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Fasttrack Constructions for Television Centres

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1988 has involved me in the design and construction of two television centres, both of which were to a very tight time scale.

The time scales of all such projects are usually dictated these days by accountants, senior management or operational needs and little consideration is given to the practicality of achieving the desired dates
other than a brief a feasability study, the minimum time it will take, and the earliest date we can be on-air by earning revenue. These speculative dates then turn into firm and binding dates by the time an order is placed and the full design study started.

On projects known colloquially as "Fast-track" projects the time scale is usually so short that the design programme is runs only one step ahead of the construction programme. Therefore all decisions concerning design and operational philosophy must be reached at a very early stage. Any time given prior to any firm commitment for the project to proceed is worth its weight in gold.

The layout of the centre and of how each area interacts with each other are crucial to the project's success. As many people as possible who have experience of using the current facilities or the way the areas are to be utilised should be consulted. It is in my experience wise for the client to prepare his own outline plan layout for the studios and their related areas and then submit these for discussion with the outside consultants and architects. This saves a lot of time and it communicates to those outside parties the client's intended use and his priorites. These can then be subsequently ammended following the consultant's views and experience.

Selecting the consultants and the contractors for a Fast-Track project is a crucial step and should not be entered into lightly. The consultants should be selected for his experience of previous projects, places and facilites he has worked on and visited, together with his overall knowledge of :-

1) Systems Design, operation and operational needs. (This should include someone who has a diverse knowledge of operational lighting for TV studios)

2) The acoustical needs of the facilites and how these are to be achieved.

3) The building services needs of the bluilding and its areas. Ideally the consultant or consultants would embrace all the above in a single person or a small close knit group of people who are used to working together and who know each other's needs.

The selection of the architect is another area of profound importance in that he will to all intents and purposes be running the project, and dictating the aesthetics of the inside and outside of the building. He will also have to deal with the planning authorites, fire officer, etc. and ensure that all the needs of the building in terms of services are catered for. Again it is a great help if he has been involved in similar projects previously, so that he is aware of height requirements, plant sizes and duties.

The Contractor.
The contractor or contractors are possibly the most important people as several specialised areas will require to be built on a" design and build" basis. Here you cannot afford to take chances and only the contractors with a proven track record in each area of responsibility for similar projects should be used. e.g. :-

The air-conditioning of television centres with their very high and diverse heat loads together with very low noise levels in the areas being served, means that large ducts and low velocities are used. (2 metres a second typically into the area being served).

Using a design and build contractor for the building services with previous experience is not the end of the story, as it is strongly recommended that his designs are checked by the client's consultants at every stage, and this may well mean both working together over the same drawing board or computer terminal.

The sound isolation and integrity of the building is down to the building contractor at the end of the day as all the drawings and design details can be negated by shoddy or poor workmanship. To make matters worse most conventional builders draw their labour from local pools with no guarantee on their ability or consciousness. Therefore it is necessary for the acoustic consultant to take a personal interest in the construction and motivate the crews and foreman to get the best out of them, and to make sure they pay attention to detail even if its going to be hidden.

The importance of regular site inspections by all consultants cannot be underestimated, as small details will always be overlooked, but can be caught and rectified by regular and

thorough inspections. This also serves to keep the standard of workmanship high.

This may seem a tall order but such people do exist, and any Fast-Track project will surely founder or miss its "On-Air" dates without them, as there is no time to teach people on such fast moving projects. Many of the decisions will be taken on the move and there will always be problems, so people with the experience and knowledge of the consequenses or repercussions on other areas and diciplines must be involved. To try to co-ordinate many differing personalities, all with conflicting needs and requirements can be very arduous and time wasting, when you have a construction team waiting for work.

To enable each member of the design team to do his appointed task it is necessary to freeze the design as early as possible, so that each has time to get his design together and into manufacture. It is a commonly forgotten that changing the use of certain rooms changes their heat loads. Also the incorporation of windows to the outside will again, increase these loads. These changes of loads also increase the duct sizes and in turn the plant that serves the area. Therefore viscouse circles of design changes can result from quiet innocuous changes in seemingly unrelated disciplines.

That was the background, now for the practical.

Project 1 Channel Television in Jersey (The Channel Islands)

My brief To act as acoustic consultant, building services consultant, operational advisor and lighting consultant.

Timescale: The programme alloted was 26 weeks for the following activities.

Design of building and layout, design of services, airconditioning and procurement of all equipment. to clear the building, demolish half the site, construct new foundations for the new studios, build the new studios furnish them and acoustically treat and commission them, install all building services and commission. Install all technical equipment and commission. Refurbish the offices, and go to Air.

Construction Utilised:

Walls: Concrete Blocks heavy density

Roofs: Cast concrete inner shell and woodcemer outer with lightweight steel cladding.

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Floors: The studios had their own floor slabs and foundations separate from the office and other facilities.

Air conditioning: A chilled water system with 2/3 air coolled chillers mounted on spring mounts, serving 5 No spring isolated airhandlers. Constant volume system dissipating 252 Kw of Heat.

Facilities	Floor Area Metres Square
TV Studio 1	182
TV Studio 2	88
TV Studio 3	16
Control 1	45
Control 2	45
Dubbing 2 off at	17
Editing 4 off at	16
VTR	45
CAR	34

Acoustic Parameters

Ventilation Noise for TV Studios and Control Rooms NR 20
Editing and Dubbing NR 25
Acoustic separation between noise sensitive areas 70dB plus.
Reverberation times
These were designed to a relaxed form of the IBA and BBC recommendations corrected by volume. However I was also asked to consider the imminant introduction of stereo broadcasting. These criteria I feel do not address all the problems associated with creating and maintaining a stereo image, having been arrived at many years ago, when stereo was only available on pre-recorded material. Therefore in the design of the studios I attempted to consider the fact that the stereo image has two or more sets of information originating from differing points. This information contains differing phase relationships, frequency contents and energy characteristics etc., all of which are displaced in terms of time to create the single image with width and depth at the listener. This meant looking at the speakers and the sound path to the engineer, ensuring the correct speaker was used and mounted in the correct manner removing boundary effects, room modes, room geometry, screening by equipment, placing of hard and reflecting surfaces(for early reflection cancellation), signal path effects etc. to ensure that the left and right speakers had similar characteristics.

Channel Television is the smallest independant television station in the IBA network, with the smallest audience catchment area, so funds were strictly limited, but the

facilities had to be of high quality to attract outside business as a facilities house in the future.

The site utilised was the old Reditronics factory at La Pouquelaye near St Helier. This was a single storey lightweight construction factory unit with coupled two storey office block. It was obvious from the outset that the studios would have to go into the factory area, and that would entail the total demolition of all structures in this area, with the construction of new foundations as the existing ones were insufficient.

Unfortunatly the site was on high ground so the height of the new studio block was limited by the existing constructions, and this predetermined the heights of the studios and the method of operational lighting. Having established the optimumum configerations of studio length, width and cyclorama height from standard calculations the ventilation, traversing barrel grids, lighting and acoustic isolation were engineered into the remaining space. The layout of the studios and their ancillary areas was based on Channel's existing operational working pattern, with areas configured so that the flow patterns were more ergonomic than in their current facilities.

Whilst the the new site was very spacious, it was felt that all facilities should be contained within the existing building envelope and still have room for future expansion. This meant that the chillers and air handlers would need to be sited within the building and close to the studios. As the design evolved, the 5 large airhandlers would have to be mounted directly above the main Control Rooms and dubbing areas if they were to serve all areas efficently and within the remaining building's physical restraints.
Hardly an ideal solution. The chillers were initially moved away from the studios but then worked themselves back to the rear of the building and finally settled on the scene dock/noislock roof directly adjacent to the main two TV studios.

Having initially looked at the acoustics and environmental separation that would be required, it was then apparent that several areas would need looking at again. Calculations then revealed not unsupprisingly that twin skin roof constructions would be needed to the control and dubbing areas.
Also all plant would need decoupling by good high deflection spring mounts with good attenuators in the AC ducts.

Reverberation Times
These were based as previously stated around current IBA and BBC recommendations, however, with the advent of Stereo television and the comming of high quality satelite

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communications, the acoustic design was aimed more towards radio studio quality. This was achieved by mineral wool panels either mounted directly onto the wall or stood off on batterns with an air space behind.

The Construction

This was heavy density blockwork and was fair faced on exposed surfaces. However, the quality of the blockes was very variable and I was extremely glad that I had specified rendering to the inside walls and regular site inspections with a camera. Talking to the forman rapidly gained the attention to detail and performance that one hoped would eventually achieve somewhere near the design criteria.

The site inspections also revealed the shortcomings of design specifications and working totally from drawings as detail was often missed or misinterpreted in the most unforseen ways. Also how contractors modified their designs on site to accommodate shortages of materials, get around difficult installation details, or just to make their life easier. Without any knowledge of the consequencies in terms of performace.

Doors
Proprietary acoustic doors were used throughout with ratings of Rw 35 to 47.

SKY Television Osterly, near London

Timescale:

18 Weeks for the following activities:
Studio layouts and design criteria. (By Sandy Brown Associates),

Design and construction of the airconditioning system. Design and construction of all studios with the exception of four TV studios. Design installation and commissioning of all acoustic treatments. Installation of all news and ancillary areas. (By IAC)

Constructions utilised

Outer Biulding: Lightweight cladding and glazed sections. (Already existing)

Walls: TV Studios 1-4 Blockwork all other IAC prefabricated panels

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Roofs: TV Studios 1-4 Cast concrete all others IAC panels

Floors: Structurally coupled except for Studio 5 and Audio Studios

Airconditioning. Two chilled water systems serving 20 no airhandlers on spring mounts served by two banks of air cooled chillers with two / three chillers on each circuit. Cooling capacity 523 Kw.

Facilities	Floor area in metres square
TV Studio 1	169
TV Studio 2	117
TV Studio 3	70

Facilities	Floor area in metres square
TV Studio 4	36
TV Studio 5	45
Control Rooms 5 No at	40
Transmission Suites 5 No at	27
Voice Booths 9 No at	5.6
Editing 15 No a	28
Audio Suites 5 No at	18

Acoustic Parameters

Area	Ventilation NR Level	Acoustic separation dB approx
TV studios	25	60
Control Areas	20/30	60/50
Editing	30	50
Dubbing	35	35
Voice over	30	50
Transmission	25	55

Reverberation times ,
A slightly relaxed BBC specification was adopted

The site and the construction

An existing building was utilised on the west side of London very near to Heathrow airport. This building had very poor acoustic properties having been constructed as offices and a wharehouse initially. However, unlike Channel the existing structure could be utilised without alteration.

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To achieve the acoustic criteria the following acoustic treatments were applied.

Walls to dubbing and editing areas, various depths of mineral wool with a stretched fabric covering.

Walls to TV studios as above but perforated plastic coated steel facings to the mineral wool.

Walls to the control rooms and transmission suites. These required a combination of high transission loss with good low frequency absorption.
This was obtained by special hard prefabricated panels that due to their construction would also act as membrane/ panel absorbers at the required frequencies. Theses were also fabric finished with a thin mineral wool quilt to try to control flutter echo. etc.

The roofs to the prefabricated studios were also based on a similar construction together with a suspended false ceiling to the inner area and an acoustic quilt to the exterior roof void to enhance the room effect.

Building services

As the studios were located in two separate buildings, two indevidual systems evolved with the chillers situated in their owne compounds between the buildings. The airhandlers (20 off) found themseves being slung at high level directly above and adjacent to the areas being served. This was not intentional but evolved through no floor area being allowed for this plant, and the physical impossability of running the sizes of ducts require to the areas concerned.

Acoustic Doors

Proprietary acoustic doors were used throughout with ratings of Rw 47.