

# **ANALYSIS OF LOGISTICS ACTIVITIES DUE TO THE EMPLOYEES UTILIZATION**

## **ANALÝZA LOGISTICKÝCH ČINNOSTÍ VZHLEDEM K VYUŽITÍ ZAMĚSTNANCŮ**

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### **Abstract**

The article deals with describing the various processes associated with the movement of freight by Škoda Auto, and the activities designed to optimize the employees in the process. The theoretical part of the LKW Control system is described here, telling what it means and on what basis it works. The second part uses theoretical knowledge in a practical solution to the issue at Škoda Auto. On the basis of this analysis the conclusion will present a proposal leading to further optimization of employees at Škoda Auto. With that there would be greater continuity process, and would save additional staff costs.

### **Abstrakt**

Článek se zabývá popsáním jednotlivých procesů spojených s pohybem nákladní dopravy po Škoda Auto a následně jsou zde navrženy aktivity vedoucí k optimalizaci zaměstnanců v daném procesu. V teoretické části je zde popsán systém LKW Control, co to znamená a na jaké bázi funguje. V druhé části jsou použity teoretické poznatky v praktickém řešení dané problematiky ve společnosti Škoda Auto. Na základě provedené analýzy je v závěru práce uveden návrh vedoucí k další optimalizaci zaměstnanců ve společnosti Škoda Auto, díky které by došlo k větší plynulosti procesu, a ušetřily by se další náklady na zaměstnance.

### **Key words**

Škoda Auto, Logistics system, LKW Control

### **Klíčová slova**

Škoda auto, logistický systém, LKW Control

## **INTRODUCTION**

Logistics is a relatively young field, which in recent years has evolved significantly. This is not only due to the globalization of world trade and the market as a whole, but also thanks to the development of information technology. Of course, a significant part is played by the customers, whom businesses have begun to focus on more. Companies are trying to prove, in any way, that their products are the most competitive. One of the areas in which it is possible to further reduce costs, is logistics. Logistics is a complex field, which in modern times extends into all areas of modern business. Each ingredient, material good or product must pass through the logistics chain before finally arriving at the consumer. The aim of every company is to make this process the most effective so the firm is able to minimize costs. This article deals with the movement of freight by Škoda Auto Inc. (Hereinafter referred to as Škoda Auto) and only for the Mladá Boleslav plant.

Škoda Auto is among the largest economic groups in the Czech Republic, engaged in the development, manufacturing and sale of automobiles, components, spare

parts and accessories for Skoda and service provision. Cars have been produced in Mladá Boleslav for more than a hundred years. Few automakers can refer to the continuous transfer of knowledge and experience in regards to long-term development and production. Since Škoda Auto has entered into the group, it has made a significant step forward. During that time, Škoda Auto more than tripled its production, significantly expanded its product portfolio, and greatly enhanced the brand image. It also built an extensive sales network of stores, a service network, and has successfully established itself in the international markets. Last year the company produced more than one million vehicles - more than ever before. As part of its growth strategy, the company expanded and modernized substantial part of its logistics. The entire logistics process involves 13 manufacturing facilities around the world from which Škoda brand cars are produced.

The aim is to describe the sub-processes associated with the movement of freight by Škoda Auto and the resulting optimization of company employees in the process. The work is divided into theoretical and practical parts. The theoretical part is based on available knowledge. At the beginning there are defined concepts related to the LKW Control system. The LKW Control System is used to control the truck after it has arrived in Škoda Auto. This is the concern about the system, which is designed to achieve the most efficient loading and unloading process with the aforementioned trucks. The practical part analyzes the process of what LKW Control has brought and optimized. The conclusion summarizes the results of the analysis and makes recommendations from the results of the analyses.

## **LKW CONTROL**

LKW Control is an internal logistics system, which helps to drive trucks for Škoda Auto, with the exception of vehicles that do not take material production or have JIT parts. This system provides a user with an overview of the movement of trucks in the premises of the plant. The system is designed so that the loading or unloading of the truck is carried out as efficiently as possible. All vehicles entering the plant must be scheduled, either announced in a fixed window or announced in a pooled time window.

*Announced in a fixed time window* means to enter the carrier itself. This is the exact time of arrival of the LKW (truck) to Škoda Auto, where all necessary documents are processed. The plant is in Mladá Boleslav 13th gate. The advantage for carriers is that the car will be cleared at the time that has been set for it.

*Announced in a pooled time windows* meaning is different from *announced in fixed time window* because the time of arrival for check-carriers is assigned by the system. And then, depending on the carrier, whether it will be used yes or no.

After processing all data, drivers will be lent a telematics device. The telematics device consists of a mobile phone and GPS. The mobile phone allows for one-sided communication between the LKW Control system and the driver. Instruction is given to direct the driver to the point of unloading at Škoda Auto. Through GPS, all users of the LKW Control system have access to an overview of where the truck is in real time. In the event that a vehicle arrives at the 13th gate without a valid or hard pool time window, the dispatcher still has to process all documents and inform the driver that they will have to wait until it releases space for ramps warehouse. The LKW Control system ranks the unannounced vehicle as the last one, after checking all the announced trucks.

LKW Control system itself consists of the following applications:

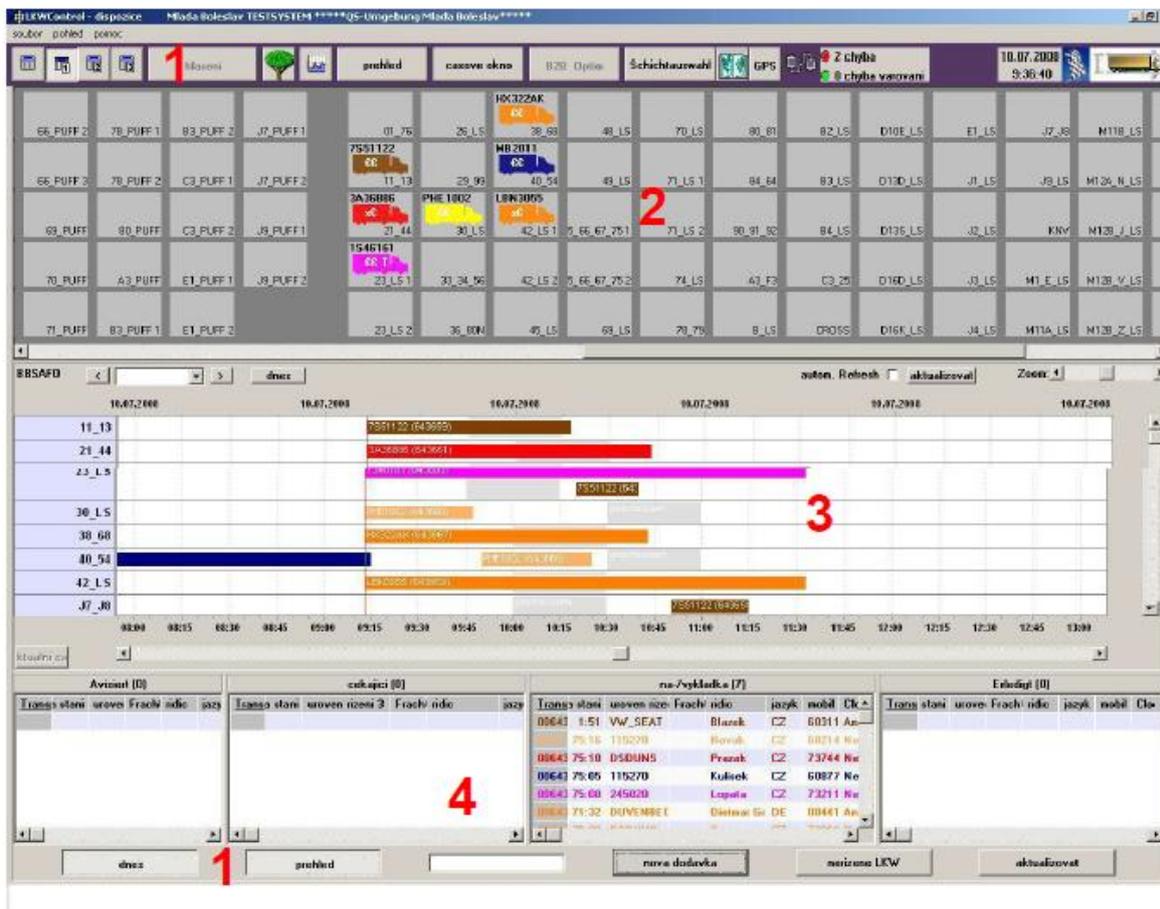
- Client management
- Client storage
- Master Data Editor
- B2B Portal
- Company protection

## CLIENT MANAGEMENT

This application is designed primarily for dispatchers on the 13th gate. They accept and process documents (delivery) from a vendor that delivers drivers.

### Guidance for the management of LKW

The driver shall inform the managing place on the 13th gate of their transport ID (This is the number of the transporter, which the system has created, in order to link all other information about driving). Thanks to that, the system searches LKW Control via search box. If the ID number is not known it may cause the need to search through forwarding, vendor registration marks, etc.



Source: Internal materials Škoda Auto – LKW control – příručka – řídicí klient WOB  
**Fig. 1 Basic screen managing client**

### Basic Screen managing client

The primary screen for truck driving is divided into 4 main areas. These areas are distinguished from each other as each has a different mission (as seen in Figure 1).

1. Graphic display of processing zones and their current settings.
2. Graphic display of cast compensatory parking, unloading yard and managerial positions with all supplies (LKW) which are released from the control sites.
3. Grant-chart – this is a graphic representation of unloading yard with the estimated time of unloading or loading. This time is calculated automatically by the system based on the data from the master data and the input data entered by the carrier at booking time window in the B2B portal.
4. The last part displays all trucks in the plant. The time window, whether announced or pocket billiard is divided into the following four parts: The announced, waiting, loading / unloading, and discharged.

Splitting the screen can be set and stored individually for each user.

### Check unannounced truck

If the driver arrives to control space and time window and is not reported such as its supplies can be divided into two kinds, namely: managed and unmanaged supply deliveries. Controlled deliveries are advised to be marked as planned deliveries and the managing client will control them within Skoda Auto. In this event such supplies are labeled as *new supply*. Subsequently, the LKW Control system lorry driver is ranked in last place in line for the entrance to the store. Uncontrolled supplies, which are controlled by the control client, are accepted as unmanaged. Their answer button is used *Uncontrolled LKW*, which is located on the main screen. Uncontrolled supply of Škoda Auto is a car that does not take production material. These include cars carrying supplies (food) waste, JIT, etc.

### Delivery advise on managing client

Whenever the worker enters any place of the control carrier time window in managing client. However, this is an emergency solution. It is used only when the carrier cannot, for technical, reasons open the B2B portal with the internet. The system allows an operator to specify a fixed time window or pocket billiard unloading.

## **CLIENT STORAGE**

With this application the storekeeper has an overview of entry/departure trucks to and from the warehouse. His work in this system lies in the fact that he can start or stop the loading/unloading trucks. The storekeeper can see the trucks appear on a computer monitor at the time of their arrival at the car park in front of the store. They must then enter all the necessary steps manually, ie. *The beginning of loading/unloading* and *End of*

loading/unloading. In addition, a warehouse worker completes an overview of the truck after it has entered the plant. And checks the number of pallets that it carries to individual stores. The basic screen client storage is divided into four regions as shown in Figure 2:

1. Procurement search box deliveries by ID drive, display the workload of individual unloading yards (warehouses).
2. Graphic display of individual unloading yard.
3. Table with a list of supplies for each unloading yard.
4. Option selection displays vehicles (announced in the plant), language selection, updates, and workplace selection.

The screenshot shows a web-based interface for a client storage system. At the top, there is a header with the 'INFORM' logo, a search bar labeled 'Scan:' with a red '1' next to it, and the 'VOLKSWAGEN AG' logo. Below the header is a grid of 30 unloading yards, each represented by a small icon and a label (e.g., '23 LS 1', '29 99 1', '38 88 1', '42 LS 2', '49 LS 1', '89 LS 1', '71 LS 2', '80 81 1', 'A3 F3 1', 'B4 L'). A red '2' is placed over the grid. Below the grid is a table with three columns: 'Zahájení vykládky', 'Status', 'Pozice', 'příči poz.', 'SPZ nákl. auto', 'Zbytková vykládka', 'Číslo mobilu', and 'Transportní ID'. The table contains three rows of data. A red '3' is placed over the table. At the bottom of the screen is a status bar with a dropdown menu, a 'Nová dodávka' button, a red '4' next to it, and a checkbox labeled '48 sekund do automatického opětovného načtení da'.

Source: Internal material Škoda Auto

Fig. 2 The main screen of the client storage

## MASTER DATA EDITOR

Master data editor contains all information about journeys made to Škoda Auto and the system users LKW Control. Using Master Data Editor one can make changes to master data, which are needed in the application of LKW Control. Master data editor is submitted depending on the master data for each master file of your card. Textbox can be selected to define and change master data and are located in the upper part of the card. At the bottom of the table is the current master data. In the middle centrally mounted buttons are located so that they are readily available for use in regards to data processing. (See Figure 3). If changes are made in the master data these changes must also be available in the LKW Control system. Use the *Update* button in the main menu to accomplish this.

## B2B

This portal is used primarily for external controllers. You can book a time slot for loading or unloading. Each of the suppliers or shippers who deliver to the company Škoda Auto has your password and login name. The B2B portal announces the supplier of all supplies bound for Škoda Auto (Internal material Skoda Auto - příručka - LKW Control).

## PROTECTION OF COMPANY

The main objective of this application is to provide an evidence of all cars that sweep or start from Škoda Auto (the 13th gate). At the time of arrival of the truck at the factory gate a worker enters the vehicle registration number. In the event that the car was in the plant during the last three months, a backup of all the information is completed (as the car itself, and drivers). If some information is not complete, the worker must complete it so the truck can then enter into the plant again. (Internal material Škoda Auto, a.s. – Příručka – závodová ochrana).

The screenshot shows the 'Stammdateneditor Volkswagen AG' application. The main form is for editing user data. The 'Benutzer' field is set to 'ADMIN\_CL\_INFORM' and the 'Profil' is '10 - BENUTZER\_ALLES'. The 'Programme' field is 'DISPO DATEN STATI'. There are three 'Arbeitsplatz' (workplace) sections, each with a 'Steuerstelle' (tax office) dropdown and a 'Stellplätze Steuerstelle' (positions per tax office) field. The 'Rollen' (roles) field is 'LSC\_10 LSC\_11 LSC\_13 LSC\_4 LSC\_55 LSC\_LZH LSC\_LZH\_L6 LSC\_18A ALLES ALLES\_'. The 'Beschreibung' (description) field is 'Systembenutzer Inform'. At the bottom, there is a table of users.

Si	Benutzer	rofil	Eigenschaften	Programme	Rollen	Beschreibung	Arbeitsplatz 1	Steu
	ABC	20		DISPO STATI	ALLES_WERK	abc		
	ADMIN_CL_INFORM	10		DISPO DATEN STATI	LSC_10 LSC_11 LSC_13 LSC_4	Systembenutzer Inform		
	AVD10AR	10			LSC_FE	Airt, Oliver		
	AVD1TGU	10			LSC_FE	Gerullis, Thomas		
	BASILE	10		DISPO STATI	ALLES	Basile Marco		
	BEHSE417	10			LSC_105	Behse, Frank		
	DL10FOR	10		DISPO DATEN STATI	ALLES	Form, Sebastian (K-SDM)		
	DL10KLI	10		DISPO DATEN STATI	ALLES	Klingebiel, Reinhard (K-SDM)		
	DL10SDR	10	KLEIN MEISTER	DISPO DATEN STATI	ALLES LSC_SIT1 LSC_SIT4 LSC	Schröder Jens		
	DL60 PEJ	10			LSC_1A LSC_1B	Petersen, Jens		
	DL60AGD	10			LSC_20	Ahrens, Gerhard		
	DL60AIO	20	MEISTER	DISPO STATI	ALLES	Ackermann Ingo		
	DL60BAC	10			LSC_11	Bath Eckhard		
	DL60BRA	10			LSC_15	Böttcher Bastian		

Source: Internal material Škoda Auto, a.s. – Příručka – LKW Control: Editor kmenových dat  
**Fig. 3 Main Screen Master Data**

## PROCESS CONTROL SYSTEM LKW

LKW Control system fulfills a number of functions, including: decision support, internal order planning and route optimization, automatic prioritization of trucks futures shipments, and influencing the allocation of time windows based on web interface, etc.

The process itself begins by creating temporal matrices. The basic matrix of time windows serves as a basis for entering daily time windows carriers. In this fundamental matrix time slots are permanently assigned for regulatory procedures and thus are not available for any subsequent assignments for other the arrival of trucks. The time window for them is always saved to the managing client and does not go directly to the warehouse. In case that it is the regular arrival at the control point, the base matrix can provide an accurate time window for the loading or unloading place. For this eventuality system offers LKW Control an auxiliary setting. When creating the basic matrix uses the same optimization algorithms as in the later (daily) calculate the optimum time window for the following day:

- After consultation with the carriers about the frequency and approximate arrival time window of the truck to a control point or at a loading / unloading area.
- The LKW Control transmits the time window of the truck's arrival to an Excel spreadsheet, to do all the optional loading / unloading at a specified point
- LKW Control system calculates the *optimal* plan for all allowable loading / unloading sites with regard to their capacity will be partially changed due to the arrival time of trucks.
- one can manually change subsequent matrices as defined in optimization.
- one can save and load the base matrix

Based on the difference in capacities of loading / unloading points and times booked by the time windows for control processes in the matrix, time windows that can transmit daily carriers can be shown. It can also provide spare capacity loading / unloading locations at certain times in the matrix not in the time window or the block.

Immediately after the driver passes the gatehouse, the vehicle is registered and receives the status of *arrival of the consignment*. At this point, a truck driver shall report to the appropriate place (by dispatcher VLO) 13th gate at Škoda Auto, and forward all documentation (delivery). The dispatcher will check all the documents and enter them into the system, at which point the vehicle gets the statute *arrived*. The driver will wait for the return of the processed delivery notes. From this moment compensation for downtime (ie. demurrage) begins, if the time window is not respected. Once the driver surrenders documents of the goods received from him against signature mobile phone with integrated GPS to the dispatcher he gets the statute *Ready to appeal*. After taking care of all paperwork, the driver leaves for waiting place to pass the time before the system gives him advice where to go. LKW Control System calculates the plan envisaged moving truck after the race and the time windows for individual stores, which have come (Internal material Škoda Auto, as - příručka-LKW control).

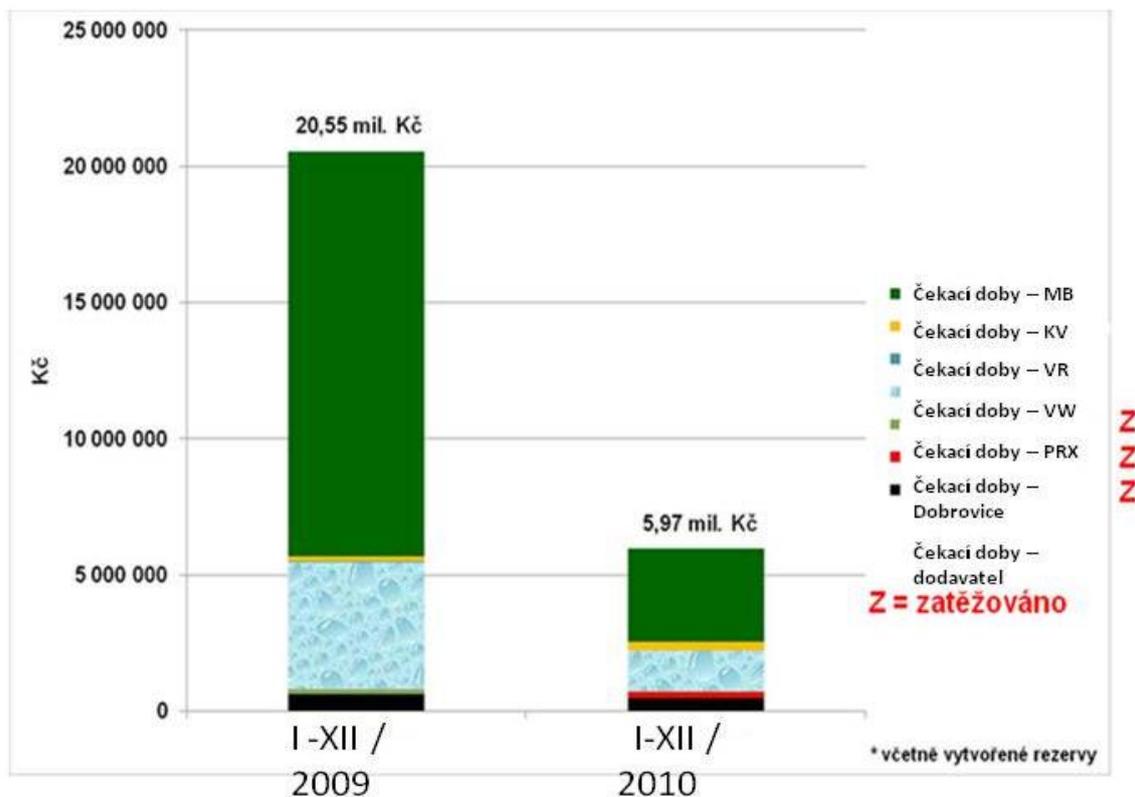
When the system sends control messages to the mobile phone with the first order, the lorry receives the status of *appeal*. The GPS system advises the driver that has arrived at the destination and thereby receives the status of *The Expectant parking / truck and place*. At the moment, unloading or loading, the truck gets status *loading / unloading*. Upon completion of loading or unloading the driver receives information from the system to the mobile phone

of another loading or unloading site or the need to move to a waiting car, which has arrived. The truck gets status *appeal*. In the event that no further loading or unloading positions should come for the driver the Control System LKW will withdraw the truck at the control point and the vehicle will receive the status,, Pending Out ".

The driver will then go to the control point (ie. the 13th gate), log off and return borrowed telematics device. Then he is assigned the status *unsubscribed* and after leaving the factory is set up at the gatehouse with the statute *draw out*.

## THE BENEFITS AND OPTIMIZATION OF THE LKW CONTROL SYSTEM

Introduction and use of the LKW Control system are doubtlessly several major innovations in the management system of logistics processes. This system has helped, for example, to reduce waiting times of trucks.



Source: Internal material Škoda Auto

**Fig. 4: Comparison of paid downtime before and after the introduction LKW Control**

Figure No. 4 shows the situation before and after the introduction of the LKW Control. Thanks to a reduction of downtime cca14,58 mil. CZK within one year, the company saved almost 71% of the original amount in all factories in the Czech Republic. The plant itself in Mladá Boleslav has saved almost 80% of the original amount.

In addition to reducing costs LKW Controls has helped to simplify the work of employees, to utilize cargo spaces, and collect information on all trucks in Škoda Auto. These benefits are not only for the company itself, but also for carriers and forwarders from external companies who have an opportunity for B2B Internet portal to help manage their trucks. To the process involves clerks, and managing the loading sites and management of material points. The whole system optimizes and confirms the time windows online, in case there is any intervention at any stage of unloading or loading. The system has balanced the workload not only at the 13th gate, but also at individual stores. Each day, hundreds of trucks arrive at Skoda Auto, more than half of them carrying material. It would be impossible to manage the workload without the LKW Control system. Such efficiency and optimization is only possible with a specialized system like this one.

Another benefit is the ability to determine priorities for critical supplies. Called Engpass (production logistics, the term refers to endangered, critical material). Holders, who have an overview of critical material together with suppliers, organize special trips with critical material. Such a vehicle, which is marked Engpass is preferably controlled right from the moment as it arrives at the 13th gate. Available for these types of supplies exhibit ID drive and have so accurate view of how the vehicle is driven.

Furthermore, LKW Control enables reporting, i.e. obtaining data or information for further analysis or evaluation. These acquired results of the analyzes show the reducing of costs, streamlining of work, hard work loading and unloading of individual departments, shifts, etc. This is seen to occur to return the initial investment by the company in the real system LKW Control.

In this process, however, there are also some disadvantages. One is the instability of the system. If congestion occurs, prolonged response or may even system failure may occur. In this case, it is necessary to go into emergency mode. Records of all data necessary for controlling the movement of trucks to ensure the manual way. This is not only annoying, but it also means more work for all workers and a reduction of the flexibility of moving trucks.

Throughout the process, the logistics flow is to achieve maximum optimization of employees. However, the process can be further optimized to reduce costs and time that is necessary for the purposes of transporting raw materials or in the race. This applies particularly to the optimization of workers at the 13th gate where my terms in modern times leads to unnecessary manual administration. And, as a result, more downtime for the trucks.

The proposal would display the fact that the proceedings were trucks from suppliers. If the supplier itself had bought a telematics device that was connected with the system LKW Control (Namely that suppliers and freight forwarders have a unified program for system LKW Control on data transfer). This would have eliminated manual entry of telematics devices to the system LKW Control and any agenda that precedes it with the transfer and repatriation. In addition, the failure to optimize personnel at 13th gate, another advantage would be even smoother ride, the possibility of tracking material from the supplier to the factory Škoda Auto. The path of the truck itself would lead directly from the supplier to the plant, without having to delay the processing of any documentation. This would result in a total saving of 18 minutes downtime. 3 minutes, on execution of necessary documentation and the delivery of devices, and 15 minutes on parking and attendance back and forth to the 13th gate.

The idea for the study of materials, is the only one that did not challenge me. The group itself has a Quick Check system that allows truck driving just from the supplier

## CONCLUSION

This article deals with the movement of freight by Škoda Auto. The aim was to describe the sub-processes associated with the movement of freight by Škoda Auto and the resulting optimization of employees in the process.

The article is divided into theoretical and practical parts. The very theory based on theoretical sources of logistics. The first chapter deals with the internal system LKW Control. This is a logistics system that helps manage trucks from Škoda Auto except for trucks that do not take material production or have JIT parts. This system was introduced in order to achieve the most effective and efficient loading and unloading processes. The aim of this system is not only smooth loading and unloading, but also the optimization of all costs associated with the truck.

The main part is the analysis by logistic flows for trucks and explanation of the process LKW Control in real-time with benefits. On the basis of the product design, which leads to a reduction of employees. The most important benefit of the introduction of this system was to reduce the waiting times of trucks, thereby reducing down time. The company Škoda Auto has an overview of the workload of individual jobs for unloading and loading, and thus can decrease staff on the Managing sites and warehouse locations.

Recommendation concerns the further optimization of workers at the 13th gate, where there are unnecessary administrative manual transmission and telematics devices. My suggestion is to advise drivers of trucks from the supplier to buy a telematics device at their own expense. This would be connected with the LKW Control. This would allow the steps of returning the telematics device at gate 13 to be eliminated and all agendas related to delivery notes, could be sent electronically, cutting the entire process of loading/unloading by 18 minutes. In addition, there would be more fluid rides and monitoring of deliveries from suppliers to Škoda Auto. Through extensive amounts of research I have learned that I am not the only one to propose similar systems. This idea of the LKW Control is not a new one, however I have also proposed some ideas that are my own. The company itself should include a similar process in future plans. In addition to the proposal, I have not found another possible route, where in the logistics process to save manpower, since the process is almost entirely automated with minimal human factor.

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