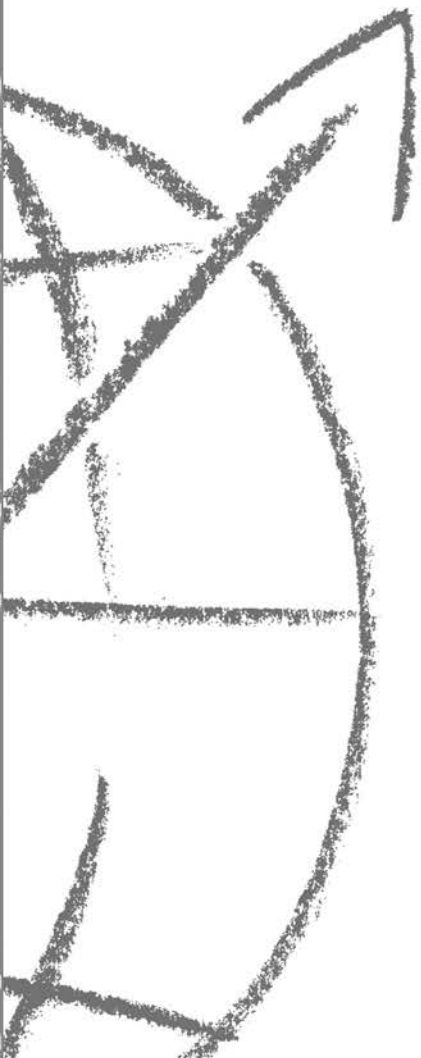
VOLKER KUHNE

FACTORIES OF THE FUTURE – BEIJING AIRPORT

DESIGNING THE BELLY OF THE BEAST



ABSOLVENT SIEMENS01
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SUMMARY

Ein Artikel von Sebastian Webel[1]

Simulation has made it possible to build and test complex baggage handling facilities – including Beijing's new dragon-shaped terminal – before construction begins.

With the Olympic Games coming to China in August 2008, preparations are now running at full steam, including construction of Beijing Capital International Airport's Terminal 3, a vast, dragon-shaped complex.

Beginning next spring, some 60 million passengers and 500,000 planes will arrive and depart from the terminal each year. High-tech solutions – such as a baggage handling system from Siemens – will help ensure that the facility can accommodate this colossal volume.

With some 50 km of conveyors, the baggage handling system can transport and sort more than 19,000 pieces of luggage per hour, making it one of the world's biggest – and fastest – systems of its kind. Equipped with a complex network of sorting machines and sorting gates, and with a top speed of 40 km/h, the Siemens baggage handling facility requires less than 25 minutes to move a piece of luggage from the check-in counter to the furthest parked plane at the terminal.

Beijing Capital International Airport (BCIA) specified a number of requirements that the system was to meet. For instance, it should not only make use of the terminal's basement down to the last meter but also meet tough requirements regarding maximum luggage size, throughput, and baggage travel time. The company also wanted the facility to be developed, installed, and tested within 32 months – and to function fault-free afterwards.

In order to plan and build such a vast facility in such a short time, a team of engineers from Siemens Industrial Solutions & Services (I&S) in Offenbach, Germany had to dig deep into their virtual reality toolkit. Long before the first component was manufactured, these experts built and tested the entire baggage handling system using 3D software. Indeed, they utilized some of the same procedures they had developed in designing similar facilities in Seoul and Madrid.

Virtual Luggage on the Move. The engineers downloaded key data on the airport's catacombs to their PCs and utilized software modules from the Seoul and Madrid projects that had been stored in digital libraries. Their 3D simulation and optimization software allowed them to examine even the smallest areas of the baggage handling system and its building in order to determine

1 http://w1.siemens.com/innovation/en/publikationen/publications_pof/pof_fall_2007/factories_of_the_future/beijing_airport.htm. Stand 05.06.2008.

if planned systems would fit into the available space, and to ensure that sub-systems would not interfere with one another.

A simulation of the initial conveyor belt setup revealed areas of congestion. A second test indicated that the distance between some junctions was so tight that it could lead to delays and shutdowns – problems that would make it impossible to achieve the target of a maximum 25 minutes of travel time for any given bag. Ultimately, the planners were able to eliminate all of the errors in the huge system before construction began.

This virtual planning and simulation led to huge cost benefits, as changes could be made and tests carried out without expensive prototypes. Planners knew at each process stage which components (and how many of them) would be needed for a given solution. After planning was completed, the software produced assembly lists containing everything that needed to be procured.

Before the facility could be built, the control software responsible for smooth operation of the actual system had to be extensively tested. To ensure smooth interaction between software and hardware, Siemens experts tested the software at the Siemens Airport Center (SAC) in Fürth, Germany, which serves as the company's simulated airport. SAC actually has the largest baggage handling facility in Germany, after Frankfurt and Munich. It's a complete airport – the only things missing are the control tower and planes. SAC also serves as a training center, which is why Chinese staff from Terminal 3 were sent there to learn to use the sophisticated system.

BCIA gave its preliminary approval of the baggage facility in July 2007, two years after the project was launched and eight months before the new terminal is scheduled to open, at which time Beijing Airport will become one of the world's busiest destinations. The city will then be ready for the Olympic Games, and the last thing visitors will have to worry about will be their luggage.