Institute of Acoustics

# THE ROLE OF THE ELECTRO-ACOUSTIC CONSULTANT

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## INTRODUCTION

This paper aims to assess the task, endeavours and responsibilities of the Electro-Acoustic Consultant. It cannot and does not purport to offer either advice or direction, rather it is intended to promote both thought and discussion.

We are involved in a fast-moving technology both in terms of application of theory, measuring techniques and products. We feel that the consideration that electro-acoustics is merely an adjunct to acoustics and that the extrapolation of ideas and expertise is automatic, is short-sighted and not in the profession's best interests.

Necessarily, this paper directs a general measure of criticism. We would however say that it is meant with the very best intentions and with the utmost regard for our collective professions.

## CONSULTANTS

Firstly we should define our role as a consultant. A dictionary definition suggests that a consultant is 'a specialist who gives expert advice and information'. This definition, whilst a little brief and incomplete, does strike at the heart of the matter. The consultant is assumed to be both a specialist and expert in his field. An expert is, of course, one who has his extensive skill or knowledge in his particular field and a specialist is one who specialises in, or devotes himself to, an area of particular activity. Clearly therefore, the consultant should be not only conversant with the subject matter but also be adept at design and able to manipulate and extrapolate the necessary theory to fit the task. Within the context of acoustics we have many varied and diverse disciplines notwithstanding the inevitable and obvious inter-dependence, is it reasonable to expect individuals to be expert in all? Of course large multi-discipline acoustic consultancies can reasonably argue that a specialist is available in all related subjects.

## ELECTRO-ACOUSTICS

Even the term electro-acoustics is perhaps overbroad and too all-encompassing. It collects together those who may be engaged in transducer design, systems design and even equipment design. Within the context of this paper, electro-acoustics refers to system design. Within system design we would include the following: Public Address Systems, Conference Systems, Boardroom Systems, Sound Reinforcement and Music Systems, Communication Systems and Theatre and Concert Systems.

# THE ROLE OF THE ELECTRO-ACOUSTIC CONSULTANT

A successful consultant designer (or design team) necessarily would require detailed knowledge of the following engineering and physical principles and practices:

1. Electro-Acoustic Design Principles and Theory
2. Room Acoustics
3. Electrical Engineering Principles and Practice
4. Some understanding of Electronic Principles
5. A good understanding and knowledge of available products and product compatibility.
6. A good understanding of the achievable.

## THE DESIGN AND SPECIFICATION PROCESS

Recently, the authors of this paper have been engaged as consultants in the design and implementation of an extremely large and complex public address system. Our client was able to direct sufficient resources to ensure that the project was handled in the most efficient and ideal manner. The process from start to conclusion may be summarised in the following chronological steps:

1. Client consultatation to identify operational needs.
2. Site survey to define the acoustic parameters.
3. Preparation and submission of a detailed design including verification of all design parameters, performance and operational criteria.
4. Further consultation to verify that the design met the client's requirements.
5. Production of system specification for tender purposes.
6. Interviews with prospective tenderers and tender evaluation. Selection of contractor and assistance to client in preparation of the contract document.
7. Project management for the duration of the contract, including factory and interim acceptance of all equipment and supervision of all contractors.
8. Final commissioning and final acceptance of system.
9. Assistance to the client to ensure full and proper operational procedures and status of the system.

In our opinion, the above represents the ideal although all too often steps (generally at the clients behest) are left out. Often a full and detailed design study is omitted and from steps 1 and 2 a specification is produced. All too often we find the consultant who prepared the specification is not fully involved in the tender process. All too often we find the consultant is not fully involved and responsible for commissioning the system. All too often the system does not meet the client expectation. All too often blame is apportioned incorrectly. All too often the system is later replaced directly by a contractor without recourse to a consultant. All too often the ultimate and final cost to the client exceeds the cost of doing the job properly in the first place.

To avoid problems and later misunderstandings, we believe the design study should clearly detail the design parameters, the type of equipment preferred and an outline budget costing. The study should also clearly indicate areas of possible confusion or conflict and in lay terms any expected compromises and shortfalls should be explained. The client's expectation of a faithful and articulate sound may not, for many reasons, be possible; he should be made aware of this. Any expected disruption to the fabric of the building should be included.

Prior to the production of the specification, a further consultation with the client may be necessary to ensure that in an operational sense, the system will perform as expected.

There are many diverse opinions regarding the format and detail of a specification for tender purposes. We feel that products and equipment should be specified by performance together with an approved type. We prefer not to use the term 'approved equivalent' rather we use 'agreed equivalent'. Hence, the would-be tenderer should seek the consultants agreement that an alternative product would be acceptable. This avoids later discussion and misunderstandings that often ensue.

The specification should clearly detail all works that are included together with any terms and conditions applicable. For evaluation purposes, we prefer to include a Bill of Quantities.

The specification should not include any design detail except where it is necessary to convey the intent of the project. Most important, we believe the specification should be clear, concise and unambiguous.

Tender evaluation should be a simple matter providing the specification was clear. Tenderers that have not quoted to specification would normally be rejected. This ensures that the evaluation is open and fair to all concerned and it avoids cost-engineered systems. Tenderers are of course always at liberty to offer alternative designs. On large projects, tenderers are often interviewed to allow further evaluation of the project and its consequences.

Project management may be included if the project warrants it or if the architect or other consultants regard the installation is beyond their scope of expertise.

As a matter of course, we prefer to either commission the system ourselves or be involved with the contractor. This is important since it is our reputation as much as the contractors that hangs on the successful outcome of the project and further we would normally be responsible for the performance of the system.

## RESPONSIBILITY

The Electro-Acoustic Consultant, in common with all consultants, is primarily responsible to his clients. However, in our opinion a direct and important responsibility exists towards both our profession and the industry as a whole. This in many ways is slightly different to an acoustic consultant since generally his field is much larger and in addition more than often he is dealing with generic constructions and general solutions. The professional audio industry is fairly small and insular and further, bad news travels fast. Manufacturers and distributors of electro-acoustic products place some reliance upon the opinions and wishes of consultants. We should therefore be careful to accept this responsibility in a mature and sensible manner since any other course of action will only serve to allienate the consultant from the industry as a whole.

The concept of responsibility may be further defined in respect of system performance. Who, for example, is responsible if the system fails to meet expectation?

Consider the scenario:
The consultant specifies the positions, numbers and performance criteria of loudspeakers in a particular system. He also specifies the performance of the system in respect of coverage, level and intelligibility. In the event that the system performance falls short of the specified criteria, who is at fault?

In a recent discussion, it was proposed that the installer-contractor should be held responsible since the performance was specified. Is this honestly reasonable? In our opinion the consultant was at fault and should be held responsible since the specification of the system and its performance must be seen as a tautology. Either the system or the system performance should be specified. In the event that only the performance of the system is specified, then at the letting of the contract the consultant must still accept a high measure of responsibility since he would presumably endorse the design.

## THE LOWEST BID

We are mindful not to direct unfair criticism towards our fellow consultants since very often the system that is finally installed bears little resemblance to that specified. The client in fact accepted the lowest bid which may not have been to specification. In this instance of course the system design was by the tenderer and not the consultant.

In fact even with the above situation, we would still level some criticism towards the consultant on the grounds that:

1. The specification was not written such that interpretive licence was restricted.
2. He did not seek the clients assurance that he would only accept bids that in the opinion of the consultant were to specification.

3. He did not submit realistic budget information to fully acquaint the client with the expected system cost.

The result of the above may bring adverse publicity to the consultant and others in his profession and further, it does not engender trust within the industry.

## CONCLUSIONS

We, as consultants, should be mindful that considerable expertise exists within the commercial professional audio industry such that Electro-Acoustic Consultants may be redundant should they fail in their basic responsibilities. We should not under-estimate the application of design in respect of practice and theory that exists without recourse to consultants. We should also be mindful of the often rightly low opinion that those in the industry hold consultants. Many have suffered broken promises of bidding to specification and in the case of 'tender by demonstration', inadequate, uninformed and shallow evaluation. We hold many in the industry with high regard - for most, their endeavour to further the success of their business does not compromise their attitude towards the industry. We should all be respectful of that.

From a clients point of view, he may engage a consultant and pay for the design, expertise and independence or he can obtain the design apparently free of charge from the industry. From a contractors point of view, he can either bid direct to the client and suffer the competition of cost-engineered designs, or he can bid to specification.

In most instances, not surprisingly, we would argue that it is preferable to clients and contractors alike that a consultant is engaged; always provided that the consultant is mindful of his responsibilities to his client and the industry alike and moreover, that the consultant has the confidence and trust of both.

We believe there is considerable room for improvement and direction within this facet of acoustics and professional audio.