



9th Railway Working Group Meeting

10–12 June 2025 • Bishkek, Kyrgyz Republic

9-е заседание Рабочей группы по железнодорожному транспорту

10–12 июня 2025 года • Бишкек, Кыргызская Республика



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Session 2: Best practice for port- railway connectivity

Udo Sauerbrey & Adrian Sammons





Outline

- Introduction
- Best Practices in the world
 - Port of Antwerp
 - Port of Hamburg
 - Port of Dammam-Saudi Arabia
- Crucial Factors for Success

Introduction

PORTS

- Maritime transport has the highest mass carrying capacity and the lowest unit cost.
- Ports facilitate freight transfer between foreland and hinterland.

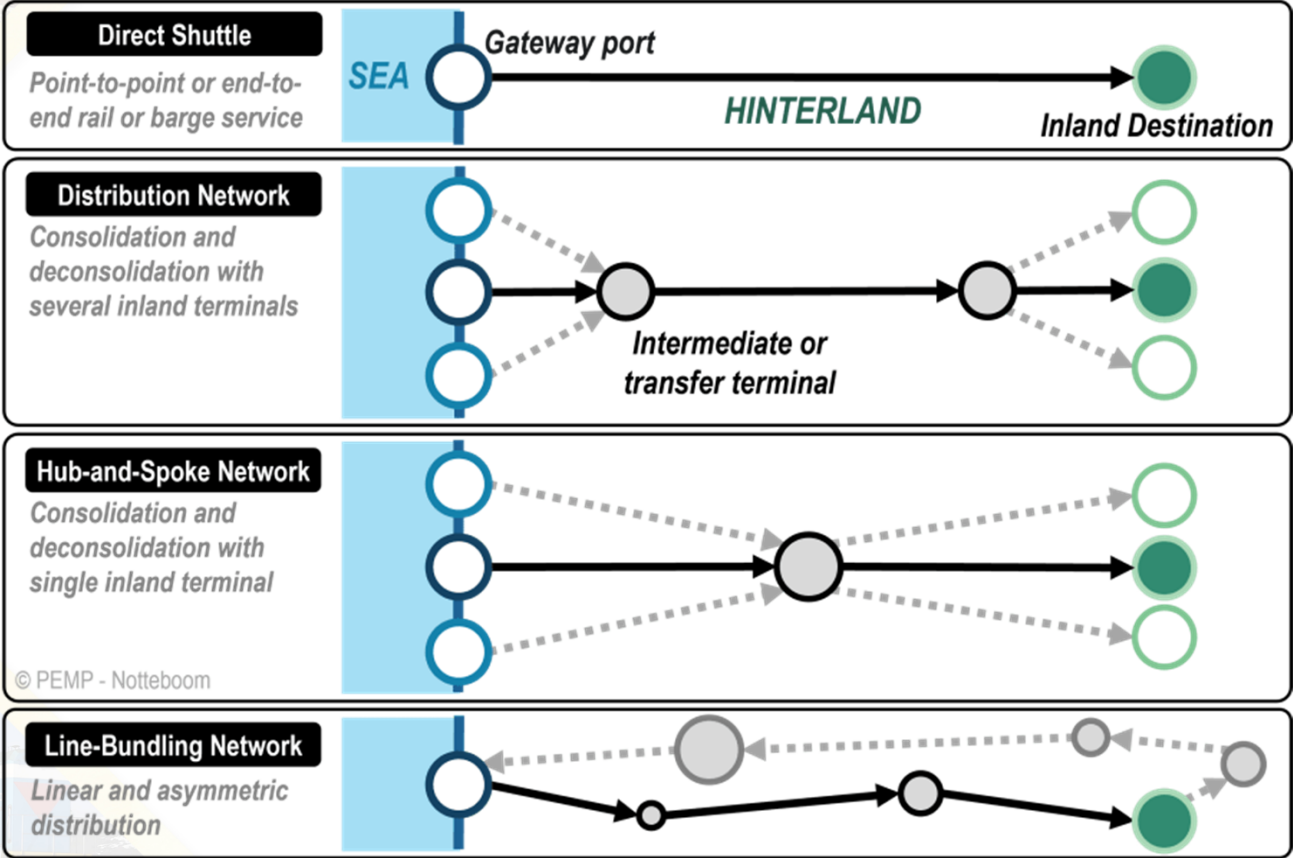


RAILWAYS

- Rail is essential for the development and efficiency of ports. Rail enhances economic value and competitiveness.
- Rail provides faster throughput and higher productivity of a seaport.



Introduction



Introduction

1 History

- Rail connectivity of ports was realized by shunting facilities and marshalling yards
- To sort trains from different destinations and origins within port

2 After the introduction of Containerized goods

- Ports concentrate to operate full length trains directly within the port to avoid any additional handling or sorting
- A significant change in the infrastructure layout of railways within modern ports

3 Modern Ports

- Shunting yards to become buffer zones rather than sorting stations
- Tracks within ports became longer
- Mechanized loading and unloading areas close to the port terminals

4 Effects

- Shorter round-trip times for wagon sets and less congestions due to shunting operations within the ports
- Ports could directly load volumes onto rail wagons
- Fully loaded trains already formed and ready for long-distance journey onto the mainline

Introduction

Examples around the world



Port of Antwerp

- One of the biggest railway ports in Europe
- Moving heavy cargo flows out of the city center to avoid congestion and pollution
- Infrastructure is adjusted to facilitate full block trains without any shunting effort



The Port of Hamburg

- 3rd largest port in Europe with an extensive rail integration
- Moving heavy cargo flows out of the city center to avoid congestion and pollution
- Infrastructure is adjusted to facilitate full block trains without any shunting



The Port of Dammam

- Showing efficiency of the track layout determines the accessibility and competitiveness of railway services
- Track layout configuration over used transshipment technology

Best Practices in the world

Port of Antwerp



Integrated rail operator (Railport Antwerp): A dedicated coordination platform enhances efficiency by synchronizing rail operations among terminal operators and logistics players.

High rail modal share: Over 24% of inland transport is by rail—among the highest in Europe for a general cargo port.

Extensive rail network connectivity: Direct rail services link Antwerp with key industrial zones across Europe, improving cross-border freight movement.



Best Practices in the world

Port of Antwerp



The origins of the modern port of Antwerp. Construction of the first docks

1800s



Rail connection to the German industrial Ruhr region

1836

Rail connection to the Belgian capital of Brussels

1873

1879

The first port facilities were built directly north of the city on the right bank of the Scheldt



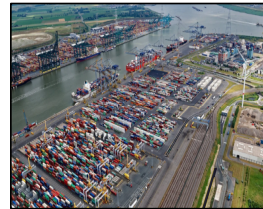
Best Practices in the world

Port of Antwerp



A new large gravity hump yard known as Antwerp-North was built

1920-30s



Ports facilities expanded also to the left bank of the Scheldt

1950s

Break bulk cargo handling declined in favor of containers



1970s

New rail tunnel to connect the Antwerp-North yard with rail facilities on the left bank



2014

Best Practices in the world

Port of Antwerp



The city map from 1897 shows the original port facilities and the rail network



Map showing Antwerp-North shunting yard and port rail infrastructure, 1943



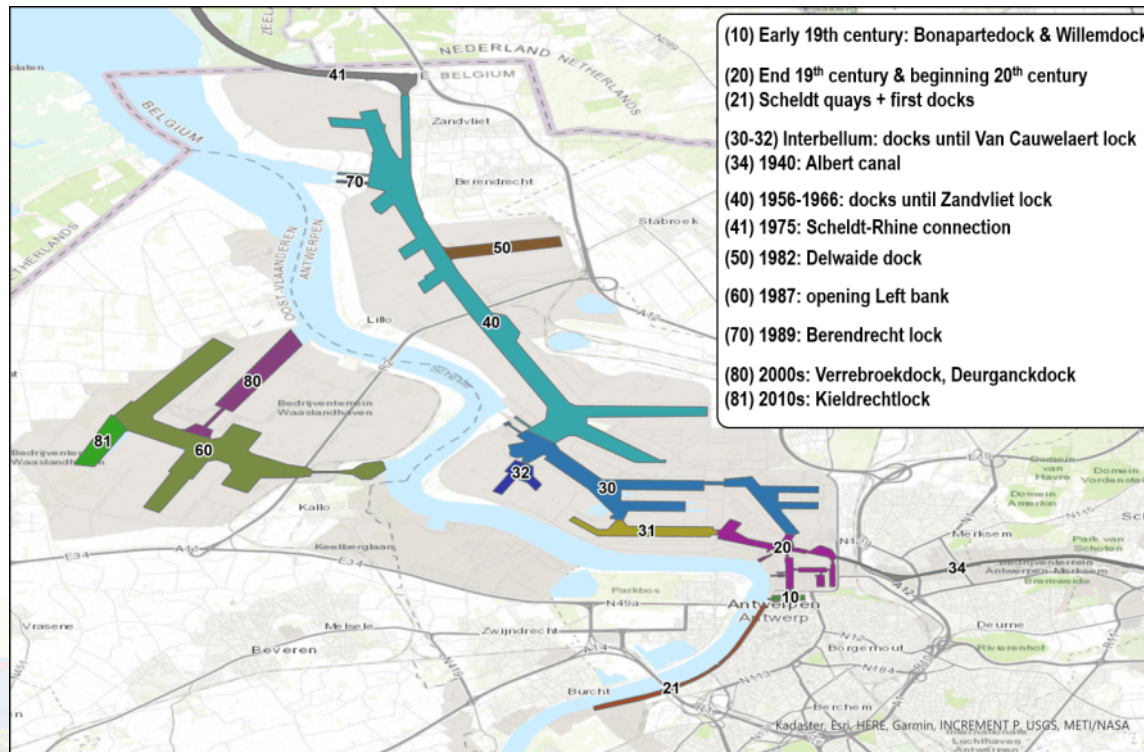
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Best Practices in the world

Port of Antwerp



Development timeline



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Best Practices in the world

Port of Antwerp



Governance



Ownership

Cities of Antwerp (80%) and Bruges (20%) as the sole shareholders (public)

Management

National infrastructure manager, Infrabel
Some sidings within the port belong to private industries

Users

The infrastructure is open to all qualified railway undertakings

Best Practices in the world

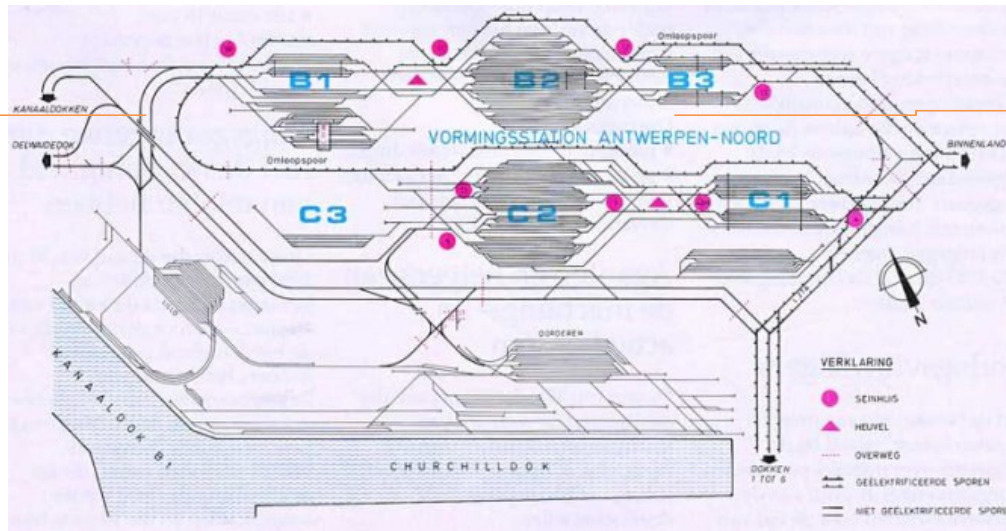
Port of Antwerp



Layout and access

The heart of the port railway network
Antwerpen-Noord hump yard

The majority of container transshipment occurs in the new port area where rail terminals are located directly on dock



Bundles are used in a direction manner, one for arrivals and one for departures

5 rail served container terminals
-all with modern RMG cranes and -track lengths suitable for handling block trains

Best Practices in the world

Port of Antwerp



HUPAC container terminal in old port

Yards to prepare trains for the change between main line locomotive/shunting locomotive and waiting purpose

The tracks in the port cross active shipping channels requiring the use of movable bridge



Best Practices in the world

Port of Hamburg



Europe's rail freight leader: Over 50% of hinterland traffic is handled by rail—the highest proportion of any major European port.

Strong last-mile infrastructure: Dense on-dock rail infrastructure at container terminals enables seamless train-to-ship cargo transfer.

Advanced digital coordination: Uses systems like transPORT rail to digitally manage slot allocations and rail dispatching, enhancing punctuality and reliability.



Best Practices in the world

Port of Hamburg



The port had to be rebuilt after WW2

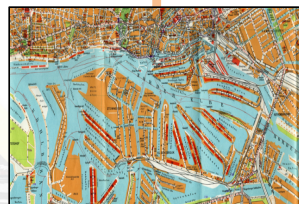
1945



The original harbor area slowly abandoned as break bulk shifted to containers

1960s

Significant development on the south side of the Elbe



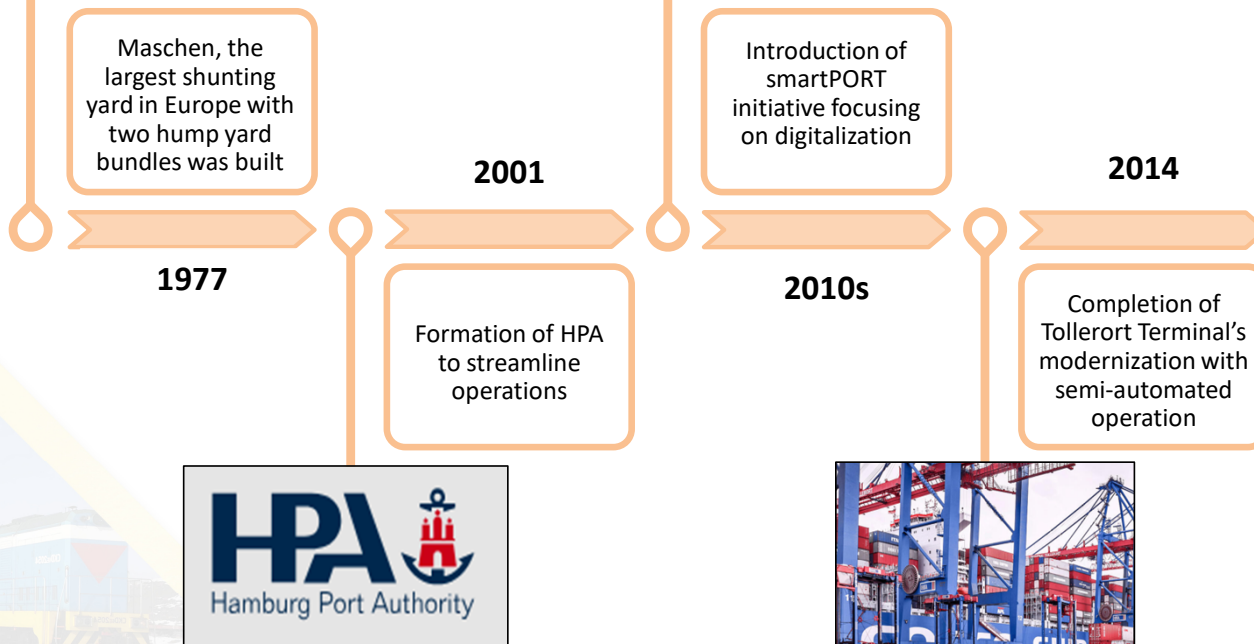
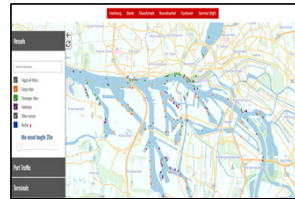
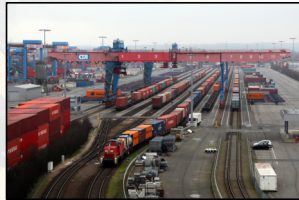
late 1960s

The first dedicated container terminal opened on a new site at the west of the harbor



Best Practices in the world

Port of Hamburg

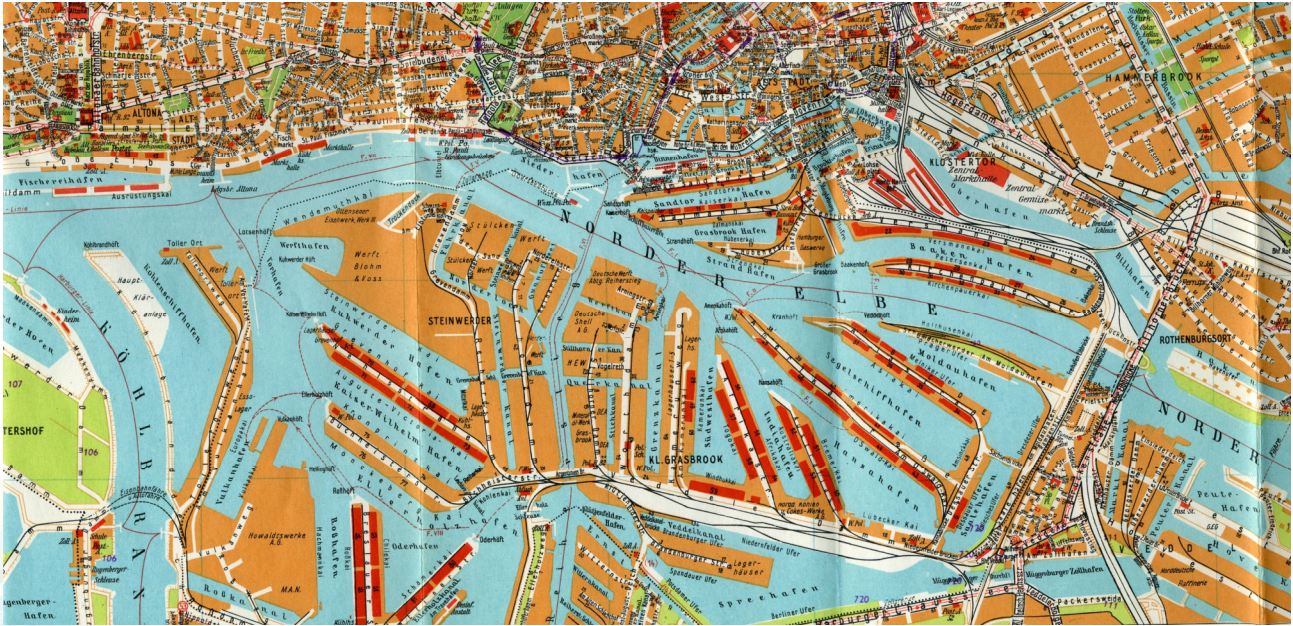


Best Practices in the world

Port of Hamburg



Layout of port in the mid 1960s



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Best Practices in the world

Port of Hamburg



Layout and access

-Approximately 300 kilometers with 750 track switches
-Approximately 80 customer owned connecting spurs, totally 120 kilometers

The HPA network is connected to the national network at 5 locations



4 major electrified yards used for blocking trains, allowing entry and exit with mainline locomotives

4 major container terminals located on dock with high capacity overhead RMGs for transshipment

Best Practices in the world

Port of Hamburg



Governance



Ownership

Hamburg Port Authority (HPA) (public)

Management

HPA at port rail yard and connecting lines

National infrastructure manager, DB

Most of the sidings within the port belong to private industries

Users

The infrastructure is open to all qualified railway undertakings

HHLA (public) operates with its own fleet branded as Metrans

Best Practices in the world

Port of Dammam



Direct rail connection to the national network: Dammam is linked via the Saudi Railway Company (SAR) and connects to Riyadh and dry ports inland, reducing road congestion.

Dry port integration (Riyadh Dry Port): Efficient cargo handling from port to dry port via rail minimizes turnaround times and supports inland logistics.

Government investment and Vision 2030 alignment: Strategic upgrades to rail-port infrastructure are part of Saudi Arabia's logistics transformation goals, improving multimodal integration.



Best Practices in the world

Port of Dammam



Opening of first railway line which connects the port and Riyadh

1951



New container terminal with 3*1400m tracks and overhead RTG cranes

1982

mid 2010s

Riyadh Dry Port was built



2022

The Port handled as containers 2 million TEU



Best Practices in the world

Port of Dammam



Governance



Ownership

Saudi Global Ports (SGP) (public)

A joint venture between Gov. of Saudi Arabia-Singapore based PSA

Management

Operations within the port and on mainline railway network are done by Saudi Arabian Railway (SAR)

Users

Infrastructure is open to private companies like Arasco, Saudi Cement SAR (public)

Best Practices in the world

Port of Dammam



Layout and access

Second pier;

- offers on-dock rails for grain, cement, bulk goods
- 3*1400m tracks with overhead RTG cranes for container transshipment



4 piers, 2 piers have rail access

- First pier has 3*950m tracks in the center with RTG cranes for container transshipment

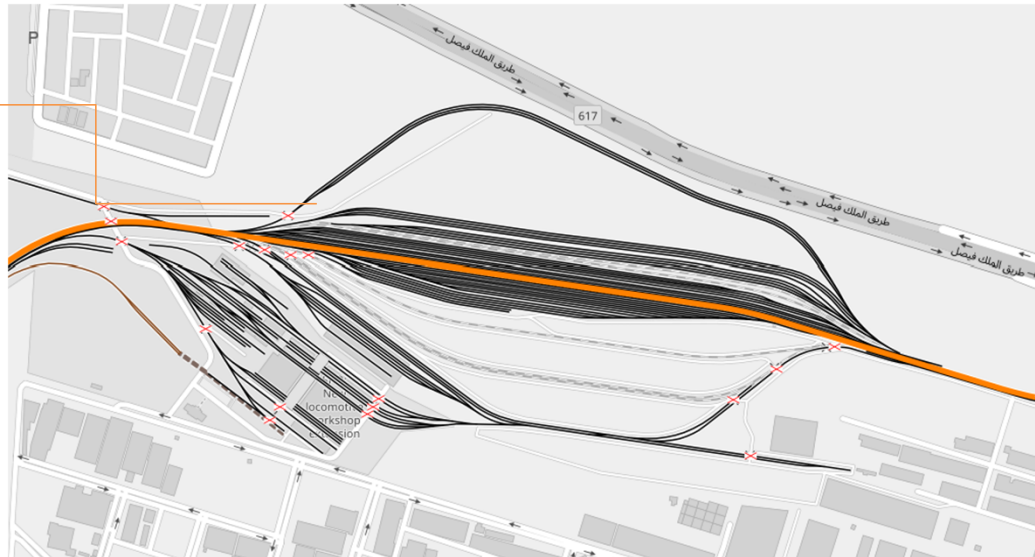
Best Practices in the world

Port of Dammam



Layout and access

8 tracks with max length of 1100m for transshipment at city terminal with reachstackers



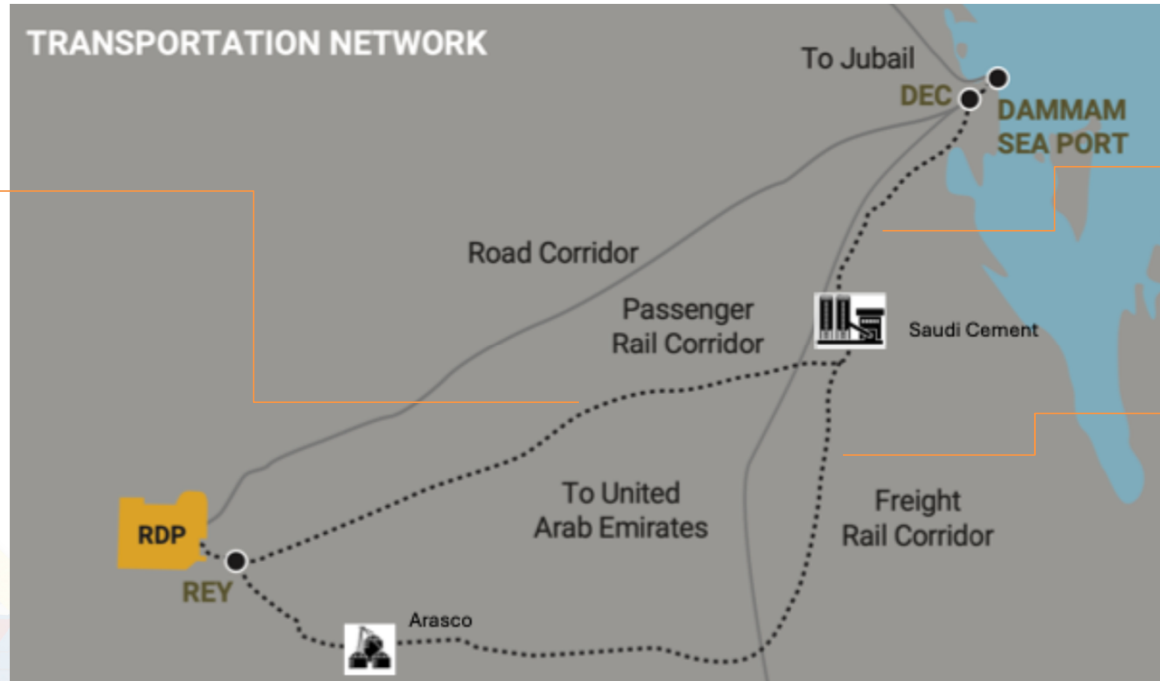
Connection to main railway yard in Dammam by a double track rail line which has 36 tracks

Best Practices in the world

Port of Dammam



Map of hinterland rail connections from Dammam



Rail connection between Dammam port and Riyadh Dry Port

Cement is transported between Saudi Cements facility and the port for export

Grain is imported through the port by Arasco and loaded on rail

Crucial Factors for Success

- 1 Availability of rolling stock (wagons and locomotives)
- 2 Introduction of scheduled freight trains with fast turnaround also in other terminals (such as at DP World)
- 3 Allowing PPP arrangements for providing intermodal rail services
- 4 Enhancing the reliability and safety of the rail infrastructure
- 5 Infrastructure at port to facilitate rail connectivity
- 6 Systems at port to facilitate rail connectivity
- 7 Digital transformation and expected implications

Crucial Factors for Success

Infrastructure at port to facilitate rail connectivity






- Track capacity allowing a maximum number of assembled wagon-sets to meet current & future demand
- Marshalling yards to simultaneously cater to laden and empty wagon-sets.
- Storage yard for container transfers to/from rail.
- Shunting locomotives to adequately serve train arrivals.
- Dedicated Gantry cranes for fast train / yard transfer
- Dedicated mobile plant used for yard handling
- Other.....

Systems at port to facilitate rail connectivity

- Railway port infrastructure management systems.
- Access to 5G telecommunication networks
- Digitalization; digital technologies and processes that maintain high efficiency of freight movement.
- Organizational change; formation of new business models, sources of revenue, and pricing systems.
- Other.....

Crucial Factors for Success

Digital Transformation & Expected Implications

TECHNOLOGY Digitalization DATA SCIENCE Analytics PROCESSES Operations INNOVATION 	 First Mover	<ul style="list-style-type: none"> Importance of being first bringing a new product to the market.
	 Demand Responsive	<ul style="list-style-type: none"> Focus on customer and market demands to align production and distribution.
	 Cooperation	<ul style="list-style-type: none"> Focus on co-operation and partnerships (intra and inter organization). Downstream / upstream the supply chain, competitors and start-ups.
	 Organizational Change	<ul style="list-style-type: none"> New governance and business models with flexible partnerships. New revenue models and pricing systems.
	 Continuous Change	<ul style="list-style-type: none"> Continuous adaptation in organizational and managerial processes.
	 Agility & Resilience	<ul style="list-style-type: none"> Resilient and flexible infrastructure and assets. Improve asset utilization and reduce sunk costs.
	 Competencies	<ul style="list-style-type: none"> Build organizational digital competencies.
	 Digital Focus	<ul style="list-style-type: none"> Incorporate digital processes in organizational layers. Corporate function of Chief Digital Officer or Chief Information Officer.



Thank you

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