

Managing director of footwear machinery and robotic systems provider Desma, Klaus Freese, spoke at the 2016 UITIC Congress on the subject of shoes produced by 'smart' robots.

Robot-human teamwork is the future

Footwear factories around the world have never been under as much pressure to change the way they work as they are today, according to Klaus Freese, managing director of footwear automation, machinery and mould provider Desma. So much so that he believes it is only a matter of time before the industry will begin concentrating on interlinked and "intelligent" factories rather than simply on the speed with which manufacturing facilities can produce and distribute shoes. "Intelligent" factories will be able to produce "intelligent" shoes, he

contends, but he predicts that this will make limited runs of (almost) singular shoes available for the same cost as mass production, something for which market demand appears to be strong.

FOUR MAIN ADVANTAGES

As you might expect, the managing director of Desma can offer plenty of reasons for using automation in a shoe factory and, speaking at the 2016 UITIC Congress in Chennai, for which the International Union of Shoe Industry Technicians chose 'the footwear factory of the future' as the main theme, he said he could sum this up in a list of four

main advantages that automation can bring. "It's not just that labour costs are becoming more and more expensive while robots become cheaper and cheaper," he says. "The quality of the shoes you make will be better too because a robot can work with great consistency and precision."

The second advantage he names is an overall reduction in production costs because material costs as well as labour costs will reduce. The third is that productivity will be higher because "robots can work 24 hours a day, seven days a week, and they are not in a union", and the fourth is that robots



Human-machine-interface (HMI) technology is becoming easier to use.

CREDIT: DESMA



Desma chief executive, Klaus Freese, speaking at the nineteenth UITIC Congress in Chennai in February 2016. CREDIT: WTP

are, he claims, more environmentally and socially friendly because they mean women and men do not need to be exposed to any hazardous substances or a dangerous environment inside the factory and will only use the materials they need.

PASS IT ON

In many cases, Mr Freese continues, automation starts with direct injection processes (DIP) and this removes the need to have pre-assembled soles; there is no need to apply cement to the sole or the upper. Instead, a soling material of, for example thermoplastic polyurethane is injected directly onto the upper. DIP is used mainly on rotary table machines with integrated robots, but the most up-to-date versions also link to conveyor lines, a system Desma calls AMIR (automated material flow with integrated robots).

One of the keys to this system working well is that each shoe has to 'pass on' information about what it, the shoe, must end up looking like to the robot. So far, successful projects around the world have used radio frequency identification (RFID) chips to do this; Mr Freese says there are other chips that can do the same job. One interesting application of this, he feels, would be to use this technology to transfer details an individual customer has specified for a particular shoe, making genuine customisation part of the normal production flow. The latest developments in DIP make it possible for consumers to have options on previously inconceivable aspects such as customising the softness of the sole. Desma technology now can combine

four different materials, each with different functions when injecting the sole of a shoe. Different combinations will give different sole softness.

SIDE BY SIDE

However, not every part of the process can be completed by electronic tags and robots. The Desma chief executive believes a big consideration for the future of automation in the shoe factory will be humans and robots working together. "We can see that robots and humans work side by side already," he explains, "but today it's with barriers between them, for safety reasons. In the future, robots and human beings will work much more closely together."

There are examples in the industry already of the shape of thing to come. He likes the way robots and humans interact while putting precisely sized and positioned holes into the soles of adidas Copa Mundial football boots. A thread goes into each hole and a stud goes into each thread. "It looks like quite simple work, but it's complicated," Mr Freese states. "And yet this whole bottoming process can be done by one person only." Good communication between this person and the roboticised system is essential, of course, but the Desma chief executive says human-machine-interface (HMI) technology is becoming easier to use. "It is like a giant iPad," he says.

Robots always follow what he calls "the optimum line" and it is here that footwear manufacturers can achieve savings by reducing waste. In one

example, of robots rather than humans applying a release agent (to stop unwanted bonding between components and surfaces), he says the manufacturer's use of robots has reduced its consumption of release agent by 90%. He also likes the idea of using robots in 'laser' roughing leather because robots can open up the structure of the leather in a consistently effective way, no more and no less than necessary, better than people can, making adhesion between upper and sole, and therefore the overall quality of the shoe, better. "These are applications that are in daily use now," he says. "They are successful; there are almost no limitations on what can be done by robots today."

TOWARDS SMART FACTORIES

Klaus Freese regards it as "unfortunate" that less than 10% of all the shoes currently being produced worldwide are produced using robots or DIP. "The demanding part of shoe production is still the cementing process," he explains. "You have a prepared sole and an upper and you have to get good adhesion. The use of robots in cementing is quite new, but the first lines are already in production." He believes firmly that instances of this will increase and that people will work more closely with robots in the future. "Automation is the future and robots and human beings will work side by side, without any barriers. All of this will guide us towards smart factories and smart shoes," he says. 📌