

## COMAH REMODELLING: THE COMAH COMPETENT AUTHORITY AS A LEARNING ORGANISATION FOR MAJOR HAZARDS<sup>†</sup>

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The remodelled COMAH regulatory regime went live on 1 April 2010 after a two year project to develop options and deliver the changes. This paper describes how the remodelled Competent Authority (CA), comprising HSE, the Environment Agency and SEPA, is a learning organisation for major hazards. This includes aspects of leadership, self-examination, options development, new intelligence systems, hazard ranking/performance rating system and new arrangements for the faster release of learning from incidents. It also focuses on the process of the COMAH remodelling project in creating the required organisational change, including leadership, involvement, communications and training. This is put in the context of earlier work on the science of learning organisations for major hazards. The paper uses the remodelled CA as a case study to make the practical steps to becoming a learning organisation more accessible and usable by others.

KEYWORDS: Learning organisation; COMAH; intelligence; Seveso

### INTRODUCTION

Onshore major accident hazards are regulated by the COMAH Competent Authority (CA), comprising the Health and Safety Executive (HSE), the Environment Agency for England and Wales (EA) and the Scottish Environment Protection Agency (SEPA). The COMAH Regulations (HSE, 1999) were 10 years old in 2009 and it was an appropriate time for the CA to review its implementation and see what improvements could be made. The UK has an excellent track record in implementing COMAH but there was some evidence, in that major accidents continue to occur, that the COMAH regime may not be delivering the desired benefits. To ensure that the regulation of major hazards was optimised the CA decided to review and revise their approach through the 'Remodelling COMAH programme'. There were many examples of HSE, EA and SEPA working well together but there was also a need to co-ordinate the functions of the CA more effectively.

For these reasons, a two-year project 'COMAH Remodelling' (CRM) was initiated, with strong leadership from the CA Strategic Management Group (CASM), comprising senior representatives from HSE, EA and SEPA. One of the objectives of the CRM project was that the CA should be a learning organisation in terms of the most effective and efficient way to operate a major hazards regulatory regime. This paper will discuss the project, its outputs and its process from that perspective.

### LEARNING ORGANISATIONS FOR MAJOR HAZARDS

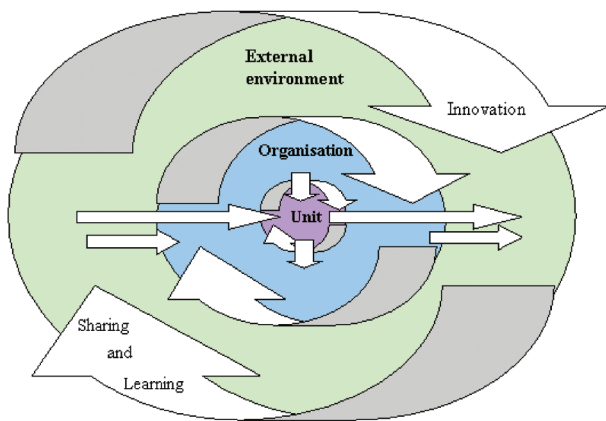
The concept of learning organisations was developed as a tool for business management, concerned with productivity and efficiency. Senge et al. (1994) suggested that the

organisations that truly excel are those that discover how to tap into people's commitment and capacity to learn at all levels of the organisation. It has been applied in a number of organisations including some which operate major hazards processes, such as Shell (Boyle, 2002) and BP (Collison & Parcell, 2004). British Energy (Beswick & Kettleborough, 2007) in the nuclear sector has applied learning organisation principles to the improvement of safety culture. Duffey and Saull (2008) present interesting work in terms of learning from incidents. They present a quantitative model for a 'human bathtub curve', which describes the decrease in accident probability as a function of experience due to learning.

Wilday et al. (2009) discussed learning organisation principles and information flows in the context of the safety of an exothermic reaction process. They argued that a learning organisation has both strong leadership and a culture of learning from the bottom up and at all levels in the organisation. This results in the aspirations of the leadership being implemented in a practical and workable way. They used a simple model based on a learning organisation being one that learns from others and from experience, shares ideas and information, and is open to and encourages innovation (HSE, 2005). Figure 1 (Wilday et al., 2009) shows this model, including the way in which information flows are needed between different levels of the organisation and with those external to the organisation. Figure 1 shows a single team within the organisation but any organisation will have multiple teams at different levels and each needs to communicate, learn and innovate with other teams, with the organisation as a whole and with external stakeholders.

Figure 2 shows the same simplified model, adapted for the COMAH CA. Three teams are identified, being the

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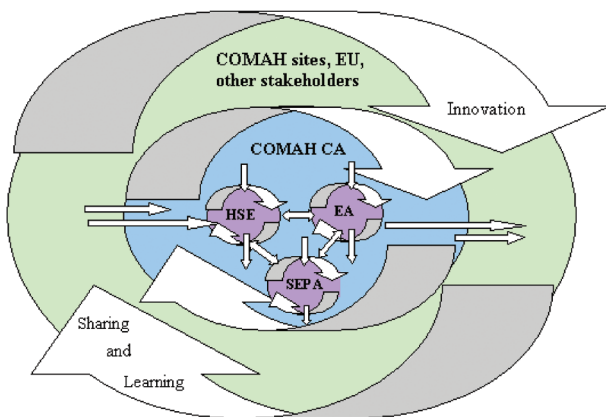
**Figure 1.** Simplified model of a learning organisation showing key information flows

constituent organisations of the CA. Clearly there are also many smaller teams within each organisation.

Saw et al. (2010) discussed how a regulator can be a learning organisation for major hazards, using a team in HSE’s Offshore Division as an example. They also presented a learning organisation toolkit. The section below, which describes the process of the CRM project, draws on characteristics of a learning organisation from this toolkit.

Lekka (2010) presents a review of the characteristics of high reliability organisations (HROs). These are high hazard organisations that are able to sustain almost error-free performance over long time periods. She shows that HROs develop and sustain a strong learning orientation through:

- Continuous training to improve technical competence;
- Rewards for near miss reporting;
- Open discussion of errors to identify causes;
- Analysis of near misses and past incidents to identify accident trends and develop appropriate control measures.



**Figure 2.** Learning organisation model applied to the COMAH CA

**OUTPUTS OF COMAH REMODELLING**

Before discussing the process used by the CRM project, this section will briefly discuss those outputs and main changes brought about by CRM, which are relevant to the objective of being a learning organisation for major hazards.

**FOCUS ON INSPECTION**

A key decision of CRM was to focus regulatory activity where it has greatest impact on the control of risk. The CA’s own experience and feedback from duty holders indicated that inspection is the most effective intervention to deliver its key aims, so a greater focus on inspection is at the heart of the changes. The major difference in approach will be the handling of five year reviews of safety reports. There will be a shortening of the assessment process, moving away from desk top assessment and the need for repeated requests to duty holders for more information. The aim is to re-deploy some resources which would previously be engaged on safety report assessment to inspection, enabling the CA to probe and test the arrangements described in the safety report onsite. Many of the changes described below are to enable this refocus onto inspection and to allow it to have the greatest possible impact.

There will also be a new pre-receipt meeting, between the CA and the dutyholder, six months before resubmission of the safety report is due. This is for the sharing of expectations about the information to be contained in the resubmitted safety report. It is intended that this will lead to safety reports which meet the CA’s requirements first time, thus reducing resource requirements from both the CA and duty holders for remedial resubmissions. CA resource savings can again be redeployed to inspection.

**INTELLIGENCE**

A key innovation of CRM has been the development of a formalised system for gathering operational and strategic intelligence to inform and help prioritise the activities of the CA (Hare et al., 2010a).

One of the features of CRM is a move to strategically driven inspection programmes (COMAH CA, 2010a). A robust evidence base will be used to ensure that the CA’s strategic priorities are appropriate and relevant. The main sources of intelligence will be:

- Incident data. This will include analyses of the causes of relevant UK incidents such as described by Hare et al. (2009, 2010b). It will also include analyses of worldwide incidents, including the EC MARS database of reportable accidents under the Seveso Directive.
- Inspection data. This is expected to include analysis of inspection reports and of the issues highlighted during inspection. (One of the changes brought about by CRM is that many of the demonstrations of safe operation presented in Revision Safety Reports will be checked via onsite inspection rather than considered by desk-based assessment (COMAH CA, 2010b).

- Inspectors’ experience. The CA’s inspectors have substantial experience which allows them to identify issues that may be of strategic importance. This information is being collected from each of the HSE inspector disciplines (regulatory, process safety, predictive, mechanical, control, human factors) and from EA and SEPA COMAH inspectors. Representatives of each of these are members of the CA Intelligence Review Group (CAIRG) and coordinate the collection of this information for their discipline.

Analysis and collation of this information by the Health and Safety Laboratory (HSL) will allow CAIRG to propose any new CA strategic priorities (or new themes within existing ones) to CSMG on an annual basis. A number of minor changes to incident and inspection report templates have been made to facilitate data collection and analysis. It has also been decided that all COMAH relevant information, including that from EA and SEPA, will be stored on HSE’s COIN database, to which it is intended that EA and SEPA will have access.

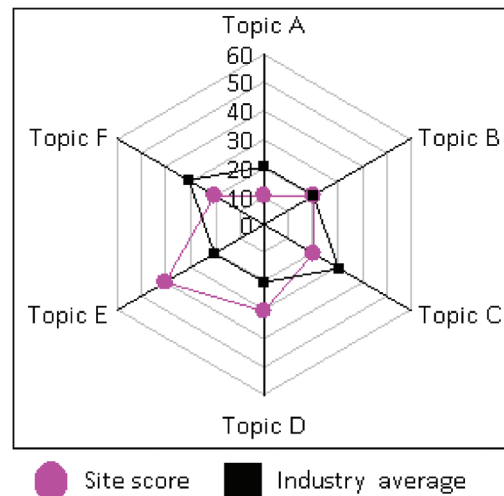
Other information and trends will also be produced from information on the COIN database, including:

- trends in performance data from COMAH establishments (see below);
- enforcement activities, i.e. prosecutions, prohibition notices, improvement notices and warning letters.

**RISK AND PERFORMANCE RANKING**

Associated with the intelligence system is a new system for ranking all COMAH establishments on the basis of their intrinsic hazard and their performance (COMAH CA, 2010c). The intrinsic hazard scores for all establishments are based on a semi-quantitative methodology considering both safety and environmental aspects, and have already been calculated. Performance scores for all establishments will be assigned and collected over time as establishments are visited by CA inspectors and one or more of the CA strategic priority topics are inspected and scored. Delivery Guides for each strategic topic (COMAH CA, 2010d) give details of the issues to be inspected and the benchmarks with which performance will be compared to determine the score.

The ranking of COMAH establishments, and the breakdown by safety and environmental scores, provides key intelligence that can be used to prioritise CA resource between establishments and individual duty holders. Intrinsic hazard scores and performance scores will be shared with the duty holder concerned and are expected to promote learning by COMAH duty holders as well as by the CA. For example, when sufficient performance data have been gathered, it will be possible to feed back to operators about their performance in several areas, compared with benchmarks in terms of average performance for the industry as a whole or the relevant industry sector. This is illustrated in Figure 3 (note that a low performance score equates to high performance, so that the nearer to the middle of the diagram the better).



**Figure 3.** Feedback of performance scores and industry average benchmarks to duty holders

**WORKING TOGETHER BETTER**

A number of areas were identified where improved procedures could facilitate better working within the CA. These include earlier exchange of information during the investigation of major accidents, between HSE, EA and SEPA (COMAH CA, 2010e); and more consistent joint decision-making about enforcement, through use of the enforcement management model (EMM) (COMAH CA, 2010f).

EA have implemented their ‘Smaller Deeper’ project whereby a smaller number of staff will be involved in COMAH activities, allowing them to develop deeper knowledge. EA have also provided a member of the CA Business Support Team (BST), based at HSE, which will ensure the appropriate consideration of environmental issues.

**SHARING INFORMATION**

There are a number of ways in which the CA will be sharing more information with industry to help facilitate learning.

Without prejudice to any potential enforcement action, the CA will seek to ensure early dissemination of causes and lessons from investigation and will make recommendations on future preventive measures (COMAH CA, 2010e). This will include identifying and transmitting without delay to duty holders and other appropriate recipients any information requiring immediate action to further safety and/or environmental protection. Dissemination of information may be achieved by CA release of a:

- safety alert (for major faults that would result in a serious or fatal injury and where immediate remedial action is required);
- safety notice;
- message to duty holders or trade bodies;
- bespoke report(s) (mostly for major incident investigations).

Safety bulletins (alerts and notices) will be made available on the HSE website Safety Bulletins home page (<http://www.hse.gov.uk/safetybulletins/index.htm>). An example of a Safety Alert was that issued to the Oil/Fuel sector about tank gauging after the Buncefield incident (HSE, 2006). Alternatively, the CA may contact a trade association with specific information (e.g. the UK Petroleum Industry Association and the Tank Storage Association issued a safety alert after HSE made them aware of an issue involving a series of Gantry spill incidents).

The CA has made available its internal guidance and procedures for COMAH on the HSE COMAH web pages. It is also anticipated that reports generated by the COMAH intelligence system will be made publicly available.

### PROCESS OF THE COMAH REMODELLING PROJECT

It can be seen from the previous section that many of the outputs of the CRM project are designed to promote learning both within the CA and within industry. This section is concerned with how the CRM project was conducted, i.e. with the process of the CA developing as a learning organisation while improving the efficiency and effectiveness of the regulatory regime itself.

### LEADERSHIP

CASMG and a COMAH Remodelling Programme Board provided strong leadership in setting the objectives and agenda for the CRM project. These comprised senior managers from all three organisations in the CA (HSE, EA and SEPA), and they were able to give a clear steer of the need for enhanced cooperation and of finding ways for more effective and efficient working together. This was important as one learning point from the Buncefield incident was the need for improved joint working as the CA.

The CRM project was the main item on the agenda of CASMG meetings throughout the project. Indeed, CASMG and the Programme Board began to have joint meetings. These received reports of progress and made key decisions. However, in line with learning organisation principles, CASMG drove the vision but without over tight supervision which could lead to a lack of real empowerment (Senge, 2007), (Saw et al., 2010). CASMG members also set a personal example, typified by their involvement in all of the workshop sessions which rolled out the new arrangements to CA staff.

CASMG also set a challenging timetable for the project. This included a decision to start the remodelled regime from April 2010, rather than spending an additional year in piloting the changes. This gave a clear steer as to the need to move forward, while continuing to learn, change and adapt, which is a characteristic of a learning organisation (Saw et al., 2010). It is also consistent with the work of Duffey and Saull (2008) who show that experience directly leads to learning which drives improvements.

In keeping with the steps to becoming a learning organisation (Senge, 2007), a steering group, the CRM

Core Team, was set up to oversee the project. This facilitated detailed planning, agreement of resources and delivery of the project. An overall project manager and leaders of each workstream held and developed the vision for the project.

### OPTIONS DEVELOPMENT

The first year of the project was concerned with identifying options and developing them to allow decisions to be made as to the way forward. This included learning from within the CA by means of workshops involving staff from throughout the CA. There was therefore a very bottom-up approach to developing options. The workshops helped to identify areas which were in need of improvement as well as constructive ideas to be taken forward. In addition, there was learning from external sources. This included the Hampton (2005) review of modern regulation. Also HSL conducted reviews of:

- previous reviews of COMAH and of other permissioning regimes operated by HSE (Holmes, 2008a); and
- regulatory regimes and methods of implementation used elsewhere, including for example the financial sector and schools (Holmes, 2008b).

At the end of the options development phase, the options approved by the Programme Board were:

1. More 'joined-up' COMAH Competent Authority with a recognised identity and single values, culture and strategic priorities.
2. Improved operational intelligence to support operational decision making.
3. Transparent risk ranking of COMAH establishments allowing those presenting the highest risk to be identified.
4. Transparent performance rating systems allowing identification of poor performance (with greater resource targeted at these establishments).
5. Majority of establishments to be subject to a periodic inspection (with greater emphasis on team inspection) by the CA.
6. Focus of interventions to be on fewer topics, dealt with in more depth by project based working on strategic priorities.
7. Local inspection priorities should not be lost, but must not prevent delivery of strategic priorities.
8. Radical change to safety report assessment for COMAH five year revisions with a reduction in the depth of paper-based assessment and increased onsite verification to ensure demonstrations are made.
9. Simplification of intervention plans for each establishment, providing clarity about expectations and more confidence about delivering work plans.

### DEVELOPING NEW WAYS OF WORKING

A workshop was held for all CA staff to maintain communications. This explained the options to be taken forward and the details of the project plan, in which nine Workstreams

were tasked with taking forward the development of the details of the identified options. These comprised:

- Management of the COMAH Competent Authority
- Management Arrangements
- Intelligence
- Regulatory Activity
- Training for Operational Delivery
- Resource Evaluation
- Communications
- Project Team Training
- Quick Wins

Workstream members met as necessary in order to progress the work required, culminating in the drafting of a procedure. The work was therefore to a large extent bottom-up development of workable solutions. The tight timescale meant that teams had to work in parallel, although there were clearly many interactions between them. Some of these could be resolved by liaison but it was not always obvious what the interactions were. Monthly meetings of the Core Team received progress reports and it was able to identify and help resolve any possible conflicts. The Core Team also fulfilled a challenge function to help ensure that solutions were workable and had a rationale or evidence base for their decisions. The final recommendations of the Workstreams were taken to CASMG/Programme Board for agreement.

An important aspect was the inclusion of EA and SEPA staff alongside HSE staff in the Workstream teams. This brought essential sharing and learning from the different perspectives and experience of the three constituent organisations of the CA. Experience within HSE was also diverse and the Workstream teams also included representatives from the different parts of HSE involved in COMAH, and in some cases HSL. Learning organisations often use 'peer assists' where someone from a different and uninvolved part of the organisation adds their experience to the team. This was relatively unnecessary for the CRM project because of the diverse nature of the experience within the teams. HSL members were also able to bring experience from working for other parts of HSE in other major hazards sectors such as offshore and nuclear. One example of the benefits of the wide experience within the teams was the experience of the HSE's Explosives Inspectorate in rating the performance of COMAH establishments, and that of EA and SEPA in rating performance under Integrated Pollution Control (IPC) legislation, all of which was available to inform the development of the CRM performance rating system.

Work within the Workstream teams began the process of forming stronger teamworking and a culture of trust between the different constituent parts of the CA. This was key to moving towards the vision of a single CA with a common culture and values. Openness, sharing knowledge and trust are all characteristics of learning organisations (Saw et al., 2010).

Alongside the development of the outputs and remodelled ways of working, expected benefits of the new regime

were collated. This will allow the realisation of the expected benefits to be monitored as part of a subsequent review of the changes.

### **ROLL-OUT**

Considerable effort was put into the roll out of the changes to staff in the CA. Many had not been involved in the Workstream teams, and most that had only knew about their own, rather than having any overview of the project as a whole. During the efforts to develop the new ways of working, there was little time available to maintain communications with CA staff as a whole.

This was recognised as extremely important to the success of the project and so for the final six months of the project, an HSE communications specialist joined the team and proved invaluable. The delivery manager also changed her main focus to communications, leaving her deputy to complete the coordination of work. Communications included email bulletins and an intranet site using a CRM house style. Access to the HSE intranet was obtained for EA and SEPA staff, although this had limited success. A significant resource was also spent in attending meetings of different Units within the CA to explain the changes and progress towards them. A staff survey of attitudes to the project and changes was also carried out. This was helpful when pitching the training of CA staff and will also be used as a baseline to compare with a similar survey later when reviewing the success of the project.

Stakeholder events were also held for industry. These were one-day events and included a presentation of the main changes and then discussion sessions on each of the main changes with the industrial delegates. Very positive feedback was obtained from these stakeholder events.

Training of CA staff was very important. This was a key part of getting all staff on board, of helping to achieve the single CA, and of ensuring consistency in applying the new procedures and in recording the information required by the intelligence system. A team of trainers was identified from HSE, EA and HSL staff, most of whom had been active in the Workstreams and/or Core Team. External consultants were used to provide 'Train the trainers' events which were particularly useful in helping to refine the presentation material to include interactive elements as well as lectures. A set of powerpoint slides with speaker notes and other presentation materials were produced, and were reviewed and finalised by the project's communications specialist. Following the staff attitude survey, it was decided to run the training courses as workshops since most staff wanted the opportunity to discuss the changes and to ask questions.

A total of 22 two-day workshops were run at eleven locations, using three trainers per workshop. Additionally a member of CASMG gave the introduction to each workshop, answered questions and often stayed for some of the remainder of the workshop. This was effective in demonstrating commitment from senior managers. Workshops included a mixed audience of HSE, EA, SEPA and HSL

staff, depending on the location. This meant that each workshop also helped cement the single CA and allowed exchanges of views and perspectives from the different parts of the CA.

One of the characteristics of a learning organisation is that they promote creativity and innovation (Saw et al., 2010). It was recognised that the workshop sessions had to strike a balance between training staff in the agreed new procedures, and harnessing their creativity and ideas for how it could be done better. To this end, the senior manager introduction at each workshop made it clear that staff needed to accept and implement the agreed new procedures and not try to redesign them. However, each workshop also recorded any areas where staff highlighted that the new procedures would not work and a number of essential revisions were made as a result of such feedback from the workshops. Constructive ideas for improvements were also recorded and considered for inclusion in the improvement plan (see below).

#### FUTURE WORK

Continuous improvement is part of any learning organisation. The new CRM regime began operating in April 2010. However a number of aspects are still being developed as part of a prioritised improvement plan. Key work within the improvement plan includes further development of the intelligence system, and extension of the hazard and performance ranking system to facilitate resource planning for the CA. Other work involves the central scheduling of inspections, including team inspections.

Other work during this initial year of implementation involves monitoring to ensure that procedures are being followed and that information is recorded consistently. Monitoring is also being carried out to check that the anticipated benefits are being realised.

#### CONCLUSIONS

This paper has described the COMAH Remodelling project from the perspective of its objective for the COMAH CA to be a learning organisation for major hazards. This includes changes brought about by the project which enhance the learning by the CA from its new intelligence system and hazard and performance rating system. It also includes the sharing of information by the CA to help industry learn the lessons from incidents and other CA interventions so as to prevent major accidents.

The paper also uses the remodelled CA as a case study to make the practical steps to becoming a learning organisation more accessible and usable by others. A balance between strong leadership and a bottom-up approach to designing the new system was successful in delivering the changes and new procedures. In many ways, the roll out and implementation of the changes were more challenging than their development. Communication initiatives, including training, were key to addressing this.

#### ACKNOWLEDGMENTS

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