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Signed

Steven R. Cole
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POST OFFICE '999' EMERGENCY SERVICE

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Introduction

Prior to 1937 subscribers served by an automatic telephone exchange wanting to make an emergency call to the Police, Fire or Ambulance authorities either dialled the public telephone number of the authority required or dialled '0' for the exchange operator and asked to be connected. No priority could be given by operators to answering such calls, as there was no means of identifying them. In 1935, following a fire in Central London, a delay occurred in answering the call and a Parliamentary Question resulted in an Inter-Departmental Committee being set up to review the position with the following terms of reference:-

'To consider the best means of securing the rapid setting up of emergency telephone calls (such as calls to Fire Brigades, Police Ambulance and Doctors) including the question of a special indication to the exchange operating staff that such a call is of an urgent nature; regard being had to the education of the public in the matter, and to the future development in automanual working'.

The Committee decided in favour of introducing the code '999' on a national basis for all emergency services. This number would be answered by Post Office operators who would connect the call to the appropriate service.

The recommendations were accepted by the Post Office Board in June 1937 and the '999' service was introduced almost immediately, initially in London. The service was gradually made available in the 5 other major cities ie Birmingham, Edinburgh, Glasgow, Leeds and Liverpool, as modern automatic equipment was installed during the next few years, and at the same time a start was made to introduce the system in the rest of the country where the telephone system was suitable. At the present time the service is available at about 95 per cent of all exchanges.

The Post Office connects all calls on the service free of charge and provides the service at its own expense, without any contribution from the Emergency Authorities.

Operation

'999' calls are given priority of answer by selected Post Office operators who connect to the appropriate authority as promptly as possible. Connection is made either by dialling over the public network, usually to an ex-directory number, or by a direct circuit rented by the authority themselves.

Use of service

No national statistics are available; but as far back as 1957 a sample record showed that about 1,000,000 genuine emergency calls each year were being made. There can be no doubt that by now this number is greatly exceeded each year.

So much for the broad outline of the service; let us now consider in a little more detail how it works in present day conditions.

Getting the call to the Post Office Operator

a. In LONDON all local telephone calls are handled by equipment known as "directors" - a very early form of computer - which enable digits relating to exchange names (now alas overtaken by the system of 'all figure numbers') to be

translated into routing codes for establishment connection over a comprehensive junction network. Thus it is not difficult to arrange that a caller dialling '999' is connected to the nearest manual switchboard over a direct circuit. Furthermore the switchboards are often in close proximity to the exchange switching equipment, serving perhaps half a dozen exchange areas. Thus, apart from a serious failure in the exchange equipment (and this can never be entirely discounted) the only weakness is in the number of '999' circuits to the switchboard. The basis of provision was 3 for every 10,000 exchange subscribers, and it is clear that if 4 simultaneous '999' calls are made in an exchange area, one must fail to reach the operator. Recently steps have been taken to increase the number of circuits to 6 for every 10,000 subscribers.

b. In the FIVE MAJOR CITIES mentioned earlier, 'director' equipment is also used and the arrangements for '999' calls are similar to those in London except that a manual switchboard often serves more exchanges and a '999' call may have to be routed via a switching centre. The basis of provision of circuits to the switchboard is generally the same as for London; but there is an additional hazard if a '999' call is routed to a switching centre over a group of circuits which are also available for ordinary telephone traffic.

c. For the REST OF THE COUNTRY the arrangements are quite different. The local telephone exchanges are connected to larger exchanges (known as parents) which in turn are associated with main switching centres having their own manual boards. The routing of all local calls is by the caller dialling the required series of numbers to select the routing throughout the network - no translating equipment is used. Furthermore the number '9' is used to select circuits to parent exchanges and from parent exchanges to the main centres for the normal traffic. Indeed, it is because of the system that the '999' service can be given; but there is the serious disadvantage that a '999' call has to use circuits which from the outset are common to ordinary traffic.

Circuits between a main switching centre and its manual switchboard are provided on the same basis as for London (ie up to 6 per 10,000 exchange subscribers with a minimum of 3); but no allowance is made for emergency calls on the routes leading to a main centre.

d. At the switchboard '999' calls are signalled on at least 2 operating positions by lamps and in addition a special red light glows, with an audible alarm to ensure prompt attention.

Answering a call

The operator asks the caller which emergency service is wanted and, having obtained the number of the telephone from which he is speaking, connects to the required point. Once the call is set up, she monitors it throughout its duration and gives any help she can. A Supervisor may also monitor the call to give assistance. Should the caller clear prematurely, there are holding facilities from the switchboard to enable the connection to be traced back to the calling line; but more and more exchanges are not staffed by engineers for long periods and it is becoming less and less possible to get a call traced quickly.

It is at this stage that other difficulties may be encountered. Firstly if '999' calls reach a switchboard over a common route, the operator cannot tell from which exchange the call has originated. This information is essential if the operator is to select the right emergency centre (hence the need to interrogate the caller). Secondly the area covered by telephone exchanges seldom coincides with the emergency authority boundaries - nor do the different authority boundaries always coincide - and as a result calls may have to be handed over from one centre to another. Various schemes have been suggested to overcome this problem, not one of which has been found to be practicable. The most an operator can do is to connect all calls from an exchange to a single centre for each emergency service. It would be impossible for the Post Office to adjust its exchange areas to improve

the situation significantly; the local cable networks have been built up over the years to meet the needs of the public service and any wholesale scheme of reorganisation on the scale that would be required would be extremely costly. Thirdly, unless the operator has access to a direct line to the required emergency centre, she has to make an ordinary call over the public network which may be heavily loaded with normal telephone traffic.

At many, but not all manual switchboards there is a card index system giving amongst other information the actual addresses of all the exchange telephones in its area. This can be invaluable in checking calls.

Adequacy of service

The '999' service has been integrated with the normal telephone system and it must be appreciated that the Post Office for economic reasons cannot provide sufficient circuits to ensure first time completion of all calls. Because of the unpredictable incidence of '999' calls the emergency traffic cannot be assessed in the normal way. The arrangements are vulnerable in 2 respects:-

- a. Congestion on routes carrying ordinary telephone traffic
- b. Simultaneous calls, reporting the same or different incidents

Regarding (a), following representations from the Home Office, the Post Office are attempting to give priority to the provision of circuits on those routes which are heavily overloaded and which also have to carry '999' calls.

In respect of (b) there is little that can be done to overcome this difficulty. The problem varies from having to cope with 2 co-incident calls, to a complete swamping of the exchange arrangements in the case of a local disaster. This situation will arise no matter how many '999' circuits are provided, if more calls are attempted than there are circuits available.

Recently it has become apparent that the audibility of some '999' calls is inadequate when connected to the emergency service centres. There are 3 main reasons for this:-

- a. The Post Office policy of centralising the operator services with the result that calls are coming in from much larger areas.
- b. The trend of the emergency authorities themselves to centralise their own call reception points, often situated a long way from the Post Office switchboards. This means that emergency calls are no longer just a local connection for the switchboard.
- c. The economic factors governing the standards of speech transmission across the Post Office junction networks.

Limiting factors

Any significant increase in the numbers of circuits provided would not necessarily improve the ability of the Post Office or for that matter the emergency authorities to handle the calls received. To be effective the Post Office would have to employ more operators at their switchboards and the authorities would have to gear their reception arrangements accordingly.

Future trends

We have recently met the Post Office and discussed the whole field of the '999' service. Changes in the pattern of their telephone network affecting the emergency services are as follows:-

- a. The Post Office will continue further to centralise their operator services - they envisage manual switchboards being

perhaps 100 miles apart. This will increase the speech transmission problems mentioned earlier; but they are well aware of this and will be taking steps to ease the situation. Nevertheless the need for the emergency authorities to provide their own direct links from the manual switchboards will become even more pressing.

- b. There will be far reaching changes in the grouping of local telephone exchanges. Small exchanges will be incorporated into linked numbering schemes, whereby a single exchange centred in say Brighton or Newcastle will serve an area perhaps 20 miles in radius. However the Post Office have said that they will continue to 'sort' emergency calls on the basis of local area numbers. We cannot accept any worsening of the situation in regard to connecting '999' calls to the appropriate action point.
- c. The card indexes at manual switchboard centres will gradually be withdrawn so that it will no longer be possible to check quickly the address of a calling telephone.
- d. New types of operators switchboard have been designed for more efficient working. These have arrangements for incoming calls to be queued in busy periods. '999' calls will be segregated into their own queue and the Post Office are confident that their speed of answer will not be affected. Holding facilities will be continued but the chances of getting a call traced will virtually cease as exchanges are further unmanned.
- e. The switching systems which are being developed will most likely include facilities for identifying the number of a caller at a switchboard. The benefit to the emergency services are obvious; but alas it will be many years before this can be available.

Clearly we must keep a close watch on these new developments.

Conclusion

The whole of the costs are borne by the Post Office and they are satisfied that the service provided is adequate; but they are well aware of the difficulties which can and do arise from time to time.

If the service continues to be part of the normal telephone system there is little that can be done in the immediate future to bring about a significant improvement apart from adding circuits on busy routes.

It may be that the time has come for a general review: to consider whether specific standards should be laid down, what the standards should be, and most important of all what regard should be paid to costs.

Prior to joining the Home Office Mr S W Calkin was engaged in the design and development of line remote control and communications systems for fire brigades. Earlier Post Office experience included public telephone exchange systems and subscribers installations. At present he is concerned mainly with planning the communications systems for fire brigade centralised mobilising schemes and liaison with Post Office on matters relating to telephone service. He is a member of the Central Fire Brigades Advisory Council Joint Communications Committee.