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**Assessment of noise exposure to various
persons working at T in the Park**

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EXECUTIVE SUMMARY

Objectives

A campaign focussed on the noise exposure of individuals working at live music events is currently being taken forward by the local authorities in Scotland. 'T in the Park' gives the opportunity for gathering data on noise exposure at a very large music festival. Noise levels were recorded around the site and used to assess typical noise exposures of various employees in a range of disciplines, working at the festival.

Main Findings

The calculated daily personal exposures $L_{EP,d}$ ranged from 95 dB(A) to 108 dB(A).

The A-weighted L_{eq} where people could have been working ranged from 79 dB(A) to 111 dB(A).

The use of hearing protection and noise control was inadequate.

Recommendations

The risk due to the noise needs to be considered and control measures need to be taken. Exposure needs to be reduced by means other than hearing protection. Where a risk still remains the correct fitting and use of ear protection needs to be enforced.

1 INTRODUCTION

The work undertaken at 'T in the Park' 2006 supports a campaign focussing on the control of noise exposure for individuals working at live music events. The campaign forms part of an initiative being taken forward in Scotland by the local authorities that is concerned with one of the HSE priority topics for the local authority enforced sector. 'T in the Park' gives the opportunity for gathering data on noise exposure at a very large music festival that can then be subsequently utilised at future interventions with similar events.

The music and entertainment sector is currently working under the *Noise at Work Regulations 1989* [1]. These regulations give a Daily Exposure 1st Action Level of 85dB(A) and a Daily Exposure 2nd Action Level of 90dB(A). Hearing protection is voluntary above the 1st Action Level and mandatory above the 2nd Action Level. There is also a Peak Action Level of 140dB where hearing protection is mandatory.

On 6th April 2008 the music and entertainment sector will have to comply with the *Control of Noise at Work Regulations 2005* [2]. These regulations specify a Lower Action Value, an Upper Action Value and a Limit Value for Daily Exposure and Peak Exposure. For Daily Exposure the values are 80dB(A), 85dB(A) and 87dB(A) respectively, and for Peak Exposure the values are 135dB(C), 137dB(C) and 140dB(C) respectively. Hearing protection is voluntary above the Lower Action Value and is mandatory above the Upper Action Value.

In both regulations, hearing protection is a last resort when a risk still remains after control. Control is outlined in the guidance [3] and examples relevant to this event include:

- Separating noisy and quiet areas
- Providing quiet areas for people to work
- Locating food facilities away from speakers.

2 MEASUREMENTS

Noise dosimetry was carried out at 'T in the Park' 2006 on 08/07/2006 between 1530 and 2215 as agreed with the local authority officer. The dosimetry was based on five doseimeters, three of which were permanently fixed on the same people. The other two doseimeters were attached to various willing volunteers for shorter periods of time, in order to assess their individual exposure whilst working at the event.

The three permanently fixed doseimeters were attached to Richard Heaton and Paul Pitts of the Noise and Vibration section at HSL and Greg Scott from Perth and Kinross Council. The individuals kept a record of their location on the site, as they were moving around the different stages and tented venues. Richard Heaton and Paul Pitts had the other two meters to attach to willing volunteers. It was found throughout the day that it was easier for us to stand next to the volunteer rather than attaching a meter to them, in order to assess their exposure.

To assess the volunteer's daily personal noise exposure ($L_{EP,d}$) a measure of the equivalent unobstructed A-weighted levels generated by the noise source was required as well as information on hours of work etc.

For the latter part, a series of notes were taken about each volunteer:

1. Start time of the doseimeter for that particular exposure
2. The job of the volunteer
3. Their location on the plan of the site
4. Who they work for
5. How long they work for
6. Where they go on their break
7. Are they wearing ear protection
8. The main noise source
9. Any noise controls in place
10. The end time of the doseimeter for that exposure
11. The number of meter the exposure was recorded on

The measurement period that the daily personal exposures were based on ranged from 15 minutes to 1 hour.

3 RESULTS

In order to calculate the daily exposures the time history spectra from the three permanently fixed dosimeters were first broken down into individual time periods using the times noted down for each volunteer.

The workers' daily personal noise exposures were based on the equivalent unobstructed field levels during these individual periods along with the notes taken for each worker. These results are contained in Table 1.

When not enough information was known in order to calculate daily exposures or when volunteers' exposures were not being recorded, the field levels were used to show average noise levels around the venue. These results are contained in Table 2.

A map of the site showing the locations of the workers in Table 1 and the noise levels in Table 2 is shown in Figure 1.

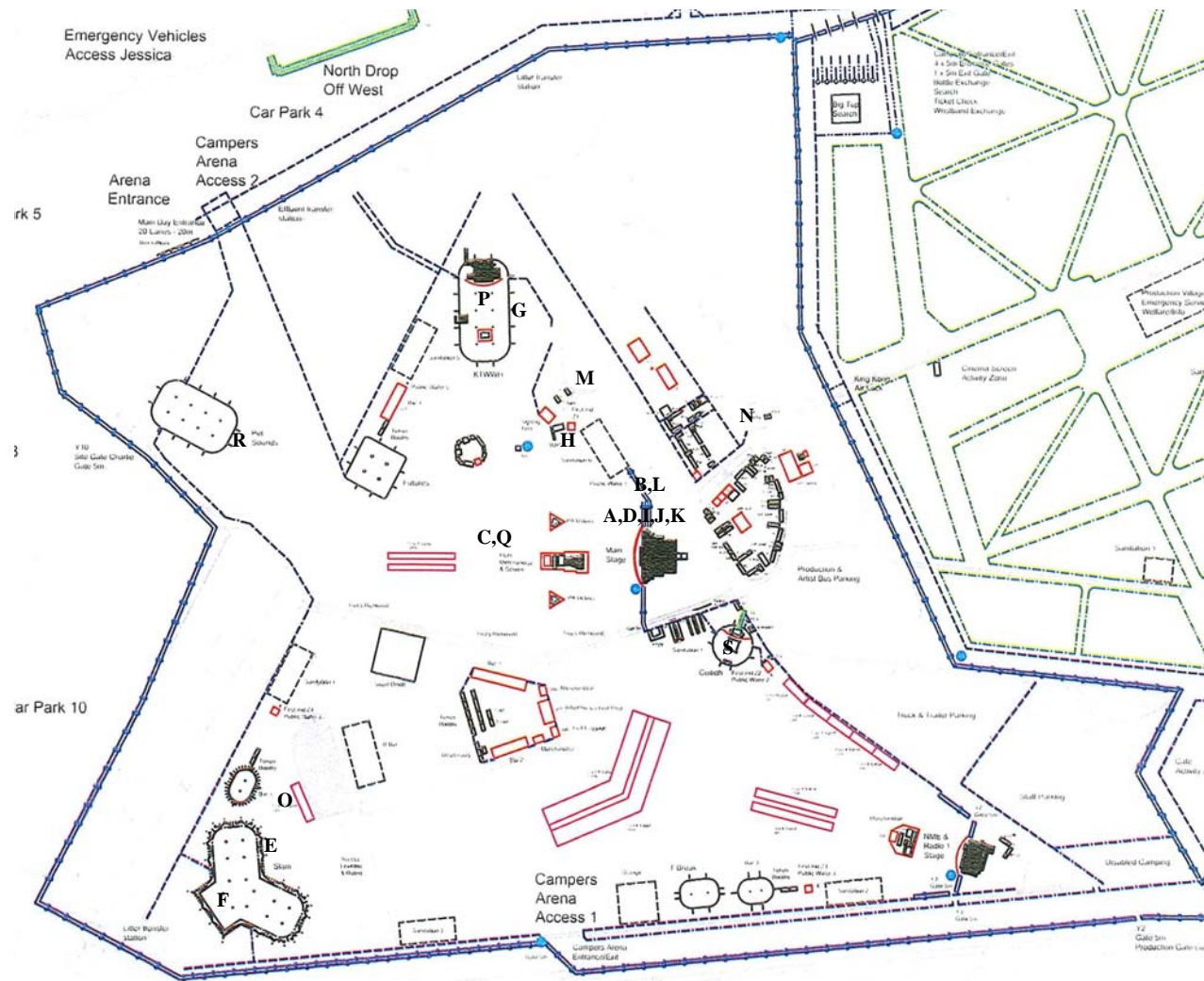


Figure 1 – A map of the site showing the locations of the workers in Table 1 and the general levels in Table 2

Table 1: Estimates of daily personal noise exposure $L_{EP,d}$ of various persons working at the festival

Job	Employed by	Work Pattern	Breaks	Location		Ear protection	L_{eq}	$L_{EP,d}$
Paramedic	NHS	1pm-9pm	1 hour	Side of main stage	A	Muffs	101	100
First Aider	St. Andrews Ambulance Association	9.30am-11pm	1.5 hours	Side of main stage in tent	B	Muffs if goes outside	95	97
Food Service	Café's to Go?	8am-Midnight	1.75 hours	Close to PA delays of main stage	C	None	97	100
Gate Security	Rock Steady	7.30am-8pm	0.5 hours	Right hand side of main stage	D	None	99	101
Door Security	Rock Steady	8.30am-Midnight	10 mins	Door of Slam tent	E	None	96	99
Stage Security	Rock Steady	10am-Midnight	2 hours	Front of Slam tent stage	F	Plugs	107	108
Door Security	Rock Steady	10am-Midnight	2 hours	Door of King Tut tent	G	None	102	103
Gate Security	Rock Steady	10am-Midnight	2 hours	Wheel chair area for main stage	H	None	94	95

Table 2: Equivalent unobstructed A-weighted L_{eq} at various locations around the site

Location		L_{eq}
Side of main stage (1640)	I	97
Side of main stage (1750)	J	103
Side of main stage (2145)	K	98
First aid tent by main stage	L	82
Council cabin	M	82
Staff canteen	N	79
Food service opposite Slam tent	O	83
Front of stage in King Tut tent	P	105
Merchandise area	Q	89
Entrance to Pet Sounds tent	R	90
Ceilidh tent	S	111

4 OBSERVATIONS

Whilst walking around the venue a number of issues were observed by Richard Heaton and Paul Pitts, mainly concerned with ear protection and noise control:

1. Earplugs were supplied to the Rock Steady security staff. No training on the use was provided and protection did not appear to be fitted correctly. Earplugs will give good protection when fitted properly – this involves gently pulling the outer ear back to straighten the ear canal, otherwise only a small section of the plug is in the canal and the plugs provide little or no protection.
2. In many cases the security staff for the main stages were standing directly in front of the bass speakers, about 1m away.
3. The daily exposures were very long with only a small number of brief breaks – particularly the Slam tent where music appeared to be continuous. Other stages had periods where bands were swapping over, providing respite for staff.
4. A few of the front of stage security staff were choosing not to wear any hearing protection when the risk was clearly very high.
5. Many of the food vans for the main stage were pointing directly towards the stage and had been positioned very close to the PA delays. Ear protection had not been considered.
6. There was no real refuge from the noise on the main site. For example, the noise level in the council cabin was greater than 80 dB(A) and in the staff canteen was around 79 dB(A). Although the latter was located away from the main venues it was a very reverberant building.

5 CONCLUSIONS AND DISCUSSION

The $L_{EP,d}$ estimated from the average L_{eq} and from the work pattern information obtained from the individuals ranged from 95 dB(A) to 108 dB(A). The levels reported here are all significantly higher than the 2nd Action Level of 90 dB(A) according to the *Noise at Work Regulations 1989*. Above the 2nd Action Level hearing protection is mandatory and in all but three cases this was not being worn.

There was little or no evidence of noise controls in place.

The general noise levels ranged from 79 dB(A) to 111 dB(A) around the visited areas of the site where people could have been working.

6 APPENDIX

Measurement Equipment

CEL 360 logging noise dosimeters, serial numbers 3/026936, 3/026937 and 3/026938

Manufacturer's calibration March 2006

Meter conformance to IEC 60804 Type 2, IEC 60651 Type 2 and IEC 1252

CEL 460 logging noise dosimeters, serial numbers 0691603 and 0691607

Calibration by HSL, Noise and Vibration Section March 2006

Meter conformance to IEC 60804 Type 2, IEC 60651 Type 2 and IEC 1252

CEL 110 acoustic calibrator, serial number 026392

Calibrator conformance to IEC 60942 Class 2C

7 REFERENCES

- [1] **Noise at Work Regulations 1989** Statutory Instrument 1989 No. 1790 – Health and Safety Regulations 1989.
- [2] **Control of Noise at Work Regulations 2005** Statutory Instrument 2005 No. 1643 – Health and Safety.
- [3] **Controlling Noise at Work** – The Control of Noise at Work Regulations 2005 – Health and Safety Executive guidance on regulations. HSE books. ISBN 0 7176 6164 4.