



World-wide Coverage for the Royal Wedding

Week 29 1986 will long be remembered as something of a milestone for BBC outside broadcasts. It was THE week when virtually every major O.B. facility was in use, the week when a royal wedding was immediately followed by a major UK sports event, the Commonwealth Games. And just to keep everyone firmly on their toes, OBs at the Test Match, the Henry Wood Proms, the Open Golf, Boxing Heavyweight Championship Fight and Ascot were included for good measure.

This Royal Wedding then was characterised by a major planning of resources, and very creditably, everything went without a hitch. Some pretty smart shifting of equipment was of course involved. For example, equipment used earlier in the week at the Open Golf Championship was split to two destinations; television equipment moved on to the Test Match and radio equipment was rushed to cover the Wedding. As the Royal Wedding OB was drawing to a close, literally as the Abbey service ended and the last of the procession passed by, some television equipment was moved on to the Test Match and an overnight exodus of camera lenses took place destined for the Commonwealth Games.

As is the custom for major royal events, many of the broadcasting facilities for the Royal Wedding were exclusively provided by the BBC. Television OBs set and supervised the lighting in Westminster Abbey, and Radio OBs were responsible for the sound of the wedding service in the Abbey. The sound was then provided for television and the world's broadcasters either as a clean feed (sound minus any commentary) or as mixed feed with commentary added.

For BBC Radio the royal wedding was an altogether more complex exercise than the wedding of Prince Charles and Lady Diana. More walkabouts with roving reporters were used with the sound being relayed via miniature transmitters carried as backpacks. Also a new Radio OB Mobile Link

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David Dimbleby in the main commentators studio

Editorial

Preparing for a recent exhibition, I was confronted with the problem of the correct spelling of a word that would appear on a six inch high graphic. Being a poor speller, I consulted the standard BBC Oxford pocket dictionary, only to find that the word could be spelt two ways! Realising that this was a bigger problem than I had imagined, I asked my colleagues in EID for their opinions, and checked with the reference library; the former suggested the word-processor spell-checker - which offered one spelling, and the latter consulted a larger dictionary - and that offered the alternative! As a last resort, I rang the British Library, and they said that either spelling was correct, but that any technical document used by the BBC would already have set the precedent, and must therefore be correct.

By now you will be wondering what the word was. I refer, of course, to "routing" or "routeing". Inspection of the Comms Department Handbook suggested the first spelling without the "e", and this was duly put onto the graphics for the exhibition.

Subsequently, I was sent a cutting by Nigel Phillips (TVC Duty Engineer) taken from the Guardian in 1978. This makes reference to "Hart's Rules for Compositors and Readers" and suggests that this debate has been going on for years. It includes words like "adaptors" or "adapters", "glueing" and "gluing". Taking a lead from Hart, I will, in future, be using "routeing" with an "e" to distinguish it from "routing", meaning defeating. I would welcome other readers views.

IERE

Have you ever looked at a job advertisement in Ariel and seen "membership of the relevant institution desirable", and given up the idea of promotion because you haven't got the "desirable" qualification? Now you have the opportunity to rectify the situation by joining the IERE, who are currently having a campaign to recruit new members. Application forms and more information can be obtained by contacting me at 707, HWH or ringing LBH 5432.

Alan Lafferty

1000th Ampex VPR



Bryon Parkin, Managing Director, BBC Enterprises, accepts the 1000th VPR video tape recorder bought by the BBC from Ampex.

Transmitters Opened

The following transmitters have opened or changed since April :

UHF Television

Ballintoy	Co Antrim
Brinscall	Lancs
Crewkerne	Somerset
Dorking	Surrey
Harbertonford	Devon
Llansawel	Dyfed
Talley	Dyfed
Wardle	Lancs

VHF Radio

Fenham	Tyne & Wear
Kendal	Cumbria
Windermere	Cumbria

Local Radio

R. Bedfordshire	Luton
R. Bedfordshire	Sandy Heath
R. Cambridgeshire	Peterborough
R. Devon	Huntshaw Cross
R. Cumbria	Kendal
R. Cumbria	Windermere
R. Gwent	Christchurch
R. Kent	Swingate
R. Kent	Wrotham
R. Newcastle	Chatton
R. Newcastle	Fenham

New OB vehicle for the Royal Wedding

In 1985, the BBC placed a contract for the supply of five new major television outside broadcast vehicles (the Type 6 Colour Mobile Control Room) for service in Wales, Northern Ireland and Scotland. At the time it was planned that the first of these vehicles would make its first programme in Wales in late 1986. In fact it made its debut in London as the central control vehicle providing coverage of the Royal Wedding on 23 July 1986.

The reason for this change of plan was the unfortunate, from a broadcasting point of view, juxtaposition of the Royal Wedding and the Commonwealth Games. The opening ceremony of the Games in Edinburgh was on 24 July and the BBC, as Host Broadcaster, provided television and radio facilities to many Commonwealth countries as well as to the BBC domestic and external services networks.

To provide the coverage, a temporary broadcast centre was built in Edinburgh and a large part of the BBC's outside broadcast resources were committed, including the television Colour Mobile Central Control Room (CMCCR). This vehicle which has been in service since 1981, was specially designed to cover large scale OBs and it is interesting to consider the design concept of such a vehicle.

Design Concepts

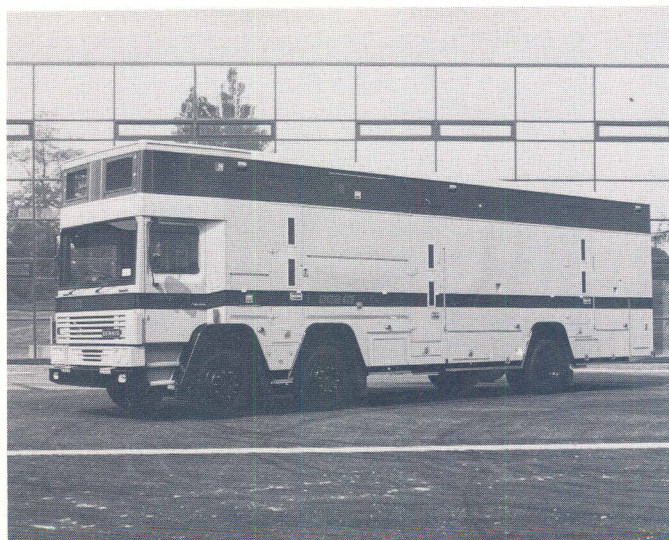
The heart of a television vehicle is the production control room. The problem of covering a very large event is that a large number of cameras are needed and the producer usually wishes to be able to monitor all of them. Once the number of monitors gets into the twenties or thirties, the stack becomes very large. In practice, this means very wide as the human neck is much more comfortable when scanning from side to side than when moving up and down.

In plan view the ideal production area is roughly square. If it is too wide, too much neck turning is needed. If it is too deep, the monitor viewing distance is too great. Unfortunately vehicles are not square; road traffic requirements make them long and thin, with the external width limited to 2.5 metres. The designer is faced with the decision of aligning his production desk across the vehicle or along its length. In the first case he limits the width of the monitor stack, the

number of seats at the desk and the ease of movement of staff between areas. In the second alternative the production staff are close to the monitors and if the stack is too wide the person at one end of the desk has a poor view of the monitors at the other end. There is also very limited space for the production staff between the desk and the wall. Nevertheless, the BBC has in recent years favoured the latter approach as the lesser of two evils.

The design of the CMCCR incorporated a neat solution to this problem. Large sections of the vehicle walls can be slid outwards creating a production control area approximately 5 metres wide by 4.5 metres deep within a 2.5 metre vehicle. Such a design is not suitable for general use because of parking and space problems. However, the number of programmes requiring facilities on this scale is small enough that it is generally adequate to have one such vehicle in the fleet.

The announcement of the Royal Wedding date created the exceptional circumstance which could not have been foreseen. The CMCCR was irrevocably committed to the Commonwealth Games and clearly could not cover a programme in London on the previous day. None of the other vehicles in the fleet was felt to be suitable for the planned coverage of the Wedding. Consideration was given to building a temporary installation at or near the Abbey but this would have been costly and time consuming. It was then suggested that one of the new Type 6 vehicles might be brought into service for this purpose.



The Type 6 OB Scanner

The Type 6 CMCR

The design of the Type 6 has certain features which make it easier to adapt as a central control unit than any of the earlier CMCR designs. Bringing the new vehicle into service for this occasion, moreover, would cost very little other than hard work in various departments of the BBC and by Ampex Electronics Ltd., our main contractor.

The key differences lie in the layout of the production area. The Type 6 production control desk is aligned on the length of the vehicle but, to accommodate an extra person, it is somewhat longer than in the Type 5 and earlier vehicles. This has also given a substantial amount of clear desk space for music scripts, a caption generator keyboard or other uses depending on the type of programme. The extra length, however, made the viewing angle of the monitor stack from the end positions rather awkward.

To alleviate this, the monitor stack has been mounted on slides which enable it to be moved outwards so that it projects beyond the vehicle wall by some 300mm. Whilst this may seem to be a small change, it increases the distance from the face of the monitor to the eye of the viewer by almost 25% and decreases the angle subtended by the two ends of the stack from 86° to 74°, as seen from the central position at the desk.

The desk is also mounted on slides, with a 300 mm movement and with three locking positions - fully forward, centrally and fully back. Fully back it gives the narrowest viewing angle. Fully forward the viewing angle is the widest but there is much more space for the staff behind the desk. The central position gives the



The Type 6 Production Control Area

traditional British compromise. Operation is, of course, completely viable with the monitor stack wound in, as it may have to be in some locations. In these circumstances the space and viewing angles are no worse than with many previous vehicle designs.

For the wedding, the vehicle was used with the stack wound out and the desk fully back. By using the maximum distance between the desk and the monitor stack it permitted an extra row of monitors to be fitted at the bottom of the stack, bringing the number up to 33 whilst still retaining an adequate viewing angle.

The vehicle is fitted with a Grass Valley 1600 vision mixer which has 16 sources available on each of four control banks. In normal use, the same 16 sources are available on each bank. In order to increase the number of sources available for the Royal Wedding programme the operation of the control panel was split. Two of the four control banks selected sixteen sources to the mixer in the normal manner. The other two controlled a similar mixer in a Type 5 vehicle parked nearby, the output of which was routed into the main vehicle. The producer thus had up to 32 sources available on the main mixer control panel.

On this occasion, the Type 6 was used only as a central control room, all the cameras being controlled from the Type 5 and other vehicles. This released the cue feeds normally used for the engineering area monitors in the Type 6, enabling them to be used for the extra sources in the production area. In most other respects the Type 6 was used in its normal working mode.

Other Type 6 Design Features

Built on a Hestair Dennis Delta Chassis with twin steering axles, the Type 6 CMCR has the conventional BBC three-area layout. The engineering area is at the front, the production area central and the sound area at the rear. All three control desks are aligned along the length of the vehicle with the sound and production staff facing the off-side and the engineering staff facing the nearside. The sound supervisor is separated from the production staff by a double-glazed partition with a folding door. He has two picture monitors of his own and also has a reasonable diagonal view of the production stack. By turning his head he can observe the action of the vision mixer.

At the other end of the production area the engineering manager, who sits at the end of the production desk, has a diagonal view into the engineering area and a connecting door for quick access. The main control room entrance is between the engineering and production areas and is protected by a light-proof lobby.

The engineering area is designed for six-camera operation using Link 130 or Link/NEC 100 cameras. Six will not always be used and the combination of main and lightweight cameras will be chosen to meet the needs of the individual programme. A Probel 32 x 16 preview matrix is installed, four of its bus-bars having a two-wire control for routing to destinations remote from the vehicle.

The sound mixer is a 36-channel Calrec desk with 8 stereo groups. This is the greatest number of full-facilities channels yet used in a BBC television vehicle and reflects the growing complexity of the sound component of television OBs. It also probably marks the limit to the number of channels in a conventional desk which can be sensibly accommodated in a vehicle. Further expansion will almost certainly be into the assignable field.

The sound area also houses the communications system. This is a new, more compact, version of the BBC designed pin matrix system which has been in use for about ten years, manufactured in this instance by Philip Drake. There are 80 sources which are selectable by pin insertion to 45 destinations. Five

differently coloured pins allow sources to be mixed at different levels to a destination. The flexibility of the system is vast but is judged necessary to meet the needs of a wide variety of programmes. Consideration was given to meeting this routing requirement with more modern technology using keyboard selection but indication proved to be an insuperable problem. The pinboard enables supervisory staff to make visual assessment of a very large number of combinations of the 18,000 different pin colours and positions. Unusual routing patterns are quickly seen and easily changed. We have yet to find an alternative system of presenting this amount of information as well as incorporating the selection mechanism in a quarter of a square metre of panel space.

The telephone system is a Pye/TMC KBX model designed as a business exchange. It has conventional, single button selection of main routes and has been adapted for use on control line circuits. The communications and telephone systems are compatible throughout the BBC's main fleet vehicles, an essential feature when setting up a major complex OB such as a Royal Wedding.

The efforts of the Planning and Installation Department team, led by Mike York, and of colleagues from Wales and London OBs in preparing the vehicle to meet this important programme commitment, are gratefully acknowledged. Also the cooperation of staff at Ampex and their subcontractors who rescheduled their work to complete the vehicle much earlier than planned.



The Type 6 Sound Control Area



The Engineering and Camera Control Area

New look for the Paris Studio

BBC Radio's Paris Studio near Piccadilly Circus in Lower Regent Street, has recently undergone a major re-furbishment, yet has had only the briefest shutdown period. The Paris, which is situated in a basement theatre underneath a Victorian office block, produces a very full schedule of radio audience participation shows, including comedy, panel games, quizzes and light music.

The studio closed in July 1985 and re-opened in November that year using temporary technical equipment, installed in a small recording channel (H17). During this time, the studio was producing programmes, often two per day - seven days a week, and many of them were with full audiences. The work caused major logistic problems for the installation engineers who had to work around the operational staff on a day-to-day basis, while keeping a close eye on the studio bookings.

The studio comprises a glass-fronted entrance at street level with a small reception area at the top of a wide staircase which leads down to a further reception area. Leading off of this is the narration suite in one direction and the auditorium in another.

At the rear of the auditorium is the control suite, beneath the old projection room. From here, down a gently sloping floor, is the audience area seating 313 people and leading to a slightly raised stage.



The Paris Studio Auditorium

The control suite consists of a central cubicle containing the control desk, and an observation window allowing operators a clear view of the stage and auditorium. A separate room contains the programme recording channel (H17) and communications equipment.

The technical installation is centred around a new 40-channel SSL 4000 series desk, replacing the old Neve S24/8. To ensure compatibility between areas, the desk is similar to the Maida Vale installation (MV3), which was commissioned around the same time. The main difference being the addition of a 'Stage Lighting' control panel, which allows a particular lighting pattern to be pre-set from the desk. As in MV3, the desk incorporates a BBC specified 'Comms Rack' which interfaces with a bay mounted relay panel, allowing a very comprehensive communications system to be tailored to a particular area without changing the desk specification.

Sixty-two microphone lines were provided from the studio and ancillary areas, such as the 'Narrators Suite', and suspended ambience mics. Most of the mic and tie line facilities in the studio terminate on two wall pattresses, but quite a few facilities were required to appear in stage traps which had to be enlarged within the confines of the stage structure and fireproofed to meet safety regulations. Stage facilities also include points for the Musical Director's talkback box, and a number of headphone boxes. Also the 'Mentometer' system was re-installed - similar to the concert hall facilities. This enables audience voting by means of buttons wired into the back of audience seats, and is intended for programmes such as 'You the Jury'.

Cubicle technical facilities include three EMT 950 disc players, and three Studer B62 tape machines. An existing Studer A80 24-track tape machine was overhauled, updated and reinstalled with suitable interface modifications to suit the desk remote track selection system.

Two large equipment bays of the old installation were replaced by two stub bays fitted with a working surface, allowing better use of the available space. The stub bays house a Dolby SP24 noise reduction rack and several ancillary panels. A trolley accommodating various effects processors and two new AMS RMX16 electronic reverberation units, which



Paris Studio Control Room

replace the previous EMT echo plate, was also provided for the cubicle.

The refurbishment was both technical and decorative with no major structural work involved, although a complete electrical rewire was necessary due to the very poor condition of the existing mains. The project architect was responsible amongst other things for the studio decor, with the stage, auditorium and technical areas being completely renovated whilst retaining the period 'feel' so characteristic of the studio.

Despite a number of problems, including three minor floods during the course of the installation, the project was completed on time. The studio went back into service on 1st April, which is also the date which SCPD developed into its new form - Radio Capital Projects Department.

New Con's for Bush

External Services are justifiably proud of two new continuity suites that entered service earlier this year. Created on the site of old offices in the Centre Block at Bush House, Continuity 3 and Continuity 4 offer a variety of facilities beyond the conventional continuity role.

Both can cope with record programmes and interviews, as well as handling linking announcements and programme replay facilities. Continuity 4, on the fourth floor, is mainly used by the Arabic Service, and Continuity 3, on the third floor, World Service popular music and vernacular service programmes. Both, unusually for Bush House facilities, have been built to allow daylight to penetrate into the areas, giving the impression of space and airiness, which is matched by

the gentle pastel coloured acoustic treatment on the walls.

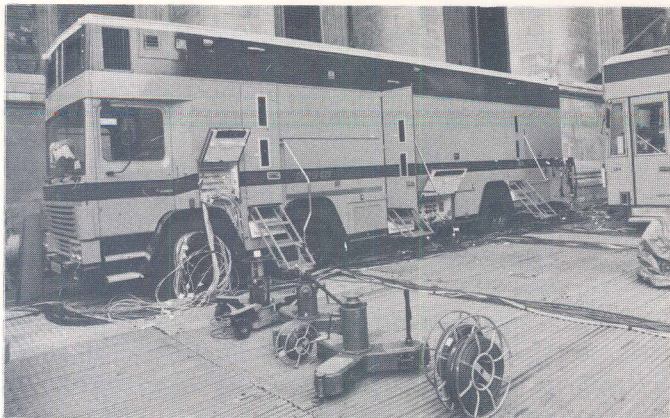
Continuity 3 is slightly larger than 4, although both are similarly equipped. The cubicle has a custom-designed desk, with a 12-channel stereo mixer made by Tweed Audio. The stereo capability is part of an up-grading in Bush House facilities to meet an increasing demand for programmes recorded in stereo, and then air-freighted to other broadcasters - most notably in Latin America. Also on the desk are three outside source channels, Big Ben, and the outputs from three Studer A80 tape recorders, one cartridge player, and three EMT 950 disc machines. The desk uses voltage controlled amplifiers (vcas) for programme control, and no audio is actually routed through the desk. Two bays in the corner of the cubicle contain the vcas and other hardware.

Conventional communications and talk-back facilities are provided and, like the other Bush House studios, the Control Room pre-transmission test (ptt) alert system has indicators and controls on the desk. The studio's output is split into main and secondary, with all channels selectable to either or both outputs. Monitoring is via a pair of LS5/8 loudspeakers.

The studio desk has a ten-channel stereo mixer, also made by Tweed Audio. This can handle three microphones - currently one Shure and two Neumann, with a 4038 available if required - three EMT948 gram decks, three cartridge players, two NAD 5355e Compact Disc machines, and a tape channel diverted from the cubicle. Rogers LS 3/5A loudspeakers are provided for monitoring purposes, and a small table in one corner can be used for talks programmes, if necessary.



Continuity 3 Cubicle at Bush House



The TV OB Type 6 at the Abbey

**Worldwide coverage
Continued from page 1**

Vehicle was used for the first time and from this was produced much of the "Today" programme. The vehicle was used outside Buckingham Palace and along the processional route and a special pick-up point was established on the roof of Bush House to receive the vehicle's transmissions.

As already mentioned the worldwide viewing and listening audience was dependent on BBC Radio for the sound from the Abbey. Microphones were rigged as unobtrusively as possible and fed initially to a 64-channel clean-feed stereo mixer installed nearby beneath Deans Court. The stereo clean-feed output was used by BBC Enterprises to produce the LP and cassette sound recordings and by BBC Radio themselves to make a digital recording for, ultimately, a commercial compact disc. A mixed-feed mixer housed in a hut near to the clean-feed mixer produced a final feed for Radio 4. It was important for the clean feed and mixed feed mixes to be carried out in isolated rooms to enable



The "clean-feed" sound mixer

the mixer at the clean feed desk to concentrate on balancing the ceremonial. The "clean-feed" desk output was then fed to the "mixed-feed" position where the operator mixed the commentators' microphones using cues from talkback. BBC Television carried out their own sound mixing and other broadcasters took either direct microphone feeds or outputs from one of the mixers.

The television presentation also had a complexity of its own with two live early-morning broadcasts via satellite, one from the Falklands and one from the deck of HMS Brazen in the Indian Ocean. Altogether, 41 cameras were used in London for the broadcast including a camera mounted in an airship hovering over the processional route and a remotely controlled lightweight camera mounted in a special cage rigged high up in the lantern of the Abbey. This camera provided some of the most dramatic shots of the wedding service as it panned down on the bridal procession.

Notable, too, for the television broadcast was the debut of the first of the Type 6 vehicles (see article, page 3) which, along with two Type 5 CMCRs (Colour Mobile Control Rooms), provided the central production facilities. The vision mixers from each vehicle were combined to provide a 31-channel mixing capability. The Type 6 vehicle has a unique extending monitor stack which, on this occasion, housed 32 monitors, a necessary number for this complexity of broadcast. The CMCCR II (Colour Mobile Central Control Room) which would normally have been used, had been firmly committed earlier in the year to the Commonwealth Games broadcast.

The worldwide audience for the broadcast was estimated at some 500 million people and, uniquely, a "unilateral" television facility was provided which enabled countries to have their own commentators in vision. Japan and Australia both took up this option with 40 other countries taking composite sound and vision and adding an "off-tube" commentary via facilities in TC3.

At the end of the day the whole OB operation was judged a huge success. All the engineering facilities worked on cue, itself an achievement in organisation and communications. The success of the production was also immensely gratifying because much of the ceremony could not be properly rehearsed for obvious reasons.

Traffic noise levels in TC Stage 5

The Television Centre Stage 5 development, at present under construction, will include a new Television Theatre. Basically this is a very large studio (floor area about 30 metres by 26 metres) with permanent audience seating. A particular feature is a "fly tower" some 2 metres high extending over the whole stage area of the theatre, which will enable scenery changes to be made live and so give artistic continuity to a production.

Controlling the sound in such a large building poses several problems. Because of the long path lengths involved, successive reflections of sound between one surface and another in the building occur less frequently than, say, in a sound talks studio or even a conventionally sized television studio. There are consequently correspondingly fewer opportunities in a given time for the absorption of sound level (short reverberation time in other words) that is normally required in a television studio: it is expected that the reverberation time in the theatre is absorbed relatively slowly, and noise levels in the theatre from unwanted sources of sound (such as air turbulence in the ventilation grilles or traffic noise propagated through the walls) will be correspondingly higher, again compared with a studio of more conventional size.

Mention of the need to provide adequate sound insulation against traffic noise outside the studio introduces another and perhaps more difficult problem. The construction of the walls of the studio, and the materials used in this construction, have to be chosen with this factor in mind, so that noise outside the studio does not raise the sound level inside above the appropriate criterion. Sound attenuation through a partition depends on many factors, including its frequency, the number of leaves which make up the complete partition, the spacing between the leaves and the "surface density" (mass per unit area) of each of the leaves. In general, an increase in any of these quantities will produce a corresponding increase in the attenuation of sound through the partition. A survey of the noise caused by traffic passing along Wood Lane, adjacent to the site of the new theatre, indicated that a very high sound level could sometimes occur at

the lowest audio frequencies usually considered in broadcasting (say 50-100 Hz). This indicated that the north-west and north-east walls of the theatre, the upper halves of which are directly exposed to traffic noise, would have to be of a particularly elaborate and massive construction in order to provide adequate sound insulation if it was assumed that they were exposed to the same traffic noise level as was measured adjacent to the road. The walls would have had to consist of three masonry or concrete leaves, each some 225mm thick, and separated by at least 500mm. An essential aspect of this construction would have been the complete absence of bracing between one leaf and another, as this would have coupled the leaves together acoustically. Such partitions are possible to construct to a relatively modest height, as might be the case in a conventional sound studio, but would have presented a very serious problem in the present case, where walls some 24 metres high were required.

Because of the anticipated difficulty of constructing the theatre walls, Research Department carried out a series of tests using a model of the Stage 5 development to see whether traffic noise measurements taken near ground level were in fact directly applicable to the estimation of wall transmission, or whether an allowance could be made because of the greater height of the theatre walls and also because of possible screening effects due to projecting parts of the building. The model had been constructed in cardboard to a 100:1 scale for Architectural and Civil Engineering Department by Messrs. Richard McKinder of Finchley. An outline of the route taken by Wood Lane past the building



Stage 5 Development Model

was added, as were additional cardboard "flats" which represented neighbouring buildings to the same scale. The highest traffic noise levels had been found to occur in the 63 Hz third octave band, and in the modelling work this was represented by a source emitting a third-octave band of noise at the scale centre frequency of 6.3 kHz. The relatively large size of a conventional high-frequency loudspeaker unit precluded its direct use as a noise source; instead, sound was conducted to the centre of a "ground-plane" through a narrow pipe to provide a source with acceptably good omni-directional properties. The small microphone used to measure the noise level at the faces of the theatre walls can also be seen. The experiments were carried out in Research Department's anechoic chamber ("dead room") to eliminate effects caused by reflections from room surfaces: the foam wedges that form the surface treatment in this room can be seen in the background.

Measurements were made at different places on each of the exposed walls of the model theatre, for various positions of the noise source, and averages taken to find mean sound levels. Measurements were also made under conditions which represented the original traffic noise survey. The

differences between these two sets of measurements then gave the average reduction in sound level that could be expected at the wall surfaces, compared with the levels measured during the survey. During the work it was found that the presence of the neighbouring buildings had a very considerable effect on the sound levels at the theatre walls. The residential buildings to the north-west of the theatre, for example, reflect sound back on to the north-west theatre wall even though this is facing away from Wood Lane itself. Furthermore, the noise source itself and its reflection in the wall of a neighbouring building can sometimes combine to form a "dipole" source having a polar diagram which causes a considerable increase in sound level at the exposed theatre wall surface.

On average it was found that the effective traffic noise level was reduced by 6 dB at the exposed wall surfaces, compared with the levels measured during the survey. This reduction in noise level, and therefore in the amount of sound insulation that is required, has enabled the specification of the wall structure to be simplified to a two-leaf construction: each leaf is to be 342mm thick, with a 228mm airspace between them.

Designs and Equipment Departments Reorganised

This new Department will continue to provide many of the services which were formerly available from Designs Department, Equipment Department, Central Purchasing, Engineering Purchasing and Ware Stores.

Design and Equipment Department will deal with all requirements from conceptual design through manufacture and delivery. The Department can take a requirement from a specification through to delivery, with manufacture taking place under competitive conditions of contract.

The Design Group has been organised into four Design Sections. Video Section will be responsible for all video developments for studios, transmission and measurement. Audio Section will similarly be responsible for all audio developments for studios, transmission and measurement. Control Section will be responsible for all developments with a substantial central element, and Radio Frequency Section will continue, as formerly, to be

responsible for design work in that area.

Support Group comprises an Electronics Section and a Services Section. Within the Electronics Section, Standards will continue to establish and maintain a range of components and parts of assured quality, and provide data-sheets, advice and information on request. The Laboratory will operate the Repair Service and provide investigative and other support.

Services Section, in addition to providing internal support, will offer comprehensive mechanical and installation services, from prototype and one-off, to arranging the manufacture of production quantities, under competitive tender conditions.

Supply Group, as well as being responsible for the Engineering Central Stores and disposal of redundant equipment, now incorporates Engineering, Office Equipment, Stationery, General Purchasing and Ware Stores. The Group will continue to supply a very wide range of electronic components and equipment but additionally will now offer an extensive range of

stationery, office equipment, furniture and sundry items. It will also offer a professional purchasing service to meet every need, whether large or small.

The Transport Group functions are not affected by this amalgamation.

NC1 and NC2 Refurbished

On 12 May the BBC1 Network Control Room (NC1) re-entered service following three months of work by PID Tel, and Network Engineering. This has brought NC1 up to the same technical standard as the new BBC2 control room (NC2) which was totally rebuilt, and entered into service in June 1984.

The function of the Network Controls is to join all the programmes together and their main operations are in the junctions between the programmes, where the various captions, stills, menus and trails are inserted to give the complete Network outputs seen by the viewers. To do this there is a staff of four in each Network Control room consisting of a Senior Engineer, Network Director, Vision Mixer (Presentation Operational Assistant) and a Network Assistant who loads the caption equipment and keeps the programme log. The Announcer sits in the adjacent Continuity Booth, which includes vision and sound mixers for self operation to ensure that the vision output matches the spoken script.

The new NC2 was built to a design which took into account the operational experience gained in the original new NC1 which came into service in the Autumn of 1981 and it is these changes, made in NC2, that have now been the subject of the NC1 retrofit. The major part of the work in NC1 included the replacement of the old wooden framed monitor stack with one made from Alusett. The colour monitors have been replaced with new Electronic Visuals, grade one monitors, and three additional 12" monochrome monitors have been provided. A new type of fixed channel indicator has been installed, together with drawer space at the base of the stack to store the system drawings and manuals for the area. The rest of the work included the replacement of the talkback and intercom system with a logic controlled system designed and installed by John Keeley and Bob Head of PID Tel.

Other improvements were made to the remote control system for tk and vt and to the sound and vision monitoring system. To aid the ease of operation for both presentation and engineering staff, the desk layout has been changed such that it is now identical to that in NC2. Whilst PID were completing the work outlined above, the opportunity was taken to properly install the facilities in NC1's continuity used for the In Vision presenter for "Children's BBC". These facilities were originally installed at short notice last autumn when Philip Schofield began his presentation of children's programmes. An Ikegami HL79D camera has been provided in a locked-off position in NC1. Lighting is provided by four 300 watt MIZAR spotlights and controlled by the engineer from a 6-channel D.E.W. dimmer unit. The camera can be taken to air directly by either the network or continuity vision mixers.

The main transmission equipment in both control rooms is as follows:

The main network mixer is a Grass Valley 1600-4S sound and vision switcher which has 24 vision and 30 sound channels. The Grass Valley M204 automation is also provided which it is hoped will be linked to the ICL computer currently being installed as the Presentation Transmission System. Together with the automation this should be used to achieve the pre-selection of sources and then compile an exact daily log for each network. After the Grass Valley mixer there is an additional sound mixer which allows sound overs from the Announcer. To allow the mixer to be used for rehearsing a complex junction without disturbing the



NC1 Desk and Monitor Stack



NC1 Continuity, with Camera

transmission of the programme from the area, the vision and sound mixers can be by-passed whilst still leaving the Grass Valley processing amplifiers in circuit.

One channel of the network mixer is fed from the continuity sound and vision mixer, a 10-channel Cox mixer which uses a "knob" or fader for each channel. This system is still preferred by the announcers who have to operate the mixer during the junctions whilst reading the scripts. Other sources of the network mixer include ten "outside source" lines from the central apparatus room 100 source matrix, to select all programme sources, whether videotape, telecine, studios or outside broadcasts, and the output of a "reserve selector" matrix which allows



NC2, with Continuity at far right

immediate selection of the reserve output of all West London studios in the event of a problem with the main feeds. The remaining channels are occupied by the network caption sources which include the electronic symbol, electronic clock, Open University symbol, slide file for the transmission of stills, Ceefax-in-vision equipment, character generators for fault apologies and programme change details, and a BBC micro used for simple animated captions (e.g. "Children's BBC"). There is also a Cox black edge keyer for inserting captions over a programme source. Other features installed in both Network Control Rooms include communications for the regions. (NC2 was equipped last year in preparation for the transfer of regional programmes to BBC2). These include Prefax (the announcer's script and other junction information), tk/vt or cue dot countdown, (to enable the regions to have a mimic of the network machine rundowns), and Auto-Opt. These signals are presently transmitted to the regional centres using ICE on lines 21 and 333 of each network's vision signal, although plans to transfer this to Datacast are under discussion. The regional talkback circuit can be changed from NC1 to NC2 to carry the talkback associated with the network using the opt-out facilities. TIM is usually used as the circuit ident, but when switched to NC2, the ident becomes a mix of TIM and BBC2 sound.

Whilst NC1 was out of service, Network One was originated from a Sub Control Room with its associated Continuity, which was formerly the old NC2. Sub Control is equipped with the spare symbol and clock equipment for both Networks and is therefore able to originate either BBC1 or BBC2 whilst the main control room is out of service or undergoing maintenance. This was fitted with a Grass Valley 1600-4S switcher in the early 1980s but the remainder of the equipment is becoming outdated and less reliable, so Sub Control and Continuity will shortly be rebuilt in two stages to make it more reliable and more compatible with the new NC1 and NC2.

Authors Note

If anyone has any stories or material for the Autumn edition of Eng Inf, I would be pleased to receive it by 1st September.

Alan Lafferty

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