Port logistics 4.0

Track capacity management digitally and at a glance for all actors

Fig. 1: Track capacity management in mobile use

The German import and export business is booming, and projections promise economic growth at a consistently high level. The planning effort at ports, as the central transit point, is increasing with the growing volume of goods. For port logistics, it is necessary to maintain an overview of all processes on the track infrastructure, and to provide the users with the necessary information and make tracks available at the right time. Seamless communication between all actors ensures efficient processes and optimal track occupancy. The use of a solution for digital track capacity management transparently provides all of the necessary data for booking and exact invoicing of the track usage with a reduced error rate.

The importance of the railway as an environmentally friendly mode of transport is increasing, as is the volume of cargo transported by sea. Both trends come together at the interface for the entire transport route: at the port. One of the biggest German sea ports, for example, is frequented by more than 100 different railway undertakings (RUs), records more than 9,000 ship arrivals per year, and handles around 140 million tonnes of seaborne cargo. Here, trains are unloaded, shipping containers are loaded onto trains and prepared for transportation inland. When a train arrives at the port, it requires track capacity for inbound and outbound train processing, for shunting procedures, turnarounds, or cargo handling operations. These track capacities must be provided to the RU by the port infrastructure operator with no discrimination, i.e.

there may not be preferential treatment given to certain railways. The port charges usage fees for the use of the track in accordance with tariffs and regulations determined by the port. Planning of the track occupancy requires precise coordination between the port authority, the RU, the terminals, and the shunting service providers. This means a great deal of planning. If coordination errors and unsynchronised processes occur, this results in unnecessary waiting times, the flow of traffic at the port is obstructed, and higher costs arise from longer track usage times and delays in goods transport. Until now, track capacity management has often been based on Excel-based solutions developed in-house in combination with a wide range of paper documents. There was no universal solution and the effort of communication between the actors was time-consuming. The use of a digital solution for usage-specific, paperless invoicing and documentation, for example zedas cargo[1] (see Figure 1), ensures synchronised processes at the port. This creates an exact basis for invoicing and, thanks to optimised scheduling, allows for efficient track utilisation. All processes, from track scheduling through advance train notification to invoicing, can thus be connected, centrally managed, automated and documented (see Figure 2). Processes coordinated between all parties involved result in reduced waiting times and an improved flow of traffic at the port. Modern track capacity management is also indispensable for the extensive documentation obligations. With the introduction of a digital solution which supports the operational and commercial processes for powerful controlling, ports achieve track utilisation which makes the best possible use of all resources. The dispatchers have all of the key information about the location or status of the wagons, the track occupancy, the wagon

sequence, information regarding the cargo, or service lives in front of them on the computer screen.

Smart communication for agility without time delays

With digitisation, seamless communication between everyone involved in a process is possible in real time. A modern solution for track capacity management must also provide a modern communications platform with high data quality. It thus constitutes the "digital door" to the port for RUs, shunting service providers and terminals, and contributes to creating closer links between ports and their customers and partners. If an RU is planning train journeys to the port, such a solution allows all of the data required for questions relating to the use of infrastructure to be collected in advance, for both regular and ad hoc traffic. For the RU, this simplifies the arrangement of dates with the port through the automated communication of all necessary train and wagon information. All scheduled and invoiced services can thus be seen transparently at a glance, and quick and easy verification is made possible. The dispatcher then carries out scheduling and scheduling authorisation. In addition to management of the contract data, digital track capacity management allows for graphic representation of the planning by means of Gantt diagrams[2], in which any conflicts are directly visualised and adjustments can be made intuitively using drag & drop. Each usage request should be given a transaction number as a clear assignment criterion so that all relevant actions within the overall process, from the request through operational planning and scheduling to payroll, are available as a package.

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[1] **zedas®cargo** is a registered trademark of ZEDAS GmbH, Senftenberg;

[2] Gantt diagram ➡ bar chart/bar graph ➡ a project management instrument

Customer portal	Planning and scheduling	Invoicing
• Booking requests	• Contracts and tariffs	• Usage fees
• Bookings	• Operation planning	• Additional services
• Cancellations	• Booking approvals	• Cancellations
• Track calendar	• Acceptance wagon data	• Credit notes
• Upload wagon data	• Manoeuvring procedures	• Invoices
• Invoices	• Track occupancy	• Controlling

Fig. 2: The functioning of zedas®cargo track capacity management

Before the arrival of the train, the RU can enter all train and wagon data which is required for further planning via a web portal (see Figure 3). It should also be possible to provide advance train notification by means of interfaces or data upload. As a result, train advance notification information such as the train number, wagon sequence, or freight details is available to the dispatchers before the train arrives. Through interfaces with the railway infrastructure operator, the port can be informed promptly of the actual train movements. In the event of a delay, it can thus immediately adjust its planning. Long-term planning can also be rolled out in a digital solution in the form of flexibly adjustable sample plans within a scheduling period in the calendar.

Portable illustration of shunting logistics

If the train is at the port, the status of trains and their wagons, as well as their location, can be seen in the port infrastructure. Based on the collection and delivery requirements, terminal employees can use a digital solution to query and assign the delivery or collection of wagons with specific parameters such as track, cargo or number for a specific time. The provision of a modern, platform-independent web solution also allows for mobile communication with the shunting staff and the RU. Complex agreements,

manual recordings, and the associated sources of error can thus be avoided. With the help of the mobile solution, all processes at the port can be mapped in real time. This allows to manage and document the wagon movements within the port. The actual track occupancy situation can therefore always be viewed in graphic form in the system. The dispatchers can see at a glance what operations the RU and shunting service providers are carrying out, where individual wagons are located, or what their loading status (empty or loaded) is. In addition, customer communication via email and interfaces should be possible at any time.

Fair and customer-oriented usage fees

The digitisation of track capacity management provides exact bases for invoicing because the entirety of the wagon circulation, from arrival through the retention times, changes of status, and track locations through to the departure time are recorded in detail. The usage fees for invoicing are automated and transparently determined on the basis of this data, as well as the customer data stored in the system and the invoicing regulations. Approval for the value date and account assignment, as well as invoicing including cancellations and credit entries, is either

Fig. 3: Track calendar with booking request

done in the software solution itself or the data is transmitted to a third party system such as an ERP system (enterprise resource planning system). The comprehensive data basis allows ports to better adjust their tariff systems to suit the actual terms of use. Instead of flat rate fees, usage-specific invoices are possible. With such a digital solution that provides all relevant data for invoicing in a single system, port control maintains an overview of the usage fees, ancillary services, cancellations, credit entries, and invoices. For the RU, the invoicing is accessible and transparently understandable at any time.

Attractive port logistics through transparent track capacity management

The digitisation of track capacity management makes efficient track utilisation possible for ports: the dispatcher receives all of the relevant data at a glance and can optimally manage all processes at the port and improve the utilisation of the rail infrastructure based on the performance indicators and analyses. Employees can access key data at any time and from any location, and are also relieved of the need for time-consuming routine work such as manual data recording for wagon information. Invoicing is done transparently and accurately according to usage. The effort is thus reduced for everyone involved in the processes, track occupancies are planned and invoiced effectively. The modern, digital port ultimately gains increased attractiveness because intuitive track scheduling, transparent invoicing, and smooth handling give the port an image boost as a business partner for RUs, terminals and shunting service providers.

Author

Chris Richter
Head of Sales zedas®cargo
ZEDAS GmbH, Senftenberg
crichter@zedas.com