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**A REPORT OF MONITORING OF
AIRCRAFT NOISE FROM STANSTED AIRPORT
AT SADBURY, SUFFOLK,
BETWEEN APRIL AND JULY 2005**

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Summary

A mobile Noise Monitoring Terminal (NMT) was deployed by Stansted Airport between 14th April and 13th July 2005 at Sudbury in Suffolk, approximately 20 miles north east of Stansted airport.

The aim of this report is to present the results of this three month duration noise monitoring exercise and to interpret the results in a way that places the contribution to the noise from passing aircraft in the context of the overall noise climate from all other sources.

The NMT records noise data relating to noise events which exceed a threshold level of 52 dBA for a time of at least 15 seconds.

These noise events are then compared by the airport's GEMS (Global Environmental Management System) noise and track keeping system with radar tracks of aircraft arriving at or departing from Stansted Airport. Those noise events which are matched with aircraft tracks are called aircraft noise events, and those that are not matched are designated as community noise events.

In addition to gathering data about noise events the NMT also collects and stores, on an hourly basis information about the total level of noise at the site from all sources.

The number of aircraft noise events per day varied from zero to 27, with an average of 13 events per day, and a total of 1008 events over the three month period. The numbers of events did not show any obvious correlation with day of the week or weekends, or with Public Holiday weekends. The highest numbers of aircraft noise events occurred in the morning, between 09.00 and 11.00 hours (local time) and between 18.000 and 21.00 hours in the evening.

Aircraft noise events were outnumbered by a ratio of about nine to one by non-aircraft noise events, called community noise events in this report, of which there were 8, 500 during the monitoring period, an average of 112 each day.

The daily average maximum noise level (L_{ASmax}) of aircraft noise events ranged between 55 dBA and 60 dBA, but showed no significant day to day variation throughout the period, with, on average, the maximum noise levels of community noise events being about 3 dBA higher.

The noise climate at the site may be characterised by average hourly values of various noise percentile levels, and by the average (or equivalent) noise level (L_{Aeq}). These values are fairly constant during the daytime (with values of L_{AS10} of 53 dBA, L_{AS90} of 41 dBA, and L_{Aeq} of 54 dBA), but falling to lower levels in the late evening night-time and early morning periods.

Average values of aircraft noise levels, derived from the aircraft noise events, are much lower than the average noise levels derived from the community noise events, and than the total noise level from all sources.

During a typical daytime hour there may be 1 or 2 bursts of aircraft noise at a level of 50 to 55 dBA intermixed with 9 or 10 bursts of community noise at slightly (3 dB) higher noise levels, superimposed on an ambient noise level which will be at or less than 46 dBA for 30 minutes in the hour, and at or less than 41 dBA for 6 minutes.

The average maximum noise level (L_{ASmax}) during events does not vary significantly with aircraft type for the relatively few aircraft types which make up most of the aircraft noise events.

The information presented in this Report will serve as a baseline for comparison with any future noise level surveys at this location.

1.0 Introduction

1.1 A mobile Noise Monitoring Terminal (NMT) was deployed by Stansted Airport for a three-month period in 2005 (from 14th April to 13th July) at Sudbury, Suffolk.

1.2 The NMT was sited at Sudbury in Suffolk, approximately 20 miles north east of Stansted airport.

1.3 The aims of this report are:

- to present the results of the three month noise monitoring survey, and
- to interpret the results in a way that places the contribution of the noise from passing aircraft in the context of the overall noise climate from all other sources, and
- to provide a baseline for comparison with any future noise surveys that may be undertaken at this location.

1.4 A glossary of technical terms used in this report is given in the Appendix 1.

2.0 Data from the Noise Monitoring Terminal

2.1 The NMT records noise data relating to noise events which exceed a threshold level of 52 dBA for a time of at least 15 seconds.

2.2 These noise events are then compared by the airport's GEMS (Global Environmental Management System) noise and track keeping system with radar tracks of aircraft arriving at or departing from Stansted Airport. Those noise events which are matched with aircraft events are called aircraft noise events, and those that are not matched are designated as community noise events.

2.3 The following information is recorded for each noise event: date, time, duration, L_{ASmax} and SEL values, and, in addition, for aircraft noise events, event type (Arrival / Departure), Runway used, and aircraft type.

- 2.4 In addition to gathering data about noise events the NMT also collects and stores information on an hourly basis about the total level of noise at the site from all sources (including that from aircraft movements), and from individual noise events.
- 2.5 Because the noise level is usually not constant, but varies continuously throughout each hour it is necessary to describe the noise levels statistically in terms of a measure of the average noise level throughout the hour (and called the hourly continuous equivalent noise level, L_{Aeq}) and also in terms of a series of percentile levels. The most important of these is the L_{AS90} , which is the noise level exceeded for 90% of each hour. This level of noise is conventionally taken to be a measure of the background noise level for each hour, and is the more or less constant level of noise which underlies the variations caused by various transient sources including aircraft.
- 2.6 There are gaps in the data, with no events being recorded: between 5th and 8th May 2005 inclusive, between 13th and 17th May inclusive, and between 15th and 20th June. Although the reason for these gaps in the data is not known, they do not affect the overall conclusions presented in this report, which are based on data from 1008 aircraft noise events gathered over 76 days over the three month period.

3.0 Analysis of Noise Monitoring Survey Results

The numbers of noise events

- 3.1 The table below shows the total numbers of noise events in each month and the breakdown into aircraft and community noise events. It can be seen that community noise events far outnumber those due to aircraft (by a ratio of almost nine to one) with, on average, 13 aircraft noise and 112 community noise events each day.

Dates	No. of days on which events were recorded	No. of Aircraft noise events	Average no. of aircraft noise events per day	No. of Community noise events	Average no. of community events per day
April (11 th -30 th)	17	296	17	3,178	187
May (4 th , 9 th -12 th , 18 th -31 st)	22	332	15	2,758	125
June (1 st -14 th , 21 st - 30 th)	24	245	10	1,661	69
July (1 st -13 th)	13	135	10	903	69
Total	76	1008	13	8,500	112

-
- 3.2 Figures 1 to 4 show the numbers of aircraft noise events occurring each day during the months April to July, and Figure 5 shows a comparison of numbers of aircraft and community noise events each day during May (with the other months showing a similar pattern).
- 3.3 All of the aircraft noise events are arrivals, with, on average over the three month period, 81% of them using Runway 23 (i.e. landing to the West) with 19% using Runway 05 (i.e. landing to the East); the percentage using Runway 05 is much higher during July, the percentages of events using Runway 05 for the four individual months, April to July are: 18%, 13%, 17% and 41 %.
- 3.4 Figures 1 to 5 also indicate the day of the week, and it can be seen from the graphs that the number of aircraft noise events per day varies from zero to 27, but with no obvious correlation with day of the week or weekend, or with Public Holiday weekends.
- 3.5 The wide day to day variation in numbers is noticeable, for example from 24 events on Wednesday 20th April to 4 events on Thursday 21st April (Figure 1). Possible explanations for these variations include variations in flight paths i.e. proximity to the NMT, and changes in wind direction / runway used.
- 3.6 Figure 6 indicates the average distribution of aircraft noise events throughout the day, showing that the highest numbers occur in the morning, between 09.00 and 11.00 hours and between 18.000 and 21.00 hours in the evening. No aircraft noise events were recorded after midnight, but there were a few early morning aircraft noise events, with the following total numbers for the entire (14 April to 13 July) period: 6 between 03.00 and 04.00, 4 between 04.00 and 05.00, and 15 between 05.00 and 06.00 hours.

Maximum levels of aircraft and community noise events

- 3.7 The NMT records the maximum noise level (measured using the 'A' frequency weighting and the Slow (S) time weighting) produced by each aircraft noise event, (L_{ASmax}). These values range from 52 dBA to 69 dBA, but with 90% of the events lying within a smaller range of 52 to 62 dBA. A statistical distribution is shown in Figure 7. Figure 8 indicates the daily average L_{ASmax} value of aircraft noise events during April, May, June and July 2006 and shows that the daily average maximum level ranges between 55 dBA and 60 dBA, but shows no significant variation throughout the period.

There is no significant difference between average L_{ASmax} values for aircraft noise events arising from the use of runways 23 and 05.

- 3.8 The NMT also records the maximum value of each community noise event. These values range from 52 dBA to 75 dBA, but with 90% of the events lying within a smaller range of 52 to 64 dBA. The average value is 58.4 dBA.
- 3.9 Figure 9 shows a comparison of average L_{ASmax} values of Aircraft and Community noise events at Sudbury in May 2005 (with the other months showing a similar pattern). It can be seen that average values of L_{ASmax} are up to 3dBA higher for community noise events than for aircraft noise events.

Duration of aircraft and community noise events

- 3.10 The duration of 90% of the aircraft noise events lie between 15 seconds and 50 seconds, with an average value of 35.6 seconds. The duration of 90% of the community noise events lie between 15 seconds and 75 seconds, with an average value of 41.7 seconds.

Total noise climate

- 3.11 The NMT also records the total noise level (i.e. from all sources, including aircraft and community noise events) each hour, measured in terms of the hourly values of L_{Aeq} (representing the average noise level over the hour) and the following statistical percentile levels: L_{AS10} , L_{AS50} , L_{AS90} and L_{AS99} , where, for example L_{AS10} is the noise level (measured using the 'A' frequency weighting (i.e. in dBA) and the Slow (S) time weighting) exceeded for 10% of the measurement time interval). Figure 10 shows these values averaged over the April to July survey period for each hour of the day.
- 3.12 It can be seen that the value of each index is fairly constant during the daytime period, from about 06.00 hours to 19.00 hours but then falls off outside these times (i.e. in the late evening, night-time and early morning periods.)

3.13 The average index values between 06.00 and 19.00 hours are:

$$L_{AS10} = 53 \text{ dBA}$$

$$L_{AS50} = 46 \text{ dBA}$$

$$L_{AS90} = 41 \text{ dBA}$$

$$L_{AS99} = 38 \text{ dBA}$$

$$L_{Aeq} = 54 \text{ dBA (but varying from hour to hour between 50 and 57 dBA)}$$

3.14 For a period of one hour L_{AS10} is the noise level exceeded for 6 minutes, and L_{AS90} is the level exceeded for 54 minutes, so that noise levels at or below the L_{AS90} value occur for 6 minutes. Thus for a typical hour in the daytime the total noise level would exceed 53 dBA for 6 minutes, would lie between 46 dBA and 53 dBA for 24 minutes, and between 46 dBA and 41 dBA for 24 minutes, and would be below 41 dBA for 6 minutes, and below 38 dBA for 36 seconds (1% of an hour) each hour. The hourly average noise level varies from hour to hour between 50 and 57 dBA but with an average value of 54 dBA between 06.00 and 19.00 hours.

The contribution of aircraft and community noise events to the total noise climate

3.15 In addition to L_{ASmax} values the NMT also records the Single Event Noise Level (SEL) for each aircraft noise event. This parameter relates to the amount of sound energy in each event, and may be used to calculate the average or equivalent aircraft noise level (L_{Aeq}) due to aircraft noise events over a period of time (hour, day or month). Although this average noise level bears little relationship to the aircraft noise as heard, which occurs in short bursts of noise at higher levels rather than as a much lower continuous average level, it is, nevertheless, a useful parameter for comparative purposes.

3.16 Figure 11 shows a comparison between the measured daily L_{Aeq} values of the total noise and the L_{Aeq} values of community noise and aircraft noise calculated from noise event SEL values. It can be seen that the total noise level is typically about 50 dBA, and that the level due to aircraft noise is typically 10 to 15 dBA lower than this, at between 30 and 35 dBA. The L_{Aeq} due to community noise events is much higher than that due to aircraft noise events, and for many days during the period accounts entirely for the total noise level. On days where the total noise exceeds that due to community noise the difference will be due to community noise occurring at a level below the event trigger level of 52 dBA.

A typical day's noise exposure pattern

- 3.17 Using the information presented in this report it is possible to attempt a description of the noise climate during a typical daytime hour, during which there might be 1 or 2 aircraft noise events and 9 or 10 community noise events. During this typical hour the noise at the site would be as low as or lower than 46 dBA (the L_{AS50} value) for 30 minutes and as low as or lower than 41 dBA for 6 minutes, but interrupted by 9 or 10 community noise events lasting on average 42 seconds each, and 1 or 2 aircraft noise events (which will be recognizably different in character from the community noise events) lasting, on average for 36 seconds each. The level of the aircraft noise events will be in the range 50 to 55 dBA and those of community noise events about 3 dBA higher.

Aircraft types contributing to aircraft noise events

- 3.18 Forty one different aircraft types contribute to the total number of 1008 aircraft noise events which occur during the three month period. Figure 12 shows the numbers of events from each aircraft type, described by a 3 character source Code. A list of these Codes is given in Appendix 2. Seventy five percent of events arise from only five types of aircraft (Boeing 737-800: 460 events, Boeing 737-300: 84 events, Airbus A319: 67 events, Boeing 737-500: 60 events, and Boeing 737-700: 51 events), and 12 aircraft types account for up to 90% of events.
- 3.19 Figure 13 shows the average L_{ASmax} value for each aircraft type, and it can be seen that there is very little variation among the most commonly occurring aircraft types. Although there are some aircraft types which produce significantly higher values of L_{ASmax} there are only very small numbers of these types of events.

4.0 Summary and Conclusions

- 4.1 The number of aircraft noise events per day varied from zero to 27, with an average of 13 events per day, and a total of 1008 events over the three month period. The numbers of events did not show any obvious correlation with weekday or weekend, or with Public Holiday weekends. The highest numbers of aircraft noise occurred in the morning, between 09.00 and 11.00 hours and between 18.000 and 21.00 hours in the evening.

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- 4.2 Aircraft noise events were outnumbered by a ratio of about nine to one by non-aircraft noise events, called community noise events in this report, of which there were 8500 during the monitoring period, an average of 112 each day.
- 4.3 The daily average maximum noise level of aircraft noise events ranged between 55 dBA and 60 dBA, but showed no significant variation throughout the period, with, on average, the maximum noise levels of community noise events being about 3 dBA higher.
- 4.4 The noise climate at the site may be characterised by average hourly values of various noise percentile levels and by the average (or equivalent) noise level. These values are fairly constant during the daytime (with values of L_{AS10} of 53 dBA, L_{AS90} of 41 dBA and L_{Aeq} of 54 dBA) but falling to lower levels in the late evening night-time and early morning periods.
- 4.5 Average values of aircraft noise levels, derived from the aircraft noise events, are much lower than the average noise levels derived from the community noise events, and than the total noise level from all sources.
- 4.6 During a typical daytime hour there may be 1 or 2 bursts of aircraft noise at a level of 50 to 55 dBA intermixed with 9 or 10 bursts of community noise at slightly (3 dB) higher noise levels, superimposed on an ambient noise level which will be at or less than 46 dBA for 30 minutes in the hour, and at or less than 41 dBA for 6 minutes.
- 4.7 The average maximum noise level (L_{ASmax}) during events does not vary significantly with aircraft type for the relatively few aircraft types which make up most of the aircraft noise events.
- 4.8 The information presented in this Report will serve as a baseline for comparison with any future noise level surveys at this location.

Figure 1: Number of Aircraft Noise Events, April 2005, at Sudbury, Suffolk

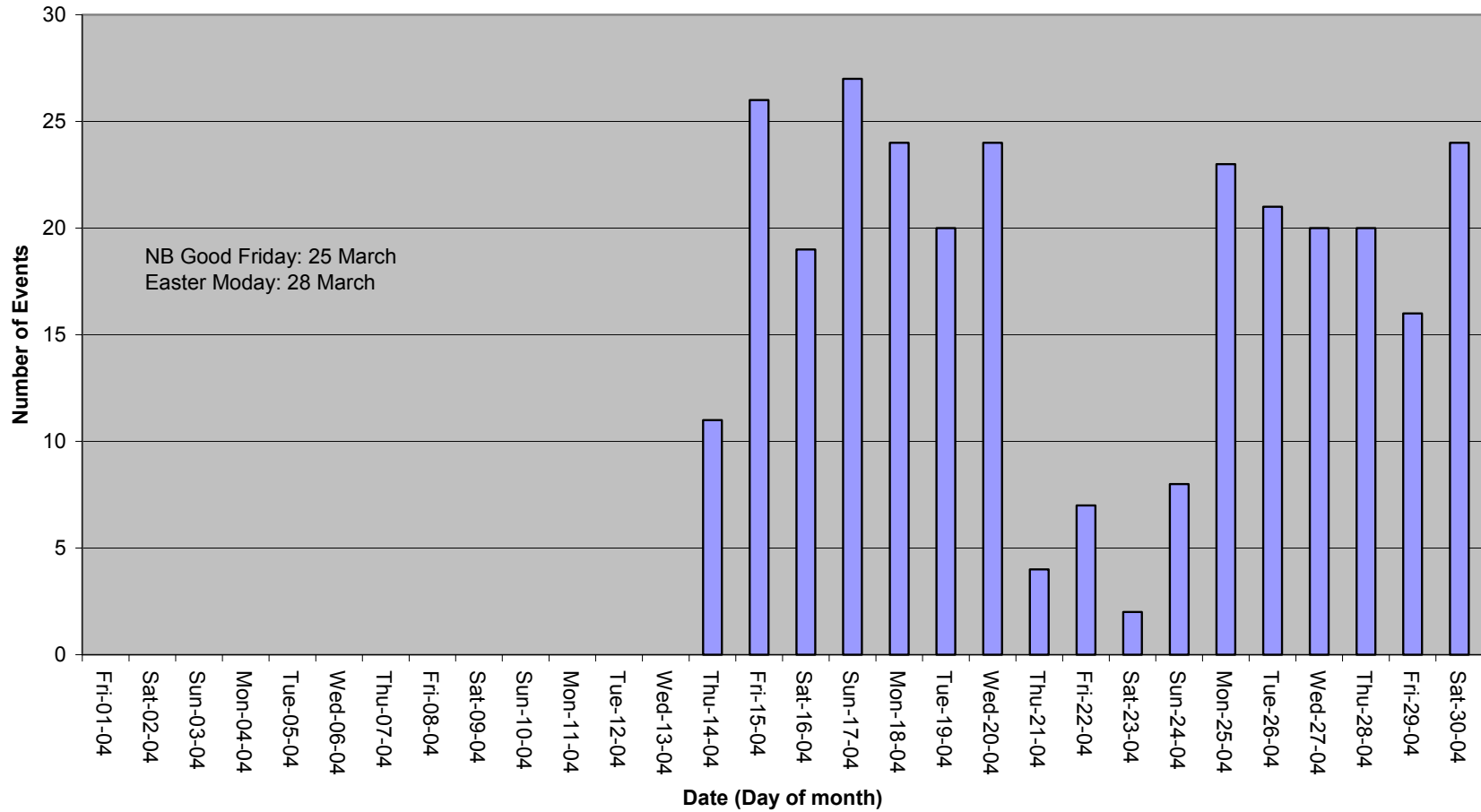


Figure 2: Number of Aircraft Noise Events, May 2005, at Sudbury, Suffolk

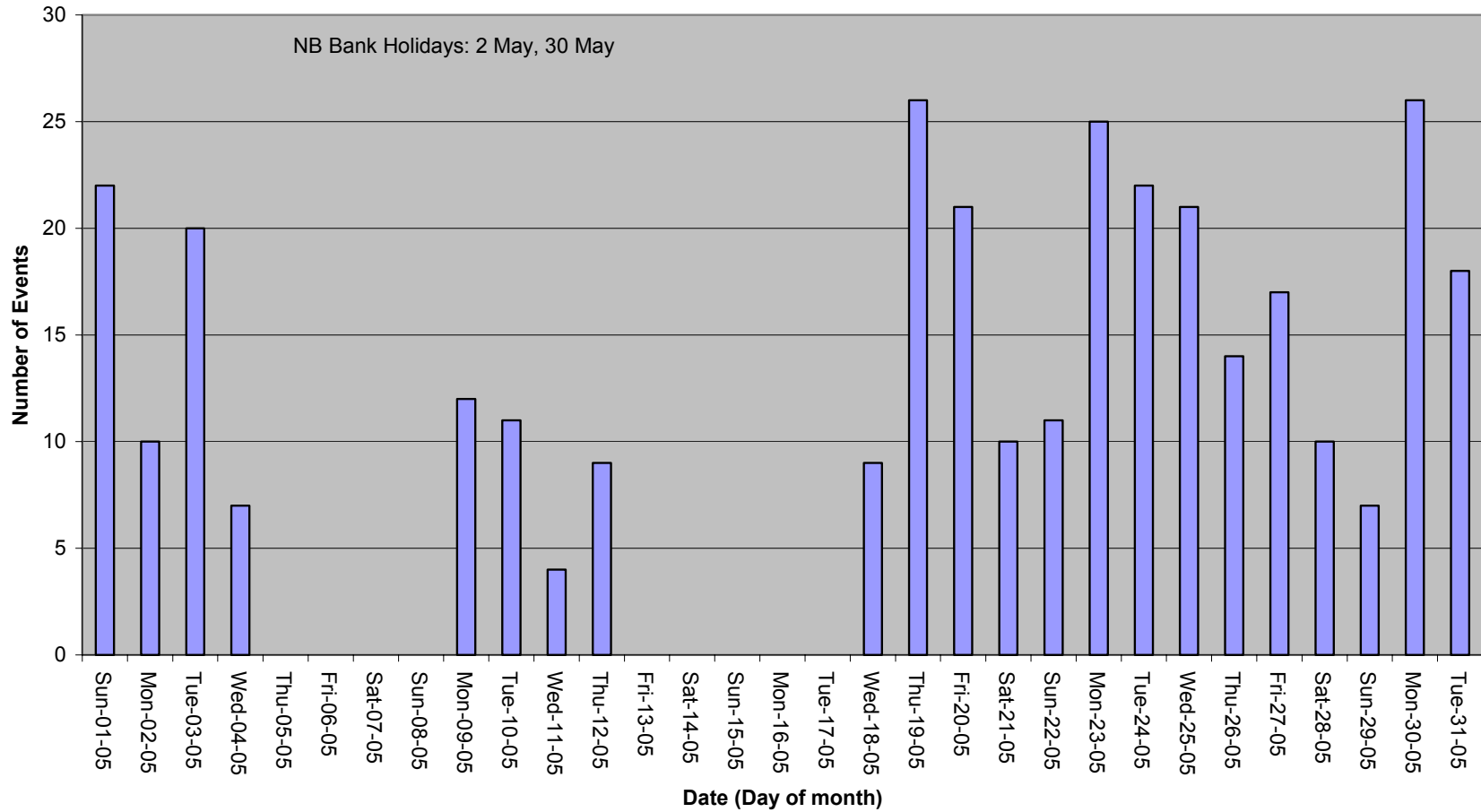


Figure 3: Number of Aircraft Noise Events, June 2005, at Sudbury, Suffolk

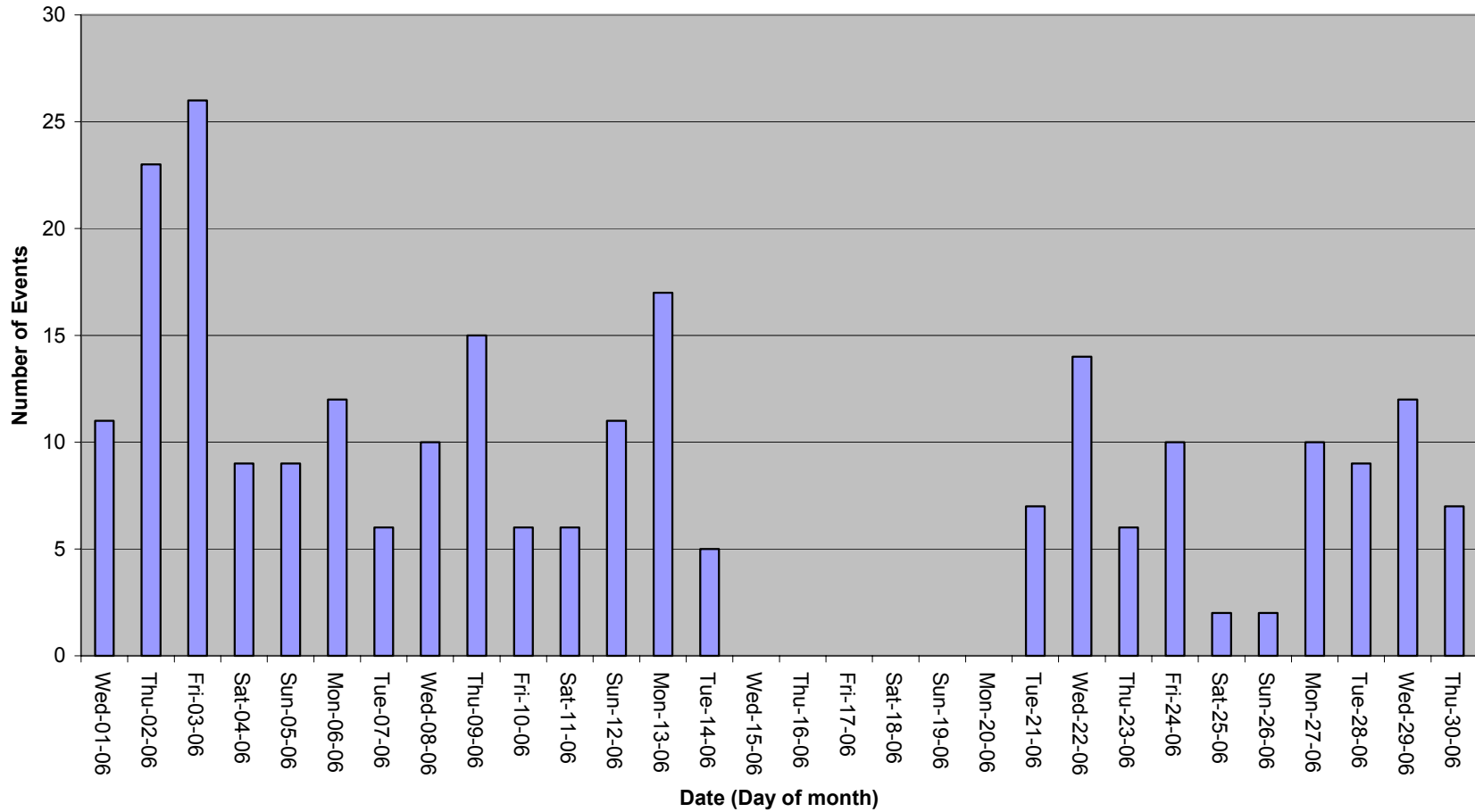


Figure 4: Number of Aircraft Noise Events, July 2005, at Sudbury, Suffolk

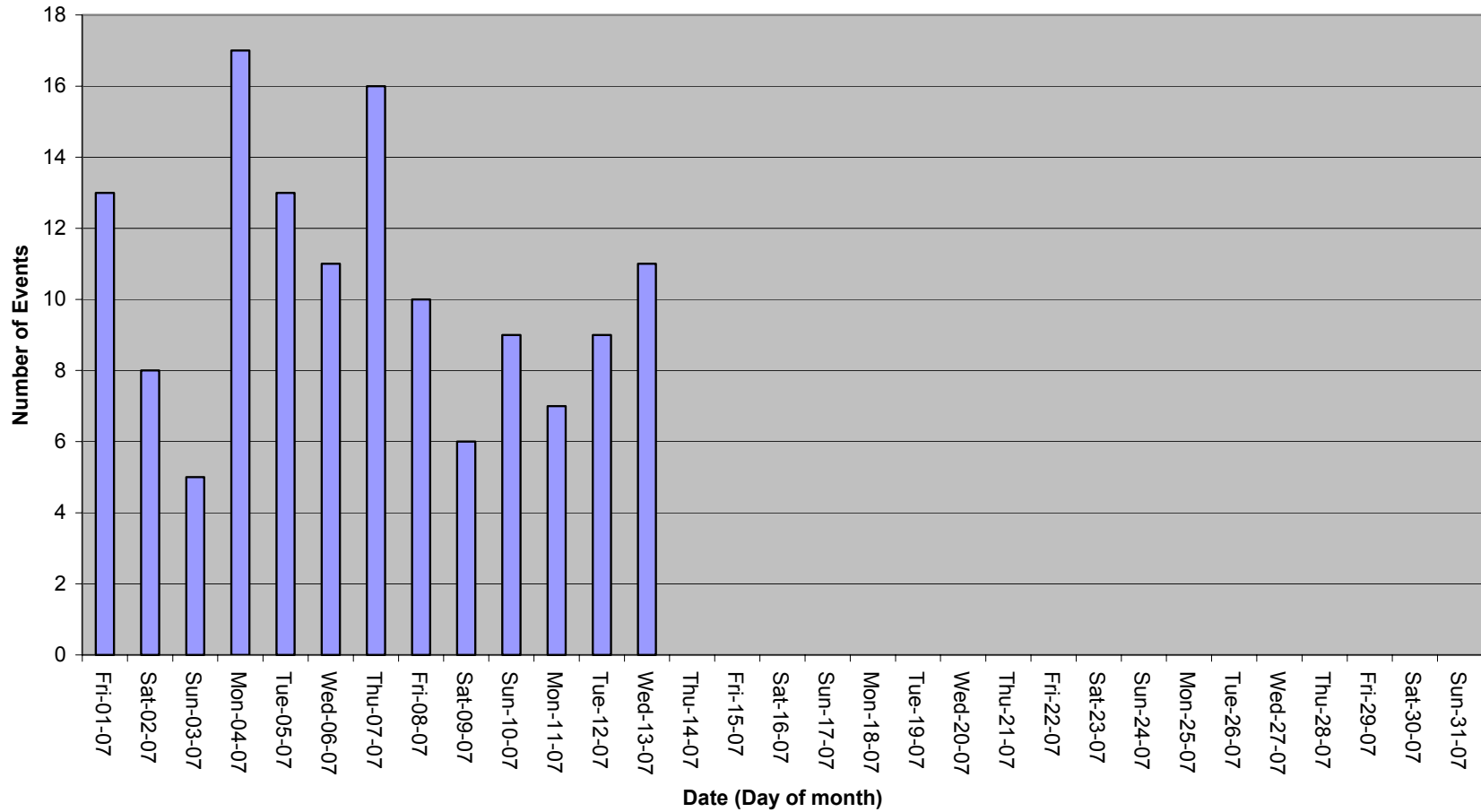


Figure 5: Comparison of numbers of Aircraft and Community noise events at Sudbury in May 2005

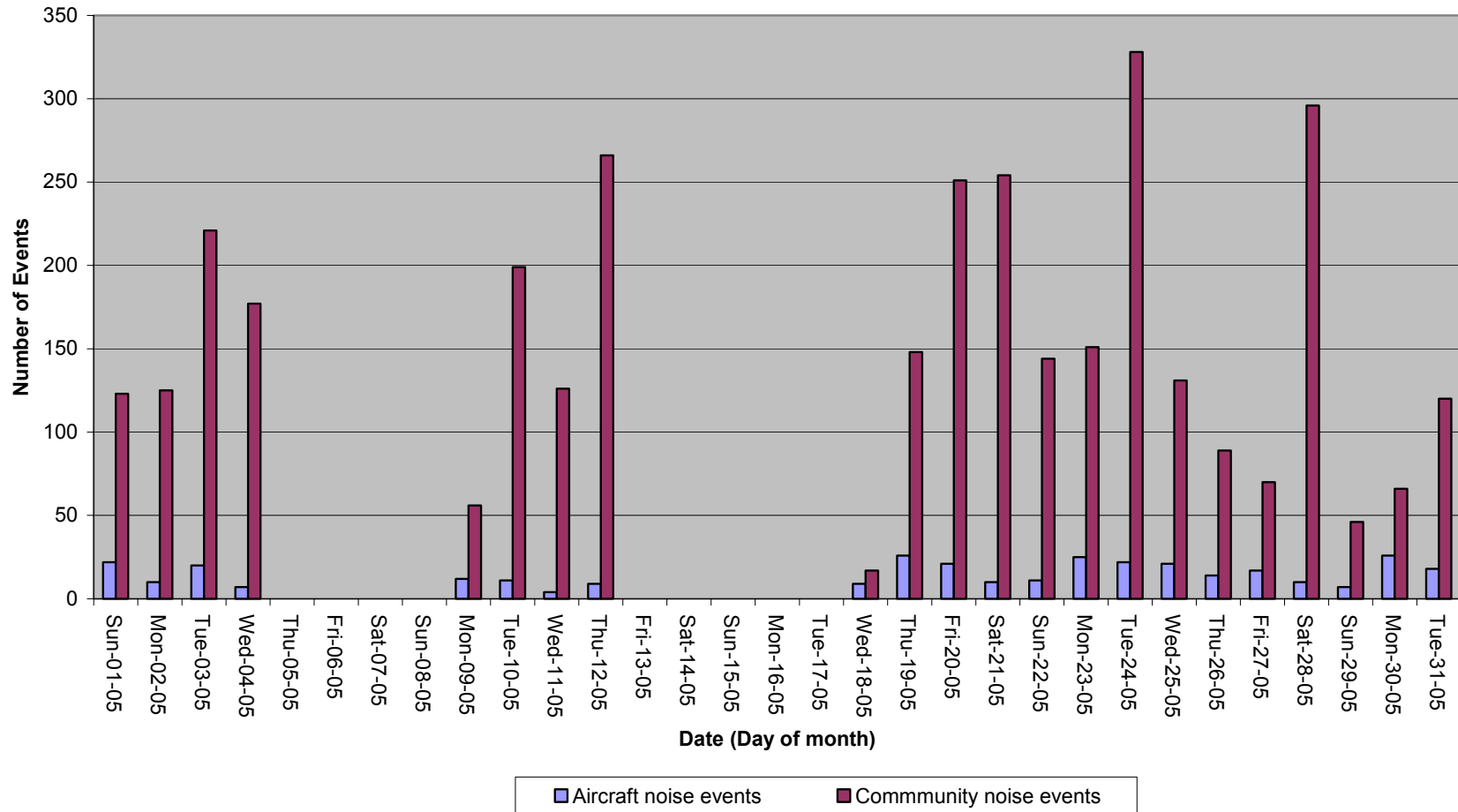


Figure 6: Total numbers of aircraft noise events in each hour of the day at Sudbury for the three month period from 14th April to 13th July 2005

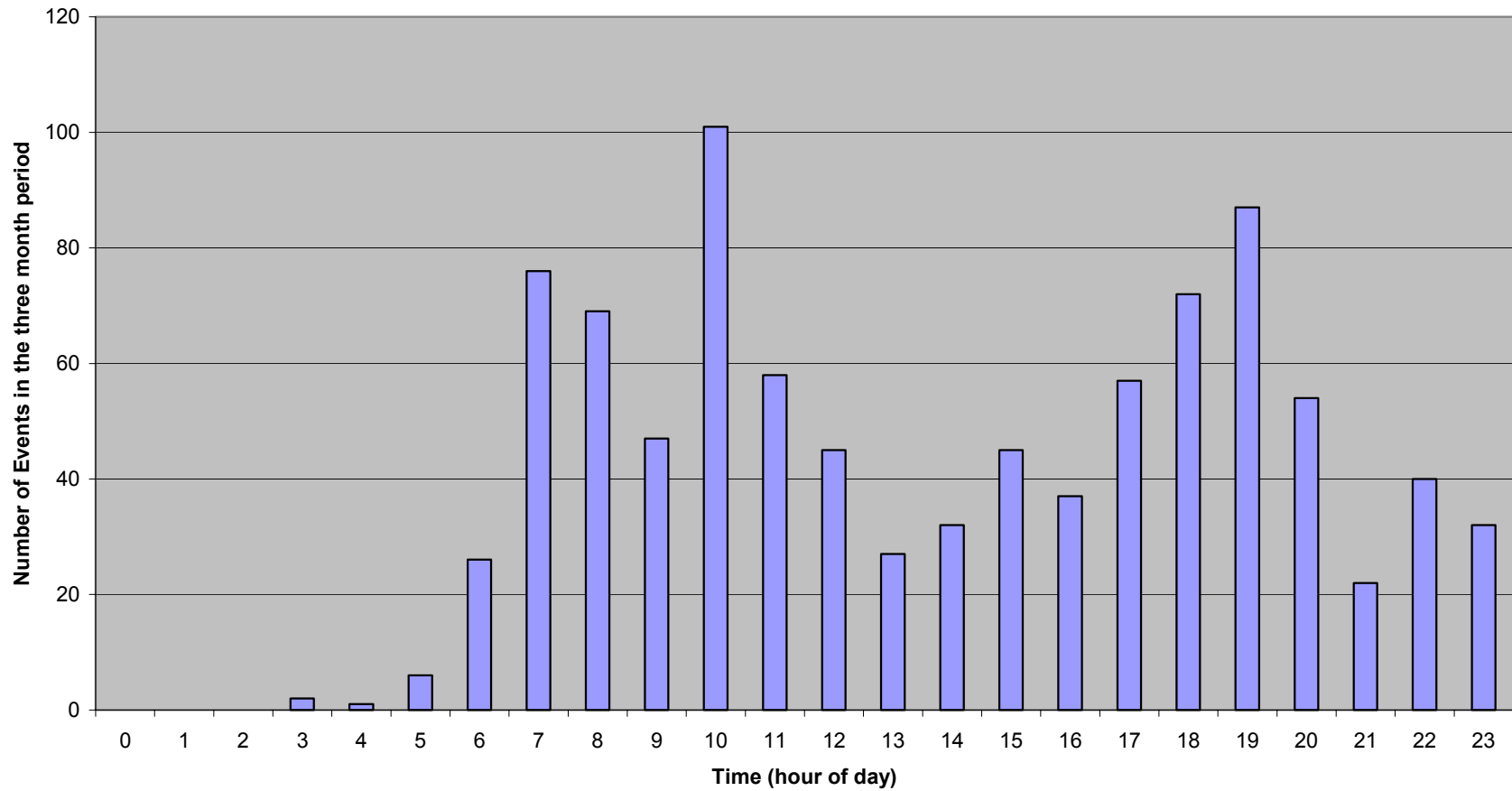


Figure 7: Statistical distribution of LASmax values for aircraft noise events at Sudbury, Suffolk, April to July 2006

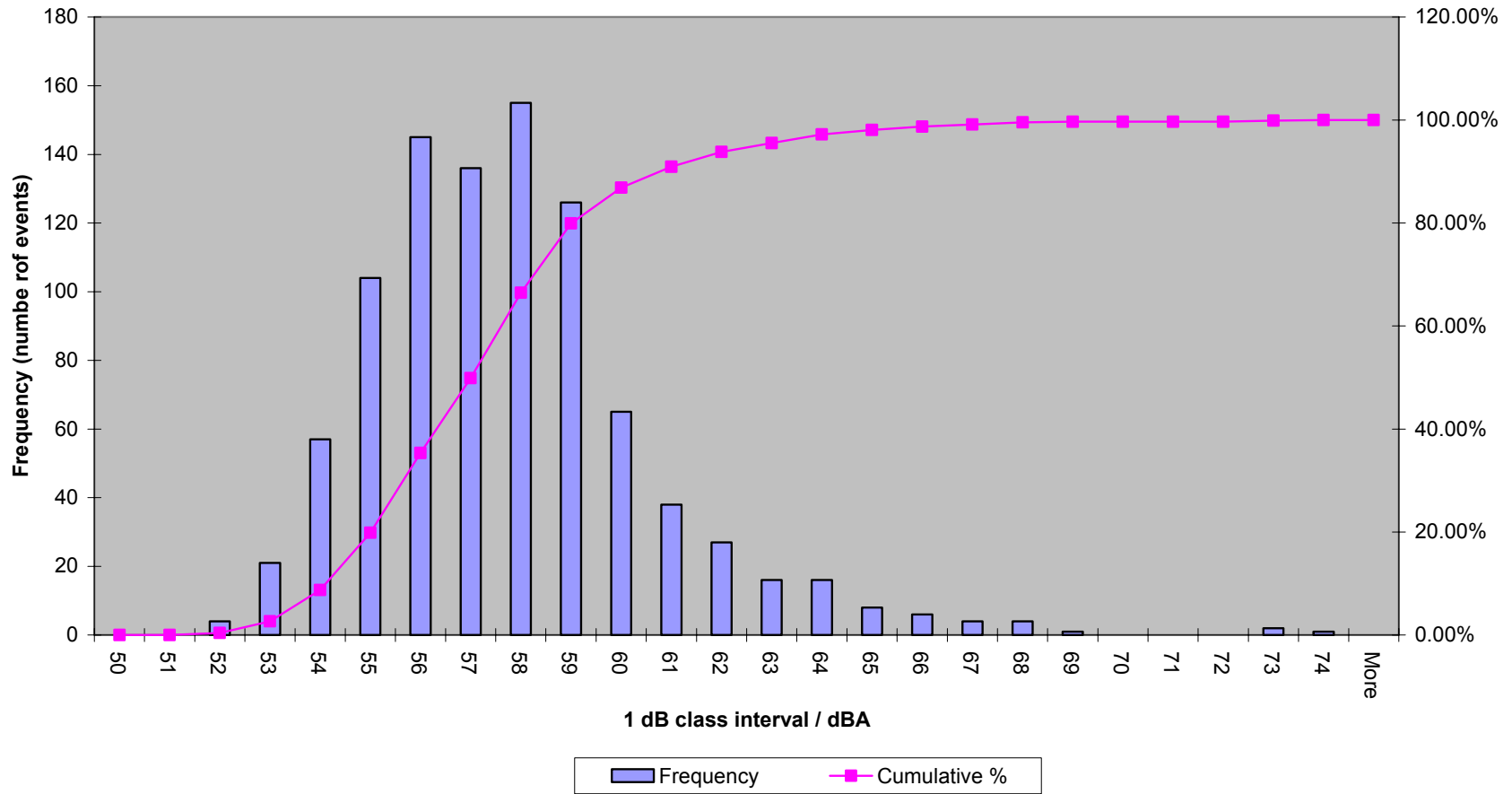


Figure 8: Daily average LASmax value of aircraft noise events during April, May, June and July 2006

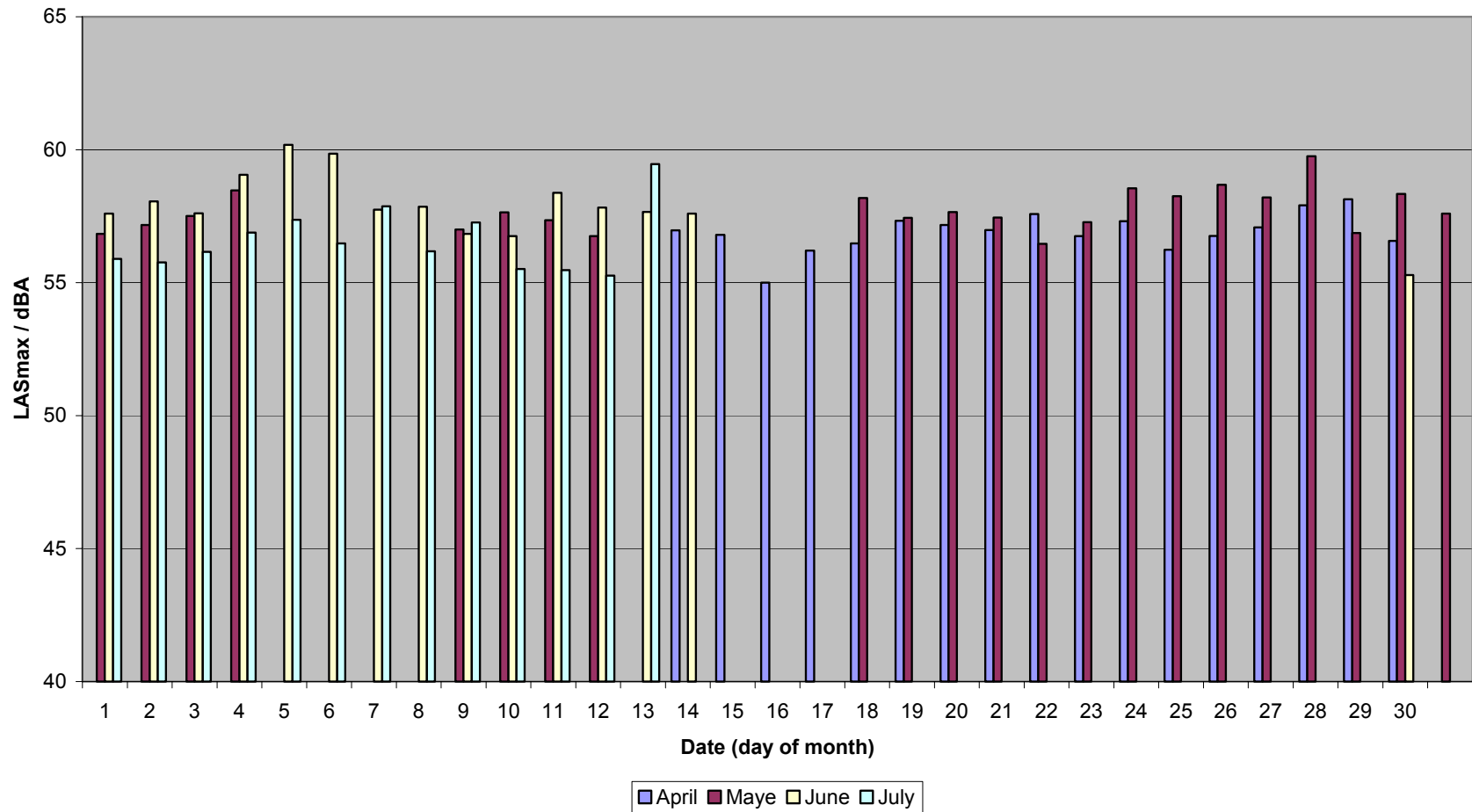


Figure 9: Comparison of daily average LASmax values of Aircraft and Community noise events at Sudbury in May 2005

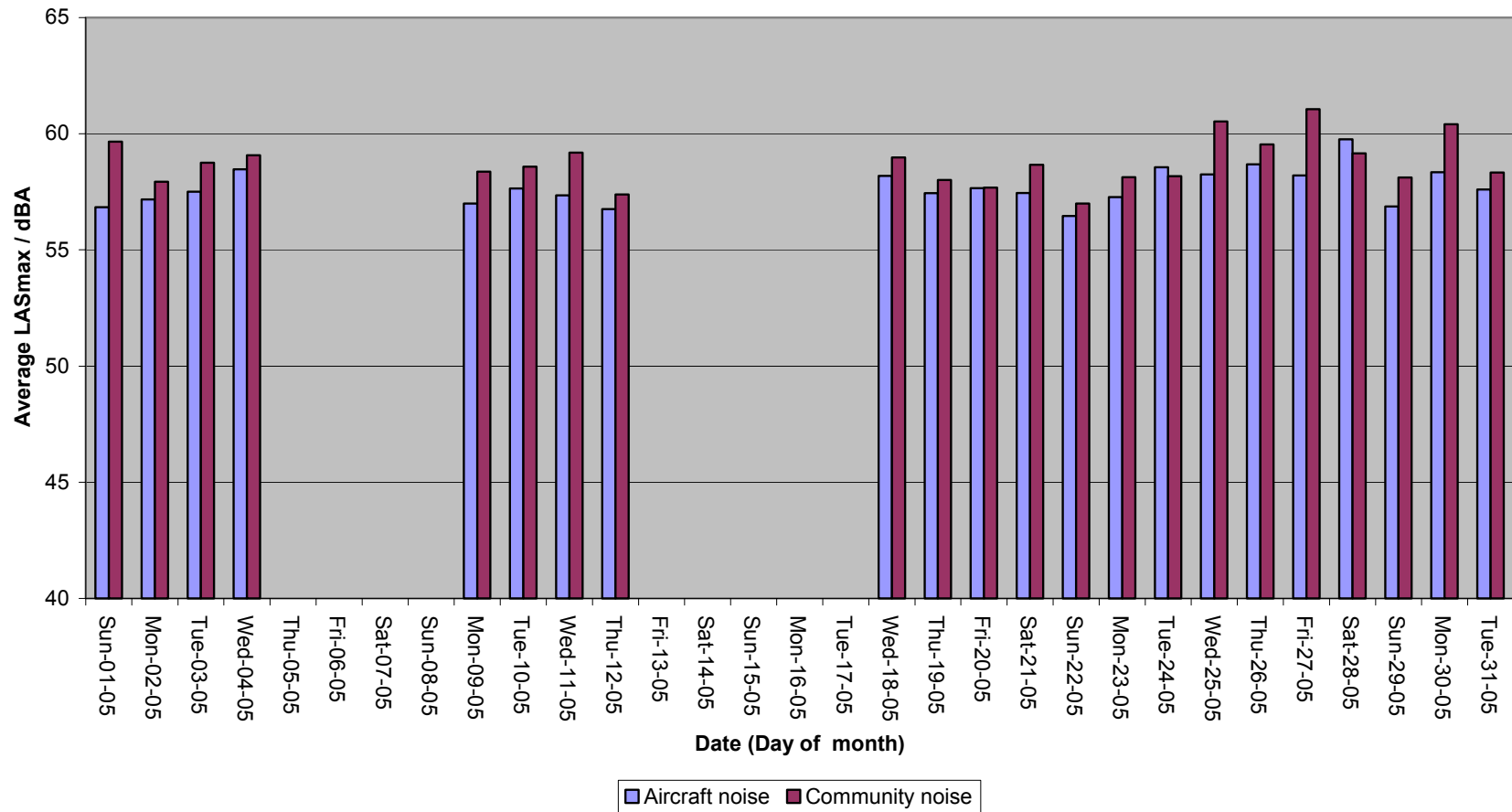


Figure 10: The Total Noise Climate - Average hourly total noise levels throughout the day at Sudbury between 14th April and 13th July 2005 (expressed in terms of LAS90, LAS99, LAS50, LAS10 and LAeq parameters)

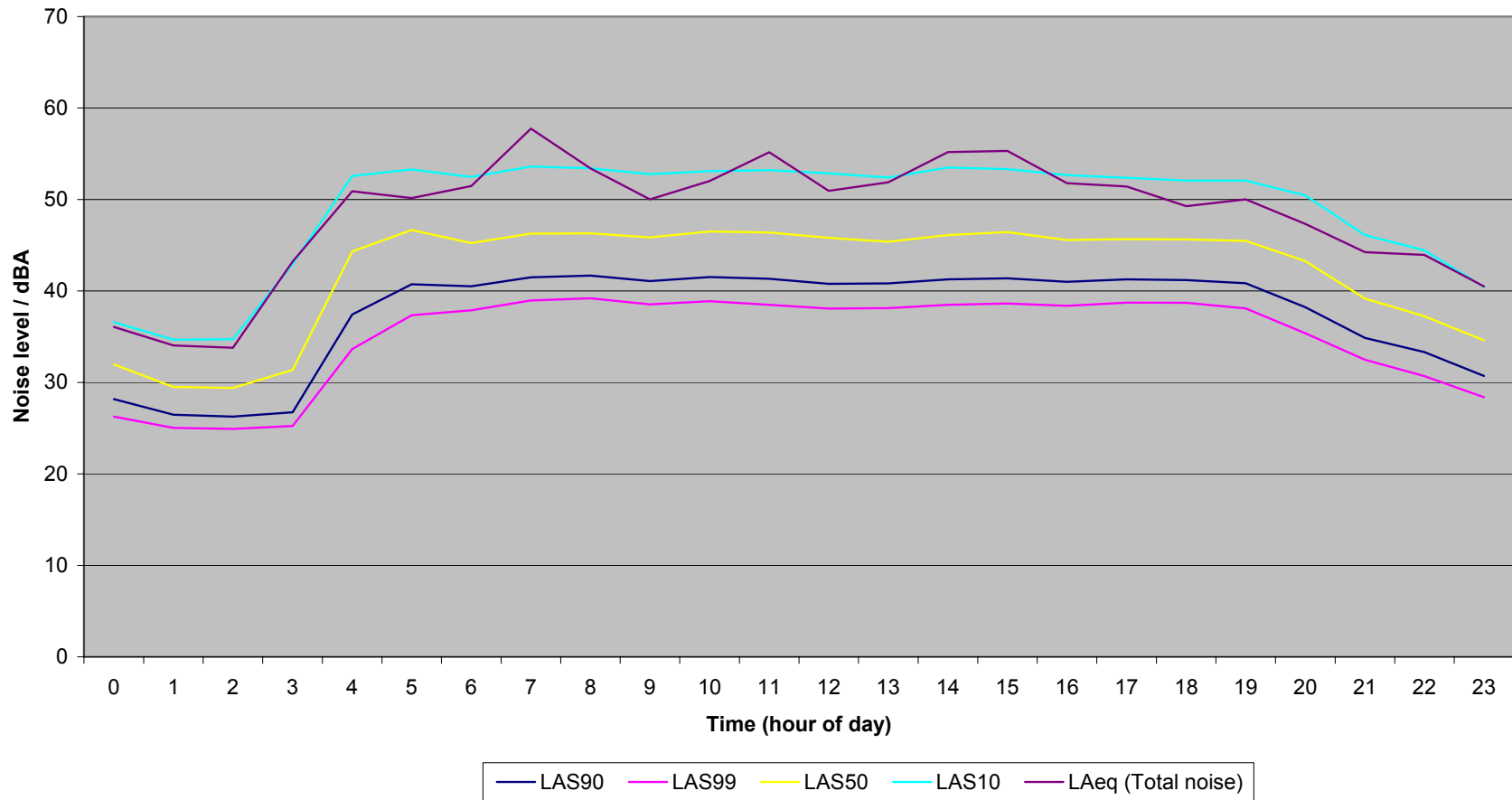


Figure 11: The contribution of Aircraft noise to the total noise climate - Comparison of daily LAeq values for Total, Aircraft and Community noise at Sudbury, from 14th April to 13th July 2005

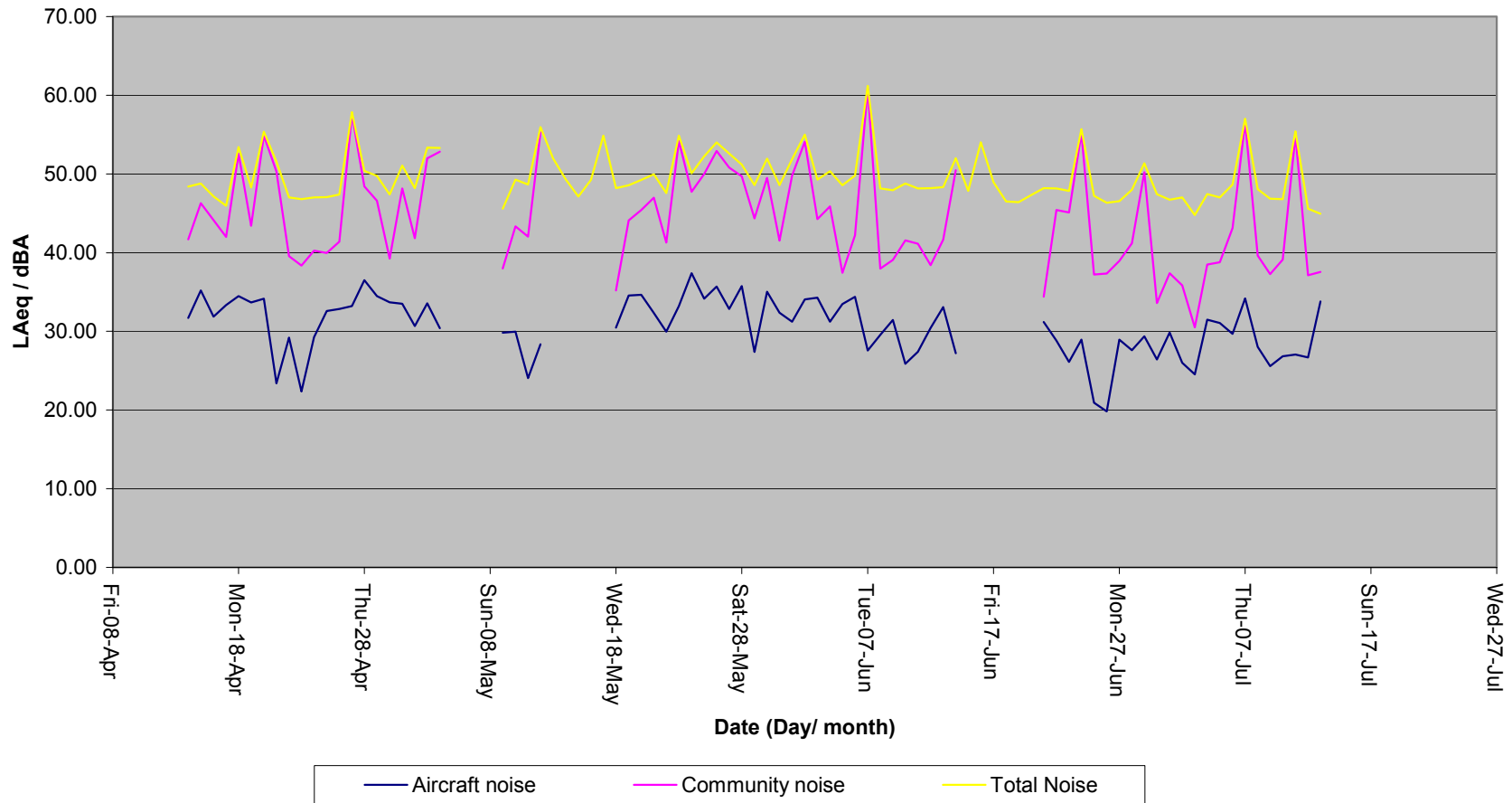


Figure 12: Distribution of Aircraft Noise Events at Sudbury from 14th April to 13th July 2005, by Aircraft type

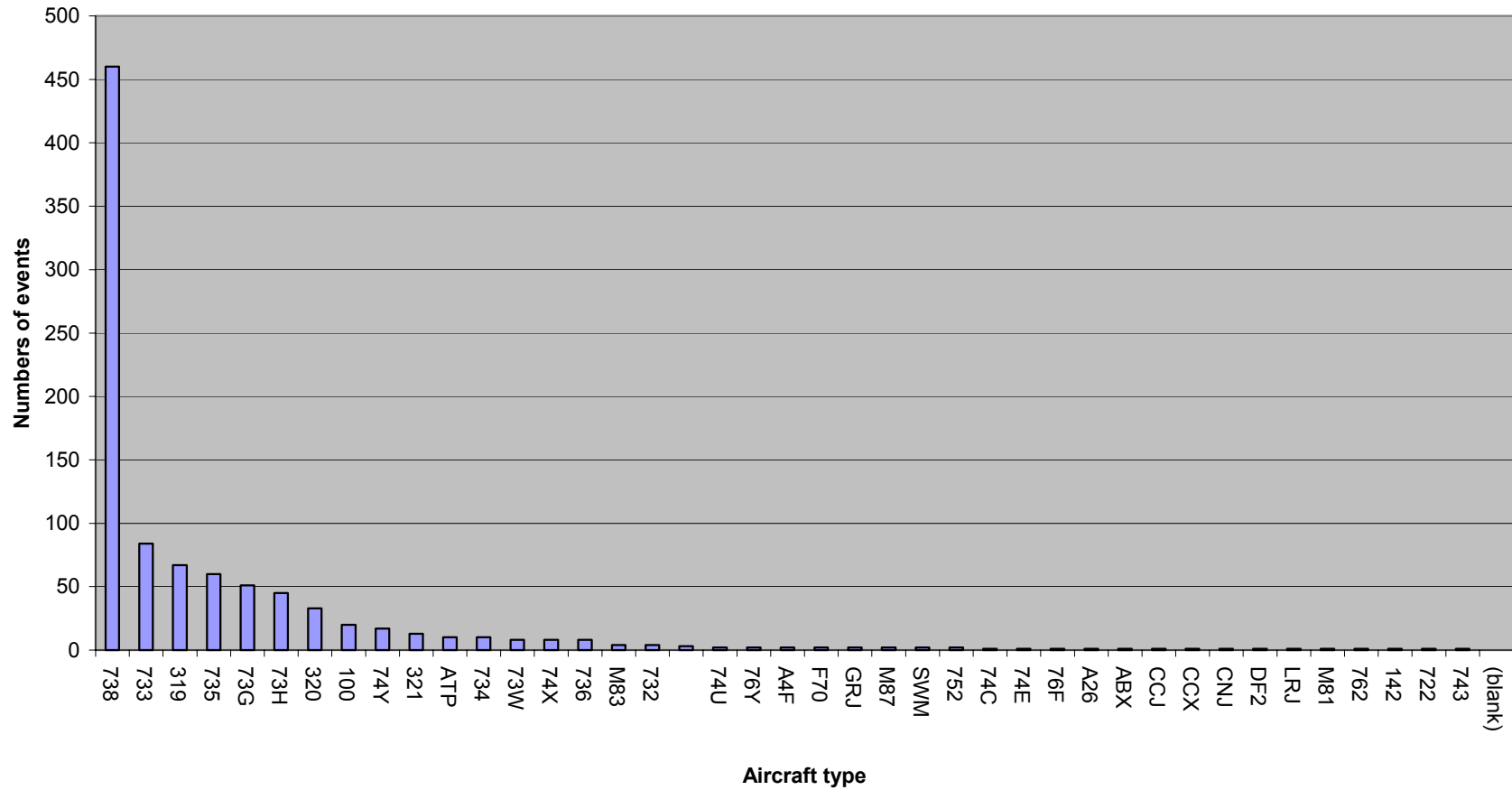
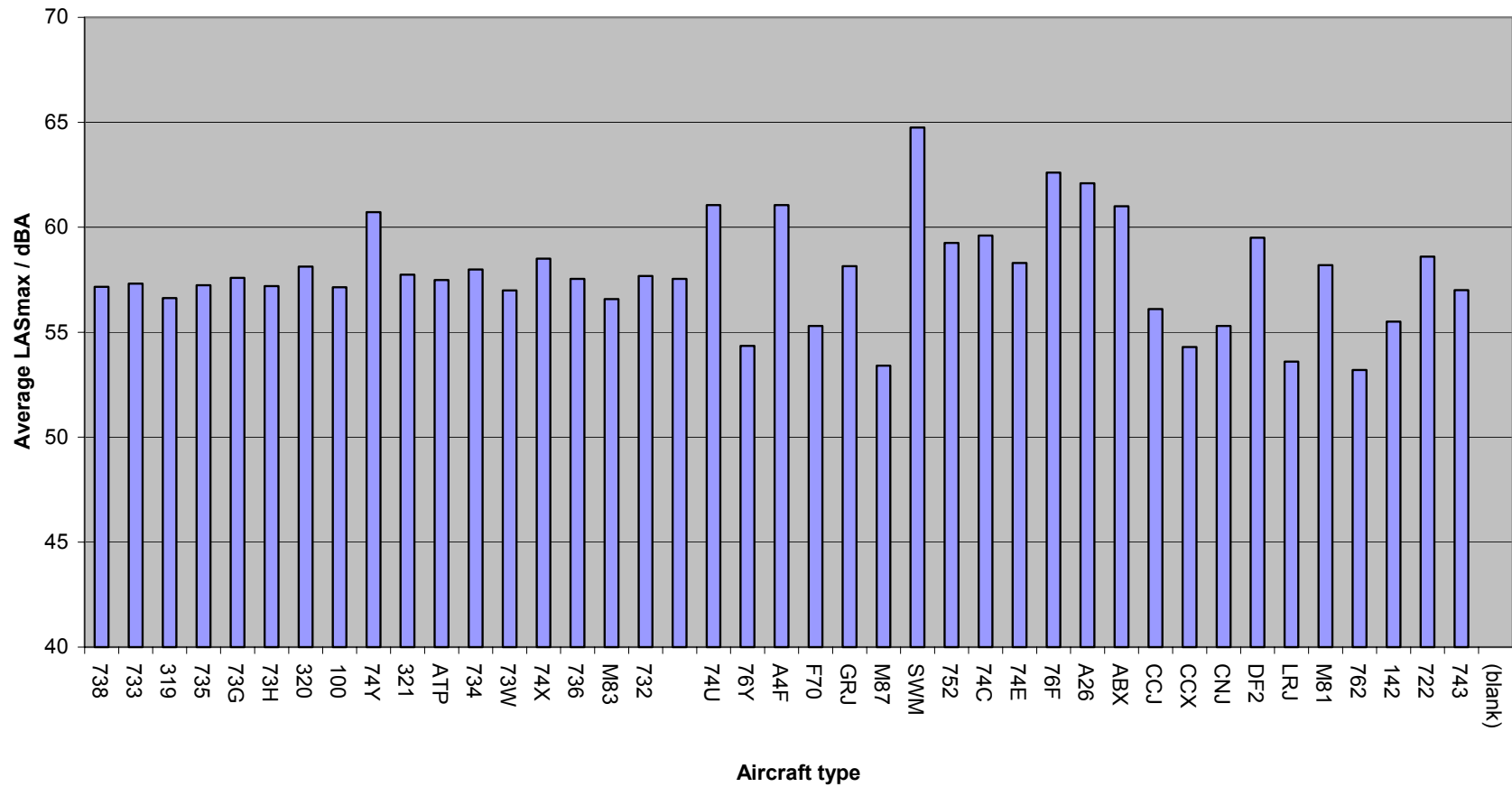


Figure 13: Variation of average LASmax value with Aircraft type for aircraft noise events at Sudbury from 14th April to 13th July 2005



APPENDIX 1

GLOSSARY OF ACOUSTIC TERMS

THE GREEN BUSINESS CENTRE
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GLOSSARY OF TERMS

This glossary is presented in two parts. The first part contains definitions relating specifically to the context of this report, followed, in the second part, by a more general glossary of acoustic terms.

Definitions relating specifically to the context of this Report:

Aircraft Noise events Noise events which have been matched by the NTK system to aircraft tracks in the vicinity of the NMT.

Aircraft noise level The average noise level derived from aircraft noise events, aggregated into hourly, daily or monthly average (LAeq) values.

Applied Acoustic Design (AAD)

Acoustic consultants retained by FEU

Average L_{ASmax} level

The arithmetic average of the L_{ASmax} values of all the events (of a particular type i.e. either aircraft noise or community noise) which occur over a particular period of time (eg hour, day or month).

Community Noise events

Those noise events which have not been matched by the NTK system to aircraft tracks in the vicinity of the NMT.

Flight Evaluation Unit (FEU)

The unit within BAA which monitors all aircraft movements to ensure compliance with Department for Transport noise regulations relating to track keeping, noise abatement and night flights, and which also provides a means of investigating and responding to complaints and enquiries from the public.

GEMS NTK System Global Environmental Management System.

The software data analysis system currently in use (since January 2000) at the airport.

Noise event A burst of noise at a high level which satisfies the noise event capture conditions for a particular NMT, i.e. which exceeds the pre-set trigger noise level (in this report 52 dBA) for a pre-set time interval (in this report 15 seconds).

Noise events are detected, captured and stored by the NMT, and following subsequent processing by the NTK system are classified in this report as either aircraft noise events or community noise events

Noise Monitoring Terminal (NMT)

The noise measurement and analysis system installed at each site consisting of a precision grade sound level meter (Larson Davis type 870) inside a weather proof and tamper proof metal cabinet connected to an outdoor microphone located at a height of approximately 3.5 m above ground level.

NTK system Noise and Track Keeping system.

A software system able to match noise events recorded by the NMTs with aircraft tracks.

Statistical frequency Analysis (of L_{ASmax} noise levels)

An analysis of a group of L_{ASmax} values giving the numbers of events (or percentages of total numbers) at different dBA levels

Total noise All noise arriving at the NMT microphone, i.e. not only including all noise events (both aircraft and community) but also all other noise which does not satisfy the trigger conditions for capture as a noise event.

Total noise level The average or continuous equivalent level (L_{Aeq}) of the total noise at the site, recorded each hour by the NMT, which may also be aggregated into daily or monthly values.

Total noise climate

The level of the total noise at the NMT microphone varies with time. Over a particular period of time e.g. one hour, this variation may be described in terms of a number of different noise indices including the average or equivalent noise level, maximum and minimum noise level values and various percentile levels.

Such a description constitutes the noise climate at the site over that period of time.

The NMT records the following total noise indices every hour:

L_{Aeq} , L_{ASmax} , L_{AS10} , L_{AS50} , L_{AS90} and L_{AS99} .

A general Glossary of acoustic Terms:

A-weighting A method of producing a single figure measure of a broad band noise (as opposed to the 8 or 9 figures which make up an octave band spectrum) which takes into account, in an approximate way at least, the frequency response of the human hearing system. The idea is that sound levels measured in this way should give an indication of the loudness of the sound.

A-weighted sound pressure level (dBA).

The value of the sound pressure level, in decibels, measured using an A-weighting electronic circuit built into the sound level meter. The vast majority of noise measurements are carried out in this way.

decibel scale

The decibel scale is the scale on which sound pressure levels are commonly measured. It is a logarithmic scale and is used for convenience to compress the audible range of sound pressures into a manageable range, from 0 dB to 140 dB. The zero of the scale, 0 dB, corresponds to the notional threshold of hearing, 0.00002 Pa, and the upper limit, 140 dB, corresponds to 20 Pa, which would cause immediate damage to the ear.

Equivalent continuous sound level ($L_{Aeq,T}$), also called the Average noise level.

The $L_{Aeq,T}$ represents a measure of the 'average' sound level over the measurement period. It corresponds to the steady continuous level of sound which, over the same period of time, T, would contain the same amount of (A-weighted) sound energy as the time varying noise.

This is the most common method of measuring time varying noise, and within certain limits gives the best correlation with human response to noise, for example with annoyance.

Frequency

The frequency of a musical note is what gives it its pitch. It is the number of cycles of the fluctuating sound pressure which occur each second, and is measured in cycles per second, Hertz (Hz). The human ear can detect frequencies in the range 20 to 20000 Hz.

Most noises are a mixture of all frequencies, called broad-band noise.

$L_{AS90,T}$

This is the most commonly used of many possible statistical measures of a time varying noise. It is the 90th percentile of the statistical noise level distribution, or, more simply, the noise level that is exceeded for 90% of the measurement time (T). Thus over one hour for example it represents the noise level which is exceeded for all but (the quietest) six minutes of that hour.

It is commonly used as a measure of the background noise in any given situation, against which the level of any new, potentially intrusive source of noise is often compared. Background noise itself often varies with time and so the $L_{A90,T}$ is almost universally used as the best measure of the 'more or less always present' noise level which underlies short term variations from other sources of noise.

Maximum sound pressure level ($L_{ASmax,T}$)

This is the highest value of the time weighted sound pressure level, (measured using the A frequency weighting and the Slow time weighting) which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the $L_{Aeq,T}$ value.

In the context of this report the L_{ASmax} value for each aircraft noise event and community noise event is monitored

Noise Unwanted sound

Octave band spectra In order investigate the frequency content of broad band sounds, called its frequency spectrum, measurements of sound pressure are carried out over a range of frequency bands. The most common method is to split the audio frequency range into 8 or 9 octave bands. An octave is a frequency range from one particular frequency to double that frequency.

Octave band measurements are not referred to in this report.

Percentile noise level, (L_{ASN} , where N is a number between 0 and 100)

The noise level which is exceeded for N% of the measurement period. For example, a value of $L_{A10,1hour}$ of 56 dBA means that in that hour the noise level was at or above 56 dBA for 6 minutes (i.e. 10% of an hour), or alternatively, was at or below 56 dBA for 54 minutes.

Sound exposure level (SEL)

This is a measure of the A-weighted sound energy used to describe single noise events such as the passing of a train or aircraft; it is the A-weighted sound pressure level which, if occurring over a period of one second, would contain the same amount of A-weighted sound energy as the event.

SEL values for events may be used to calculate the average noise level over a period of time (hour, day or month)

Sound pressure sound is a disturbance or fluctuation in air pressure, and sound pressure, measured in Pascals (Pa), is used as a measure of the

magnitude of the sound. The human ear can detect sound pressures in the range from 0.00002 Pa to 20 Pa. This is an enormously wide range and so for convenience sound pressures are commonly measured on a decibel (dB) scale.

Time varying noise

When the level of noise varies with time, as is often the case, for example with noise from road traffic, various measures or noise indices as they are called are used to give a single figure description of the noise over a given period of time. The three most commonly used noise indices are the $L_{Aeq,T}$, the $L_{A90,T}$ and the $L_{Amax,T}$ values.

In all three cases the 'L' stands for the level of the sound in decibels, the 'A' for the fact that it is the A-weighted value, and the 'T' for the time period over which the noise is measured, for example 5min, 1 hour, 24 hour etc.

Time weighting (Fast (F) and Slow (S))

An exponential function of time, of a specified time constant, that weights the square of the instantaneous sound pressure. (Defined in BS EN 61672 – 1:2003).

There are two time constants defined in BS EN 61672 – 1:2003, designated Fast (F) and Slow (S), and noise indices such as the maximum, or percentile noise levels which are based on instantaneous time-weighted sound pressure should indicate which time weighting has been used in the measurement.

In this report, in line with standard practice for aircraft noise measurement, it is the Slow (S) time weighting that has been used, hence reference is made to L_{ASmax} and to L_{AS90} .

AAD

applied
acoustic
design

APPENDIX 2

List of Aircraft identification source Codes

THE GREEN BUSINESS CENTRE
THE CAUSEWAY
STAINES
MIDDLESEX
TW18 3AL

TELEPHONE: 01784 464404
FACSIMILE: 01784 465447

List of Aircraft Identification Codes

Three digit Code	Aircraft Type
100	Fokker 100
142	BAe 146-200
319	Airbus A319
320	Airbus A320
321	Airbus A321
722	Boeing 727-200
732	Boeing 737-200
733	Boeing 737-300
734	Boeing 737-400
735	Boeing 737-500
736	Boeing 737-600
738	Boeing 737-800
73G	Boeing 737-700
73H	Boeing 737-800 (winglets)
73W	Boeing 737-700 (winglets)
743	Boeing 747-300
74C	Boeing 747-200
74E	Boeing 747-400
74U	Boeing 747-300 Freighter
74X	Boeing 747-200 Freighter
74Y	Boeing 747-400 Freighter
752	Boeing 757-200
762	Boeing 767-200
76F/76Y	Boeing 767-300 Freighter
A26	Antonov AN-26
A4F	Antonov AN-124 Freighter
ABX	Airbus A300 Freighter
ATP	BAe ATP
CCJ	Bombardier Challenger
CCX	Bombardier Global Express
CNJ	Cessna Citation
DF2	Dassault Falcon
F70	Fokker 70
GRJ	Gulfstream
LRJ	Bombardier Learjet
M81	Boeing (McDonnell Douglas) MD81
M83	Boeing (McDonnell Douglas) MD83
M87	Boeing (McDonnell Douglas) MD87
SWM	Fairchild (Swearingen) Metro