



a day in the life of...

It is hard to imagine what life is really like for people with restricted mobility and the challenges they face carrying out simple everyday tasks. For many elderly people, or those who suffer from debilitating health conditions, life can be a daily struggle. Over the years academics from the University's Ergonomics and Safety Research Institute (ESRI) have used their expertise in empathic modelling to enable others to experience what life is like when your mobility is restricted, raising awareness, aiding the design of new products and improving the provision of healthcare.

It was in 1994 that Sharon Cook, an ergonomist based in ESRI, was approached by the Ford Motor Company. They wanted their in-house ergonomists and designers to better understand the needs of the older driver, to enable them to incorporate these needs into the design of new vehicles.

Initial research was undertaken by ESRI into the state of knowledge concerning older drivers and reported to Ford, who then returned to Loughborough with a further request – they wanted to know if there was any way ESRI’s findings could be turned into a ‘hands on’ experience for their staff.

“Ford knew that simply telling their ergonomists and designers about the problems older drivers faced was not enough – they needed to experience them in order to gain a true understanding,” Sharon explains. “We then started to look into how we could liven up the data and make it more tangible.”

It was at this stage that the concept of creating a simulation suit was born. This would literally let someone walk in the shoes of an older person and experience firsthand what life is like for someone with restricted mobility.

“This wasn’t something we had tried before so we didn’t know if our idea would work, it really was a step into the unknown,” Sharon said. “Based on our research we knew what issues we wanted to replicate in the suit, some were achievable and others were not. For example we could reduce people’s dexterity through the use of gloves, but we could not replicate the impact old age has on cognitive function, such as increased decision response times.”

After several months in development the Third Age Suit was completed, recreating key aspects of old age including: the restriction of key joints in the body; restricted movement in the neck; impaired vision and a reduction in the dexterity of the hands and sensitivity of the fingertips.



Sharon Cook experiences life as an older motorist through the Third Age Suit

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The suit was handed over to Ford, who found it so useful they asked for several duplicates to be made for use in the company’s global facilities. The suit has since been used to help shape not only the design of cars that are more user-friendly for older people, but also of commercial aeroplanes. Through a technology sharing alliance between Ford and Boeing, the suit was used by Boeing engineers to help them experience flying as a Third Ager and so aid the design of its 787 Dreamliner.

Once the project for Ford was completed the team continued with other research, assuming their work with simulation suits

was finished. However in 2006 they were approached by Napp Pharmaceuticals, who upon learning about ESRI’s success with the Third Age Suit wanted to harness their expertise to tackle another issue, osteoarthritis.

“When Napp came to us their main priority was to raise awareness of osteoarthritis,” Sharon explains. “But they appreciated that such topics are not particularly appealing to the media or the general public and that they needed to find a way of generating interest in this incredibly debilitating condition. They felt that if people could experience some

aspects of osteoarthritis for themselves it would really make people stop and think about what sufferers have to endure on a daily basis.”

Napp wanted a suit that could not only be used to ignite interest in the media about the condition, but also by healthcare professionals to help inform and guide their treatment of people who suffer from it.

To develop the Osteoarthritis Suit ESRI worked with specialist consultants and the Arthritis Care charity, who provided patient case studies.

“Clearly we couldn’t, on ethical grounds, recreate the pain that is associated with osteoarthritis,” Sharon added. “Instead we focused on the physical restrictions it can cause, which have a massive impact on the quality of life of sufferers.”

The Osteoarthritis Suit was another success, being used in a major PR campaign – led by Napp and Arthritis Care – to help raise awareness of the condition and to assist healthcare professionals.

But yet again the end of the project has not signalled the end of ESRI’s work in simulation suits. The research team, which includes external occupational health and design professional Karen Walmsley, have now joined forces with colleagues in the Department of Civil and Building Engineering to create a third suit. This time they will be focusing on the older construction worker and the work-related health conditions from which they may suffer, in a project being funded by the University’s Innovative Manufacturing and Construction Research Centre (IMCRC).

“This project has largely come about because in recent years there has been a real skills gap in the construction sector,” Sharon explains.

“This has occurred in part because construction workers tend to leave the sector as they get older or move into other less physically challenging roles because aspects of the work get too difficult. Clearly these are highly skilled people with years of experience that the sector is losing. Alongside this we have an aging population of whom many will have to work longer into their senior years, so there are issues here that need tackling.

“What we are hoping to achieve with this simulation is to raise awareness of the needs of older construction workers. We want to help improve working practices and equipment to make it easier for older people to stay in the sector, and encourage younger people to take better care of themselves throughout their careers to avoid developing common occupational health problems that some older construction workers suffer from.”

Even though the project is not due for completion until the autumn, there is already a new challenge on the horizon. ESRI will be joining with colleagues from the Departments of Ergonomics and Design and Technology to develop an ‘obesity’ or bariatric simulation suit. Academics across the departments have recognised that there is a real need within our society to understand and meet the requirements of the ‘plus size’ market. High fidelity wearable simulations and an extension to Design and Technology’s HADRIAN computer-aided-design (CAD) human modelling inclusive design tool are, the team proposes, key contributors to achieving this. It is hoped that funding for the research will be secured enabling this project to become one of the first collaborative ventures within the University’s new Design School.

Want to know more?

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Visit: www.lboro.ac.uk/research/esri/design-safety/projects/sim_suit/

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