Changing the concept of changing clothes

Changing clothes usually conjures up an image of removing one outfit and putting on something different, but the demands of consumers are altering this concept. Rather than the wearer changing clothes, it is more and more the case that the clothes themselves are changing to suit different situations, with or without the intervention of the wearer. Whether it be a two-in-one outfit or one that alters itself to cope with the climate or even to offer protection - it all depends on what you mean - metamorphic clothing is changing the market, and no more so than in garments used by travellers.

Long gone are the days when travelling was a privilege of only the very small, affluent minority who would embark on long sea voyages with trunks full of clothing and supplies, and an entourage of staff to travel to far flung lands. The introduction of affordable travel – in particular air travel – opened up a multitude of opportunities to the average person. And nowadays, thanks to the further expansion of air travel, and particularly with the growth of low cost airlines, travel is accessible to everyone and this has led to people travelling more often and further afield.

Modern day travellers also have different ideas about travel and in particular the clothing that they pack. Whilst their affluent predecessors travelled with trunks full of gowns and suits, and even 20 years ago, people heading off on package tours could be seen lugging heavy suitcases through airports and onto coaches, the modern traveller is more mobile, often hopping between destinations and travelling for longer periods of time. As a result their luggage has to be as mobile as they are and therefore smaller, lighter and less cumbersome than before. This means that, whilst they travel with fewer garments, they demand more from these garments in that each item must often fulfil more than one function. In short, the modern traveller does not expect to have to change their clothes too often, they expect the clothes themselves to change… As people's expectations alter, the apparel itself is having to metamorphose to meet these demands.

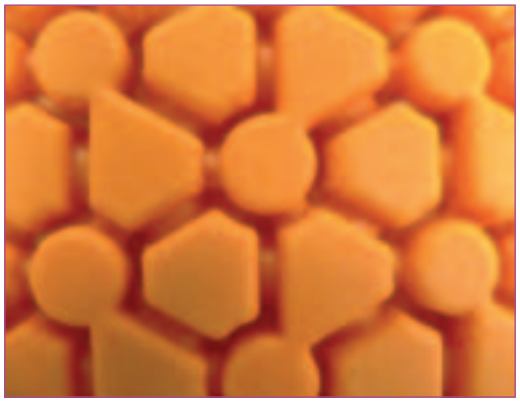
Redefining multi-functionality

Clothing is often labelled as multi-functional, in that it offers the consumer added performance such as breathability, waterproofness, UV protection, thermo-regulation, etc., but for the traveller multi-functionality can also be interpreted in a more literal way…as in how many situations can a garment be used so that they need fewer



Maier Sport women's jacket with Outlast technology.

Outlast



d3o changes its material properties from soft and flexible to stiff and protective when an impact occurs.

d3o

garments that can be used in numerous situations? The most obvious example of this is arguably clothing that can be worn in different climates. For example, we are aware of the benefits of layering, but sometimes the consumer needs single layer clothing to alter to their needs too. For instance, there are situations when both trousers and shorts are required. A traveller may need long pants and short pants during the same day and not have the room, or the wish, to carry an extra item of clothing. This is where metamorphic clothing can be, and has proved to be, a popular option. Companies such as Magellans, The North Face, Columbia Sportswear, and Ex Officio have all developed convertible pants that keep the legs warm as cargo pants, but can be turned into shorts by unzipping the legs.

This concept is by no means limited to trousers either - there are numerous garments available on the market with 'detachable' elements that can be used in different ways. For example, Burton's Convertible Women's Jacket, is a snowboarding/skiing jacket with removable arms, so that it can also be worn as a vest. And letting nothing go unused, the sleeves can then even be used as leg warmers.

Going through a phase

These garments are all very useful to the modern day traveller, but there is no real science involved, and it is not a complicated concept to add a zip to a garment to allow the length of the legs or sleeves to be altered and, at the end of the day, these garments only metamorphose through human intervention. But there are materials and garments now available on the market that are capable of altering themselves without the need to undo a zipper, or release a press stud. The most well known of these are phase change materials (PCMs) and when you consider that Outlast's PCMs were originally developed for space travellers and have been certified by Space Foundation, there is no doubt of their relevance in the travel industry, however far afield people wish to travel.

These materials actually alter themselves to create a balanced temperature through phase change particles. The particles absorb body heat and melt when the temperature rises to absorb the excess heat, but, when the temperature begins to drop, the capsules solidify and release the stored heat, thus maintaining a constant temperature within the garment. This offers advantages to those wishing to travel light as, in theory, it reduces the need for travellers to carry as many garments as fewer layers should be required in order to regulate temperature, an important consideration for those journeying into different climates, particularly cold climates such as for skiing and snowboarding where in the past bulky clothing was vital to protect against the cold.

Science non-fiction

A British company has used intelligent molecules to create a truly metamorphic material that reduces bulk and can offer a high level of protection to those who wish to travel the world seeking thrills on the ski slopes (as well as for participating in dangerous sports at home).

d3o possesses the ability to change between flexible and rigid. It is a smart material that reacts to high speed impact by changing its material properties from soft and flexible to stiff and protective when an impact occurs. Not only that, but it changes back to its original form when the impact has been absorbed and this all happens in less than 100th of a second, a truly metamorphic material.

It is available in different forms: sheet products (d3o mesh in 4mm and 6mm) or type 1 components (elbow, knee, coccyx, shoulder, hip) which can be directly integrated into existing garments, and Type 2 for motorcycle wear, which is on the horizon. All of the products offer consumers the level of protection required with unrestricted movement.

According to the company, "Impact protection in active sports has traditionally been provided by bulky, rigid protectors. This is not ideal as it forces a compromise between the amount of protection you can accept and the freedom of movement you can enjoy. d3o technology negates this trade-off by providing a high degree of protection and total freedom of movement."

This material has been integrated into a number of garments including Globe skateboarding shoes, Sells' goalkeeper gloves and shin guards, Ribcap snowboarding hats and Spyder ski suits, which will be worn by the US and Canadian Alpine Ski teams at the winter Olympics.

Superhuman soldiers?

This concept of metamorphic clothing that can transform from a flexible material into a rigid protective layer is also being researched for use by the US Army. The

Men's Paramount Convertible Pant from The North Face

The North Face





Soldiers in the future could have an even higher level of protection from their uniforms.

Defenselink

Massachusetts Institute of Technology (MIT) was selected by the US Army to carry out a five-year contract to research the applications of nanotechnology and create lightweight molecular materials to equip foot soldiers of the future with uniforms and equipment which can heal them, shield them, and protect them in the field. Working with Raytheon, DuPont and several hospitals, the team is developing metamorphic materials that will offer a variety of applications such as the 'exoskeleton' which will include nanoparticles, electroreological fluids and polymer actuators which could provide not only ballistic protection, but could transform into a rigid medical cast (although this would be on demand and not automatic as with d3o) or could even be activated to create an offensive 'forearm karate glove'.

With the advances that have been made in 'metamorphic' clothing and what the future looks set to hold if research such as that being carried out by MIT comes to fruition, the future of multi-functional offers a broad spectrum of opportunity, and not just for the traveller. We now know the possibilities that have been opened up through integrating electronics into garments, but with materials that already exist, such as d3o, that have the ability to respond to situations without human intervention, and those in the pipeline under research programmes, the future of clothing is set for further change. As for the modern day traveller, whether that be the average holidaymaker, the intrepid explorer, or a soldier out in a tropical forest or a harsh desert environment, these metamorphic clothing systems offer less bulk, more functionality, and above all protection. Moreover, people will no longer be changing outfits, the outfits themselves will be changing… it seems science fiction may become reality.

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