BASF
We create chemistry

Excellence in operations: Smart supply chains

Dr. Andreas Backhaus
Senior Vice President, European Site Logistics Operations
November 21, 2018

Cautionary note regarding forward-looking statements

This presentation contains forward-looking statements. These statements are based on current estimates and projections of the Board of Executive Directors and currently available information. Forward-looking statements are not guarantees of the future developments and results outlined therein. These are dependent on a number of factors; they involve various risks and uncertainties; and they are based on assumptions that may not prove to be accurate. Such risk factors include those discussed in the Opportunities and Risks Report from page 111 to 118 of the BASF Report 2017. BASF does not assume any obligation to update the forward-looking statements contained in this presentation above and beyond the legal requirements.

We develop new supply chain solutions to increase our efficiency

Operational excellence

Operational excellence improves our plant availability and efficiency

Site logistics operations

Dynamic site logistics enable agility in delivering our products

Digitalization

Digitalization enhances our technology footprint

New supply chain solutions

1. BASF Class Tank Container
2. Tank container storage yard
3. Automated Guided Vehicles

BASF
We create chemistry

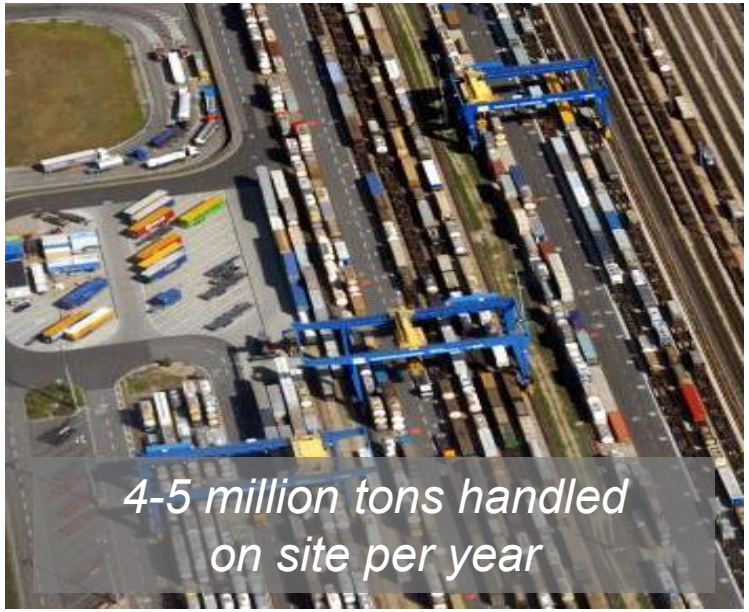
Ludwigshafen efficiency depends on reliable inter- and intra-site logistics

Road:
2,100 trucks daily
32% of transport volume

Rail:
400 rail cars daily
26% of transport volume

Inner waterways:
20 ships daily
42% of transport volume

Pipelines:	2,850 km
Roads:	106 km
Rail tracks:	230 km



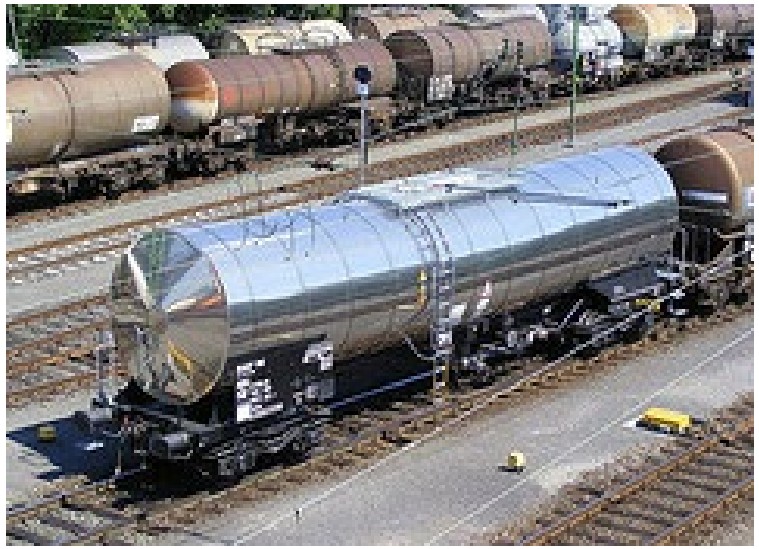
4-5 million tons handled on site per year

The current intra-site rail bulk process is rather slow

- Every day railcars need to be strung together into 40 trains, delivering railcars to 160 loading stations
- Train building process at the hump is very time consuming and complex
- High amount of shunting activities lengthens the process further

Three distinct measures increase the process efficiency

1. **We innovate:** BASF Class Tank Container – a new container type



Classical rail tank car
70,000 liter volume
64 tons payload

BASF Class Tank Container
up to 73,000 liter volume
66 tons payload

Standard tank container
25,000-36,000 liter volume
25 tons payload

Three distinct measures increase the process efficiency

2. We build: Fully automated BASF tank container storage yard

Storage capacity of 2,000 twenty-foot equivalent units with a maximum stacking height of six containers

Accessibility via two cranes spanning across three railroad tracks and eight loading bays

Compliance with highest safety standards allows the storage of a wide range of chemicals

BASF
We create chemistry

Three distinct measures increase the process efficiency

3. **We develop:** New Automated Guided Vehicle (AGV) transport system

AGV at a gross weight of 110 tons with a payload of 78 tons distributed across 32 wheels

Intermodal switch between regular rail carrier and AGV ensures fast deployment on site

Tele-operated control stands allow monitoring and vehicle operation even if transponder lane is blocked

BASF
We create chemistry

The revamped process is faster and more flexible at reduced cost

- Fully automated yard as de-coupling point between external and internal transport
- Fast and flexible onsite transport with Automated Guided Vehicles
- Noise and payload optimized rail wagons for external transport

BASF
We create chemistry

Further opportunities arise by scaling these developments

- Concept can be implemented independent of site location
- Extension of the current implementation scope will lead to further operational excellence savings
- BASF Class Tank Containers – potentially a new segment in intermodal transport for all industries

BASF

We create chemistry