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CONCERT HALL DESIGN
ARCHITECT/ACOUSTICIAN WORKING RELATIONSHIP

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The opportunity to design a new concert hall is a very special prize. Concert Halls are land mark buildings: the positive manifestation of the importance of cultural life in a city. Not many halls are built, not many halls end up being highly successful.

The opportunity is there to create an impressive statement in which architecture and acoustics come together for the benefit of both performers and audience.

Much debate takes place over who should be appointed first, the architect or the acoustician, who should be the leader and who will drive the concert hall design. There is considerable pride and power at stake: the seeds of a conflict which can mitigate against a truly successful solution.

Traditionally the dominance has been by the architect and this, in many cases, has led to severely compromised acoustics. More recently clients have moved towards appointing the acoustician first, thus recognising him as the dominant force, but does the acoustician have the creative and organisational ability to take the whole project through? Does this end up with an acoustic model as the auditorium to which finishes are applied by the architect, together with an external skin and foyers?

Both these approaches tend to miss the opportunity for truly creative and integrated working. This can be achieved by a collaborative approach with the power of veto available to both. The roles need to be carefully defined in that there will be areas where the architect's input is dominant and vice versa for the acoustician. Balance depends upon an understanding of each other's criteria, responsibilities and aims. The architect's appreciation of the key factors in acoustic design demands regular listening and capacity to push challenging ideas to the acoustician: this may lead to innovative solutions. Likewise, the acoustician will need an appreciation of architecture and the context of the building, the need for the eye and the ear to work together and an acceptance of the importance of building technology and construction. Both must understand the implications of their concepts upon cost.

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At the outset of the project therefore, a number of aspects need to be resolved in conjunction with the client's representative who forms the third side of this critical triangle. For example, the location of the hall is fundamental. From the architect's point of view its role is either strengthening the existing urban fabric or creating a catalyst to a new area of development which will effect all his subsequent design decisions. These urban and environmental planning opportunities will need to be balanced with those of noise and vibration control. Likewise, initial decisions upon the auditorium shape, volume and capacity will provide the most important test of collaboration. The balance between the acoustician's goal of excellent sound to all seats may not be fully compatible with the architect's search for the visual involvement of the audience in the performance with a sense of focus within a sculptural form.

If the relationship works in this area then all other aspects of the building will relatively easily fall into place. For instance, common sense will prevail in building planning, keeping noisy activities away from particularly sensitive areas yet offering the architect the opportunity to develop a planning strategy appropriate to this most demanding building form.

In the development of the building concept through to the system design, other disciplines such as structures, services, technical equipment and architectural lighting are heavily involved, but the mutual influences of the architect on the acoustician and vice versa remain paramount. Together they should lead the other consultants through the design criteria for each of the elements. For example, the large ducts needed for quiet air can put considerable pressure on architectural designs. Conversely, positive integration is an opportunity for the architect provided the acoustician has clearly identified the priorities at the right time. Similarly the form of the roof, including protection of the auditorium from external noise, can be developed with the structural engineer with possible dramatic results affecting the interior design of the space.

The remaining principal area of collaboration is in cost. It is the architect's ultimate responsibility to ensure that the building provides affordable excellence and yet the acoustician will be defining the criteria which will have a significant effect upon the end cost. Is the client getting value for money? Whose advice does he take? Who has the ultimate

responsibility and, per se, is the design team leader with all its ups and downs?

If the architect and acoustician have established their roles and the basis of working together, they can now examine the method of achieving the desired results. The initial stages must be one of establishing mutual respect and trust coupled with the search for the form of the auditorium itself. This is best achieved through discussion, with reference to known examples, ideally having been visited by both parties, coupled with sketches. The basic form will begin to emerge, hopefully with a balance between the oral and the visual needs. There is a major opportunity in this early design stage for the mutual use of simple models, initially at 1:100 scale and subsequently at 1:50 and normally generated by the architect. The second phase of model working is undertaken by the acoustician, first filling architectural models to test approximate volume and a degree of light testing. These design tests would normally be developed further by the acoustician with acoustic models and computer models. At the same time these all offer invaluable tools to clients and the other design consultants to understand the three dimensional form and enable them to develop their own disciplines.

A successful hall providing the client with excellent value for money is one where each element achieves more than one function and every item is contributing to the acoustic success of the room. If each part is carefully integrated and its acoustic potential accepted as a development of the whole, then a calm logic can run through the total design.

Too many buildings have had acoustic materials applied to the interior fashioned by the architect to avoid the embarrassment of acoustic failure. Acousticians have much to answer for in filling auditoria with acoustical devices, for example aggressive complex forms, nasty perforated patterns and ugly surface modelling. The architects have failed too often to understand the acoustic working of the room at the outset. Too many architects have kowtowed to acoustical gobbledegook rather than trying to understand the principles of sound reflection within the room. The largest area of misunderstanding is over adjustable acoustics. How valuable are these? Was the client's brief vague and unrealistic, did the architect fail to create a hierarchy of use, prior to commencing design, or is it just a method of protecting the acoustician's ego, when criticised after a performance, by being able to say that the adjustable acoustics were not properly set for that type of

music? Does the client really know the true cost of the very expensive insurance premium he is paying for?

Major auditoria always attract substantial publicity. Both architect and acoustician have a vital role to play in guiding 'the story' of the auditorium design and its acoustic performance. The quality of a hall acoustic is so highly subjective that opinion is often easily influenced and a good reputation can 'live' or 'die' by the views of critics, conductors, orchestras at a very early stage. This can take no account of variation in listening conditions at different parts of the hall (critics usually sit in the 'best' seats in the stalls). A hall will respond with differing success for different music-making. Reputation can be damaged by poor playing. Opinion is often formed well in advance of the opening night. There is no substitute for good design but there is a duty to promote its success when it is complete and this should be by the client architect and acoustician, in unison.