Big and small scale

Sending our families and friends to travel by air and worrying if their baggage will be lost or damaged or if they will arrive on time often without thinking about 'the worst' comes at a price. A price that may at first glance look as though it is paid by airports, ANSPs, airlines, regulators and other organisations involved in the chain that takes care of safety, but a price that is in the end somehow split between the people paying for their journey and Society in general.

It is easier to see the direct link between buying an air ticket and getting in return a safe service (although some airfares really stretch my ability to find a link between the fare paid and the service received – and here I am not talking only about super-expensive, one-operator-served routes. Nevertheless, at this small scale, I pay for a ticket and then I get transported. The relationship is direct and at my individual level I aim to optimise what would be the cheapest and yet still safe and comfortable service. At my small scale the trade-off looks simple – in principle, if I want to get more I have to pay more but if I can find a good deal, I can save some money!

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It takes a little bit more brainwork to figure out the cost that the Society pays towards by journey. Often it pays directly, since some aviation organisations still rely on public funds. But it also pays indirectly – by accepting the monetary and non monetary costs and the wider consequences which come with airports, noise, carbon dioxide emissions… Society pays towards the system because air transport is also a 'public good' and because the alternative way to achieve it may mean higher costs as well as larger environmental and socially negative impacts.

When we talk of Society the relationship between costs, benefits and safety is not that simple any more compared to my individual trade-off. Because Society operates on a large scale, costs for some are benefits for others. This paradox of the 'helicopter view' was explained well by the Nobel Prize winning economist Paul Krugman in his regular blog for the New York Times. The economy, as Mr. Krugman states, is not like individual families. Families try to maximise their earnings and minimise their spending. For families, spending and earning are very different things, in which the excess of the latter over the former equals their savings. For the economy, the product of all individuals' economic activity, spending and earning are interdependent. The more I spend, the more you earn and vice versa. If we all cut our spending at the same time, we would all have less earnings too.

So how can the large and small scale point of view be applied to the balance between cost and safety in aviation?

Zoom in!

The individual operations are diverse, performed at different airports and in different conditions. Let us take one particular example. An airport may be using High Intensity Runway Operations (HIRO) to get the most out of existing runway capacity. If the spacing on final is one of the 'bottlenecks' then it will be normal to expect aircraft closely spaced one after another. And when a 'system' like this works well without any buffer or slack, any small unexpected event, such as a rapid change of wind speed or direction, can interfere with our plan and cause an aircraft go-around.

But we know this will happen and we accept the cost of go-arounds as the price for maximising capacity. After all, go-around is a normal phase of flight and the operational risk associated with this phase should be comparable to those related to other phases. If the go-around procedures at this airport are well used, designed and managed then we will have just a small additional to risk coming from the additional 15 or 20 minutes of flight time which results.

It is different story if the airport lies in a complex terrain environment, with difficult missed approach procedures, challenging the crew with very low initial stop altitudes or early turns or lack of procedural de-confliction of the missed approach path from other traffic. It is an even more

different story if the go around is from a circling approach - although I have difficulty imagining HIRO and circling approaches being used together. The transition from visual circling to the prescribed instrument missed approach procedure may involve re-entering cloud during a complex but only loosely specified manoeuvre, in which the loss of visual reference increases the chances of losing positional awareness. Moreover, if the aircraft is below the minimum vectoring altitude, ATC may not be able to provide assistance.

As we see, when we zoom-in to our micro level, optimising cost can affect safety in many possible ways – the effect of safety can be positive, neutral or negative. But what will be the perspective when we take a view at the macro level of Society – are we going to find the same interdependence as Paul Krugman formulated for the economy?

Zoom-out!

Let us still use the go-around examples. The Flight Safety Foundation (FSF) has said that around a third of all aircraft accidents are runway excursions and that one of the greatest contributors to runway excursions is an unstable approach. An unstable approach should result in go-around but more often it does not. It has been stated that no other single safety improvement could have as great an impact on the overall industry accident rate as go arounds from every unstable approach. So why are some crews not going around when they should?

As part of the FSF go-around safety initiative a survey of pilots was performed, to try better understand the go-around decision making process. More than 2300 pilots from all over the world accepted the invitation to complete the survey, providing us with a macro view of the problem. The survey results include a lot of data and we will need some time to be able to digest it in full, but already some preliminary conclusions can be made. Pilots were asked to recall a recent event involving an unstabilised approach, When those pilots that recalled continuing to a landing rather than going around were asked whether their company was more likely to reprimand pilots for performing an unstabilised approach or a go-around, they reported expecting less company support for a go-around decision than a successful landing off an unstabilised approach.

In summary, when we look at the large scale, the decision with probably the highest return from investment in safety is being challenged by considerations of cost. It may well be that this is just a false pilot perception of pressure from their companies. But the point is that at the macro level, we are much more connected then we think. Policies and procedures should be well understood, well communicated and effectively embraced the industry to ensure that my safety gain is considered as well as your safety gain and, indeed, that the safety gain for Society is recognised too.

Enjoy reading HindSight!