RESEARCH REPORT

Symbol Development: Keep Seat Belt on Incase of Turbulence

The Interaction Group (TIG) Research Reports discuss some findings relevant to passenger understanding of safety equipment or procedures. In this report we discuss the development of a symbol designed to instruct passengers to keep their seat belt on because of potential turbulence. This symbol was developed for use on TIG's passenger safety information cards.

Turbulence and Seat Belt Use

A passenger can be injured severely -- even fatally -- during turbulence. Obviously, injuries can occur as a passenger moves about the cabin. Injuries can also occur if a passenger is struck by another passenger or piece of equipment. But many passenger injuries, perhaps even most, could be avoided if passengers were to keep their seat belt fastened whenever seated. We believe that if some passengers were to see, on the safety card, the warning to wear their seat belt this would increase overall passenger safety.

Our goal was to develop a symbol that would instruct passengers to keep their seat belt on when seated due to the danger of turbulence. We wanted a symbol that would communicate without words. And we also wanted one that would be understood by most who saw it.

Symbol Development

A key problem was how to communicate the concept of turbulence -- a quick oscillating change over time -- using only static pictures and no words.

An initial version showed a sequence of aircraft "porpoising" across the page as shown in Figure 1. But when tested on a small number of people we found that some thought this meant that whenever the plane went up or down the seat belt should be fastened. This could be misinterpreted to mean that it would be safe to release the seat belt in level flight.

Figure 1. An early version of a symbol not well understood.

So, another symbol, shown in Figure 2 below, was finally developed. But before we reached that point, we found that the aircraft symbol with just wavy lines (and no vertical arrow) was interpreted by some to mean the plane was floating on water. And when just the two-headed vertical arrow was shown (i.e., no wavy lines) some thought it meant whenever the plane was taking off or landing. So, the symbol in Figure 2 was finally tested on 30 different people to see if the message was understood.

Figure 2. The message to be communicated is:

a. When seated
b. Don't unfasten seatbelt (or keep seat belt fastened)
c. Because of the danger of turbulence

Note: The circle/slash and three arrows are red.

Who Was Tested

Of the 30 people tested on the final art 16 (53%) were men and 14 (47%) were women. Their recent flight experiences and ages are indicated below:

Flights in Past 2-years	0	1-2	3-5	6-10	10+
Number of People	7	5	3	6	9
Percentage	23%	17%	10%	20%	30%

Age	20s	30s	40s	50s	60s	70s
Number of People	16	2	1	4	5	2
Percent	53%	7%	3%	13%	17%	7%

Results

All 30 (100%) of the people tested understood the symbol elements for "When seated" and "Don't unfasten seatbelt (or Keep seat belt fastened)." The "turbulence" element, along with its potential for injury, was understood by 27 (90%) of those tested. Of the three people (10%) who did not understand the symbol, two had not flown in the past two years. Inexperience with the concept may have contributed to their difficulty in understanding the symbol.

Our interviewer then asked the 90% who understood the "turbulence" element whether it was the wavy lines around the airplane or the two-headed vertical arrow which was most important in conveying the concept: 7 (26%) said the wavy lines were the important cue; 7 (26%) said the arrow was important; and 13 (48%) said both were important.

Conclusions

Symbol meets standards. The turbulence symbol meets our criterion for understandability (90% or higher). It exceeds the United States industry standard which requires at least an 85% comprehension rate for safety symbols (ANSI Z535.3-1998).

And even though some did not understand the turbulence element, or what it implies, all of those tested understood that, for whatever reason, they were to keep their seat belt fastened when seated. To this extent, the symbol was 100% effective.

Greater passenger safety. Most passengers who look at the final symbol will understand its message. Since words are not necessary it can be understood regardless of whether the person can read English. We believe that, compared to those who do not see the symbol, those who do will be more likely to appreciate the hazard and will be more likely to keep their seat belt buckled when seated.

Airline benefit. Having this symbol on a safety card will demonstrate that an airline is doing more than just the minimum to ensure a high level of safety. Passengers will not be able to claim they were not instructed to keep their seat belt on when seated.

The symbol developed in this program is now a standard item on all of IRC's passenger safety information cards.

Note: In the interest of passenger safety readers are encouraged to use the ideas presented in the report. However, the expression of those ideas, as exemplified in the graphic illustrations presented herein, is copyrighted and may not be used without written permission.

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