

Incident

Failure to manage organisational change – a personal perspective

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Summary

1.20pm on the 21 September 1992 was a moment that changed my life forever and I was one of the lucky ones. A large jet fire lasting less than two minutes destroyed the office I was due to move into and caused the death of five people. Numerous papers and articles have been written about the fire on the nitrotoluene plant at Hickson & Welch and a detailed investigation report was published by the Health and Safety Executive (HSE). Failure to effectively manage organisational changes leading up to this incident is used by the HSE as a case study in guidance on organisational change and major accident hazards.

The aim of this article is to provide a personal perspective of the organisational changes leading up to the incident, how they affected me and the lessons I learned from those changes.

Keywords: Management of change

Background

After graduating as a chemical engineer, I started working at Hickson & Welch in 1984 as a trainee plant manager on a multi-product batch chemical plant. The company management structure was an old style hierarchical one. Plant managers managed small plants with each shift team comprising a shift supervisor and a small number of shift operators. Plant managers reported upwards to an area manager, who was responsible for a number of plants.

A well-established but informal mentoring and development system was in place. Most of the plants on site were managed by two people, a chemist and a chemical engineer and new starters were normally teamed up on a plant with an experienced manager. New graduates picked up hands-on operational experience by working with experienced shift supervisors or experienced shift operators.

In addition to carrying out the day to day management, plant managers also carried out troubleshooting and optimisation. They carried out functional design for changes to plant and processes and were responsible for implementing and commissioning those changes. Management of health and safety on each plant was clearly defined as the responsibility of the line management. This was simple to understand due to the clearly defined hierarchical management structure. My early career and development followed this established path.

In 1989 the company started an independent third-party audit process aimed at identifying weakness in their health and safety management system. The site operated a fairly effective plant modification system and an improvement programme was implemented with the aim of reducing the lost time accident rate. An improved permit to work system was introduced and a new accident / incident investigation system was put in place. In hindsight, it is interesting to note that the absence of a formal organisational change management system was not identified by the audit.

Organisational changes leading up to the incident

1991 was a significant year for me personally and it was also a key year for the company. My first child was born and major organisational changes were introduced at work a few months later. The hierarchical management structure was changed to a matrix management structure. Plant managers and shift supervisors were removed from the management structure. I had to apply for one of several new job roles within the new organisation and go through an interview and selection process.

My job title changed to process technologist and I reported to a new line manager, but I was still sat at the same desk on the same plant, doing much of my old job. My day to day priorities were still set by the area manager. My main communication channels were with the area manager and newly created role of shift team leader, but my line management communication was with a technical manager. For example, operationally I still had to issue hot work permits and confined space entry permits for the plant I was now only technically responsible for. (See Figure 1 and 2).

Human performance influencing factors

Looking back at the organisational changes that were occurring and retrospectively applying modern human factors assessment methods, it is easy to identify the human performance influencing factors that existed during and following the change. I can share some of the factors that I was personally affected by and I believe many other people were influenced by similar factors and probably to a greater extent than I was.

Person factors — factors in my life that affected my performance:

- Fatigue — I was fatigued, lack of sleep and a first-born baby go hand in hand. I also had a daily commute across or

Figure 1 – Production department management structure before the change (illustrative version)

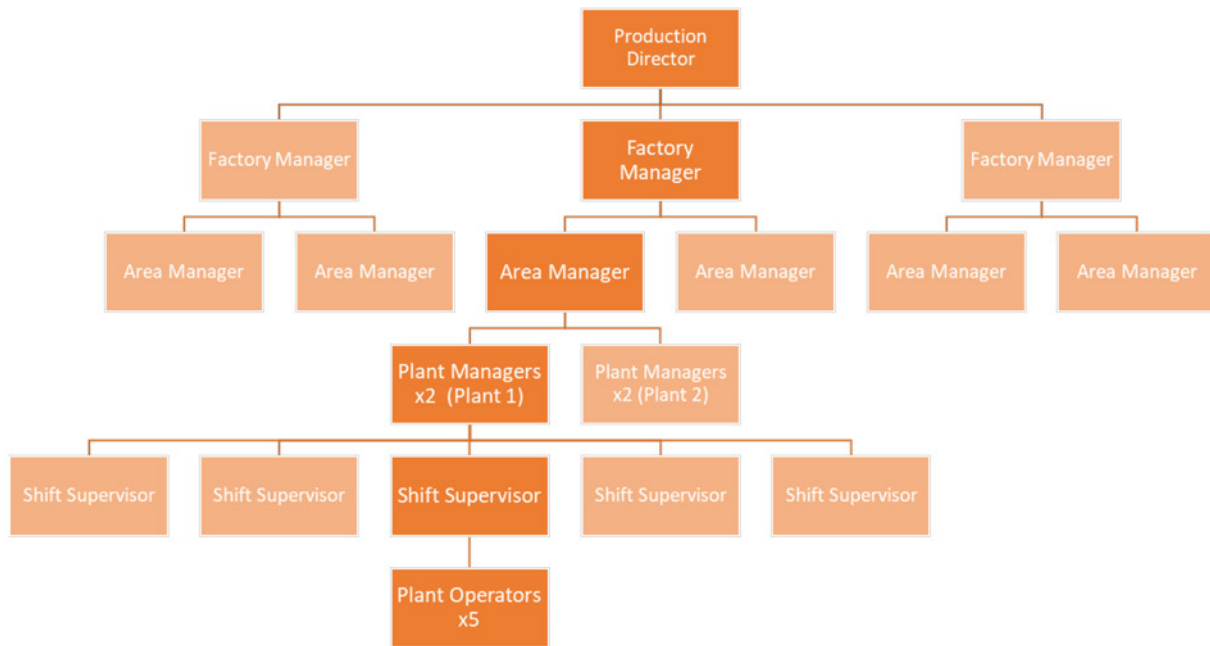
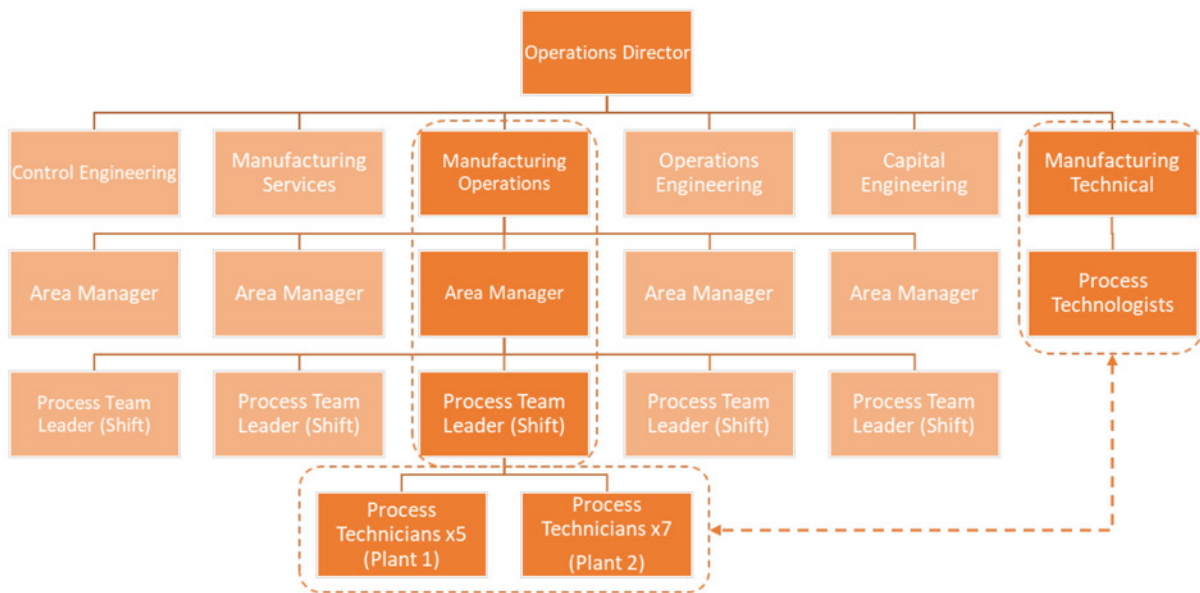


Figure 2 – Operations department management structure after the change showing the dotted line reporting between the technical and non-technical roles within manufacturing



around Leeds that took 45–60 minutes each way.

- Stress / morale — I was stressed and my morale was low. This was my first experience of major organisational change. The processes of being interviewed by people you have worked with for seven years for a job role that you currently do sapped my morale.
- Work overload — The plant I was responsible for constantly needed expansion of a number of product streams and I was very busy at work. There was also the extra workload caused by the transition of responsibilities between the old and new management structures.

Organisation factors — factors within the organisation that affected my performance:

- Work pressures — pressure to implement the organisational change caused a loss of focus on the health and safety improvement programme
- Clarity of roles and responsibilities — matrix management was not a well established or well understood model and there was a lot of confusion about who was responsible for what.

Following the organisational change, it was recognised that

my morale was low. After discussions with my line manager and the relevant area manager, it was decided that it would be mutually beneficial for me to move and become technically responsible for the nitrotoluene plant. It was planned for me to move offices and plants in September 1992. My actual move was postponed by several weeks as minor structural changes were needed to remove a large built-in cupboard from my new office.

The incident

After lunch on 21 September 1992, I didn't follow my normal routine of calling into the nitrotoluene plant office for a coffee and a chat. A couple of my colleagues were not at work and I knew the area manager and shift team leader were very busy that day, instead I walked directly to my plant office. About 20 minutes later I heard a loud roar and looked out of my office window. I saw a large flame and knew something serious had happened. From the location, size and direction of the flame, I knew I had been very lucky. I also realised what the consequences of that flame were likely to be. The fire alarm sounded and I went into robot mode and responded, but my thoughts were elsewhere. It was a long day for me, but I was one of the lucky ones and I knew people had been killed or seriously injured and the effects on their families would be immense.

The aftermath

The following day, I turned up to work as normal and did whatever needed to be done. Over the next week or two, along with many others, I attended five funerals. One of those funerals was for someone who I classed as a mentor, who took me from a fresh graduate and taught me about hands-on operation of chemical process plants. Most importantly he taught me to listen to people, even when they were telling me things I didn't want to hear. Another funeral was for a young manager who had recently become a father about a year after I had.

As time went by, things seemed to get back to some form of normality. I carried on working at Hickson and Welch in a variety of operational roles. I worked closely with the safety, health & environment department and human resources department developing and implementing new management standards. I eventually became the production manager for the nitrotoluene plant area and had the unfortunate task of planning and managing the major organisational change of closing down the nitrotoluene process. My experiences led me to change my career path and become a process safety and loss prevention professional.

Lessons I learned

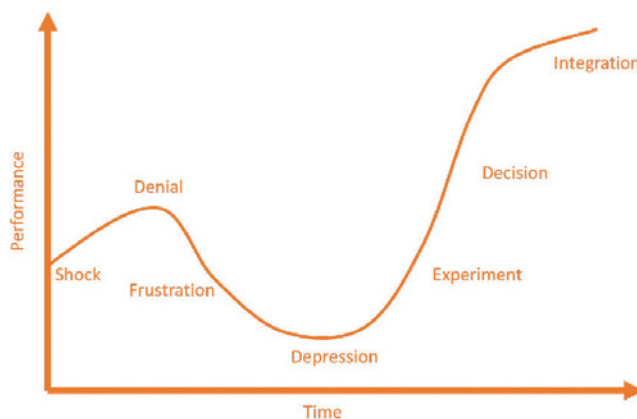
The aim of this article is to share the lessons I have personally learned from the incident and during my subsequent career. Readers who want to know more about the incident, the underlying root causes and the wider lessons learned can read the publications listed in the reference section and numerous other LPB articles on the incident.

Changes in the process industry can affect the plant, the process and the people and should follow a typical plan, do, check, act cycle. The impact of change on plant and process

can generally be predicted, measured and monitored by engineers and scientists by following this type of cycle:



The impact of change on people is much more difficult to predict, measure or monitor. However, the journey people go through is predictable and is illustrated using the change curve. This is based on the Kübler-Ross Model^{3,4} for the five-stages of grief, which has been expanded to cover other types of personal loss such as job loss, income loss or major rejection.



People are initially shocked or surprised when they are made aware of a significant change that could affect them. They then move onto a denial stage, where they are in disbelief and look for evidence that the change isn't true. They then recognise that the change is real and things will be different, and become frustrated or even angry. Depression sinks in and morale, motivation and performance are low.

It is important to remember that everyone is different and has their own individual (person) factors. People move through the change cycle at different speeds. Without careful management, some people can become stuck at the depression point and fail to move on. If this occurs, their performance never rises back to previous levels.

For effective change management, a staged process should be followed and managed by an appropriate team of competent people. Each stage should be considered as an individual plan, do, check, act process. The stages should be carried out in their defined order ensuring that the check and act steps of each cycle are not skipped. The check and act steps are important as they verify that the stage has been carried out as intended (See table overleaf).

Organisational changes are often implemented before

Stage	Purpose
Definition & justification	To define the scope and purpose of the change in sufficient detail to allow the impact of change to be assessed.
Assessment	To carry out suitable and sufficient assessment(s) to identify potential adverse effects that the change may have and to manage them by identifying safety measures that are required before the change can be implemented
Approval	To provide the appropriate level(s) of approval for the change to be implemented and confirm the competence of the team of people involved in assessing and implementing the change
Implementation & handover	To ensure that all relevant safety measures have been put in place and have been checked before the change is put into place or used
Closure & review	To ensure that any assumptions made at earlier stages remain valid and to ensure all outstanding actions and any implementation or commissioning issues have been closed out and to review the effectiveness of the change after an extended commissioning or operational period.

people have reached the appropriate point on the change curve. It is also too easy to close off the change too soon, before people have moved through the full journey of the change curve.

Potential adverse effects of major organisational changes can be difficult to assess as there are a wide range of influencing factors. Changes within an organisation can vary widely in terms of depth and complexity. They can have a wide range of impacts to major accident hazards, as well as occupational health, safety and environmental hazards.

At the lower end of the scale, there are insignificant changes such as a change in a function or department or individual post which has little or no impact on major accident hazard safety. These types of change can often be pre-assessed, pre-approved and managed by human resource department procedures and line management.

At the upper end of the scale there are changes with potential impact on major accident risks, such as:

- large scale downsizing or outsourcing of a major accident hazard significant function;
- organisational change due to major changes to the site risk profile e.g. introduction of a new, or major expansion, of a chemical process plant.

Changes at this end of the scale are likely to require detailed assessment considering:

- tasks and individuals;
- training needs analyses / competence assessment;
- workload and resource assessment.

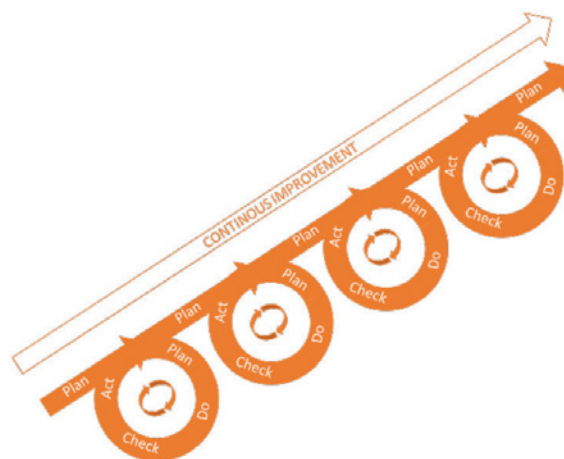
Approval for these types of major change would normally require corporate or board level approval. Regulators, e.g. UK COMAH Competent Authority, may need to review the change before it is implemented.

In addition, experience following mergers and acquisitions has recently led the Organisation for Economic Co-operation and Development (OECD) to publish specific guidance on change of ownership in hazardous facilities⁵.

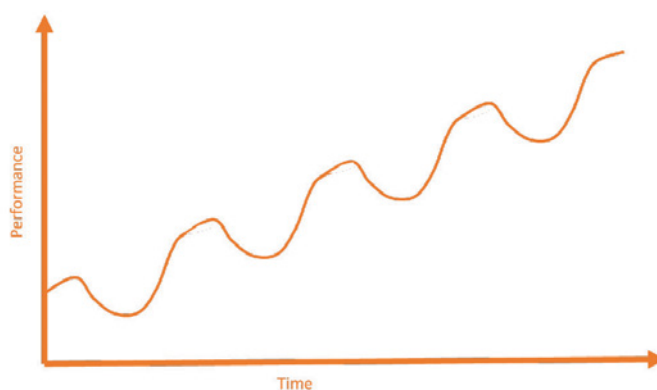
It is important that organisational changes are formally categorised based on their potential impact and their complexity. This allows the appropriate level of resources, assessment and approval to be defined at the planning stage.

The effect of continuous change

Most organisations strive to improve the effectiveness and efficiency of plant and processes. Higher standards are set and changes form part of a continuous improvement cycle. In practice the next change often starts just as the previous change is completing the plan, do check, act cycle.



The effect of this on the performance of people is illustrated below. If a new change starts before people have fully integrated with the previous change, some people can remain at the low point of the first cycle.



Conclusions

In order to effectively manage organisational change a staged process should be followed, and planning should be started as soon as the change is being considered. A plan, do, check, act cycle should be followed at each stage of the change management process, to ensure each stage has been completed as intended.

Organisational changes should be categorised based on their potential impact and complexity to allow the appropriate level of assessment and approval to be determined. The

same amount of effort and resources should be committed to managing an organisational change as are put into managing an equivalently sized or complex plant or process modification.

Compare the amount of effort and resources put into the design and hazard studies for a major plant or process change and ask yourself "are we putting the same effort and resource into managing organisational change?".

The people affected by the change should be involved in the process as early as possible. Their concerns should be carefully listened to and form part of the assessment process. The assessment process needs to consider potential risks caused by the change and also consider potential risks caused by the transition process. The workload on those affected by the change and those managing the change should be carefully assessed.

Training and other support needs required for the transition should be assessed, identified and made available. Support needs to be available for as long as required to complete the full transition to the point where everyone is fully integrated into their new roles.

Human performance influencing factors (job factors, person factors and organisation factors) are listed in published human factors guidance. These require consideration for the transition process as well as for the proposed new organisational change.

References

1. *The fire at Hickson & Welch: A report of the investigation by the health and Safety Executive into the fatal fire at Hicks & Welch Ltd, Castleford on 21 September 1992*, HSE (1994), ISBN 0 7176 0702 X
2. *Chemical Information Sheet No CHIS7, Organisational change and major accident hazards*, HSE (2003)
3. Kübler-Ross, E., *On Death and Dying*, Routledge, (1969), ISBN 0-415-04015-9
4. Kübler-Ross, E., *On Grief and Grieving: Finding the Meaning of Grief Through the Five Stages of Loss*, Simon & Schuster, (2005), ISBN 0-7432-6344-8
5. *Guidance on Change of Ownership in Hazardous Facilities, Environment, Health and Safety*, Environment Directorate, OECD (2018)