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Creating value from uncertainty

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Technical note:
Process and guidewords for organisational HAZOPs

When organisations change their structures, there is great value in stress-testing the proposed new arrangements to ensure they will work as intended, and will not generate unintended adverse outcomes. Organisational HAZOPs provide one way of doing this. This technical note outlines the process we use for organisational HAZOPs and the guidewords we recommend for such studies.

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1 Background

The hazard and operability (HAZOP) process has been applied traditionally to chemical, petrochemical and related processing plants and systems. In those areas, it is used to investigate the causes, controls and consequences of events or circumstances that might cause the system to function outside its designed 'normal' and 'safe' operating states.

Despite its origins in the chemical and petrochemical sector, the HAZOP process works very well for all systems and processes, both technical and non-technical. It is now applied in a diverse range of applications such as software development, procedure writing, contract development and organisational change.

The HAZOP process examines each of the critical properties of a system in turn. It stresses each one by discussing what could cause that property to move outside the envelope that is regarded as safe. This facilitates the specification and design of controls that ensure the system never becomes 'unsafe'. Unsafe in this context means unacceptable in terms of performance when compared with the organisation's objectives.

2 Stress testing an organisational change

Stress testing is achieved by asking questions based on a set of guidewords. Each guideword is a combination of words that describe a critical property or parameter of the system and how it might deviate from normal or expected behaviour.

- Key parameters are commonly related to system properties like 'action', 'time' and so on
- Deviations are commonly expressed in terms of words like 'no or not', 'more', 'less', 'as well as', 'part of', 'reverse' and 'other than'
- For example, in a classical HAZOP of a fluid flow system, where flow is a key parameter, combining deviations with the parameter 'flow' generates guidewords like 'no flow', 'more flow', 'less flow', 'reverse flow' and so on
- In a HAZOP of an organisational change, where workload is a key parameter, combining deviations with the parameter 'workload' generates guidewords like 'more work', 'less work', 'different work' and so on.

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Changing structure is one of the most significant changes that an organisation can undertake. These changes can involve just one position or department, or a far broader re-structure of an entire organisation. Despite the significance of these changes in terms of future business performance, few organisations undertake any formal, systematic risk assessment before they occur. On the other hand, we have all witnessed and felt the effects of poorly planned and executed organisational change.

Risk management is concerned with adding value and providing the means for managers to make confident and soundly based decisions. However, when it comes to organisational change, the need for speed and secrecy often seems to lead to decisions being made without a full understanding of the consequences or the need for ancillary actions to ensure the changes will be successful.

Proposed changes should be challenged, to assess the risks associated with the change, and also to see how those risks might best be treated to ensure that the organisation achieves its objectives.

If we view the organisation as a system, then HAZOP provides the ideal tool to systematically identify the risks associated with changes to that system. The final organisational diagram represents the overall system and the position descriptions, personnel performance requirements, employment records and résumés correspond to the specifications and performance characteristics of its components.

A HAZOP study provides a check on an organisation's resilience by testing how it responds to stresses or excursions outside normal conditions, as represented by the guidewords. This can assist in:

- Identifying the possible consequences of a new organisational structure
- Indicating where the design of an organisation might be improved, either to prevent a failure or under-performance, or to capture and lock in better performance than expected
- Developing additional actions to ensure that the change is successful, in the sense of achieving the organisation's objectives effectively and efficiently.

The HAZOP workshop itself provides a valuable occasion for the change team and key stakeholders to meet, discuss issues and concerns, and agree a way ahead, using a reliable process and structured agenda.

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3 Conducting an organisational HAZOP

Preparation

Like any form of risk assessment, the context for the change should be established in terms of:

- Its purpose and how it is intended to contribute to the organisation's overall objectives
- Its scope of application
- The stakeholders associated with the organisation, particularly those likely to be affected by the change, and their objectives
- The external and internal factors that might influence the change and the way the organisation works.

Detailed information is needed to support establishing the context and the HAZOP:

- The proposed organisation chart for the new structure
- The role descriptions for the key positions in the new structure, in both their current form (before the change) and in their revised or new form
- An understanding of the most important business processes, for example from business process mapping, before and after the proposed change.

Before the workshop, the proposed change should be split into 'nodes' to facilitate a comprehensive examination. Often the most appropriate nodes are the components of the organisation, such as departments and divisions.

Establishing the context takes place before the risk assessment, and it only involves a few people for a few hours. The outcomes should be recorded in a briefing note for the HAZOP workshop participants.

Participants

A HAZOP workshop requires a trained facilitator and a recorder. It should involve the change team and key stakeholders. With many organisational changes it is necessary to limit the size of the team and only directly involve a selection of relevant stakeholders; however, the views and objectives of other stakeholders should have been considered in the earlier context analysis.

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Conduct

Typically, a HAZOP workshop takes from two to four hours, depending on the complexity of the change.

The workshop should start with a quick review and update to the statements in the briefing note. The base guideword set shown in Table 1 below is then used to prompt risk identification. The facilitator may choose to add guidewords that are relevant for the organisation or the specific application.

The facilitator should help the team work through the guideword list and apply each guideword to each of the nodes in turn. Some guidewords may be irrelevant for some nodes and they can be omitted. In each case, the team should discuss:

- What might cause the circumstances described by the guideword
- The nature and extent of the consequences if that situation occurred
- The controls in place to change the likelihood of that situation arising or the consequences if it did arise
- Any further controls that would be required to treat the risk
- The priority for risk treatment action, using the organisation's normal risk rating process.

The details of the role descriptions and the business processes gathered during the context activity provide essential background for the discussion and analysis based on the guidewords.

Outcomes

The outcome of the workshop should be a list of amendments to the proposed organisational change, together with any ancillary actions to reduce the risk and ensure the organisation is successful and achieves its objectives. The amendments might cover:

- Revisions to the organisational structure itself
- Adjustments to role descriptions
- Modifications to important business processes to take account of the proposed change
- Enhancement of skills and competency
- Additional automation and monitoring.

All proposed actions should be costed, and the costs should be considered in the overall cost benefit analysis that is used to justify the organisational change. Where the costs and benefits are not tangible or cannot be expressed easily in a

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single metric, such as dollars, then qualitative cost benefit analysis should be applied.

4 Guidewords for an organisational HAZOP

Table 1 lists typical guidewords for an organisational HAZOP study. Each guideword is accompanied by topics that might be considered and discussed in a HAZOP workshop when the guideword is applied to a node or step in the organisational change.

Table 1: Typical guidewords for an organisational HAZOP

Guide word	Topics for discussion
Different or revised objectives	Objectives are different from previous ones, or require a different interpretation or mind-set
Unclear or conflicting objectives	Objectives are unclear, vague or imprecise; conflict between objectives, unclear priorities
Changing objectives	Objectives are not fixed but may vary; varying time requirements for meeting objectives
Over-achievement	Exceed objectives, meet objectives more quickly
Under-achievement	Fail to meet objectives, delay in meeting objectives
Partial achievement	Meet only some objectives
Breach of requirements	Direct or indirect breach of statutory or policy requirements or conditions
Conflict with or constraints imposed by requirements	New arrangements are in conflict with or constrained by statutory or policy requirements, or require requirements to be renegotiated
Contract breach	Direct or indirect breach of contractual requirements, fail to meet contractual conditions, inability to meet requirements
Contract late delivery	Contractual requirements delivered late, delayed

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Guide word	Topics for discussion
Contract partial delivery	Only some contractual commitments met fully
Unclear authorities	Lines of authority, authorisation levels and spans of control are unclear, vague, ambiguous or imprecise
Gaps in authorities	There are important gaps in authorities, authorisation levels or spans of control
Overlapping or conflicting authorities	Authorities and spans of control overlap, are in conflict, or may promote conflict
Too little supervision	Level of supervision reduced
Too much supervision	Dual or multiple reporting lines
Different supervision	Different forms of supervision require changes in behaviour or reporting
Need to work without supervision	Requirement for independent, autonomous or remote work
Too little communication	Insufficient information communicated, reduction in communications
Gaps in communication	Additional effort is required to create new communications pathways
Too much information	Information overload
Too little information	Insufficient information to carry out the role, cut off from necessary information, important gaps in information
Incorrect information	Information is incorrect, misleading, out-of-date or corrupted
Different information	Information is in a different form, or measures different things
Loss of information	Loss of skills, expertise or intellectual property (IP)
High workload	Too much work, too fast a pace of work, overload, inability to cope, insufficient time for work
Light workload	Too little work, too slow a pace of work, more time than needed
Different workload	Different or unexpected work requirements or pace of work, workload inconsistent with ability

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Guide word	Topics for discussion
Varying workload	Nature and pace of work varies, unpredictable work requirements
Insufficient skills and capabilities	Skills gaps, requiring new capabilities
Inexperienced personnel	Insufficient experience or gaps in experience, personnel are new to their roles, the business or the industry
Over-qualified personnel	Personnel are over-qualified for their roles, possibly leading to reduced motivation, reduced morale and higher staff turnover
Too much stress	New arrangements impose additional stress on personnel
Too little stress	Personnel are too relaxed, leading to lack of attention
Different stress	Unexpected or changed levels or forms of stress
Varying stress	Stress levels vary, unpredictable levels of stress
Improved morale	Happy personnel, stimulating environment, improved motivation
Reduced morale	Unhappy personnel, higher turnover
Poor motivation and incentives	Incentives encourage poor or misdirected behaviour, or encourage conflict; perverse or conflicting incentives encourage poor behaviour
Supportive culture	Inclusive and supportive work environment, encouragement to improve
Non-supportive or inappropriate culture	Antagonistic culture, conflict, bias (e.g. on basis of gender, ethnicity or some other characteristic unrelated to capability)

5 Reference

The international standard IEC 61882-2016 *Hazard and operability studies (HAZOP studies) - Application guide* describes the HAZOP process in detail, with a focus on production and related technical systems. Organisational HAZOP follows the same principles, with a slightly different focus.

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6 Contact

If you would like further information about this topic please contact us. We will endeavour to reply promptly.

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