifffahrts-Gesellschaft mbH, Event-Schifffahrt Haider, Genuss-Schiffahrt GmbH / Donauparadies Gierlinger, MAHART PassNave Shipping Ltd., MS-Marbach, Nostalgie Tours, Video & Consulting Ges. m. b. H., Shipping Company Wilhelm Stift GmbH, Slovak Shipping and Ports – Passenger Shipping JSC (SPaP-LOD, a. s.), viadonau, WGD Donau Oberösterreich Tourismus GmbH, Wiener Donauraum Länden und Ufer Betriebs- und Entwicklungs GmbH

FIGURES_DATA_FACTS

Navigational closures due to high water and ice 2002 to 2016



Source: Supreme Navigation Authority at the Federal Ministry for Transport, Innovation and Technology; Federal Waterways and Navigation Administration; viadonau

AVAILABILITY OF THE WATERWAY

Danube navigable throughout whole year
No closures due to ice or high water

- Long-term annual availability of the Danube at 97.8%
- 2016 no closures due to ice or high water

Over a 15 year annual average from 2002 to 2016, the availability of the Austrian section of the Danube waterway was 97.8%, or 357 days per year. During this period three closures due to ice were recorded with an average duration of 19 days, while the waterway had to be closed in nine of these years due to floods with an average duration of around seven days.

The cumulative run off volume of the Danube in 2016 essentially corresponded to the average value of the 30-year observation period 1981 to 2010. In contrast, an above-average total water discharge was recorded for the month of February and from June to August. The highest navigable water level was exceeded for a few hours in the middle of July, thereby causing the stretch of the river between Freudenau and the Morava estuary to be officially closed to shipping for twelve hours. Apart from this brief closure, no closures due to ice or high water were recorded on the Austrian stretch of the Danube in 2016. The availability of the Danube waterway was therefore 366 days or 100% of the year.

Weather-related closures in extreme situations such as high water or ice can be implemented by the relevant authorities on the Austrian section of the Danube waterway. While closures due to ice are normally confined to the winter months of January and February, high waters and flooding generally tend to occur in the spring or summer months.

Apart from closures due to high water and ice, official closures of the waterway can also occur due to traffic accidents, construction work or events. In 2016, such closures took place on eleven days of the year with an average duration of 3.4 hours. The total closure of locks (the parallel closure of both lock chambers) in 2016 accounted for a total duration of just over three hours.

The Danube Canal in Vienna had to be closed for a total of five days due to demolition work on the bridge at Erdberg. The lock at Nussdorf was also closed for maintenance and construction work for a total of 31 days.

For traffic travelling between the Danube and the Rhine, the availability of the waterways on the Main and Main-Danube Canal is of great importance. In 2016 this route recorded neither closures due to high water nor ice. Scheduled lock closures due to maintenance work at lock facilities on the German federal waterways of the Main, the Main-Danube Canal and the Danube took place between 6th and 29th April, with a total duration of 23 days. The availability of this transport connection was therefore 93.7% in 2016.

LOAD FACTOR

Good conditions
Increase in load factor to 61.7%

- Favourable fairway conditions for most of the year
- Load factor of cargo vessels 61.7%
- Average daily level of 275 cm at the Wildungsmauer gauge

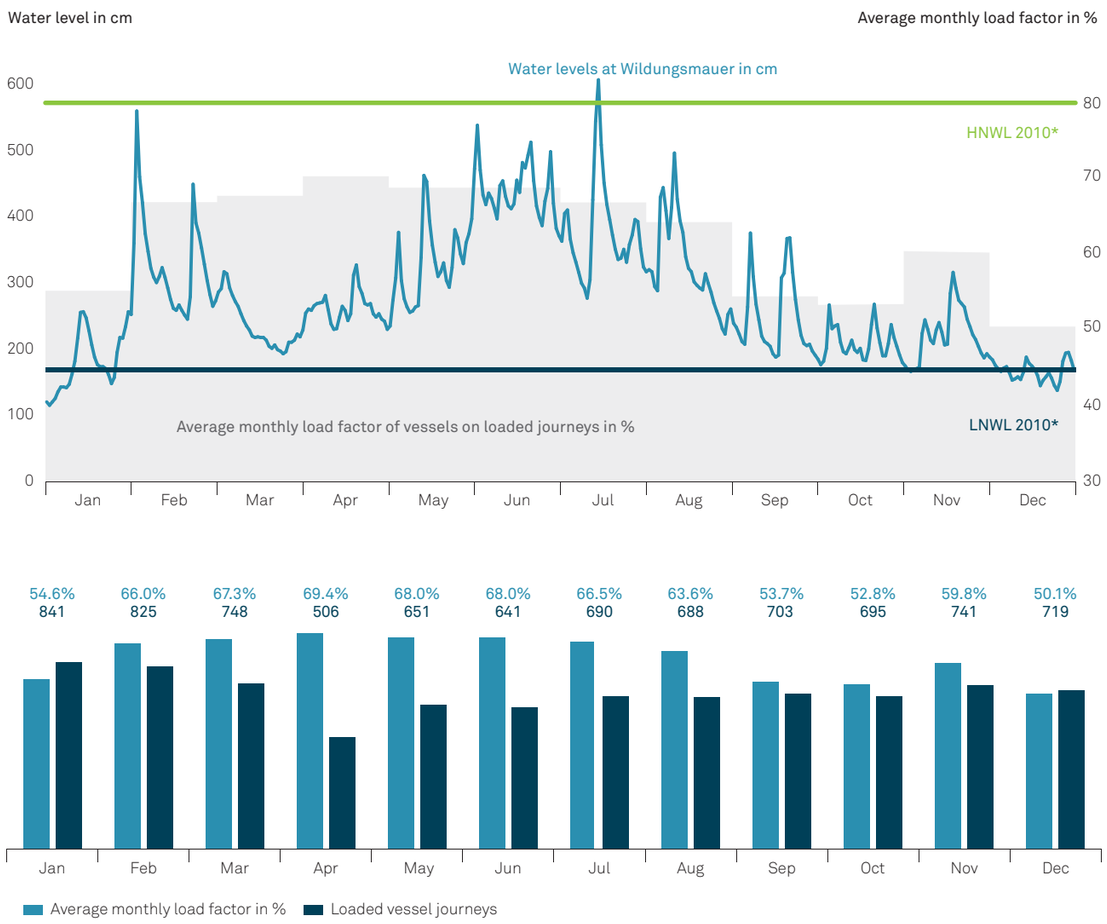
The fairway conditions were far more favourable than in the previous year, thereby allowing the average monthly load factor of cargo ships on the Danube to increase to more than 61% in 2016. Only on a few days in January and December did the daily average values recorded at the Wildungsmauer reference gauge fall below the LNWL 2010. The highest load factor was recorded in the month of April with almost 70% and in the months of May and June with 68%. The lowest load factor was registered in December 2016 with just under 50%.

In addition to economic and logistical decisions, hydrological conditions also play a major role in determining the load factor of freight vessels on the Danube. The average daily level at the Wildungsmauer gauge was 275 cm and was a great improvement on the previous year (243 cm). Fairway conditions were more typical in 2016; during the spring months they were generally higher, but from late summer onwards they were close to the LNWL 2010.

If relatively large draughts loaded can be achieved, the average load factor of vessels increases and vessel operators require fewer trips to transport the same volume of goods. This correlation can be seen in the diagram opposite: whereas in June 2016 only 641 trips were required to transport more than 777,000 tons on the Austrian Danube, 841 trips were required for the same tonnage in January of the same year.

FIGURES_DATA_FACTS

Water levels and resulting load factors of cargo vessels in 2016 using the Wildungsmauer gauge of reference

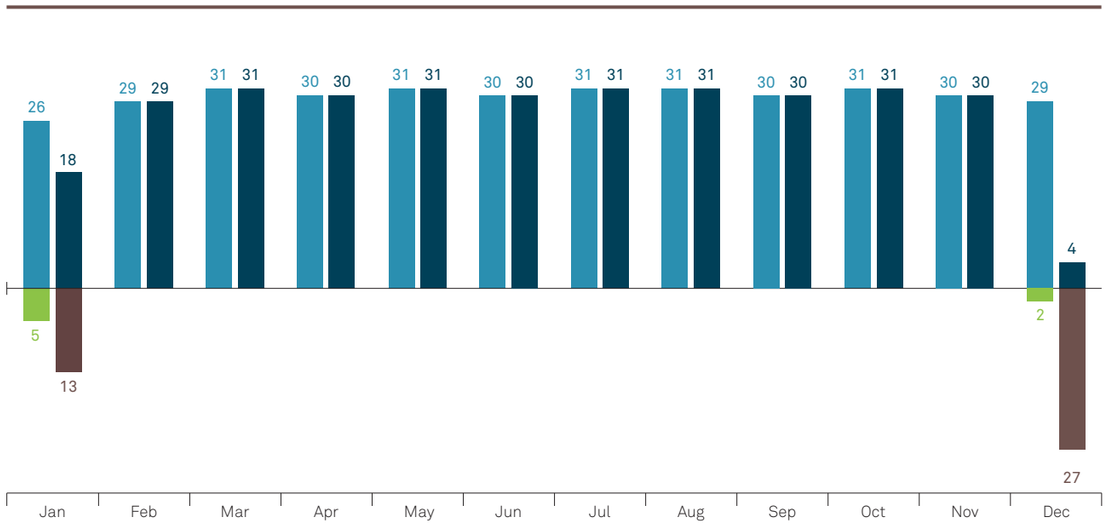


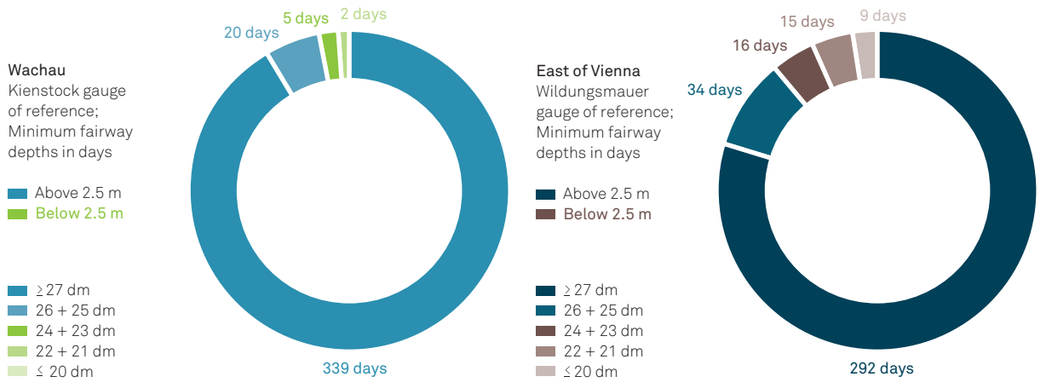
* LNWL 2010 (low navigable water level): This value represents the water level exceeded on 94.0% of days in a year during ice-free periods with reference to a 30-year observation period (1981–2010). The current LNWL value for the water gauge Wildungsmauer is 162 cm.
HNWL 2010 (highest navigable water level): This value represents the water level corresponding to the discharge exceeded on 1.0% of days in a year with reference to a 30-year observation period (1981–2010). At Wildungsmauer, the highest navigable water level is currently 564 cm.

Source: Statistics Austria, adapted by viadonau

FIGURES_DATA_FACTS

Minimum continuously* available fairway depths on the free-flowing stretches of the Danube 2016 in days





* Based on the fairway width required for a four-unit pushed convoy travelling downstream without encountering other vessels. Fairway width depends on the river bend radii involved.

Source: viadonau

FAIRWAY DEPTHS

10 months continuous depth of 2.5 metres
Good fairway conditions

From a hydrological perspective, 2016 was a good year for navigation on the Danube, with the exception of the two months of January and December. In these months the daily average value of the Danube gauge Wildungsmauer (reference gauge for the free-flowing section east of Vienna) dropped below the defined low navigable water level (LNWL) 2010 for eleven and twelve days respectively. Low water levels were recorded on a total of 23 days, or 6.3% of the year, in 2016 (–8.5% in comparison to 2015). Details of water flow conditions can be found in the chapter 'Load factor' of this publication.

In 2016, water depths of more than 2.5 metres in the deep channel of both free-flowing sections of the Austrian Danube were continuously available for ten months of the year (from February to November). Only the months of January and December recorded days with water levels below 2.5 metres due to the low water discharge: the stretch of the river east of Vienna recorded 13 days in January and 27 days in December. In the Wachau, water levels below 2.5 metres were recorded on 5 days in January and 2 days in December.

Overall, the Wachau recorded the availability of a minimum depth in the deep channel of 2.5 metres on 359 days, or more than 98% of the year (+9.6% compared to 2015). In the free-flowing section east of Vienna a minimum navigable depth of 2.5 metres was available on 326 days or just under 89% of the year (+27.7% compared to 2015). To remove aggradation from the shallow sections of the river proactively, a total of 14 maintenance dredgings were carried out in 2016, resulting in the removal of approximately 285,000 cubic metres of material. Nearly 86% of this dredging activity took place in the stretch of the river to the east of Vienna.

The lowest available navigable water depths for both free-flowing stretches of the Austrian Danube (Wachau and east of Vienna) were calculated based on all hydrographical surveys of the riverbed carried out in 2016. Figures for the periods between measurement dates were interpolated and evaluated in combination with the respective gauge hydrographs (mean daily water levels at the Kienstock and Wildungsmauer gauges of reference). The reference for these calculations was a deep channel located inside the fairway and representing the required fairway width for a four-unit pushed convoy travelling downstream without encountering other vessels, whereby the width of the fairway depends on the river bend radii involved.

"2016 once again showed that precise waterway management is a key element for traffic safety on the Danube. Proactive dredging measures, such as those carried out at Bad Deutsch-Altenburg, ensured that the waterway was navigable for freight shipping throughout the whole of the year."

KLAUS DIEPLINGER
Head of Maintenance

TRANSPORT DENSITY

351 kilometres of waterway 24,000 tons of goods per day

- Imports accounted for the greatest volume of goods shipped, followed by transit and export
- Eastern traffic more significant than western traffic
- Highest volume of goods transported between Vienna and the Austrian–Slovakian border

A total of 9.1 million tons of goods were transported along the 350.51 kilometre long Austrian section of the international Danube waterway in 2016. Total transport volumes by segment ranged from approximately 3.9 million tons (between the German–Austrian border and Aschach) to about 6.8 million tons (between Vienna and the Austrian–Slovakian border).

With just under 4.3 million tons, import traffic once again generated the most significant flow of goods in 2016. The industrial port of voestalpine in Linz made by far the largest contribution to imports and was responsible for the transportation of around 2.5 million tons. This consisted predominantly of cross-border traffic from the East.

Transit traffic was in second place with almost 2.2 million tons of goods shipped, whereby the transit of goods upstream was quantitively five times higher than the transit of goods downstream.

With around 2 million tons, export traffic followed closely behind transit traffic. Once again, the flow of traffic to the East proved to be more significant than to the West. Moreover, with around 0.8 million tons, exports from the industrial port of voestalpine in Linz also accounted for the largest share of volume of goods transported. Inland traffic played only a minor role with a mere 0.2 million tons.

As it is the largest waterside transhipment location on the Austrian Danube, the industrial port of the voestalpine steelworks in Linz stands out amongst all other ports and transhipment sites with regard to the quantity of goods transported. Therefore Linz – with a total of nearly 4 million tons of goods handled (import and export plus quantities transhipped for domestic traffic) – continued to play a major role in 2016.

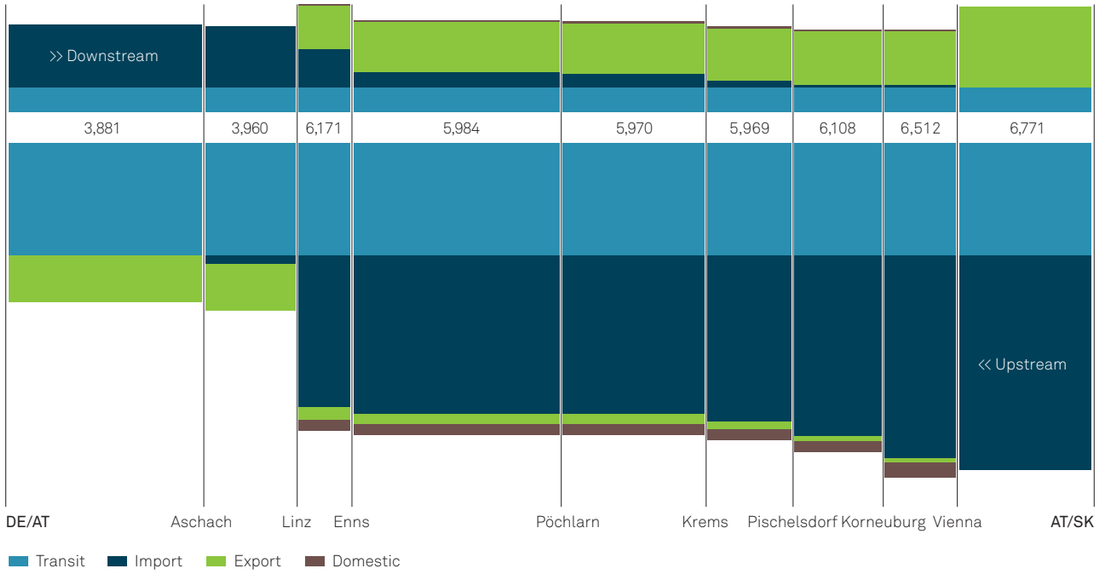
Approximately 6.8 million tons of goods were transported across the Austrian–Slovakian border in 2016. This amounts to a volume of goods of around 74% more than that of volumes crossing the border with Germany. This clearly illustrates the imbalance of freight volumes shipped across the two borders and the significance of cross-border traffic in the East of Austria.

The daily volume of goods transported on the Austrian Danube was an average of 23,764 tons. This is equivalent to 951 fully loaded lorries (25 net tons per vehicle) or 594 railway wagons (40 net tons per wagon) per day.

The most heavily used section of the Danube in 2016 was the 46 kilometre long stretch between Vienna and the Austrian–Slovakian border, which saw an average of almost 18,500 tons of goods transported every day.

FIGURES_DATA_FACTS

Density of freight traffic on the Austrian Danube 2016

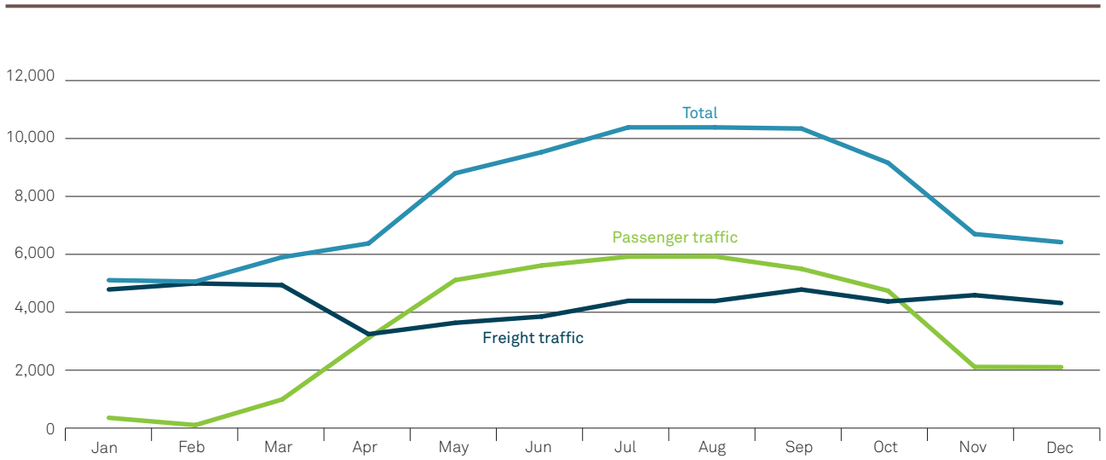


Section	Length	Import	Import	Export	Export	Domestic	Domestic	Transit	Transit	Total	Total	In sum
in 1,000 tons	in km	upstr.	d'str.	upstr.	d'str.	upstr.	d'str.	upstr.	d'str.	upstr.	d'str.	
Border DE/AT–Aschach	63.21	0	972	721	0	0	0	1,805	383	2,526	1,355	**3,881**
Aschach–Linz	31.30	103	948	721	0	0	0	1,805	383	2,629	1,331	**3,960**
Linz–Enns	16.87	2,356	586	192	679	168	2	1,805	383	4,521	1,650	**6,171**
Enns–Pöchlarn	67.63	2,456	228	161	782	166	3	1,805	383	4,588	1,396	**5,984**
Pöchlarn–Krems	46.20	2,463	207	161	782	166	3	1,805	383	4,595	1,375	**5,970**
Krems–Pischelsdorf	26.30	2,578	101	125	808	166	3	1,805	383	4,674	1,295	**5,969**
Pischelsdorf–Korneuburg	29.60	2,809	30	72	841	166	2	1,805	383	4,852	1,256	**6,108**
Korneuburg–Wien	23.64	3,150	30	70	841	231	2	1,805	383	5,256	1,256	**6,512**
Wien–Border AT/SK	45.76	3,328	0	0	1,255	0	0	1,805	383	5,133	1,638	**6,771**

Source: Statistics Austria, adapted by viadonau

FIGURES_DATA_FACTS

Vessel units* in freight and passenger transport locked through Austrian Danube locks in 2016



	Freight traffic	% to previous year	Passenger traffic	% to previous year	Total	% to previous year
2016	51,603	+1.6	41,695	+6.0	93,298	+3.5
2015	50,781	–18.7	39,347	+1.6	90,128	–10.9
2014	62,449	–1.1	38,716	+19.8	101,165	+6.0
2013	63,141	+6.2	32,329	–3.7	95,470	+2.6
2012	59,443	–6.8	33,573	–2.0	93,016	–5.1

* Vessel units in freight transport include convoys (pushers, motor cargo vessels or motor tankers with cargo and tank lighters or barges) and individual vessels (motor cargo vessels and motor tankers or individual pushers and tugs). Passenger vessels include day-trip vessels and cabin vessels.

Source: viadonau

LOCKED–THROUGH VESSEL UNITS

93,000 units locked through
Increase in freight and passenger traffic

A total of 93,298 passenger and cargo vessel units, travelling both upstream and downstream, were locked through the nine Austrian lock facilities in 2016 (excluding the Jochenstein power station on the Austrian-German border). Included in this number were 33,197 motor cargo vessels and motor tankers (+0.2% compared to 2015), 18,406 pushers (+4.3%) and 41,695 passenger vessels (+6.0%). 42,398 cargo and tank lighters or barges (–0.4%) were also locked through as part of coupled and pushed convoys. When taking all types of vessels and convoys into consideration, the total number of locked-through vessel units in freight and passenger transport showed a plus of 3.5% over 2015.

Freight transport on the Austrian Danube saw a slight increase in locked-through vessel units (1.6% or 822 more units than in 2015). Once again, there was a significant increase in passenger traffic (+6.0% or 2,348 more vessel units locked through than in 2015). In 2016 freight transport had a share of 55.3% of total shipping volumes (–1% compared to 2015) with passenger traffic accounting for the remaining 44.7% (+1%).

Over the whole of 2016, the average volume of vessels passing through an individual Austrian Danube lock facility amounted to 10,366 convoys and individual vessels (a plus of 352 vessel units compared to 2015). This is equivalent to 864 (+29) vessel movements per month and an average of 29 locked-through vessels per day. As in previous years, the highest vessel volume was again recorded at the Freudenau lock in Vienna with 13,345 vessels and convoys passing through the lock (+5.7% over 2015), followed by the Greifenstein lock with 10,878 units. Aschach lock recorded the smallest amount of locked-through vessels with 8,733 units.

In addition to commercial freight and passenger vessel units, 9,554 (–9.9% compared to 2015) small sports and leisure crafts also passed through lock facilities on the Austrian Danube in 2016, together with a further 1,656 vessels which included public authority and rescue crafts. These figures are not included in the current statistics for locked-through freight and passenger traffic.

“The results of a customer satisfaction survey conducted in 2016 made it clear that waterway users consider the lock services provided by viadonau to be first class. This positive feedback confirms that the course we are steering – holistic development with a consistent service philosophy – is spot-on.”

KATA SEHER
Junior Project Manager DoRIS Operations

AVAILABILITY OF LOCK CHAMBERS

99.96% continuous availability
Average chamber utilisation about 34%

- 99.96% continuous availability of Austrian locks in 2016
- Overhaul work and major repairs are carried out in the low-traffic period between November and March to avoid waiting times

As the nine Austrian Danube locks are large-scale technical installations, they need to be serviced and maintained at regular intervals to ensure operational functionality and safety and thus also the capacity of waterway traffic flow. These so-called lock overhauls, along with necessary large-scale repairs, accounted for approximately 88% of all closure days of the 18 lock chambers in 2016. The average duration of overhauls carried out in the winter half year 2015/16 and completed by the spring of 2016 was 127 days per chamber.

Other reasons for lock closures included year-round repairs of damage to facilities caused by vessels. These accounted for a total of 11% of all closure days and can be attributed predominantly to a damage at the Aschach lock facility caused by an accident at the end of 2015. In addition, 1% of closures were attributed to modification or maintenance work, dredging in and around lock facilities and surveying. No closures due to the adverse weather conditions high water or ice were recorded in 2016.

The continuous availability of the 18 lock chambers of the Austrian Danube amounted to 99.96% of all days in 2016.

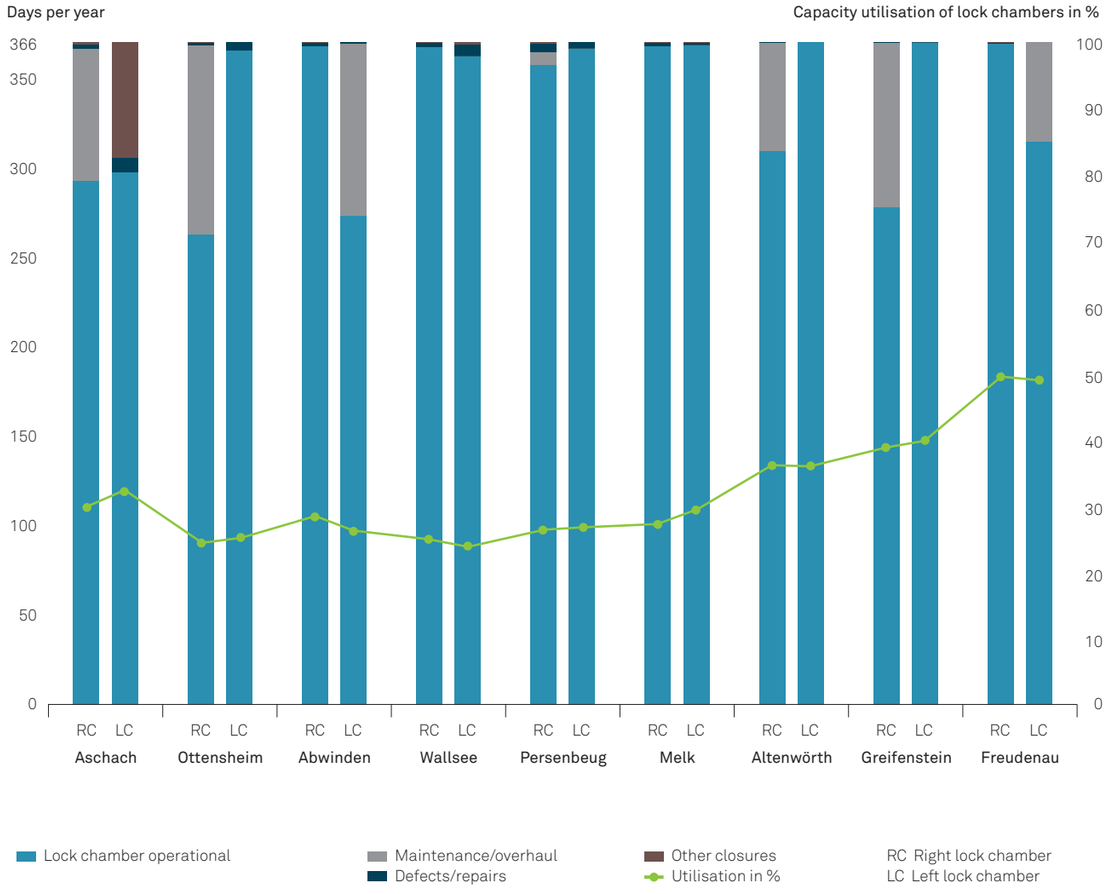
In the busiest months for passenger, sports and leisure navigation between April and October, only two short-term closures of individual chambers were necessary. These were due to maintenance work and a fire alarm. The average closure time on these two occasions was 37 minutes.

During the low-traffic months from November to March four lock chambers were simultaneously out of service. This was mainly due to overhauls and major repairs. Overhauls were carried out on individual lock chambers at seven lock facilities.

The average utilisation of individual lock chambers in 2016 was around 34%. The Freudenau lock facility once again achieved the highest average utilisation rate with approximately 50%, while the lowest rate of about 27% was recorded at the Wallsee lock. In this context, the capacity utilisation rate of a lock chamber refers to the period of time that the chamber is occupied, i.e. the entire period between the first vessel collectively being locked through and the last collectively locked-through vessel exiting the chamber, always assuming 24/7 availability of the lock chamber and considering lock closures.

FIGURES_DATA_FACTS

Availability of Austrian Danube locks 2016



Source: viadonau

FIGURES_DATA_FACTS

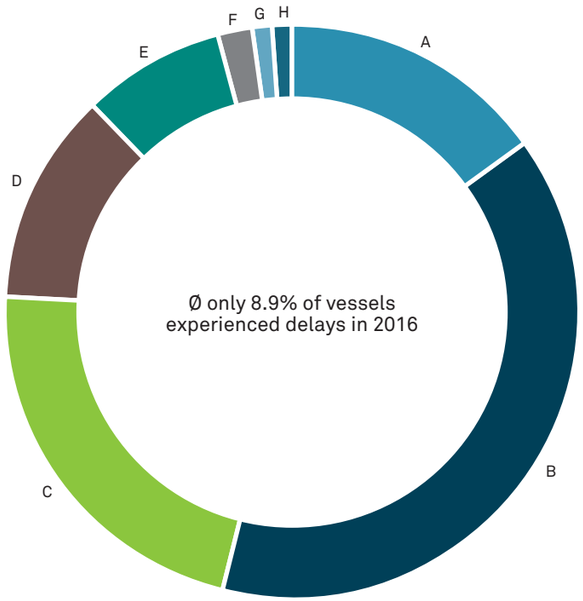
Analysis of waiting times for vessels waiting at Austrian Danube locks 2016

H
Over 180 minutes
1%

G
120 to 180 minutes
1%

F
90 to 120 minutes
3%

E
60 to 90 minutes
8%



A
Under 15 minutes
14%

B
15 to 30 minutes
39%

C
30 to 45 minutes
22%

D
45 to 60 minutes
12%

Source: viadonau

WAITING TIMES AT LOCKS

Only 8.9% of vessels experienced delays
Average waiting time 33 minutes

On average, only 8.9% of all shipping units (commercial freight and passenger vessels) experienced waiting times at the nine locks on the Austrian section of the Danube in 2016. The average waiting time amounted to 33 minutes. For more than half of these vessels the waiting time was less than 30 minutes. Three quarters had to wait less than 45 minutes and only approximately 13% of all vessel units were delayed for more than an hour.

In periods when all lock facilities were fully available (both lock chambers fully operational, excluding short-term closures), 95.3% of all ships did not have to wait at the locks. The remaining 4.7% had to interrupt their journey for an average of 27 minutes.

Broken down into individual locks and months – with an average duration of 32 minutes – only 6.9% of all vessel units experienced waiting times during the heavy-traffic months of April to October in 2016. In the low-traffic winter months of November to March, 11.6% of all locked-through vessel units experienced an average waiting time of 35 minutes. The primary reason for these delays was major overhaul and maintenance work being carried out in the low-traffic season.

- No waiting times at locks for 91.1% of all commercial vessel units in 2016
- An average waiting time of 33 minutes for 8.9% of all locked-through vessels

ACCIDENTS

Decrease in traffic accidents
Minus for groundings and collisions

- Collisions with lock facilities and ship collisions were the most frequent types of accidents in 2016
- Personal injuries: two injured, no deaths
- 17 accidents involving freight vessels and seven accidents involving passenger ships

Danube navigation has an unbeatable safety and accident record when compared to the land transportation modes of rail and road. Only 23 accidents involving commercial passenger ships, freight vessels or convoys resulting in damage to property and/or personal injury occurred during the course of 2016 on the Austrian section of the Danube. Seventeen accidents involving cargo vessels were recorded, while seven incidents of damage to passenger ships were reported.

When split into accident types, five incidents were vessel collisions which involved vessels colliding with each other whilst in service. There were no cases of accidents involving vessels colliding with each within the confines of a lock facility. One incident of a vessel running aground due to overloading, too low water levels or navigating outside of the fairway was also recorded. Six incidents involved damage to riverbanks or facilities, and a further ten collisions occurred within the confines of lock facilities. Finally, one vessel was involved in a collision with a bridge.

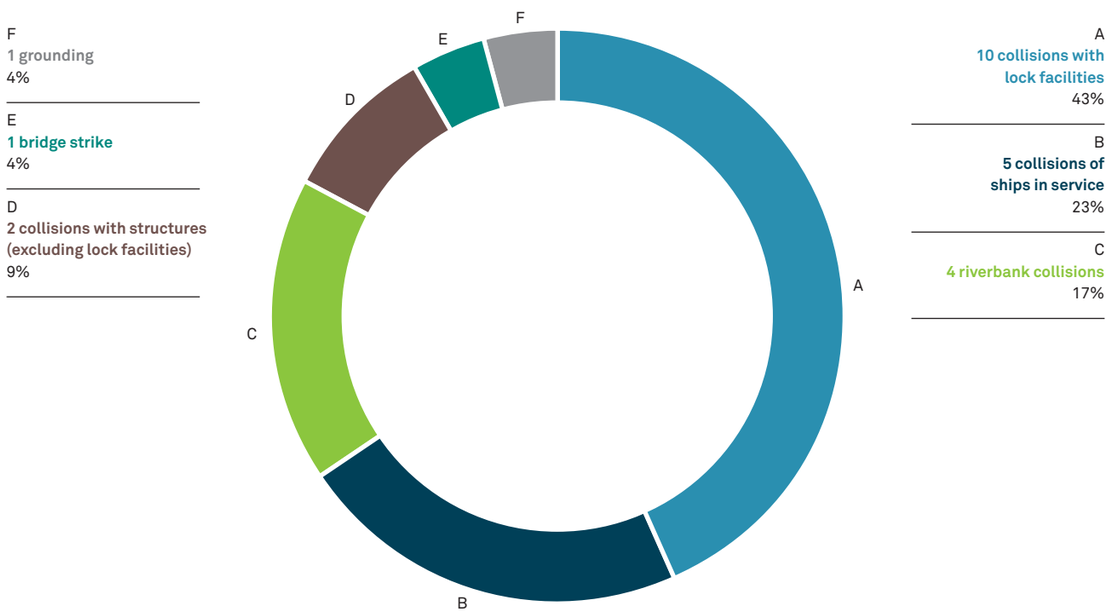
One accident resulting in personal injury was recorded for freight and passenger ships on the Austrian section of the Danube in 2016. Two people were slightly injured by the collision of a sports boat with a cargo ship. As in the previous year, no deaths occurred on the waterway. There were also no incidents of water pollution or load spillages recorded.

The majority of accidents in 2016 occurred within the vicinity of lock facilities (whilst being locked-through or in either the headwater or tailwater area of the lock). Ten such accidents, all collisions, were registered. Seven accidents occurred on the impounded sections of the Danube: two ship collisions, a bridge strike and four collisions with riverbanks. Three accidents occurred on the free-flowing section of the Danube east of Vienna (one collision with a structure, one grounding and one ship collision). Three accidents were recorded on the free-flowing section of the river between Melk and Krems (Wachau) in 2015 (one collision with a structure and two ship collisions).

Sports and recreational boating, which is not included in the accidents described above (except in the case of collisions with commercial freight and passenger vessels), recorded two accidents involving damage on the Austrian section of the Danube in 2016. Both of these accidents were collisions and, as mentioned above, resulted in two people suffering minor injuries.

FIGURES_DATA_FACTS

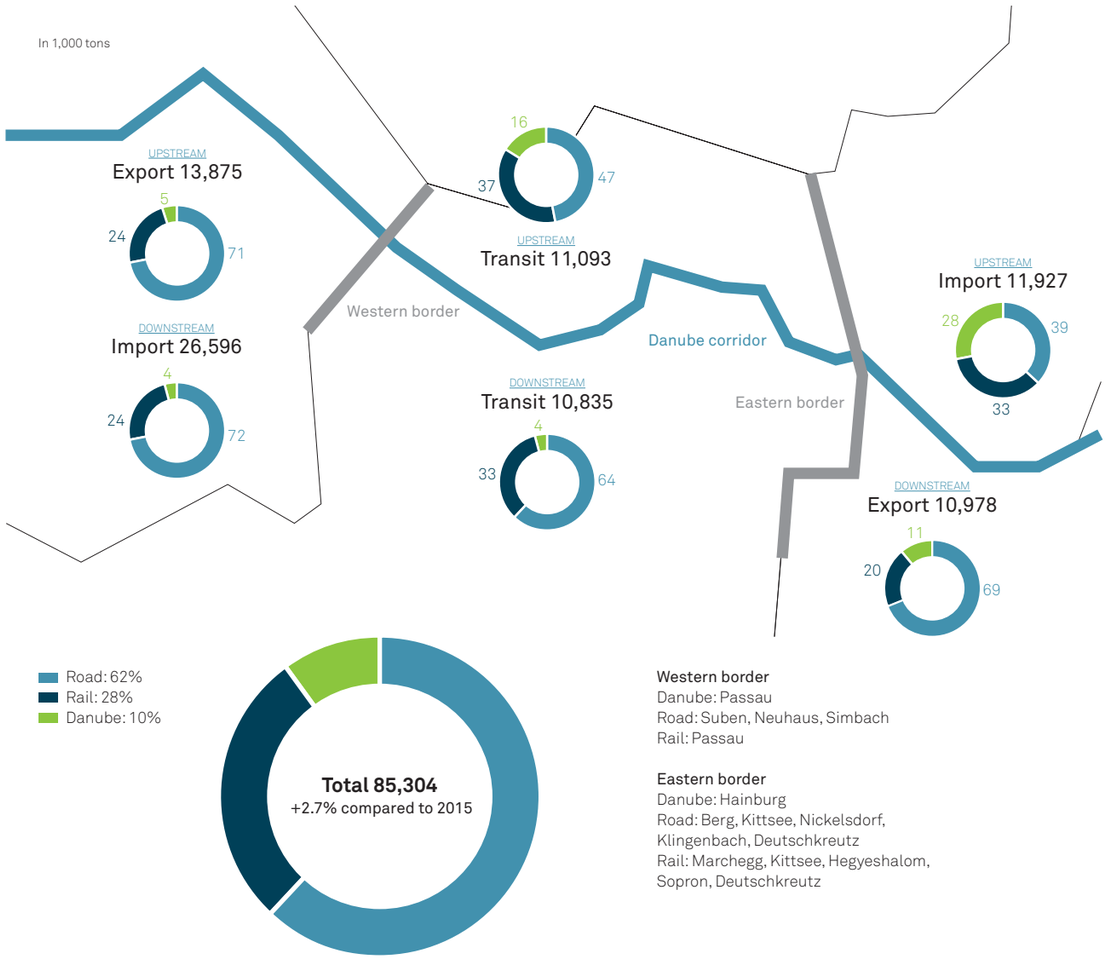
Traffic accidents according to type of damage on the Austrian Danube 2016



Source: Supreme Navigation Authority at the Federal Ministry for Transport, Innovation and Technology; Federal Office of Transport; adapted by viadonau

FIGURES_DATA_FACTS

Cross-border freight traffic in the Austrian Danube corridor 2016



Source: Austrian Institute for Spatial Planning (ÖIR), adapted by viadonau

MODAL SPLIT

Once again increase in road traffic
Danube increases share at eastern border

- Road increases market share by about 7%
- Rail loses share, Danube constant
- Danube with modal split share of 27.9% in import on the eastern border and 16.3% in upstream transit

The transport volume along the Austrian Danube corridor in 2016 was approximately 85.3 million tons. This means that it has almost doubled in the last 20 years (1997 to 2016). (Data on road transport for 2016 is based on estimates by the Austrian Institute for Spatial Planning, as official data is still pending). In 2016, the transport volumes in the corridor once again recorded a significant increase (5% or about 4 million tons).

The chart shows the cross-border transport volumes (net tons) for the three transport modes of rail, road and waterway in the Austrian Danube corridor according to transport type. A look at the figures for all transport modes reveals that the quantity of goods transported to and from the west continued to be significantly higher than the volume of goods crossing the eastern border of Austria: In 2016, 62.4 million tons of goods, including transit transport, passed through the western border of the Austrian Danube corridor (+4.4% compared to 2015), while approximately 44.8 million tons (+5.7%) crossed the eastern border.

2016 saw a significant increase in total transport volumes, with the three main modes of transport in the Austrian Danube corridor recording the following shares (rounded) in the modal split: road 62%, rail 28% and Danube 10%. Despite transport policy objectives at both European and national levels to promote environmentally-friendly modes of transport, there is an unfortunate trend towards an increase in road transport. This is at the expense of both rail and the Danube waterway, which are either losing their share or are unable to increase it. In 2016, the rail sector recorded a share of approximately 28%, representing a decline of around 2%, while the Danube remained constant at around 10%, as in the previous year. The largest share of transport volumes in 2016 the Danube achieved in imports on the eastern border with 27.9% and in upstream transit traffic with 16.3% (+2.2%).

Cross-border freight traffic on the Danube recorded an increase of 6.9% last year. Compared to 2015, the transport volume on the waterway in percentage terms increased more significantly than the total traffic volume across all three modes of transport. An increase in transported goods was recorded at the eastern border and in transit. However, on the western border the Danube lost both import and export shares to road transport.

FREIGHT TRANSPORT ON THE ENTIRE DANUBE

38.3 million tons in 2015
Minus 4.5% compared to 2014

- Decline in overall transport volumes on the Danube (–4.5% compared to 2014)
- Hungary most significant exporter in 2015, Romania once again most important exporter on the waterway
- Over 4.3 million tons of maritime traffic on the Danube (–17.5% compared to 2014)

The most current available figures regarding the volume of freight transport on inland waterways in the Danube region are from the year 2015. In total, 38.3 million tons of goods were carried on the Danube waterway and its tributaries that year – a minus of 4.5% or around 1.8 million tons less than in 2014.The figures for inland waterway transport on the Danube (including tributaries) are laid out in the following paragraphs and the chart opposite. River-sea transport is dealt with further below.

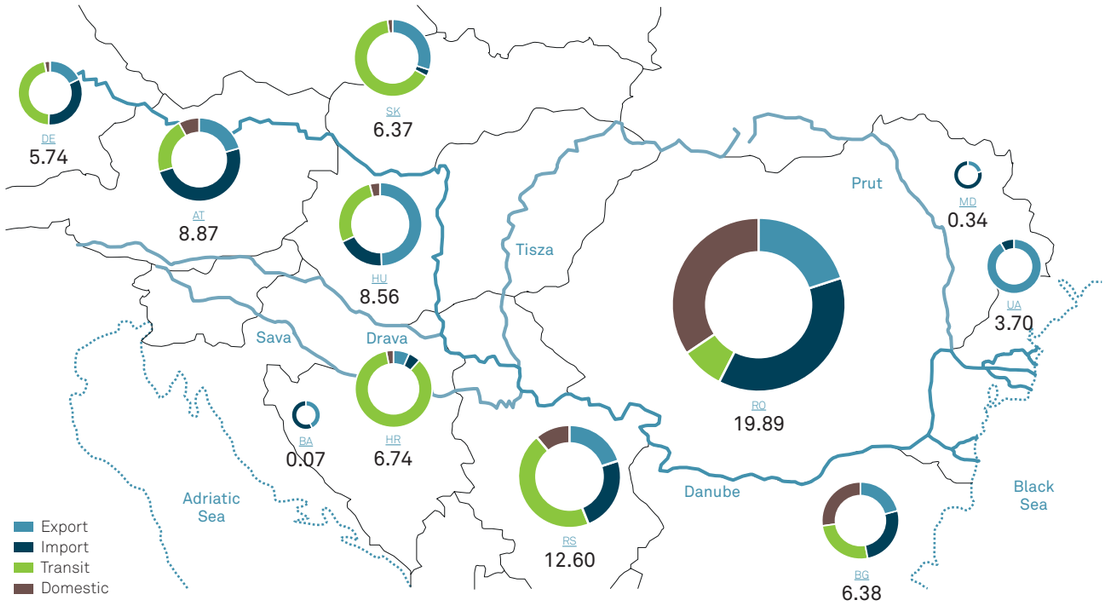
As in previous years, the largest transport volume was achieved by Romania, amounting to just under 19.9 million tons, followed by Serbia with 12.6 million tons and Austria with around 8.9 million tons. While countries in the upper regions of the Danube recorded a double digit percentage decrease in the amount of goods shipped on the waterway compared to 2014 (Germany: –17.1%, Austria: –13.9%, Slovakia: –10.9%), transport volumes in the middle and lower regions of the Danube grew once again in 2015 (Hungary: +5.4%, Croatia: +23.8%, Serbia: +1.5%, Romania: +11.0%, Bulgaria: +7.4%, Moldova: +19.9%, Ukraine: +21.0%). This was despite the prolonged period of low water that characterised the second half of the year.

With almost 4.3 million tons of goods shipped (+15.6% compared to 2014), Hungary was, after two years in second place to Romania, once again the largest exporter on the Danube. Romania exported almost 4.0 million tons (+3.1%) in 2015, followed by the Ukraine with around 3.4 million tons (+13.4%) and Serbia with nearly 2.5 million tons (–1.2%). With a considerable increase of 35.5% compared to 2014, Romania yet again boasted the largest volume of imports on the Danube with approximately 7.5 million tons. The second strongest import country on the Danube was again Austria with over 4.4 million tons (–11.0%) in 2015, followed by Serbia with over 3 million tons (+1.3%).

A total of 13.9 million tons were transported on the Romanian Danube-Black Sea Canal (including its side channel) in 2015. This figure includes river-sea shipping amounting to approximately 141,000 tons. This represents a significant decrease amounting to nearly 3% or around 0.4 million tons of goods, compared to 2014. In 2015, maritime transport on the Danube, i.e. transport by river-sea vessels or by sea-going vessels, accounted for a total of nearly 4.3 million tons – a decrease of 17.5% or more than 0.9 million tons compared to 2014. The majority of this traffic, some 3.8 million tons of goods transported, was shipped via the Romanian Sulina canal (+4.9% compared to 2014).

FIGURES_DATA_FACTS

Freight transport on the entire Danube 2015

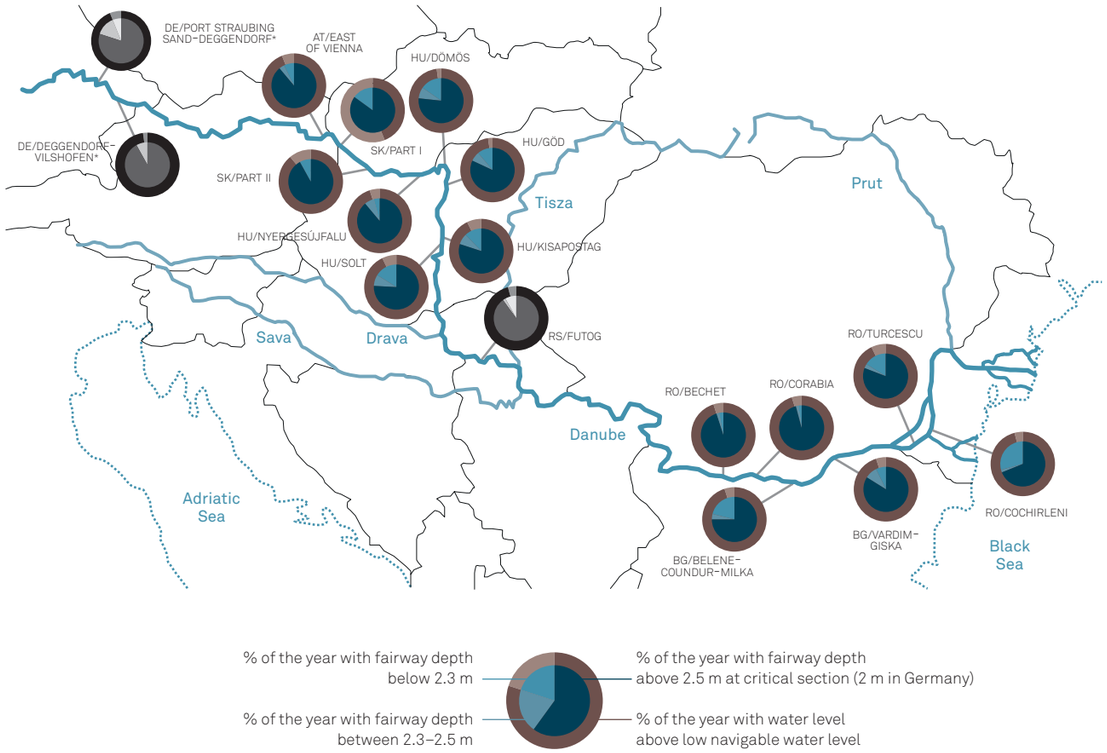


In millions of tons	DE	AT	SK	HU	HR	BA	RS	RO	BG	MD	UA
Export	1.03	1.85	2.07	4.29	0.34	0.03	2.46	3.98	1.34	0.07	3.38
Import	1.91	4.43	0.10	1.61	0.17	0.04	3.06	7.45	1.66	0.27	0.31
Transit	2.64	1.91	4.18	2.44	6.18	0.00	5.71	1.68	1.68	0.00	0.00
Domestic	0.16	0.68	0.02	0.22	0.05	0.00	1.37	6.78	1.70	0.00	0.01
Total	**5.74**	**8.87**	**6.37**	**8.56**	**6.74**	**0.07**	**12.60**	**19.89**	**6.38**	**0.34**	**3.70**

Source: Eurostat, National Traffic Statistics, viadonau, adapted by viadonau

FIGURES_DATA_FACTS

Fairway conditions at critical locations along the Danube 2016



* In the free flowing section between Straubing and Vilshofen a fairway depth of 2.5 m ist neither developable nor maintanable. In this section the objective is to maintain the fairway depth of 2 m related to Low Navigable Water Level. Depicted values in Germany therefore refer to 2 m fairway depth.

For a detailed interpretation of the chart, reference is made to the "Fairway Rehabilitation and Maintenance Master Plan for the Danube and its navigable tributaries" and the National Action Plan Update May 2017. Individual framework conditions at critical sections need to be taken into account. The severity of the critical sections, along with reasons for failing to meet maintenance targets, differ and may change over the course of time.

Source: "Fairway Rehabilitation and Maintenance Master Plan for the Danube and its navigable tributaries", which has been prepared within the framework of the EU Danube Region Strategy (www.danube-navigation.eu) and the FAIRway Danube project. Chart adapted by viadonau.

FAIRWAY CONDITIONS ALONG THE ENTIRE DANUBE

Good fairway conditions compared to 2015

Fairway conditions were significantly better in 2016 than in 2015. After January, which experienced fairway depths below 2.5 m (due to the continuation of the bad winter in 2015), good hydrological conditions meant that minimum fairway depths were exceeded along the complete length of the Danube. In September, however, water levels dropped on the Lower Danube and fairway depths of 2.5 m were not reached for almost two months at a number of critical sections. On the Upper and the Central Danube both hydrological and fairway conditions were generally favourable until October. The last three months of the year saw water levels slowly start to decline. This was partially due to a lack of maintenance work being carried out in many riparian states leading to unfavourable fairway conditions in winter and several days when fairway depths fell below the maintenance target.

The chart provides a status overview of the most important critical locations on the Danube in 2016. For each critical location, the figure illustrates the situation regarding fairway availability (inner circle) in relation to reference water levels (outer circle). The maintenance target is to provide fairway depths exceeding 2.5 m (2 m on the German stretch of the Danube) on at least as many days per year as the statistical Low Navigable Water Level (LNWL). This situation corresponds to the inner dark blue circle reaching the level of the outer dark brown circle. In 2016, this maintenance target was achieved at several critical locations along the Danube. It is also important to include depths of just under 2.5 m when interpreting the status of critical locations. These allow for a slightly reduced level of navigability although not reaching a depth of 2.5 m. On some sections of the fairway, depths of 2.4 m or 2.3 m (mid-blue colour in the inner circle) were available on a number of days.

Despite experiencing good hydrological conditions throughout the entire year, fairway conditions were less favourable in the second half of 2016. This was the result of insufficient maintenance work and required capital intervention. In Hungary and Bulgaria for example no dredging was carried out in 2016 due to a lack of budget and suitable dredging equipment.

Many riparian countries have made considerable investments in recent years in order to increase the efficiency and effectiveness of their maintenance programmes. Most of these investments are co-financed by the EU. The "Fairway Rehabilitation and Maintenance Master Plan for the Danube and its navigable tributaries" and the project FAIRway Danube, both coordinated by viadonau, are crucial elements of the joint effort to achieve optimal fairway conditions along the entire length of the Danube waterway.

- Between January and autumn 2016 the maintenance target of a 2.5 m fairway depth achieved at most critical sections along the entire Danube
- Unfavourable situation in the second half of 2016 result of insufficient maintenance activities, often caused by a lack of financial resources

Germany

Czech Republic

Upper Austria

Lower Austria

Vienna

Burgenland

Slovakia

Styria

Danube

Inn

Große Mühl

Kamp

Traisen

Erlauf

Ybbs

Enns

Traun

Donau

Thaya

Morava

Danube Canal

2,250

2,225

2,200

2,175

2,150

2,125

2,100

2,075

2,050

2,025

2,000

1,975

1,950

1,925

1,900

1,875

Jochenstein
River km 2,203
2 chambers
of 227 × 24 m

Kachlet
River km 2,231
2 chambers
of 226.5 × 24 m

Passau

Engelhartszell

Aschach
River km 2,163
2 chambers
of 230 × 24 m

Aschach

Service Centre
Upper Danube Valley

**Handelshafen
Tankhafen
voestalpine
Felbermayr**

Linz

Ottensheim
River km 2,147
2 chambers
of 230 × 24 m

Abwinden
River km 2,120
2 chambers
of 230 × 24 m

Enns

Wallsee
River km 2,096
2 chambers
of 230 × 24 m

Grein

Ybbs-Persenbeug
River km 2,060
2 chambers
of 230 × 24 m

Ybbs

Pöchlarn

Melk
River km 2 038
2 chambers
of 230 × 24 m

Dürnstein
River km 2,009
LNWL 2010: 258 cm
HNWL 2010: 638 cm

Kienstock
River km 2,015
LNWL 2010: 164 cm
HNWL 2010: 618 cm

Krems

Service Centre
Wachau

Altenwörth
River km 1,980
2 chambers
of 230 × 24 m

Pischelsdorf

Greifenstein
River km 1,949
2 chambers
of 230 × 24 m

Korneuburg

Nussdorf (Danube Canal)
1 chamber
of 70 × 13 m

Head office

Freudenau
River km 1,921
2 chambers
of 275 × 24 m

**Freudenau
Albern
Lobau**

Service Centre
March-Thaya

Thebnerstraßl
River km 1,879
LNWL 2010: 132 cm
HNWL 2010: 598 cm

Hainburg

Bratislava

Service Centre
Carnuntum

Wildungsmauer
River km 1,895
LNWL 2010: 162 cm
HNWL 2010: 564 cm

The Austrian section of the Danube

- Waterway
- Free-flowing stretch
- Lock
- Important water gauge
- Port/transhipment site
- Navigation surveillance
- viadonau Service Centre
- **LNWL** Low navigable water level
- **HNWL** Highest navigable water level

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