‘People want to press the button themselves’
People can be strange creatures, as ergonomics expert Professor Peter Vink (Industrial Design Engineering) knows. They will sit in tight and uncomfortable seating to save money, complain about it in surveys and then do it all over again. These are the enigmas of environmental ergonomics.
As an ergonomist, you should know all about designing your office, but your workstation looks pretty standard. “I have not been at this desk very long. But I do have a good chair, an Axia from BMA ergonomics, which my colleague Richard Goossens helped design. What makes it so special is that if you put the backrest down, the back part of the seat tilts with it, preventing you from slipping out of the chair. And my computer monitor is perpendicular to the window, minimising negative effects of external light and reflections. But my workplace at home is better.”

You have been a part-time professor since 2001, but full-time since June of last year. Why the change? “For years, I was in charge of the interior design department at TNO, working on the design of offices, factories, aircraft and vehicles. I worked one day a week at TU Delft to forge links between it and TNO. That worked well: TNO was able to recruit students easily and I could bring in people from TNO to do their PhDs at TU Delft.”

So why did you make the move? “My department at TNO just kept growing and I wanted a smaller group to leave me with some time for research. That was difficult to achieve at TNO, and it got me thinking. Then an advertisement appeared for a chair in environmental ergonomics, so I applied for it.”

In office design, you emphasise the role played by the user, but how can the user contribute to the design of an aircraft or car? “A new chair for BMW is a good example. This chair needs to distribute the pressure under your body and be as adjustable as possible. We worked on it for seven years. But when we started testing it with people, they all looked worried, thinking ‘what on earth is happening?’. Although they said they found it an improvement, you could tell from the looks on their faces that they were not relaxed. Then we added a button saying ‘ideal seat’. The result is: people sit down, press the button and you can see them thinking that it feels comfortable. The most important difference is that you are giving people control. As long as they can press a button before something happens, they are happy and otherwise not. Actually, the same applies for flexible working, ‘het nieuwe werken’ in Dutch. If suddenly all kinds of things start being introduced and you have no control over any of them, people become distrustful. At TNO, aspects of flexible working were always phased in in a small department first, leaving the rest of the organisation unchanged. We then conducted evaluations. When, after that, you want to introduce the changes more widely, you will have much more support within the organisation. Simply by enabling people to become used to the idea and testing out the changes on a small scale first.”

Is it possible also to give people in an aircraft a feeling of control? “Definitely. If you book a ticket with KLM, you can book yourself a little extra legroom in comfort class for EUR 2.50. Even people who have less legroom are now more satisfied than they were before because they have themselves opted to sit in tight seating. People want to have control, they want to know what they can expect. We conducted a study among more than 1,000 air passengers that revealed that there is no significant difference between the comfort score for economy and business class. This is not because there is no difference, but when you book, you set a scale in your head and you use that scale to calibrate your comfort score. Your booking is what determines your expectation and your expectation determines the score.”

What should be done with passengers who are too wide for the seat? “Many airlines solve this problem by removing the middle armrest. This makes it possible to book two seats, and this is also indicated in the small print from the airlines. The shape of the seat created in this way is not ideal, however. You should make the seats flatter, but this makes them more uncomfortable for people using them in the standard way. Actually, the trend is towards narrower seats. When I was involved in the design of the Boeing 777, the original plan was to have three rows of three seats. But Emirates wanted three-four-three. That meant slightly narrower aisles, but an additional seat in each row. People did not complain and now Emirates is thinking of switching to four-three-four because people continue to book the seats. It would seem that the width is not so important. People complain more about legroom.”

Are Emirates passengers less wide on average? “Not at all. Using anthropometric data (average

CV

Peter Vink (1953) has worked on interior design for offices, production halls, aircraft and vehicles. With his interior design group at TNO, he worked with companies including Boeing, BMW, Ahrend, Gispen and SNCF (train interiors). He is seen as one of the pioneers of participatory ergonomics, in which the future user plays a role in designing his/her own environment. From 1998 to 2004, Vink was chairman of the Netherlands Association for Ergonomics. With Klaus Brauer, he co-authored the book ‘Aircraft Interior Comfort and Design’ (2011). In 2011, he was presented with the American Hal Hendrick Distinguished International Colleague Award. Vink worked for TU Delft as a part-time professor from 2001. In June of last year, he opted to devote himself fully to the development of knowledge rather than management. On 4 June 2014, he will give his inaugural address: ‘The sweetness of discomfort’.

No. 3 October 2014
human dimensions), you can calculate that 95% of people will fit in the seat and 5% will not. The latter sit in an aisle seat with the armrest up. If you end up sitting between two people like that it is just bad luck.”

Is there still room for further development of aircraft seats?
“Yes, because in the past there was only business and economy class. Then first class was added and now you have premium economy. Below economy you also have low budget now. The manufacturer may secure a major order from a low-cost airline but it is not proud of the end product because the seat has been stripped down to nothing but the backrest, seat and a bit of foam.”

Are people happy with that?
“There is no significant difference in the experience of comfort between low-cost and economy and yet low-cost tickets are 50 to 100 euros cheaper.”

And people do not complain?
“That’s the funny thing about it: about 40% of passengers complain about the lack of legroom, but they still buy the tickets. In my view, you could make the seating even tighter and people would still continue to book. Ultimately it’s the price that is decisive. People decide to do without legroom but then complain about it in their trip report. They sometimes say that they will not book again, but still do it anyway.”

You came to TU Delft inspired by a desire for knowledge and greater depth. What lines of research will you be pursuing in the years ahead?
“My dream is to build an interior of a blended wing body aircraft here at TU Delft. I think there are many more possibilities for feeling more refreshed and comfortable in a small space and on a long flight. For BMW, we developed a game for the rear seat that you operate by pushing your shoulders against the seat. You activate a whole range of muscles that way. This game is much more refreshing for passengers than reading a book and the idea can also be applied in aircraft. A blended wing aircraft, which will not start flying until 2050, offers more options than the tube-shaped aircraft we have today. On the outer edge, you can allow people to lie down and sleep in a type of oblong container. Even more than is currently the case, booking will take place via social media, enabling you to form groups even before the flight. In the middle of the aircraft, you can go in search of sociability and entertainment, with relaxation on the periphery. I would like to build this kind of interior and then investigate whether you can achieve a greater variation in positions and activities with the same density.

“We prefer to have the discomfort first followed by the comfort’

One of my PhD students discovered that if you start from a hard seat, a softer seat feels much softer. You can take advantage of this by having people sit on harder materials at the gate so that the aircraft seating feels better. Our sensors do not work in terms of absolute values, but relative values.”

Perhaps comfort is a question of variation?
“Yes, and that it is what I would like to explore. If you make the whole journey as comfortable as possible, you do not experience very much. But if you have to go without it now and again, you enjoy the comfort more. People are strange creatures. We prefer to have the discomfort first followed by the comfort.

I thought that ergonomics had already discovered everything, but you have a whole world still to explore!
“Yes, and that is what is so great about working with students. They can be so ingenious at times. I currently have a student who is working on an aircraft seat with a hole in it that enables you to sleep sideways. I really like these kinds of wild ideas.