



STRUCTURAL *COLLAPSE* LITTLE FALLS

by Hugh Price-Hughes

On 16 October 2008 the City of Johannesburg Emergency Management Services received a call that a building had collapsed on the corner of Hendrik Potgieter and Van Staden roads in Little Falls, Johannesburg.

equipment was needed on the scene. Most of the patients had performed self-rescue or had been rescued by untrained first responders, including their colleagues, private ambulance personnel or the SAPS. It should be noted that this is in line with international research on structural collapse (mainly earthquake-based) where approximately 80% of casualties are rescued by first responders. These patients were stabilised and transported to the various hospitals in the area. One critical patient was airlifted to the Chris Hani Baragwanath hospital by Netcare 911. In total, 15 patients were transported.

Once the patients had been treated and removed the priority changed to search in order to determine whether there were living casualties trapped under the rubble. By that time Mr S Cunniffe had arrived on scene and assumed incident command. In addition, 18 structural collapse technicians and five K9 search-and-rescue teams from the SAPS were on hand to assist in the search.

During the initial "line-and-hail" search the body of a partially trapped worker was

It was reported that there were a number of injuries and that people were still trapped under the rubble.

Johannesburg dispatched two engine companies, two ambulances and an ALS response vehicle as a first turn-out. In addition, the command centre dispatched the Heavy Rescue Unit from Sandton and began calling the list of structural collapse technicians in order to assemble a heavy rescue team. The first-in vehicle was Boom Pumper 20 with platoon commander P Westerveld in command and from the outset, several problems were evident. Initial size-up revealed that half of a three-storey building

had collapsed in a pancake-type pattern. The remaining building was damaged but still standing and this created a further collapse hazard. Upon arrival at the scene there were a large number of emergency personnel working inside the collapse zone and the priority was to evacuate these personnel into a safe zone.

Access to the scene was difficult as several emergency vehicles, including private ambulances, metro police and the SAPS, had already arrived at the scene and had parked in a haphazard manner blocking access and egress routes. Clearing the access and egress routes became a priority as heavy

discovered. The initial search was followed by a K9 search and all visible void spaces were searched using a search camera. Difficulties in controlling noise in the surrounding area prevented the use of seismic/acoustic listening devices. The K9 search indicated numerous possible victim locations but the search was complicated by the amount of blood and items of clothing that were distributed after the medical operations.

The contractor had at this stage arrived on scene and it was determined that there was possibly one casualty unaccounted for. However, this could not be confirmed due to the fact that ambulances had left without reporting to command.

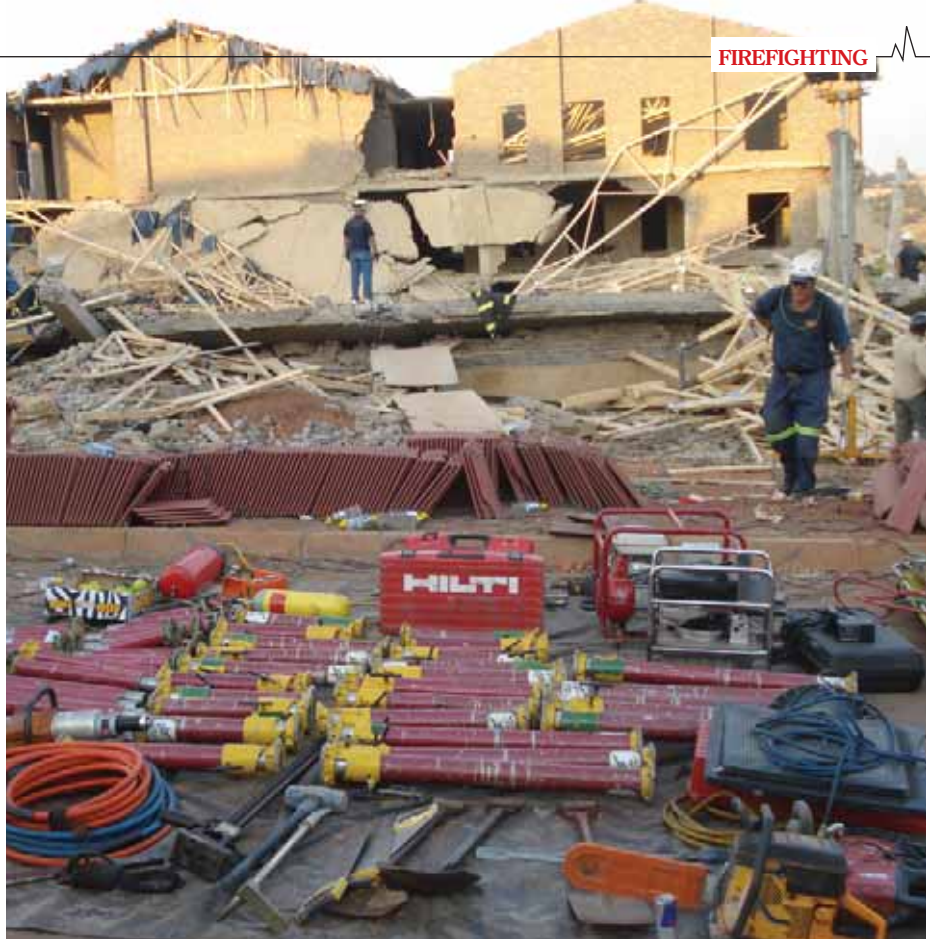
At this stage a command decision on overall strategy and tactics had to be taken. The command group, comprising Mr S Cunniffe (EMS incident commander), inspector Stroppe Grobbelaar (SAPS K9 unit), Mr S Knoetze (EMS technical advisor) and Mr I Scher (Rescue South Africa logistics), decided that operations would only continue in the safe area outside the collapse zone and that the area would be cleared using heavy earthmoving equipment. Mr Scher managed to organise two back actors (excavating equipment consisting of a digging bucket on the end of a two-part articulated arm) from a nearby construction site, which the contractor agreed to pay for.

The plan was put into action and the back actors began clearing the site. Initially, the operations were delayed by an hour when inspectors from the Department of Labour refused to allow the machine operators to work until they produced their operator's certificates.

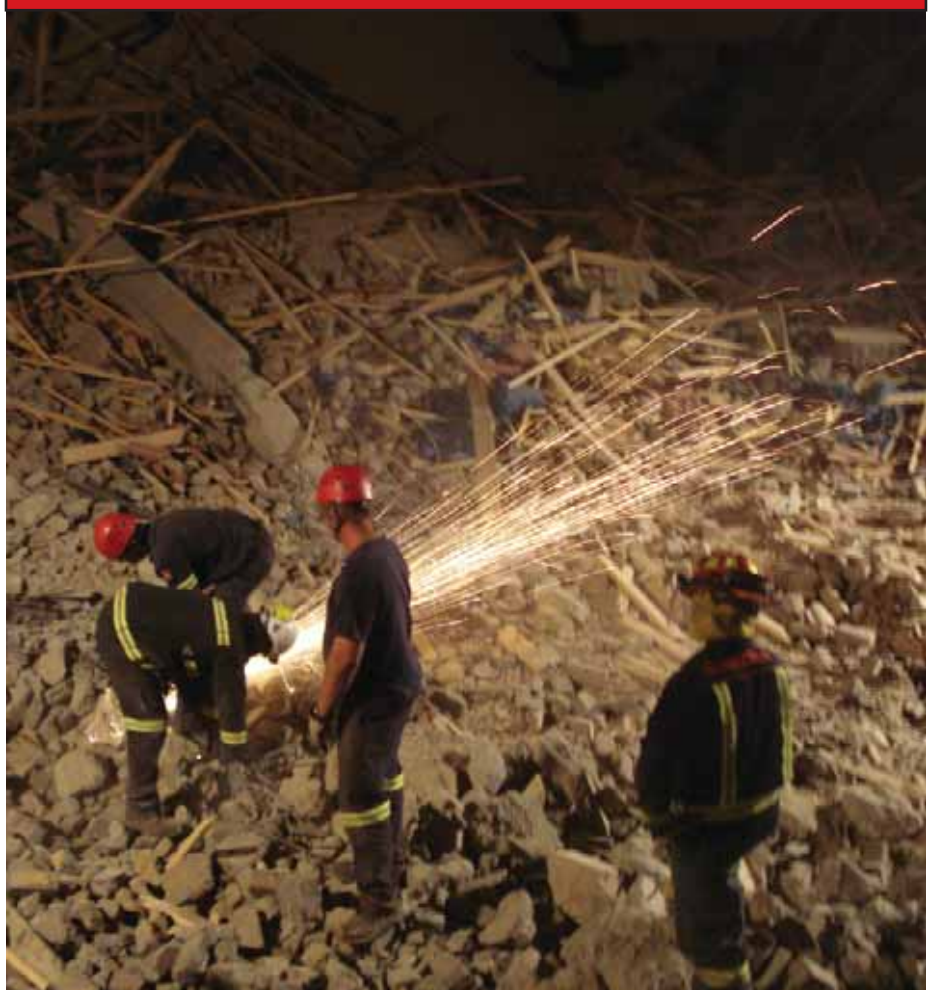
Operations were terminated at 22:00. After doing a risk benefit analysis it was decided that the casualty was unlikely to still be alive and continuing rescue operations through the night would be unwise. It was decided that a smaller group of technicians, assisted by a fire crew, would continue operations the next day. The K9 members from the SAPS would also assist.

Friday, 17 October

Mr JJ Viljoen had taken over command for the EMS and operations started with a K9 search of the premises. More than two dogs alerted in two areas – one in the safe zone and the other inside the collapse zone. An incident command meeting was held to decide on strategy and it was decided to continue with the assumption that the casualty was



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deceased and to continue operations in the safe zone. Once the safe zone was cleared it would be considered moving into the collapse zone.

Operations continued in the safe zone using the back actors to move and break rubble with rescue technicians assisting by cutting reinforcing bars so that the pieces of slab could be moved. The City of Johannesburg's new Petrogen cutter, a cutting torch that uses a vaporised petrol and oxygen mixture, had a trial by fire and proved to be incredibly useful. It is interesting to note that most of the USA's heavy rescue teams have replaced oxy-acetylene with Petrogen.

As the operations continued it began looking more and more likely that we would have to move into the collapse zone and it was decided to get the advice of an engineer to assist with the planning. Mr Scher requested one of Rescue South Africa's engineers, Andrew Richmond, to respond to the scene.

Mr Richmond completed a survey of the site and the building was condemned. It appeared that there were numerous contributing factors which caused the collapse. These include a lack of top steel (the reinforcing bars that join a pillar to the floor slab) and the concrete appeared to have insufficient cement in the mixture. As the weight of the roof tiles was added to the structure, the pillars punched through the floor slab causing the collapse.

As the building had been condemned it was decided that some of the remaining buildings would be demolished to enable work in the initial collapse zone. Two demolition companies were contacted but could not assist over the weekend and operations were suspended at 16:00.

Saturday, 18 October

Operations once again commenced with a K9 search of the area and more than two dogs alerted in the position where the cone was previously placed.

The contractor had been tracing victims and it now emerged that there was a possibility that the critical patient flown to the Chris Hani-Baragwaneth hospital might be the casualty that we had been searching for. The SAPS then accompanied the casualty's family to the hospital in order to confirm this suspicion. Operations on site continued with the objective of clearing remaining rubble from the safe zone.

The family confirmed that the Baragwaneth casualty was not the missing person. It was now decided to collapse the front of the building so that rescuers could access the area the dogs had indicated.

Rescuers using a boom pumper ladder climbed into the structure in order to rig chains around the façade. All machinery was shut down in order to minimise vibrations

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and the boom pumper was sited with its rear to the building. The rigging operations were completed successfully and the back actors were able to demolish the façade.

On entering the identified area a body could be seen trapped between two collapsed slabs. Using one of the back actors the top slab was lifted and stabilised in place. The body could then be extricated from under the slab.

During the extrication efforts it was discovered that the deceased's foot was trapped. By digging from the other side it was possible to access the foot and remove the work boot, which allowed the foot to be freed. The body was removed and handed over to the SAPS.

The incident could now be handed over to the SAPS and the Department of Labour for further investigation.

Learning points

In order to benefit from this incident and to avoid making the same mistakes, the following should be noted:

- On arrival at the scene there were numerous emergency personnel working in the collapse zone. This is inherently dangerous and forms unsafe practice. Rescue South Africa intends introducing a three-day first-responder course for structural collapse incidents which will deal with subjects such as unsafe zones. As with fire-fighting one should consider a collapse zone of one-and-a-half times the height of the building as unsafe.
- As with any multiple-casualty incident, access and egress routes are vitally important. First-arriving crews should identify these routes and establish staging areas as soon as possible.



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- It is essential to do the paperwork, i.e. ambulances leaving the scene should not neglect reporting to command. The report should include the number of patients, their priorities, if possible their identities and where the patients are being taken. Command should establish an area on the egress route where ambulances can be stopped and the above information obtained.
- At no stage during this incident was a command vehicle dispatched. These