



# NELI

Cooperation-Network for logistics and nautical education focusing on inland waterway transport in the Danube corridor supported by innovative solutions

## LOGISTICS ON THE INLAND WATERWAY



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# Learning target

*The overall learning target of the logistics course is to provide comprehensive information and material about inland waterways and logistics respectively.*

*Inland waterways should be recognized as basic and substantial traffic carriers.*

The course involves information about:

- General characteristics of inland waterways
- Logistics and terminals
- Market & organizational aspects
- Trip to the port of Ennshafen (9<sup>th</sup> of June)

Questions, inputs in advance.....?



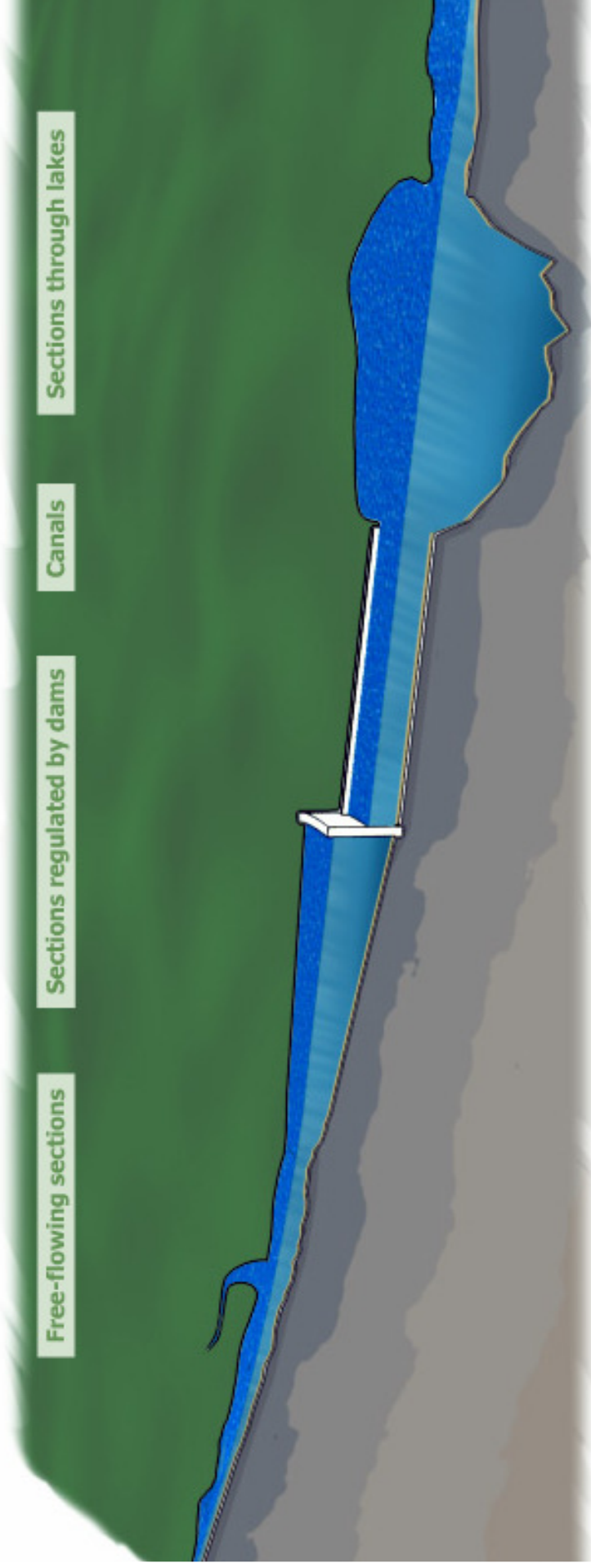
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# Basics

- Navigable inland waterways in the European Union – 35,500 km
- Density of 8.2 km per 1,000 km<sup>2</sup>
- Sections:



# Basics

## Length of

- road network 410,000 km
- railway network 210,000 km
- inland waterway 35,500 km

- **Navigability** is determined by fairway depth
- **Fairway** – navigable deep water channel in a river
- **Fairway depth** determines max. draught of ships + loads
- **Draft** is determined for fully loaded vessels

# Basics

- Infrastructure of an inland waterway has a direct impact on the performance
- Key rules:
  - The larger the draught, the more cargo → less unit costs per ton
  - On free flowing rivers high water fluctuation → unpredictable
  - Canalised sections show less fluctuations and larger guaranteed fairway depths



# Waterway systems in Europe

## Rhine waterway:

- Busiest waterway
- Consists of the Rhine and its tributaries Moselle, Neckar and Main
- Connects the seaports in Belgium and the Netherlands with the Ruhrgebiet, industrial regions around Stuttgart, Karlsruhe, Mannheim as well as Cologne



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# Waterway systems

## North-south corridor:

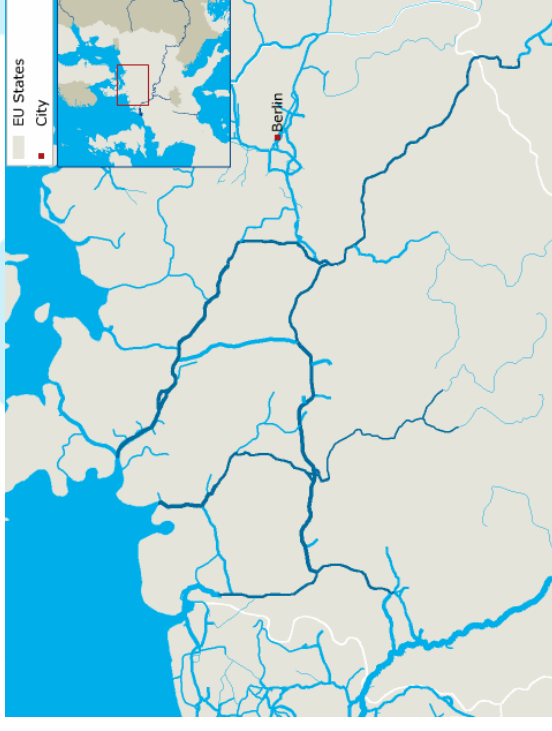
- Northern Netherlands, rivers Meuse and Schelde + canals in Belgium, Netherlands and northern France
- Connects the Seine with north-west waterway network
- Top priority in the Trans-European Networks (TEN-T)



# Waterway systems

## East-west corridor:

- Mittelland canal, Dortmund-Ems canal + Elbe and Weser as connectors to German seaports as well as to Poland and the Czech Republic
- Mittelland canal is the longest artificial waterway in Germany





# Waterway systems

## South-east corridor:

- Main river, Main-Danube canal and the Danube river
- Main river is the longest tributary to the Rhine
- Competitive waterway from the North Sea to the Black Sea



# Waterway systems

## Roundup

- Rhine is Europe's most important waterway transport link
- Navigation is possible with all kinds of vessels on the Rhine
- Danube is the longest navigable river in Europe (2857 km)
- Danube connects Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria and Romania, Ukraine and Moldavia
- Container traffic development on inland waterways is rising

# Waterway systems

## Infrastructural bottlenecks

- Missing link
  - No link at all or below standards
- Strategic bottlenecks
  - Satisfy basic requirements and have to be upgraded
- Basic bottlenecks
  - Nautical parameters are not conform with requirements

# Advantages of IWT

- Requires lowest energy input and consumption to carry 1 ton of cargo over a distance of 1,000 km
- Lower CO<sub>2</sub>-emissions in relation to its energy input, emits less hydrocarbons and carbon monoxide
- Lowest capital expenditure requirements for maintenance and improvement of the infrastructure
- Good safety levels, lowest accidents costs
- Reliable transport mode (→ fairway depth)
- ....

# Disadvantages of IWT

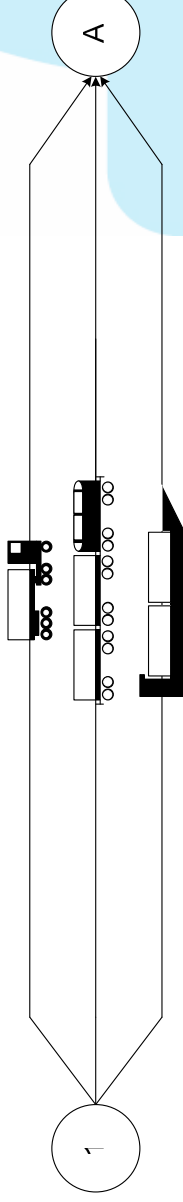
- Dependence on water levels
- Comparatively low transport speed
- Low(er) network density
- ....

# Intermodal transport

## General information – Systematization of transport processes

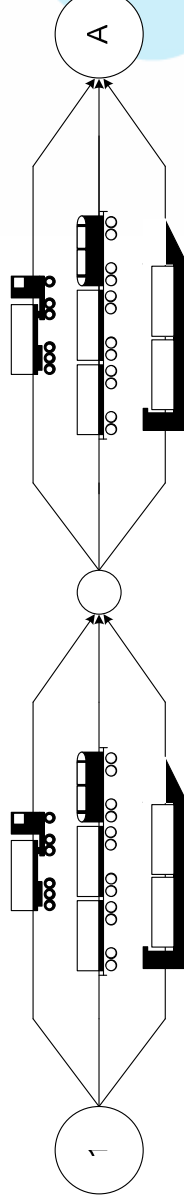
### Unimodal transport

- No changing of means of transport



### Multi-chain transport

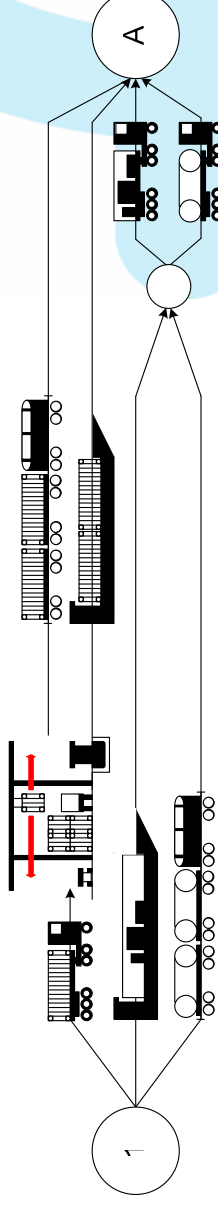
- Transshipment and different means of transport – but one traffic carrier



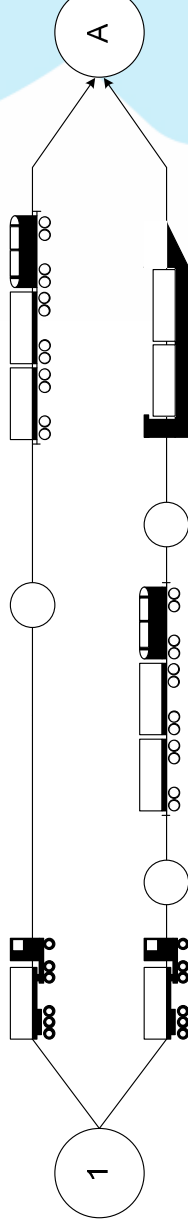
# Systematization of transport processes

## Multimodal transport

- Transport with two or more traffic carriers



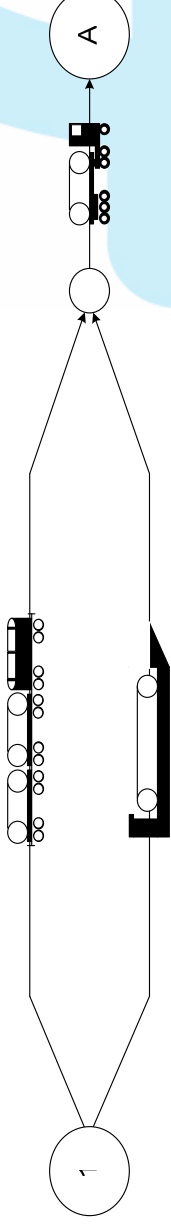
- Bi- and trimodal transport



# Systematization of transport processes

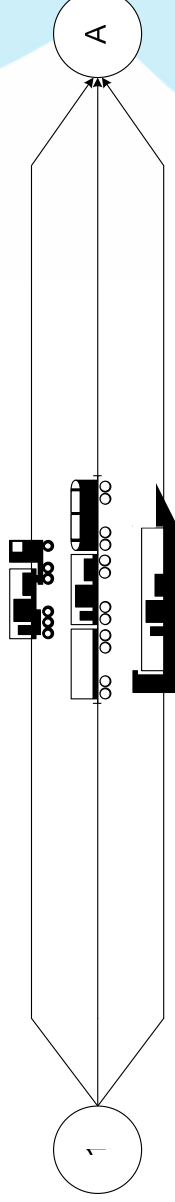
## Interrupted transport

- Two or more modes of transport on one or more traffic carriers



## Part load traffic

- Individualized goods which can be handled separately

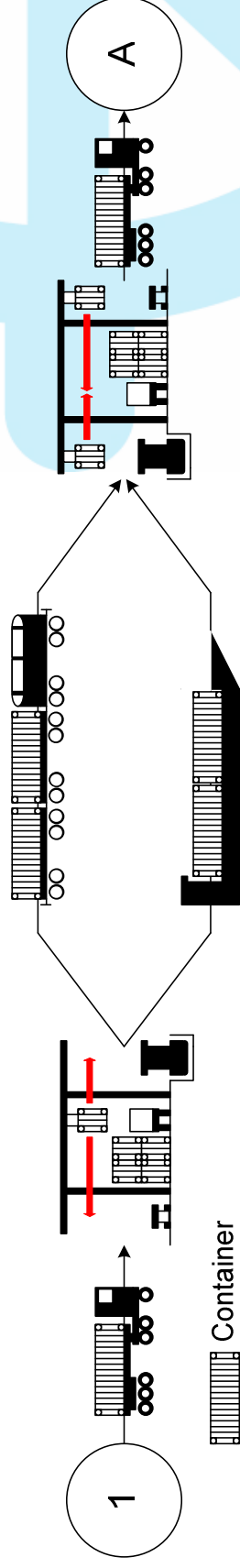




# Systematization of transport processes

## Intermodal transport

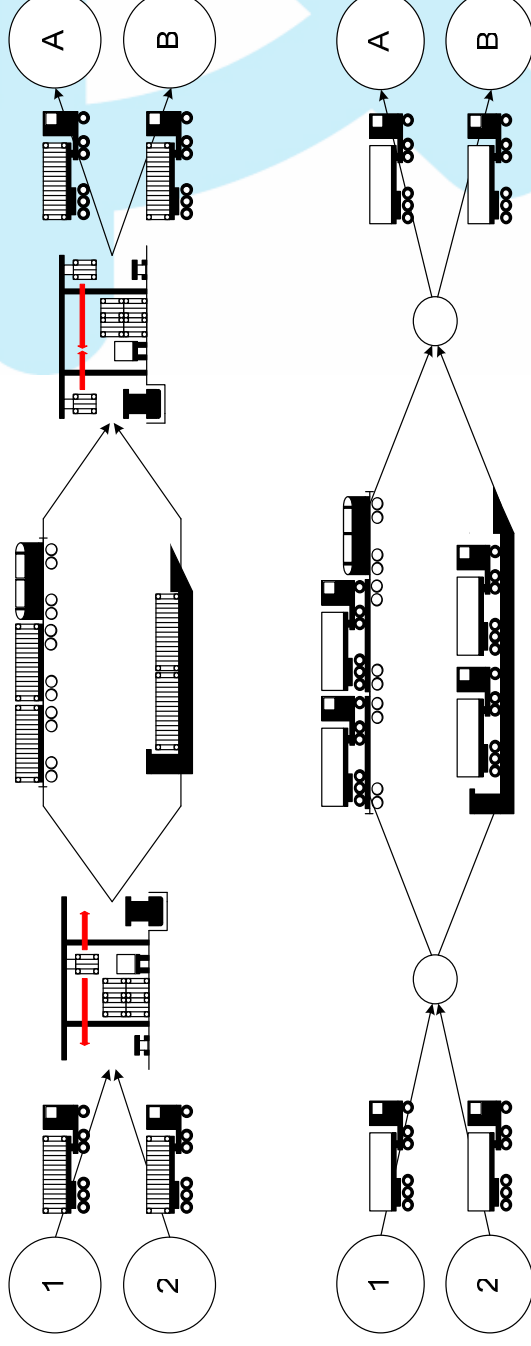
- Transport of goods in the same loading unit or road vehicle which uses successively two or more modes of transport



# Systematization of transport processes

## Combined transport

- Intermodal transport where the major part of the European journey takes place on rail, inland waterways or sea and initial/final legs are kept as short as possible
- Unaccompanied and accompanied combined transport



# Some definitions

## ***Transport volume – tons:***

- Quantitative volume of goods transported within in a period of time

## ***Transport performance – in ton kilometres***

- Incorporates mileage as well as quantitative volume of goods

## ***Intermodal transport unit – ITU***

- Defines containers, swap bodies and semitrailers suitable for intermodal transport

## ***Consignment***

- Freight sent under a single contract of carriage

## ***Twenty-foot equivalent unit – TEU***

- Standard unit based on ISO-containers of 20 feet length (6,1 m)

# Some definitions

## ***Gross tonne***

- Accumulates the total mass which has to be moved for the transport of a good
- Good, packaging or container, dead load of transport vehicle
- Not the tractive unit

## ***Net tonne***

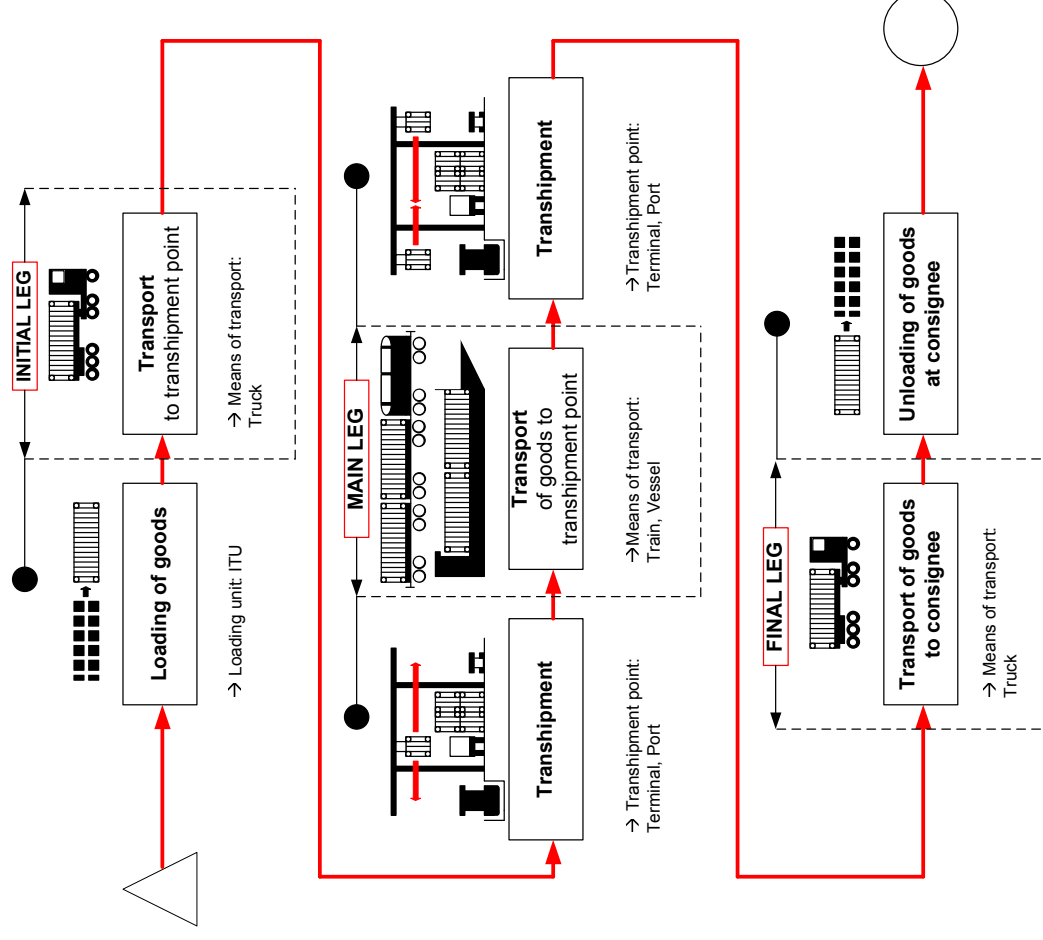
- Weight of the cargo or the ITU
- Dead load of ITU

## ***Net-net-tonne***

- Only the weight of the cargo without dead load
- Comparison of transport performances

# Intermodal transport

Transport chains...





# Players in intermodal transport

## ***Consignor/Shipper***

- Person/company puts goods in the care of others to be delivered to a consignee
- Contract of carriage

## ***Consignee***

- Person entitled to take delivery of goods

## ***Transport operator/carrier***

- Provide modes of transport
- Act as sub-contractor for freight forwarders



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# Players in intermodal transport

## *Freight forwarder*

- Intermediary who arranges for the carriage of goods and/or associated services on behalf of the consignor
- Contract of carriage
- Management of national/international goods transfer
- Completion and dispatch of freight documents
- Inspection of goods at delivery
- Carrying out all customs formalities
- Cooperation and consultancy concerning all logistics aspects and questions
- .....



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# Players in intermodal transport

## ***Multimodal transport operator***

- Concludes a multimodal transport contract and assumes the whole responsibility for the performance thereof as a carrier or transport operator
- Service from terminal to terminal
- Complete „transport chains“ from door-to-door

## ***Terminal operator***

- Transshipment of goods calls for appropriate buildings
- Close to high-ranking road networks and business premises of consignors/consignees
- Capacious terminals and small transshipment points





# Players in intermodal transport

## *Railway undertaking*

- Offer railway transport services on the infrastructure of railway infrastructure companies
- Reservation of train path

## *Regular service in inland waterway transportation*

- Contracts or spot market
- Transportation of freight from 1,000 to 7,000 tons with self-propelled vessels or pushing units
- Broad time slots
- Shipment of goods from port of loading to port of discharge
- Involvement of a shipper and a consignee



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# Players in intermodal transport

## *Shipping companies/ocean carriers*

- Commercial organization of transports
- Own or external ships
- Several ships are disposed



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# Loading units

## *Containers*

- Dimension – feet (')
- Standardization and robustness
- Stackable – space saving storage
- Lacking compatibility with europallets
- Deposition on the basement – loading and unloading more difficult
- Various kinds of containers....



# Loading units

## Containers – ISO Container

- Most popular and successful loading unit in intermodal transport
- 96 % of all containers are 20' or 40' containers



### ISO-Container/20 feet (Ct 20)

Inside length	Width	Height	Loading weight
20' = 5,919 mm	8' = 2,340 mm	8' = 2,380 mm	22,100 kg

### ISO-Container/40 feet (Ct 40)

Inside length	Width	Height	Loading weight
40' = 12,051 mm	8' = 2,340 mm	8' = 2,380 mm	27,397 kg

# Loading units

## Containers – Land container (UIC)

- Land containers (UIC) fit to European dimensions
- Width: 2,55 m ~ maximal allowed length and width in road traffic / railway loading gauge in railroad traffic
- Suit better for the loading of europallets
- Can be stacked sixfold



# Loading units

## *Special forms of containers*

- Variety of special forms for all kinds of transport assignments
- Dimensions are primarily oriented on the allowed length and width in road traffic
- Roll-off containers, bulk containers, flat containers, high cube containers....





# Loading units

## *Swap containers*

- Optimized to road vehicle dimensions
- Fits to handling devices for transfer between modes – usually rail/road



# Loading units

## *Semi trailers*

- Non-powered vehicles for the carriage of goods, intended to be coupled to a motor vehicle
- May have to be adapted for the use in combined transport
- Width: 2,55 m / Height: 4 m / Length: 12-13 m
- Craneable or non craneable
- Grappler pocket make handling in intermodal transport possible





# Vehicles in intermodal transport

## *Load train and tractor trailer (road)*

- Can be transported with low-loader wagons
- Generally fit to rolling road transport





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# Vehicles in intermodal transport

## *Railway vehicles*

- Containers are used in unaccompanied intermodal transport processes
- Pocket wagons are used for craneable semitrailers



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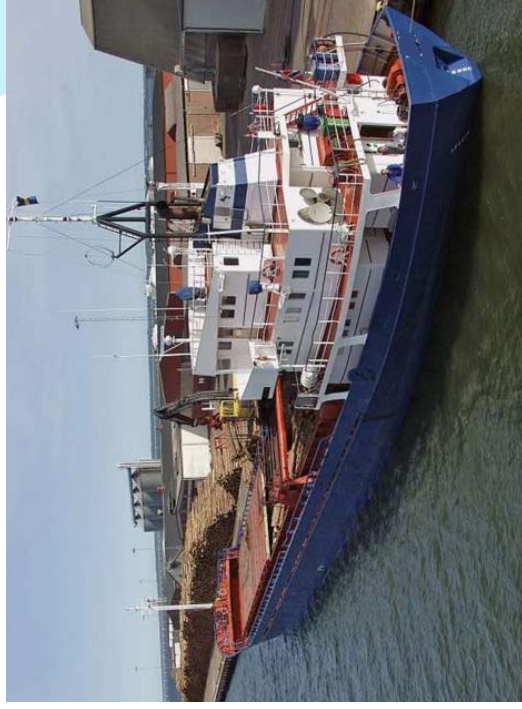
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# Vehicles in intermodal transport

## *Inland waterway vessels*

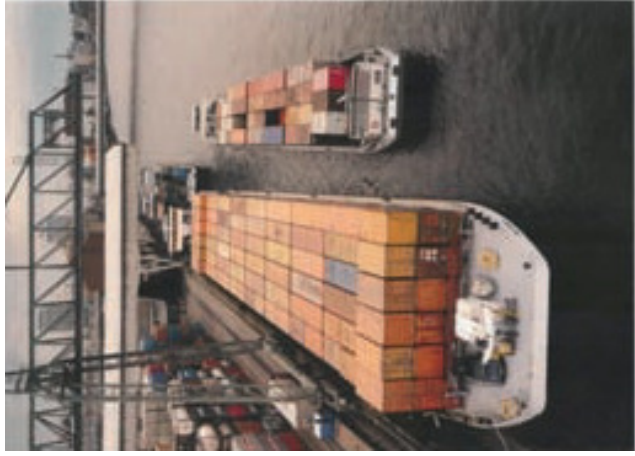
- Differ from seagoing vessels regarding their construction
- Dry cargo vessels
  - For a variety of goods: long wood, coils, grain and ore
  - In the Danube region, appr. 100 dry cargo vessels travel on international transport routes
  - 1,000 to 2,000 tons



# Vehicles in intermodal transport

## *Inland waterway vessels – Container vessels*

- More than 1 million TEU are transported on the Rhine river to the sea ports
- Predominantly used for transporting containers





# Vehicles in intermodal transport

## *Inland waterway vessels – Roll-On/Roll-off vessels*

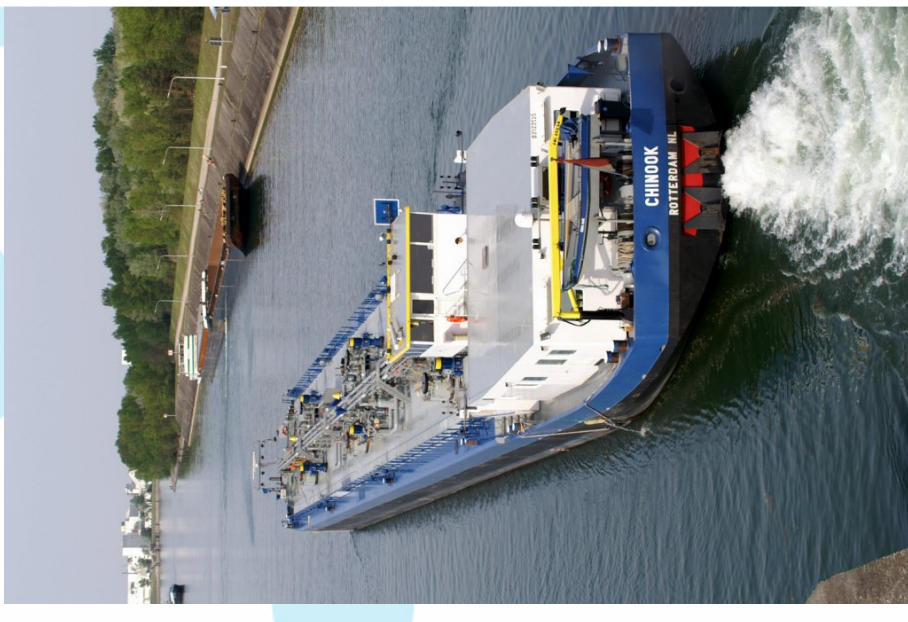
- Objects are loaded and unloaded via port or vessel ramps
- Most important goods transported are tractor trailers and semi-trailers, passenger vehicles, construction machinery, farm machinery, motor tractors, heavy cargo and over-sized goods.



# Vehicles in intermodal transport

## *Inland waterway vessels – Tanker shipping*

- Transport various kinds of goods in liquid form
- Mineral oil and its derivatives (petrol, diesel, light heating oil)
- Chemical products (acids, bases, benzene, styrene, methanol etc.)
- Liquid gases



# Advantages in intermodal transport

- Road transportation contributes to a negative development (impact on living space, environment, road safety, etc.)
- Intermodal transport can be advantageous due to cost, time or geographical reasons
- Some factors necessitate the incorporation of different modes of transport
  - Due to geographic reasons transportation can only be carried out when applying different modes of transport
  - Combined transport can be more economic, although unimodal transport would be possible

# Disadvantages in intermodal transport

- Adequate economic efficiency is hard to attain when non-stop unimodal transport chains simultaneously exist
- Multitude of players involved in the initial and final leg
- Costs emerging in transshipment activities
- Increased coordination effort
- Not competitive on short distances



# Prerequisites for an efficient performance

- Efficient design of transshipment processes in handling points
- Reduction of the portion of costs for the initial and final leg
- Compensation of additional costs by bundling in the main leg
- Offering of additional services
- ...

# Port technology – Ports

## *General information:*

- Terminals depict a structured (regular) access to goods traffic on rail and/or inland waterway
- Public accessible transshipment points in combined transport
- Equipped with special infrastructure and transshipment technology for the handling of intermodal loading units between modes of transport
- Transshipment with or without intermediate storage
- Conventional terminals – vertical transshipment

# Port technology – Ports

- Special forms of terminals – horizontal transshipment
- Take over the business of bundling, storage and distribution of intermodal loading units
- Public, general and non-discriminating accessible terminals
- Private terminals

# Terminal functions

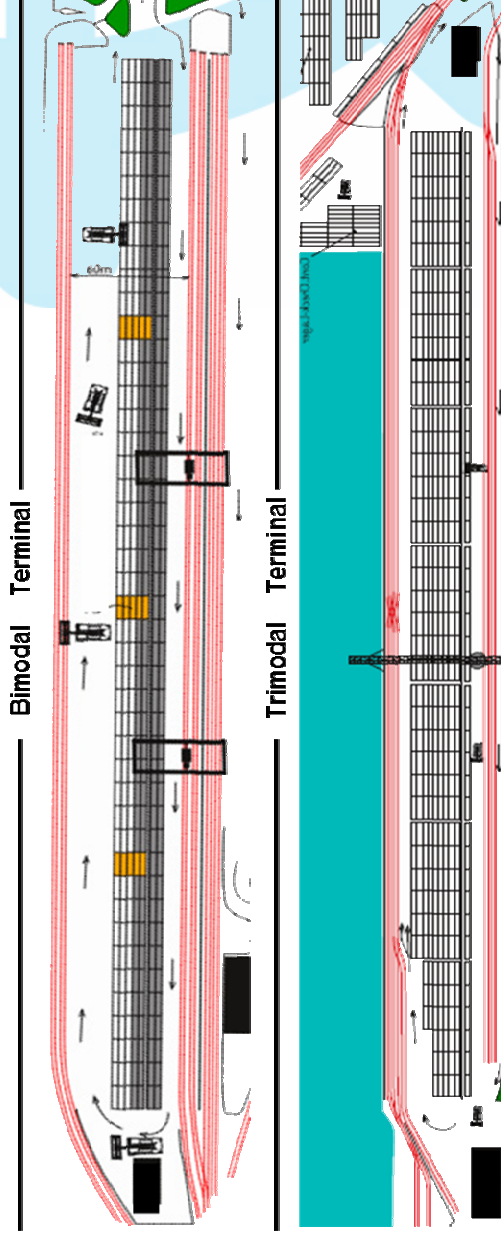
## *Terminal functions*

Transport function		Logistics function		Customer function
Transport connection	Train services	Network	Local	
Bimodal Trimodal	Single wagon Block train Shuttle train Company train	Gateway Loco	Import Export	Transshipment Storage Additional services

→ Classification is oriented towards the basic terminal functions and their services

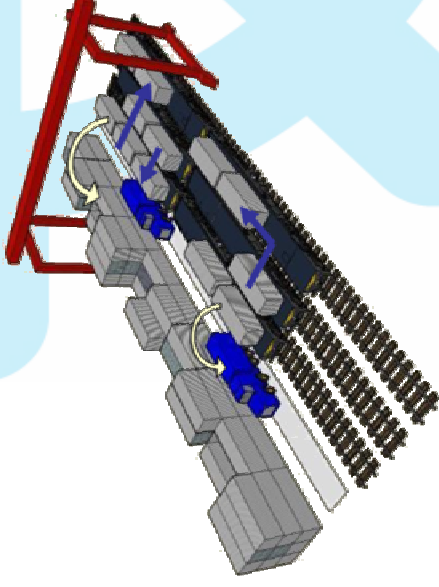
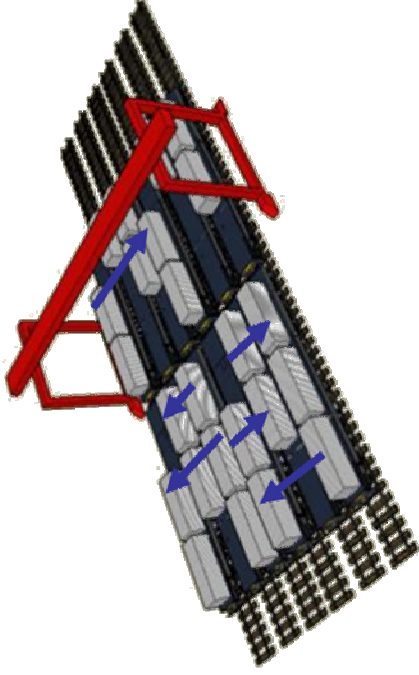
# Transport function

- Transport function describes the type of connection to various modes of transport and the offered service trains
- Bi- or trimodal terminals – depending on the number of connections

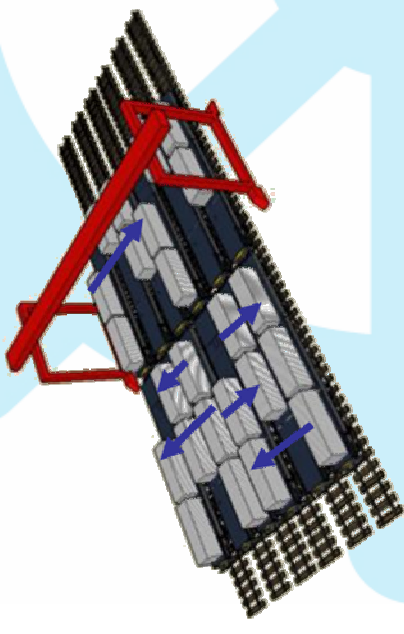


# Logistics function

- Differentiation regarding the function of a terminal in a network, the local function and the characteristics of the operated business segments
- Function in the network describes the purpose of the transshipment
- Gateway and Loco terminals:



# Logistics function

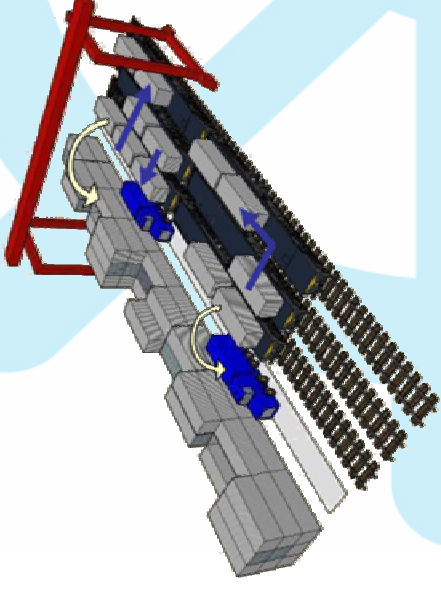


## *Gateway terminal*

- Connection and transshipment point for railways
- Loading units are transshipped directly and transported to other destinations
- Trains run in (at the same time) and swap loading units among them, pick new loading units and proceed to their respective target



# Logistics function



## *Loco terminal*

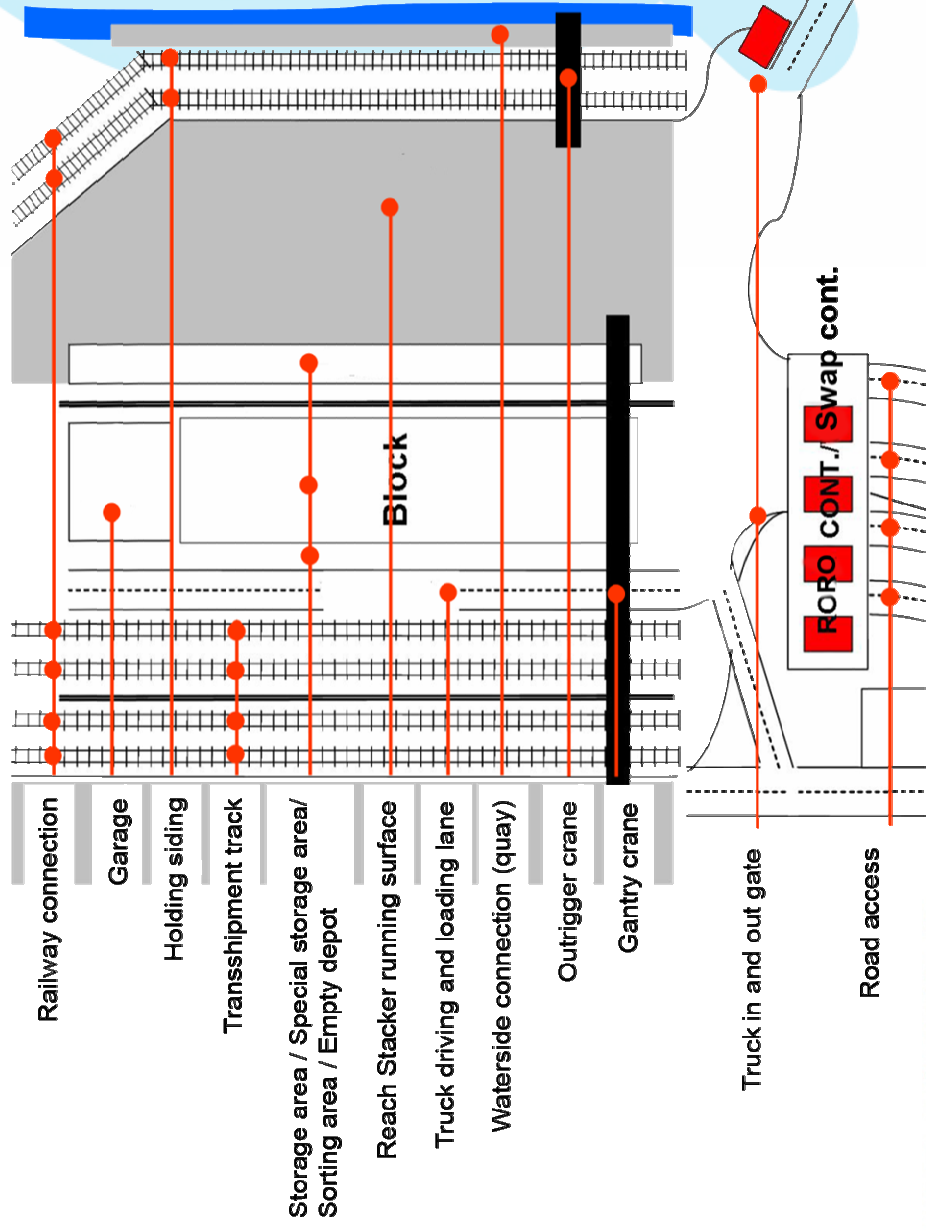
- Local distribution centers
- Majority of loading units is delivered with trucks and transported onward by train (and vice versa)

# Customer function

- Describes the nature and amount of services offered
- Services in addition to transshipment tasks – added value
- Differentiation according to transshipment, storage and additional services
- Storage space in terminals as buffer for temporal compensation
- Systematic planning and organisation – optimal loading of vessels
- Minimize holding times – reduction of costs for customers

# Functional areas

*Infrastructure of a terminal is divided into different functional areas*



# Functional areas

## Landside operation

- Related to the connection to rail and road
- Road side: registration counters – truck processing
- Marked driving lanes for delivery and collection / arrival and departure
- Truck gates
- Dispatch rate of trucks is closely tied to the number and capacity utilization of transshipment facilities available
- Connection to railway via transshipment rail tracks for loading and unloading

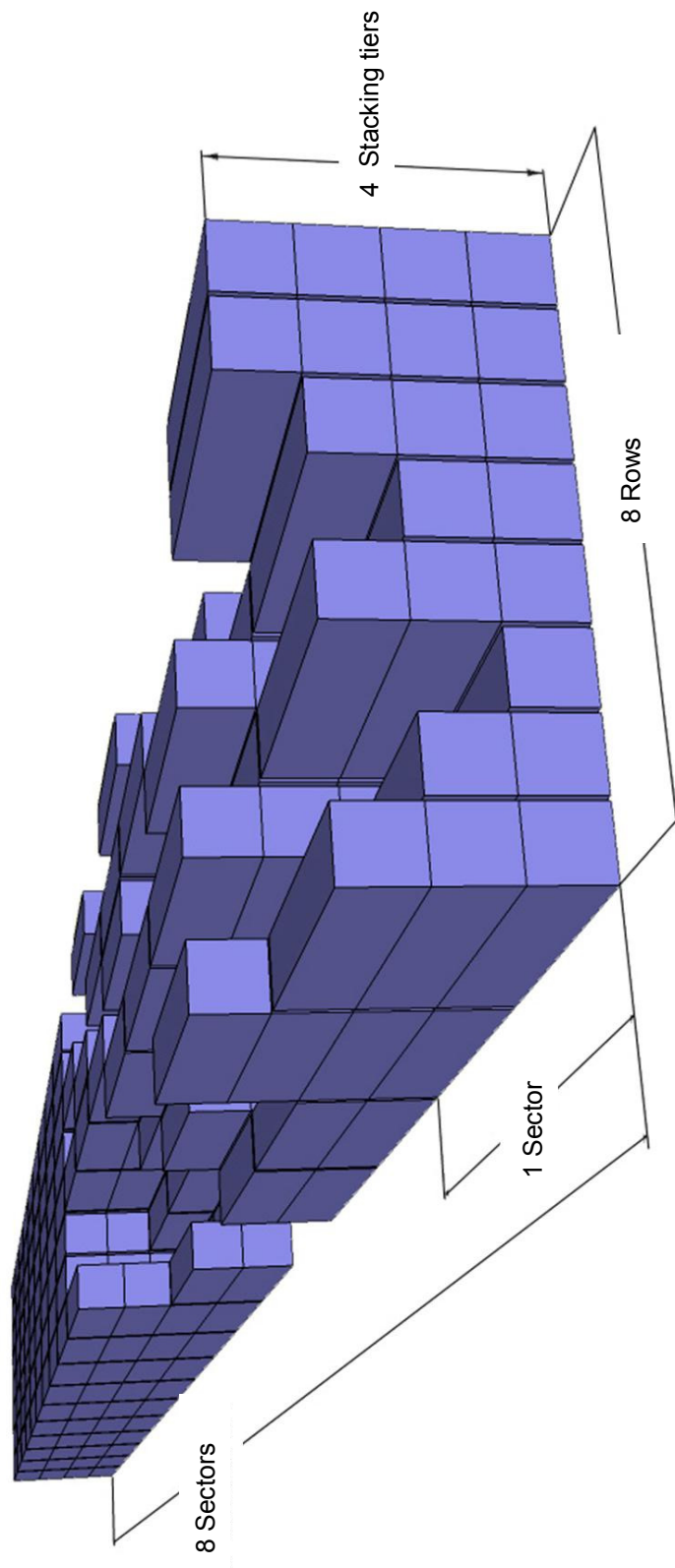
# Functional areas

## ***Landside operation/connection – Storage area***

- Divided into different blocks according to the size of the terminal facilities
- Classification according to the length of the sectors, width according to rows and height (stacking tiers)
- Blocks typically consist of lanes (one or two lanes are provided for loading and unloading as well as approach and departure)
- Blocks are divided in several sectors, one block has a total length of up to 650 meters (→ length of a block train)
- Length of sectors varies and is adjusted to the storage area available and various lengths of loading units handled

# Functional areas

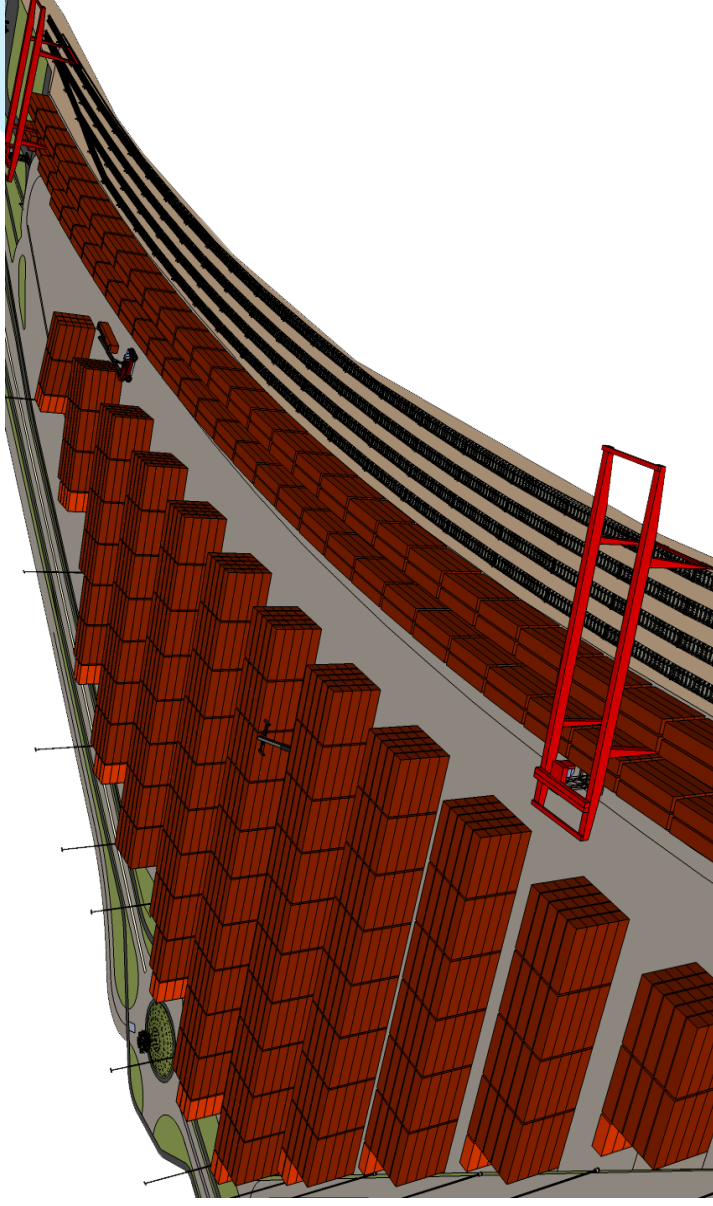
## *Landside operation – Container block*





# Functional areas

*Landside operation – Storage area*





# Functional areas

## *Landside connection*

- Stocking, stock removal and moving stacks is carried out with terminal transshipment facilities
- Loading units stored in mixed blocks
- Different lengths (20, 22, 23, 24, 25, 30, 35, 40 and 45 feet)
- Separation between containers, swap bodies and semitrailers
- Different functional areas (e.g. separate storage of empty containers, special loading units, sorting areas etc.)

# Functional areas

## *Waterside connection*

- Quay + quay wall – interface between terminal and container vessel
- Berths – mooring of vessels for loading and unloading
- Outrigger cranes – loading processes
- Transportation with trucks or trains, reach stackers, forklifts, terminal tractors, straddle carriers or AGV to quay cranes

# Terminal services

## *Transshipment*

- Describes changing modes from one mode of transport to another
- Horizontal and vertical transshipment
- Horizontal transshipment is a „younger“ method
- No special terminal equipment necessary for horizontal transshipment
- Loading units have to be lifted slightly
- Special loading units and/or special transport equipment are prerequisite
- Innovative transshipment facilities (technologies)

# Terminal services

## *Transshipment*

- Commercial upstroke / dispo-upstroke
- Commercial hub: transshipment of a loading unit from one means of transport to another
- Hub is charged
- Dispo-hub is not charged, refers to transshipment processes when managing and handling the storage area
- E.g. when loading units have to be laid open
- Tried to minimize dispo hubs

# Terminal services

## *Storage*

- Storage and empty are services which affect the physical storage of loaded or unloaded units
- Storage and intermediate storage serve as bridgeover between delivery and pick up
- Number and extent of additional services vary according to location, equipment and space
- Dangerous goods
- Temperature control
- Additional services



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# Transshipment equipment

- Vehicles, instruments (tools) which support transshipment, stacking and transportation of loading units, swap bodies and semi-trailers
- Rail-mounted industrial tracks
- Non-rail-mounted (rubber tyred) industrial tracks
- Driverless transport vehicles:



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# Transshipment equipment

Outrigger crane	Function						Working area		Control			Cargo gear				Loading units						Hubs / Movements per hour				
	Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers craneable	Semi-trailer non craneable	Transport container	Stacking	Loading / Unloading train	Loading / Unloading truck	Carrying capacity (t)	
	●	●						●	●	●		●	●		●	●	●	●	●	●		k.A.	k.A.	k.A.	41	

- Uplifts loading with a cable via a pivot mounted arm
- Direct connection between vessel and quayside
- Usually rail-mounted



# Transshipment equipment

Rail mounted gantry		Function						Working area		Control		Cargo gear				Loading units						Hubs / Movements per hour					
		Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers	craneable	Semi-trailer non craneable	Transport container	Stacking	Loading / Unloading train	Loading / Unloading truck	Carrying capacity (t)
		●	●						●	●	●		●	●		●	●	●	●	●	●	●	N.a	20-30	N.a	N.a	41

- Two pillars, drive on two parallel racks along a block
- Drive lengthwise
- Can serve several blocks with more rows

# Rubber tyred gantry




- For vertical transshipment which bridges loading lanes with a portal fixed on sidewise pillars
- Four, eight or sixteen wheels
- Allows for bridging several rows

# Transshipment equipment

Reach Stacker	Function						Working area		Control		Cargo gear				Loading units						Hubs / Movements per hour					
	Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU Einsatz	Container	Empty	Swap bodies	Semi-trailers	craneable	Semi-trailer non craneable	Transport container	Stacking	Loading / Unloading train	Loading / Unloading truck	Carrying capacity (t)
Container	●	●		●	●		●		●				●		●	●	●	●	●	●	●		15	20-30	1C	42-45
Empty	●	●		●	●		●		●				●		●	●	●	●	●	●	●		15	20-30	1C	12

- Tractor vehicle with front equipment for lifting, stacking or moving ITU
- Used for transshipment and stacking + internal transport of containers, swap bodies and semi-trailers
- Typical for inland terminals
- Lifting capacity up to 50 tons (dead weight of ~ 100 tons)

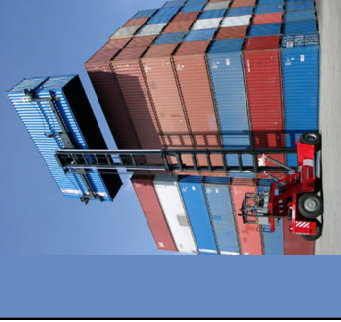
# Transshipment equipment

Top Lifter	Function						Working area		Control		Cargo gear				Loading units						Hubs / Movements per hour				
	Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers craneable	Semi-trailers non craneable	Transport container	Stacking	Loading / unloading train	Loading / unloading truck	Carrying capacity (t)
	●	●	●	●	●		●		●				●			●	●					Na	Na	Na	36-45

- Hoist loading units at the upper corner fittings
- Pick up only in the front row
- Applied for block and line storage
- Stacking up to five rows

# Transshipment equipment

Front lift truck	Function						Working area		Control			Cargo gear					Loading units					Hubs / Movements per hour			
	Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers craneable	Semi-trailers non craneable	Transport container	Stacking	Loading / unloading train	Loading / unloading truck	Carrying capacity (t)
	●	●	●	●	●	●	●	●	●				●				●					N.a.	N.a.	N.a.	7-10



- Difference to top lifter is the cargo gear
- Front lift trucks pick up at the face side with a spreader
- Can only pick up containers in the first row
- Usually used for empties



# Transshipment equipment

Straddle carrier	Function						Working area		Control			Cargo gear				Loading units						Hubs / Movements per hour					
	Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers	craneable	Semi-trailers non craneable	Transport container	Stacking	Loading / unloading train	Loading / unloading truck	Carrying capacity (t)	
	●	●	●	●	●		●		●	●			●				●						Na	Na	Na	Na	40-110

- Rubber tyred overhead lifting vehicle for moving or stacking containers
- Primarily used for stacking and transporting


# Transshipment equipment

Fork lift truck	Function						Working area		Control			Cargo gear				Loading units						Hubs / Movements per hour			
	Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers craneable	Semi-trailers non craneable	Transport container	Stacking	Loading / unloading train	Loading / unloading truck	Carrying capacity (t)
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	Na	Na	Na	5-18

- Equipped with a conventional fork for stacking (empties)
- Stacking height up to nine layers

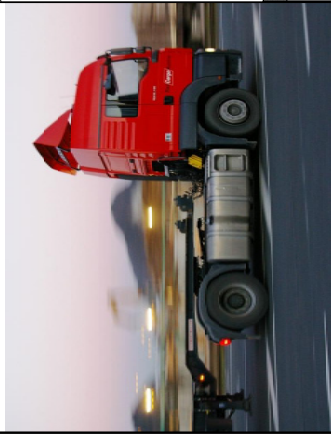


# Transshipment equipment

Terminal Tractor	Function							Working area		Control		Cargo gear				Loading units						Hubs / Movements per hour				
	Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers craneable	Semi-trailers non craneable	Transport container	Stacking	Loading / unloading train	Loading / Unloading truck	Carrying capacity (t)	
				●	●		●		●							●	●	●	●	●		Na	Na	Na	25-32	


- Internal towing vehicle used for the transport of loading units
- Equipped with a height adjustable fifth-wheel plate
- Containers, swap bodies on chassis
- Semi-trailers can be coupled directly

# Transshipment equipment

Trucks (with our without chassis)		Function							Working area		Control			Cargo gear				Loading units							Hubs / Movements per hour				
		Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers	craneable	Semi-trailers non craneable	Transport container	Stacking	Loading / unloading train	Loading / unloading truck	Carrying capacity (t)		
					●	●	●	●		●							●	●	●	●	●	●		●	N a	N a	25		

- Used for internal transport between different terminal areas, pick up and delivery services for customers
- Carry loaded and empty containers, swap bodies and semi-trailers

# Transshipment equipment

Automated guided vehicle		Function						Working area		Control			Cargo gear				Loading units						Hubs / Movements per hour				
		Transshipment	Vertical	Horizontal	Transport	Internal	External	Variable	Fixed	Manually	Semi-automatic	Fully automatic	Gripping pliers	Spreader	Fork	ISU deployment	Container	Empty	Swap bodies	Semi-trailers craneable	Semi-trailers non craneable	Transport container	Stacking	Loading / unloading train	Loading / Unloading truck	Carrying capacity (t)	
					●	●			●								●	●	●				N.a.	N.a.	N.a.	N.a.	60

- Driverless transport vehicle
- Guided via leader cable or transponder in the ground
- Carry 40 or 20 feet container(s)

# Market & Organization

- Documents in intermodal transport
- Legal framework
- Information & communication technology
- Organization of logistics processes / intermodal transports
- Inland waterway transport solutions
- Best practice examples

# Documents

Documents are related to the selected type of intermodal transport:

- Container traffic – waybills or so-called transfer notes
- Trailer shipments – CMR bills of lading
- Combined transport – combined bills of lading
- FIATA combined transport bills of lading
- FIATA FCT – Forwarders Certificate of Transport

# Bill of lading

- **Bill of lading:** transport paper which administers the legal position of the consignor and carrier
- Demonstration document concerning the completion and content of freight contract
- Ownership of bill of lading does not imply the power of disposition of the goods
- Verifies the completion and content of the freight contract + acceptance of goods by the carrier
- Basis for the assumption, that goods and its packaging are in a proper condition





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# Customs documents

Within the EU only necessary for non community goods

- **Commercial invoice** is a bill issued in a proper manner, serves as proof for the fulfilment of a contract
- Basis for the issuance of further documents
- Contains information about identification of the packaging, goods, freight, insurance costs, name and address of the exporter and importer, date of issue, exact description of the goods, all round price, delivery conditions, conditions of payment + legally binding signature and stamp
- Important in relation with the customs and foreign exchange laws
- T1 and Carnet TIR

# Customs documents

Commercial Invoice		Date						
<b>Shipper/Exporter</b>		<b>Exporter Reference</b>						
<b>Bill To</b>		<b>Customer Reference</b>						
<b>Consignee/Ship To</b>		<b>Terms of Payment</b>						
		<b>Incoterms</b>						
		<b>Ship Via</b>						
		<b>Carrier Name</b>						
		<b>Export Date</b>						
		<b>Import License Number</b>						
		<b>IMCO Code</b>						
		<b>ITN</b>						
		<b>Special Instructions</b>						
		<b>Hazardous Material</b>						
		<b>Packing Information</b>						
<b>Item #</b>	<b>Quantity</b>	<b>U M</b>	<b>Product ID</b>	<b>Product Description</b>	<b>HTS No</b>	<b>CKD</b>	<b>Unit Price</b>	<b>Total</b>

Shipping Number

# e-customs

## *e-customs*

- Meant to replace all paper-based customs procedures with electronic procedures
- Risk-analyses-module integrated
- Suggests the checking of goods or releases the goods (~ 10 minutes)
- Final decision is always made by the particular customer team of the responsible customs office
- Trader gets the adequate documents, supplemented with the electronic customs certificate

# Dangerous goods

- Assignments for dangerous goods
- Dangerous for human beings, animals or the environment
- Transportation is specifically regulated in international agreements
- For European ground transport:
  - ADR – European Agreement concerning the International Carriage of Dangerous Goods by Road
  - RID – Agreement for the International Carriage of Dangerous Goods by Rail
  - ADN – Agreement for the International Carriage of Dangerous Goods on Inland Waterways

# Legal framework

- ***National regulations***
  - Austrian motor vehicles act
  - Road traffic regulation
  - Railway act
- ***European regulations***
  - Directive 92/106/EWG
  - Liberalisation of the first and final leg in combined transports
  - European act about the granting of financial support for the advancement of environmental friendliness of freight traffic

# Legal framework

- ***Liability***
  - Complete listing concerning liability is impossible
  - National provision regarding liability: Allgemeine Österreichische Spediteursbedingungen (AÖSp)
  - International provision regarding liability: specific international regulations for each traffic carrier:
  - CMR – Convention on the Contract for the international carriage of goods by road
  - CIM – Uniform Rules concerning the Contract for international carriage of goods by rail
  - Montreal Convention – Unification of certain rules for international carriage
  - CMNI – Convention de Budapest, valid for transportation on inland waterways
  - Hague-Visby-Rules – set of international rules for the carriage of goods by sea

# Legal framework

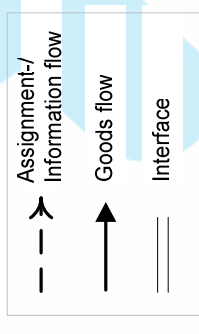
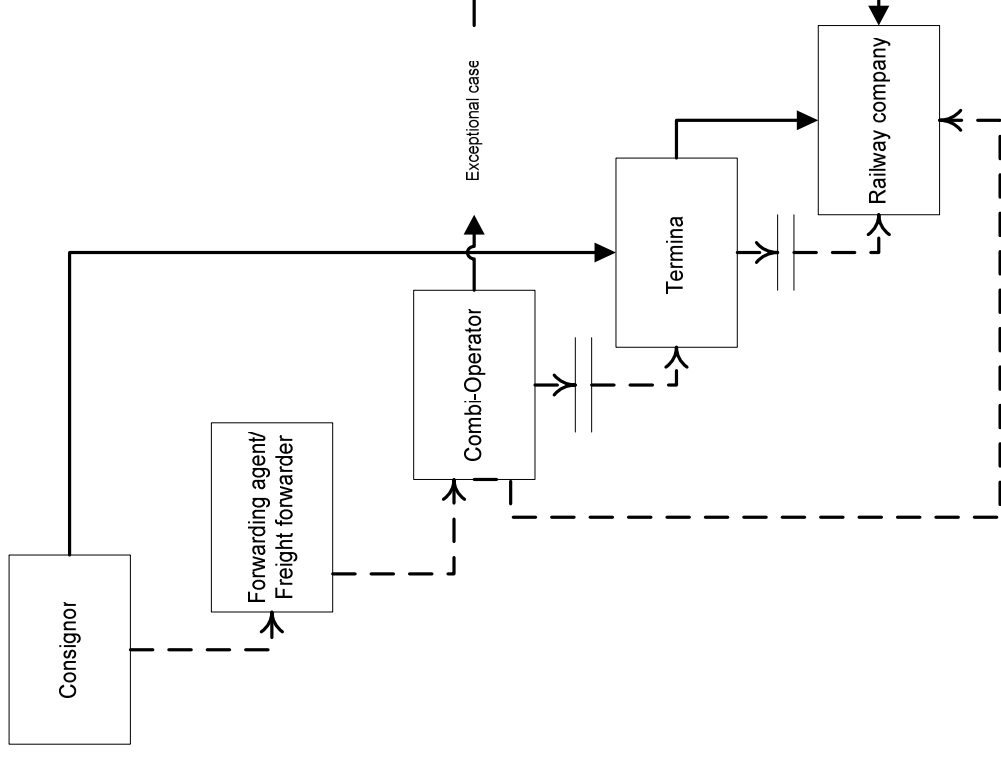
- **SHIPPING PROCEDURE**
  - According to the customs law especially relevant for goods in bond (non community goods)
  - Within EU and EFTA for goods under customs control
  - Certificates + accompanying documents
  - Decisive factor: origin of the goods + transport route
- **CARNET TIR**
  - TIR-procedure aims at facilitating international transportation of goods on the road
  - With CARNET-TIR goods can be transported through any number of regions of contracting partners
  - Not applied when goods have to be transported solely in the EU
  - 68 contracting states
  - NCTS-TIR – electronic transfer of relevant data



# Legal framework

- **COMMON/COMMUNITY TRANSIT**
  - Used for the transport of goods within EU-27 and EFTA countries
  - Common transit procedure
  - Rules are effectively identical to those of Community transit
  - Community transit is used for customs transit operations between EU members
  - In general applicable for the movement of non-Community goods
  - For community goods which pass the territory of a third country

# Information and communication technology





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# Information and communication technology

- ***ELECTRONIC BOOKING IN GENERAL***
  - Internet based application
  - Facilitate preparation of electronic freight data
  - Standardized way of communication among participating parties
  - Electronic freight documents, transferred in a standardized way
  - Documents cannot get lost, arrive earlier to due electronic submission
  - Possible to trace and schedule goods along the whole supply chain



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# Information and communication technology

- ***E-WAYBILL***
  - Simple and cost-efficient preparation of waybills via internet
  - Standardized drafts for repeating transport (RCA)
  - No printing of waybills necessary
  - Reduction of administrative effort
  - Simple, electronic transfer
  - Simplification of data captures due to search and filter functions
  - Templates
  - Simplification of the recording of waybills



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# Information and communication technology

- ***TRACKING & TRACING***
  - Information concerning location and processing status
  - Logistics service providers
  - Improved planning quality, cost-savings, better delivery service
  - Precondition: all packages have to be equipped with barcode-labels
- ***DISPATCH***
  - Electronic announcement of a delivery and the receipt of goods respectively
  - Dispatch notification and shipping notice
  - Electronic Data Interchange (EDI) – interbranch, international standard for electronic data



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# Information and communication technology

- ***INTERMODAL TRANSPORT – FIELD OF APPLICATION FOR TELEMATICS***
  - Integrated application of the technologies of telecommunication, automation and informatics
  - Telematics denotes the combination of these components
  - Communication comprises data between mobile and/or fixed devices in the necessary bandwidth
  - Automatic gathering of data and parameters as well as on digital display
  - Informatics has to combine and display information in an appropriate way
  - All traffic carriers have to be integrated and intelligently combined
  - To date, technically and economically feasible concepts only exist rudimentary



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# Information and communication technology

## EXKURS RIS – VIA DONAU



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# Organization of logistics processes

- Differentiation between sea shipping, inland waterway navigation as well as railway and road transportation
- **Carrier's haulage:**
  - Transport services door-to-door
  - Loading units are provided at the ramp of the consignor by the consignee or shipowning company
  - Transport operator/carrier organizes the transport on the inland waterway (main leg) + transport to and from transshipment point
  - Transport operator/carrier is liable for the whole transport organization

# Organization of logistics processes

- ***Merchant's haulage:***

- First and final leg have to be organized by the consignor or by an authorized freight forwarder
- Freight forwarder supplies the loading units at the ramp of the consignor and organizes the transport to the transshipment point and port respectively
- At the port loading units are handed over to the shipowning company, which organizes the transport on the inland waterway
- At the place of destination loading units are handed out to the freight forwarder who organizes the final leg to the consignee

# Organization of logistics processes

## ***Checklist for the organization of intermodal transports***

- Are the goods to be conveyed applicable for intermodal transport?
- Enough transport volume?
- Who organizes the rail- and/or inland waterway transport?
- Is there the possibility to access transshipment facilities (rail/inland waterway) nearby?
- Railroad or waterway connections to the designated destination?
- Potential partners at the destination, which take over pick-up?
- Duration of transport processes applicable for the logistics concepts?
- Prizes offered marketable?
- Does intermodal transport process fit into transport control concept?
- Are liabilities clear and acceptable?



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# Organization of logistics processes

## Transport costs in intermodal transport + at the port!



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# Thank you for your attention!

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