

Practice of the route options can reduce the requirement for staff assistance dramatically. Practice is essential in all those cases in which assistance is required, especially in situations where one person is responsible for a number of others, in a classroom or workshop situation, for example. People with a learning difficulty or poor memory may need to practice their routes for escape frequently, perhaps on a monthly basis. If so, this need for regular practice should be written into a person's PEEP.

In any case, you have to make sure that all people with special needs who are likely to be in the building on a regular basis have their own PEEPs. Furthermore, they should be involved in the preparation and maintenance of their own plans. If at all possible, they take full responsibility for the whole development, delivery, and maintenance process, providing, of course, that they feel they have the capability and the desire to take on this level of responsibility for their own safety.

4.3 Planning for the Disabled

As we mentioned in the previous section, you will need to consider a number of different types of impairment when preparing plans for specific individuals or groups who have special needs, and we shall consider the approach to each of these categories in turn. These suggestions should be read in conjunction with the comments made in the previous section regarding "Concerns for the Disabled."

Throughout the process, you and your staff should always respect the dignity and independence of all those concerned when planning for their evacuation and bear in mind their willingness and capability to make a special effort in an emergency situation. Also, take account of their special needs, establishing what is possible and what is required. The whole process should be seen as planning with rather than planning for.

For the purpose of preparing PEEPs, we can recognize the following categories of disabled person:

- ▶ Mobility impairment.
- ▶ Hearing and deafness.
- ▶ Visual impairment and blindness.
- ▶ Cognitive impairment.

Persons in each category will have their own specific set of concerns to be taken into account and particular questions which need to be addressed when preparing to plan for their evacuation. Do not make assumptions on their behalf, especially not before engaging them in a dialog about their needs, capabilities, and willingness.

4.3.1 Plans for Mobility Impaired People

When writing a plan for, and with, someone who has impaired mobility, or who simply uses a wheelchair, the provision of reasonable modifications and changes together with the following areas of the environment should be taken into consideration:

- If stout handrails on all exit and escape routes are provided.
- Whether handrails are, or should be, on one or both sides.
- How far the person will be expected to travel on the routes in question.
- The availability of separate fire compartments to be used as temporary rest areas or to provide access to alternative escape routes.
- If special evacuation chairs, or chairlifts, can be provided.
- The location of any lift or elevator that can be used in the event of a fire.
- Whether willing and able people will be available to provide assistance.

Interview Questions for Mobility Impaired People: Be prepared to ask a number of questions when interviewing persons with impaired mobility regarding the development of their personal evacuation needs and expectations. A good starting point is to describe to them what is already in place for everyone and try to make sure that they do understand and appreciate the kinds of emergency you are planning for. Further questions may arise as the conversation develops, but the following questions should cover the main ground. All of these questions need to be prefaced with “in a real emergency” because it has to be made clear that we are not about to discuss routine or regular travel around the place.

In an emergency situation:

- Would you be able walk down the stairs, either with aid or unaided?
- How far would you be able to walk unaided?
- Could you shuffle or slide down stairs without any assistance?
- If you could shuffle or slide, how many flights of stairs could you manage, and would this be increased if assistance was made available?
- How many people do you think you would need to assist you?
- How many times might those assisting you need to stop for rest?

- ▶ Would handrails be of use to help your evacuation?
- ▶ Are there any places along the escape route where aids might assist you?
- ▶ How might your mobility be worsened, such as by smoke, etc.?
- ▶ Is your wheelchair electric powered or manual?
- ▶ Can you be carried in your wheelchair?
- ▶ Finally, would you be willing to take part in an emergency evacuation drill, or would you be prepared to evacuate only in the event of a real emergency?

4.3.2 Plans for Hearing Impaired People

When you are writing a plan with someone who has a hearing impairment or who is deaf, establish if any of the following are, or could be made, available:

- ▶ Some form of visual warning in the fire alarm system.
- ▶ A text-phone connected to the telephone network.
- ▶ A vibrating pager dedicated to emergency use.
- ▶ A fellow member of the team or department where the impaired person will normally be or someone who would take responsibility for alerting those with a hearing impairment.
- ▶ Fire wardens who would be responsible for ensuring everybody responds to the alarm.
- ▶ An appointed buddy for the individual.

Interview Questions for Hearing Impaired People: The following questions should be asked when you are interviewing persons with impaired hearing. These questions are designed to give a clear indication of their emergency requirements. Preface the questioning by describing what is already in place for everyone, and try to make sure that they do understand and appreciate the kinds of emergency you are planning for.

- ▶ Are you likely to be in the building out of hours?
- ▶ Are you ever likely to be alone in the building?
- ▶ Can you recognize the fire alarm wherever you are in the building?
- ▶ Do you work as part of a team or in a group environment?
- ▶ Do you have a dedicated text number?
- ▶ To what extent do you move around the building?

The answers to these questions should provide the right level of information upon which you can start preparing a suitable plan for this type of person.

A Practical Exercise: University of Lincoln

The University of Lincoln has to consider the needs of disabled staff, disabled students, and the possibility of disabled visitors, both known and unknown. The HR department is responsible for the policies and process with regards to the care of disabled staff. The university's HR department incorporates the assessed need for a PEEP through the staff probation and orientation checklist that is managed by line managers. This means that all new members of staff who require a PEEP can be identified and dealt with as an integral part of the induction process and at an early stage. Existing staff members who develop a disability can also make their needs known to their line manager, initiating the PEEP process. The student services department has a disability team with a robust PEEP process to take care of the evacuation needs of disabled students.

Fortunately, by embracing the requirements of disabled people within the university's BCP, it is possible to highlight their special requirements with senior management. In a recent exercise, the BC manager gave the incident management team an emergency scenario which identified a number of problems to be resolved. The university campus is a challenging site, divided by a railway line; as a result, the two halves of the campus have completely separate power supplies and different access routes.

The basic scenario was bad weather conditions causing transport and other difficulties. Over time, this led to a power outage in one part of the campus. Upon investigation, it was discovered that a disabled person was stranded on the first floor above the ground floor of the student services building. This individual was a wheelchair user. There is an external metal staircase exit from that floor as well as the internal stairs. Taking into account the weather conditions, it was considered a risk to try to make use of the emergency exit stairs. As this was NOT a fire, there was no urgency. It was deemed safer to operate the elevator mechanism manually. This exercise scenario had the full support of the disability team, a real disabled student, the health and safety manager, and the security team.

The strategy they adopted was to hand-winch the elevator up from the ground floor and then to reverse that maneuver to bring the disabled passenger down to ground level, thus enabling the person to get out to a place of safety. It took 45 minutes of hard manual work for the two members of the campus team to raise the elevator up one story. Although members of staff are routinely trained in hand-wincing elevators across all of the campuses, the team had not participated in a full test to establish the time and resource parameters to complete a single evacuation using this process. Altogether, it was almost two hours before the disabled individual was able to get clear of the darkened building. These parameters can now be

incorporated into future incident planning, employing simple mathematics to determine timelines for multi-story buildings.

Lessons Learned: Apart from the problem of the wheelchair above the ground floor, a number of other evacuation issues were raised during the exercise and the subsequent debrief. One of the factors which influenced their interest and concern was the large number of people who could potentially be involved in a full-scale evacuation. The university has up to 5,000 students who reside within close proximity of the Brayford Campus and a further 1,000 who live locally. Apart from the students, the university has around 1,100 support and academic staff, supplemented by visiting lecturers.

Additional Evacuation Considerations: One of the threats to the university site is the possibility of large-scale flooding which could be brought on by prolonged heavy rains. To cope with this sort of situation, the university has evolved a two-stage evacuation strategy in which the most vulnerable people leave the site whenever the flood risk is considered to be high and imminent and an evacuation instruction has been authorized and released by the incident management team. This first or pre-evacuation stage aims to get all of the disabled people, together with their care workers, off the campus and en route towards home or, if required, into temporary accommodation well away from the flood risk. The university has worked closely with both internal departments and external organizations to ensure that arrangements can be put in place to achieve a successful evacuation.

The university also recognizes the need for continuously monitoring the whereabouts and mobility of people throughout the campus. In other words, it is very difficult to know where everybody is at any one time. The movement of administration and service staff can be known with a fair degree of accuracy; most of them have a fairly static work style. Members of the academic staff tend to be rather more mobile and thus less predictable in their whereabouts. Students and members of the public form a volatile and mobile population which simply cannot be predicted or tracked. However, to offset these issues, the disability team works closely with each disabled student, reviewing timetabling requirements and assessing the unique needs of each student, as the student moves between planned academic events. All evacuation requirements for those students are diligently identified and exercised to ensure that they are effective.

One of the concerns of the university in this connection is the presence of a public right of way through the campus, making most of the buildings publicly accessible, apart from a few which incorporate access security measures. As a result, at any time, there could be an unknown, or undisclosed, disabled person somewhere on the campus.

Within a university, it is not feasible to employ a booking in and booking out procedure. Instead, the University of Lincoln has a skilled and trained team of fire wardens who are required as part of their role to ensure, to the best of their abilities, that all spaces within their area of responsibility have been cleared of people. This is then reported to the incident manager and forwarded on to the Fire Service appropriately. Discussions among colleagues continuously review the evacuation plans to incorporate the best methodologies to cover all evacuation scenarios.

4.5 High-Rise Buildings

The National Fire Protection Association (in the US) defines a “high-rise building” as one which is more than 82.25 feet (25 meters) high where the building height is measured from the lowest level of fire department vehicle access to the floor of the highest story which can be occupied.

Background: In 1852, Elisha Otis introduced the concept of the safety elevator, which incorporated a mechanism to prevent the cab from falling if the cable broke. The design of the original Otis safety elevator is somewhat similar to that which is still in use today. If the elevator should ever start to descend at an excessive speed, a mechanical device locks the elevator to its guides. Otis first demonstrated his clever new apparatus in 1854, at the New York exposition staged in London’s Crystal Palace in what was described at the time as “a dramatic, death-defying presentation.”

Three years later, on March 23, 1857, the first Otis passenger elevator was installed at 488 Broadway in New York City, although the first elevator shaft already existed in Peter Cooper’s Cooper Union building, opened in 1853. Cooper included an elevator shaft in the design for Cooper Union because he was so confident that a safe passenger elevator would soon be invented. The shaft was cylindrical because Cooper believed it was the most efficient design. Otis went on to design a special elevator for this grand institute of higher learning. Today, the Otis Elevator Company is the world’s largest manufacturer of vertical transport systems, i.e., escalators and elevators.

Without such devices, we would have very few high-rise buildings let alone huge skyscrapers. The competition to build higher and higher is largely fueled by elevator technology and innovative engineering. A major concern with all of these enormous structures is rendering them safe for the hundreds, sometimes thousands, of people who fill them on a regular basis. Such precautions involve preventative, protective, and reactive measures for all the various dangers which can be imagined. Lessons from the past provide valuable input to this type of thinking. Unfortunately, plenty of incidents in the 150-year history of tall buildings provide us with lots of evidence of what can go wrong and the likely costs and consequences of such events.

4.5.1 Categories of High-Rise buildings

From an emergency planning point of view, we can place high-rise buildings into two broad categories.

- ▶ Basic high-rise buildings – under 10 stories
- ▶ Skyscrapers – over 10 stories

Basic high-rise buildings: First, there are buildings which can be considered as a single entity where a single set of evacuation and other security measures can provide us with a comprehensive solution. The principal limitation here would be the number of stories involved. High-rise apartments of up to 10 stories existed in Roman times – long before the invention of elevators or escalators. There is no reason why we should not expect healthy people to make their way out of a 5- or 6-story building. It is quite common to find buildings of this size in which the only means of access to the upper floors is via a staircase. Presumably, it is unlikely that anyone with a physical disability would normally be situated above the ground floor. Therefore, you can rely on the stairs as a valid escape route in an emergency. Ideally, alternate routes should be provided, but many older apartment blocks have a single entrance and only one set of stairs. In these instances, it is obviously wise to invest in good fire detection and prevention measures such as smoke detectors and sprinkler systems.

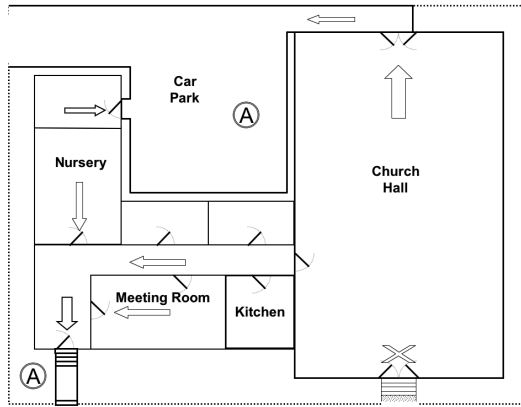
The higher the building, the more complex the problems become, with some of the super-tall skyscrapers requiring two or three hours to get everyone out of the building.

Skyscrapers: Once we get to the second type of building, one with 10 stories or more, then you have to take into account that the majority of the people will have reached their destination through the use of electrical means, such as elevators, which would be probably be out of action in an emergency. Evacuation then becomes more complex because people may need to rest on the way down, and a proportion of the population is likely to be disabled with special emergency requirements of some sort. The provision of safe refuges, buddy systems, and various kinds of travel aids has to be considered in the planning process.

The higher the building, the more complex the problems become, with some of the super-tall skyscrapers requiring two or three hours to get everyone out of the building. Fireproof compartments need to be considered as a partial solution along with multiple exit routes, ideally one in each corner of the building leading to separate exits and different assembly areas, offering a choice of evacuation routes.

Importance of Your "Unofficial Inspection" of a Site

As part of my research, I have taken to reading all the emergency instructions in the various buildings which I visit on a regular basis. Prior to this, I have always assumed, as most people do, that I would always



manage to find my way out to safety in the event of an incident occurring. I also adopted the common view that it wasn't going to happen when I was around. The term for this attitude is complacency, a widespread condition which often leads in the direction of negligence with regrettable consequences.

One of these unofficial inspections concerned a meeting room which my gardening club uses as a regular venue to hold talks and show prize specimens. This meeting room is one of the side rooms of a church, which also houses a children's day nursery and several other separate areas. The doors to the four entrances into different parts of the building are usually locked except when that particular area is in use. We enter and leave the building by the southwest door.

I found emergency instructions posted by each of the exit points and fire instructions alongside the fire extinguishers which were mounted nearby. A separate set of emergency instructions was posted on the bulletin board in the lobby area close to our southwest doorway.

Two separate emergency evacuation strategies seemed to be available. Only one escape route could be accessed from the main church hall, leading out to an assembly area in the parking area alongside the building. Apparently, the south door was not to be used in an emergency, presumably because it led straight out onto the road. The other escape route, the one for most of the rest of building, led out to a small assembly area on the grass between the building and the cast iron boundary fence. Actual maps showing the whereabouts of these two assembly areas were included only on the poster in the lobby; elsewhere, the assembly areas were simply described in words as either "parking lot" or "Ventnor Avenue."

Depending on which notice people might have read, those escaping from the nursery or our meeting room would either gather in the middle of the road (Ventnor Avenue), or they would congregate on the small patch of grass under a tree immediately outside the blazing building. Meanwhile, people escaping from the church hall would be standing alongside a blazing building surrounded by cars full of gasoline.

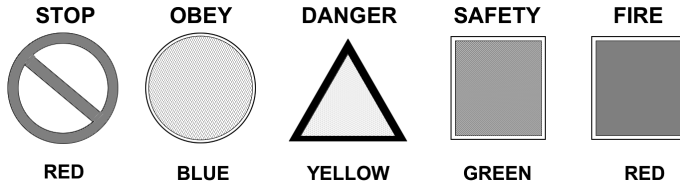
According to the instructions posted in the main hall and in our meeting room, "All members of the congregation who have a disability have their own personal emergency escape plans." I might be cynical, but somehow I doubt whether ALL of the disabled members of ALL congregations have a PEEP. However, such a notice might well be enough to satisfy anyone who is asked to check whether the church conforms to the relevant health and safety regulations.

The thought of a large crowd milling around in the dark among the parked cars while the church burns down around them reminds me of the scene I witnessed after a fire where several cars parked alongside a burning building caught fire before the firefighters had an opportunity to bring the blaze under control. At least one of the vehicles had exploded. If any people had been nearby, they would undoubtedly have been severely injured.

I have now arranged for our relatively small crowd to gather in a nearby neighbor's yard in the unlikely event of a fire on a Friday evening. In exchange, they now have a nice plant and are invited as guests to our December holiday party and our summer barbecue. One day they may even come around to our viewpoint and join the club. I raised my concerns with the churchwarden, who is going to bring the matter up before the next meeting of the Committee of Elders. The commander of the local fire and rescue service says the firefighters will close the road and move everybody well away from the scene immediately upon arrival. In fact, they plan to dispatch three vehicles: two to deal with the fire and one to deal with the occupants and the public. Hopefully the elders will modify their instructions to align them with the commander's intentions.

Many of the signs used in the church were the common off-the-shelf ready-made plastic ones with a small space in which to write a description of the assembly area with a ballpoint pen or a permanent marker. Such signs are common; they are an affordable and simple way of complying with the regulations and providing people with the information they might need. Unfortunately, the ink used in most of these pens or markers may fade and becomes illegible after a few years, especially where chemicals are used for cleaning purposes. One solution is to use something like plastic tape which lasts quite well or use enamel paint to do some sign writing. A third, short-term or temporary, measure would be to produce sticky labels using a laser-jet printer, but they are unlikely to withstand the attentions of an enthusiastic cleaner for very long.

The 5 broad categories of safety signs are shaped and colored like this:



Generally five broad categories of signs relate to safety:

- ▶ *Prohibition* signs, which say “Stop” – a red circle with a diagonal red line and a black symbol.
- ▶ *Mandatory* signs, which say “Obey” – a blue circle with a white symbol.
- ▶ *Hazard* signs, which say “Danger” – a yellow triangle with a black border and a black symbol.
- ▶ *Safe Condition* signs, which indicate “Safety” – a green oblong or square with a white symbol or text.
- ▶ *Fire Equipment* signs, which indicate “Fire Protection” – a red oblong or square with a white symbol.

Preference is given to symbols (also known as pictograms) rather than words because words may not be entirely clear to those with reading, learning, or language difficulties.

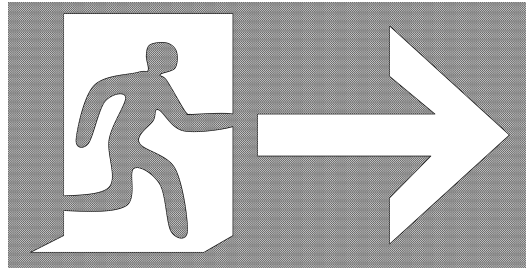
It is the safety group which we are principally concerned with. Emergency evacuation signs are uniformly rectangular and green, bearing symbols or words which convey information about the route out towards safety or indicate the safe space once it has been reached. Green safety signs are also used to indicate the availability of first aid. Preference is given to symbols (also known as pictograms) rather than words because words may not be entirely clear to those with reading, learning, or language difficulties. Such difficulties will almost certainly be aggravated by the circumstances of a real emergency. Almost anyone can understand what a simple arrow indicates – the only question is, Which way is the arrow pointing?

Here is a typical emergency escape route sign, a plain green background with a large white arrow superimposed to show which direction the people should go. The white pictogram showing someone hurrying towards an open door

implies that the indicated route will lead a person out to safety. The overall message of “hurry out in this direction” is adequately conveyed without the need for text. The color green means safety and the symbols suggest where it can be found.

4.6.2 World-Wide Developments

The original version of the “running man” symbol was designed in 1982 by Yukio Ota. It is now in common use in Japan and South Korea, referenced in the British Standard (BS 5499) and New York City local law



(LL26) and is also used in Australia, Norway, and throughout China. However, it is worth noting that the actual implementations of this design do vary slightly. In North America, such exit signs are often white on a red background; local codes dictate whether the background color should be green or red.

In the UK, since 1996, text-only signs for escape routes and assembly areas are not permitted under the current fire regulations. All emergency evacuation signs must indicate their meaning through suitable symbols. These symbols are laid down in the British Standard (BS 5499). Within Europe, an EEC Directive (EEC/92/58) describes the symbols for emergency evacuation signs. The differences between these two standards are relatively minor; thus, there is little chance of confusion for the European traveler who visits or returns to the UK.

Australia has its own standard, “AS 1319 – 1994: Safety Signs for the Occupational Environment.” In the US, OSHA publishes a fact sheet with concise guidelines about emergency exit routes and the associated signage. This fact sheet offers practical guidance on the implementation of the relevant part of the Code of Federal Regulations (part 1910-E of CFR #29).

Further details on standards and guidelines can be found in the chapter on Rules and Regulations and in the EEP Toolkit.