SAFETY AT SPORTS GROUNDS (SOUND) - AN ANNOUNCEMENT

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INTRODUCTION

This paper is an announcement of the establishment of a Working group for Safety at Sports Grounds (Sound Systems) by the industry whose objective is:

> "To be able to offer to whoever requires it, guidelines and/or specifications for the design and use of Sound Systems for Safety at Sports Grounds."

The text printed in the proceedings of this conference is a statement of the background of the subject, the aims of the group, and action perceived to be necessary.

The presentation of the paper will include a progress report and from the basis of further discussion.

The contents of the paper and the proceedings are given in the form of an announcement rather than a statement of findings or a conclusion.

The Composition of a Working Group:

Stephen Jones of B J Auditorium Design representing the ISCE and an elected Director of the Sound & Communication Industries Federation (SCIF) who has been chosen as chairman of the group.

Jim Griffiths of Travers Morgan representing the ISPP. Ian Flindell of ISVR Southampton representing the Noise Council on behalf of the IOA.

Ken Walker MBE who is the Chief Executive of the Sound & Communications Industries Federation who has been chosen as Secretary of the Group and through whose offices provides secretariat facilities.

Another representative of the Noise Council on behalf of the Institute of Environmental Health Offices has been invited, but not yet appointed.

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It is hoped that this Working Group will form the basis of a Government Working Party and that the composition of the latter will also include representation from the Local Authority Licensing Officers, the police Authorities, fire authorities the Sports Ground Operators and other interested parties.

The current draft proposals:

The working group proposes the following:-

A) The Guide to Safety at Sports Grounds be re-worded as attached (1)

B) A research programme be commissioned to evaluate sound pressure levels generated by crowds under differing physical conditions in order to establish a prediction formula for the level of Sound necessary to be produced in order to overcome crowd noise in an emergency situation on an area by area basis within the ground. See attached (2)

C) Commissioning of a Working Party to produce:-

(i) Guide to Sound Systems for Safety at Sports Grounds

(ii) Guide to CCTV Systems for Safety at Sports Grounds

D) The introduction of a two part licensing system specifically for the Communications Systems at Sports Grounds to be administered by the Local Authority licensing officers

(i) A systems license valid for 5 years

(ii) An event license valid for each event with a recommendation that these licenses only be granted if the guidelines (see c above) are met in full.

Expansion of the points raised in the foregoing proposals:-

The Existing Guide to Safety at Sports Grounds

To do justice to the subject of sound and communication in sports grounds would make the current format of the Guide unwieldy - hence the cross reference to two separate publications.

Research of Noise Levels

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As previously explained, not enough is known about the effects of crowd packing in the open, under a canopy, or in a corridor to be able to specify objective design parameters for evacuation systems. The attached document (2) provides a draft brief for this research which would only require moderate funding.

Guide to Sound Systems and CCTV Systems

These guides will enable the standards of systems installation, operation and test to be objectively established and enforced. They should be written in the style of British Standards so that they can be offered (via BSI) to CEN for possible adoption. Members of this working group are already involved in the work of BSI panels and not only can they co-ordinate such guides with BSI but are also appreciative of the facts that

a) the establishment of a standard is measured in years and
b) The European linking may cause unnecessary complications and delays to the needs of Britain.

Two Part Licensing:

No system will be effective unless it is designed and installed correctly.

No system will be effective unless it is fully operational and therefore has undergone routine tests and maintenance.

No system will be effective unless not only do the audience know what to expect, but that the system is used correctly.

The design and installation are permanent and therefore a system license for 5 years is reasonable. The 5 year timescale should be fast enough for potential changes in legislation, yet long enough not to overburden the sports ground operators.

The continual operability of the system is something which does need constant monitoring, and hence falls quite neatly in the same category as existing licensing practice.

The use of the system is partly definable and is a matter of education more than legislation. (i.e. intelligibility starts with the voice of the announcer)

Proposed re-wording of the Guide to safety at Sports Grounds

The section of the guide proposed to be re-worded include:-

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There shall be a voice communications system capable of clearly relaying essential messages to all parts of the ground in both normal circumstances and in an emergency. This shall be designed in accordance with the Guide to Sound Systems for Safety at Sports Grounds.

i. There should be intercommunication between the central control and all turnstiles or banks of turnstiles and all entry and exit gates used by the public.

ii. Metering systems to record all admissions should be installed at turnstiles and, to ensure that ground capacities are not exceeded in any section, arrangements should be made for central control to be informed immediately a pre-determined number of spectators has been admitted through each turnstile.

iii. There shall be an uninterruptible Power Supply such as to enable it to continue to operate in an emergency such as fire or a failure of the standard mains supply.

iv. All emergency announcements shall be preceded by a warning tone and this tone shall be 3dB louder than the sound pressure level of a crowd in panic as predicted for each area of the ground. Such tone generation systems shall be considered as an integral part of the voice communications system even though it may consist of a separate set of equipment which is operated in conjunction with the voice communication system.

v. Closed circuit television shall be installed such that every route of the evacuation process can be monitored from central control.

vi. The closed circuit television system shall be designed in accordance with the Guide to Visual Communications at Sports Grounds.

Required of the Sports Ground Operator

2 hrs prior to allowing access to the Public, but after 8 a.m.:-

Speech Sound System to be checked for all systems working.

Pre-announcement Sounders & Speech announcement to be tested with staff in position to check all sounders are working and speech announcement follows correctly and intelligibly.

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Defects recorded and remedial action taken.

Prior to sports taking place:-
Standard procedure announcement made (as done in aircraft) advising the public that the evacuation system is to be tested.

Pre-announcement Sounders & pre-recorded test announcement made, followed by zone information for evacuation routes.

Event Licensing

Required of Licensing Officer

(Prior to issue of event license)

Test system in conjunction with Sports Ground Operator in accordance with the procedure laid down in the system manual (Certified at the time of systems approval).

Record defects and arrange for a re-test if necessary.

Sign and stamp test record book.

(Optional: attend event and monitor the fact that the pre-sport announcements are made correctly.)

Guide to Sound Safety for Safety at Sports Grounds

DRAFT VERSION - SPJ 18/9/89

Foreword to draft

At this stage the details of the minimum requirements for sound systems in emergency applications is in need of definition. In order to define these, a certain amount of research is necessary and the normal procedures for public comment are likely to need to be followed.

In general terms, the following criteria will be addressed and the resultant installations will require the system designer and the licensing officers to agree upon the particular design PRIOR to any work starting on site.

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Standard Requirements for Safety at Sports Grounds

The sound pressure level of the speech system shall be designed to exceed by 3dB the varying levels of crowd noise in each area. The crowd noise in attentive mode being predicted using the following formula:-

(To be inserted)

The speech system shall be addressable in zones according to the area usage. e.g.:

Public Areas
- Turnstiles
- External circulation areas
- Internal circulation areas
- Bars, restaurant, banqueting areas
- Toilets
- Standing and seating terraces - Sub-divided into at least 4 zones

Non-Public Areas
- Plant rooms
- Kitchen, services, stores
- Offices

The auditorium and turnstiles shall additionally be fitted with pre-announcement tone systems which shall produce a sound pressure level 3dB above the maximum SPL produced by a crowd in panic as predicted using the following formula. The pre-announcement tone system shall be zoned in the same areas as the speech system.

The tone and speech systems shall be powered by an uninterruptible power supply (UPS) at all times when the public. Where the UPS is achieved using batteries, the relevant British Standards or ISO Standard regarding the capacity of the battery system shall be observed. (see below)

The tone system shall only be available for emergency paging purposes.

The full power of the speech system shall only be available for emergency paging purposes. All other uses of the speech system (music, commentary and standard paging etc.) shall have the system amplification attenuated to levels which comply with the Environmental Health Officer's requirements as well as any restriction given under existing legislation in terms of Health and Safety. The system shall employ compressor/limiters to

achieve the above criterion, yet render the result suitable for this purpose.

Under non-emergency conditions the speech systems shall use noise sensing techniques in order to moderate the sound level under conditions of partial occupancy. Such noise sensing control shall be bypassed during emergency conditions.

The system (in part or whole) may be used for entertainment purposes and should be designed for the best possible overall quality anyway.

Sound Coverage

The voice communication system shall cover all areas where the public has access.

Variations of Sound Pressure Control

The sound pressure level of voice communications shall be 3dB above the "attentive ambient sound pressure level" as defined by the prediction formula according to each "audience area". Within such "audience areas" the sound pressure level of the voice communications shall be +0dB,-3dB of that prescribed level.

Frequency Response of Sound Systems

The frequency response of the sound system shall lie within the acceptable band shown in graph Fig.1. for all emergency announcements, and shall be designed to exceed this bandwidth where the system is also to be used for entertainment (music) - an example of which is given in the graph Fig.2.

Intelligibility

The voice communications system shall comply with IEC 849 i.e. have a speech transmission index of better than 0.5.

Standards

Microphones shall meet B.S.....

Systems shall meet B.S..... IEC 849

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Cabling shall meet B.S. 5837 (?)

Uninterruptible Power Supplies shall meet B.S.....

Systems Design

The overall systems design shall be designed in accordance with all the aforementioned parameters and shall also take into consideration any parameters highlighted by the licensing officer, whether suggested by the police & fire authorities or not.

The predicted maximum crowd sound pressure levels shall be marked on plan drawings of the sports ground level by level and these shall form the basis of the sub-zoning for ambient noise level sensing purposes.

The paging zones shall combine these sub-zones in a logical fashion in agreement with and to the satisfaction of the licensing officer.

The pre-announcement tone system for emergency purposes shall be designed to provide an SPL 3dB above the predicted maximum level of crowd noise under panic conditions and such calculations shall be checked and approved by the licensing officer.

The final design specification of the evacuation and voice communications system shall be approved in principle by the licensing officer PRIOR to the commencement of the installation or any part of the system.

The approval in principle of the system design shall not relieve the sports ground operator or his nominees of meeting the performance standard described in this document.

Definition

Zone: A zone is an area (or group of areas) which are served by a series of loudspeakers under in a unified manner.

Normally a zone would be dedicated to one (or more) amplifiers which have a common set of inputs and controls. Under certain circumstances a zone may be created by the exclusion of unwanted loudspeakers, but this method of system design should be avoided.

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Matrix: A matrix is an electronic device which can route a particular source to one or more destinations or zones. A matrix is not a mutually exclusive switch and therefore the matrix can route a combination of sources to their corresponding destination simultaneously.

In view of the fact that destinations can potentially receive any source, each crosspoint of the matrix must have a priority status which is preset for each source. e.g. emergency microphone has top priority on all crosspoints whereas commentary only has priority over background music.

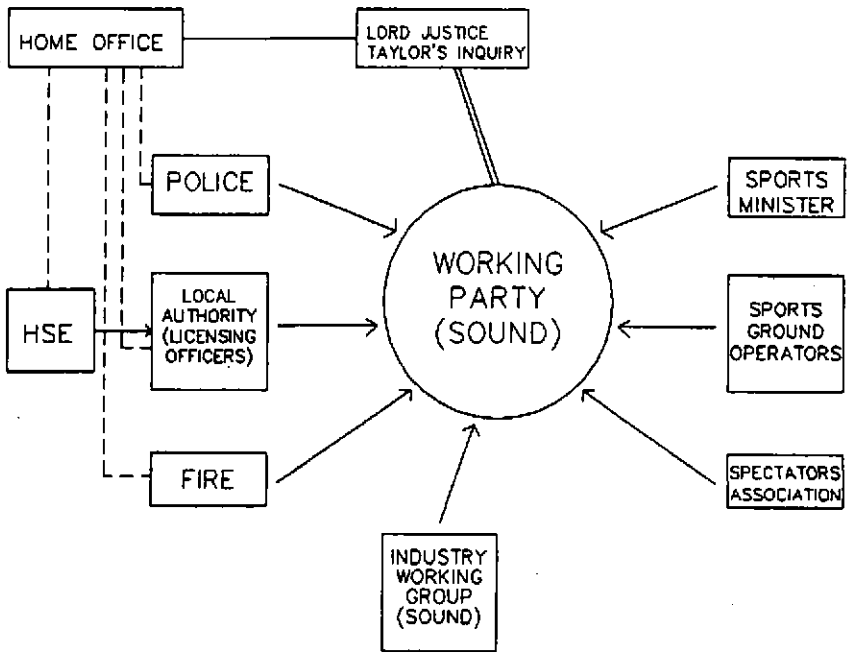

FIG 1: Organisational chart of possible Working Party for the establishment of Guidelines/Codes of Practice or other forms of regulation.

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