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# ADVANCED WAREHOUSE TECHNOLOGIES – PERSPECTIVES AND POSSIBILITIES

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**Abstract**: The selection of orders means to find a number of products in the warehouse matching a number of independent orders of several customers. It is an important part of the supply and distribution chain, accounting for 65% of the total operating costs of a typical warehouse. The emphasis of this work is on the synchronization of all activities within the manufacturing system, which is a permanent challenge for both a successful manufacture and business in general. For the realization of this research task it is necessary to start with the structure of the manufacturing system and to theemphasis the hierarchy of objectives and also the strategies which should be employed for their realizations. Thevalidity of the concept suggested is estimated out by computer simulation, using the initial data from theindustry. The SAP orPerftech.Largo ERP is a simple and technically updated software for creating effective comprehensive business information systems that can at any time provide users with the desired status information in the company. The most commonly used modules are: finance, human resources management, sales and procurement, external operations, production, material operations.The simulation program starts with a temporary presumption that the materials needed for reproduction are available in the input data of the warehouse. All work orders are processed and sent to the data entry of the warehouse.The program starts the data at the time of occurrence of any work order within the system at the time required for its realization and automatically takes into account the priorities of each working order. The user has an intermediateor material warehouse that enables normal operation of the production process and optimal supply time.
**Keywords:** Warehouse, advanced technologies, simulation Program

## INTRODUCTION

The next generation, technology-enhanced warehouses is bringing unprecedented levels of real-time visibility into organizations' assets, people and transactions across a myriad of industries, from discrete manufacturers in automotive, electronics and machinery to food and beverage processing companies. But it's the transformation of the supply chain ecosystem that has prompted operations professionals to take a hard look at upgrading their warehouses with an eye towards boosting productivity, slashing transportation costs and expediting merchandise shipments. As a result, supply chain networks are poised to undergo an extreme makeover over the next few years. Indeed, the retail, wholesale, transportation and logistics sectors are transitioning to "best-of-breed" warehouse management systems that take automization to new heights — from equipping workers with mobile devices that increase the speed and accuracy of order picking to the rollout of radio frequency identification technology (RFID) for real-time inventory visibility. At the same time, executives plan to roll out more warehouses, while expanding their size and retrofitting them from legacy systems into highly mechanized, leaner facilities. This approach is designed to reduce costs and increase responsiveness to customers.

## 1. RESEARCH METHODOLOGY

Warehouse industry is also banking on the IoT to streamline and link up the many moving parts of a supply chain by allowing for real-time, sharable and actionable data insights across a variety of processes, from inventory tracking and order picking to maximizing fleet routes.

As warehouse executives prepare to increase the volume of items shipped in the coming years, they rank outfitting staff with new technology, as well as increasing the use of barcode scanning, tablets and the Internet of Things, as their top initiatives and lead investments for an optimized supply chain.

Succeeding in the new supply chain paradigm calls for shortening merchandise delivery times and slashing transportation costs, which were cited by executives surveyed as the core reasons driving the move to the smart warehouse.

Big investments in automating inventory management, the heart of a warehouse operation, are another strategic imperative.

The RFID technology is another big push. The Internet of Things, objects enhanced with electronics, sensors and network connectivity that enable them to collect and exchange data, has sparked a big buzz around "smart' consumer products, such as fitness wearables that track a user's activity level.When it comes to the application of IoT technology, RFID, once cost prohibitive and now significantly more affordable, will play a critical role in modernizing warehouses for the era of digital commerce. RFID offers the promise of heightened inventory visibility —the ability to know precisely where any pallet, case or SKU is in the warehouse at any given moment. For this reason, retailers, manufacturers, distribution and logistics providers are planning to more than double their usage of RFID for cycle counts and inventory validation by 2020. An RFID-enabled warehouse-management system can boost efficiencies in put-away and picking, verify shipments received from the manufacturer and those shipped to stores with greater precision, increase everything from inventory accuracy to merchandise replenishment speed — while reducing opportunities for human error.Optimizing warehouse logistics so that the right goods reach the right customers at the right time has never been more crucial amid the explosion of direct-to-consumer sales. A changing ecosystem means retailers, wholesalers and transportation companies are not only delivering items to stores, but shipping them to consumers' homes. In addition, they are servicing more customer who buy online, pick-up in-store and meeting the growing demand for same-day deliveries

## 2. USHERING IN AN ERA OF WORKER PRODUCTIVITY

Warehouse executives are also turning to technology enhancements to ratchet up worker productivity when it comes to order picking and fulfillment, which eats up 70 percent of a facility's operating costs.The move to multi-modal picking, which augments voice picking with screen-directed picking on mobile devices, be they handheld and vehicle-mounted or wearables, is designed to automate and quicken the workflow to accommodate order volume surges in the supply chain, reduce pick and fill costs and enhance profit margins.At the same time, companies will turn to task interleaving to boost worker efficiency. The productivity practice maximizes employees' movements based on their location and equipment usage in the space by assigning them multiple tasks, such as order picking or truck loading. Studies show that task interleaving can boost worker productivity from 10 percent up to 40 percent.Over the next five years, warehouse executives will expand the use of cross-docking, which minimizes material handling by eliminating unnecessary put away. Their goal is to increase inventory throughput and decrease delivery times without the need for additional storage capacity — efficiencies that have gained new importance as order volumes increase and per order values decrease.

## 3. GOING GREEN

Over the next few years, warehouses will become increasingly eco-friendly. As "conscious capitalism" has moved from the margins to the mainstream in business practices, the warehouse industry is no exception.Key eco-conscious initiatives include reducing and recycling the packaging materials used during shipping, and cutting down on energy consumption by purchasing high-efficiency equipment. When it comes to implementing environmentally friendly practices, doing good can also mean doing well: While most respondents said they view green initiatives as an expense, they also see it as a savings opportunity.Beauty company Kiehl's, for example, recently switched from box to envelope shipping. The move reflected a push toward sustainably, but it also ended up reducing Kiehl's product shipping costs.

## 4. DISCUSSION AND EXAMPLES

The successful application of advanced warehouse technologies leads to increased productivity, better quality and cost savings. The Perftech.Largo ERP software is used. is a simple and technically updated software for creating effective comprehensive business information systems that can at any time provide users with the desired status information in the company. The LARGO system has several working modules that are used in the organization and operation of a company: finance, human resources management, sales and procurement, external operations, production, material handling, storage.

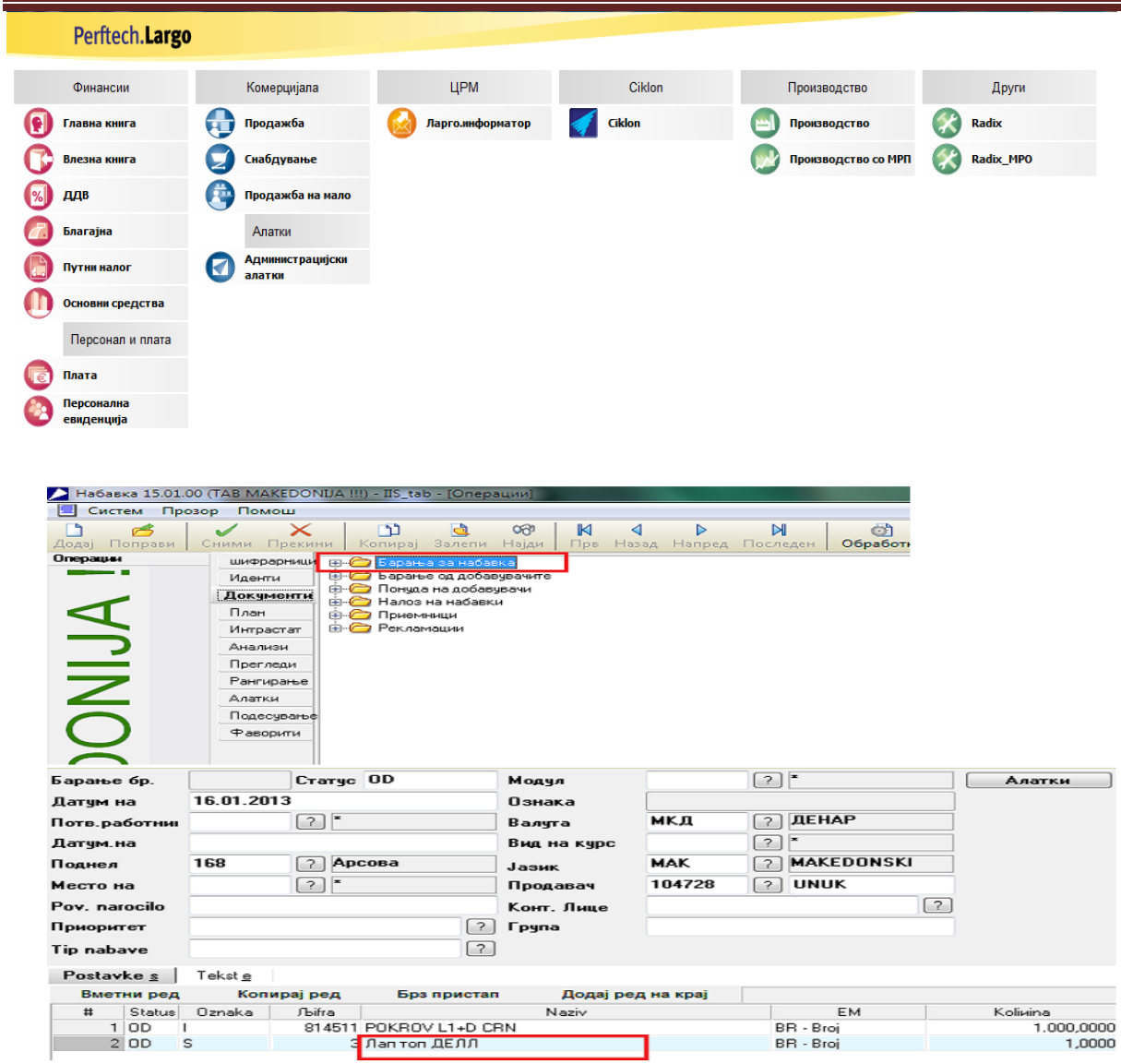


*Figure 1. Window of Largo software*

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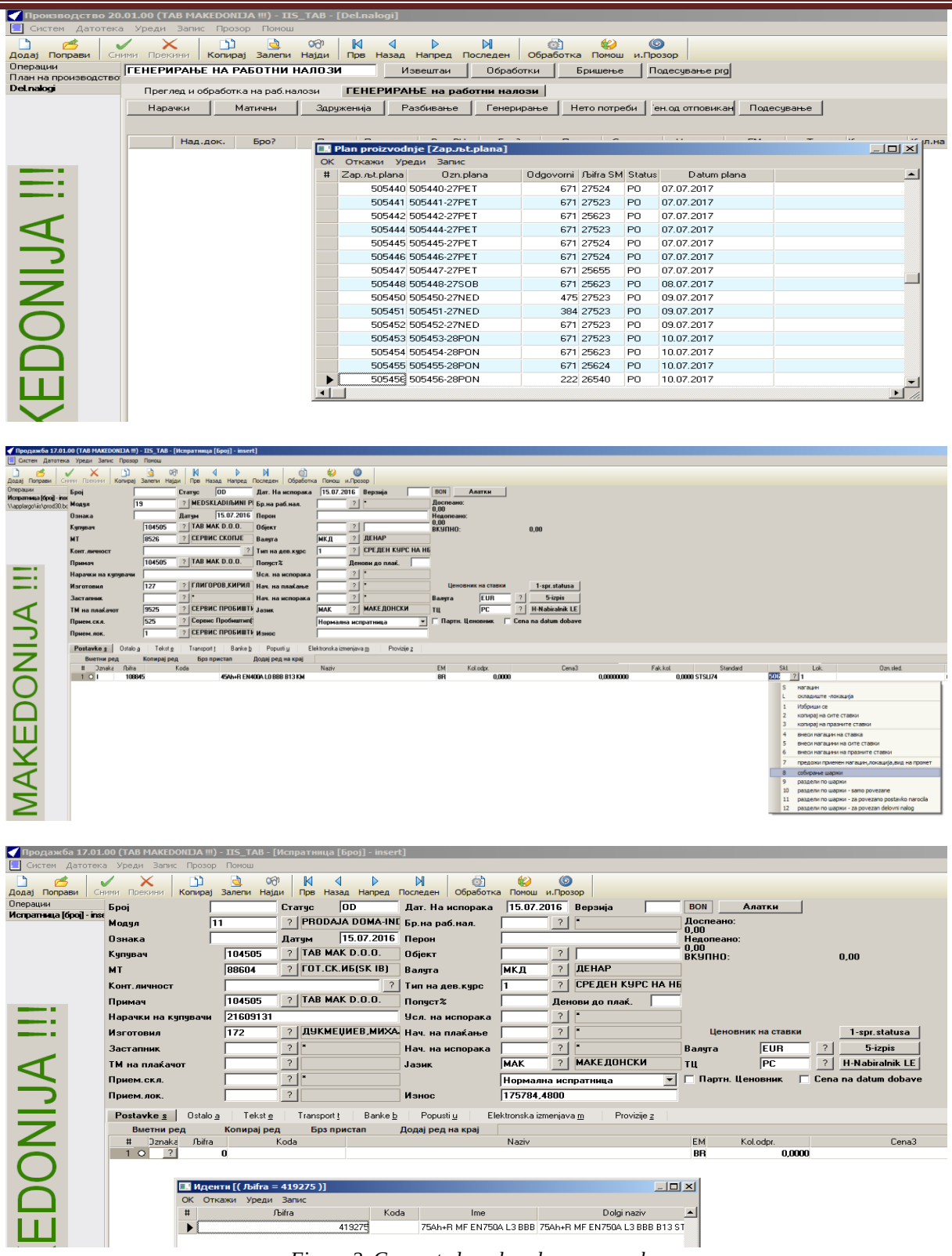


*Figure 2. Generated work orders - examples*

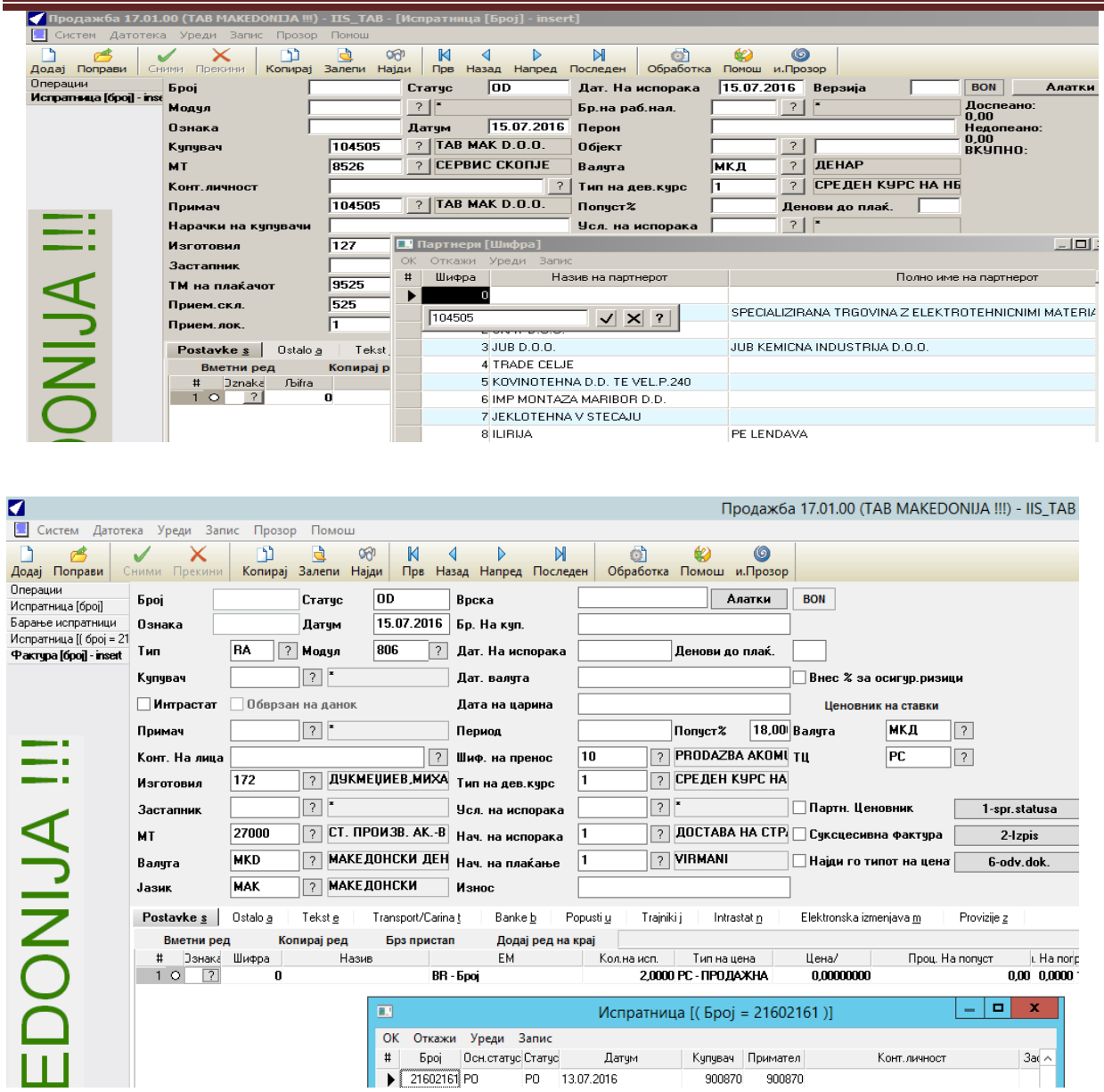





*Figure 2. Generated work orders - examples*

## 5. RESULTS AND DISCUSSION

The simulation program begins with a temporary presumption that the storage materials from warehouse needed for reproduction are available in the input data of the warehouse. All work orders are processed and sent to the data entry of the warehouse. Priority orders regulate execution and are defined from the time they appear in the exit data of the warehouse, the time needed for transport to the client and the given delivery date. The user has a semi-product warehouse that enables normal operation of the production process and optimal supply time.

## 6. CONCLUSION

The emphasis of this paper is on the synchronization of all activities within the production system, which is a constant challenge and successful production for the business as a whole. In order to achieve this research task, it is necessary to begin with the structure of the production system and to emphasize the hierarchy of objectives, as well as the strategies that should be applied to their realization. The stock inventory status is a bit important.

Advanced warehouse systems and procedures are particularly important. All information systems and other tools are appropriately necessary. The vulnerability of the proposed principle is assessed by computer simulation, using the initial data from each considered industry.

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