Thank you for your interest in Ziztel - we are a UK based manufacturer of PAGA and Intercom products. Our systems are mainly designed for use in the Hazardous Oil, Gas and Petrochemical industries.

A PAGA is a prime life safety system, the effectiveness of the package is dependent on the correct assignment and placement of both visual alerts (flashing beacons) and acoustic devices (loudspeakers) to ensure all persons receive vital emergency voice and alarm broadcasts. Ziztel are experts in the design, project engineering and delivery of fit for purpose mission critical PAGA systems. An important feature of our design role is the ability to supply a complete solution including the correct specification and placement of all field devices to ensure compliance with project and international standards where applicable.

LOUDSPEAKER ACOUSTIC COVERAGE STUDY

Ziztel acoustic design service is available to enable the project to predict broadcast system performance. The study is executed on the basis of a site survey, where actual broadcast versus ambient noise sound pressure level readings are recorded and mapped onto area plot plans. For green field sites the acoustic coverage study can be implemented from data derived from ambient noise predictions. In either case the field equipment is then specified in terms of type, quantity, orientation, frequency response and power output.

System performance

The performance criterion includes intelligibility of speech, speech / alarm tone audibility and broadcast clarity, in each case with the coverage area envelope defined by the client. For example achieving site wide speech intelligibility maybe impractical and so this requirement might be limited to critical escape routes, walkways and muster areas with broadcast audibility (alarm tone signals maintained over all areas of the installation.

Requirements

In order to execute an acoustic study we require some basic information from the client:-

Scaled plot plan and elevation drawings generated in Auto CAD, area classification i.e. Safe area, zone 1 and zone 2 potentially explosive hazardous area, performance basis for study – Broadcast audibility and / or intelligibility. The coverage envelope required detailing escape routes, muster areas, critical locations. Finally ambient noise predictions for each area of the site, this can be in the form of contoured maps, spread sheet analysis, software generated files or spot ambient noise data given at strategic locations. Where the client has no knowledge of the ambient noise then Ziztel are able to deliver a solution based on our nominated ambient noise estimates from our extensive experience of similar sites.
Design input required

Device selection

Selection and specification of the loudspeaker type is aligned to the requirements of the site, for example:-

1) **Safe area internal direct radiator** :-

   *Ceiling flush fit loudspeaker*
   *typical SPL @ rated power 96dBA; location offices, domestic areas, corridors.*

   *Surface cabinet loudspeaker*
   *typical SPL @ rated power 96dBA; location plant rooms, stairways, workshops.*

   *Bi directional loudspeaker*
   *typical SPL @ rated power 96dBA; location stairways, corridors.*

2) **Safe area internal / external horn** :-

   *Re entrant horn loudspeaker*
   *typical SPL @ rated power 100 to 120 dBA; location machinery areas, plant compartments, process trains.*

3) **Hazardous area internal loudspeaker**

   *Ceiling flush fit loudspeaker*
   *typical SPL @ rated power 90dBA; location offices, domestic areas, corridors.*
Bi directional loudspeaker  
typical SPL @ rated power 90dBA; location stairways, corridors.

4) Hazardous area horn loudspeakers

Re entran horn loudspeaker  
typical SPL @ rated power 100 to 117 dBA; location drilling decks, plant compartments, process trains.

Detail performance data for each selected loudspeaker
Client scaled plot plan and elevation drawings, hazardous area envelope, ambient noise predictions, performance criterion.

Scale drawings of the site. Minimally the drawings shall comprise as follows:-

1] Native Auto CAD generation. In some cases, depending on the drawings in question, we can use PDF drawings but this reduces the quality of the report and extends the time and cost to produce the report
2] Drawings shall show all areas where coverage is required

3] Drawings shall include elevation, plot plans of each level / mezzanine

4] Drawings shall show those areas that are 'safe', hazardous – Zone 0, 1, 2 safe

5] Ambient noise predictions for each area

6] Design basis – Audibility of alarm tones, Speech intelligibility, and compliance with a particular standard or classification society [example ABS, IMO SOLAS]

7] Duplicated A + B, N +1 or single system architecture - example what is coverage required in event of single circuit / single system failure.

**Design study options**

**Device assignment**

Ziztel are able to deliver simple manually generated acoustic design studies, for example enabling the client to budget project costs. For this execution either 1) a desk top study (applicable to ‘green field’ sites) based on client plot plan drawings or 2) an onsite sound survey (brown field / existing sites) with marked up drawings is the starting point. The engineer determines the quantity of field devices, i.e. loudspeakers and flashing beacons, associated power requirements both in terms of audio amplifier wattage and UPS mains supply demand and provides direction on the procurement of the most effective hardware solution.

Example of manual assessment shown above. The colour coded sound pressure gradients are compared to spot ambient noise readings / estimates and basic design concept generated. This enables further detailed studies based on resulting budget constraints and possible field cable containment / routing requirements.
Detail acoustic study

Ziztel are able to offer a detail acoustic study with placement of field devices, orientation, power, performance, compliance with audibility and intelligibility requirements versus predicted ambient noise. This study can be executed using software tools with manual validation to ensure we deliver the most technically efficient cost effective solution to the project.

Output from the acoustic study

A graphical illustration of system broadcast performance is overlaid on to the client project plot plan drawings, this shows coverage sound pressure level gradients from each loudspeaker and signal to ambient noise maps (relative levels above the ambient noise levels measured or predicted). Each device is uniquely tag numbered with the following data appended – power setting, type of loudspeaker (i.e. horn loaded, direct radiator, explosion proof or safe area) alignment.

The study considers compartment foot print and height, dividing walls, target listening area, location and quantity of devices.
A detail report is delivered which contains the design input data, the basis for the study, rules / specifications (where applicable) and output data i.e. quantity of field devices, location and type. The report details the predicted performance of the system and compliance with specification / standards plus any corrective actions.