COLD WAR CONCRETE

ENGINEERING THE AIRWAVES

RICHARD BROOK AND MARTIN DODGE

The postwar - and subsequent Cold War - boom in telecommunication demanded all manner of experimental engineering and ingenious infrastructures for transmission to receive, store, sort and (re)distribute data. Exploring the airwaves required tangible engineering of distinctive vertical forms that were peculiar to and implied their purpose. The slender broadcast antennas, masts and towers, festooned with aerials and receiving dishes, were positioned prominently in the landscape for unobstructed access to the Hertzian space. The structures, as well as their own physicality, informed an invisible topography across existing terrain. As dishes and horns evolved, so did the towers. An engineering-led approach to the design and development might be conveniently contained by ‘form follows function’. In the case of the Telecom Tower in Brittain, form was only able to follow the knowledge of the function and new technologies required experiment: the leading force was the General Post Office (GPO).

The GPO was a major national organisation, part of central government, a quasi-military uniformed service and enjoyed a monopoly over the provision of all inland telecommunications. Early in the Cold War period the GPO was charged by Whitehall with providing sufficient telecommunication, with resilient infrastructure and hardened facilities, for the nation to fight and survive atomic war. One part of the provision was a network of high bandwidth communication using super high-frequency radio beams running along a chain of antennas in line-of-sight of each other. This became the national-scale microwave relay network, also known as a ‘backbone’, which built upon experiments in the 1930s and advances in technology made during the Second World War.

Despite the fiscal austerity of the late 1940s and early 1950s, expenditure related to atomic warfare was prioritised in terms of capital, resources and personnel. This included significant investment in new telecommunications infrastructure apparently justifiable for the overriding demands of national defence. Much of the new hardware was also purposefully designed to be dual-purpose, in that it operated fully for civilian traffic
in peace times but could be switched in emergencies to grant access only to privileged priority users. Engineering a network running through airwaves was appealing to central government and the military. The nodes of the network, the antennas, could be widely spaced and were relatively cheap compared to building wholly new cable routes that bypassed vulnerable cities. Furthermore, evidence from the aftermath of atomic bombs in Japan in 1945 showed that steel lattice towers and concrete chimneys were some of the most blast resistant structures.

The growing need of consumers was a convenient cover story for a defence infrastructure that could hide in plain sight. The chain of microwave towers was a perfect example of this: the towers were clearly deemed vital for defence communications but in planning enquiries and public reports were described as fulfilling other needs. Increasing numbers of households acquired telephones and there was rapid growth in long-distance business traffic. This was coupled with the burgeoning new media of broadcast television that had recommenced scheduled programming to the London area in 1946. The first major inter-city microwave link was from London to Birmingham, which opened in 1949 to relay television signals to the Sutton Coldfield BBC transmitter. Increased bandwidth and higher definitions for future channels following the Television Act of 1949 further contributed to a convincing case.

If the factory chimney was the enduring icon of the industrial era of production, perhaps the information age may assume towering radio transmitters for such symbolism. The principle problem of getting the aerial as high as necessary with minimum cost has been solved using various structures, often suited to particular contexts, including the tubular pole, guyed mast, steel lattice antenna and the reinforced concrete tower. The last two approaches were deployed by the GPO in various designs of the 1950s and 1960s as a means to position microwave receivers at the required altitude and orientation. The skeletal steel and bare concrete structures suggested efficiency and an unadorned functionality emblematic of modernist ideals.

The standout architectural structures of the microwave network were the large cylindrical towers built from exposed reinforced concrete in the 1960s, less than ten were constructed, the most celebrated was the Post Office Tower in central London, opened by Harold Wilson in October 1965. Interestingly the companion structure for Birmingham city centre was to follow the same approach as London but a ‘totally unexpected change in the design of the tower proposed for aesthetic reasons’ meant that it was built square in section with distinctive corner profiles. Whilst of the same construction method, the city centre towers and those in less urban settings had alternative appearance. Seven rural and suburban towers were built to a design named ‘Chiltern’ - its form approved by the Royal Fine Arts Commission. They were sited at Stokenchurch (Buckinghamshire), Charwelton (Northamptonshire), Pye Green (Staffordshire), Sutton Common (Cheshire), Tarstall (Leeds), Weston-under-Edge (Gloucestershire) and Haslam Park (Manchester).

At Heaton Park the tapering tower joined an existing police radio antenna on an elevated position north of the city centre in 1967. At the head of the tower four cantilevered discs provided the platforms for a mixture of aerial types. Six dishes and five horns served three relay points, Henwick, Sutton Common and Windy Hill - connected to Carlisle, Birmingham and Leeds links respectively. Most visually striking were the horns. The largest of these paraboloid aerials were 377ft (115m) tall and made from ribbed aluminium, and their shape and scale offered greater capacity for receiving. The inverted pyramid forms had chamfered faces over the horns’ apertures made from a pearlescent Hypalon-coated Terylene sheet and the cluster of antennas on the tower appeared deliberate and composed. Some of these towers were visible from the growing motorway network and the distinctive futuristic silhouette of the horn reflector microwave aerials accentuated their formal similarities. The form and composition of the towers on the landscape was of concern and discussed in engineering journals, as were pylons in the 1920s. Their number and position was determined by line-of-sight logic that meant that prominent hills were a useful aid to the network. Concrete was both structural and sculptural here. The form of the ‘Chiltern’ type towers suggested their growing from the ground, a rooiness, and the notion of these as symbolic of fear or a threat of the Cold War was assuaged by ‘White Heat’ and progress.

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