Safety practice

# Emergency procedures

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## Summary

Effective emergency procedures that support the people who have to detect, diagnose and respond to hazardous situations can reduce the likelihood that minor incidents will escalate. Unfortunately, procedures often fail to support the people who have to deal with the early stages of an incident. This paper examines the reasons why emergency procedures may not provide adequate support, and sets out some guidelines to help in writing more effective ones.

Keywords: Emergency procedures, response, planning

## Procedures for initial response to emergencies

Although our aim is always to prevent accidents and incidents; we know that the potential can never be eliminated completely. In the process industry, where we have to deal with hazardous substances and conditions, the way we respond to the early stages of an incident can make a difference to the final outcome. If a hazardous situation is detected early, diagnosed correctly and an effective response is implemented the consequences can usually be minimised. However, if any part of this chain fails, the situation can escalate, potentially leading to a major accident.

Effective emergency procedures that support the people who have to detect, diagnose and respond to hazardous situations can reduce the likelihood that minor incidents will escalate. To do this the procedures must be relevant to the hazardous situations that can occur and provide strategies that can realistically be implemented. Also, they must be presented in a way that ensures critical and useful information is communicated to people who will be dealing with a demanding and stressful situation.

There are three key factors that need to be recognised about the initial response to a hazardous situation:

1. It is usually carried out by the process operations teams and not dedicated emergency personnel;
2. It is a situation that is not clearly defined;
3. There are limited resources available.

As an incident develops the required actions will usually become clearer and more resources become available. Hence, it is the early stages where we are most vulnerable to mistakes. Unfortunately, emergency procedures often fail to provide effective support to the people who have to deal with these early stages. Typical issues include:

- wordy, long and overly complex presentation;
- reliance on text, and not using photos, diagrams and schematics;
- general information provided instead of useful instructions of what to do;
- unreasonable time scales assumed;
- conflicting goals set by different plans or parts of the same plan;
- responsibility not properly delegated;
- not tested properly in emergency exercises;
- instructing people to make decisions without giving them clear criteria or guidance on how to do this;
- assigning actions to people who may not be available (i.e. named individuals or people in daytime roles when the plant operates 24 hours per day);
- failure to learn from previous incidents and exercises; including feedback from the people involved.

This paper uses examples taken from my consultancy experience to illustrate where emergency procedures fail to provide appropriate support.

## "Doh – It's as big as a phone book" (Homer Simpson[1])

The process industry has a tendency to produce procedures that are more wordy and complex than they need to be. Whilst this is not ideal for 'normal' operating procedures, it can have very serious consequences in an emergency.

I was asked, with a colleague, to review a site emergency plan and to make recommendations on how it could be improved. We arrived on site to be presented with a procedure of over 250 pages, the majority of which was in 'standard' procedure form of text in a small close-spaced font. The owners of the plan suggested that we had underestimated the time it was going to take for us to complete a review. Apparently, the site's training course covering the emergency plan took nearly a week to complete because there was so much to get through.

Our approach was to identify the main activities being described in the procedure. We found that these could be described in 25 pages; using a larger, wider-spaced font. The client was a little sceptical at first as they assumed that we had missed out a lot of important information. In fact, we were able to demonstrate that their 250 page procedure had a number of omissions that were covered in out 25 page version. Everyone agreed that our procedure was far easier to read and understand; and provided far better support to people who would be managing any incident.

The site acknowledged that, in hindsight, their procedure had developed into an unwieldy document for a number of reasons, including:

- the site's standard procedure template had been used, and this encouraged people to produce wordy documents;
- the site was large and complex, and there was a subconscious expectation that the emergency plan had to be similarly large and complex;



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- the procedure had undergone multiple revisions, which almost invariably resulted in text being added and very rarely resulted in text being deleted;
- the main aim had been to document the emergency management system, and very little thought had been given to how it would be presented to the people who had to follow it.

The last point is particularly important. Whilst dedicated emergency response personnel have plenty of opportunity to read and practice emergency procedures; operations teams, who have to manage the early stages of an incident, do not. Hence, they have much greater need for procedural support.

## Critical activities overlooked

There are lots of things to be done at the start of the incident and it is very easy for seemingly obvious ones to be forgotten or delayed. A process operator recounted an incident to me where he was part of a small team who experienced a fire on their plant. They did everything except call the emergency services. They knew they needed the emergency services to attend, but simply overlooked the requirement to make the phone call. When the blast furnace exploded at Port Talbot Steel works, the failure to evacuate the area when trying to recover the unstable furnace resulted in three people dying[2].

One of the key reasons for writing emergency procedures is to remind people about the critical things they need to do. To achieve this we need to understand why things don't get done. In a small team the usual reason is that people have so many things to do they forget or just don't get around to doing it. In larger teams it can be that people assume someone else has done it. This highlights the need to understand who is going to use our procedures. Also it highlights the importance of recording what has been done, which can be supported if we present parts of our procedures in checklist form.

## Only supporting response to the worst case incidents

One of the reasons people don't refer to emergency procedures during the early response of an incident is that they feel they are not appropriate for the situation they are dealing with. This is often because they describe what to do in the worst case scenario, which seems to be 'over the top' at the time. Most incidents do start small, and if people rely on their memory and do not follow procedures they are liable to make mistakes.

Examples of where emergency procedures can be viewed as inappropriate are instructing that emergency services must be called, the site must be evacuated and the plant shutdown for every incident. If people feel these steps are unnecessary in most cases they will quickly lose faith in the emergency procedures and stop using them.

There is a counterargument to this standpoint that the standard response to any incident should be to overreact in the first instance as it is always possible to scale back if appropriate. If this is really the requirement it needs to be very clearly communicated and backed up continuously in words and action from senior management. However, this stance is usually driven by risk aversion and does not take account of natural human behaviour, and so is very difficult to sustain in practice.

In most cases the best solution is to provide a tiered set of responses, depending on the nature of the incident. As well as providing support to respond to each type of incident, the procedure needs to guide people to make the correct assessment and to be looking out for potential escalation and the need to scale up the response. This approach needs to be tested and practiced to make sure people become used to making the appropriate decisions for different scenarios and circumstances.

## Who takes the lead?

It is very common for emergency procedures to assign roles according to specific operational roles (i.e. the Incident Controller shall be fulfilled by the Shift Supervisor), which is then applied in all emergency exercises. If that person is not immediately available, for example the Supervisor is at a meeting or on plant, it can mean that critical roles are not fulfilled. Specific activities may not get done and the team may not be able to function effectively.

The opposite approach can be to not assign any roles to any person. This was the approach taken by one of my client's when implementing a 'self-managed' operations team. In this case the procedure was that critical roles would be filled in an emergency by the first people available. Whilst potentially workable, this approach required a very high level of support in the form of procedures and training, which were not forthcoming in this case.

When writing emergency procedures it is important to be realistic about who will be available immediately, how long it will take for others to become available and to accept that in some cases people will simply not be available. On many sites, it is usually a control room operator who will be the first person to become aware that an incident is taking place, and who will have to initiate the initial response.

## Who has authority?

There is some logic to the idea that during 'normal' working hours the management team (day workers) have authority. If there is an incident they should be informed immediately and will take critical roles, including making decisions about how to respond. But the reality is that day workers are present for less than 25% of the time. Hence, it is the shift workers who have to deal with most incidents and it is far more important that they are skilled in this role and take authority.

Members of the management team who want to keep some authority will often accept calls 'out of hours' when there is a problem. This can create grey areas where shift teams are sometimes reluctant to take decisions without first calling their manager. One of my clients had a significant incident at 10pm one evening. Although some action was taken by the duty operations teams, a lot of time in the first hour was spent calling managers at home and waiting for them to arrive to take over.

Whilst the willingness of operations personnel to act in an incident is largely cultural, emergency procedures can help if they provide effective support for assessing incidents and taking appropriate decisions. Not only does this help people to perform these actions correctly it also reassures them that they cannot be held liable for making a decision that, in hindsight, proves to be incorrect because they have followed a defined process. Once again, regular testing and practice is essential if people are to become comfortable with taking authority.

## Knowing what to say

It is a simple job under normal circumstances to make a phone call or an announcement on a public address system. But during an incident people are under stress, they don't know all the facts and getting the correct message across can be critical.



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When two trains collided in the Severn tunnel in 1991[3] the emergency services went to the wrong end of the tunnel, which caused significant delay to the response. The correct location was known but the wrong message was given. In another case, when I observed an emergency exercise at a client's site, someone in the command centre wanted to make an announcement on the PA. They pressed 'transmit,' but only managed to say "all personnel .... please standby."

Including a set of pre-prepared scripts in emergency procedures can be an invaluable support to people who need to pass on critical information during an incident, particularly in the early stages.

## General vs specific instructions

Many emergency procedures provide only general instruction on how to respond to any type of emergency. The reason given is that 'you can't write an instruction for every possible scenario.' Whilst this is entirely correct, it means that the people responding to incidents have to decide themselves what to do, which requires an in-depth knowledge of the hazards, the potential consequences and acceptable and effective mitigation activities. This is too much to remember, especially on a site that deals with a number of different hazards.

The good news is that, when you start writing instructions for specific scenarios you usually find that the number of options is not as great as you imagined. In most cases the complexity comes from the potential for a number of issues to occur at the same time. The development of plans for specific incidents that supplement the general response procedures can be particularly effective at identifying the best method of response, resources required and potential for escalation.

I worked with a client to generate a suite of emergency job aids. When the site experienced a significant and complex incident the operators were not sure what to do at first, but they picked up the job aids and realised that a couple of these could be used together to give them a strategy to respond. Their feedback was that the job aids help them understand what was happening and to develop a prioritised plan that they could implement systematically.

## Practice makes perfect

Whilst this paper is focussed on writing better emergency procedures it is vital to realise that this won't achieve anything if they are not used. Reformatting procedures and making them look nice does not automatically mean they will be used.

I observed an emergency exercise at a site. Copies of the emergency procedures were laid out at all the desks. Although the exercise lasted for over an hour, no one looked at them. Everyone was confident that they knew what to do and didn't think they needed any help. In this case one step missed was a requirement to check wind speed and direction. Without doing this in a real incident it is possible that emergency services would have been harmed when arriving at the site as they could have been driving through a gas cloud.

When I tell clients that they need to make use of emergency procedures a key requirement in exercises and actual incidents their response is often that they need people to act immediately and not 'waste time' going to a procedure. I totally agree that I expect the person who first becomes aware of an incident (typically a control room operator) to act quickly. But I also know that in an incident it is very easy to forget key steps or to make poor decisions. My expectation is that getting out the procedure may not be the first thing to do, but very quickly someone needs to be looking at them in order to check that the correct response has been activated.

Another issue with emergency exercises is that companies often fail to review the outcome with any real objectivity. Review discussions, if they happen, often emphasise how well the exercise went, and the opportunity to learn and improve is missed.

## Conclusions

I see a lot of emergency procedures and unfortunately they are often poor in their critical role of supporting people during the early stages of an incident. The following guidance will lead to improvement:

- It will normally be the operating team that have to deal with the initial stages (first 10 to 20 minutes) of an incident and not dedicated emergency personnel;
- For procedures to be effective at providing the necessary support they need to be clear, concise and laid out well;
- Text describing how your emergency management system functions is important to the company, but not to people dealing with an incident and so should be presented separately;
- The importance of the step is what determines if it needs to be included in the procedure, not whether it appears to be obvious or not;
- Presenting your procedure as a set of checklists can ensure completion of a step is recorded (with a time);
- If your procedure only describes how to deal with the worst case scenarios people may see it as irrelevant to the actual incidents they experience. Providing a tiered set of responses is one way of overcoming this;
- Procedures should support diagnosis and decision making; as well as giving instruction on how to act;
- Procedures should balance the assignment of roles to specific people with the likelihood of them being absent. Teams need to accept that people may be incapacitated by the incident and so not available to respond;
- The operating team should take the lead in all incidents. If managers take over when they are present (i.e. during the working day) the authority to act can be undermined;
- Procedures should include standard scripts on what to say in critical communications, including telephone calls to emergency services and PA announcements;
- Procedures should provide a mixture of general and scenario specific instructions;
- Using procedures need to be practiced and should be a key required for all emergency exercises;
- Robust management of change is required to ensure procedures stay relevant and the principles of supporting people in the early stages of an incident are not undermined by revisions.

## References

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