The International Research and Service Center Hohenstein Institute (Department of Clothing Technology)

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Abstract

An old castle in a tranquil setting. At first glance, no-one would suspect that this was the backdrop for the research and services centre providing expertise from all areas of the textile-clothing supply chain, textile care and other associated sectors. The Hohenstein Institutes are a modern communications centre with the latest research equipment, where highly qualified scientists carry out their research and exchange knowledge. This combination of high-calibre staff and the philosophy of the unity of research, training and application have guaranteed the Hohenstein team of their position as an internationally respected institution offering high levels of expertise in all areas of the textile-clothing chain.

At the beginning of the 21st century, the team of scientists at Hohenstein made the research and development of high-tech textile and garment innovations their number one priority. They recognise a rapidly developing market for "intelligent textiles" and "Smart Clothes" capable of adapting their function to the existing environmental conditions. Clients for the research projects, which are often carried out in conjunction with other institutions and industry, are research associations, federal ministries, the European Union and numerous leading companies both in Germany and abroad. The Hohenstein Institutes dispose of four international offices at the moment: in Turkey (since 1996), USA (since 1999), Lima (since 2002) and Mexico (since 2003).

Introduction

Researchers at Hohenstein have been involved with innovations such as clothing membranes, microfibres, multi-layer sports underwear and microporous coatings. These functional garments are now taken for granted around the world. Textiles and clothing are increasingly developing into high tech products. The Hohenstein Institutes are therefore anticipating a boom in textile and garment innovations for the beginning of the 21st century which will involve all areas of life. The possibilities are boundless. The "intelligent" textiles are rapidly on the increase. In the coming decade, there will be advances in the field of textiles and garments on a scale never before experienced. The products will involve all areas of life, including medicine.

In the well-equipped, modern medical textiles competence centre, the Hohenstein researchers are working on textiles to which "molecular repositories" are applied. Active substances can be embedded in these repositories. When the garment comes into contact with the skin, the substances are slowly and continuously released.

Another area deals with so-called "Smart Clothes", in other words, clothes with integrated microelectronics, sensor technology and actuator technology. In the foreseeable future, mobile phones, computers and camera systems will become part of our everyday clothing. This will allow people to communicate with each other if they so wish wherever they may be. The products will offer more than pure entertainment value, however; they will also promote personal safety and health.

In addition to the research and development of innovative products and processes, another of the Hohenstein Institutes principal tasks is testing, product testing and certification. As a textile and clothing test centre, Hohenstein has an excellent reputation world-wide. It is regarded as completely independent, respectable and extremely competent.

In the area of textile ecology, the Hohenstein Institutes have played a crucial role in developing the internationally recognised "Oeko-Tex Standard 100" label. This stipulates comprehensive criteria and stringent limit values to be used for testing textiles for harmful substances.

Another important branch of the Hohenstein Institutes is practical-based basic and advanced training and advice in all textile and clothing fields. The philosophy of the institute involves combining research with practice and advanced training. Hohenstein's research results have helped secure the future of many small to medium-sized companies. Hohenstein employs over 180 staff in

ten specialist areas. The specialist areas are divided into: Textile Innovations, Clothing Technology, Clothing Physiology, Material Testing, Consumer Tests, Textile Cleaning, Laundries, Textile Leasing, Medical Textiles, Hygiene and Biotechnology.

Results

The main aim of the department of Clothing Technology is to support the clothing industry by the results of their work. Main results of recently carried out research projects are described in the following:

A sizing survey on 1,500 women carried out on behalf of the Clothing Industry Research Association have recently generated a high level of public interest. The measuring subjects were measured without the need for contact using state-of-the-art 3D body scanners. The results are to be used by the industry to help improve the fit of support garments. This has since been put into practice by the manufacturers. Another project is focussing on the target group of older women. Women aged between 50 and 80 were measured at Hohenstein and throughout Germany using a mobile "scan truck". The objective is to determine how our body proportions change as we grow older, and to identify ways in which the clothing manufacturer can engage this target group with high purchasing power by developing special ranges.

Another high-profile project at the turn of the millennium was "Clothing made to measure", which also made use of the new scanner technology. Researchers at Hohenstein, in conjunction with partners in industry, succeeded in manufacturing men's outerwear based on individual body measurements on an industrial scale. A manufacturing concept which is set to revolutionise the clothing market over the coming decades. A fully equipped model factory in Hohenstein made each of the individual processes transparent. Several pilot shops have already opened up in Germany and abroad. There, customers can have themselves measured without need for contact and have their clothes made to measure. All at affordable prices. Numerous manufacturers are supported by the Hohenstein Institutes in the development of new products.

A knowledge database for the clothing industry is the result of a research project, managed by the German research community of the clothing industry. The database comprises all necessary basic knowledge for the manufacturing of elastic and other critical materials for outerwear. The host of different material-constructions cause a lot of difficulties in relation to construction, manufacturing and care of the products. The same applies for many fashionable textiles which are problematic materials from a technical point of view but which have to be processed because of the market and fashion trends. This presents the possibility to take the necessary steps to avoid or even to minimise the possible problems of manufacturing.

The department of Clothing Technology is working on the joint research project, "Virtual Try On", sponsored by the German Research Ministry (BMBF), in conjunction with eight other partners from a number of specialist areas. Starting with the three-dimensional body surface of the customer, recorded using a 3D body scanner, there are two different scenarios of future shopping developed. One deals with online-shopping in a catalogue on the internet, the other one will develop a "virtual mirror" for a department store to represent the customer in a photo-realistic, three-dimensional form with different combinations of garments.

In order to significantly reduce the entire manufacturing process for made-to-measure clothing from the time the order is placed to the time the goods are received, nine well-known partners from the fields of research, technology, the clothing industry and the retail sector have joined forces. Within the "MyNet" research project sponsored by the BMBF, these partners are investigating how the entire process chain can be optimised in the made-to-measure sector.

In view of the stiff international competition, the European clothing industry is pinning its hopes on a wealth of innovations and innovative technologies in order to open up new markets. The "e-Tailor" joint research project, commissioned by the EU, for example, has recently been completed. The Hohenstein Research Institute and 16 other clothing manufacturers, textile retailers, research institutes and technology providers were participating. The ambitious goal was the integration of the extremely promising market segments of industrial made-to-measure clothing and online shopping, which have so far only been exploited as niche markets, into the textile processing chain.

Within the three-year research project, new technologies were developed and prototypes of the individual research results were combined and implemented as complete solutions for reality testing at the shops of the involved retailers.