ELECTRONIC DELIVERY TICKET FOR READY-MIXED CONCRETE

OLAF AßBROCK AND INGO LOTHMANN

Abstract

The German Ready Mixed Concrete Association (BTB) is recognized as the national trade association and representative body for the german ready mixed concrete producers. In 2009 BTB started to develop an internet based system with the aim to exchange the data of delivery tickets for ready mixed concrete with the customers in a comfortable way. The main principle is that plants using the system are able to upload the delivery ticket on a web server run by BTB. The advantage is that the data format is standardized. All users of the system use the same data format. The individual customers of the ready mixed concrete plants are then provided with a login-ID so that they have access to their delivery tickets sorted by construction sites. The customers can decide if they use the system in an online mode or if they download the data day by day or weekly for example. After download the integration in the accounting systems or technical control systems is easy. After a test and development stage the system is now running in daily concrete production. Nearly 200 plants are registered. More and more customers ask to be delivered by rmc plants offering this service.

Keywords

Delivery ticket, plant management, customer service

Biographical notes

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1. Introduction

In 2009 the German Ready Mixed Concrete Association (BTB) started to develop an internet based system with the aim to exchange the data of delivery tickets for ready mixed concrete with the customers in a comfortable way. The main principle is that plants using the system are able to upload the delivery ticket on a web server run by BTB. The advantage is that the data format is standardized. So that all users of the system use the same data format.

A daily situation: Together with the supply of the ready mixed concrete ordered by the construction company several delivery tickets signed by the customer have to be collected and then given to the controlling department of the construction company. In many cases these documents are not protected against rain and dust so that they are not in a good shape. This is not the only problem coming along with the ´classical´ handling of delivery tickets for rmc. Also manual post compilation, checking and storage of the paper tickets needs a lot of valuable working time.

With the new digital Internet service ELSE www.beton-else.de which is the german abbreviation or ´Electronic Delivery Ticket Development´ BTB provides a solution to improve the described handling of delivery tickets. Main principle of the unique service in Germany is to have a common interface between ready mixed concrete suppliers and their customers on the construction site. This interface standardizes and simplifies the data exchange of daily delivery ticket management in the office and on the construction site. This idea is well accepted by the construction industry up to now. Several member companies of BTB joined the system. Actually nearly 200 plants are registered for this exclusive member service and use the platform for their internal and external delivery ticket management. Some ten thousands of tickets of the daily rmc practice are handled and stored in the online data base with increasing trend.

The content of the delivery ticket transmitted is strictly in line with the European concrete standard EN 206-1, clause 7.3 ´delivery ticket for ready mixed concrete´. Consequently the system differentiates between ´designed concrete´ and ´prescribed concrete´. Only in case of ´prescribed concrete´ data about the concrete composition is submitted.

2. System principle

How does the work flow of the ELSE system look like in practice? Based on the principle shown in figure 1 a short description of the single steps of the ticket tracking follows.
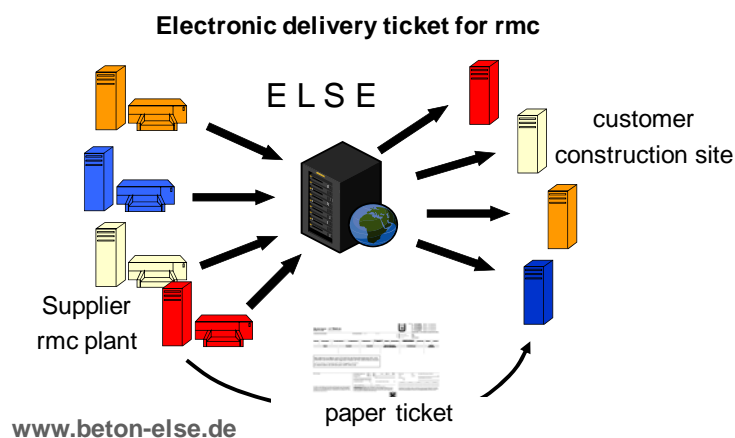

Figure 1: principle of the internet based system for delivery ticket exchange

1. Forwarding of the delivery and technical data to the platform: The concrete plant which uses the service sends the standardised data via the interface to the portal www.beton.else.de. The information sent is password protected. The data format used is the widely known XML format.

The database imports the data and prepares the ticket data for further transmission to the contractor or other customers.

2. Access and retrieval of delivery tickets: Depending on the demand the tickets stored in the database can be checked and sorted by an individual login through the customer. This can be done in an online mode or offline at the end of the day or on a weekly basis for example. Several kinds of data analysis are possible as well as a total overview about all orders of rmc. Further more the users are able to track the status of the individual delivery by short mouse clicks.

3. Import of data into the management systems of the construction site: The data can be exported easily from the data platform to the individual software of the customer so that they can be processed further and archived.

4. future orders of rmc: The basic data are stored once and can be used for future orders of rmc or coming construction projects. A repeated manual data capturing is not necessary.

The advantages of the system can be summarized as follows.

- time and cost savings because of reduced administration effort
  (i. e. with data capturing and archiving of delivery tickets)
- simplification of the accounting of rmc deliveries
- project costing analysis and especially the costing analysis of concreting services are simplified
- simplification of controlling of the rmc deliveries by the customer
- material samples of the factory production control can easily be linked with the corresponding delivery tickets
- single unified digital data format
- automatic data import of the delivery ticket data in XML format

3. Data security

In order to protect the data against unauthorized access by third parties the internet service provides several safety precautions. The data access is password protected for registered users only. Passwords are submitted to authorised users only so that third parties have no access to the delivery ticket data. For data transmission the protocols FTP-S or HTTPS are implemented. These are deemed to satisfy the general safety requirements. As an option a VPN tunnel can be installed additionally. Together with the data transmission an individual ticket code is submitted which is valid only one time. If an invalid ticket is used the data are seen as invalid too and access is denied.

4. Legal aspects

As a strict condition for the development of the ELSE system the board of BTB approved a resolution that with the use of the system no conflict with the national and European cartel law is given. As a result of the analysis of the legal aspects the following points can be stated. Regarding the cartel law no risk is seen because only ´historic data´ are stored. No forecast or estimation collected. The data are total set of data refers to deliveries which are already processed. The delivery tickets stored do not represent the total production of a plant. Besides the electronic tickets also deliveries with ´paper tickets´ are managed. These production data are not captured.

Via the system the content of the delivery tickets, especially the amount of concrete delivered with each individual ticket is not stored and analysed. Each user has access only to his own data. BTB as the ´official operator´ of the system cannot see the individual sets of delivery tickets. BTB only has information about the amount of tickets so that these can be charged to the users.

At the moment the ELSE system is an exclusive service for BTB members only. Should the system develop to a quasi-monopoly BTB will be obliged to offer the system also to non-members. Different fees for members and non-members are possible in this case.

5. Financial aspects

The basic development of the system was financed by the research association of BTB as well as the operating cost of the system during the test phase. Also the further future developments (processing of data captured on site) will be financed by the research fund of BTB. Once the standard regular operational phase of the system is reached after finalizing the development the system has to be financed by the users. This is planned for 2013. The estimated cost will be between 0,15 EUR and 0,04 EUR per ticket depending on the total amount of tickets transmitted via the system. The advantage is that the cost reduction by a high amount of users is given to all users. Also the company which transmits only a few tickets via the system will benefit from the reduction of cost reached by standardizing the system.

6. Further developments

The first development state of the ELSE system is stabilized now and used in practice. Development is going on to implement the missing link. The current system is not able to gather additional data on site and to capture the signature of the customer at the point of delivery. For this purpose the next stage of the system called ´ELSE digi´ is currently developed.

With ´ELSE digi´ the paper ticket will still be the central part of the system. BTB members are convinced that for the next several years the electronic ticket will be an additional service for the customers. The industry cannot force all customers to accept only electronic delivery tickets instead of paper tickets. For example private customers or small construction companies will not be able to receive and process electronic tickets right now. Consequently the idea is to combine the traditional paper ticket with the advantages of the electronic ticket. The chosen solution as shown in figure 2 has the additional advantage that no further hardware as for example mobile computers or special smart phones are necessary. Standardized hardware which can be bought in conventional markets for electronic equipment is sufficient.
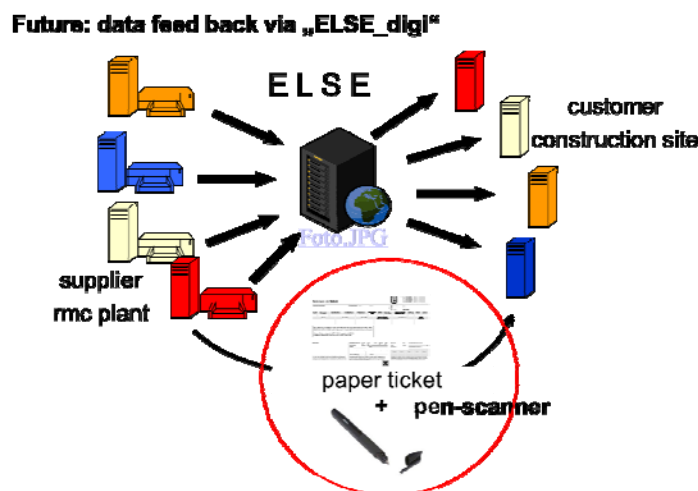

Figure 2: capturing of data on site

Each truck mixer using the system is equipped with a so called pen scanner. The drivers need little training to use the pen scanners. But there is no big difference compared to writing with a traditional ball pen. Each paper ticket is printed with a nearly invisible grid which is individual for the company and each ticket. When signing the ticket for example or noting the amount of

super plasticizer on the paper ticket the hand written data is scanned and the pen scanner identifies the ticket by the grid. The signed ticket remains on the construction site. No copy of the ticket is necessary for the rmc plant because all the data are already stored on the platform immediately after generating the ticket data after mixing of concrete. And the additional data will be transferred by the pen scanner back to the plant. Consequently one piece of paper given to the customer after signing is enough. An example of such a pen scanner is shown in figure 3.

Figure 3: example of a pen scanner

After return of the truck mixer to the plant the data is submitted via local network or wireless network to the ELSE system. A new version of the stored delivery ticket is generated. The data gathered on site is combined with the original delivery ticket. Immediately after combining the data the new version is online and available for the customer for download. The new version of the ticket is the basis for the accounting of the delivery. This at the end is the real advantage for the rmc company.