Aircraft interior comfort experience

Prof dr P. Vink*, ir I. Kamp*, drs M. Blok**
*Delft University of Technology, Faculty Industrial Design Engineering
**TNO

more info:
Prof dr Peter Vink,
Delft University of Technology
Faculty Industrial Design Engineering
Landbergstraat 15
2628 CE Delft
The Netherlands
e-mail: peter.vink@tno.nl
tel +31 23 5549590

Many changes
The aircraft interior is changing. Lightweight seats, new materials, better cabin air, new entertainment and new lighting systems are all to be seen. Most of these innovations are driven by technology. However, the question is whether the passenger experiences these improvements. It’s also the question whether these improvements really solve the main problems passengers experience during their flight.

Fig. 1. From 11513 website reports a selection was made of the reports that contained the service and comfort rating, the airline name, information on the type of airplane of a flight between May 1st and September 1st. These 291 selected reports showed the main problems mentioned in the figure.
Table 1. Differences in comfort experience of passengers caused by length of the flight, first/business class, leisure flights and old airplanes. Comfort could be rated on a scale from 0-10, Ten being the highest comfort. The differences are tested with the t-test, $p<0,05$ is seen as significant (marked with *).

<table>
<thead>
<tr>
<th>comfort value (scale 0-10)</th>
<th>special group</th>
<th>others</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>long distance versus others</td>
<td>6,67</td>
<td>7,18</td>
<td>0,17</td>
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<tr>
<td>first/business class versus others</td>
<td>7,91</td>
<td>6,99</td>
<td>0,11</td>
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<td>leisure flights versus others*</td>
<td>6,29</td>
<td>7,33</td>
<td>0,00</td>
</tr>
<tr>
<td>old airplanes versus others newer ones*</td>
<td>5,88</td>
<td>7,26</td>
<td>0,00</td>
</tr>
</tbody>
</table>

The opinion of internet passengers
A study among 11513 trip reports on a website showed that the main problems according to passengers concern legroom, delay, lost luggage and rude flight attendants (see fig. 1). The same study showed also that the comfort rating was significantly higher for the new planes compared to the older airplanes (see table 1), showing that the innovations have their effects. It was also interesting to see that leisure flights are rated significantly lower regarding comfort compared with non-charter flights. This study also showed that a delay of several hours influenced the comfort scores so much, that the ratings became around 3,5, while the average rating was 7,0 (on a scale from 0-10, where 10 =max comfort). Probably, it has no use to improve the legroom in case of a frequent delay.

The opinion of passengers after their flight
The disadvantage of the above mentioned internet trip reports is that it concerns a selected group of internet users, which is perhaps different from the normal passengers. Therefore, also 152 passengers flying with 36 different airliners were interviewed after their flight regarding their comfort experience. Also, in this study legroom was a major issue. Additionally, seat width, personal space, in- and egress were rated as the main issues to be improved (see fig. 2). In general people wanted more movement space, sometimes legroom, sometimes seat width, sometimes more movement possibilities. The latter is also a big issue in recent literature regarding office seats (Vink, 2005). It’s not designing for the ideal posture, but stimulating movement. To prevent neck complaints and deep vein thrombosis more movements of body parts is stimulated.
Innovations from the passengers point of view

Two studies each with their shortcomings clearly show that legroom is a problem mentioned by most of the passengers. In the second study also seat width, in- egress and personal space are mentioned. Based on these problems designs were made not taking into account what is possible, but what the passenger would like to experience. The designs were focused on increasing the legroom, increasing the personal space and stimulating movement. Three concepts were developed and showed to passengers (see fig 3, 4 and 5 respectively). Especially, the legroom and the personal space were preferred by the passengers.

Is it useful to focus on passenger comfort experience?

According to Brauer (2004) airliners can increase their financial margin by reducing maintenance costs could be reduced. However, a reduction of 14% of the maintenance costs results only in a 1% margin, while an increase of only 1% more passengers has the same result. To attract more passengers, we need to know the selection behaviour of passengers according to Brauer (2004). It appears that passengers first select on point-to-point transport, time and price. Then, aspects like marketing (frequent flyer programmes) come into play, followed by comfort, past experiences and delays. For short distances the delay aspect is more important and for long hauls the comfort aspect plays a more important role. This study shows that it is more important to reduce delays than to focus on comfort as a delay with good comfort seats results still in a low rating. However, more
than half of the passengers complain about knee space and airliners can use this fact to attract more passengers.

Fig. 3. A concept aircraft interior to stimulate movement, to go shopping and get a drink, but also making it possible to work with your laptop, shown to passengers. An advantage of this system could be that tickets will get cheaper, because of more passengers. After discussing on advantages and disadvantages 28% of the passengers preferred this concept of all three presented here.

Fig. 4. A concept aircraft interior to increase knee space without reducing the number of passengers. After discussing on advantages and disadvantages 42% of the passengers preferred this concept of all three presented.
Fig. 5. A concept aircraft interior to increase personal space to sleep, read or listen to music. After discussing on advantages and disadvantages 30% of the passengers preferred this concept of all three presented.

**Conclusion**

The aircraft interior industry was successful in improving the passenger comfort experience. New airplanes are rated significantly better compared with the old airplanes regarding comfort. However, there is still room for improvement especially in the leisure (charter) airplanes. Possibilities to innovate concern the need for more legroom and personal space. This is possible even within the current airplanes with at least the same number of seats with lightweight seat systems.

**References**