

MICRONAV



Vehicle Runway Incursions in the UK 2004-2010

A Brief Analysis from MOR Data Provided by UK CAA SRG

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Ltd. Updated: 7th March 2011

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Introduction

As a part of market research for their Airside Driver Trainer (ADT) simulation training system, Micro Nav Ltd have analysed runway incursions involving vehicles in the UK for the years 2004 to 2010 from data provided by the UK Civil Aviation Authority (CAA) Safety Regulation Group (SRG).

The data have been collected by the CAA SRG from the Mandatory Occurrence Reporting (MOR) system; these records include information reported to the CAA, information obtained from CAA investigations, and deductions by CAA staff based on the available information. The authenticity of the contents and the absence of errors and omissions in the raw data cannot be guaranteed.

The authors have created a few significant 'causal' categories into which the majority of vehicle incidents and accidents can be placed. This report gives an overview of the vehicle runway incursion categories and a summary of the trend in over the period.

Trends in UK Vehicle Runway Incursions

The MOR records for annual vehicle runway incursions in the UK between 2004 and 2010 show an overall rising trend from a low in 2004 of below 40 incidents to a peak of over 80 incidents in 2009.

The average number of vehicle runway incursions over the period 2004-2010 (7 years) was 61 per year (see Figure 1).

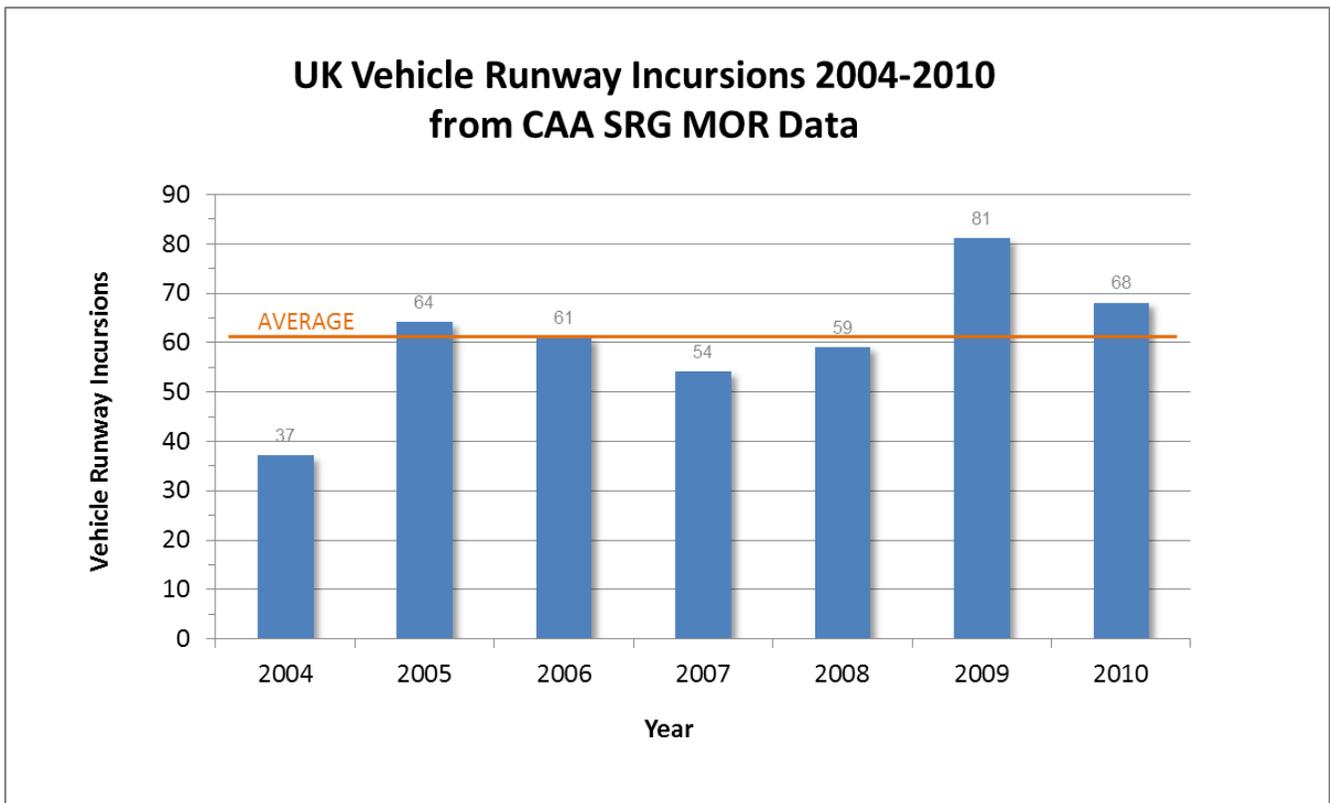


Figure 1: UK Vehicle Runway Incursions 2004-2010 (data from UK CAA SRG MOR System records). The graph also shows the average number of incursions for the period (61 per year).

What Accounts for the Rise in Incidents in 2009/10?

There may be any number of factors influencing both the low vehicle incursion figure for 2004 (37) and the more recent high figures for 2009 and 2010 (81 and 68 respectively).

In January 2007 the UK CAA adopted the International Civil Aviation Organization (ICAO) definition of a runway incursion: *“Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft”*.

The adoption of the ICAO definition does not appear to be responsible for the marked rise in vehicle incursions in 2009. On the contrary, the adoption of the ICAO runway incursion definition may have contributed to a slight fall in the number of reported incursions in 2007, but this is not easy to substantiate.

Possible causes for the fluctuation in vehicle runway incursions over the period might be as a result of changes in the overall activity at UK airports. We might expect a correlation between a measure of overall activity, such as the total number of aircraft movements, and the number of vehicle runway incursions.

However, a comparison of annual total aircraft movements for the UK with the number of vehicle runway incursions shows that during 2009-2010 the number of aircraft movements fell significantly, whilst the number of vehicle runway incursions remains higher than average (see Figure 2).

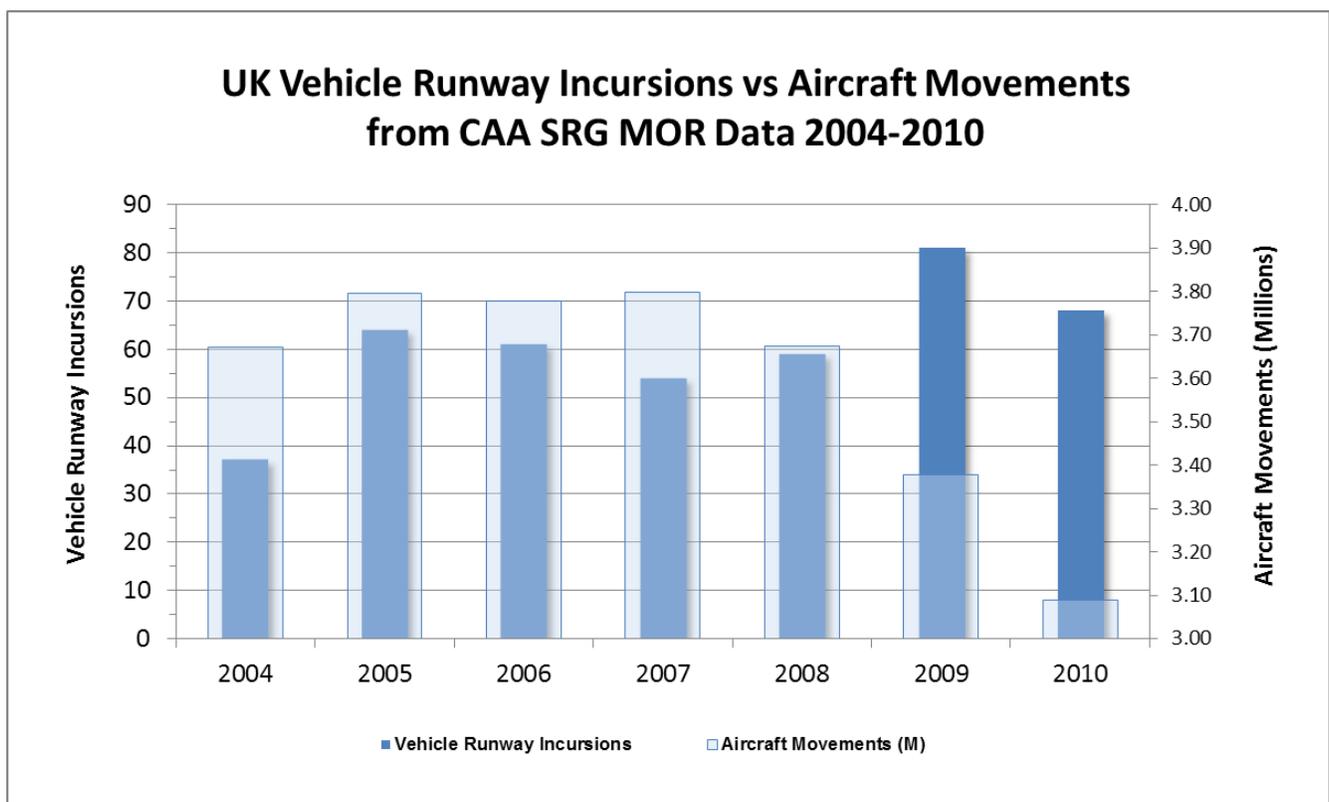


Figure 2: Vehicle Runway Incursions plotted against Total Aircraft Movements for the UK, 2004-2010 (vehicle incursion data from CAA SRG MOR records, and aircraft movement data from CAA Airport Statistics, covering 69 UK airports). [2010 movement data is provisional]

The average total number of annual aircraft movements over the period 2004-2010 (7 years, taken from 69 UK airports) was 3.6 million, giving an average of one vehicle runway incursion to every 59,000 aircraft movements for this period.

Given the average ratio of vehicle runway incursions to aircraft movements in the five years prior to 2009/10, we might have expected the number of vehicle runway incursions in 2009/10 to have been around 50. However, the number of vehicle runway incursions was 81 and 68 respectively, which represents a substantial rise over the historical norm.

This brief analysis shows that neither changes in the definition of a runway incursion nor any changes in aircraft movements were likely causal factors in the rise of reported vehicle runway incursions. The rise must represent either a change in reporting habits or a *bona fide* increase in runway incursions.

In discussions with the CAA SRG, it seems unlikely that reporting habits would have changed significantly over the period, so the increase more than likely represents a factual increase in runway incursions. The hazard has been reflected in the CAA Safety Plan as one of the 'Significant Seven' risk categories. A task force has been allocated to each category to develop mitigation measures.

Categorisation of Incidents/Accidents

1. Airport Vehicle Failed to Inform ATC	[26%]
2. Airport Vehicle Exceeded Boundary	[18%]
3. Vehicle Ignored ATC or Security Instructions	[16%]
4. Vehicle Lost	[12%]
5. Radio Telephone (RT) Misunderstanding	[9%]
6. Airport Vehicle Ignored ATC	[8%]
7. Airport Vehicle Lost	[5%]
8. ATC Error	[6%]

Table 1: Results and Categorisation of UK Vehicle Runway Incursions 2004-2010, from a total of 424 incidents (data from UK CAA SRG MOR records). Note: 'Vehicle' is a general term, whilst 'Airport Vehicle' means a vehicle operated by the airport owner/authority.

A total of 424 vehicle runway incursions were individually (and uniquely) categorised from UK MOR data from the period 2004 to 2010. Table 1 lists the categories chosen to best represent the major cause for incursions, along with a percentage breakdown for each category of incursions.

Figure 3 shows a graphical representation of the breakdown of the vehicle runway incursions from the UK MOR data.

The selection of categories is somewhat subjective, but was compared with those chosen by Young & Vleck (2009) in a study of over 2,000 airfield vehicle incursions in the USA from reports to the Federal

Aviation Administration (FAA). The causal factors selected by the authors for the UK data correlate well with those from the larger US study.

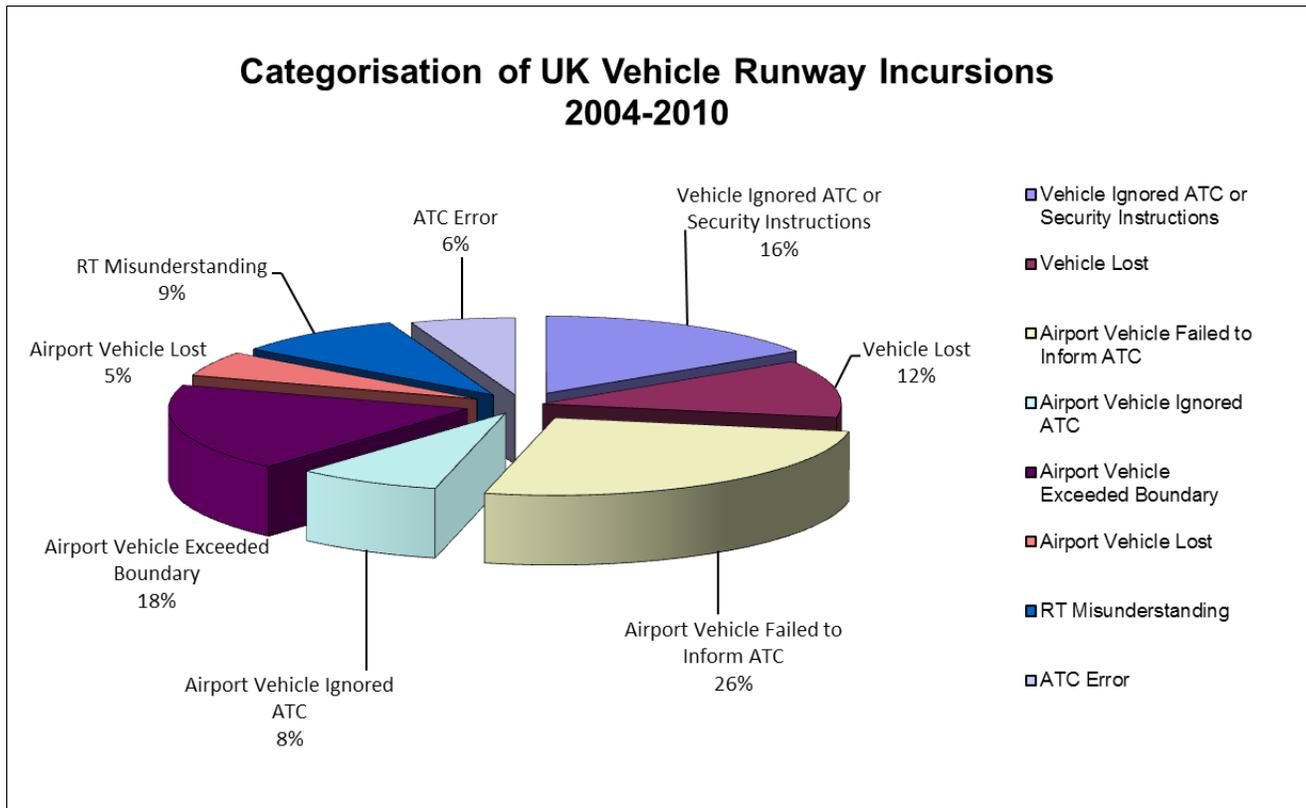


Figure 3: Categorisation of UK Vehicle Runway Incursions 2004-2010 (data from UK CAA SRG MOR records) from 424 incidents.

Causal Analysis - Summary

The categorisation of vehicle runway incursions reveals that the largest category (26%) is a communications-related issue where drivers are failing to report their location and intentions to Air Traffic Control (ATC).

When this proportion is added to the 16% of incidents where ATC instructions were ignored by drivers and the additional 9% of incidents where there is a RT misunderstanding, the total share of vehicle runway incursions that arguably can be designated as ‘communication-related’ amount to over 50%.

The high proportion of vehicle incursions with a communications-related cause in these data are in keeping with the findings of the International Civil Aviation Organisation (ICAO) 2007 “Manual on the Prevention of Runway Incursions”. In the ICAO manual, RT and communications issues are included in five out of the top ten most common driver-related factors contributing to vehicle runway incursions.

It follows that improved driver training, covering RT communications with both air traffic and ground operation controllers may help to reduce over half vehicle runway incursion incidents. In addition, improvements in driver education regarding the necessity of strict adherence to airside ground markings and signage (especially runway boundaries), along with improved airport topography familiarisation training may help to reduce as much as 37% of vehicle runway incursion occurrences.

It is of note that non-airport owned and operated vehicles account for approximately 28% of vehicle runway incursions. Restrictions on the movements of vehicles including those driven by sub-contractors (where the driver may be inexperienced), may be an area where airport operators and regulators may wish to focus special attention in the future.

The number of vehicle runway incursions attributable to ATC error or willful disregard of instructions is less significant at approximately 14%. It is possible that team training to improve awareness of procedures and increase mutual understanding between controllers and drivers could help in this area.

References

International Civil Aviation Organisation. “Manual on Prevention of Runway Incursions” Doc 9870 AN/463 First Edition 2007. (Chapter 2, Section 5).

Seth Young & Joost Vleck, 2009. “An Analysis of the causes of airfield incursions attributed to ground vehicles”. Journal of Airport Management, Vol. 3, pp. 299-308. April-June 2009.