

Third Party Risk around airports

Around 80 per cent of jet aircraft accidents occur during take-off and landing. People on the ground near the ends of airport runways are, therefore, at a heightened risk of death or serious injury. In general, these people are there for reasons unrelated to aviation - they may live there, work there or are passing through - and the risk is, therefore, known as Third Party Risk (TPR).

High-risk activities like aviation are, of course, regulated to minimise the risk of accident but, as crashes at Heathrow (January 2008), Madrid (August 2008) and Amsterdam (February 2009) reminded us, the risk cannot be entirely eliminated. The land use planning system must, therefore, impose controls which ensure that the risk to people on the ground is within tolerable limits. It falls to Local Planning Authorities (LPAs) to do this when they consider applications for planning permission, either through imposing conditions on the permission which reduce the risk to tolerable levels or, if this is not possible, by rejecting the application.

Where such risk arises from chemical plant, nuclear installations or oil depots, the Health and Safety Executive (HSE), advises the LPA on both the level of risk to third parties and the tolerability of that risk. Where the risk arises from an airport or airfield, the LPA has nowhere to turn for advice except when considering an application for permission to develop land which falls within a Public Safety Zone (PSZ) defined by the Department for Transport (DfT). PSZ policy is explained below.

Individual and Societal Risk

Third Party Risk (TPR) is usually described in terms of two concepts: Individual risk and societal risk.

Individual risk is the annual risk of death or serious injury to which specific individuals are exposed. Whether the risk is tolerable can be judged relatively easily as individuals knowingly take and accept risks all the time. By reference to known statistics about such risks, it is generally accepted that risk of death or serious injury to third parties should not exceed 1 in 10,000 in any year and that risk below 1 in 1,000,000 is negligible in relation to other accepted risks¹. Between these limits, the risk arising from a hazard must be made “as low as reasonably practicable” (ALARP).

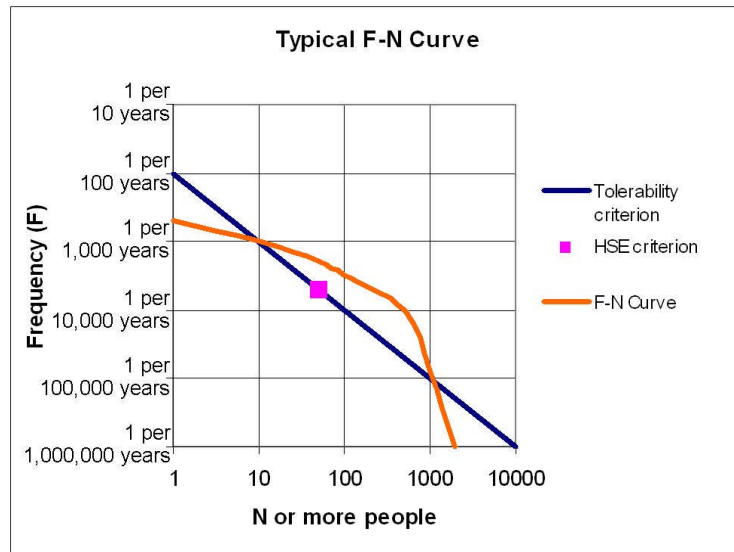
Individual risk does not, however, completely describe situations where a single accident could kill or injure large numbers of people. Decision makers are aware that there is a big public reaction when, for example, a train crash kills a number of people while the fact that a greater number die on the UK’s roads every day goes largely unnoticed. The cost-effectiveness of risk reduction measures must be assessed in relation to the likely number of casualties.

These situations are addressed by estimating **societal risk** which is expressed as the relationship between the probability of a catastrophic incident, expressed as the average frequency with which it can be expected to occur, and its consequences. It is usually represented as an F-N curve. This graph (see example in figure 1) plots the expected annual frequency (F) of the number (N or more) of casualties in the whole surrounding area arising from all possible dangerous incidents at a hypothetical hazardous site. Note that the number of casualties (N) is cumulative so the curve can only increase towards the

¹ See, for example, HSE paper: “The Tolerability of Risk from Nuclear Power Stations”, HMSO 1992.

left of the graph.

Figure 1



Because such incidents are rare, it is more difficult to establish tolerability limits to apply to societal risk. The blue line in the figure was the proposed limit for the Pressurised Water Reactor (PWR) nuclear power stations which were planned but never built. More recently, the HSE has proposed that the frequency of 50 or more people being killed or seriously injured in a potential incident should not exceed 1 in 5,000 years². This point is also shown in the figure (the pink dot).

In the fictional hazardous site example here, the F-N curve (the orange line) exceeds the tolerability criterion (the blue line) over a large range of values of N. This curve could, for example, have been produced to assess the increase in overall risk arising from a proposed development. It is a matter of judgement whether the fact that the proposal takes the total risk above the tolerable level is sufficient to rule out approval of the proposal but the fact that it exceeds the HSE's criterion is a strong pointer to reaching such a conclusion.

Public Safety Zone policy

In 2002, the DfT issued guidance to LPAs (Circular 1/2002) considering applications for development in the areas outside the airport fence around the ends of runways at the busiest airports. On 8 March 2010, this circular was replaced by DfT Circular 1/2010 primarily to acknowledge the transfer of administration of the guidance to the Civil Aviation Authority (CAA). It contains no substantive changes to the policy.

The guidance, which is non-statutory, defines two Public Safety Zones (PSZs) at each runway end:

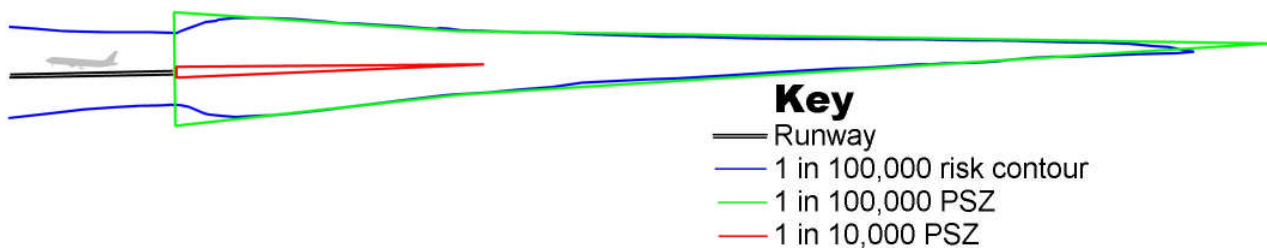
- the inner PSZ within which the annual risk exceeds 1 in 10,000 and where only land uses with very low occupancy levels should be permitted to remain. Examples are long-stay (minimum 6 hours) car parks, unmanned plant or machinery and golf courses (but not club houses).

² HSE, "Proposals for revised risk policies to address societal risk around onshore non-nuclear major hazard installations", 2007

- the outer PSZ, within which the annual risk is between 1 in 10,000 and 1 in 100,000. Here, planning permission should not result in a significant increase in the numbers of people living, working or congregating and, further, “the number should be reduced as circumstances allow”. The apparent anomaly that existing development is permitted to remain arises because the guidance is designed to be applied by LPAs without the need for a detailed risk assessment for every planning application. As a measure of the practicability of reducing the risk to individuals, it references typical 1990s house and land values to balance the different costs of displacing residents and preventing development against the notional costs of fatalities.

The PSZs are triangles – or, at some airports, slightly modified triangles – of land with their bases at the runway end. They are simplified forms of the individual risk contours which are derived using a mathematical model of risk produced by consultants for the DfT in the 1990s and published in the so-called “Green Book”³. Figure 2 shows typical PSZs with the underlying 1 in 100,000 contour. As the likelihood of a crash at any airport increases with the number of flights, the size of PSZs increases with air traffic. Typically, the 1 in 100,000 PSZs are 2 to 4 km in length and 200 to 500 metres wide at the runway end.

Fig 2: Typical Public Safety Zones



The risk model on which the PSZ size and shape is based comprises 3 components:

- accident risk based on the type and volume of air traffic,
- crash location derived from accident data and
- crash consequence which establishes the area expected to be destroyed by the accident.

The DfT guidance to local authorities extends PSZ policy beyond individual risk in the case of rail and road infrastructure which quite often exists within PSZs. Examples are the A30 trunk road at Heathrow and the main London to Brighton railway line at Gatwick.

The guidance states that if transport facilities would have average densities of occupation comparable to residential or commercial buildings, then the same rules should be applied: for example, only minor roads should be constructed through a PSZ, and major roads should be removed from the inner PSZ immediately and from the outer PSZ when the opportunity arises. The obvious principle being applied is that, if the same number of casualties would arise from an accident, it matters not whether the victims are resident or just passing through.

Application of PSZ policy

Since the DfT guidance on PSZs was published in 2002, a number of problems with its practical application have emerged:

³ Third Party Risk Near Airports and Public Safety Zone Policy, DfT, 1997

- The PSZs are based on predictions of air traffic and aircraft fleets 15 years into the future and are to be updated at approximately 7-year intervals. The predictions are supplied in confidence by airport operators. The PSZs are, therefore, derived from data which is not open to external scrutiny. Furthermore, if the anticipated number of flights increases, the updating process will result in expansion of the PSZs, so imposing restrictions on the possible uses of more land without consultation with the LPA or landowners.
- The implementation of the risk model and the production of PSZs appear to have been privatised with National Air Traffic Services (NATS) and is controlled by the DfT. As a result, LPAs considering planning applications for further development of airports are unable to obtain reliable predictions of the effects of the proposals on the PSZs so as to accurately predict the implications of PSZ policy for land uses beyond the airport fence. In one such case, at the request of the LPA, the applicant submitted a notional expanded PSZ which proved much smaller than that from the “official” model.
- The extension of the guidance to transport infrastructure - roads and railways close to the runway - has clearly not been understood by local planners and, in at least two cases, officers have advised their planning committees that, because individuals passing along roads spend very little time within the PSZ, the risk of casualties is negligible. As explained above, the DfT guidance makes it clear that, where the proposed average density of occupation is, for example, the same as for a housing development, the same restrictions on development should be applied.
- The DfT’s response to LPA’s requests for further guidance has been inconsistent. It has ranged from simply declaring it is satisfied that the LPA has considered PSZ policy in making a decision to commissioning the production of a predicted PSZ and risk assessment from NATS.

There is also growing evidence that LPAs believe that, if they have followed the DfT guidance in respect of PSZs in their decision-making, they have dealt with the whole issue of third party risk in the vicinity of the airport. This is a dangerous assumption which is seriously undermining public safety.

Third Party Risk outside PSZs

DfT makes clear that its PSZ policy applies only to locations which fall within the PSZs. It says nothing to assist LPAs in determining planning applications on sites which are outside the outer PSZ where the risk of aircraft accident is still significant. In particular, for land uses where large numbers of people are likely to congregate such as schools, hospitals, shopping malls and sports stadia, societal risk should be evaluated for the whole area to ensure that the total risk would not exceed levels judged by the LPA to be tolerable. Figure 1 illustrating “Societal Risk” (above) shows criteria which could be applied by LPAs.

Third Party Risk arising from airport development

An LPA considering a planning application for a new airport runway, or for expansion of an existing airport which would increase air traffic, should commission an independent assessment of risk from aircraft accident in the locality in order to fulfil its responsibility under Planning Policy Statement 1 (PPS1, Department for Communities and Local Government) to maintain public safety. This assessment should look at both individual and societal risk in the whole area. The LPA must take a view on the tolerability of risks before approving or rejecting the application.

To make this requirement clear, policies on airport development in LPAs' Local Development Frameworks (LDFs, formerly Local Plans) should include a requirement to demonstrate that the risk to people in the vicinity is within tolerable limits.

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