

**Policy Issue:**

## Communicating the nature of an emergency incident to passengers soon after it happens

Welcome to this issue of the SOCIONICAL\* Policy Brief. The purpose of this series of policy briefs is to engage members of the policymaking community, professional services personnel as well as the general public in SOCIONICAL's work which deals with developing Complexity Science based modelling, prediction and simulation methods for large scale socio-technical systems.

As the adjacent quote from a passenger who was trapped on one of the London Underground trains involved in the July 7, 2005 bombings illustrates, a hazardous event can have far-reaching psychological effects. Even highly improbable situations become suspiciously likely and false assumptions may be made, leading to further confusion. An urgent need arises to ascertain the actual nature of the event and prepare for the real consequences rather than lose valuable time anticipating imagined consequences based on wrong conjectures and assumptions. In such emergency situations, split-second decisions need to be taken in the very first minutes after the triggering event. Survival hinges on true information that the survivors' mind can register and instinctively trust. Experience from real life events however shows that this communication and flow of reliable external information more often than not, fails to happen.

### Lack of communication is a widespread problem

One of the recurring patterns in emergency situations in recent years has been the lack of communication between providers of a public service and users of the service. This has especially been the case in rapidly deteriorating situations such as the London

Underground 7/7 incident consequent to bombings as well as in relatively slower evolving events such as the breakdown of the Eurostar trains in December 2009 ensuing as a result of temperature differentials between the internal and external environment of the tunnels.

Frequent communication breakdowns, putting lives at risk, across widely differing situations suggests that the matter has not been given the requisite attention, policy-wise as well as technologically.

### Practical difficulties in early communication

"At this point, debris started raining down on the roof of our carriage and, momentarily, it sounded exactly like water. At that point, I did think we were going to die. I assumed the tunnels were flooding."

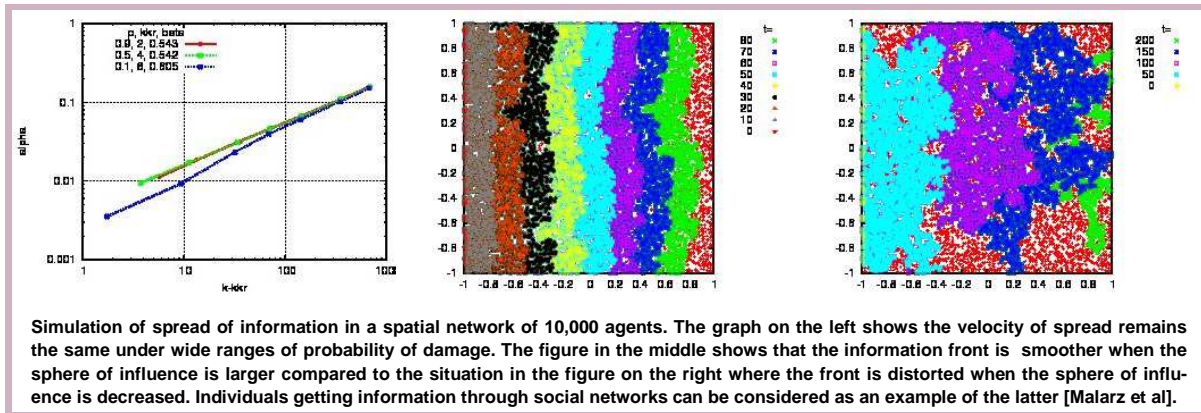
- 7/7 London Underground Bombing Survivor

Information flows even if designed to be as seamless as possible may yet present difficulties for authorities, some way removed from the site of the incident, when trying to convey accurate and reliable information capable of being acted upon immediately for a properly managed evacuation. The first report about the incident

has to originate from the site. This can get obstructed if the physical damage is such that communication devices fail or lives of operating staff are lost. It may be possible to indirectly infer the cause but there is still high risk of wrong diagnosis. Attribution of transport network failure to a power surge in the July 7 incident is an example. Some survivors may manage to escape and inform emergency services but this would at best be a lay account, not sufficient to rule out other causes or continuing threats. If the authorities opt to wait until the cause of the incident is reliably established, the likely onset of panic at the site would cause people to look for ways to escape, putting themselves and others at even greater risk, the Eurostar incident of December 2009 being another example. Effective communication in emergencies is therefore about delicately balancing right content and timing.

### Social networking creates information demand

Communication between authorities and trapped survivors may be controlled or managed depending on operational protocols in place. However, where



available technology allows other channels of communication such as between trapped passengers and their relatives and friends (through social networking sites), lack of communication between authorities and trapped passengers could easily be construed as apathy of the authorities to the risks being faced by passengers or even as technical incapacity to deal with the situation, prompting a quicker rescue response from the authorities. At the other end, alternative channels of communication may not be made available, these being solely possible through 'official' means, such as in the London Underground Transport Network where mobile coverage is not provided (although technologically feasible) but controlled communication devices have been installed on trains for use in emergencies. The question still remains whether even the removal of social networking technology creates more intense demand for quick and reliable information for immediate and managed evacuation.

### **Probabilistic Spreading of Information**

AGH-Krakow and LSE have conducted simulations showing the spread of information in a spatial network of agents when the probability of 'damage to information' and the 'sphere of influence' of agents varies. Information may be considered 'damaged' and incapable of flowing between two agents when it is insufficiently clear or when the degree of trust between any two given persons in an emergency is low. The 'sphere of influence' of a person is represented by the degree of connectivity in the network and may reflect

information bits received from social networks (low connectivity) or information received from authoritative sources (high connectivity).

The results show that the 'velocity' or the rate at which agents get informed over the whole network remains nearly the same over a large range of degree of damage. This means that even if the degree of trust between survivors is low, it does not too heavily affect the spread of information to others. What is more critical is the 'sphere of influence', in other words, whether the information is authoritative (many people accessing the same information) or personal (derived from individual social networks).

When the sphere of influence is small, the information front appears distorted indicating that different (and perhaps contradictory) perceptions would be held by survivors and may lead to panic. From a policy perspective, the information front ought to be smooth (uniform perception) for a well-managed evacuation.

### **References**

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