

Assessment of Noise from All Weather Sports Pitches

Charley Woodman

**Senior Environmental Health Officer
Dudley Metropolitan Borough Council
charley.woodman@dudley.gov.uk**

Introduction

- IOA Diploma project looking at the impact, assessment and control of noise from all weather sports pitches (AWPs)
- Different approach criteria and methods of assessment currently in use
- Primary data and secondary data from noise impact assessments (NIAs)
- Identified and further investigated issues of the character of noise from AWPs

Current Methods of Assessment and Values Used



Measurement Methods

- 13 NIAs reviewed, 2008-2016
- Commonly measurements made at 10 metres, varying reference time periods 10-65 minutes
- 8 out of 13 assessments reported on $L_{AF,max}$ and $L_{Aeq,T}$ values
- 5 out of 13 assessment reported on $L_{Aeq,T}$ values only

Methods of Assessment

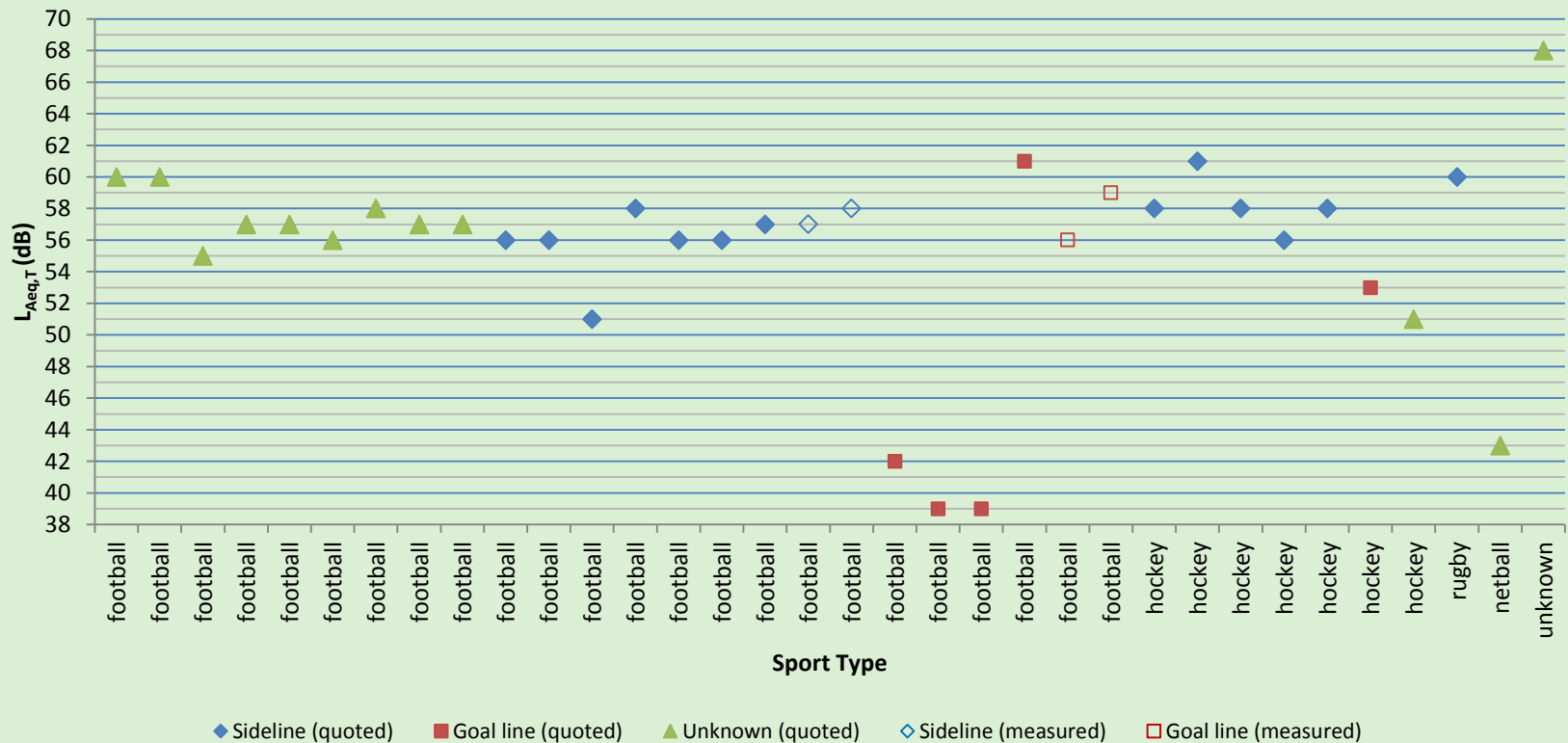
- Assessment methods for $L_{Aeq,T}$ values
 - WHO Guidelines – $L_{Aeq,T}$ 50/55 dB outdoor amenity areas
 - IEMA / IOA – resultant change noise levels
 - PPG 24 – resultant change noise levels
 - BS 8233: 2014 – $L_{Aeq,T}$ 40 dB habitable rooms
 - BS 4142: 1997
- Assessment methods for $L_{AF,max}$ values
 - Comparison of predicted with measured values
 - WHO Guidelines – $L_{AF,max}$ 45 dB indoors, night time
 - 5 dB correction to absolute levels for character
 - Subjective assessment of character

Typical Noise Levels

- Primary and secondary data collated
- All weather sports pitches
- Range of sports activities
- Sideline and goal line measurement positions
- Typical $L_{Aeq,T} = 58$ dB (Sport England, 2015)

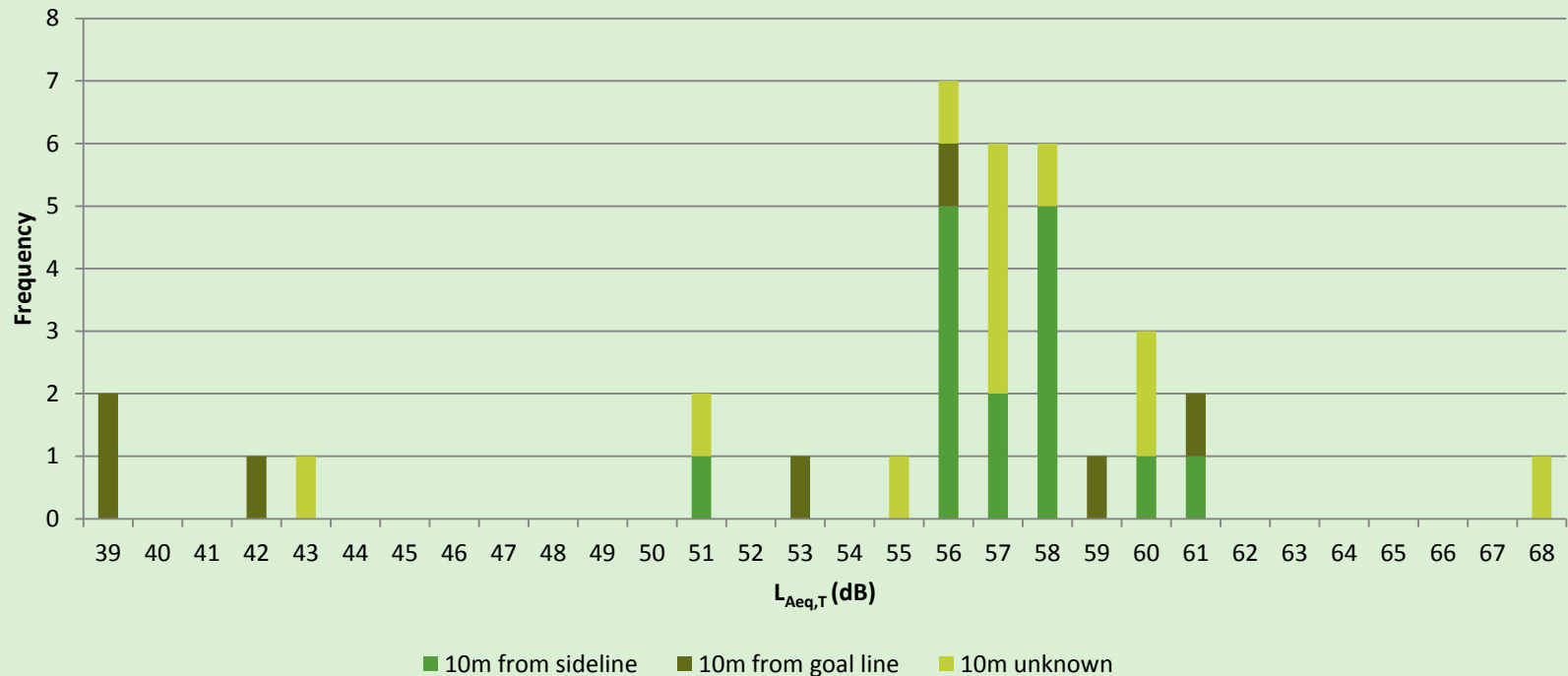
Typical Noise Levels

Graph presenting measured and quoted $L_{Aeq,T}$ values from sports activities on all weather sports pitches, at varying monitoring positions.



Typical Noise Levels

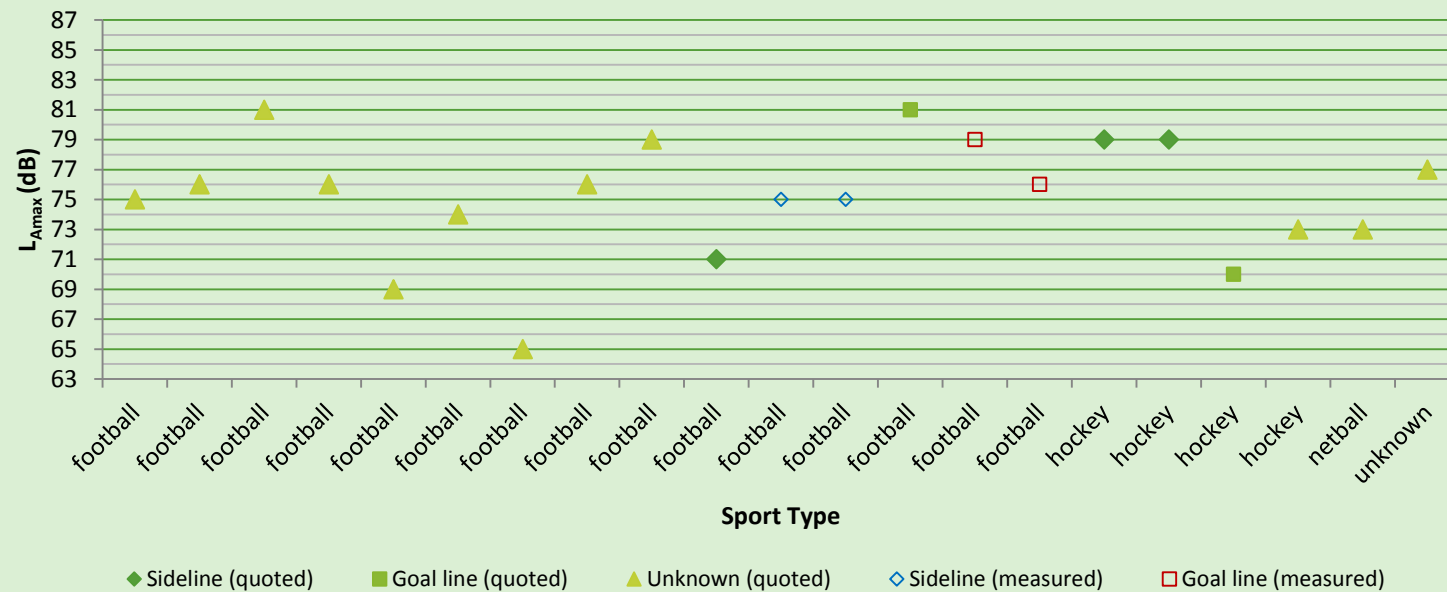
Graph presenting frequency of measured and quoted $L_{Aeq,T}$ values of noise from all weather sports pitches at varying monitoring positions.



•Validation of 58 dB $L_{Aeq,T}$ (free field, 10 m halfway sideline)

L_{AFmax} Descriptor and Typical Noise Levels

Graph presenting average measured and quoted L_{AFmax} values from sports activities on all weather sports pitches, at varying monitoring positions



Characteristics of Noise from AWP's

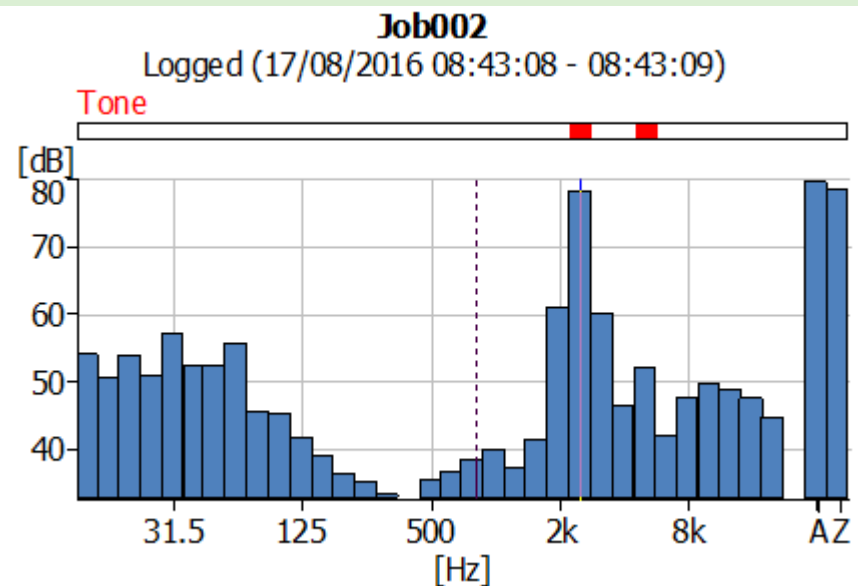
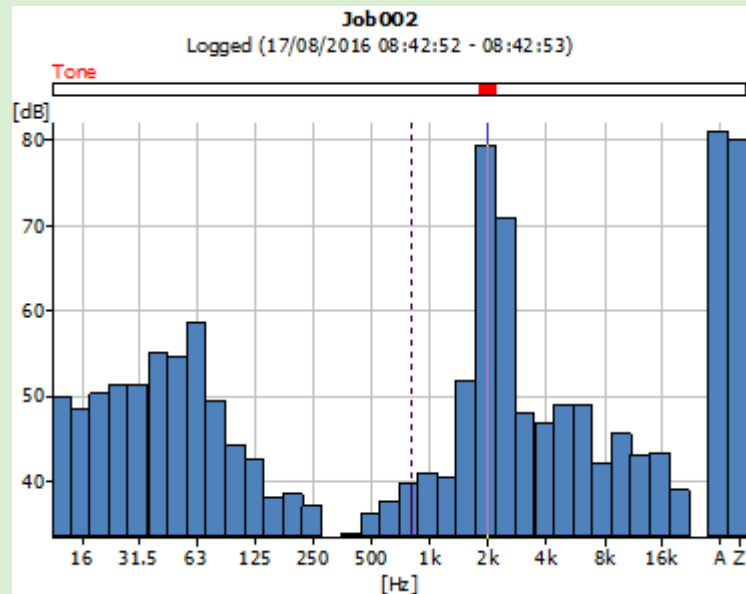


Character of Noise from AWP's

- Number high L_{AFmax} events (average every 2 – 6 minutes*)
- L_{AFmax} events occurred regularly throughout sports activity
- Subjectively ball impacts distinctive and clearly notable
- Known cause of complaint and planning disputes (shouting, foul language, ball impacts and whistles)
- Tonality – referee whistles
- Impulsivity – ball impacts
- Standards which proposed correction for impulsive character
 - BS 4142: 2014 3–9 dB impulsivity
 - BS 4142: 2014 3 dB intermittency
 - ISO 1996-1 (2003) 5 dB regular impulsive sounds

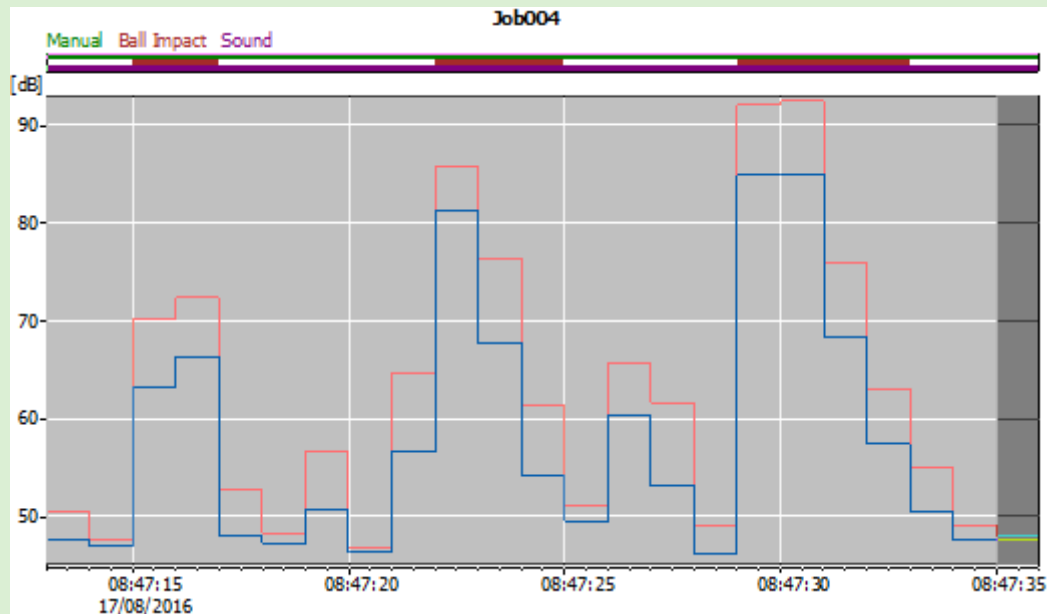
Tonality of Whistles

- Tonality of Referee Whistles
 - ISO 1996-2 (2007) & BS 4142: 2014
 - Subjectively not considered tonal



Impulsivity of Ball Impacts

- Impulsivity of Ball Impacts
 - Irish EPA 2006: ≥ 10 dB difference in L_{AFmax} and $L_{Aeq,T}$



- $L_{Aeq,1s}$ (blue) and $L_{AFmax,1s}$ (red) levels recorded during three instances of a football impacting the perimeter fence of the pitch when kicked from a distance of 10 m. $L_{Aeq,1s}$ levels; 63, 81 and 85 dB respectively with corresponding L_{AFmax} levels; 70, 86 and 92 dB.

Impulsivity of Ball Impacts

- Impulsivity of Ball Impacts
 - Overall change in sound level (BS 4142: 2014)
- Recorded $L_{Aeq,1s}$ levels prior to and upon ball impact and the difference in levels.

Time	Ball Impact / No Impact	$L_{Aeq,1s}$ (dB)
10:22:03	No Impact	53
10:22:04	Ball Impact	70
Difference		+17
10:28:15	No Impact	52
10:28:16	Ball Impact	69
Difference		+17
10:36:40	No Impact	50
10:36:41	Ball Impact	64
Difference		+14
14:31:29	No Impact	49
14:31:30	Ball Impact	69
Difference		+20
15:09:57	No Impact	51
15:09:58	Ball Impact	66
Difference		+15
18:41:09	No Impact	57
18:41:10	Ball Impact	82
Difference		+25
18:52:56	No Impact	63
18:52:57	Ball Impact	87
Difference		+14

Conclusions and Proposals



Conclusion & Proposals

- Further validation of 58 dB L_{Aeq} as typical noise level at 10 metres, as presented in Sports England guidance
- Less consistency in L_{AFmax} levels, could a typical a typical level of 79 dB L_{AFmax} be proposed to assist with prediction of noise impacts?
- Some commonality in assessment criteria - WHO guideline values for outdoor amenity space and IEMA Noise Assessment Guidelines
- Characteristics of noise from AWP's; should corrections r another be applied to account for the character of noise from AWP's?