Brussels airport continuously improves its runway safety concept

by Jan Loncke and Davy Van Hyfte

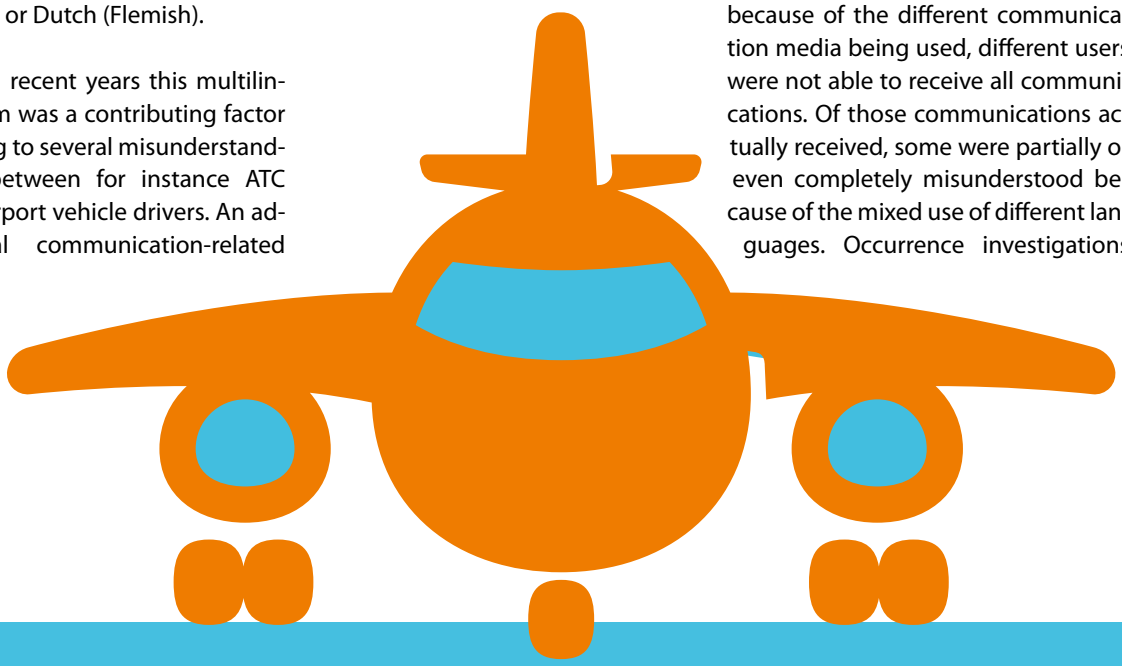
At Brussels Airport, "runway incursions" is the number one safety key performance indicator. The European Action Plan for the Prevention of Runway Incursions (EAPPRI) has been fully implemented by the Airport Authority with the full support of the Belgian CAA who have included the application of EAPPRI recommendations as a key performance indicator in the State Safety Plan (SSP).

It is well known that most runway incursions have a typical set of causes and this article will not elaborate on all of these but instead focus on some specific issues identified. Few of those working at the airport are native English speakers – the mother tongue of the majority is either French or Dutch (Flemish).

During recent years this multilingualism was a contributing factor leading to several misunderstandings between for instance ATC and airport vehicle drivers. An additional communication-related contributing factor to some runway incursions was the combined use of VHF-sets and trunked radio systems.

An atmosphere existed where ground operations personnel, air traffic controllers and pilots were speaking to each other using different communication means and often using different languages whilst seeking to achieve expeditious and safe movements within an area including two parallel runways and one crossing runway.

We all advocate the importance of situational awareness for users of the manoeuvring area and on the importance of developing mental maps to help prevent runway incursions, but because of the different communication media being used, different users were not able to receive all communications. Of those communications actually received, some were partially or even completely misunderstood because of the mixed use of different languages. Occurrence investigations



showed that situational awareness, especially for vehicle drivers, was often minimal and pilots were unable to appreciate what was happening around them.

After consulting the Local Runway Safety Team, Brussels Airport decided to implement the "triple one principle" of "one runway – one frequency – one language". This means that all people working on or around the same runway in use, whether being a pilot, an air traffic controller, an airport lighting technician or anyone else would speak the same language, using the same VHF radio frequency.

As a direct consequence, the need to retrain all those working on the manoeuvring area became apparent. A new curriculum and training program was developed and began by focusing on driving on the manoeuvring area safely according to standardised procedures. A compulsory and important part of this training is about the use of standard ICAO phraseology by all vehicle drivers. This training program was developed and managed by the Brussels Airport Safety Management Unit (SMU).

The curriculum consists of a theoretical part focusing on general airside safety and specifics such as runway incursion awareness, markings and signage, local airside traffic rules, radio communication and stop bar procedures.

General airside safety deals with the hazards that can exist airside such as FOD, adverse weather (winter conditions, low visibility, thunderstorms, high winds), and jet blast. The radio communication procedures element contains quite a bit of standard phraseology and aviation vocabulary in line with the relevant ICAO Annexes and Documents and was developed by Brussels Airport's SMU in close collaboration with ANSP Belgocontrol.

Phraseology and how it should be used in a standard way is covered on a theoretical basis and when the vehicle driver trainees seem comfortable using the vocabulary, exercises were conducted using role play scenarios. As they became more familiar with the procedures, scenarios on the manoeuvring area were simulated by making use of a large airport chart, a slide show and by projecting airside images relevant to routes virtually driven. When trainees achieved an adequate proficiency, they were taken outside to do live on-the-job exercises. After completion of the course, trainees had to successfully pass a theoretical test but for the practical part trainees were assessed on-the-job.

Initial training is followed by recurrent training at two year intervals. This covers the same topics but also includes case studies and lessons learnt from incidents that have happened during the period between their initial and recurrent training.

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Davy Van Hyfte started his aviation career as a military air traffic controller. He gained experience as a Tower, Approach and Area controller and participated in overseas missions too. For the past six years, he has been Safety Development Manager at the Brussels Airport Safety Management Unit and is involved in auditing, incident investigation and human factors.

After following this regime for some years we concluded that the effectiveness of the practical training part was rather limited. Navigating virtually on a map and using only some background pictures in a classroom was still rather distant from the real thing. It was also not feasible to undertake practical training at night, during low visibility operations and general airside driving practice at busy times was rarely permitted by the tower controllers for obvious reasons.

Brussels airport continuously improves its runway safety concept (cont'd)

So, at the end of 2013, an airside driver training simulator was acquired to provide better practical training in a controlled environment without unnecessary disrupting normal airside operations. This simulator is now being used for both initial and recurrent practical training.

Different scenarios may be presented during the training sessions, customising them to the trainees' specific training needs, their acquired level of proficiency and the professional context. For instance, response by ARFF personnel to aircraft emergencies, picking up FOD from the runway, checking for obstacles on the aerodrome and performing general airside inspections can all be covered.

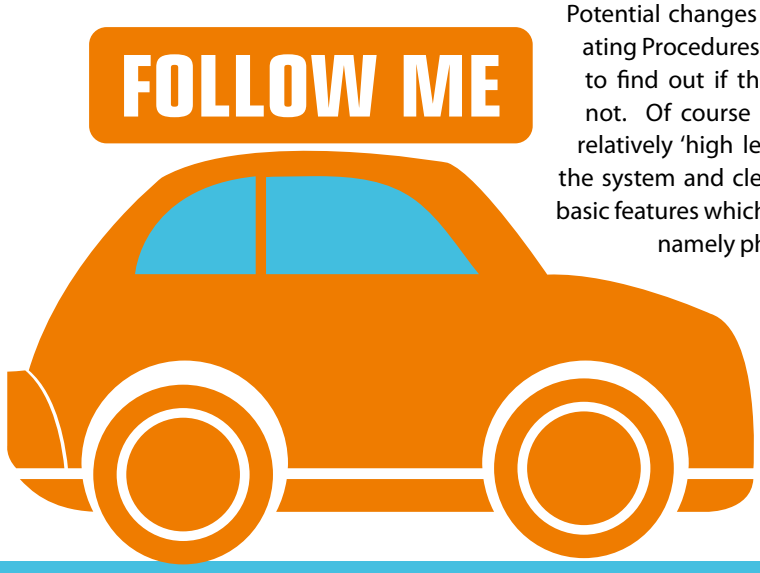
Brussels Airport SMU instructors are able to pre-program any possible scenario and control traffic density, time of the day and all kinds of (adverse) weather conditions. This makes it possible to effectively train airside drivers under simulated stressful conditions and to help them cope with harsh situations when driving airside for real.

The system is not only used for personalised training with the capability to track the progress made by individual trainees for feedback purposes, but also for driver practical testing. By means of this training tool, the Brussels Airport SMU goes way beyond to what is practically possible on an operational international airport in real life.

In anticipation of the forthcoming EASA regulations for aerodromes, the system is also configured not only to provide initial and recurrent training, follow-up of trainees and testing but is also ready to be used as a proficiency check platform. In addition, training can be programmed for all kind of airside tasks, such as aircraft push-back and towing operations, marshalling, winter operations, follow-me, ARFF, aircraft servicing, and all other activities with specialised equipment for that matter.

Actual occurrences and incidents can be replicated too. We also believe that by examining actual incidents from a different point of view, we might discern additional contributing factors and perhaps lessons to be learnt – the latter being able to add value to training by demonstrating to trainees the reasons why occurrences happened in a just way.

Potential changes to Standard Operating Procedures may also be tested to find out if they are practical or not. Of course some of these are relatively 'high level' possibilities of the system and clearly, it is the more basic features which will be most used, namely phraseology training and airside familiarisation. Such training is not only available for drivers who need to drive on the manoeuvring area but also for those who drive on other parts of the movement area. The overriding aim of all familiarisation is to improve situational awareness in a range of different circumstances.



In all these ways, we are sure that the use of the driving simulator will make a positive contribution to practical training, improve situational awareness and thus enhance airside safety.

Case Study One:
RWY 25L in use for arrivals only. Intersecting RWY 01 was not in use.

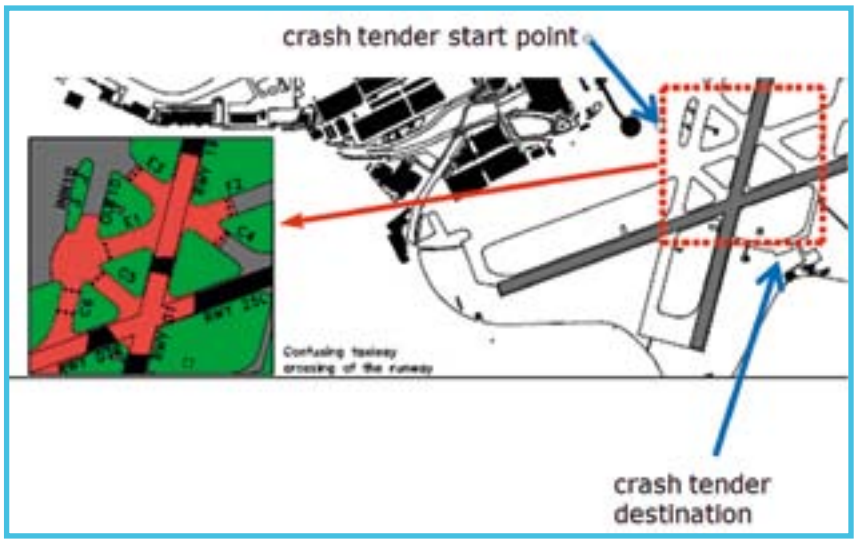
A crash tender, entering the manoeuvring area, requested to cross RWY 25L via (TWY) C5, the way the fire fighters were used (and trained) to do, using ICAO phraseology. ATC gave them an instruction (also using ICAO phraseology) to proceed instead to C6, because it was necessary to keep C5 free as a high speed exit for runway 25L. (C6 is not a high speed exit)

Since the driver & co-driver were mentally prepared to cross at C5, they were not ready for another instruction. In the crash tender a discussion started, in a mixture of Dutch & French, about the contents of the instruction while it was still being issued by the ATCO, so that they didn't copy the complete message, which was : "Proceed to C6, hold short of RWY 25L, landing traffic." The part that was not copied by the crash tender was: "hold short of RWY 25L, landing traffic".

The result was that the crash tender crossed RWY 25L at C6 while an aircraft, which had been cleared to land, was crossing the threshold of 25L.

The pilot initiated a go around before the controller was able either to stop the crash tender or instruct the pilot to go around. The pilot had noted that a crash tender had made a request to cross 25L whilst he was short final thus giving him optimal situational awareness and enabling a prompt and appropriate response.

Here is part of the hot spots chart which shows the location:



Case Study Two:
RWY 25R in use for both arrivals and departures

A Follow-Me vehicle was escorting seven dumper trucks for the removal of snow from OUT-2. The drivers of these sub-contractor operated vehicles, were neither used to nor trained to drive on the manoeuvring area, but they had been briefed by the Follow-Me driver about the "do's & don'ts" before they started. The Follow-Me driver had told the escorted drivers, to "always stay behind him".

Upon arrival at OUT-2, the Follow-Me vehicle pulled out of the way of the trucks, making a 180° turn - to the north - but in doing so crossed the stop bar on B9.

The controller noticed this and immediately instructed the Follow-Me vehicle to vacate (the protected area of) RWY 25R as there was landing traffic on short final.

The Follow-Me vehicle vacated the protected area and stopped at the safe side of the stop bar. But instead of remaining on OUT-2, the escorted drivers (who had been briefed to stay behind the Follow-Me), all lined up behind the Follow-Me vehicle, ending up in a single file on TWY B9, thus, all entering the protected area of RWY 25R and creating a 'combined' runway incursion.

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