



Safety

Heathrow Expansion Factsheet 8

How would safety be assured with Heathrow expansion?

New flight paths need to be integrated with the general re-design of London's airspace currently underway. Proposals for steeper flight paths on landing and for curved approaches to reduce noise raise new safety concerns. The multi-use of a single extended runway for take-off and landing has not been tested at any airport in the world, let alone one as busy as Heathrow.

What's the issue?

1. Any new runway at Heathrow will need new flight path designs. These will need to be integrated with the general re-design of London's airspace currently underway. Information has not yet been made available on how this will be achieved. Before an expansion option is recommended, the proposed increase in numbers of air traffic movements need to be factored in so that safety issues are addressed.

What factors are significant in safe operations design?

2. Flight path designs need to take account of several factors:
 - a. Airspace density: a 50% increase in air traffic movements means risk is increased due to greater density of airspace use. This needs careful design and management;
 - b. Arrival and departure procedures: risks increase with additional runways as the complexity of the arrival and departure procedures increases. Missed approaches are a particular concern with multi runway operations as the risk of aircraft mishandling and air proximity incidents increases. There have already been a number of near catastrophic incidents of this type at Heathrow;
 - c. Aircraft weight: there is a trend towards heavier aircraft and these have greater inertia, and take up a larger turning circle than smaller aircraft;
 - d. Stabilisation for landing: all aircraft must stabilise on approach for landing no later than 1,000ft above the runway elevation and must be fully stabilised by 500ft. In normal operations, flight crews aim to be fully stabilised by 1,200ft. On a 3 degree glide slope this is typically at 4 nautical miles from the touchdown point of the runway (often marked by an outer marker beacon or delineated by Distance Measuring Equipment (DME) or GPS on the pilot's display). This needs to be planned into flight path designs;
 - e. Noise and air quality: aircraft power and therefore noise and exhaust gas emissions increase as the gear and flaps are lowered for landing. Aircraft approaching to land at Heathrow lower their landing gear at different distances from touchdown as a result of numerous factors including individual airline operator requirements, flight crew experience and ability, weather conditions and the stability of the approach. These factors need to be considered to reduce the impact on people under the flight paths whose health is compromised through noise and air pollution.

What's the effect of Steeper Glide Slopes?

3. Both Heathrow schemes propose steeper glide slopes to reduce the impact of noise on people under the flight paths. Safety issues arise relating to increasing the descent glide path/slope into Heathrow because:
 - increasing the instrument landing system (ILS) glide slope reduces the flight crew's ability to control speed in the later stages of the descent. This increases the likelihood of unstable approaches resulting in an increase in missed approaches

(go-arounds). It also increases the likelihood of deep landing events (i.e. further down the runway) which, in the case of the Heathrow Extended Northern Runway (Heathrow ENR) option, would increase the risks of a collision between aircraft landing and those awaiting take-off further down the same extended runway;

- noise reduction benefit cannot be achieved if safety margins are compromised. Increases in angle of descent beyond 3 degrees are risky at a busy international airport where large heavy transport aircraft operate.

What's the effect of changed Approach and Landing paths?

4. Curved arrival flight paths are considered for at least the Heathrow North West Runway (Heathrow NWR) option and possibly for Heathrow ENR. These are riskier than extended straight-in approaches which provide the easiest, most economical, environmentally sustainable and safest operation to landing heavy aircraft at a busy airport. Extended straight-in approaches also produce the maximum landing flow rate. Any deviation from this straightforward method increases the possibility for operational errors, incidents and accidents. The level of risk increases as the complexity of the arrival procedures increases. Weather conditions, flight crew experience, airborne systems integrity, navigational instrument integrity and other factors also play a part in safety.

What are the safety issues for a multi-use single runway (Heathrow ENR option)?

5. The Heathrow ENR option has particular safety issues that need to be addressed. The proposal is for simultaneous use for landing and take-off of one extended runway. There is no example of this type of runway layout anywhere in the world. It is therefore an experimental layout, not well tried and tested. Such an experiment at one of the busiest airports in the world is a brave plan which carries unknown and untested additional safety risks. A number of additional issues need to be considered:
 - deep landing aircraft and botched missed approaches (Go around) run the risk of collision with aircraft waiting for take-off clearance further down the runway and with aircraft that might have just started their take-off on the extended part of the runway;
 - reduced visibility approaches carry even greater risk as do aircraft completing unstable rushed approaches. These are relatively common and there is no reason to think that incidents of this type will reduce significantly in the future;
 - weather, poor visibility, cross winds, unstable air, wind shear, cumulonimbus activity and fog are aggravating factors which increase the risk of accidents on this type of multi-use runway;
 - pilots risk mis-identifying the touchdown point on the runway for that of the take-off end half way down this multi-use runway.
6. Whilst these risks exist, actual incidents would be rare and accidents rarer still. However, these risks are real, are known and must be enumerated and taken into account during the planning stage. They are in addition to those present in single use normal runway operations and in the worst case scenario have the potential to result in a collision between two A380 aircraft with a total load of up to 1,200 passengers.