



## Meet the Scientist

### Dr. Kees Jan Roodbergen: Finding New Efficiencies in the Cold Chain

*This column profiles scientists from the WFLO Scientific Advisory Council (SAC). Each of the scientists is available to IARW and WFLO members for consultation on scientific issues they may encounter in the PRW industry. To consult with a scientist, please contact Cold Chain Headquarters at +1 703 373 4300 or email@wflo.org. In this issue, we profile Dr. Kees Jan Roodbergen of the Rotterdam School of Management at Erasmus University in The Netherlands.*

“Any logistics issue that counts in a general supply chain, counts double in a cold supply chain.”

So says Dr. Kees Jan Roodbergen, Assistant Professor of Logistics and Operations Management in the Rotterdam School of Management at Erasmus University.

Roodbergen is one of the world’s leading experts on supply chain logistics, and he has recently turned much of his focus to cold chain logistics. He is currently co-authoring journal articles on automated storage and retrieval systems and designing the layout and structure of manual order-picking areas in warehouses.

“Much of the time waste in a typical supply chain takes place in the warehouse,” he explains. “Quality and speed in logistics has a much bigger impact on product value and product quality in cold supply chains than in many other supply chains. Moreover, the order picking process is highly labor intensive, which is a tough job in a cold environment. For employee’s welfare, there should be a continuous search for possible improvements of the manual work, especially in cold environments.”

In the past Roodbergen has focused

on key aspects of the order picking process, including routing, storage assignment and layout. His research has shown that any of these three aspects has a considerable impact on the efficiency.

“However, very little is known about the interactions between these three factors,” he observes. “From an academic point of view these interactions are very difficult to investigate. But from a practical perspective, there doesn’t seem to be much reason to invest money in a new layout if you could achieve the same results by just rearranging your products in the existing layout.”

His current research focuses at simultaneous consideration of layout and control policies for order picking. Together with Iris Vis from VU University Amsterdam and Don Taylor from Virginia Tech, he is using a novel approach for a warehouse to generate new concepts for its new facility.

“Compared to a common rule-of-thumb approach we were able to save an estimated 25 percent in picking times,” Roodbergen explains.

He encourages warehouses to take advantage of what is already known about logistics practices.

“What has surprised me most in past few years is the gap between academics and practice that sometimes seems to exist,” he notes. “There is so much knowledge in academic literature, just waiting to be actually used in practice.”

Roodbergen also sees opportunities for warehouses to excel in several areas simultaneously.

“Often it is thought that there are trade-offs between service level, efficiency, and employee’s welfare,” he says. “Recently, one of my Ph.D students, Jose Larco, looked into the latter two aspects for two warehouse operations and developed a model for this. It appeared that it is possible to improve the speed of the operation, and simultaneously – at virtually no cost – improve employees’

perceived comfort of the job. All of this by simply changing storage locations of products. More efficient operations can result in better ‘best before’ dates in the stores, while at the same time warehousing cost can be reduced and employees’ welfare can be improved. There is no trade-off; just the need to do things better.”

Outside his professional life, Roodbergen and his wife enjoy hiking.

“We try to go hiking whenever we spot some trees or hills,” he says. “Especially hills and mountains draw our attention, since we don’t have any of those in The Netherlands.”

He also plays bassoon in a symphony orchestra, which is currently working on the fifth symphony of Dmitri Shostakovich. 🎷

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