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Health and Safety Executive

Development of a Business Excellence Model of Safety Culture

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This report gives the results of a study carried out by Entec UK Ltd to provide a comprehensive review of research on how to assess and develop safety culture, and thereafter produce a safety culture improvement matrix (SCIM). Due to the adoption of the Business Excellence Model (BEM) by certain nuclear licensees consideration was given to whether it would be valid and useful to structure the tool according the BEM framework. Having concluded that the BEM provided a reasonable framework a SCIM was developed. The SCIM was trialed in a series of six desktop applications by NII inspectors, in the context of sites under their inspection. The trials, whilst revealing points requiring refinement, indicated that the BEM framework and our safety culture version was useful and practical.

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EXECUTIVE SUMMARY

Aims and approach

This project aimed to develop a Safety Culture Improvement Matrix based on the Business Excellence Model (BEM) for use by Nuclear Installation Inspectors. The ultimate goal is to develop a tool that helps licencees improve safety culture rather than simply measure safety climate. Therefore, the tool needs to incorporate guidance on progressive improvements and be sufficiently detailed for users to ascertain what is required to improve safety culture.

The study comprised a number of stages, namely:

- identification of the key elements of safety culture and those factors that promote or inhibit achievement in the area of safety
- assessment of whether BEM provides a suitable framework for the assessment and improvement of safety culture;
- drafting of a safety culture improvement matrix (SCIM);
- trialing the SCIM with a group of NII inspectors;
- concluding whether the SCIM is useful and, after responding to trial results, producing a final version for use by inspectors.

The review of previous research and publications, has been used to answer the following questions:

- do the nine elements in the Business Excellence Model capture the critical safety culture factors?
- do the statements contained in the Business Improvement Matrix address, at a micro level, the key safety culture sub-factors?
- what are the advantages and disadvantages of delineating safety culture in this way?

We have used the ACSNI report on Organising for Safety (HSC, 1993) as a starting point of the review as it is based on a comprehensive review of safety culture research completed in the period up to 1993. We then identify and summarise research completed since the publication of the ACSNI report. The more recent work is used to check whether the view of safety culture has changed or the weights attached to various elements have altered, due to either new findings or changes in management structures in the nuclear sector, such as contractorisation.

In addition, the study examines:

- the extent to which it is valid to read across from an assessment of the quality of business management to the quality of safety management, and;
- the conditions under which it is likely that there will be a congruent style of business and health and safety management.

The goal here is to examine whether it is "safe" to read across from one area of management performance to another.

Findings from the literature review

There is a broad consensus amongst earlier models that the following factors are important:

A. Commitment of the organisation, particularly senior management, to the achievement of a high standard of safety, and the demonstration of this commitment through communications, consistent decision making, reward and approval systems, allocation of resources training, a caring management attitude etc.

B. An effective process of communication between all parts of the organisation, based on trust, openness and mutual respect.

C. Communication and maintenance of a shared view of risks and standards of acceptable behaviour.

D. Open-minded learning from experience.

E. Ownership and acceptance of the need for health and safety controls, typically requiring a participative approach to the development of control and a co-operative non-confrontational approach to securing adherence to agreed procedures and practices.

It is also broadly agreed that it is necessary to reinforce a culture over time by assuring consistent management response to incidents, feedback on unsafe/unacceptable behaviours and consistent decisions on resourcing. Attitudes are, in part, a product of an individual's interpretation of what other people expect of them. Therefore, if individuals perceive that there has been an implicit shift in expectations, perhaps due to changes in (say) management response to incidents, they may believe that the expected standard of behaviour has changed regardless of stated policy.

There are four areas where models either differ or where new research provides a different perspective;

A. Differences in the emphasis, content and philosophy of earlier models of safety culture.

In particular:

- Many models recommend a participative approach to the development of a safety culture, involving staff in the identification of issues and development of initiatives. However, some models, especially the INSAG4 model, places greater emphasis on the role of management in defining the required norms and thereafter securing acceptance of these norms, viewing the development of a safety culture as a "top-down" process.

- The ACSNI and some other studies appear to presume that an organisation will possess a valid view of what constitutes "strong safety commitment" and that such commitment can be assumed to apply equally to all areas of health and safety performance. There is also something of a presumption that once a set of "good" norms and beliefs have been defined they remain unchanged thereafter, with the only remaining task being the maintenance of these norms. It could be argued that the ACSNI model focuses on internal processes and overlooks the issue of who/how safety norms are formulated and reviewed. This stands in contrast to the NUREG work that places emphasis on external reference points.

Indeed, recent studies suggest that safety culture is a dynamic entity which may need to change due to internal and/or external events. In this context an organisation must be adaptive and flexible, displaying an ability to recognise the need to change norms and attitudes.

B. Developmental versus descriptive models.

The earlier models and research sought to describe the features of an effective safety culture and the attributes of organisations which exhibit effective cultures, rather than trying to explain how an organisation can develop such a culture.

C. Recent changes in organisation and management.

The early models of safety culture were developed in the 1980's and early 1990's before research had been completed on the ramifications of "new ways of working", delayering, downsizing and outsourcing. There has been a shift from larger hierarchical organisations and traditional command and control styles of management towards more decentralised, devolved styles of management and much greater use of contractors. These changes not only create new issues, such as how the use of contractors affects safety culture, but also raise questions about the continued validity of some of the earlier recommendations on safety culture.

D. Recent research on safety culture.

There has been some new research on safety culture that allows some further elaboration of the earlier models.

A development model of safety culture

The SCIM needs to fulfil a number of aims, including:

- Allow users to recognise what is required to improve safety culture.
- Be applied via self-assessment and/or observations of an organisation.
- It must be theoretically sound.
- It must be applicable to a range of organisational types.
- Be sufficiently detailed to allow specific areas of improvement to be pinpointed.
- The model must be progressive, directing progressive improvements.

The review indicates that a developmental model of safety culture should comprise the following main parts, as illustrated in Figure E.1:

A. A means of defining health and safety cultural ideology, norms and goals which takes account of the opinions, perceptions and expectations of internal and external stakeholders.

B. A means of communicating and demonstrating the organisation's commitment to these goals and norms, and maintaining this sense of commitment over time.

C. Processes to facilitate the achievement of stated goals and norms, such as participation, empowerment, staff-management-contractor communications, training, proper resource management etc. These processes must allow for the impact of organisational structure, outsourcing and new ways of working on the means by which an effective culture is developed.

D. A means of checking that the organisation's cultural goals and norms have been effectively achieved or at least that the behaviour of people is consistent with these norms and/or within the boundaries of agreed acceptable behaviour.

E. A means of tracking the opinions, perceptions and expectations of stakeholders and assessing whether the organisation's norms need to be adjusted to reflect significant changes in these.

Comparison of BEM with models of safety culture

The correspondence of the BEM, as shown in Figure E.2, with models of safety culture has been assessed by:

- A high level comparison of the main elements of the BEM and the development safety culture model shown in Figure E.1;
- Comparing the questions and issues addressed by BEM and the earlier safety culture models.
- A comparison of the compatibility of the sub-division and ordering of questions, and;
- Back-fitting BEM to the composite safety culture model to test their compatibility.

In addition, the implications of research into the congruency of attitudes for the validity of reading across from one area of performance to another have been examined.

Key points of comparison:

- The earlier safety culture models do not pose questions on "results".
- The majority of matches from earlier models are in the area of leadership, policy and strategy and people management.
- The safety culture models pose questions in areas which are not explicitly noted in BEM such as hazard management.

These differences reflect the origins of the models, namely that:

- the BEM reflects a view that quality and business excellence must be driven by an outward looking attitude, comparing performance with competitors and assessing customer satisfaction;
- the early safety culture models focus on the internal processes of leadership and communication, reflecting the focus of early research in the area of safety culture, and;
- the BEM covers the more formal aspects of resource management and management processes. These processes are generally regarded to fall into the area of safety management systems rather than safety culture.

It is suggested here that the lack of matches to the "results" part of the BEM reflects limitations of the earlier safety culture models rather than a failing on the part of the BEM. This conclusion, in combination with the finding that the first 3 elements of the BEM do match well with the safety culture models, suggests that the BEM may be a reasonable "vehicle" for framing a developmental model of safety culture.

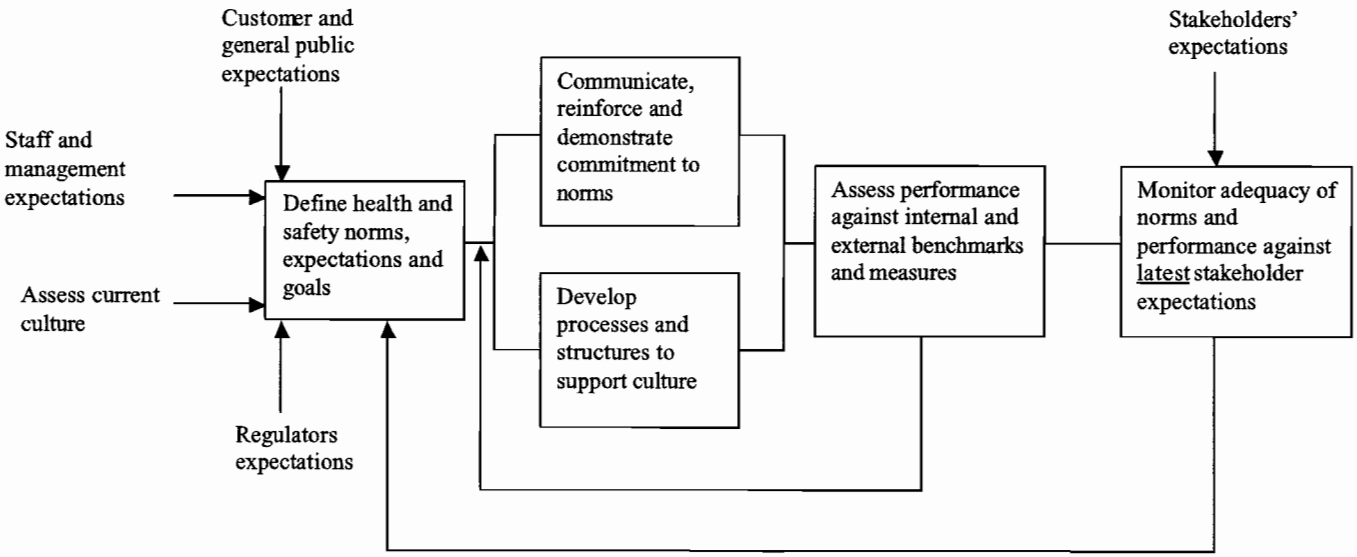

Figure 1
Overview of composite safety culture model

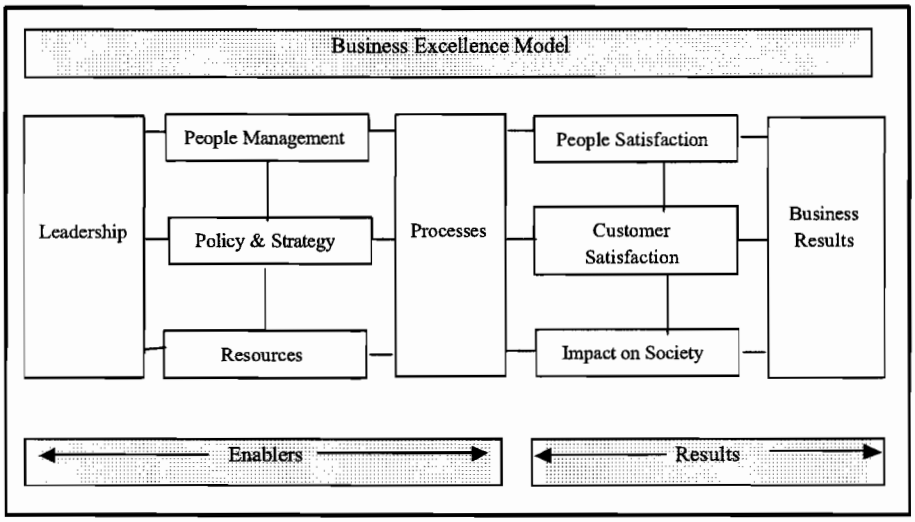

Figure 2
Summary of Business Excellence Model

As a further test of whether the BEM provides a useful "vehicle" for assessing safety culture, we "back-fitted" the BEM onto the developmental model of safety culture in E.1. This entails trying to re-word the BEM question set to be specific to safety culture, i.e. what is the safety culture analogy of each BEM question? This indicates that:

- The wording and intent of some questions in BEM are similar to many questions raised by the developmental safety culture model.
- Many questions posed by BEM are directly analogous to those that might be asked or posed by safety culture but need to be made specific to safety to be of any value, such as questions on "results".
- The split between leadership, processes and results is similar to the split of factors in the composite safety culture model, although leadership does cover aspects of two parts of the safety culture model.
- The BEM model does broadly cover the whole scope of the composite model, if allowance is made for deletion, addition and re-wording of specific questions.
- Some BEM questions are analogous to safety management system factors rather than safety culture factors – although these could be deleted or re-focussed without degrading the general match of BEM to the safety culture model.

Therefore, at the very least, it would appear that there is a broad match between questions asked of safety culture and those raised by BEM although the range and wording of questions need to be adjusted. Indeed, the progressive improvement matrix in BEM is considered a better framework for providing a safety culture improvement matrix than the descriptive models developed by ACSNI etc. Whilst it is possible to suggest sub-divisions of safety

culture factors different to that within BEM, it is not certain that they offer significant advantages. Therefore, the BEM sub-division may be advocated on the "practical" grounds of allowing a safety culture matrix to be related directly to the business matrix already in place in companies using BEM.

Therefore, as a first step in the development of a SCIM, it was decided to:

- Retain the 9 elements in BEM.
- Modify the question set to be meaningful in the context of safety culture.
- Provide a "statement of intent" regarding the philosophy behind the SCIM.

Trial of the SCIM

The SCIM was trialed by six NSD inspectors, chosen to represent a range of power generation, decommissioning, chemical process and other types of activities. Each inspector was asked to apply the SCIM to a site with which they are very familiar, namely the site they are responsible for inspecting. If necessary they focussed in on one or more units on that site.

Inspectors provided feedback on:

- Usefulness, does it add to their understanding?
- Practicality, can it be applied using inspectors existing knowledge and/or easily acquired information?
- What unit of organisation can it be applied to - the licensee, the site, the unit, the department?
- Time required to complete.
- The virtues of alternative structures, such as using HS (G) 65 as a format.

Suggestions on how to improve the usefulness and/or practicality of the SCIM were elicited.

Trial results

Overall reaction

- The SCIM was felt to be relevant, gets down to the practical level and adds to the understanding of safety culture.
- The ladder version needs revision.
- There were no major concerns with the practicality of the SCIM. An inspector could form a judgement against each question. The benchmarking questions in element 9 would be the most difficult to answer.
- The SCIM could be applied to any size of organisation. Inspectors did not have to alter their viewpoint of their licensee to apply the SCIM.
- Time taken to complete the SCIM was not considered to be a problem.
- Only one of the issues raised, that of how the SCIM handles contractors, could be considered to be a structural problem. Otherwise there were no concerns and no obvious enthusiasm for adopting another structure, such as that of HS(G)65.

Improvement Areas

Only the issue of contractors was brought up by nearly all inspectors. Most other points were raised in only one pilot session.

- Contractors: These are seen to be different from other stakeholders, certainly not in the same bracket as customers. Where questions overlap they should be separated. It is anticipated that elements will need specific questions on contractors.
- Compatibility with nuclear safety philosophy: Some questions, are perceived to hint that staff initiative can take precedence over procedural controls.
- The perspective on risk assessment. The use of risk assessment in the evaluation of nuclear safety risk should be separated, from 'risk assessment' used to support other operational and business decisions is probably required.
- Avoid direct compliance questions: It is preferred that the features / sub-points not be binary yes/no compliance with legal requirements.

It was also suggested that the inclusion of some negative points as well as positive ones per issue and sign posting to reference material would be helpful.

Finally, editorial issues such as consistency of the wording of the scales were raised.

The draft SCIM was modified to address these points.

Conclusion

This study set out to develop a tool that would assist NSD inspectors in assessing licensee safety culture and advising licenses on how to improve culture. This has been achieved by structuring a body of guidance covering a process of continuous improvement within the BEM framework. The trial indicates that the SCIM is practical, useful and enhances inspectors work in this area. Some areas that may benefit from further work include:

- Applying the SCIM across a series of sites to (1) acquire benchmarking data and (2) testing correlation of SCIM results with site safety performance.
- Collating "real life" examples and guidance on how to select and implement improvement methods and strategies.
- Researching how alternative types of contractor and staff renumeration and reward schemes influence behaviour.

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