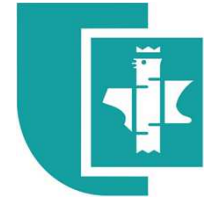




Zachodniopomorski Uniwersytet Technologiczny  
w Szczecinie



West-Pomeranian University of Technology in Szczecin

Faculty of Maritime Technology and Transport

Department of Logistics and Transportation Economics

**Lecture topic: *Rail - road transportation technologies***

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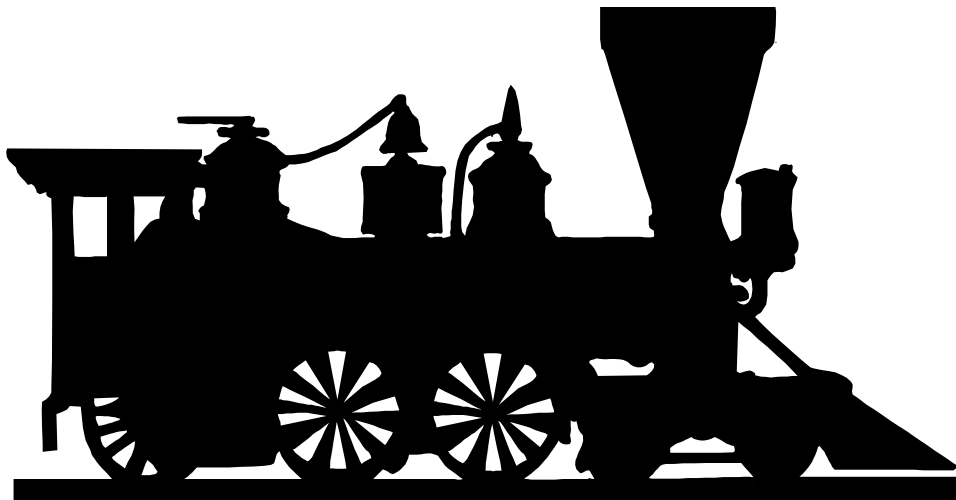
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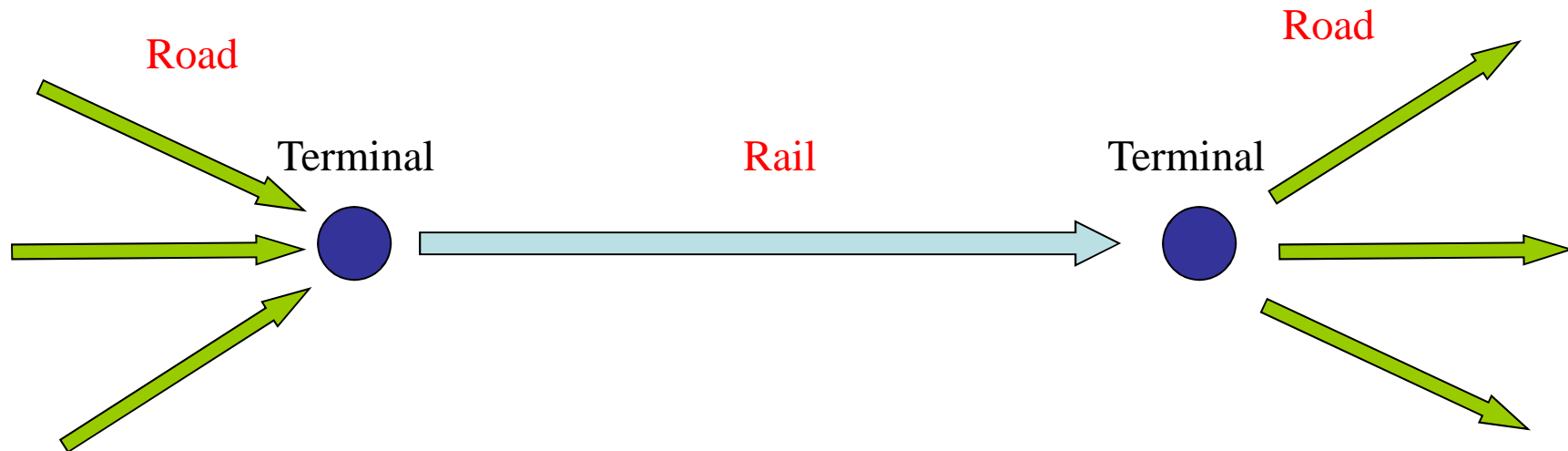
**Lisbon, 22.05.2015**

# Rail - road transportation technologies



# Rail - road transportation

- *Rail - road transport technology* is based on the fact that during the main part of the route the transport mean, including cargo placed inside it, is carried on the railway platform, but delivery to and from handling terminals is provided by road transport.



# Rail - road transportation

Main characteristic:

- Cargo: containers, lorries, swap bodies, semi-trailers etc.,
- Handling system: Lo-Lo and Ro-Ro,
- Place: different handling places, terminals, logistic centers equiped in road and rail infrastructure,
- Handling equipment: container overhead cranes, reachstackers etc.



# Intermodal terminals

- *Intermodal terminals* are the transfer points which take into account the different properties of the transport modes involved.

## *Intermodal terminals:*

- Land terminals, situated inside country,
- Water terminals, situated in seaports or riverports.



# Pan-European corridors





# Rail - road transportation

- *Main rail and road transportation technologies:*
  - system „Piggyback”,
  - system „Ro-La”,
  - „Bi-modal” system.
- *Modern rail and road transportation technologies:*
  - system „Modalohr”,
  - system „Cargo Domino”.
  - system „ACTS”,
  - system „ALS”,
  - System „Neths”,
  - system „Flexiwaggon”,
  - system „WAS” ect.



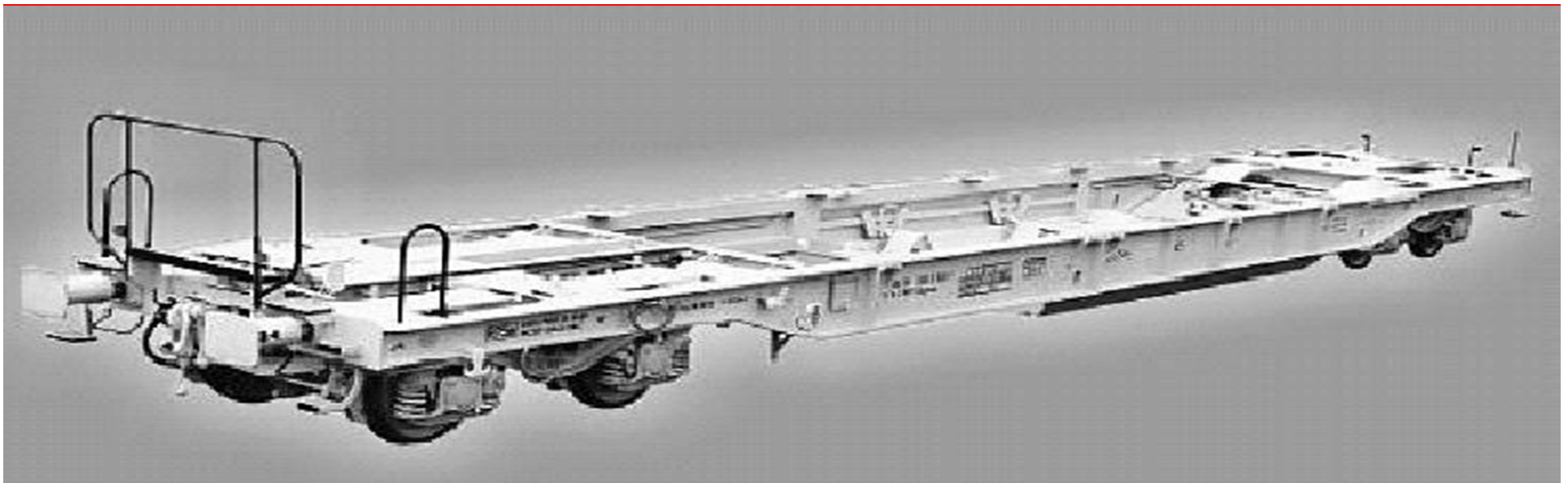
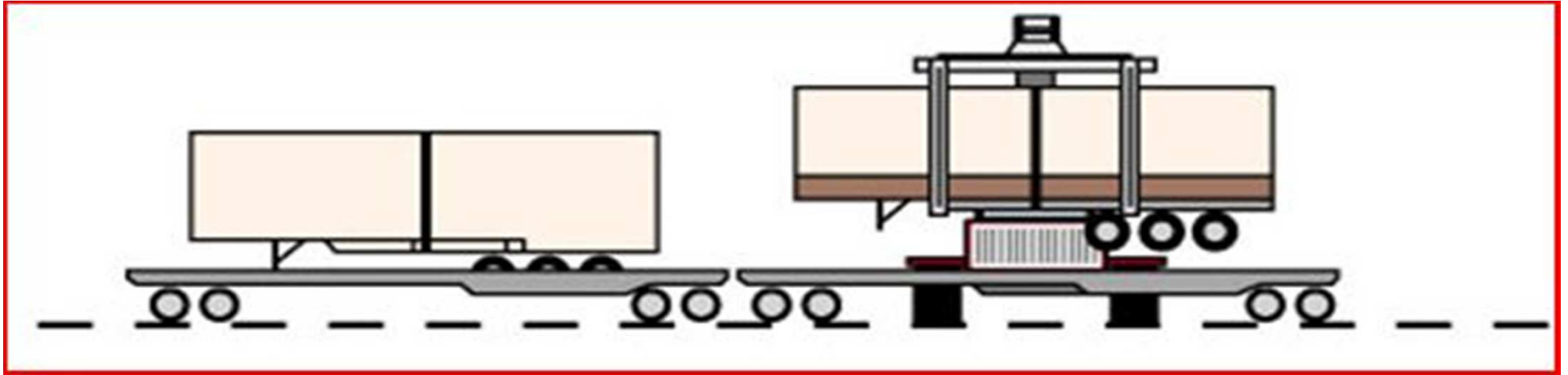


# „Piggyback” system

- In the „*Piggyback*” system loading units such as: semi-trailers, trucks, containers and swap bodies are carried on a specially designed railway wagons (atop the flatcars).
- These transportations are unaccompanied because the loading units are delivered to the terminal by trucks, which do not participate in the process of rail transport.
- Main characteristic:
  - Infrastructure: large square,
  - Handling system: lo-lo.
  - Handling equipment: reachstacher or container crane,
  - Needed: special pocket flatcars.



# „Piggyback” system



# „Piggyback” system







# System „Ro-La”

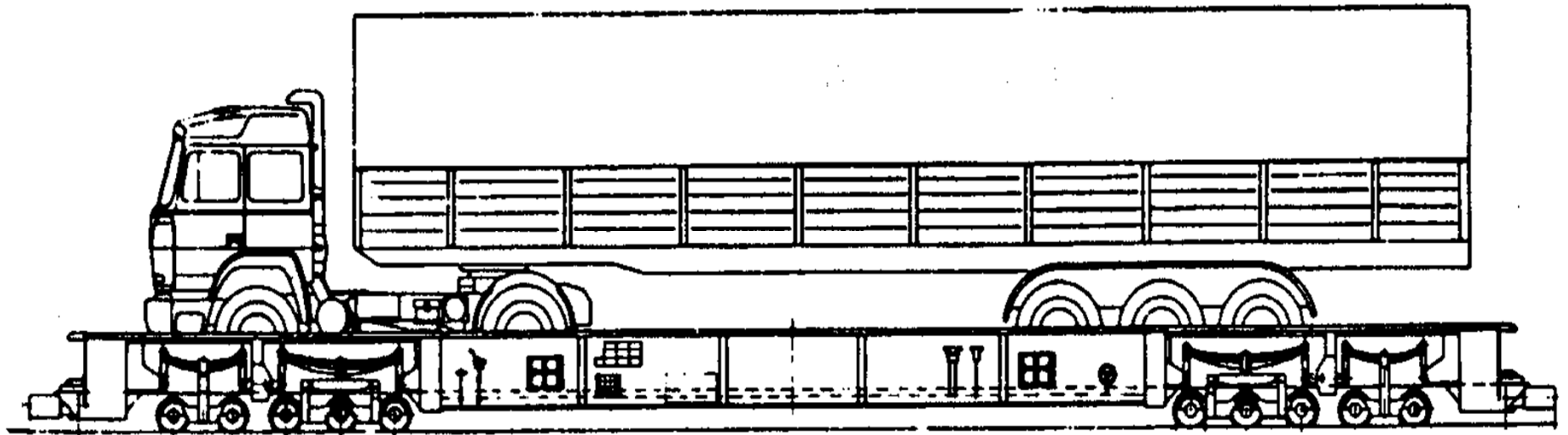
- *System „Ro-La”* relies on the carriage of trucks, articulated vehicles and units on low-floor railway wagons.

Loading and unloading of vehicles take place in a ro-ro system by using self-propelled vehicles, without additional handling equipment.

- Main characteristic:
  - Infrastructure: small square, ramp,
  - Handling system: ro-ro.
  - Handling equipment: not needed,
  - Needed: low-floor railway wagons.



# System „Ro-La”



# „Bi-modal” system

- *„Bi-modal” system* refers to the carriage of special bi-modal semi-trailer car.

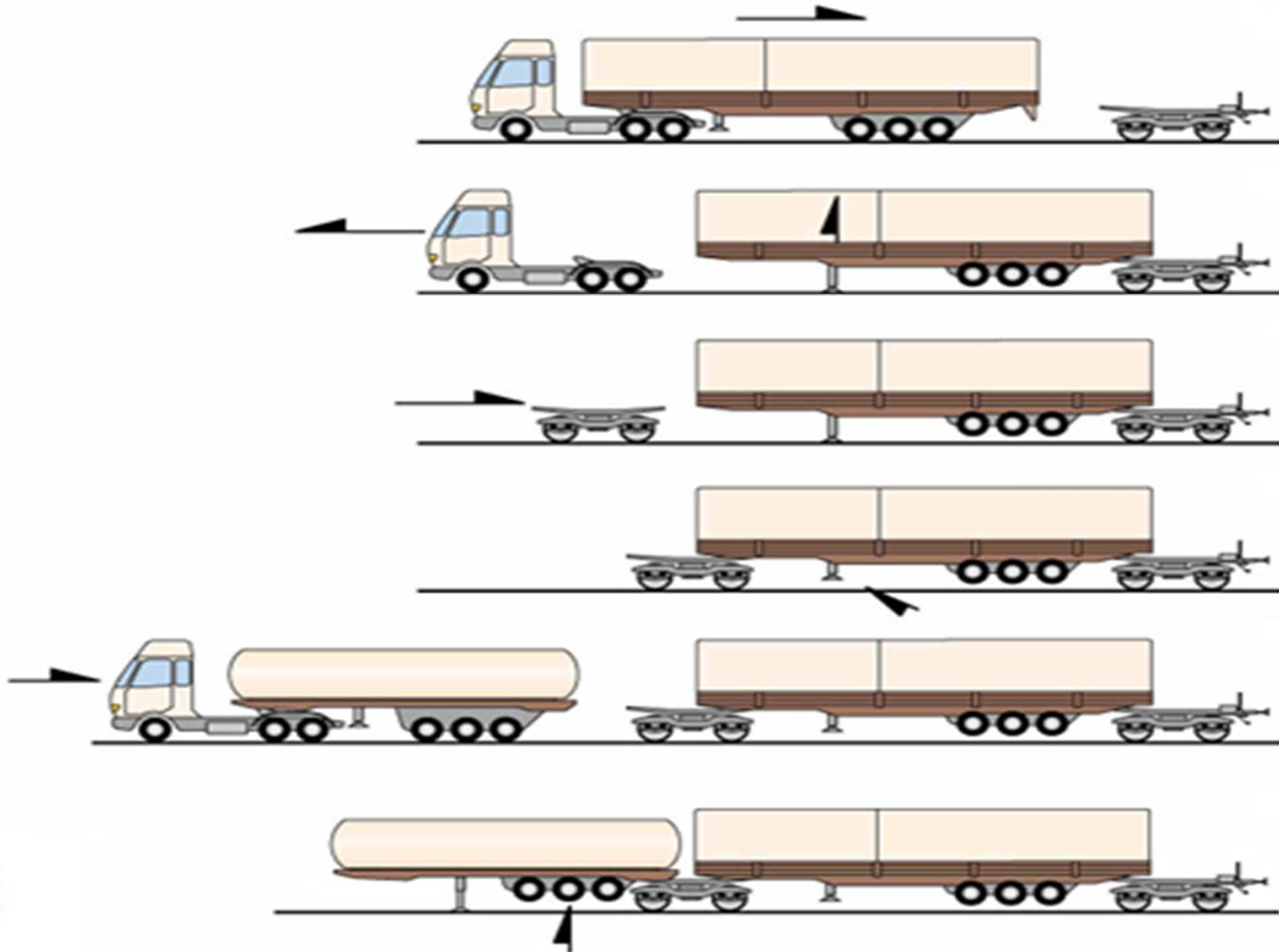
This semi-trailer after the journey by truck to the terminal becomes a railway wagon, transported as a part of a freight train.

- Main characteristic:
  - Infrastructure: railways,
  - Handling equipment: not needed,
  - Needed: bi-modal semi-trailer car, bi-modal adapters.





# „Bi-modal” system



# Several modern technologies used in rail - road transportations



# „Modalohr” system

- *System „Modalohr”* deals with transportation of semi-trailers, with or without trucks, lorries on the low-floor wagons, equipped with an additional floor pivotally suspended.
- Wagons opening and closing system is fully mechanized.
- During the loading proces floor is set at an angle to the axis of the truck.
- Main characteristic:
  - Infrastructure: special terminals with ramps,
  - Handling system: ro-ro.
  - Handling equipment: not needed,
  - Needed: low-floor railway wagons.



# „Modalohr” system

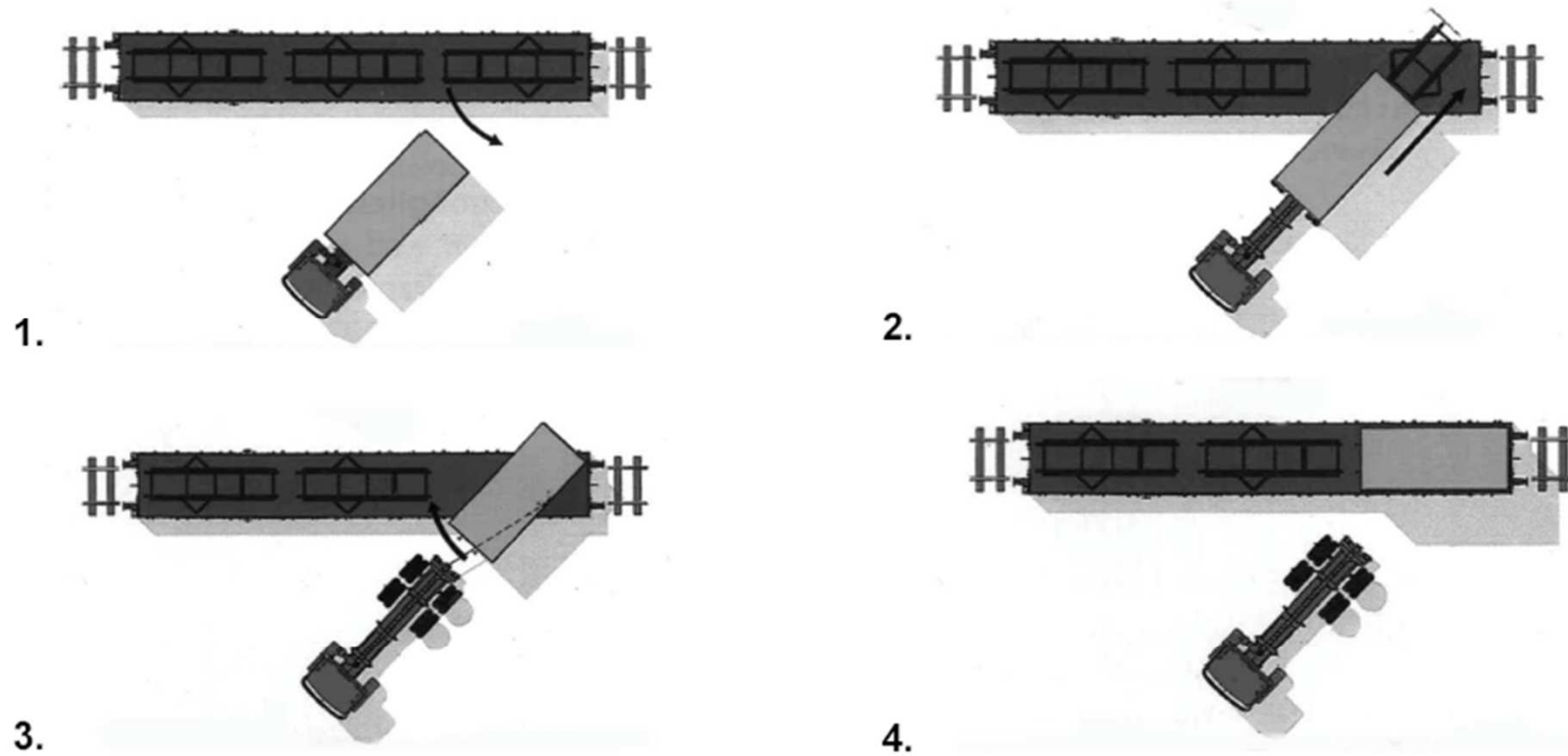


# „ACTS” system

- „ACTS” system (called Abroll Container Transport System) is the transport of containers equipped with rollers on a specially adapted for this purpose wagons-platforms (flatcars).
- Main characteristic:
  - Infrastructure: small square,
  - Handling system: ro-ro.
  - Handling equipment: not needed,
  - Need: special railway wagons, special containers, cars equipped with a hook driver system.



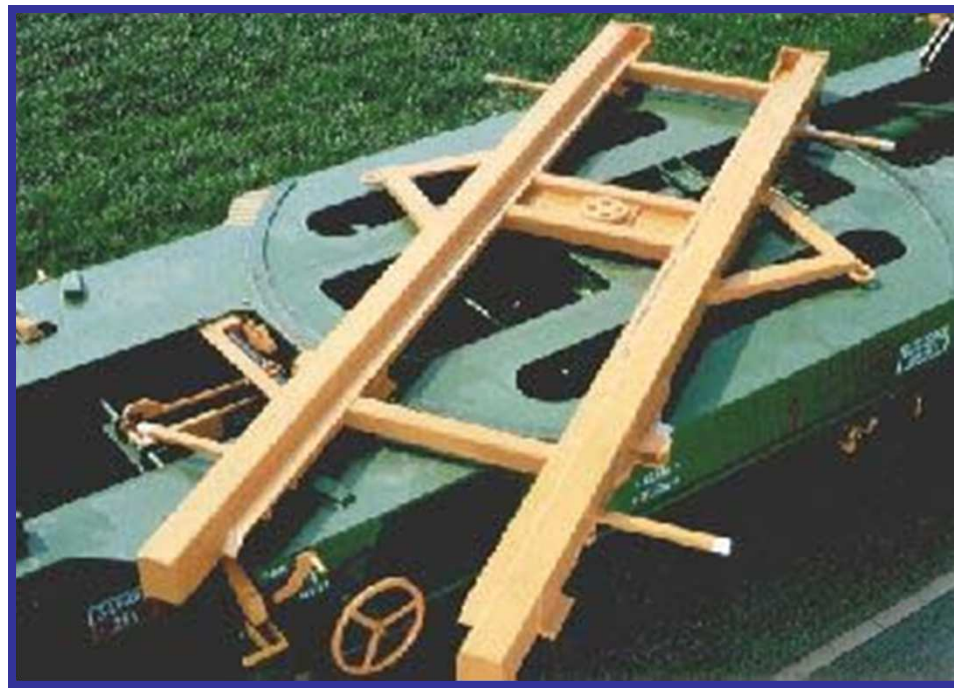
# „ACTS” system



# *„ACTS” system*



# *„ACTS” system*





## *„Cargo Domino” system*

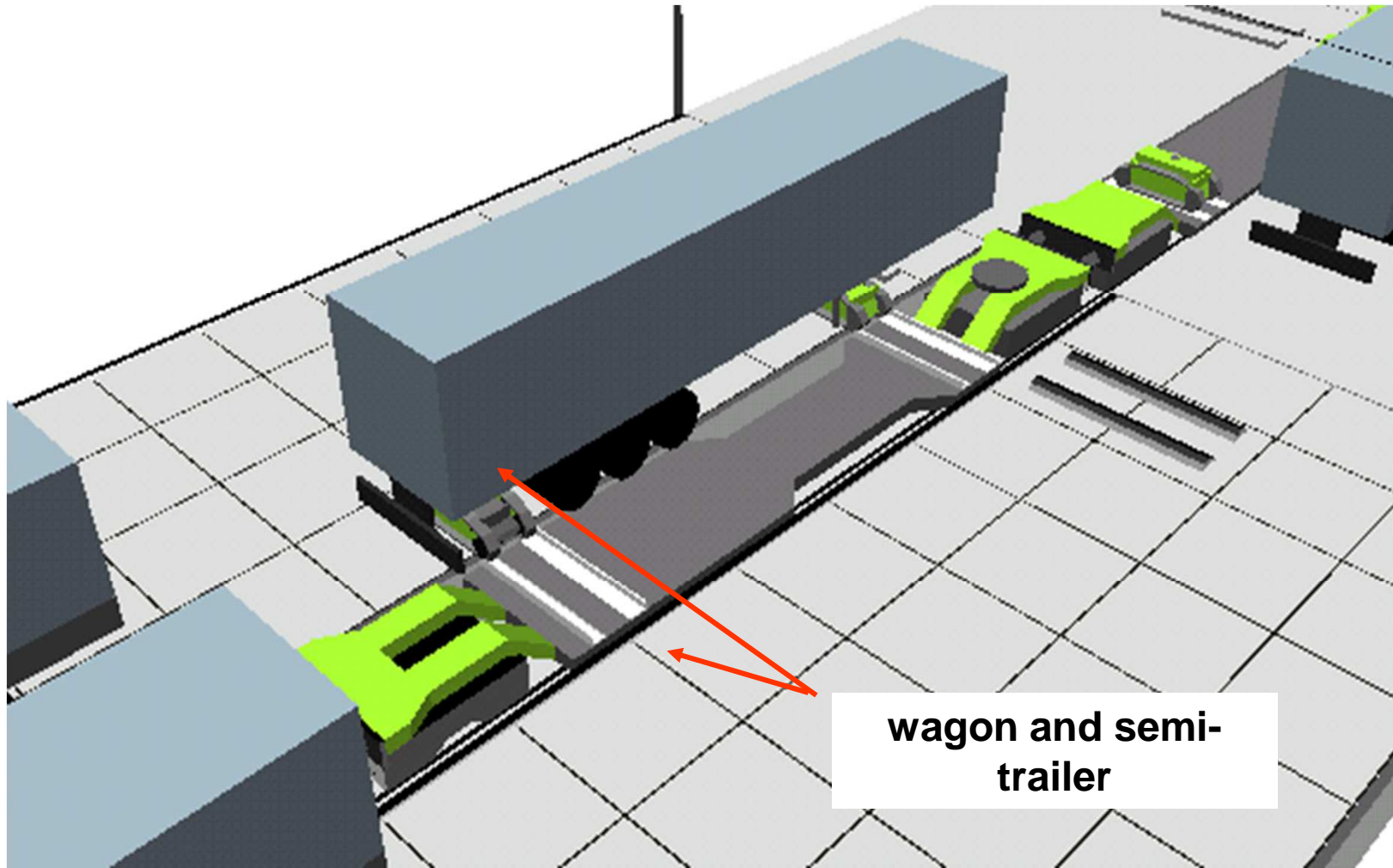
- *„Cargo Domino” system* is the system where commonly used containers and swap bodies are loading into normal container platform wagons (flatcars) with the help of the special device mounted on a car-platform.
- Main characteristic:
  - Infrastructure: small square,
  - Handling system: ro-ro,
  - Handling equipment: not needed,
  - Needed: special car-platforms.





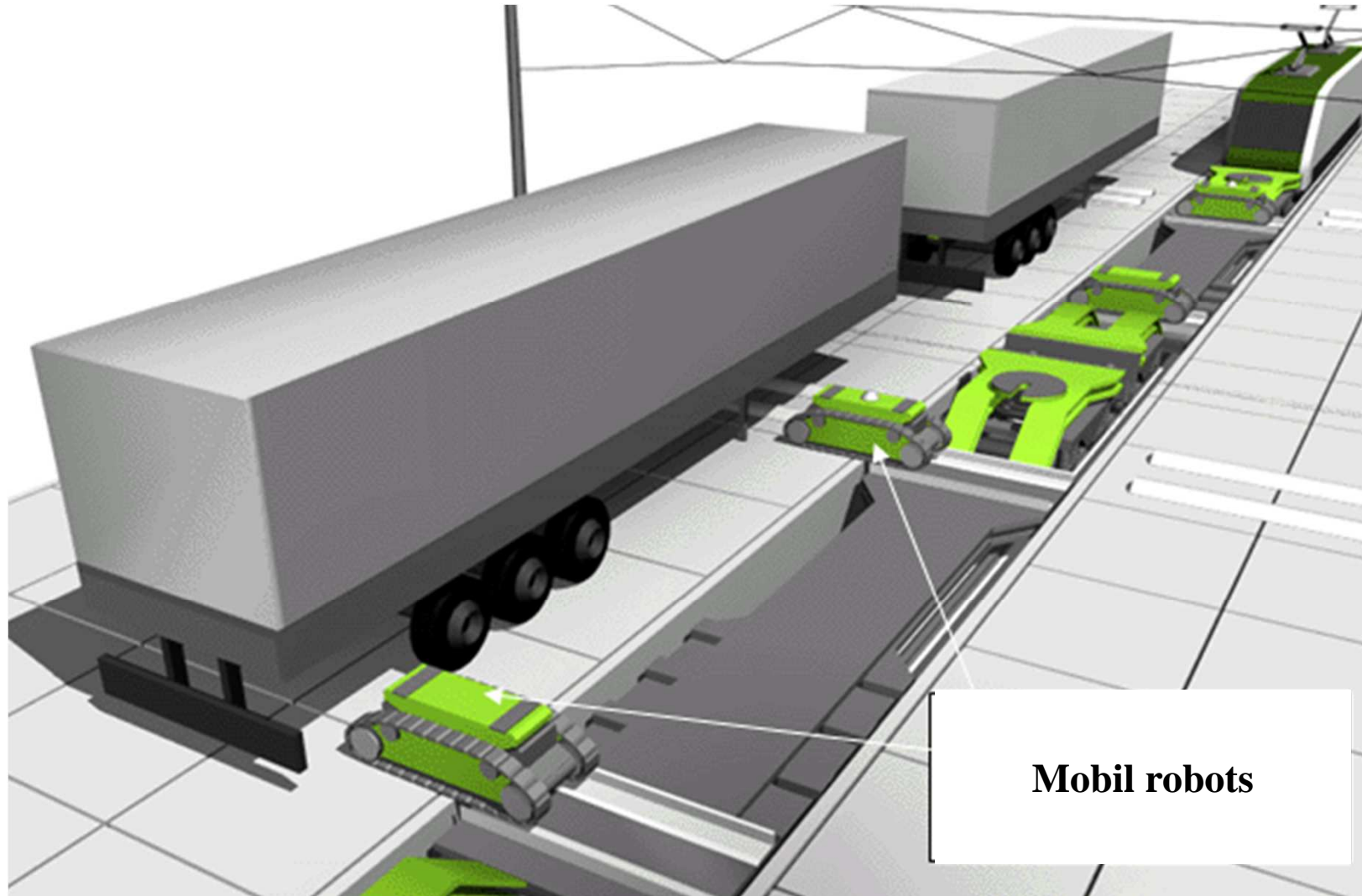
# SYSTEM ALS

*(Automatic Loading System)*

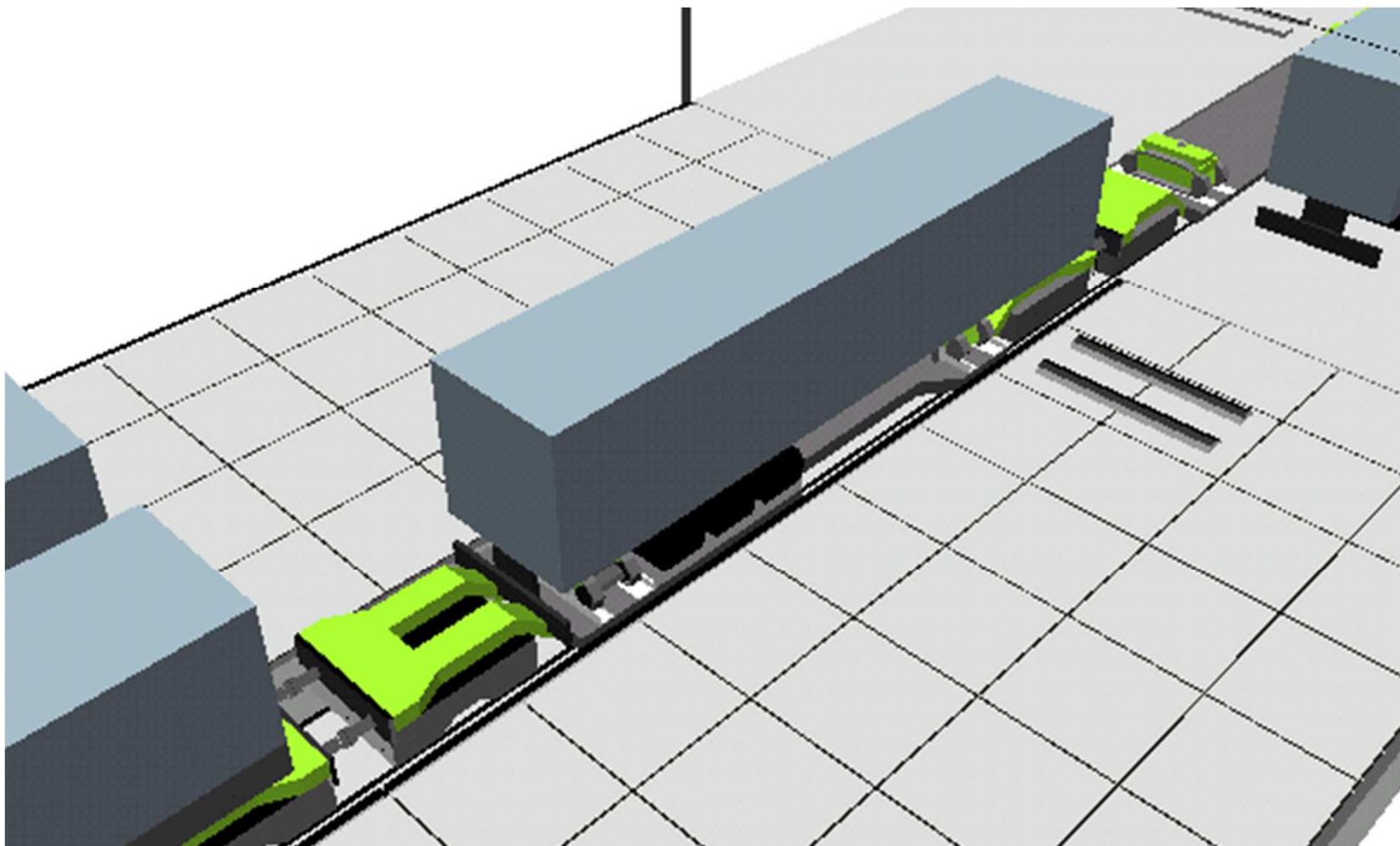


**wagon and semi-trailer**

# SYSTEM ALS



**Mobil robots**



# System NETHS



Wagon

Overloading  
equipment

Swap body,  
container

8-12 containers/hour

# System NETHS



# System NETHS





# System NETHS



# STEELBRO SYSTEM (overloading without terminal help)



# STEELBRO



# STEELBRO



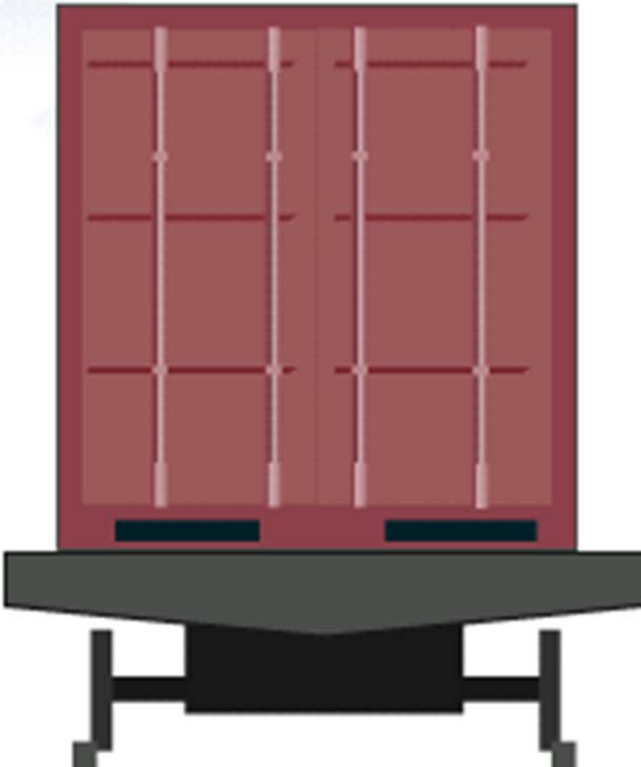
# STEELBRO



# STEELBRO



# STEELBRO



# STEELBRO



## Dimensions and masses:

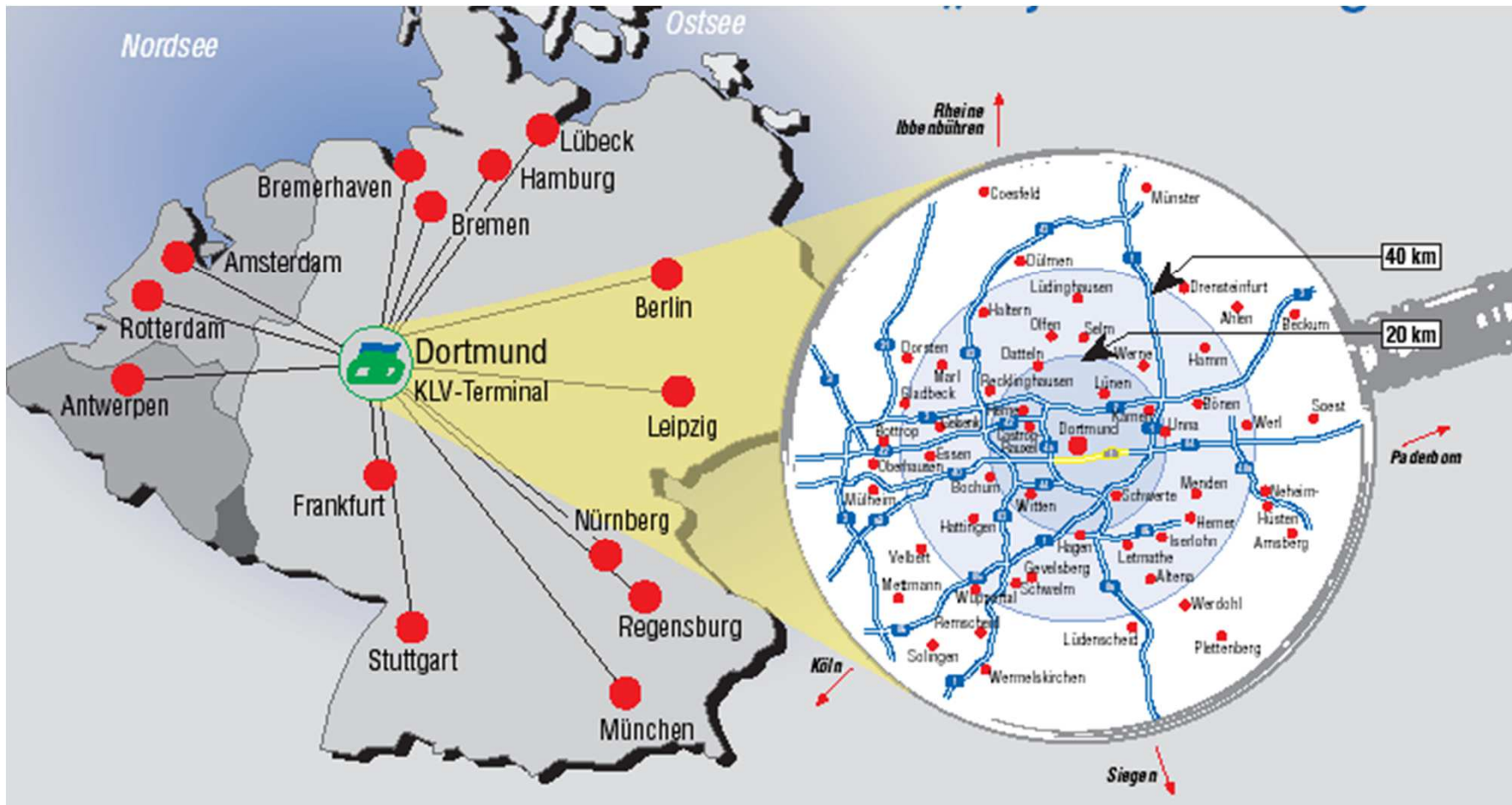
Overall length	:	<u>11642 mm</u>
Width	:	<u>2500 mm</u>
Height	:	<u>4000 mm</u>
Wheel-base	:	<u>5100 mm</u>
Maximum permitted mass:		<u>43500 kg</u>
Mass empty vehicle	:	<u>17080 kg</u>



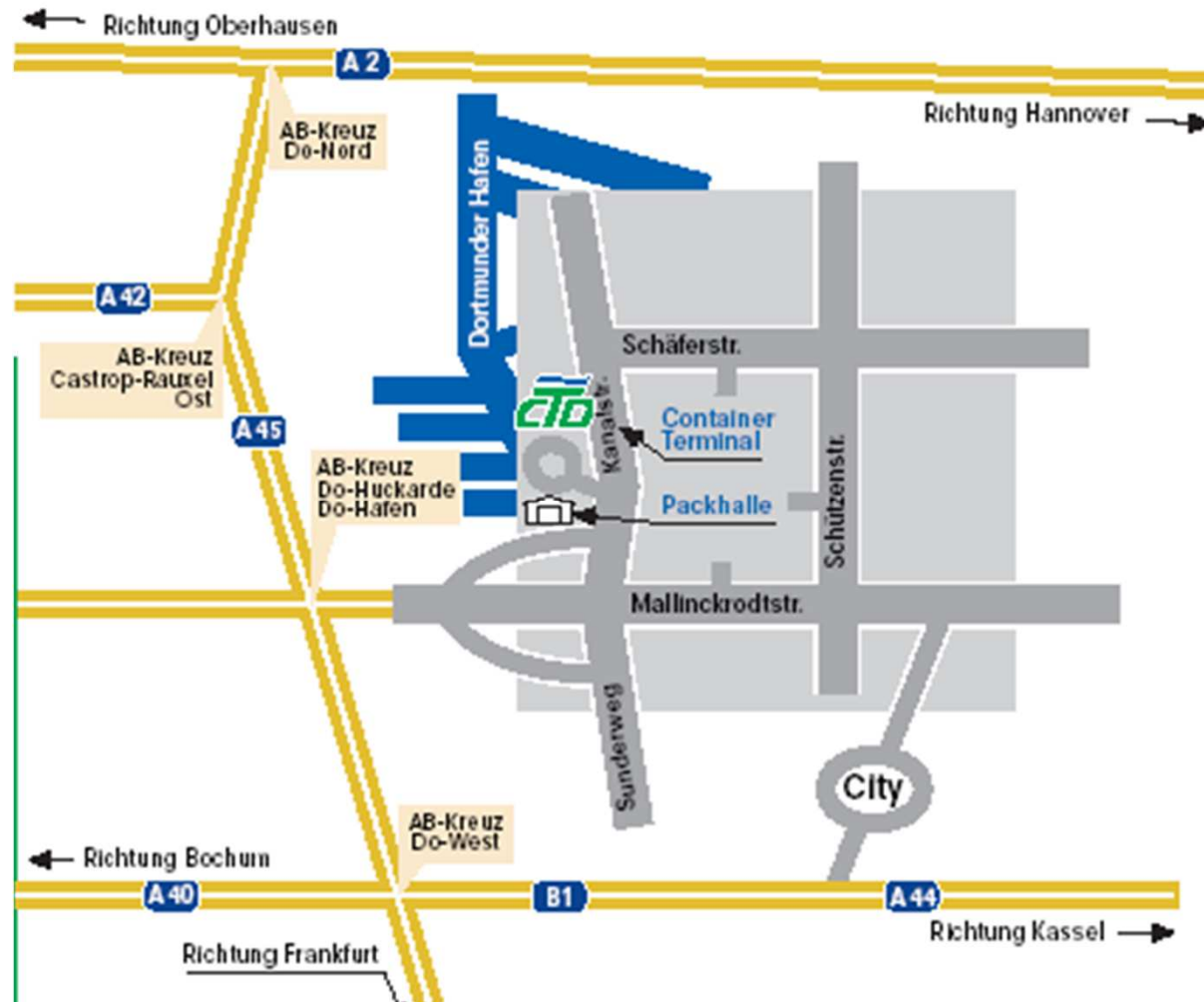
# Examples of intermodal terminals



# TERMINAL DORTMUND



# TERMINAL DORTMUND



# TERMINAL DORTMUND



River Ems

**1987**



**1989**



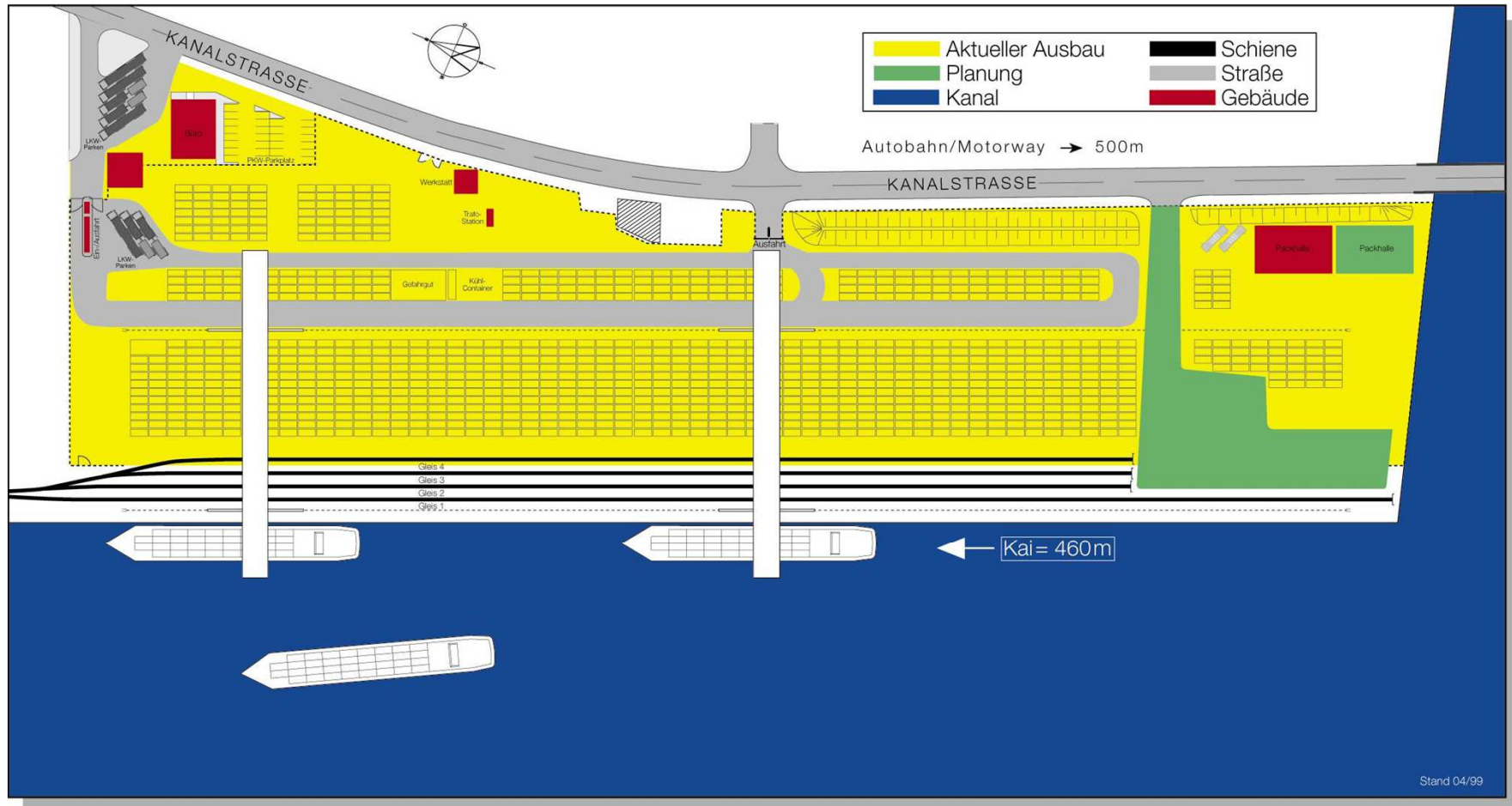
**1998**



**2004**



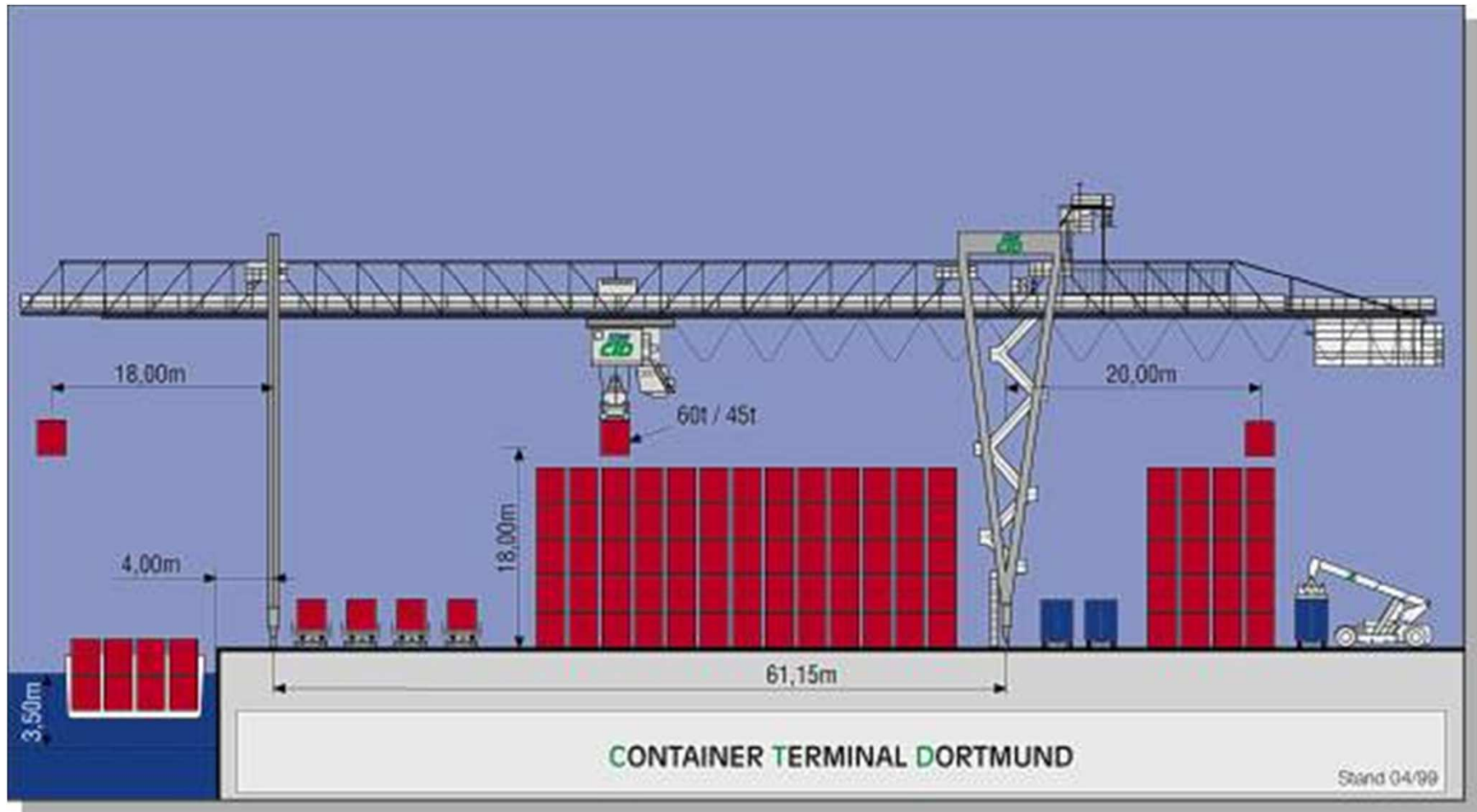
# TERMINAL DORTMUND



# TERMINAL DORTMUND



# TERMINAL DORTMUND

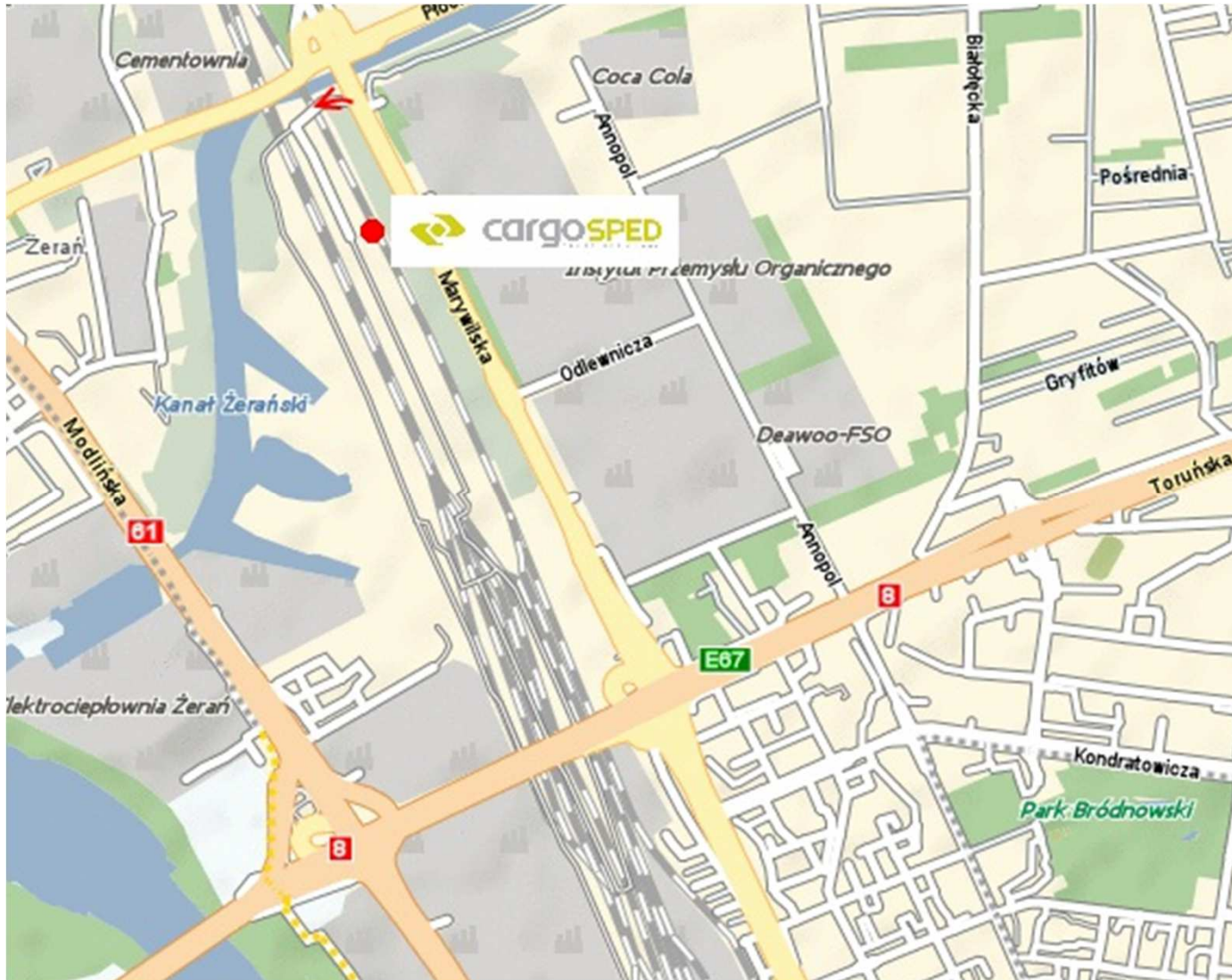




# TERMINAL DORTMUND



# TERMINAL IN WARSAW



# TERMINAL IN WARSAW



<http://www.cargosped.pl/index.php/pl/galeria-zdjec>

# TERMINAL IN WARSAW









Thank you for attention!





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