

Prevented Level Bust Trial Report

1. Introduction

The prevented level bust trial was conducted over a 10-day period (22nd June – 1st July 2005). It involved the 4 centres (LACC, LTCC, MACC – including Manchester approach and ScACC) and 2 airports (Aberdeen and Birmingham).

The purpose of the trial was to determine the true extent of the level bust problem at NATS ACS units and to determine the relationship between the number of reported level busts and the number of potential level busts which are prevented by NATS ATCOs.

The trial aimed to capture events which may have led to an actual level bust, but where early resolution prevented a level bust occurring. Such events include:

- *Occasions when a pilots incorrectly reads back a level change instruction and the ATCO hears the error and corrects it, and*
- *Occasions where a pilot states that he/she is climbing or descending to an incorrect altitude or level, for example on a standard instrument departure or on first contact with a sector, the ATCO hears the error and corrects it, and*
- *Other circumstances such as a pilot alerting an ATCO to an incorrect read back by another pilot and the ATCO corrects the situation before a level bust occurs.*

ATCOs were asked to fill in a simple Scratch Pad (see appendix A1 for an example) every time they prevented a potential level bust. All participating centres and airports were given identical scratch pads.

1111 prevented level busts were recorded during the 10-day trial across all participating units. During the 10-day trial period there were 18 actual level busts in UK airspace, 17 of these were at units participating in the trial.

2. Background

It is estimated that only one in three actual level busts in the UK are reported by ATCOs. Therefore the level bust data collated and analysed by NATS and the UK CAA does not give a full indication of the scale of the problem. The problem can be described as an iceberg (see figure 1 below) with the number of potential level busts on the bottom and the number of significant losses of separation on the top. Fortunately, there are a relatively small number of losses of separation each year but therefore gaining a good understanding of the level bust problem and eliminating/reducing the occurrence of level busts cannot be done by analysing these events alone. Moving further down the iceberg and understanding the level busts that are prevented provides a better chance of understanding the full picture and then subsequent steps can be taken to reduce the rate of occurrence and level busts.

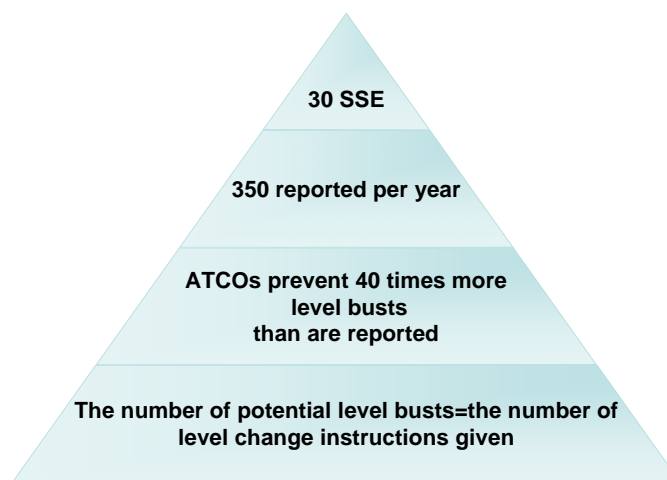


Figure 1: The level bust iceberg (all layers relate to approx level bust figures for 2005)

Very little previous work has been done to understand potential level busts and how they are prevented by the current safety nets. A survey to record the number of incorrect readbacks picked up by ATCOs at LTCC was carried out over a nine day period in November 2002. Of the 346 erroneous readbacks picked up and reported by ATCOs, 87 of them involved the incorrect readback of a level instruction and 38 an incorrect readback of a pressure setting. This highlighted the true scale of the level bust problem is significantly higher than the previously existing evidence.

3. Description of the Trial

Controllers were asked to use scratch pads to report events (see appendix A1 for an example) as they were relatively quick and easy to complete and were considered to not take up too much space on controller workstations. ATCOs were asked to fill in a scratch pad sheet each time they prevented a potential level bust.

10 days was chosen for the trial length as it was thought this was the maximum length before reporting fatigue would begin and is the length of one cycle of the controller shift pattern.

The 4 domestic centres and 2 airports participated in the trial to try and gain a better understanding of prevented level busts across all areas of NATS domestic control.

Results in the format of presentations with graphs and short summaries were produced for each participating unit. An overview presentation containing observations across all units was also produced.

4. Areas for Improvement in Future Trials

There were several lessons learnt from this trial which should be drawn upon if the trial is repeated or if a similar trial is performed. Most relate to how events were recorded on the scratch pads.

5. Results: All Units Overview

1111 scratch pads reports were received from the 6 participating units over the 10-day trial period. 34% of these reports came from LTCC and 24% from LACC. Figure 2 below shows the number of reports received at each centre each day and UK traffic levels each day. For the first five days of the trial there did appear to be some relationship between the number of prevented level busts and traffic but there was little relationship for the second five days of the trial.

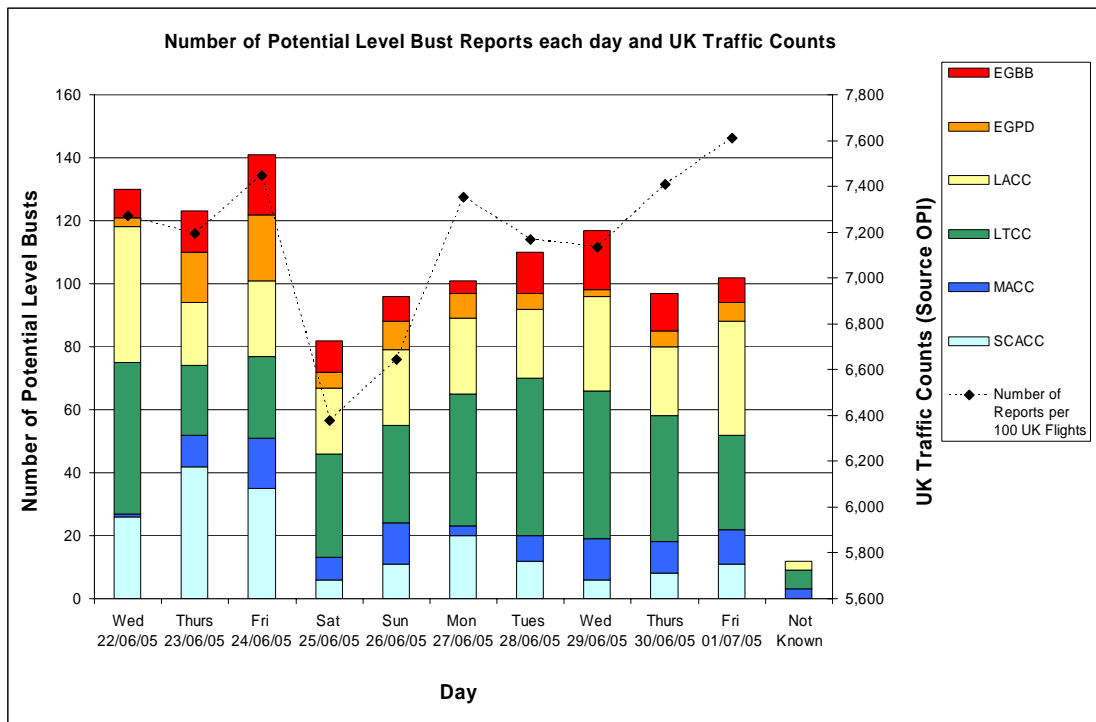


Figure 2: Number of prevented level busts reported each day during the trial by all participating units.

The following key observations were found across all participating units.

- There were lots of reports of missing levels on first or subsequent contacts.

The proportion of this type of report varied from centre to centre:

Centre Name	Proportion of Reports due to Missing Levels
EGPD	79%
EGBB	48%
LTCC	47%
ScACC	40%
LACC	10%
MACC & APR	2%

- Approximately half of all errors were detected in readbacks.

- Flight level/ altitude confusion areas (e.g. FL60, 6000ft).

The varying transition altitudes in the UK caused confusion as to whether flight levels or altitudes should be reported at certain heights for particular units. For example, at Birmingham where the transition altitude is 4000ft, 43% of all prevented level bust reports were for reported 6000ft, correct FL60. At LTCC there were 10 reports of reported FL60, correct 6000ft. In periods of extreme pressure, reporting an altitude instead of a flight level (or vice versa) can lead to a deviation of more than 300ft from cleared level and hence a level bust.

- Confusion between 2's and 3's (e.g. FL230/220, FL130/120, FL350/250) (see appendix A2).
- First digit confusion (e.g. FL50/40, FL190/90, FL370/270) (see appendix A3).

6. Results: Individual Unit Observations

Key observations are listed below for each unit in turn:

EGBB (115 reports received in 10 day trial, 7 reports received prior to trial – not included in 1111)

- Most reports were for climbing aircraft (73%).
- Almost all reports at EGBB were due to altitude/ flight level confusion or no cleared level on departure (48%/48%).
- Most flight level and altitude confusions were reported 6000ft, correct FL60 but there were also 5,000ft/FL50 and 7,000ft/FL70 confusions.

EGPD (80 reports received)

- There was a significant variety in the number of prevented level busts reported each day with approximately twice as many reports on 2 days than on the other days.
- Most reports were for climbing aircraft (78%).
- 79% of reports were due to the cleared level not being reported.
- There were 3 confusions between FL100 and FL110.
- 81% of reports were from Aberdeen approach with 91% of these being due to no cleared level reported.

LACC (269 reports received)

- 77% of errors were spotted in readback.
- Only 10% of reports were for no reported flight level. This is lower than at other units. Most of these were for reports at FL170 (8 occurrences).
- Confusions between cleared flight levels and expected levels, speed and headings were observed. There also were several observations of aircraft taking clearances meant for other aircraft (callsign confusion).
- The main flight levels that were read back incorrectly include confusions between FL230 and FL220, FL210 and FL200, FL350 and FL250, FL240 and FL250.
- 37% of reports were from LAG South.

LTCC (375 reports received)

- 47% of reports were for the cleared flight level not being reported on first contact. As the trial progressed, the proportion of reports of this kind increased.
- Early in the trial more reports were related to climbing aircraft. This pattern was reversed later in the trial and was probably due to the increase in reports for aircraft not reporting cleared flight levels.
- Confusion areas (between reported and cleared levels) included FL100/110, FL130/120, FL120/130, FL60/6000ft.

MACC & APR (95 reports received)

- The number of reports received each day varied significantly (between 1 and 16).
- There were very few reports for no reported flight level (2 % of reports). Most reports were due to incorrect readback of cleared flight level, which the controller spotted. There was one incident of a callsign confusion.
- Confusion areas (between reported and cleared levels) included FL190/90, F350/250, FL370/270, FL90/190, 6000ft/FL60, FL50/5000ft.
- 36% of reports were from each of the North and West Sector Groups.

ScACC (177 reports received)

- Many more reports were received during the first 3 days of the trial than during later days.
- 70% of reports were due to the cleared level not being reported.
- It was hard to appropriate the proportion of climbing and descending aircraft as these were regularly not filled in.
- Confusion areas (between reported and cleared levels) included FL60/6000ft.
- 52% of reports were from Galloway. 86% of these were due to the cleared level not being reported.

7. Conclusions

This trial has helped to gain a better understanding of the potential level busts that are prevented by NATS ATCOs and hence a better picture of the lower levels of the 'iceberg' (Figure 1). 1111 prevented level bust reports were received during the 10-day trial period. There were 18 actual level busts (17 at participating units) in this 10-day period. This shows a significant number of potential level busts are prevented by NATS ATCOs.

Several lessons were learnt from this trial which would be useful if the trial was to be repeated or if a similar trial was performed.

Similar types of prevented level busts were observed across all participating units. The main issues included:

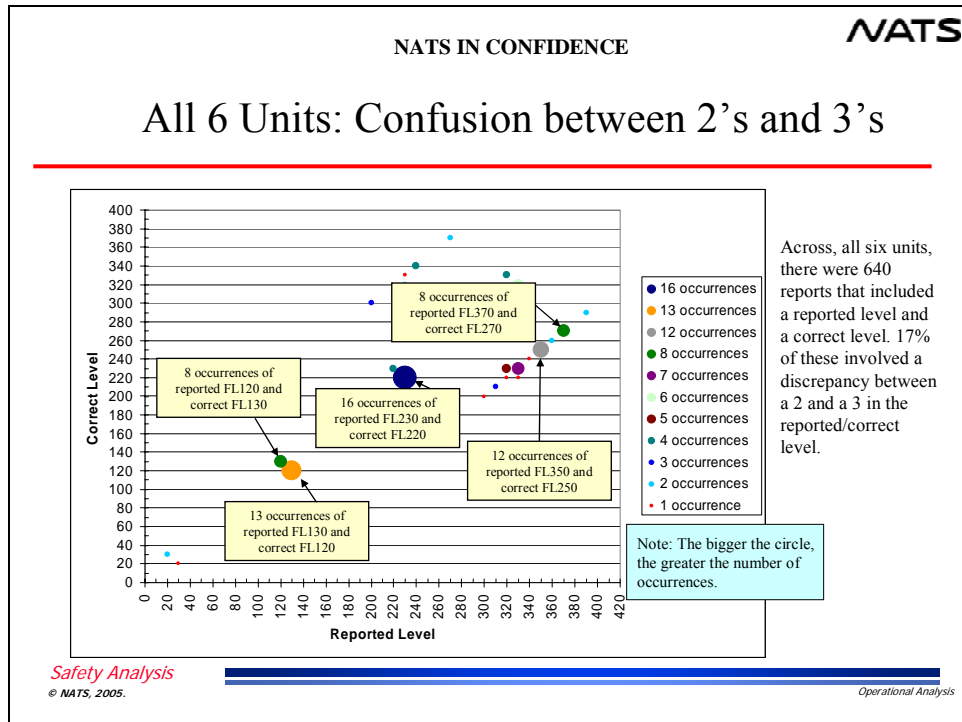
- No reported flight level on first contact.
- Flight Level/Altitude Confusion (in particular at EGGB).
- First Digit confusion e.g. FL190/90.
- Confusion between 2's and 3's e.g. FL350/FL250.

It would be useful to repeat this trial to see if recent efforts to reduce level busts have had an effect on level bust/prevented level bust numbers. Since the number of actual level busts is small, repeating the trial would demonstrate any changes more quickly than waiting for them to manifest in actual level bust data.

Appendix A1

<u>Level Bust Trial</u>	
Date + Hour	
Sector	
Callsign	
How Resolved	<input type="checkbox"/> Spotting Incorrect Readback of Level <input type="checkbox"/> Correction of First Reported Level <input type="checkbox"/> Any Other Method
Climb / Descent	<input type="checkbox"/> ↑ <input type="checkbox"/> ↓
Reported level	
Cleared level	
Additional Info	
<p>This form is not a replacement for the MOR Scheme. Any event reportable under the MOR Scheme must still be reported.</p>	

Appendix A2 – Confusion between 2's and 3's, Slide from Results Presentation



Appendix A3 – First Digit Error, Slide from Results Presentation

