

# Sound Reinforcement

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# Safer flying in public

ATM Fly-Ware president Andrew Martin looks at the legal, moral and engineering issues involved in reliably rigging speaker enclosures. There are also sonic benefits, he advises



Shopping malls demand secure audio installations

For every sound reinforcement system installed in a public place, there is an associated legal and moral responsibility to ensure the physical and aural safety of the public at large.

The prospect of litigation looms large in many venue operators' minds these days, as insurance premiums rise ever higher and the public readiness to sue for damages increases. This in turn places a greater emphasis on the installation itself, with the onus on the supply, alignment and maintenance of a professionally specified system from the outset.

The issues themselves have not changed in recent years, but the readiness to take them on board has. Systems may need to offer full CE compliance and carry internationally-approved certification for overhead suspension, if the stringent insur-

ance requirements in place for public areas are to be met.

Retail shopping centres, hotels, restaurants and clubs, for example, are turning more and more to professional installers to ensure that they comply, or at least have someone to pass the buck to, if they fall short of the requirement.

There are also the aesthetic considerations to take into account. This type of venue is looking for an unobtrusive, well-designed solution to its PA requirements. The venue operator is generally averse to having the PA visible in any shape or form and installers know only too well that only a really clean, neat and rigidly arrayed cluster of loudspeakers will pass muster in these situations.

There is also the sound itself. Few venues of this type are designed with much regard to acoustics. Glass, smooth walls, tiled floors are all typical features.

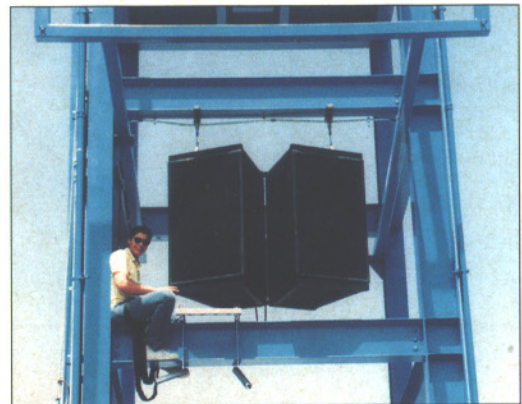
The nightmare of the appallingly inaudible airport lounge or railway concourse PA system immediately springs to mind.

In order to ensure intelligibility, the rigging has a role to play; it is imperative that the sound cluster dispersion is tightly controlled, allowing a predictable acoustic to be achieved with the cluster geometry.

This places the emphasis on using rigging hardware systems which are constructed to maintain coherent acoustic wavefronts, in turn minimising any comb filtering and lobing effects. In my experience, it has nearly always been the lobing effects of incorrectly designed loudspeaker systems, generating high level, unwanted room reflections, that are responsible for destroying the performance of sound systems in this type of public venue.

The surprising fact is that this is relatively simple to overcome, by using rigging which holds the speakers in their appropriate spatial alignment in the vertical and the horizontal plane.

Installers have a reasonably wide choice of well-designed rigging systems to select from these days. Professional systems include an industry-standard



Andrew Martin - with some sturdy looking truss-work

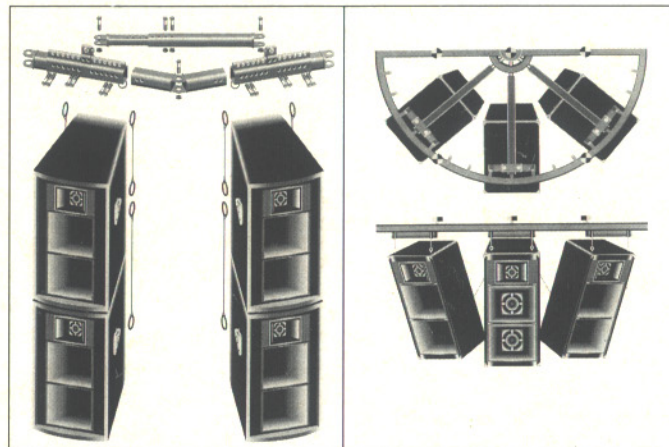
design factor of 5:1 as a prerequisite; meaning that every component's yield strength or ultimate load strength is divided by a factor of five. For example, a cabinet fitting with a yield strength of 454kg would have a working load limit of 91kg.

This in turn focuses attention on the alloy used within the system. Steel alloys have a greater intrinsic strength than aluminium, with a tendency to bend before breaking - as opposed to the more brittle nature of aluminium, which is more likely to break without much warning.

Flyable loudspeaker enclosures almost always use some form of internal bracing, which is generally fastened to the external flying hardware components. This ensures a reasonably even distribution of the load throughout the speaker cabinet and increases the overall load capacity of the enclosure. Threaded holes, nut plates, pan fittings, stud fittings and the cargo control racks are the most common external elements of the hardware system approach. The alternative to this is to use a truss flying system - the typical forms include grid truss (strap type) systems, modular grid truss systems, and modular mounted-truss systems. Of these, the most appropriate for public venues tends to be the modular grid truss and modular mounted-truss options: they combine ease of assembly and alignment, with a much neater, lower profile which is more in keeping with the public venue requirement.

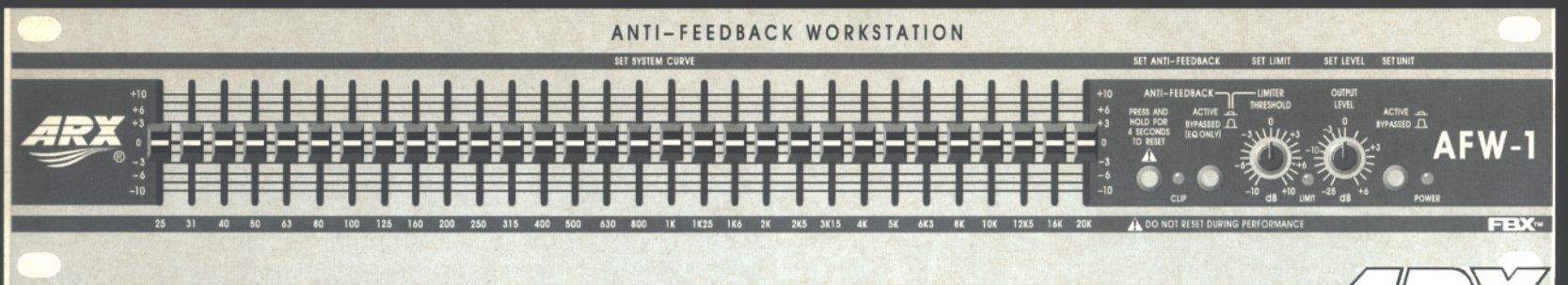
The market has finally recognised that safety, acoustic alignment flexibility and aesthetic appeal are all inextricably intertwined, and significant progress is being made towards audible PA in public places.

Venue operators are demanding an increasingly high standard of PA system across the board - in line with the public's expectation for better audio quality. Perhaps surprisingly, attention to detail - in particular, rigging detail - is playing a major contributing role in this improvement.



Grid (left) and modular (right) trussing schemes

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