

THE MOORGATE, LONDON, ENGLAND TRAIN WRECK: A CASE STUDY FROM A POLICE PERSPECTIVE

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In the following we describe a train wreck incident in London, England. The perspective is primarily that of the police who played a major role in responding to this major accident. Some of what is described is undoubtedly unique to such situations in Great Britain, but much is similar to what would be involved in this kind of rail disaster anywhere.

THE INCIDENT

At Moorgate Underground Station on Friday, 28th February, 1975, a six-car underground train crossed over points leading to the station platform at a speed estimated to be 39 to 41 miles per hour instead of the regulation 15 miles per hour. The train did not stop at the platform but continued at speed into a 69 foot long dead-end tunnel. In doing so, it demolished a central track stop signal, ploughed through a 40 foot "sand drag", demolished a central buffer stop and struck the solid concrete end wall of the tunnel.

The resulting scene can be compared with that of a wall plug being expanded by the insertion of a screw, the train virtually "exploded" and all metalwork was forced out onto the tunnel lining plates. The first two carriages and half the third carriage had entered the tunnel. These three carriages were occupied by

130 passengers at the time, a few escaped injury but 42 were killed and 82 seriously injured.

THE RESPONSE

The signalman in the platform signal box alerted the ambulance service stating that a driver had been injured. Being at the opposite end of the platform he was unaware of the seriousness of the incident. Police first heard of the incident through a pedestrian speaking to a police car crew some 200 yards from the station. At the same time the police control centre, having been alerted by the ambulance service, sent three motorcycle patrolmen to investigate and report on the occurrence.

On arrival at the station, police and other emergency services found nothing unusual at street level, 51 feet above the platform. They went down to the platform and saw what to them appeared to be one carriage of the train smashed into the tunnel and informed their control accordingly. Police and ambulance personnel started to assist casualties from the third carriage. It was some ten minutes later that, on hearing shouts for help from further down the tunnel, they became aware that there were further carriages ahead of this damaged one. They had difficulty in getting

further forward due to the expansion of the carriage onto the tunnel walls. Having got past this obstruction they found the remainder of the train – the two front carriages. The second carriage was flattened and the first carriage was rammed against the tunnel wall and roof. There were many living survivors, some seriously injured, in the first two coaches, the last living casualty was released after being trapped for 13 hours. In the early stages the train and platform were in almost total darkness. Personnel had a few torches, but they would have liked much more lighting right from the outset. From this experience, it was decided that officers should always carry some form of emergency lighting with them for immediate use. Those officers likely to be first on scenes of accidents are now equipped with cold chemical lights. These are like a pen and when required for use are activated by being flexed, thus allowing two chemicals to mix and provide a bright fluorescent green light. This light enables personnel to see for about 15 feet all around them.

After 25 minutes the scope of the disaster had been appreciated and the three coaches initially investigated for casualties and victims. 118 feet of train had been compressed into 69 feet of tunnel.

Contingency Plan Proved

This type of underground incident had not been foreseen and it was extremely gratifying after the incident to see that the police joint services emergency plans had been so flexible as to have been capable of immediate use in dealing with such an unexpected type of accident. London has a Joint Services Planning Committee and in the past three years there have been many meetings to delegate tasks and to plan an adequate control and coordination intervention plan for such occasions.

Our purpose-designed incident control vehicle had been despatched to the scene and established a joint services control point

opposite the station entrance, being joined by the fire, ambulance and post office communications vehicles.

Communications

Although all police officers are equipped with personal radio sets, it was known, through previous experience, that these radios did not work well underground. We therefore had foreseen the problems that would arise and had emergency field telephone sets and cables on our incident control vehicles. On our arrival, these sets had been installed to facilitate verbal communication between the platform and ground control units. This means of communication had remained in full working order throughout the incident and furthermore the small batteries providing power to the telephones lasted throughout the six days of the incident without replacement.

Removal of Casualties

By use of our emergency plan, an ambulance loading point was established at the station entrance. A one-way traffic system was implemented and *all* vehicles were instructed by radio to approach from the north whilst all ambulances left the scene in a southerly direction, although one of the hospitals was north of the incident. By adopting this procedure we ensured that the roadway never became blocked and the removal of casualties was therefore not delayed. Ambulance routes to hospitals were policed at every junction so as to ensure a smooth and uninterrupted passage for the casualties.

Most of the activity took place at platform level and, whilst police had, as human nature dictates, initially become involved in the rescue operation, as sufficient specialist fire rescue personnel attended so police officers were withdrawn from the rescue effort and reallocated to other duties. As with many disasters, there was initial chaos at the scene, but, by

adopting our contingency plans, a controlled and coordinated intervention was established within one hour.

The fire incident officer in charge of rescue operations was always located at the entrance to the train, behind him there was always a police property officer to receive property recovered from the train and to ensure its safe custody.

As casualties and victims were removed from the train they were handed over to ambulance personnel and placed on stretchers, being taken to a triage area for assessment by a doctor and nurse. Dead bodies were certified as dead by the doctor and removed, by agreement with the Coroner, direct to the mortuary. Casualties were assessed into two categories – those able to withstand the 3 minute journey to hospital without supportive treatment (these were placed directly into ambulances) and those requiring supportive treatment before transportation (these were treated at a medical aid station established on the adjoining platform). Refreshments for rescue personnel were available from an early stage on the opposite platform.

Whilst the medical aid teams' equipment was initially very tidy, the taking of articles from the stockpile in a haphazard fashion soon produced an unidentifiable pile of equipment. The need for a "Medical Equipment Officer" at equipment stockpiles was learnt from this disaster and such a person is now part of the team.

Life support was provided by the use of 35 lb oxygen cylinders. Smaller 10 lb cylinders were available from ambulances but these are not fitted with flow meters and medical staff were unfamiliar with and not satisfied with them, thus these large cylinders had to be carried up to the surface alongside the casualty by one of the medical staff. A total of seven persons had to accompany each casualty. The Medical Services are now establishing further training sessions to ensure that medical staff know the capabilities of the smaller ambulance

oxygen cylinders.

Stretcher-bearers are always in demand at accidents. Thirty ambulance personnel were, unfortunately, sent down to the platform together, although their immediate presence was not required, thus they became "sightseers" and obstructed movement. After a while this was realised and they were then kept at surface level until required for duties.

After 13 hours' activity all known living persons had been taken from the train. During this time cold cutting equipment had been used by the rescue services, but even then there was a temperature of 100 degrees Fahrenheit at the scene. Compressed air cylinders added to been used to reduce this temperature and provide essential oxygen and air to the rescuers and trapped casualties. With the removal of all living casualties, hot cutting equipment was used and created even more problems. The heat of the cutting equipment raised the working temperature to 120 degrees and this coupled with fumes from cut metals made further discomfort and health risks for the rescuers. Tunnel conditions were very dirty, the presence of rats gave rise to the possibility of disease and the lack of good hygiene facilities added to the discomfort of rescuers.

Health Hazards

Medical advisers directed that personnel working in the tunnel and on the platform must wear protective overalls, gloves and masks. Work in the tunnel was to be limited to 20-minute shifts and on the platform to 40 minutes, after which time they were to go to the surface for 40 minutes to breath fresh air. Stockpiles initially provided protective equipment for personnel and further supplies were obtained from commercial concerns. Two types of breathing masks were used – a single filter lasting 20 minutes and a double filter lasting 40 minutes. Police kept records of the times personnel were engaged at platform and tunnel levels. Any person not

reporting out on time was ordered out by his supervising officer, even though on occasions a rescuer wanted to continue to finish a particular part of his work. Even Senior Executives visiting the scene had to be protected by masks.

By Sunday, the third day of operations, all services were running short of stockpiled equipment. In order to standardise supplies and avoid duplication of equipment, the police were appointed quartermasters and obtained equipment on behalf of all services, issuing it as required to each individual.

To reduce the risk of infection a decontamination procedure was established at street level. All personnel leaving the station had to pass through foot baths which removed loose dirt on their footwear. They handed in their gloves and masks which were disinfected by police cadets and then reissued to other personnel. On leaving the footbath, personnel went to their support coaches, stripped off all their clothes and were given a hot shower before dressing in clean clothing prior to leaving the incident for their normal work location. Adoption of this rigid routine avoided the possibility of the spread of infection and disease.

CASUALTY INFORMATION BUREAU

The police established a casualty bureau at nearby police premises for documenting all persons involved in the incident. During the first 12 hours this bureau dealt with over 2,000 enquiries from anxious relatives and friends. It remained in operation for seven days before all enquiries were satisfactorily concluded.

The press and news media have a duty to accurately report facts surrounding an incident to the public. The police therefore appoint a Press Officer whose task is to ensure that accurate information is disseminated. The

presence of such an officer avoids the necessity for the press to glean information from other working personnel which is often incomplete or inaccurate.

WELFARE OF RESCUERS

The rescue services need refreshments whilst working. Two voluntary organisations, the Womens Royal Voluntary Service and the Salvation Army provide such facilities. Although local councils are responsible for the welfare and feeding of survivors and homeless persons from an incident, these two organisations provide refreshments for the rescue personnel and additionally assist the local councils.

After six days and five nights of rescue work the final victims were removed from the wreckage and the driver's body reached. Removal of victims requires special procedures. Each is labelled and photographed in the location where found before they are removed. In the hot atmosphere of this incident the bodies had become decomposed and therefore firemen in full breathing equipment carried out this very unpleasant task.

When the driver was reached it was essential to the official investigation into the causes of the incident that he be photographed in situ so as to establish his actions at the moment of impact. Other photographs of the mechanical and electrical control in the driver's cab were also obtained. The driver's body was then removed to the Mortuary and, like the other victims, it was medically examined by a pathologist, each step of the examination being documented and photographed.

LESSONS LEARNED BY THE POLICE

1. This type of incident could not have been foreseen. By having kept contingency plans

- for disasters as simple as possible and capable of instant adaptation to suit any situation, this situation was dealt with effectively.
2. All command and control systems must be mobilised quickly after an incident so as to become available for operational use in as short a time as possible.
 3. Each service should appoint a “quarter-master” to ensure adequate supplies of back-up equipment. There should be a general co-ordinator of such facilities, possibly the police officer should act in this capacity.
 4. Plans must include a scheme for reallocation of everyday duties so as to ensure that non-essential everyday tasks are curtailed so as to benefit the incident with the maximum resources.
 5. Any pre-planning arrangements by services must be made in discussion with all other services.
 6. Immediate availability of flexible filed telephone communications ensures that there is no breakdown in essential communications at any stage of the operation.
 7. Contingency Planning must allow for the natural human reactions of intervention personnel and their automatic activity that will always ensue must be brought under operational control as soon as possible.
 8. All casualty and incident information *must* be channelled through one bureau so as to obviate differing stories circulating to the press and news media.
 9. Regular training of emergency services organisations will not only ensure that each organisation knows its role in a disaster situation but will also ensure that all services know what their counterparts will do at an incident.