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Redefining logistics: SAP EWM's built-in Yard management strategy

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Abstract In today's dynamic and interconnected business landscape, logistics management plays a pivotal role in ensuring seamless operations and customer satisfaction. With the advent of advanced technologies, such as SAP Extended Warehouse Management (EWM), businesses have been empowered to streamline their logistics processes further. This paper explores the significance of yard management within logistics operations and delves into how SAP EWM's built-in yard management strategy is redefining logistics practices.

Keywords SAP, Extended warehouse Management (EWM), Yard Management (YM), History, Features, Uses.

1. Introduction

SAP Extended Warehouse Management (EWM) is an advanced warehouse management solution that offers comprehensive functionalities for managing warehouse operations, including inbound and outbound processes, inventory management, and labor optimization. One of the key features of SAP EWM is its integrated yard management capabilities, which enable businesses to extend their logistics control beyond the warehouse walls.

Logistics operations encompass a series of interconnected activities ranging from procurement to distribution. Yard management, which involves the efficient handling of goods within a storage or distribution yard, holds significant importance in ensuring smooth logistics operations. Traditional yard management processes often involve manual tracking, leading to inefficiencies and delays. However, with the integration of yard management functionalities into SAP EWM, businesses can achieve greater visibility, control, and optimization of their yard operations.

Yard management involves the systematic organization of trailers, containers, and other assets within a logistics yard. Effective yard management ensures timely loading and unloading of goods, optimizes yard space utilization, minimizes dwell times, and enhances overall operational efficiency. Challenges associated with traditional yard management include limited visibility, inefficient asset utilization, and lack of real-time tracking capabilities.

SAP Yard Management allows for vehicle and container tracking within your yard. Yard activities integrate with loading and unloading activities within the warehouse.

Yard management activities in SAP EWM includes,

Check in and check out.
Load and Unload
Yard Movements
Dock door scheduling and assignment
Sealing and Unsealing
Weighing
Registration of drivers and equipment.

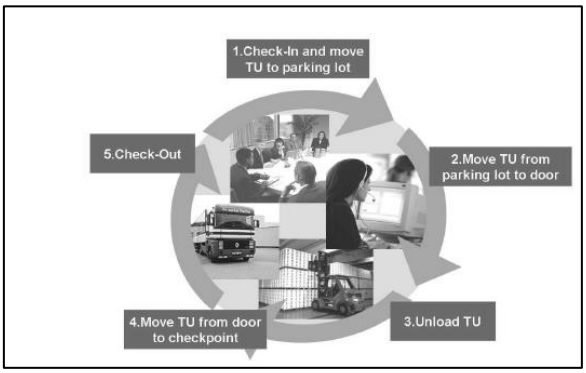

Figure 1: Yard Management Process

SAP Yard Management Organization Structure:

The Yard is configured as an extension of the warehouse.

It Can also be configured as its own warehouse and shared by multiple warehouses. Yard is defined as a storage type with role "yard." Yard is divided into storage sections for,

Checkpoints

Parking spaces

Doors

Bins are created for each yard object. Warehouse tasks are used to move things around the yard.

Check Point: A checkpoint serves as a pivotal location within the logistics process. It marks the entry and exit point for trucks before and after the loading and unloading of goods at the warehouse. Essentially, it acts as the gateway for trucks entering and exiting the yard, ensuring systematic flow and control over inbound and outbound traffic. [1]

Parking Spaces: Parking spaces within the yard provide temporary resting spots for trucks when the warehouse doors are occupied or unavailable. These designated areas serve as holding zones until the doors become free for loading or unloading operations. However, if the warehouse doors are

accessible, trucks can bypass the parking spaces and proceed directly to the designated door for their cargo operations, optimizing efficiency and minimizing waiting times. [1]

Door: The warehouse door is the primary point of interaction between the truck and the warehouse facility. It serves as the locus for loading and unloading activities, where goods are exchanged between the truck and the warehouse personnel. Upon completion of these operations, the truck departs from the warehouse through the designated checkpoint, marking the conclusion of its visit to the facility. This sequential flow ensures a structured and orderly process for the movement of goods within the warehouse environment. [1]

2. Literature

A. Overview:

Yard Operations: SAP Yard Management enables companies to efficiently manage yard operations, including check-in, check-out, staging, and prioritization of trailers based on predefined business rules.

Resource Allocation: It helps in allocating resources such as dock doors, yard locations, and equipment (like forklifts) effectively to optimize yard operations.

Visibility and Tracking: It provides real-time visibility into yard activities, allowing users to track the status and location of trailers, containers, and goods within the yard.

Integration with Other SAP Modules: SAP Yard Management integrates seamlessly with other SAP modules like Transportation Management (TM), Warehouse Management (WM), and Extended Warehouse Management (EWM) to provide end-to-end visibility and optimization across the supply chain.

B. History: SAP Yard Management has evolved over the years along with advancements in technology and changes in supply chain management practices. Here's a brief history:

Early Development: SAP recognized the need for yard management capabilities as part of its broader supply chain management solutions. Initial versions of yard management functionalities were introduced in SAP's Warehouse Management (WM) module.

Dedicated Solution: As the demand for more specialized yard management capabilities grew, SAP developed a dedicated Yard Management solution to address the unique requirements of managing trailer movements and storage within yards.

Integration with SCM: With the evolution of SAP's Supply Chain Management (SCM) suite, Yard Management became an integral component of the SCM offering, providing seamless integration with other SCM modules such as Transportation Management (TM) and Extended Warehouse Management (EWM).

Enhancements and Updates: SAP continuously enhances its Yard Management solution to keep pace with industry trends and customer needs. This includes improvements in usability, integration capabilities, and support for new technologies such as RFID and IoT for enhanced visibility and automation.

Cloud-Based Offerings: In line with the broader trend of cloud adoption in enterprise software, SAP has also introduced cloud-based offerings for Yard Management, providing customers with greater flexibility and scalability in deploying and managing yard operations.

Overall, SAP Yard Management has evolved into a comprehensive solution that helps organizations streamline their yard operations, improve efficiency, and enhance visibility across their supply chain networks.

C. Key features of SAP EWM Yard Management:

a. **Real-time Visibility:** SAP EWM provides real-time visibility into yard operations, allowing businesses to track the location and status of trailers, containers, and other assets within the yard.

b. **Automated Task Management:** With SAP EWM, yard tasks such as check-in, check-out, and trailer assignment can be automated, reducing manual intervention and streamlining operations.

c. **Dynamic Yard Planning:** SAP EWM enables dynamic yard planning based on factors such as available space, priority, and dock availability, optimizing yard operations, and minimizing congestion.

d. **Integration with Warehouse Processes:** By integrating yard management with warehouse processes, SAP EWM ensures seamless coordination between inbound, outbound, and yard activities, leading to improved efficiency and throughput.

e. **Reporting and Analytics:** SAP EWM offers robust reporting and analytics capabilities, providing insights into yard performance metrics such as dwell times, asset utilization, and turnaround times, enabling informed decision-making and continuous improvement.

f. **Management of Yard Processes [1]:** SAP EWM Yard Management offers comprehensive tools for overseeing all aspects of yard operations. From tracking the movement of vehicles and goods to managing parking spaces and dock doors, it provides a centralized platform to streamline and
optimize yard processes.

g. **Yard Monitor [1]:** The Yard Monitor feature enables real-time visibility into yard activities. It provides a graphical representation of the yard layout, displaying the location of trucks, trailers, and other assets. This allows users to efficiently monitor yard operations, track inventory, and make informed decisions to enhance productivity and resource allocation.

h. **Yard Alerts [1]:** SAP EWM Yard Management includes alerting functionalities to notify users of critical events or deviations from predefined yard management processes. Alerts can be configured to trigger notifications for various scenarios such as delayed arrivals, exceeded dwell times, or unexpected changes in yard status. This proactive approach helps users promptly address issues and maintain operational efficiency.

i. **Scheduling Chart [1]:** The scheduling chart feature provides a visual representation of yard activities and resource allocation over time. It allows users to create and manage schedules for tasks such as vehicle arrivals, dock assignments, and loading/unloading activities. By optimizing resource utilization and minimizing idle time, organizations can improve throughput and reduce bottlenecks in yard operations.

j. **Mobile Device Ready [1]:** SAP EWM Yard Management is designed to be mobile device-friendly, enabling users to access essential yard management on the go. Whether on the warehouse floor or in the field, users can use their mobile devices to perform tasks such as updating yard statuses, recording trailer movements, or receiving real-time alerts. This mobility enhances flexibility and responsiveness in managing yard operations.

k. **Seamless Integration with SAP's Warehouse, Shipping, etc. [1]:** One of the key strengths of SAP EWM Yard Management is its seamless integration with other SAP modules such as warehouse management (WMS), transportation management (TMS), and shipping. This integration enables end-to-end visibility and control across the supply chain, allowing organizations to synchronize yard activities with warehouse operations, transportation planning, and order fulfillment processes. By leveraging a unified platform, businesses can achieve greater efficiency, accuracy, and collaboration throughout their logistics operations.

D. System Landscape:

Yard management is an integral part of the Extended Warehouse Management (EWM) functionality provided by SAP. It offers flexibility in implementation, as it can be deployed within the traditional ECC (Enterprise Core Component) environment or the Supply Chain Management (SCM) suite. Moreover, yard management functionality is designed for seamless integration with other SAP modules and functionalities, ensuring smooth coordination across the entire enterprise ecosystem. Implementation of yard management can occur on the core ECC server or on a decentralized and distributed system, depending on the specific requirements and infrastructure setup of the organization [1].

Yard management serves as a critical function for orchestrating the flow of vehicles within the logistics landscape. It encompasses the management of activities in the yard, which refers to the area adjacent to the warehouse where vehicles and transportation units are processed [2].

Key Components of Yard Management [2]:

Yard Location Management: This component involves mapping physical locations such as parking lots and doors to system entities like trucks, storage bins, and transportation units. It establishes a structured framework for organizing and tracking the movement of vehicles within the yard.

Yard Movements: The yard movements component facilitates the physical relocation of transportation units and vehicles within the designated yard locations. It enables efficient maneuvering of assets to optimize space utilization and streamline operational processes.

Yard Stock: This component focuses on reporting the contents of transportation units to facilitate and control loading and unloading activities. It provides visibility into the inventory housed within the transportation units, enabling accurate tracking and management of goods flow.

Basic Data Entity of Yard Management:

In yard management, the fundamental data entity is the vehicle, which serves as the primary unit for tracking yard activities. Vehicles can be created as standalone entities or linked to shipping or delivery documents. They are categorized as means of transport (such as tractors) or transport equipment (like trailers) [1].

Yard management leverages the handling unit (HU) concept to represent vehicles in the yard. The relationship between handling units and transportation units (TUs) is strictly one-to-one, ensuring clarity and accuracy in tracking assets [1].

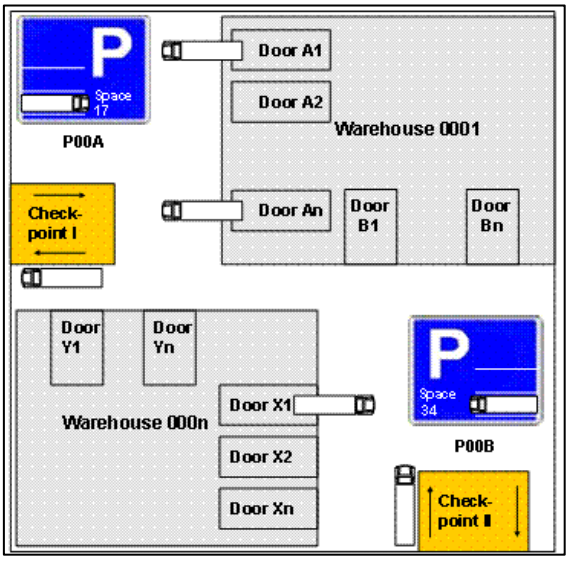

Figure 2:[3]

The operational workflow in yard management typically begins with the arrival of transportation units or vehicles at the checkpoint, where they are registered into the system. If a designated door for loading or unloading is unavailable, the transportation unit is directed to a parking space within the yard [2].

Yard movements enable the relocation of transportation units within the yard premises, facilitating efficient space management and resource allocation. Each movement of a transportation unit requires the creation of a warehouse task in EWM, ensuring systematic execution and tracking of yard operations. These warehouse tasks for yard movements are specifically categorized as handling unit warehouse tasks (HU WT), providing a specialized framework for managing yard-related activities.

E. Yard Management Challenges:

Yard management is often underestimated within the broader scope of the supply chain, yet it plays a pivotal role as a crucial link between warehouses and transportation networks. Its effective operation is imperative for maintaining overall supply chain efficiency. However, challenges within yard management can significantly impede this efficiency, resulting in delays, errors, and operational setbacks that ripple through the entire supply chain.

According to industry analysis, the average transit time for a trailer moving between facilities is three days, with a staggering 80% of this time, equating to 2.5 days, spent idling in yards during loading or unloading processes. Such extended idle times not only lead to delays but also pose risks such as production downtime, product spoilage (especially for perishables), and missed business opportunities.

One of the primary contributors to these challenges is the lack of visibility across yard operations. While organizations typically invest resources in managing warehouses, transportation, and customer service, the monitoring and analysis of yard operations often suffer from limited visibility and fragmented information. Critical data points such as driver detention, location status, arrival/departure times, gate congestion, and door availability are often difficult to track and analyze comprehensively.

Several **common challenges** arise due to visibility issues within yard management:

i. Inability to identify empty locations for inbound or outbound schedules.
ii. Incurrence of detention charges due to extended idle times.
iii. Lack of visibility into shipments moving between yards.
iv. Gate congestion leads to delays in entry or exit.
v. Difficulty in monitoring and managing overall yard operations.
vi. Limited visibility into the status and location of shipments within the yard.

However, these challenges can be effectively addressed through the integration of advanced yard management solutions, such as SAP EWM, within next-generation warehouse management systems. By leveraging comprehensive yard management functionalities, organizations can enhance visibility, streamline operations, and proactively address challenges to ensure smooth and efficient yard operations, ultimately contributing to the optimization of the entire supply chain ecosystem.

F. Yard management uses with built in EWM strategy:

Reduce Idle Dock Time and Prepare for Peak Times [1]:

By integrating yard management with built-in EWM strategies, organizations can effectively minimize idle dock time and anticipate peak periods. Through proactive planning and resource allocation, the system can optimize the flow of goods and vehicles, ensuring that loading and unloading activities are completed efficiently, even during high-demand periods.

Complete and Detailed History of Yard Activities [1]:

Integrated yard management provides a comprehensive record of all yard activities, offering valuable insights into past operations. This detailed history enables organizations to analyze performance, identify trends, and make informed decisions to enhance yard efficiency and productivity over time.

Reduced Congestion and Improved Flow:

Integrated yard management strategies focus on optimizing vehicle movement within the yard, thereby reducing congestion, and minimizing delays and bottlenecks. By implementing streamlined processes and automated workflows, organizations can ensure smooth and uninterrupted flow of goods through the yard, enhancing overall operational efficiency.

Increased Dock Utilization:

Integrated yard management facilitates efficient scheduling of appointments and tasks at loading/unloading docks, maximizing dock utilization and throughput. By dynamically allocating resources based on real-time demand and capacity, organizations can minimize idle time at docks and maximize the efficiency of their warehouse operations.

Enhanced Visibility:

Integrated yard management provides real-time visibility into the entire yard operation, allowing organizations to track the status of vehicles, doors, and tasks from a centralized dashboard. This enhanced visibility enables proactive monitoring and management of yard activities, facilitating timely decision-making and response to changing conditions.

Improved Resource Management:

Integrated yard management enables organizations to optimize the utilization of yard workers and equipment, ensuring smoother operations and efficient resource allocation. By aligning workforce and equipment availability with operational demand, organizations can minimize idle time and maximize productivity in the yard.

Better Customer Service:

Integrated yard management helps reduce wait times for carriers by streamlining yard operations and improving overall efficiency. By enhancing the carrier experience, organizations indirectly contribute to faster order fulfillment and improved customer satisfaction, ultimately driving better business outcomes and customer loyalty.

G. A use case for yard management in SAP EWM (Extended Warehouse Management) could be as follows:

Use Case: Inbound Delivery of Goods

Inbound Delivery Arrival: When a shipment of goods arrives at the yard, the SAP EWM system captures crucial delivery information such as the delivery date, time, and the specifics of the goods being delivered. This data serves as the foundation for subsequent yard management activities.

Yard Storage Assignment: Utilizing predefined rules and parameters, the SAP EWM system automatically assigns a suitable storage location within the yard for the incoming goods. Factors considered include the type of goods, quantity, and priority of the delivery, ensuring efficient utilization of yard space.

Yard Entry and Exit Management: The SAP EWM system actively monitors and manages the entry and exit of vehicles in the yard. By enforcing predefined rules and schedules it ensures that the right vehicles enter and exit at the appropriate times, minimizing congestion and optimizing workflow.

Yard Capacity Planning: Continuous monitoring of yard capacity is a critical function of the SAP EWM system. It alerts users when yard capacity approaches its limits, enabling proactive planning and resource allocation to avoid congestion and operational disruptions.

Yard Slot Management: Based on factors such as vehicle type, size, and cargo specifications, the SAP EWM system assigns parking slots within the yard. This dynamic slot allocation ensures efficient space management and facilitates smooth vehicle movement and access to goods.

Yard Security Management: The SAP EWM system maintains strict control over yard security by tracking vehicle movements and ensuring that only authorized vehicles access the yard premises. Additionally, it monitors the duration taken for vehicles to load or unload goods, enhancing overall security and operational transparency.

Yard Reporting: Real-time reporting is a key feature of the SAP EWM system, providing users with insights into yard operations. Generated reports include metrics such as the number of vehicles entering and exiting the yard, loading, and unloading times, and yard space utilization. These reports enable informed decision-making and continuous improvement of yard management processes.

This use case exemplifies how SAP EWM effectively manages yard operations, optimizing space utilization, ensuring compliance with security protocols, and enhancing overall efficiency in the loading and unloading of goods. Through automation, real-time monitoring, and robust reporting capabilities, SAP EWM empowers organizations to streamline yard management processes and drive operational excellence within their supply chain operations.

H. Future Trends with SAP Yard Logistics module:

The future of logistics management is shaped by the integration of cutting-edge technologies such as artificial intelligence (AI), Internet of Things (IoT), and predictive analytics. SAP EWM is at the forefront of this evolution, continuously evolving to leverage these advancements and offer businesses new for optimizing their logistics operations and maintaining a competitive edge in the market.

Addressing Yard Management Challenges: As warehouses continue to grow and complex, efficient management of yard operations becomes increasingly critical. SAP Yard Logistics module is designed to address these challenges by providing comprehensive control and visibility over yard activities. By leveraging advanced functionalities, such as real-time monitoring, automated workflows, and predictive analytics, businesses can effectively manage yard operations and mitigate potential bottlenecks.

Holistic Solution Integration: Integration with SAP Transportation Management (TM) and SAP EWM enables SAP Yard Logistics to serve as a holistic solution for planning, executing, and reporting on all yard operations. This seamless integration allows for synchronized management of transportation, warehouse, and yard activities, optimizing resource utilization and enhancing operational efficiency.

Visibility and Control: Yards with high volume require robust control and effective monitoring capabilities. SAP Yard Logistics, combined with SAP TM and SAP EWM, provides the necessary visibility and control over yard operations. Through integrative and automated scenarios, businesses can gain real-time insights into yard activities, enabling proactive decision-making and resource allocation.

IoT Integration: SAP Yard Logistics embraces IoT scenarios to further enhance operational efficiency. Features such as self-check-in/check-out terminals, display board control, and assisted driver communication contribute to a more streamlined and connected yard management process. By leveraging IoT capabilities, can improve accuracy, efficiency, and safety in yard operations.

Deployment Flexibility: SAP Yard Logistics is available as an add-on for S/4HANA Enterprise Management or as a stand-alone application connected with S/4HANA Enterprise Management or legacy ERP systems. This flexibility in deployment options allows businesses to tailor their yard management solution to suit their specific requirements and infrastructure.

In summary, SAP Yard Logistics represents the future of yard management, offering advanced functionalities, seamless integration with other SAP modules, and flexibility in deployment options. By embracing emerging technologies and providing comprehensive solutions, SAP EWM continues to empower businesses to optimize their logistics operations and adapt to evolving market demands.

3. Conclusion

Redefining logistics with SAP EWM's built-in Yard Management strategy signifies a paradigm shift towards holistic and optimized yard operations within the supply chain ecosystem. SAP EWM, augmented with the Yard Management module, offers a comprehensive solution that addresses the critical challenges faced in managing yard activities.

By leveraging emerging technologies such as artificial intelligence, Internet of Things, and predictive analytics, SAP EWM evolves to incorporate advanced functionalities, enabling businesses to optimize yard operations, enhance visibility, and improve overall efficiency.

Key features such as real-time monitoring, automated workflows, and predictive analytics empower businesses to proactively manage yard operations, mitigate potential bottlenecks, and optimize resource utilization. The flexibility in deployment options allows businesses to tailor the solution to their specific needs, whether as an add-on for S/4HANA Enterprise Management or as a standalone application connected with legacy ERP systems.

Ultimately, SAP EWM's built-in Yard Management strategy revolutionizes logistics by offering a comprehensive and integrated solution that streamlines yard operations, enhances visibility, and drives operational excellence. As businesses continue to adapt to the evolving landscape of logistics management, SAP EWM remains at the forefront, empowering organizations to redefine their approach to yard management and stay ahead in an increasingly competitive market.

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