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Logistics to the point

Precise transport planning saves costs and protects the environment

The harvest and transport of sugar beet during the beet campaign are particular logistic challenges. Large beet quantities must be lifted, cleaned, loaded, and transported on schedule. The sugar factory must be uniformly supplied with beet. Vehicle capacity must be exploited profitably. Uniform delivery avoids traffic congestion and keeps the burden on the traffic and the environment as low as possible.

The mentioned goals have been largely achieved by the logistics of Südzucker AG. The exact, computer-aided planning of each individual truck leads to a smoothing of the delivery schedule for the areas of supply of the individual factories. In addition, heavily travelled town thoroughfares and congested roads are avoided. In special seminars, the drivers are trained to behave respectfully in road traffic.

Initial trials regarding the use of GPS/GIS for vehicle control (e.g. during carbo-lime transport and -spreading) have been successful.

Goals of Südzucker Logistics

As an enterprise close to nature, it is important to Südzucker AG to find environmentally compatible solutions for beet transport as well. Already at the beginning of the 90s, when hauling from the field's edge superseded rail transport, a computer-based logistics system was developed. The impetus for this project was the fact that in some factories beet transport caused congestion, which was accompanied by long waits and in some cases also impaired the traffic.

The reason for these problems was that in the morning every transport contractor tried to reach the factory as early as possible. This was intended to minimize waiting times and optimize transport capacities. From the viewpoint of the individual, this behaviour was quite rational. However, it led to delivery cycle peaks continuing over the entire day, which resulted in uneven use of the entire weighing- and unloading capacities of the beet factories.

Therefore, the development of the logistics system pursued the main goal of distributing beet transport to the sugar factories by truck evenly over the day. The goals are summarized in *figure 1*.

In addition, the logistics system must be able to take the special traffic situation in the individual towns, noise development in the evening- and night hours, as well as Sundays and holidays into consideration. A traffic control system which integrates all these important reference points is a demanding challenge, which can only be met with the

aid of computers.

First, the specifically developed „Südzucker logistics“ for the planning of the beet vehicle delivery schedules was tested in some Südzucker factories. These tests showed that the intended easing of the traffic burden at peak times had really been achieved. At the same time, this system leads to the temporally staggered arrival of the beet vehicles at the sugar factory so that no long lines form during beet delivery.

The flexible design of the logistics system dispelled concerns that such a transport system, which was mainly oriented towards the traffic situation, could not guarantee the supply of the factories with beet as a raw material. The transport contractors were also quickly convinced of the benefits of this system.

Another important module of Südzucker logistics is the optimization of vehicle capacities through the exchange of transport capacities between the individual transport groups.

Meanwhile, the logistics programme has been integrated into the Südzucker planning programme and is used by the beet departments for the planning and optimization of beet transport to the Südzucker factories.

How Does the Südzucker Logistics System Work?

What truck driver picks the beet up at what location and on what day is pre-determined. Driving times and distances are established in detail using the route planning program Map&Guide. In this software, all streets are classified into the categories motorway, federal highway, state highway, and city road. Each road type is divided into three sub-classes (fast, medium, and slow). In addition, the program chooses the time-, distance-, or cost-optimal route. With the aid of these data, the logistics program calculates with 15-minute precision when the individual trucks must arrive at the factory for the first time in order to guarantee the most even delivery possible over the entire day (*fig. 2*). The data of this planning system are continuously examined and adapted to the current requirements.

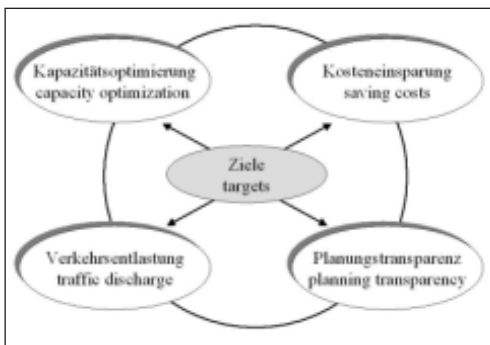


Fig. 1: Objectives of Südzucker logistics for sugar beet transport

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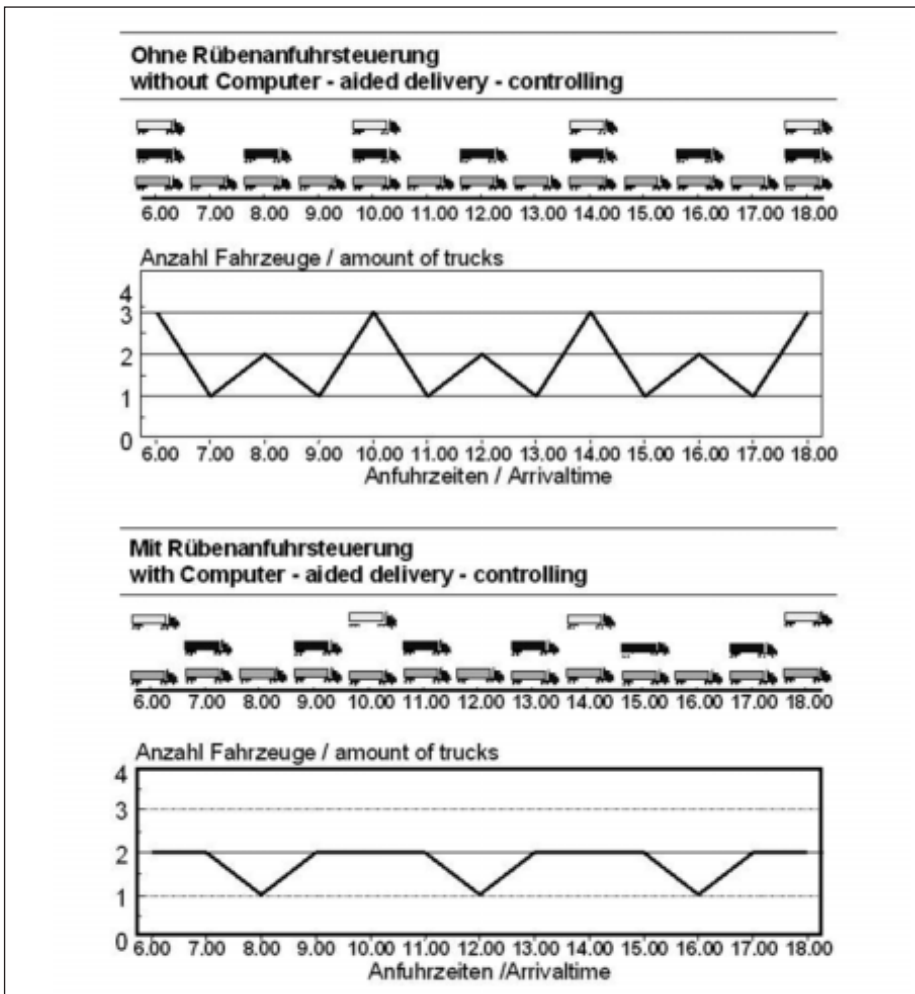


Fig. 2: How does control of sugar beet hauling function?

The time standards are checked at the delivery balance. Due to the significant reduction in waiting time, the Südzucker logistics system has met with great acceptance among transport contractors and beet farmers.

A small shift in the first delivery times already leads to a more uniform delivery. If the second truck is unloaded only one hour later for the first time, delivery is quite balanced. In reality, more than three transport vehicles are scheduled over the course of the day. Depending on the size of the factories and the structure of the transport groups, 100 vehicles and more guarantee the supply of a factory with sugar beet.

New logistic possibilities through GPS

The integration of GPS technology provides great possibilities of improving the fine tuning of the transport organizations in the future, especially in the area of logistics and vehicle navigation. On the basis of the existing software Map&Guide and a palmtop/GPS solution, further improvements were able to be achieved in the area of carbo-lime delivery and -spreading.

The drivers who deliver the carbo-lime from the factories determine the exact position of the lime clamp using GPS when dumping the lime at the field's edge (fig. 3). Subsequently, these coordinates are pooled with the data of the customer and put at the disposal of the spreading contractor. The latter reads the data into the software product Map&Guide and thus gets an overview of the position of the lime clamps in the region to be spread. In close cooperation with the Map&Guide GmbH, a module has been developed which allows inexpensive topographic maps to be integrated into the software product and enables them to be

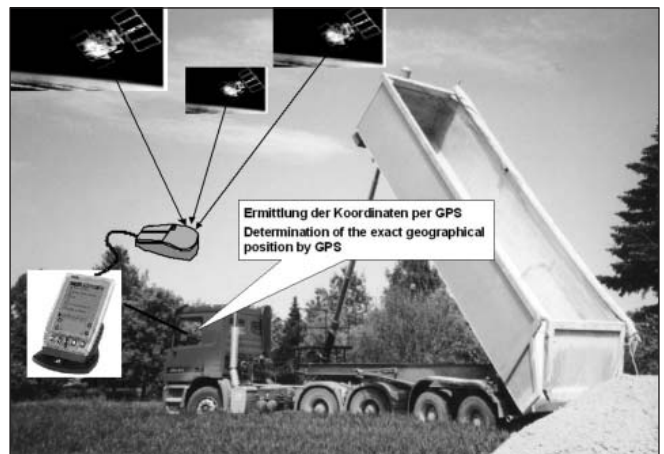


Fig. 3: Logistics solution for lime spreading

stored in the Map&Guide map. Thus, further important information, such as the position of field roads, forests, and rivers, is visualized on the map.

This enables a time- and route-optimal order in the spreading of the carbo-lime to be realized, which ultimately results in improved profitability of the spreading groups.

Thanks to this project, an economically profitable application of GPS technology was able to be introduced into agricultural practice. This becomes particularly apparent in the willingness of the spreading groups to continue to invest in this technology.

Outlook

In order to stay competitive, the transport groups must continue to exploit all possibilities of rationalization and cost reduction. In the future, it will be useful to consider and organize the logistics of the beet transports of an entire sugar factory as an integrated process. It is optimal if data processing is supported by GPS and GIS so that the use of the complete pool of loaders and transport vehicles in the area of supply of a sugar factory can be planned flexibly. The more information about the transport- and freight volume that is available and the better the transport fleet is organized, the fewer vehicles and drivers are required. This allows transport expenses to be reduced further. In the years to come, pilot projects are intended to open up new possibilities. Together with the cultivators' associations and the transport groups, Südzucker will continue to develop economically viable systems in such pilot projects so that these systems can then be widely used in practice over the entire area of supply in southern Germany.