

The installation of a new software system has enabled BMW to improve its process sequences and idle times at its German manufacturing plant. The rollout for additional plants has already taken place and will proceed further in the near future.

By David Hillis

# The thinking trucks



the goods required for production must be delivered. Through the time slot reserved for them in advance they can also fix the scheduling via the BMW portal; however, this has to be confirmed by no later than 4pm on the day before delivery. Today BMW can manage the delivery and pick-up times of the various Europe-wide transport providers with the help of a time slot matrix, and is able to create a reliable basis for handling transports (fig 1). Before the start of the booked time slot, the truck driver has to report to BMW at a time firmly agreed in advance and also confirm the date. Nevertheless, short notice changes are certainly also possible, since new priorities may also occur. This matrix is live and has repercussions on the entire supply chain.

The shipping companies have access to the matrix at any time via the Internet, and so they are continuously informed about current changes in the delivery windows and to a certain extent can also exert influence on these. Even during the initial process development the shippers involved were included in the discussion, and so they found mutual time slots which lead to an overall optimum. →

For over a year now the BMW group has been utilising a dynamic truck control system (DLSS) for all transport movements – with a high degree of success. Previously there were long idle times and process throughput times at the factory site.

Today the BMW group allocates binding time slots to transport shippers. These time slots optimally control traffic sequences and prevent long waiting queues. The time slots can be varied dynamically so that they follow the needs of production. If the production line is running faster or slower than usual the time slots will be moved forwards or backwards to maintain the right product flow to the line. This only applies to JIS (just-in-sequence) material. The SyncroSupply system from Germany-based INFORM is behind the optimisation tool. A decisive factor in the system selection was the fact that the solution already existed on the market and had successfully proven itself in practical applications – including at other automobile manufacturers. The shippers do not have to implement any additional BMW process, because it uses standard procedures for online booking and for handling telematics.

## COMPLETE DOCUMENTATION

BMW controls approximately 600 trucks per day at the Dingolfing factory via DLSS – about 450 in the receiving department and 150 in the outbound shipping area. In the past, particularly at certain peak periods early in the morning and around lunchtime, long idle times and waiting periods occurred for the shippers – and this led to high demands on BMW employees. In contrast, rough

manpower planning is much easier today and the employees are much more flexible in handling different unloading stations. The time-consuming discussions between employees and on-site truck drivers have been significantly reduced. Whereas in the past the shippers regularly complained to the central freight purchasing department or also directly to BMW about the high idle times and process throughput times along with the subsequently related costs, today everything proceeds without any problems. DLSS has provided an enormous advantage here with regard to complete documentation of truck transports. In the event of shipper queries, the event can be traced back today within a few minutes.

The internal BMW plant traffic has also profited substantially from the improvement of arrival and departure times for the truck transports. Moreover, the burden on the individual unloading stations was reduced. Even the logistics planning itself is much more flexible and visible with the software tool. Unloading stations can be allocated in advance by an optimised overall process (utilisation, traffic flow) and controlled via the system. And so for the handling of current as well as future deliveries it is easier to decide which material can be sent directly to which assembly shop and assigned to which unloading station or where an additional storage step has to be installed.

## INTEGRATING SHIPPERS

Approximately half of the overall volume is called up on a daily basis. Before the introduction of DLSS, the shipper could freely select the delivery time, which led to delivery peaks. Exact time slots are defined for the shipper thanks to the DLSS – they receive an exact time of day at which



The project team at the BMW plant in Dingolfing is extremely satisfied with the results realised through the dynamic truck control system (DLSS)

But at most of the loading and unloading stations in Dingolfing, the forwarding companies already communicate with the DLSS control station via RFID with the active transponders installed in the vehicle



Co-ordinated loading and unloading procedures and a consistent utilisation of the individual stations are the rule at BMW today

All trucks with their status reports can be seen in the system for all BMW points involved, which substantially increases visibility. "The organisation element was very important in this project – the quality of the master data to be defined and the co-ordination of processes," Matthias Berlit, responsible project manager at INFORM, says. "In addition, one has to have the right people at the table and the organisational prerequisites must also tally."

**TRANSPONDERS IDENTIFY THE TRUCKS**

The actual control of the truck through the factory site takes place with the help of a pager for the communication with the driver and a transponder for the automatic identification of the truck at the loading and unloading stations. This status report for several loading and unloading stations can alternatively be generated manually in the system. At the same time, the allocated

truck for the booked time slot is set up for automated communication with the pager and transponder number. The truck driver receives the pager immediately after arrival at BMW and the transponder upon entry to the factory site. When he leaves the site again, he hands in the devices at the factory gate. All loading and unloading stations are also completely monitored as a result. It is expected that shippers who regularly deliver to the factory will be issued a fixed communications kit in the future. The goal of obtaining a controllable and visible process would be achieved on a one-to-one basis. The truck volume will consistently smoothen out throughout the entire day or the entire week.

An additional incentive for the shippers in the system also consists of the fact that they can create a uniform process for themselves, in which case they not only deliver full-load goods to the Dingolfing factory, but can also take empties back with the same truck. As a result, they effectively handle two orders at once and thus save capacity on their part. For this empties process, BMW has set up a special buffer or waiting area, at which the BMW forklift drivers can gain access to the respective empties area in a route optimised manner. The forklift driver communicates on his mobile data device with the pager of the corresponding truck driver and instructs him to drive to his location. This has also once again substantially reduced the route times for processing empties.

**PLANNING RELIABILITY FOR BMW AND THE FORWARDERS**

The dynamic control solution provides much more: For JIS and just-in-time (JIT) deliveries the DLSS receives – through an interface with the Material Request System –



During departure from the plant, the truck driver drops the transponder in the return box provided for this purpose

the calculated target date for incoming goods for each type of component. As a result, the system identifies any time critical components on the truck and if necessary gives this truck a high priority. The comparison of this information within the DLSS is very important with regard to the product because the JIS products have to be delivered to the assembly line without extensive buffer stocks. The precise scheduling of this target incoming goods window guarantees that no conveyor belt standstills occur in the BMW factory.

Overall, the reliability of planning for BMW as well as for the shippers involved has been substantially increased through DLSS. The automated recording of all loading and unloading procedures and the automated data transfer have contributed to enormous time savings for all those involved. The further rollout in other BMW plants is planned based on the positive experience at Dingolfing. The expected effects were achieved and the project has paid for itself in an acceptable timescale. The reduction of idle and process throughput times, the



The forklift driver establishes contact with the truck driver at the truck waiting place with his MDE device

smoothing of volume as well as the demands on the loading and unloading stations and an increased process visibility have created considerable increases in efficiency. And, as expected, the route optimisation in the empties area, the increased internal and external data visibility as well as the reduction of throughput times were all achieved. Unplanned shift extensions in the full-load and empties areas are virtually non-existent. The predicted time savings – in the physical as well as administrative areas – have ensued and therefore contribute to a fast project amortisation. Even the upstream suppliers profit from the fixed pick-up times of the shippers in this process. As well as Dingolfing, the plants at Eching and Regensburg already have the system in place; while Wackersdorf and the new plant in Leipzig were due to follow at the end of 2006. ■

**BMW PLANT IN DINGOLFING:**

The Dingolfing plant, which has about 22,000 employees, is the largest production site in the BMW group. Through highly flexible processes and systems it is possible to produce vehicles of the BMW 5, 6 and 7 series jointly on one manufacturing line. The aluminium bodies for Rolls Royce automobiles are also manufactured there in an "Aluminium Centre of Competence". At the same time, chassis components for all BMW assembly plants are manufactured in Dingolfing. In addition, the central component delivery of the BMW group for provision of the worldwide BMW trade organisation is a permanent element of the plant.



**INFORM:**

The Logistics Division of the INFORM in Aachen supplies systems for managing time critical transports and optimising logistics sequences in real time. The systems are utilised successfully in internal transport, warehouses, harbours and transshipment centres, in the healthcare industry as well as in road transport and in building material logistics. A team of industrial engineers, computer scientists, business economists, natural scientists and programmers in the Logistics Division has specialised in the delivery of projects for over 20 years. Today the "SyncroTESS" and "SyncroSupply" applications are successfully employed in over 100 installations around the world and have proven their worth in large concerns as well as in medium-sized companies from the different industries.



The DLSS control station coordinates all internal and external truck traffic at the BMW plant in Dingolfing