

Summary of Extreme Noise Levels Recorded at the Newcastle 500 Motor Race.

Sound level data loggers were provided by two specialist acoustic firms. These were placed inside and outside several representative trackside properties on Zaara St and Scott St for the duration of racing. These figures were supported by 94 attended measurements taken at multiple locations over the three days. The attended measurements were used to validate computer noise modelling predictions of sound levels, as well as to measure average, maximum and peak levels at various locations around the circuit. All measurements were conducted with calibrated Type-1 integrating meters by a chartered professional engineer with 24 years of acoustics experience.

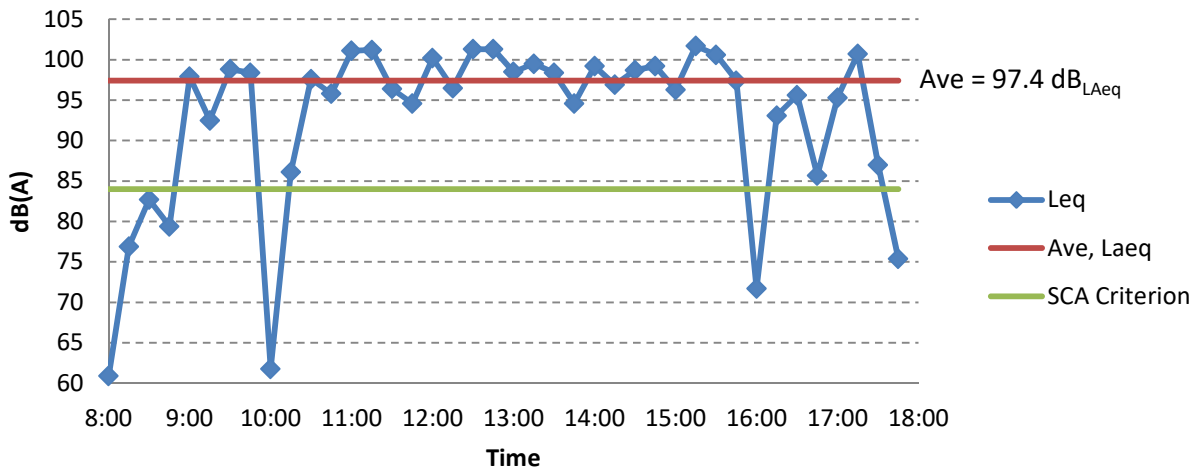
Average continuous sound pressure levels (referred to as the $L_{A,eq}$) within 4 m of the track ranged from 106 to 115 dB (A) at most locations during racing. The maximum recorded sound pressure level track-side was 127 dB(A). These exposure levels would have been experienced by the majority of track-side spectators. These differ from the waveform peak levels explained below.

The OH&S (WorkSafe) Act is based on an exposure to unprotected ears of 85 dB(A) L_{eq} for 8 continuous hours. The sound levels recorded during the race would allow for exposure of less than 1½ minutes to the unprotected ear. Note that the $L_{A,eq}$ levels above (106 to 115 dB (A)) were continuous and without interruption for between 15 minutes to more than 2 hours on Saturday and Sunday. The cumulative duration of high noise exposure events exceeded 5 hours on each day. This is up to 187 times the allowable exposure under the WorkSafe Act. Supercars adjusted this criterion to 84 dBL_{Aeq(10 hour)} to account for the longer potential exposure period of 10 hours. This figure was used for their assessment of sound level exposure risk.

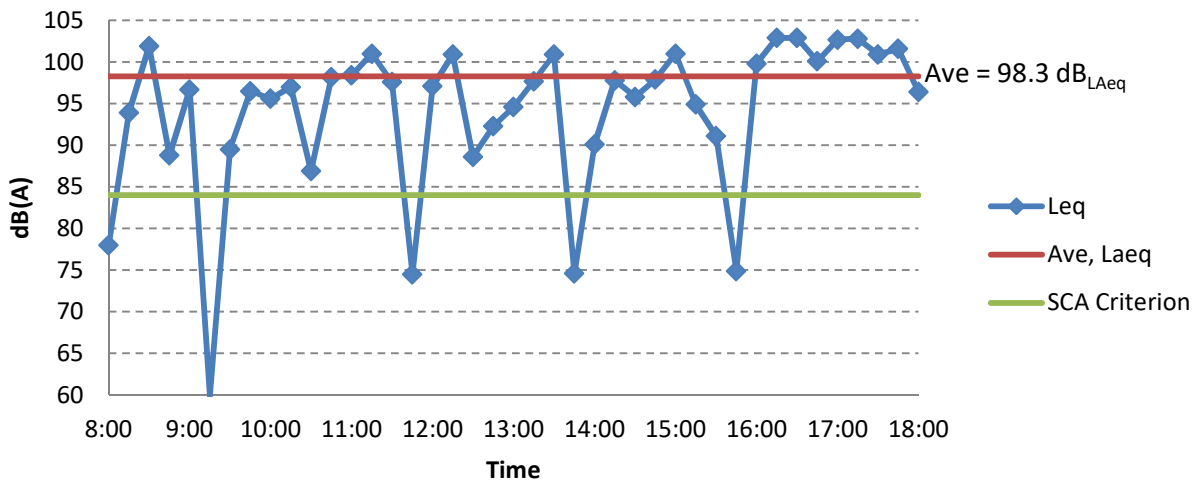
Supercars also conducted predictive computer noise modelling to determine the impact from event noise emissions to the Newcastle East community. However, their 'Noise Management Plan' did not provide any specific modelling results, noting only that the assessment criterion 'may be exceeded outside buildings facing the circuit' and 'inside 31 internal dwellings by between 1 and 4 dB'. Their 'Noise Management Plan' assumed that certain noise mitigation strategies would also be in place (including noise curtains), and that these measures would remain effective for the event duration. To date, Supercars has refused to release either their report or specific noise model results.

The following graphs indicate the range of sound levels occurring over the 3 days of the Newcastle 500 event. This sound level logger was placed outside a building, approximately 8 m from the circuit, with partial shielding from Supercars' noise curtains and is considered representative of the majority of track-side spectators or residents directly exposed to racing event noise. The graphs also compare the average $L_{Aeq,10hr}$ recorded for the day and the Supercars (SCA) criterion (84 dBL_{Aeq(10 hour)}) for an equivalent comparison.

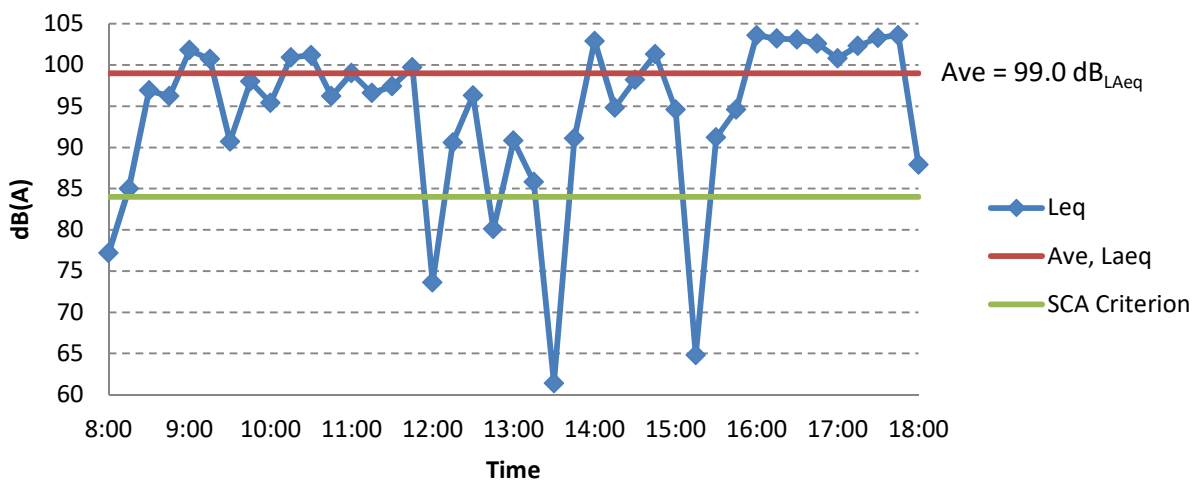
Typical dB(A)Leq Sound Levels, Scott St, 8m From Circuit - Friday 24th November 2017



Typical dB(A)Leq Sound Levels, Scott St, 8m From Circuit - Saturday 25th November 2017



Typical dB(A)Leq Sound Levels, Scott St, 8m From Circuit - Sunday 26th November 2017



Very few people, including children, were observed to be wearing any form of hearing protection. This was irrespective of their proximity to the racing circuit. During the final 2 hour race on Saturday, the following observations were made of 1908 individuals observed within 2m of the circuit,

1558 adults counted;

1443 had no hearing protection - 92%

125 had hearing protection - 8%

282 children counted (roughly 2 - 12 year olds, visually determined – pre-puberty);

212 had no hearing protection - 75%

70 had hearing protection - 25%

15 Infants and babies counted (roughly less than 2 years old);

13 had no protection - 87%

2 had hearing protection - 13%

53 workers/volunteers, including police counted;

37 had no hearing protection - 70%

16 had hearing protection - 30%

This indicates that overall, almost 90% of observed individuals were exposed to extreme levels of noise known to cause permanent hearing loss. If the supercars' attendance figures are correct "*official three-day crowd of 192,242 in Newcastle*", this exposes over 57,000 people each day to extreme and harmful levels of noise.

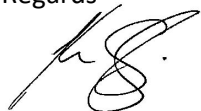
Irrespective of actual attendance figures, many thousands of people were exposed to noise levels that exceed globally accepted safe limits. This included patrons, volunteers, emergency services staff, employees and customers. According to Supercars, 6364 children under 12, and 3429 students attended the race.

Significant published medical evidence confirms that permanent hearing damage occurs from long term and repeated exposure to excessive levels of noise, as well as to single extreme noise level events. Noise-induced hearing loss is irreversible, prevention is the most effective strategy.

The WorkSafe assessment criteria also includes L_{cPeak} , or waveform peak. This is the short-term very high level impact noise caused by events such as gunshots, or in motor racing, exhaust backfires which occur during gear changes. As well as sustained exposure to very high continuous sound levels (L_{Aeq}), these short-term events also contribute directly to permanent damage and immediate hearing loss. The Act allows for one exceedance of this criterion every 8 hours. Measured levels were typically 135 dB L_{cPeak} during racing, with many exceeding 140 dB L_{cPeak} . The highest recorded level was 150.3 dB L_{cPeak} . At one location (Parnell Place), 9 exceedances of the 140 dB L_{cPeak} criteria were recorded in a single minute.

The levels occurring during this motor racing event are above the pain threshold for most people track-side. The fixed data loggers and 94 attended measurements of sound levels over the three days of racing confirmed that sound exposure levels were extreme and well within the range of concern for permanent and immediate hearing loss.

Regards



Julian Ellis

B.Eng, MIEAust, CPEng NER