WHAT GOES UP MUST COME DOWN

by Maciej Szczukowski

Aviation is organised around cycles. Shift cycles, engine cycles, flight cycles. Every departure, sooner or later, closes the cycle with a landing. In the centuries-old phrase used in the 1969 Blood, Sweat & Tears hit single 'Spinning Wheel' we know that 'what goes up must come down'.

In general, the quality of each part of the cycle is important for each flight crew and each involved controller. However, some parts are a bit more crucial for the controllers only. Preventing runway incursions, let alone collisions, has been for many years a hot topic in discussions about runway safety. The importance of correct runway vacation is usually left behind.

My experience in discussing the consequences of unpredictable runway vacation can be now counted in years. E-mail, texts, telephone calls and extended conversations with pilots who have alternative views to established and/or published procedures has improved my understanding of the complexity of this issue. Here I would like to share with you what I think are some of the risks and my thoughts about the lack of standardisation of one of the last flight cycle's phases.

Air traffic rises every year. Expectations are higher and higher whereas the airports are not balloons, which can be quickly inflated to a larger size. On the other hand, we have Rapid Exit Taxiways (RETs) to get the aircraft off the runway as quickly as possible and there is no other obvious way to minimise runway occupancy time. Some airports provide the exact distances from runway thresholds to their available RETs. Some go further and suggest the best option for each category of aircraft. And some even give the turn off angles at each runway exit, including RETs. Ideally, exits are available where they are expected to be useful in minimising both runway occupancy time and taxi-to-gate time. But on any particular day, pilots can be expected to prioritise a safe runway exit over the shortest taxi in distance once clear.

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Designated exits are established on the basis of 'standard' aircraft performance which will not always be a valid assumption. Although it all seems so straightforward, let's go through a few thoughts, which are not always mentioned and remembered:

1. The Operations Manual used by a pilot may contain a statement along the following lines: "When approaching a turn, speed should be reduced to that appropriate speed for the extent of the turn and the prevailing surface conditions. On a dry surface, use approximately 10 knots for turns greater than those typically required for high speed runway turnoffs". Occasionally, such good advice is ignored, often because the pilot has heard – or been directly advised by a controller – that the next landing aircraft should expect a late landing clearance and, not knowing how close the one behind actually is, tries to help. In this case, the first question is whether the distance between the aircraft during approach was sufficient.

But there is usually another side to such a story[1]. Maybe the approach of the first aircraft was stabilised, the taxiway to vacate was nominated and briefed, touch down occurred in the touchdown zone but on a wet runway the aircraft did not decelerate as expected and the usually convenient RET was missed. Then, although the pilot was able to reduce speed, the end of the runway was the only remaining exit and involved a 90° turn. The process of exiting the runway began normally, but directional control was lost as the aircraft began to skid sideways. According to ICAO Annex 14 "the intersection angle of a rapid exit taxiway with the runway shall not be greater than 45°, not less than 25° and preferably shall be 30°". As stated above airports can rarely expand the way they, or pilots, would prefer. Towards the end of a runway, 90° turns may sometimes be the only option available and the exit may be at or near the touchdown zone for the opposite runway direction. Thus where there will often be significant rubber deposits which will reduce the effectiveness of braking action especially in wet conditions.

2. Aerodrome controllers are expected to monitor the manoeuvring area to the extent possible but there are times when their focus must be on one area or movement at the expense of others. Having seen a particular type of an aircraft vacating the runway at a similar groundspeed a thousand times before may easily lead to an assumption that another thousand times will be the same. Looking back at the runway, after a brief moment of 'distraction' elsewhere, and not having seen that the aircraft did 'as expected' by exiting at the anticipated point may lead to wrong conclusions and even inappropriate decisions. The chances of this increase at night and/or in low visibility conditions.

3. Pilots are not aware of the equipment available to air traffic controllers. However, they probably recognise that it differs between countries or depends on the size of an airport. ICAO PANS-ATM, in chapter 7, protects a controller by allowing him to request pilot's report of leaving the runway.

1- like the one at http://www.skybrary.aero/index.php/B733,_Birmingham_UK,_2012

It adds that "the report shall be made when the entire aircraft is beyond the relevant runway-holding position" when in reality, a pilot may not necessarily know when the 'end' of his aircraft crosses the line, let alone when it is clear of the ILS sensitive area.

4. Asking pilots about their runway exit choices, I got many different answers – place of touchdown, runway state and braking action, distance to designated stand, etc. I learned how certain aircraft type reacts to various types of pavement or how, for individual aircraft, engine cooling requires extended taxi time. There is, however, one common element. As pilots are sometimes recommended to nominate a preferred runway exit when briefing I, as an air traffic controller, am always encouraged to support this by adding a reasonable preferred exit with or prior to the landing clearance. But always remembering that it may happen otherwise due to the reasons presented above.

5. It is well known that no matter what quality of systems and equipment are available in an aircraft or a control tower, there may always be an extra factor which changes everything. Acting under the pressure of time and limited space, we tend to assume that certain things are clear and understandable. But it is not always so. Therefore a pilot, taking the next exit (due unexpected braking coefficient or even a decision to shorten the taxi route) may be completely justified. But for the controller it may be otherwise, due traffic, closures or other movements. Most probably taking an unexpected exit will not lead to an incident, let alone a collision. But a closer look at this problem reveals that there may be more at stake than a little extra work or a reduced runway capacity.

We already know how important communication is. Not only our everyday task on our headphones every day, but also the one which happens in between the cycles. My idea is to give pilots as much useful information as possible, not just what is strictly required by the regulations. We all function more efficiently when we have a reason for a specific choice. Therefore, I suggest that you check with your Local Runway Safety Team, whether they think it would be helpful to provide standard exits in the AIP entry – distances, angles and possible limiting factors such as wingspan, hotspots nearby and reduced braking. Also consider introducing signs of ILS sensitive area limits for vacating traffic. Try to check, with operators based at your airport, whether their proprietary sources match information given in AIP and whether they are always current. If there is an opportunity to do so, discuss particular pilot choices and behaviours when exiting the runway. Don't be reluctant to state your preferences and perspectives. Critical analysis does not have to be unpleasant. After all 'talking' 'bout your troubles', as Blood, Sweat and & Tears sang, is not 'a cryin' sin'.