The Exit Sign Says NO!

Is it possible to negate existing exit signage in a way that would affect egress route choice making it possible to reroute evacuating people? The answer is yes, and our current knowledge and technology makes it very much a possibility.

Affecting egress route choice is possible in a number of ways. Earlier research has shown the possibilities of making certain egress routes more attractive to people by applying features such as green lights (Nilsson, 2009) and dynamic markings (Galea, Xie, & Lawrence, 2014). However, it has also been shown that it is possible to make egress routes less attractive to egressing occupants by providing negating features to the exit signage (Olander, 2015). It was found that the most efficient way to negate an existing exit sign was by providing a clear negating marking, such as a red cross over the sign, coupled with red flashing lights (Olander, 2015). Other negating options were also tested, but with much less effect. Alternating colors from a green background to a red background in an attempt to appeal to color association, which has been shown to follow the lines of green equals safety while red equals danger during an egress situation (Nilsson, Frantzich, & Saunders, 2005), only resulted in statements similar to the following:

"The red exit sign looks just like a regular sign, but different. I would just try to exit there!"

Figure 1. The least preferred negated sign of the study, largely due to its ambiguous nature. It is implied that color coding in itself it not sufficient to alter the message of the original signage into a negated message.

This is most likely the result of sending an ambiguous message, which proved to be a big issue when sorting out preference for a certain negating exit signage. Signs which provided an ambiguous message were rated very poorly when compared to signs with a more clear negating message (Olander, 2015). In addition to the above, the addition of sensory heavy features, such as the mentioned red flashing lights, should cause observers to sense a greater sense of urgency than they otherwise would (Kinateder, Kuligowski, Reneke, & Peacock, 2014). This would result in people becoming more prone to seek out and follow instructions, in addition to making the decision to evacuate faster (Day, Hulse, & Galea, 2013).

In order to determine which negated exit signage was most preferred amongst people a paired comparison survey was carried out. Participants of the survey were shown a series of tests, where in each test two signs were viewed simultaneously. Participants were then asked to fill out a survey sheet consisting of a series of affordance based questions which gave insight into what specific features affected certain sensory, cognitive of functional thought patterns (Olander, 2015).

With the help of these findings it is possible to create an evacuation system that has the ability to guide egressing people along certain paths, chosen in a way that leads the egressing people away from dangers and avoiding areas where critical conditions might have been reached or congestion is prominent. Current research projects suggest that endeavors such as this are not a too far off occurrence. Currently, similar ideas are being tested in real life full scale experiments (Bryant & Giachritsis, 2014). With the addition

Figure 2. One of the most preferred negated signs of the study.

of the signage options mentioned, future research projects may be able to incorporate an even more effective exit sign design into their dynamic evacuation systems.

With that said, I believe that the days of the old static evacuation systems are coming to an end and we will in the coming years be seeing an increase in the use of innovative evacuation solutions making use of dynamic signage to facilitate a safer evacuation and leading people out of harm's way.

Joakim Olander
Fire Engineering Student,
Lund Tekniska Högskola

References

Bryant, P., & Giachritsis, C. (2014). *The GETAWAY Project - Improving Passenger Evacuation Techniques in Railway Stations.* Paris: Transport Reasearch Arena.

Day, R. C., Hulse, L. M., & Galea, E. R. (2013). Response Phase Behaviours and Response Time Predictors of the 9/11 World Trade Center Evacuation. *Fire Technology*(49), 657-678.

Galea, E. R., Xie, H., & Lawrence, P. J. (2014). Experimental and Survey Studies on the Effectiveness of Dynamic Signage Systems. *Fire Safety Science - Draft Proceedings of the Eleventh International Symposium*.

Kinateder, M. T., Kuligowski, E. D., Reneke, P. A., & Peacock, R. D. (2014). *NIST Technical Note 1840 - A Review of Risk Perception in Building Fire Evacuation.* U.S Department of Commerce: NIST National Institute of Standards and Technology.

Nilsson, D. (2009). *Exit Choice in Fire Emergencies - Influencing Choice of Exit with Flashing Lights.* Lunds Universitet, Avdelningen för Brandteknik. Lund: Lunds Universitet.

Nilsson, D., Frantzich, H., & Saunders, W. (2005). Coloured Flashing Lights to Mark Emergency Exits - Experiences from Evactuation Experiments. *Fire Safety Science - Proceedings of the Eighth International Symposium*, 569-579.

Olander, J. (2015). *Comparative Study of Dissuasive Emergency Signage.* Lund: Department of Fire Safety Engineering, Lund University.

Sime, J. D. (1985). Movement Towards the Familiar: Person and Place Affiliation in a Fire Entrapment Setting. *Environment and Behaviour*, v. 17, 697-724.