inter·noise 96
25th Anniversary Congress – Liverpool

INCE: 52

NOISE COUNCIL CODE OF PRACTICE ON ENVIRONMENTAL NOISE CONTROL AT CONCERTS - CASE STUDIES

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INTRODUCTION

It has been a year since the publication of the Noise Council's Code of Practice on Environmental Noise Control at Concerts[1]. The Code was prepared by a Working Party comprising of specialists experienced in the issues of noise at concert events and the specific guidelines were developed from data reported in earlier technical papers[2,3].

Since the publication of the Code, a number of Licensing Authorities have adopted the general guidance in the document as noise control conditions for entertainment licences. This paper presents two such cases relating to concerts held at Villa Park in Birmingham and the Alfred McAlpine Stadium in Huddersfield. The case studies review the background to the events, relevant licence conditions, the control procedures and the outcome of the events with respect to the noise guidelines adopted from the Code.

This paper has been prepared jointly by the two Local Authorities dealing with each event and the acoustic consultant employed on behalf of the respective promoter.

CASE STUDY 1

Rod Stewart concert, Villa Park, Aston, Birmingham - 23 July 1995

Villa Park, the home of Aston Villa Football Club, has been used as a venue for a number of pop concerts. In 1975 a Barry White concert was staged at the ground and in 1983 Duran Duran were the star attraction. Both of these concerts took place without causing significant environmental noise problems or provoking significant adverse public reation in the nearby community. This was the case even though no specific environmental noise limits were applied to the events.

However, two Bruce Springsteen concerts staged at the venue on consecutive weekday evenings in July 1988 resulted in many complaints of excessive noise. The complaints came from local residents on both evenings and from residents as far as ten miles away in Solihull on the second evening, when a fresh wind carried the noise in their direction. No specific environmental noise limits were set for the concerts but extensive noise monitoring was carried out around the venue by Birmingham Environmental Services Department. The results of this monitoring exercise confirmed

that undesirably high levels of music noise were experienced at residential properties close to the venue. The music noise levels measured 1 metre outside a bedroom window of one of the closest and most exposed dwellings in Witton Lane were typically 85dB $L_{Aeq,15min}$. Two main reasons were identified for these high levels of noise. The first and most obvious was that the noise level inside the ground were unnecessarily high. Secondly, some of the residential properties very close to the ground were also close to substantial gaps between stands at the corners of Villa Park and were virtually unscreened from high banks of loudspeakers.

Partially as a result of the adverse public reaction concerning noise and other disamenity caused by staging these two concerts, Villa Park was not used for a major open air concert again until the 1995 Rod Stewart event.

When proposals were made to hold this concert a major and orchestrated campaign was launched by local residents groups to prevent the local authority from granting a licence for the concert. It was clear at this early stage that if a licence was granted it would have to be subject to clear, precise and realistic conditions to control environmental noise.

Fortunately between 1988 and 1995 significant improvements had been made to the ground and the immediate surrounding area. Most significantly, the houses in Witton Lane closest to the ground, and potentially most exposed to noise from the venue, had been demolished and the area turned into a small park. Almost as significant was the fact that two new stands were erected at Villa Park which provided better screening and reduced the gaps between stands.

A further fortunate development was the final publication of the Code of Practice on Environmental Noise Control at Concerts[1] in early 1995. The recommendations in this document were used as the basis for forming ten environmental noise control conditions attached to the licence which was eventually granted for the event.

Three of the most important conditions are reproduced below:

a. Rehearsals and sound checks are permitted only between 1200 hours and 1430 hours on Sunday 23 July 1995.
b. Live music from the event is permitted only between 1800 and 2200 hours on Sunday 23 July 1995.
c. The Licensee shall ensure that the appointed noise control consultant sets noise control limits within the venue which are adequate to ensure that the Music Noise Level (MNL) shall not, at any noise sensitive premises, exceed 75dB(A) over any 15 minute period throughout the duration of the concert.

During discussion between the Local Authority and the consultant appointed on behalf of the promoter, it became clear that it would be difficult to meet condition c. and maintain adequate sound levels for music within the ground. A particular problem was that the concert was to take place 'in the round'. That is, the stage would be in the centre of the pitch with arrays of speakers hung at a height of around 15 metres at each of the four corners. This would result in some dwellings having direct line of sight of the speakers through remaining gaps between stands. To overcome this problem it was agreed that additional screening would be provided by the erection of structures over which a double skin of heavy tarpaulin would be draped prior to the concert.

As a result of this additional screening and a delicate 'balancing act' on loudspeaker outputs during pre-event sound checks, condition c. was met to all intents and purposes. The noise level at the most exposed dwellings which were now those on Holt Street beyond Witton Road are shown in Diagram 1. Furthermore, no complaints about the environmental noise levels produced during the concert were received either by the licensee/noise consultant or by the local authority.

In summary, the environmental noise control at the Rod Stewart concert at Villa Park was undoubtedly a success. This resulted from the application of the guidelines in the new pop concert code[1] and from a lot of hard work by officers of the local

authorities and the licensees noise consultant. However events of this nature seldom occur without the odd hiccup which normally occurs at the last minute. On this occasion two such problems arose. Firstly, 3-4 weeks before the event work started on the refurbishment of the bottom tier of the stand on Witton Road. This resulted in several gaps in the structure appearing two weeks or so before the concert. A considerable amount of time, effort and expenditure was needed to block up all of these gaps just prior to the concert as the refurbishment work was still in progress. Secondly, it became clear a few days before the event that the 'roadies' were intending to loadout the stage etc on to lorries parked in Witton Lane during the night after the concert. To prevent this it was necessary for the local authority to serve a notice under section 80 of The Environmental Protection Act 1990[4] 2 days before the event. This resulted in the loadout taking place in a less noise sensitive area but with the penalty of taking considerably longer to complete.

CASE STUDY 2

REM Concert, Alfred McAlpine Stadium, Huddersfield - 25 & 26 July 1996

The Alfred McAlpine Stadium was opened in 1994 and hailed as the new spirit of enterprise in Kirklees and the cornerstone of its economic revival. The Stadium quickly put Huddersfield on the map staging the Classical Spectacular and two nights with REM all within 5 days.

In 1994 the Local Authority adopted the Noise Council's draft Code of Practice on Environmental Noise Control at Concerts, which was very similar to the final version[1]. The Environmental Protection department had already used the Code to set limits for an outdoor event in a suburban park in Huddersfield. The target 65dB(A) was monitored closely and adhered to. There were several complaints but officers at the event and the residents spoken to whilst monitoring outside the Park agreed that the music noise level was not unreasonable. Several important lessons were learnt:

1. people feel assured if they are told that the concert is to be monitored against a maximum permissible noise level.
2. people need to know the finishing time.
3. people need to know about the concert in advance so they are able to make their own arrangements.
4. noise should not be seen in isolation; the public are less likely to complain about noise if they can see that all precautions have been taken to minimise the impact of the event in terms of parking, littering, access, drugs, etc.
5. that the music style is important; pop music is more likely to annoy the older generations than classical is to annoy the younger generations.
6. that the new standards worked and are an excellent compromise between the needs of the concert promoter and the nearby residents.

These lessons were kept in mind when consideration was given to the much larger rock concert to be held at the Stadium and the following conditions with respect to noise were adopted as developed from the Code[1]:

1. The Music Noise Levels (MNL) when assessed at the prediction stage or during sound tests or during the event itself should not exceed 75dB(A) when measured 1 metre from the facade of any nearby noise sensitive premises between the hours of 0900 to 2300.
2. The following noise limit and monitoring protocol shall apply unless the condition below applies:
   The MNL measured at the mixer position at a height of 1.75 metres from the ground shall not exceed an $L_{Aeq,15min}$ of 97dB throughout the event.

3. The limits set above may be varied... if prior to the event a sound propagation test, approved by the licensing authority is carried out, using the sound system as set up for the event. The test shall demonstrate that at 1 metre from the facade of any noise sensitive premises the MNL shall not exceed an $L_{Aeq,15min}$ of 75dB under the weather conditions expected to prevail during the concert. The approval of any new limit must be approved in writing by the licensing authority prior to the start of the event.
4. The licensee shall ensure the provision of a space at least 1.5m² at the front of the mixing tower as a noise monitoring position. This area is to be provided with appropriate weather protection and a connection to a mains power supply.
5. The Licensee shall provide the licensing authority with full access to all areas of the stadium and car park perimeters for the purpose of monitoring noise.
6. Testing of sound equipment shall only take place between 15.00 and 17.00 hours on the day prior to the concerts and 10.00 to 17.00 hours on the day of the event. The total duration of the testing shall not exceed two hours on either day.
7. Audience exposure - no member of the audience shall be exposed to:
   a. an unweighted peak sound pressure level of 140dB.
   b. an L_{Aeq} for the duration of the event of 107dB(A). If the event level is likely to exceed 96dB(A) the audience shall be warned about the risk of hearing damage in advance.
   c. noise within 3 metres of an operational speaker.
8. Working personnel shall in those areas where noise exposure is likely to reach 90dB(A):
   a. have their exposure to such levels reduced to a minimum.
   b. be provided with ear defenders, and measures taken to ensure that they are used.
   c. make 'ear protection zones' and stipulate the use of ear protectors e.g. in the 'pit', mixer tower, delay towers etc.
9. The arrival or departure of HGV's, loading and unloading activities and such works as the erection or dismantling of the stage, scaffolding, seating, lighting or amplification equipment, generators or any other activities which are audible outside the licensed site shall not take place between 22.30 and 08.00 hours immediately following the event or 22.00 and 08.00 hours on any other day.
10. The licensed event shall finish at 23.00 hours and there shall be no amplified music after this time.

Planning for the concert began in January 1995 and a Concert Safety Team was set-up chaired by the Chief Building Surveyor with representatives from the Stadium, promoters, Fire Authority, Police, Ambulance Service, Highway Services and Environmental Services.

From the outset the stadium company attempted to liaise with the local community groups on a routine basis leading up to the events. The agenda was set jointly by both parties and representatives from the Police, Fire Service, Highways, Building Control and Environmental Health were requested to attend to advise of their respective roles and to be made aware of the local residents' concerns. The meetings proved to be an important source of information for Environmental Health to gauge the public's reaction to the forthcoming events. The primary concerns were noise, rubbish, drugs, vandalism and also what precautions were in place if there was an emergency at the nearby CIMAH site (large chemical works).

Particular attention was paid to communication and all officers were on radio link. Within the stadium there was some difficulty being heard over the music and although headsets were provided they were not of sufficiently high quality to cut out the music and improve transmission audibility.

The concert was monitored by EHO's and Technical Officers on a shift basis. One officer was stationed at the mixing desk alongside the appointed noise consultant, one was available inside the stadium and two were stationed outside the stadium carrying out noise monitoring on an agreed route covering those areas likely to be most exposed. The roving officers were also available to investigate complaints if the stadium based officer deemed this appropriate. Results of monitoring were recorded on a purpose designed 'Noise Log Sheet' and a standard report sheet was produced for the recording of complaints made either to the 'concert hotline' or directly to Environmental Protection during normal office hours or on the out of hours 'standby number'.

The sound propagation test using shaped noise typical of popular music, was carried out each day before the concerts. A short blast of noise through the concert sound system allowed the noise levels to be assessed at the two most sensitive sites; the first Town Avenue approximately 150 metres distant and at 90° from the speaker bank, the second Bradley Mills approximately 200 metres in the opposite direction to the direction of the speaker bank. Levels were determined by eye averaging on slow weighting. The consistent source made this relatively easy. It was found that the top row of speakers in the sound system, called the long throw speakers and angled back at approximately 5° were responsible for an additional 4-8dB(A) at the noise sensitive sites. The sound engineer agreed that these were not necessary for the internal music quality at this venue and were switched off and remained so for the duration of the concert. This allowed the internal noise limit at the mixing desk to be raised from 97dB(A) to 100dB(A) $L_{Aeq,15min}$ without breaching the 75dB(A) $L_{Aeq,15min}$ limit at noise sensitive premises.

During the concert, noise levels monitored at the worst affected noise sensitive site, Town Avenue, did not exceed 72dB $L_{Aeq,1min}$. Noise levels at Bradley Mills were barely measurable above background. Noise levels monitored at the mixing desk consistently met the 100dB(A) limit, with 99dB $L_{Aeq,15min}$ being the maximum level recorded.

The loadout was also monitored. No complaints were made and there was no audible noise from this operation off site.

In summary, the concert was regarded as a success by all concerned including Environmental Protection. Although the number of complaints totalled more than 50 for the two nights most were from people a considerable distance away from the stadium. Noise levels at these locations were often barely measurable above background. For those people in the two critical areas at Town Avenue and Bradley Mills Road only one complaint was received.

At no time did the MNL breach any of the environmental noise conditions. However on reflection the use of L_{Aeq} measured over a 15 minute period can cause problems for effective monitoring outside the stadium. A shorter temporal averaging is recommended as is suggested ($L_{Aeq,1min}$) in the Code when monitoring and controlling levels inside the venue. Comments afterwards from members of the audience did not reveal any dissatisfaction with the music noise level although a number made comment about the mixing (quality of the sound).

CONCLUSIONS

From the results of these two case studies, it appears that for occasional concerts (up to three per year), the advice given in the Noise Council Code[1] minimises the risk of noise complaints near to the venue. However, as demonstrated at the McAlpine Stadium, complaints mainly arose from residents some distance from the stadium. This aspect requires further research although the Code recognises this potential problem by stating that 'complaints may occur simply because people some distance from the event can hear it and that consequently, they feel the music must be loud even though the guidelines are being met.'

REFERENCES

[1] Noise Council, Code of Practice on Environmental Noise Control at Concerts, 1995.

[2] J.E.T. Griffiths and A. Dove, Environmental Noise Guidelines Proposed for the New Health and Safety Executive Guide for Pop Concerts, PROC I0A Vol 14, Part 5, 1992.

[3] J.E.T. Griffiths, J. Staunton and S. Kamath, A Study of Low Frequency Sound from Pop Concerts, PROC I0A Vol 15, Part 7, 1993.

[4] Environmental Protection Act, Chapter 43, 1990.

DIAGRAM 1