

Occasional Paper Number Four, Autumn 2011: **How can transport better plan for crisis events?**

This occasional paper has been produced by the Independent Transport Commission as part of its mission to encourage debate about current land use and transport policy.

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How can transport better plan for crisis events?

1. The Problem: What are crisis events?

- 1.1 Heavy snowfall, ice, volcanic ash, strikes, and flooding were just some of the crisis events that affected our transport systems in 2010, and each was met with varying degrees of success. This turbulent year reminded us of the need for our transport systems to plan relentlessly for such events. What lessons can transport learn from crisis situations, and how can we better prepare for such events in the future?
- 1.2 What do we mean by crisis events? In this paper we will use the term broadly to incorporate various levels of crises. At the lower level, this includes severe disruption, or a major change to transport routine beyond the boundaries of normal daily variation, while at a higher level we refer to disasters, or events which are precipitous to human life.
- 1.3 These issues were raised at one of the ITC's 'Forward Thinking' Discussion Evenings held in London on 17th January 2011. Key contributors included Andrew Haines, Chief Executive of the CAA, Dr David Quarmby, lead author of the government's Winter Resilience Review, Rosanna Briggs, Chairman of the Cabinet Office's National Steering Committee for Warning and Informing the Public, and Dr Richard Stephenson, Head of Safety at Transport for London.

1.4 This paper is derived from that Discussion Evening. One of the key problems raised was the difficulty of planning for the unexpected, when so much lies beyond our control. To help us better address these crises, it was clear we need to consider the extent to which it is possible for transport to plan for disasters.

2. What makes crisis events peculiar?

- 2.1 By definition, crisis events are unplanned; so conventional planning evaluation (see our Occasional Paper on Social Cost Benefit Analysis) cannot apply because they have broader connotations:
 - a. They cause unplanned disruption which is, for the time that it lasts, especially disruptive because of uncertainty over the duration of the event.
 - b. It can take a long time to readjust to a normal state of affairs (plane schedules returning to normal, recovery from trauma)
 - c. They can cause the travelling public to lose confidence in the transport system.
- 2.2 The cost of planning for an exceptional eventuality is therefore significant, especially if the cost comes through reducing the functionality of the service in normal times (e.g. airport/airline security). However, the benefits of forward planning can be substantial given the game-changing nature of these crises.

3. Can we categorise crisis events?

3.1 There are, perhaps, a number of “categories of crises”

- a. First, “Regular crises” – those that we know will happen at intervals but where we cannot be certain of the potentiality or depth – for instance snow, storms, motorway pile-ups or dense fog.
- b. There are the “Irregular but containable crises” – river flooding (in this century rarely fatal in the UK), mass strikes, rail crashes or network breakdowns – but where the course of action is reasonably clear.

Both these are, to a limited degree, predictable.

- c. There are the “Irregular and uncontrollable disasters” which are destructive in the sense that the response is not immediately clear – for instance, a terrorist attack. Terrorism goes further in that the disaster is intentional and its haphazard nature adds to the fear and purpose.
- d. Finally, we can identify “unthinkable disasters” for which it is impossible to be well prepared: the ‘Black Swan’ events – a volcanic eruption, meteorite strike or a major communications or infrastructure failure which reveals a fundamental deep problem not previously understood (for example, the breakdown of the web).

Given the different natures of these various risks, each of these categories requires a different form of contingency planning.

4. Preparation and Response

4.1 It is possible to break down crisis planning into three areas: those actions aimed at prevention and mitigation *before* a disaster event, those which apply *during* the event, and those actions ensuring as effective a response as possible to a disaster event, in other words aimed at *after* the event has taken place.

4.2 Prevention and mitigation focuses on reducing either the risks of a disaster occurring, or the scale of any such calamity. This is most appropriate when dealing with human-led disasters, such as the threat of terrorist activity, or driver/pilot error in crashes.

4.3 Actions during the event can help to contain the extent of the problem (e.g. protection of the electricity grid from failure, or isolating an area subject to terrorist attack), providing real-time information and encouraging appropriate action on the part of the people directly or indirectly affected.

4.4 Responsive actions can be focussed on the immediate aftermath of a crisis – such as the rapid deployment of emergency services, restoring power or returning stranded passengers – or on follow-up actions (clean-up operations) and the longer term logistical issues, such as rebuilding damaged infrastructure. Some of these responsive actions may be on the timescale of years, especially when dealing with the after effects of severe trauma.

5. What constitutes good crisis planning? The problem of expectations

5.1 At the core of successful crisis planning lies the effective management of human expectations. Our responses to and evaluation of a situation are often related to what we judge to be normal. Where an event could be foreseen, we tend to expect a higher level of resilience and preparedness than with those events which truly arrive out of the blue.

5.2 We need to recognise that human expectations, particularly en masse, can change swiftly as a disaster plays out. The longer it takes to resolve an issue, the less patient we become. Frustrated expectations can lead to secondary risks, as individuals attempt to sidestep procedures in order to resolve the difficulties they face.

5.3 Expectations can operate on several levels. We currently seek to operate to very high levels of system reliability and have developed our working practices and lifestyles around these levels. If disruption is to become more prevalent (e.g. through climate change), or if we are to be more resilient to unexpected disasters then it may be necessary to re-evaluate and collectively communicate what 'normal' is. This is a matter of politics as much as it is a technical issue.

5.4 Good Communication is the key to managing expectations. We fear the unknown because it hampers our ability to make good decisions and leaves us with a sense of powerlessness. Recent crises have demonstrated how difficult it is to get and provide the right sort of information. This can lead to unnecessary journeys at a time where the network can least well cope with them. Regular updates, clear instructions, and explanations to those affected by crises have been shown to reduce panic, frustration, and improve recovery times.

5.5 We also need to manage expectations before crises as well as during and after them. Emergency safety instructions are commonplace when using public transport, but we are much less aware of the likely consequences arising from disaster scenarios, and how best to behave in such circumstances. In the 1755 Lisbon earthquake, for example, misplaced expectations led to tragedy. As the population attempted to escape from crumbling buildings and the many fires that had broken out, they gathered on the beaches and near the river where water was plentiful, expecting this to be the safest place to reside. Shortly afterwards, these flawed expectations were dashed as a tsunami some sixty feet high surged up the estuary, sweeping many survivors to their deaths. Yet the relation between great earthquakes and tsunamis had been known to the ancient Greeks. The lesson here is that a lack of understanding of crisis events by travellers can worsen casualty numbers.

6. Evaluating Risk and the costs of crisis planning

6.1 Evaluating risk can be very difficult when dealing with irregular and unpredictable events such as disasters. These features tend to cause planners to err on the side of caution, because the risk events themselves can have such a high cost. Some of these costs, particularly in terms of human life, are very difficult to quantify.

6.2 We need to be aware when evaluating risk of the macro factors which affect the timing and outcome of crises, and are beyond the control of the transport sector. Strikes, for example, may be related to political issues, while flooding relies on the maintenance and spending on regional defences.

- 6.3 Risk is also determined by the scale and nature of the local infrastructure. Damage to infrastructure can in some cases be unexpectedly disruptive. For example, the Tasman Bridge Collapse in 1975 split the two sides of Hobart city. This had severe effects on the most isolated of the two sides, where medical and police facilities were limited, and the city saw a rise in crime rates and economic decline. Similarly the bridge collapse in Workington in the Lake District led to differential impacts on the communities on either side of the river. This demonstrates that disruptions to transport systems have important distributional impacts which should not be overlooked.
- 6.4 We must not forget that crisis planning also involves costs and risks. Aside from the obvious material costs associated with preparation and contingency planning, there may be long term economic and personal disadvantages to society arising from these measures.
- 6.5 There are also opportunity costs to be taken into account: investment in expensive mitigation measures for a low probability event reduces funds available for investment in more certain outcomes.

7. The paradox of planning.

- 7.1 It is often stated that we cannot plan too well for crisis scenarios. Failure to do so can lead to a worse outcome for the crisis, and poor planning is exposed after the event. As the Volcanic Ash disruption demonstrated in April 2010, we now expect even unusual and very remote events to be included in contingency planning.
- 7.2 There is normally a limit, however, to how far we tolerate the disruption associated with planning for extreme disasters. While we accept the terrorism prevention security checks at airports with limited complaint, such checks are generally considered too slow and cumbersome to be implemented on the Underground without seriously damaging the viability of the mode itself.
- 7.3 Furthermore, there is often a debate over the reasonable financial costs associated with planning. This was evident in the case of the Heathrow snow disruption of December 2010. At an extreme level, the best measures to reduce disruption have been proposed as the building of additional capacity and huge investment in snow clearance and deicing machines. Nonetheless, the costs associated with such measures mean that it cannot be justified on the basis of snowfall alone.
- 7.4 We need to identify those measures that bring most benefit during crisis planning. Careful contingency planning based on different scenarios, and better communication during crises are very cost-effective improvements. We also accept higher costs when it comes to the business of saving lives, so preparation involving rapid situation evaluation and deployment of emergency services is always an imperative.
- 7.5 It is also worth considering whether different planning processes are necessary for the variety of categories of crisis identified above. For regular and containable crises, we can expect a level of investment in contingency planning which is greater than those which are generally uncontrollable. For the 'black swan' events and severe disasters there is always likely to be a limit to how successfully we can prepare, and focus should be on the possibility of rapid response and reaction.

8. The importance of integrated planning.

8.1 It is been observed that crises are better managed when preparation has involved integrated planning from a wide range of services and sectors. Transport should not therefore plan for crises in isolation from other stakeholders. This integrated planning ought to reduce the overall costs of contingency planning and result in a better managed response.

8.2 For integrated planning to be successful, policy makers need to become aware of the consequences of their decisions for crisis planning. In the transport sector, it is very clear that placing greater strain upon networks, even if in the service of an assumed good such as carbon reduction, will seriously hamper the ability to respond effectively to disasters. Networks which are at or above capacity will not only be liable to greater damage in the event of a disaster and slower recovery times, but could also produce delays with rapid emergency responses to the event.

9. Conclusion

9.1 Planning for crises requires special measures. In the transport world, it should be assessed in terms of the type of crisis event, and the effectiveness of each contingency measure. In the light of the above analysis, the Commission makes the following recommendations.

- Improving communication during crisis management is effective, inexpensive, and can go a long way to managing expectations. We need to understand better the information people want and the most effective methods of getting that to them.
- We should evaluate each disruption or disaster scenario according to its predictability and containability.
- Integrated contingency planning must become more widespread, allowing resources for crisis management to be pooled from across sectors. While the Civil Contingencies Act 2004 is a step in the right direction, more needs to be done so that employers, insurers, and providers work together.
- Policy makers must become aware of the unintended consequences of their decisions on crisis management. Running networks to capacity makes us more vulnerable to disruption because it leaves less room for manoeuvre when crises strike.
- We should accept that not all crises can be avoided, nor is it financially possible to prepare for every eventuality. We need better cost-estimates of disruption in order to ensure that funding achieves the best value for risk mitigation.

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