THE RUNWAY AND YOU

by Ian Wigmore

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It is an interesting fact that most air traffic controllers think of the runway as their territory - like the area inside the fence around their gardens at home. They protect it from intruders with as much care as they use to keep stray dogs off their roses, or small boys out of their apple trees (well, with a lot more care really).

The runway is the springboard from which all flights depart and to which they later return, and it is the controllers' job to manage aircraft so that the maximum use is made of the runway consistent with safety. They rightly take pride in their skill in keeping conflicting traffic apart. They are acutely aware of the danger of allowing an aircraft or vehicle to enter the active runway when it is in use by another aircraft.

Runway incursions don't happen very often, but when they do, they always leave the controllers involved asking themselves if they could have been at fault. They know that there could have been an accident, so even if their performance was perfect and they should have a clear conscience, they still find themselves worrying in case there was some little extra thing that they could have done. There are many sleepless nights when the whole scenario is relived while they examine their every action with an intensity hardly matched by the investigation board, to see if it could have been improved or augmented in some way.

But if an incursion takes place as a clear result of their (incorrect) actions or omissions, even though an accident was avoided, the feeling of failure is immense. Despite all their training and experience they have somehow committed a fatal (or near-fatal) error; they have let themselves down and undermined that essential trust between pilot and controller.

I want to look briefly at some runway incursion incidents which took place in USA in recent years. There are common features in them all - features for which we should be on the look-out - which we should try to eliminate from our own operations.

SEATTLE/TACOMA INTERNATIONAL AIRPORT, JULY 8, 2001

A controller issued a taxi clearance to a Boeing MD-80 to cross runway 34R at the same time that a Boeing 767 was on short finals to the same runway. The pilots in the landing aircraft reported applying maximum braking to avoid a collision with the crossing aircraft, and the 767 stopped only 810 feet short of the MD-80. On the night of the incident, the controller was working his third shift in 2 days, with an 8-hour rest period between shifts. The day before the incident, he had worked from 1400 to 2200, slept between 4 and 5 hours at home, worked from 0555 to 1355 the day of the incident, slept 3 hours at home and then returned to work the incident shift, which began at 2245. The controller stated that he tried to avoid midnight shifts whenever possible because of fatigue; at the time of the incident he was feeling tired, in part because he knew he "…had to be up all night long on a double quick turn-around."
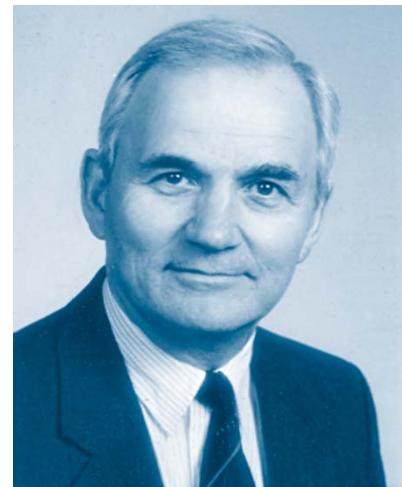
DENVER INTERNATIONAL AIRPORT, SEPTEMBER 25, 2001

A Boeing 757 departed from runway 8 in night-time VMC. Runway 8 had been closed because of construction workers and equipment operating near its departure end and, during takeoff, the aircraft passed within 32 feet of lights that had been erected to illuminate the construction area. The controller handling the 757 was aware of the runway closure and had instructed the crew to taxi to a different runway. However, after the crew requested take off on runway 8, the controller agreed and instructed the crew to taxi and take off from the closed runway. The controller had worked a shift at the tower from 0530 until 1330 the day before the incident and then had a 9-hour rest period during which she obtained

between 60 and 90 minutes of sleep. She then returned to work the incident shift, which began at 2230. When asked why the incident occurred, the controller stated that she was "…probably tired, not alert enough."

LOS ANGELES INTERNATIONAL AIRPORT, AUGUST 19, 2004

A controller cleared a Boeing 737 to taxi onto and take off from runway 24L at the same time that a Boeing 747 had been cleared to land on the same runway and was on a short finals. The pilots in the landing aircraft saw the 737 taxi onto the runway and discontinued their approach about 12 seconds before the impending collision would have occurred, passing approximately 200 feet above the 737 during the go-around. The controller had worked a shift the previous evening from 1530 until 2330, then went home and slept between 5 and 6 hours before returning to work the incident shift, which began at 0730. The controller described the portion of his shift before the incident as a "hard day" and attributed his error, in part, to fatigue.

CHICAGO O'HARE INTERNATIONAL AIRPORT, MARCH 23, 2006

A controller cleared an Airbus A320 to cross runway 4L and, less than 15 seconds later, cleared a Boeing 737 to take off on the same runway. The pilots in the departing 737 observed the A320 moving toward the runway, rejected the takeoff, and stopped before reaching the taxiway intersection where the A320 was to cross. The controller had worked an 8-hour shift

the previous day until 2130 and was then off duty for 9 hours. Because of commuting and personal activities, he slept only about 4 hours before returning to work for the incident shift, which began at 0630. He reported that he felt "semi-rested" during his shift but was "not as sharp as he could have been." He stated that the second shift had been a quick turnaround with "no coffee."

The effects of fatigue on controller performance have been under study in USA for many years, and the issue was raised again following the fatal accident involving a Comair CRJ-100 which crashed while attempting to take off from the wrong runway at Lexington Blue Grass airport on August 27, 2006. During its investigation, the NTSB learned that the air traffic controller who cleared the accident aircraft for takeoff had worked a shift from 0630 to 1430 the day before the accident, then returned 9 hours later to work the accident shift from 2330 until the time of the accident at 0607 the next morning. The controller stated that his only sleep in the 24 hours before the accident was a 2-hour nap the previous afternoon between these two shifts. In its final report on this accident[1], the NTSB concluded that the controller did not detect the flight crew's attempt to take off on the wrong runway because, instead of monitoring the airplane's departure, he performed a lower-priority administrative task that could have waited until he transferred responsibility for the airplane to the next ATC facility. The extent to which fatigue was a factor in the controller's decision could not be established.

This latter accident prompted the NTSB to write to the FAA and the US controllers' union, and their letter[2] and associated data merit serious study. In this letter, the NTSB noted that all four controllers involved in the incidents described above were working rapidly rotating counterclockwise[3] shift schedules and had received scheduled rest periods of 9 hours or less before coming to work. They stated that "in view of the high percentage of controllers who work such schedules and research carried out by FAA's Civil Aerospace Medical Institute, the probability is very high that controllers are sometimes working when they are significantly fatigued and are committing fundamental errors directly as a result of being fatigued."

According to the NTSB letter, one controller who committed an error that led to a runway incursion event reported that, although he had been diagnosed with a sleep disorder 7 years before the incursion, he had discontinued the treatment prescribed by his doctor within two years because of side effects and had not sought further medical evaluation. When asked about controller awareness of fatigue-related issues, a supervisor on duty during the incident involving this controller said she did not know the extent to which controllers were aware of fatigue-related issues, that controllers did not discuss fatigue among themselves, and that they were "just used to being tired." A controller who was on duty during another runway incursion was also asked about controller awareness of fatigue-related issues. He stated, "Recently they mentioned something to us about fatigue, but it's never been an issue." When queried about whether

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[1]   The final report was not posted on the NTSB website at the time of writing, but the statements quoted are contained in http://www.ntsb.gov/recs/letters/2007/a07_44_48.pdf
[2]   See http://www.ntsb.gov/recs/letters/2007/a07_30_32.pdf, which also contains references to the full incident reports.
[3]   Counterclockwise shift schedules are characterised by progressively earlier start times

he felt fatigued during midnight shifts, the controller stated, "Yes, but not so where I can't do my job." A supervisor on duty during the same incursion incident commented, "controllers here don't think fatigue is a problem."

The letter continues: "When faced with circadian disruption and short rest periods, it is essential that controllers use personal strategies to maximise restorative sleep and minimize fatigue. However, some controllers may have personal habits that exacerbate the fatigue caused by shift work. For example, the controller involved in the March 23, 2006, runway incursion had only 9 hours off duty before reporting for the incident shift. He arrived home from his previous shift about 2200, engaged in routine activities at home, fell asleep while watching television between 0100 and 0130, and slept only 4 hours before getting up to prepare for his next shift, which began at 0630. That he obtained only 4 hours of sleep before his next shift suggests that this controller may not have been using effective personal strategies to obtain adequate sleep. This practice may not be unusual. In fact, few controllers interviewed by the NTSB during the investigation of recent runway incursions have reported using comprehensive personal strategies for maximizing restorative sleep between shifts."

Controller fatigue is just as much of a problem in Europe as it is in the USA; although like the Americans, it is not a subject that we discuss widely. Most controllers accept fatigue as a fact of life, inextricably associated with their job, and perhaps they are right. After all, if civil aviation is to operate on a 24/7 basis, then most controllers will have to work anti-social shifts and some measure of fatigue is bound to result. In its way, fatigue in aviation can be as dangerous as it can behind the wheel of a car: the difference is that we can't pull over to the side of the road when we feel drowsy - we have to do something else about it.

There may be room for improving work schedules to minimise the occurrence of fatigue, and this should be the subject of on-going discussions between employers and unions, based on the reported experiences of controllers. Controllers should be encouraged to report incidents when they feel affected, even though no error results, so that adjustments to work schedules target the real danger areas.

At the same time, efforts should be made to combat the effects of fatigue. A first step should be to increase awareness of the problem and its potential dangers; then controllers should be helped to develop personal strategies to deal with fatigue. EUROCONTROL has done some excellent work in this area; for example, their brochure: Fatigue and Sleep Management contains an in-depth study of the effects of sleep deprivation, written in an easy-to-read style, and associated with practical tips to help the controller. These tips are published separately in an associated leaflet.

Team Resource Management (TRM) is another important tool in this battle, encouraging controllers and supervisors to work together as a team to eliminate error. If TRM is a new concept to you, have a look at the EUROCONTROL TRM leaflet. You can find all these products on the New Human Factors Documents website[4]. More detailed information on running TRM courses can also be found on the Human Factors Publications website[5].
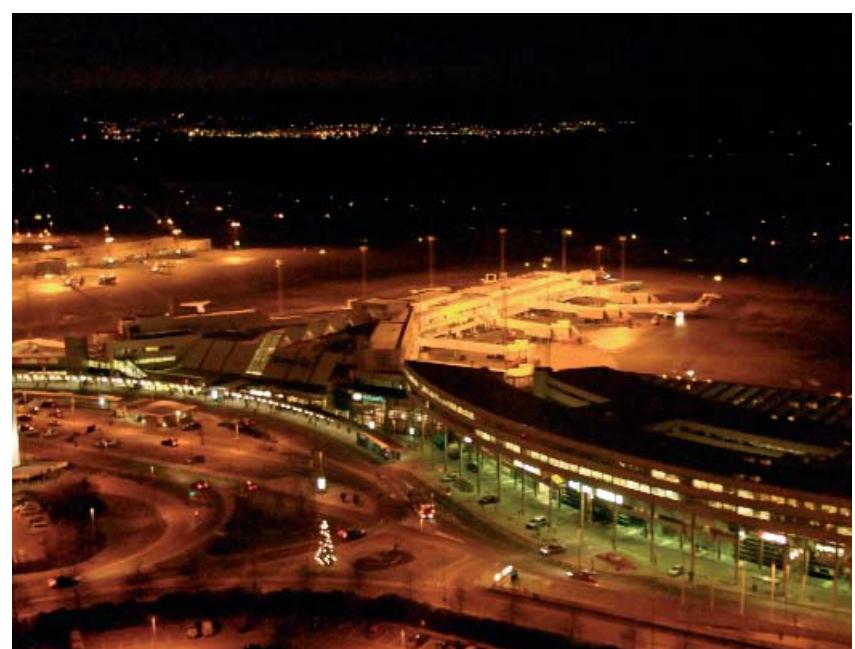
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