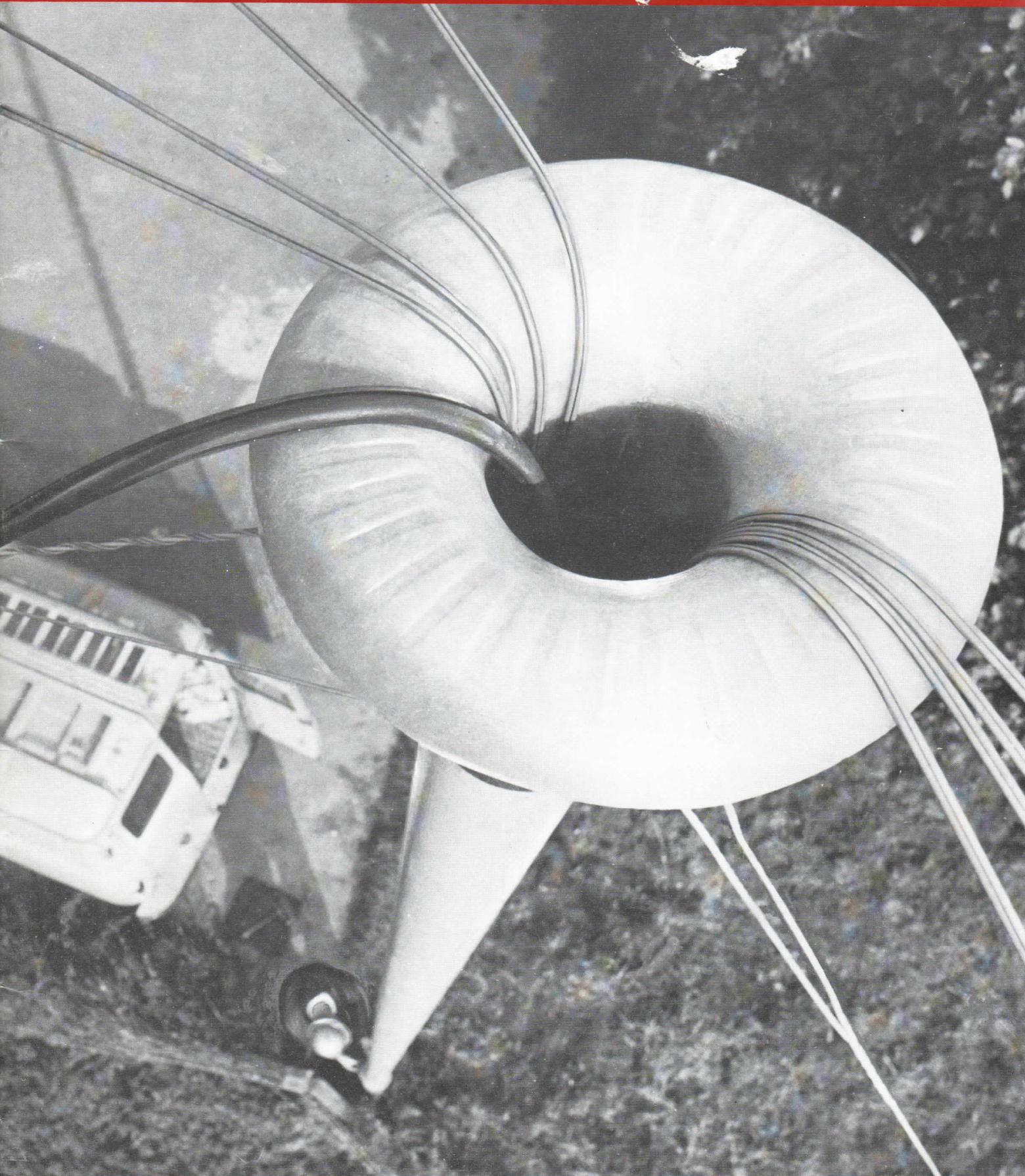


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Ten years in the Tower

DT Horn

TEN YEARS ago this autumn Mr Harold Wilson, then in his first term as Prime Minister, declared the Post Office Tower open for service and described it as "a nerve centre... which will help to ensure that both national and international telecommunications will be adequate during the next decade and beyond".

Mr Wilson went on to refer to the Tower as a magnificent example of British engineering skill and Post Office enterprise. Glowing praise indeed but how, 10 years on, does that tribute stand? And how has the Post Office Tower measured up to the forecasts made for it in 1965?

The main engineering functions that operate within the Tower column and the adjoining buildings, which together make up the Tower complex, are trunk switching of calls out of and into London via the Tower and Mercury group switching centres respectively, radio transmission incorporating telephony, and television channels and television network switching.

All these functions have common points in the aerial systems which terminate at the aerial galleries perched 111-144 metres above the London streets. Such a height was necessary to enable the radio systems to transmit and receive signals from the site of the old London Museum radio station without the signals being obstructed by the high rise buildings that were being constructed – and others that were also

planned-in and around the London area.

Radio signals from the Tower radiate in four main directions towards Dover, Bristol, Birmingham and Norwich. It is essential, therefore, that no very tall buildings are constructed in, or even close to, these paths of transmission.

The Post Office has no statutory right to prevent buildings being constructed in the paths of radio transmission so it is necessary therefore to maintain close liaison with the building planners of the Greater London Council. So far no building has been constructed that interferes in any way with radio system transmission.

Back in 1965 the ultimate capacity of the Tower radio systems was seen as 50 television links and 150,000 telephony channels. Today the radio station deals with 28 television links and 40,000 telephony channels, so there is capacity to extend should it become necessary in the future.

In the 10 years that the Tower and Mercury trunk switching units have been in service, they have been extended to virtually their full capacity, and new incoming and outgoing trunk units have been provided elsewhere in London.

The extensions both to Tower and Mercury and also the introduction of new London units have been carried out in well planned stages as part of the long term trunk switching plan, and to the credit of the trunk system planners, each stage of expansion was completed

on time to meet increased traffic demand.

All calls outgoing from the Tower trunk switching unit are routed under the control of register/translator equipment of the magnetic drum type and it is remarkable that some of the magnetic drums have been rotating at over 2,000 revolutions per minute non-stop for 10 years. With the clearance between the rotating drum and the "read" and "write" heads, which record or obtain call routing information from the rotating drum, set at only 0.001 inches, it becomes evident what a fine engineering achievement this is.

One of the most important functions performed within the Tower complex takes place in the Television Network Centre. This centre acts as the principal

point of control for the extensive line and radio transmission network which serves the needs of the BBC and the Independent Broadcasting Authority (IBA) throughout the country. It also serves the BBC and IBA when overseas television transmissions are fed into this country via the Eurovision or satellite communication systems.

This is a Post Office service which is monitored by all television viewers and for the wedding of HRH Princess Anne and Captain Mark Phillips, the service from Westminster Abbey was relayed via the Post Office Tower across the world to an audience which was estimated at many hundreds of millions of people.

The staff at the Tower are naturally

proud of their involvement with such events, and they take pride in the standard of service provided. Considerable improvements have in fact been made over the past 10 years. Most television transmission equipment is now transistorised, television network distribution equipment is completely automatic, and synchronised to the Speaking Clock Service for programme changes.

These modifications and many more, have enabled the Post Office to improve on the standard of service which 10 years ago was accepted as very reliable, to a point where the very rare breaks in service are measured in seconds. Serviceability in 1975 stands at 99.998 per cent.

The vast array of engineering systems operating within the Tower complex are fascinating, but it would not be claimed that they are peculiar to the complex, or even London. The Tower column, however, is unique, certainly in the United Kingdom, because of its height, 176 metres and its attractive shape. It has become as familiar a London landmark as Buckingham Palace, St Paul's Cathedral or the Tower of London.

The design specification set out by the Post Office to the Department of the Environment (then the Ministry of Public Buildings and Works) Architects and Structural Engineers for the Tower included the vital limiting factor, that the column should not deviate from its vertical position more than one third of a degree in any wind condition. This limit was necessary because of the high directivity characteristics of microwave aerials and if the Tower even now moved one half of a degree from its vertical position, the strength of the information signal being received at the objective aerial would be reduced to half the normal power.

At the drawing board stage the Department's structural engineers, following ►

A Technical Officer at work in the Tower television control room where programmes from both home and overseas are switched.



mathematical calculations and wind tunnel tests at the National Physical Laboratory, predicted that subjected to winds of 110 miles per hour the Tower would move a distance of 15 inches (380 mm) measured at the roof, from its vertical position. To date the actual maximum movement recorded is nine inches (229 mm), in winds of 90 miles per hour.

It was realised early in the planning stage that the building would be a great attraction for visitors, and consequently provision was made to accommodate the general public. At ground level an imposing vestibule was equipped with diagrams, photographs, automatic question and answer machines dealing with the Tower and Post Office services generally, stamp machines and souvenir shop.

Public galleries were provided on floors 31–33, the restaurant with its revolving floor on floor 34 and associated with the restaurant a cocktail lounge on floor 35. The Tower quickly became a favourite place to see and was on the schedule of most visitors to London.

In the first five and a half years no fewer than 4.6 million visitors were taken to the observation galleries: the record number in one day was 5,600 on May 30, 1966, two weeks after the opening of the public side of the Tower. All were taken up in one or other of the two high-speed lifts, each of which is limited to 14 passengers, and which as well as carrying visitors to the galleries and the Top of the Tower restaurant, also had to take Post Office engineers working in the Tower. In those early days income from the public was considerable, and Post Office enterprise in providing the facilities seemed to be well justified. Children's charities also benefited from coins that were tossed into the water fountain in the public vestibule. On average about £400 was collected and donated each year the Tower was open.

But all the hectic activities of the public side of the Tower came to a sudden and dramatic end early on October 31 1971. Floors which only a few hours earlier had been crowded with visitors enjoying the sight of the London skyline by night, were shattered by an explosion. The blast removed one section of the outer wall of floor 31, and severed domestic water supplies to the upper floors. Within minutes of the explosion police and fire services were on the scene, and together with Post Office staff, they set about accounting for all staff on duty, making a preliminary assessment of the extent

of the damage, and dealing with services that had been disrupted.

Examination of the communication systems revealed that disruption to service was limited to a failure of one radio link to Dover. A piece of falling debris had knocked a hole in the reflector of the horn aerial providing the radio link and matters were complicated by water entering the hole and thereby into the waveguide aerial feeder. Because of this one international telephony link of 1,800 channels and one television link were effectively put out of service for about six hours.

Following the explosion, DOE architects and structural engineers made a detailed examination of the building and found, fortunately, that the main structure had been unaffected by the blast. The building restoration work was finally completed in early 1973, and although the Top of the Tower restaurant reopened less than a month after the blast the observation galleries have remained closed to the public ever since.

Security at the Tower involves the stringent checking of people in and out of the building, including patrons of the restaurant, and dealing with bomb hoaxes. Since the end of 1971 staff have had to deal with more than 2,000 hoaxes; at one time three or four a day were being received. The number slackened, however, when one offender was given a six-month prison sentence. The bomb incident, as might be expected, had a very real effect on the administration of the whole complex and every member

of the Post Office staff on site was involved.

But significant though the events of October 31 1971 were, most staff who have been at the Tower for between five and 10 years prefer to recall some of the happier and more interesting events.

Visitors have included HM The Queen, HRH Prince Philip, foreign royalty, Prime Ministers of the United Kingdom and of the Commonwealth, well-known sportsmen and stars of the entertainment world. Other memorable occasions which readily spring to mind were the transatlantic air race of 1969, when 360 competitors started on their journey to the Empire State Building, New York, and the many races up and down the column staircase.

On the engineering side, events recalled would be the introduction of colour television transmission, connection of subscriber trunk dialling transit facilities, Post Office involvement with world-wide transmission of television pictures for royal functions, Parliamentary elections, Apollo moon shots and major sporting events.

Undoubtedly 1965/1975 has been an eventful decade. The plans that were first drawn up as long ago as the early 1950s have been realised, and nothing has happened that in any way detracts from the statement made by Mr Wilson at the opening of the Tower.

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Bird's eye view from the top. This dramatic picture was taken as building work on the Tower neared completion.