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Towards integrated hygiene and food safety management systems: the Hygieneomic approach

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Abstract

Integrated hygiene and food safety management systems in food production can give rise to exceptional improvements in food safety performance, but require high level commitment and full functional involvement. A new approach, named hygieneomics, has been developed to assist management in their introduction of hygiene and food safety systems. For an effective introduction, the management systems must be designed to fit with the current generational state of an organisation. There are, broadly speaking, four generational states of an organisation in their approach to food safety. They comprise: (i) rules setting; (ii) ensuring compliance; (iii) individual commitment; (iv) interdependent action. In order to set up an effective integrated hygiene and food safety management system a number of key managerial requirements are necessary. The most important ones are: (a) management systems must integrate the activities of key functions from research and development through to supply chain and all functions need to be involved; (b) there is a critical role for the senior executive, in communicating policy and standards; (c) responsibilities must be clearly defined, and it should be clear that food safety is a line management responsibility not to be delegated to technical or quality personnel; (d) a thorough and effective multi-level audit approach is necessary; (e) key activities in the system are HACCP and risk management, but it is stressed that these are ongoing management activities, not once-off paper generating exercises; and (f) executive management board level review is necessary of audit results, measurements, status and business benefits. © 1999 Elsevier Science B.V. All rights reserved.

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1. Introduction

The businesses in which we work and the society in which we live faces a significant challenge. High standards of hygiene are critical to maintaining consumer trust and to maintaining the integrity of brands and the reputation of our companies. Yet

important trends in demographics, consumer habits and the increasing complexity of the supply chain pose an increasing threat to our ability to consistently deliver high standards. Governments and regulators are becoming increasingly active as evidenced by the recent development in the US and UK. Their approach will inevitably lead to greater governmental involvement in inspection and testing. This will certainly directionally help. But, by comparison the vast resources lie at the disposal of the food manufacturing and food service community and not with

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the governments and regulators. It is the people that work and manage in the entire global food supply chain that will be the driving force for change.

Quite simply food producers should not wait or look for the regulators alone to improve food safety. If the responsible persons can communicate effectively and gain the understanding and commitment of their employees and customers, then this will result in a very effective improvement of the all round management of food safety. This benefits to the good of the consumers and the businesses of the food producers. This engagement and understanding of the microbiology community about the importance of the role they play in the totality of ensuring of food safety will be the core of this paper.

Current systems and related standards such as ISO9000 provide a sound basis for the establishment of quality management approaches. However, the adoption of such systems and standards does not always lead to improvements in areas such as food safety. Success from ISO based approaches appears to be most often achieved by organisations which fully understand their starting point and can tailor the application to their exact situation and need.

Professor Peter McKie, formerly of the DuPont organisation, introduced a background of a management theory which is of great benefit in the area of employee health and safety. The essence of the theory is essentially very simple, but, as with all such insights, is of fundamental importance to driving change in an organisation. The theory describes four important stages or generations in the development of an organisation and is also ideally suited to the area of food safety and the development of management systems.

2. Development of an organisation

There are four stages or generations in this thinking which develop within organisations over a period of time. As the organisation develops, there will come a lower incidence of food safety issues. It is essential to understand which generation the organisation is in, and to tailor the management action to the state of the organisation at that period of time if real improvement in food safety manage-

ment is to happen. It is equally important to recognise that these generations will occur sequentially, and without attention the performance of an organisation is likely to move backwards.

The four generations can be described as setting rules, getting compliance, gaining individual commitment, and finally creating a collective interdependence.

2.1. Generation 1 — setting the rules

This is a relatively straightforward stage, but is most important in showing the commitment of the top management to work in a particular way and to attain a standard that is acceptable. In essence the policies and standards form the rulebook which governs the company. Of course it seems obvious to say that the organisations should have sound policies and standards for key areas of food safety. But many of the problems start here.

2.2. Generation 2 — ensuring compliance

Second generation companies ensure compliance to policies and standards through audits and measurements. This, at a very basic level, will ensure that employees realise the importance of the area and will at best ensure commitment, at worst force compliance. Many organisations that find themselves with a food safety issue will start here. A series of crisis will often lead to the establishment of an audit programme, often by a third party.

Very often this audit programme will be started without any real basis of policy or standards and inevitably will fail, because employees do not understand the basis on which their activities are judged. It is experienced that there are probably more problems and confusion caused in the area of food safety by ill-conceived audit approaches than any other area. Audits force the attention of the employees on areas that the auditors look at. If these areas are not the greatest risk then this is counterproductive. The lessons are clear. The basis of standards and policies in Generation 1 must be established before audit and measurement take place. Generations develop sequentially; it isn't wise to try to leapfrog.

2.3. *Generation 3 — individual commitment to action*

Sound food safety performance can be achieved through the creation and effective communication of policies and standards and their continued reinforcement through well designed assessment and audits throughout the company. This is the basis for a Generation 2 company. However, the policies and standards are only as good as our knowledge of the key hazards and risks in the kitchen, in the slaughterhouse or dairy parlour. We are dependent, usually on our technical departments, to create these policies and standards and they are usually mostly correct, but can never cover every nuance. So the third generation of development in better food safety comes from continuous improvement through commitment to individual action. The people who work on production lines or serve in restaurants or prepare food at home take actions that have profound influences on food safety. With appropriate training and knowledge, these people can take positive action to avoid hazards and minimise risks that were overseen by standards and policies. With their own knowledge they are able to enhance food safety and better protect their customers.

Clearly, it takes a well-designed training approach to reach this generation and is not easy in some businesses that have characteristically high staff turnover. Nevertheless, committed employees, who understand the key risks and can take positive action regarding food safety, are most powerful in achieving excellent standards in hygiene and food safety.

2.4. *Generation 4 — interdependent action*

The very last stage of continuous improvement, Generation 4, comes where work groups of people, who understand the policies and standards and have a good knowledge of the key risks and hazards, work together to improve the food safety situation, that is they show collective interdependent action. This team-based approach builds upon the knowledge base of the workforce and is one of the best ways to cope with situations of high staff turnover as a knowledge is maintained within the team and not solely with experienced individuals. This collective action can be seen within an organisation, for

example joint activities spanning various functions, or between different companies working together in the supply chain setting common standards and creating joint action plans.

3. **Assessing the generation of an organisation**

A key starting point in the development of any management system is to understand the generation the organisation is in before implementing anything, especially in an area as important as food safety. Well meaning, but ill-conceived changes, can at best be ineffective, at worst dangerous.

Recent work by David Edwards and his team at Checkmate International in the UK together with DiverseyLever shows that it is possible to gain an understanding of the generational state of a company with respect to food safety. Combinations of structured interviews of key management and personnel coupled with diagnostic use of specific on site assessments leads to a comprehensive overview of the generational state. The background reason for this approach, is that the traditional techniques of food safety management, e.g., HACCP, fail to take account of normal business pressures that are prevalent in the operating environment. They do not really cover the very fact that food safety considerations should be seen in the context of a real world business environment. Reactive management, lack of resources, high staff turnover, or weak supplier controls can all challenge otherwise well established safety disciplines drawn up in a food safety department or laboratory. In contrast, the new method, which is beginning to be called the 'Hygieneomic approach', appraises management against seven key indicators. The approach is thorough, systemic and predictive and provides users with insight into both existing and future risks.

The key mapping indicators are:

1. *Regulatory compliance*: it is established who is responsible for both national and internal regulatory compliance, how effective they are and how compliance is monitored.
2. *Standards*: how standards are developed, monitored and reviewed and determine if they are adequate and communicated at all levels.

3. *Policies*: food companies need an effective overall policy concerning food safety. As with standards, the approach examines policy formulation, content and communication and whether they integrate or conflict with other business processes
4. *Training*: training is examined in detail and, in particular, how effective current training is in relation to the actual implementation of company and regulatory standards and policies.
5. *Auditing*: the content and effectiveness of internal auditing are examined in relation to the existing site and suppliers.
6. *Management systems*: all management systems that impact on food safety are investigated including responsibilities, communication, fault rectification, etc.
7. *Awareness and business culture*: lastly understanding the company and food site ‘culture’ is a critical aspect of the ‘mapping’ exercise. Experience shows that unless management have fully understood and committed to company systems and controls they have little chance of success, particularly if the business is placed under operational or financial pressure.

This approach goes way beyond the current audit or checklist approach which focus really only on the tangible or visible aspects of food safety (for example temperature control, HACCP plans, etc.) and reaches into the heart of the food safety culture within a company.

4. Practical examples

In this paragraph some practical evidence is presented that the systemic thinking that underpins the ‘Hygieneomic approach’ can tackle hygiene and food safety issues in food production companies.

4.1. Disconnect between policies and practice

Many organisations pride themselves on well written and neatly bound policies issued from the centre. Traditional management system approaches and the audits that accompany them will point to the mountains of documentation in the head office and the latest policies that have just recently been

updated in light of the latest development. More often than not, the situation on the factory floor or the far-flung restaurant is totally different. Policies are often out of date, or the sheer volume of upgrades totally overwhelms the recipients. Worse still, new important issues are missed. The training programme that should support their implementation and the audit approach used to check compliance do not match the intent of the new policies.

This is a classic case of the systemic thinking needed to support excellence in food safety. Policies should be coupled to the training approach, which should be checked by a relevant and up to date audit approach and the key new important developments communicated succinctly throughout the organisation.

A good example of this disconnect between policy and practice occurs where there is a recently identified new microbiological risk, for example the latest being *Escherichia coli* 0157:H7. Policies are updated to cover the threat of this organism, but are then supported by audits and training all stressing the importance of temperature control (which, of course is really aimed at microorganisms such as *Clostridium perfringens* and *Staphylococcus aureus*), instead of the risks of cross contamination which is the key to control of *E. coli* 0157:H7.

Another example of the need for systems thinking comes from ignoring the interaction between operational pressure and food safety. A company preparing and selling pizza noticed a problem in customer complaints in the area of food safety, especially around outlets placed at retail parks with cinemas. Internal food safety people set up visits to sites to ascertain the reason for the complaints. As usual, visits were set up or timed not to interfere with peak times in the kitchen, as staff would not be too responsive to questioning. As may be guessed internal audit found no problems, because the audit was timed to coincide with minimum kitchen disruption when the intricately designed food safety policies and procedures can be followed. An external team using the ‘Hygieneomics approach’, looked at the complaint log, found out that key problems occurred at peak times (i.e., when the cinema emptied) and audited during these times. Clearly, food safety approaches were not designed for peak times and were ignored by willing, well trained, but over-taxed staff. Again, systems thinking is needed. Approaches

need to be designed for the real world, not in the cloisters of a food safety department.

5. Consistent standards

A key requirement of effective management systems is the setting of clear standards. These standards should have two basic characteristics:

- Provide the basis for unequivocal auditing — surprisingly most standards are not designed with professional auditing in mind. Where standards need to be used across national boundaries, they should be designed in a way that ensures reciprocity with national requirements but provides a consistent basis for auditing and performance comparison.
- Be consistent with relevant international standards (e.g., Codex) but be designed in a manner that is specific to a particular sector of the food manufacturing or food service market.

6. Key elements of management system: the ‘Hygieneomic approach’

Having assessed the generational state of the company and decided which areas are the priorities for action and development, what are the key elements needed to set up an effective management system? It is believed that there are 6 essential elements of effective management systems in the food safety area. In the next paragraphs they are described.

6.1. Systems thinking

The first, probably most important element is to understand all the linked elements of the system.

Understanding the key processes and the linkages that underpin food safety in the organisation, R&D, Procurement, Supply Chain, Human Resources, Financial Management, Internal Audit and Crisis response, etc., is the first step. At first sight it may not be apparent that some of these functions can be important to food safety. The roles of R&D and manufacturing distribution are clear enough. However, the impact that the recruitment and training

policy can have may be more critical than the technical concerns in product design or manufacturing. If the training programme doesn’t link to and emphasize key issues in food safety and the importance to the company, what message will the employee take home? Moreover, the policies governing capital management and procurement can greatly re-enforce the drive for excellent hygiene and food safety. At worst, however, procurement approaches that focus only on the lowest cost can totally undermine effective hygiene and food safety. This is because the benefits of adherence to certain specifications are not communicated or understood throughout the system.

6.2. Communication of policies and standards — senior management responsibility

Once the system has been mapped and the linkages understood, it falls to senior management to unequivocally communicate the policies and standards that govern food safety. Task forces drawing on all functions that impact food safety should be involved in drawing up the policies and standards. However, senior management must communicate policies and standards. Without any shadow of a doubt, this is not an area that can be delegated to anyone, such as the technical or quality function within the organisation. They should be visible and regularly updated. Food safety must be communicated by the senior management as a non-negotiable.

6.3. Clarity of responsibility

Within the policies clear responsibilities must be defined and, in the main, ensuring food safety is the role of line management, i.e., the people who run the operations and functions. This should be clearly distinguished from the role of food safety specialists and microbiologists who are there to support the line management in the execution of their responsibilities. Training should be given to line management to enable them to execute their responsibility and their performance linked to their remuneration package. It won’t work out if managers are given responsibility to achieve high standards in food safety, but their bonus depends on making cost savings that give rise to the lowering of standards.

6.4. Tools as living processes

Line management should ensure that there is systematic use of key tools such as HACCP and risk assessment and management throughout the company. Moreover, these should be 'living' activities with documentation and processes which remain in constant evolution. HACCP plans should not be static documents that fill shelves and are brought out as defence tools to placate auditors or government officials. The plans should be regularly reviewed as part of a process and continually improved and updated to reflect the constant change that goes on in an organisation. Moreover risk assessments should be regularly reviewed. Risks change, often dramatically, because of major changes in companies but often slowly and insidiously as a result of a combination of small individual, but collectively very major changes to raw materials, production approaches, staff changes, etc. Risk review must be an ongoing management activity.

6.5. Effective audit

As mentioned earlier, an audit approach must be set up which reinforces the policies and standards

governing the organisation. The best approach to audit is a cascade of multiple levels; with as many as five types, which span the spectrum from daily checks by each and every member of the workforce through to independent accreditary audit leading to certification.

6.6. Measurement and review

Finally, and essentially, the measurement of the effectiveness of the food safety processes should be reviewed frequently at the executive management board level. The measurements should be linked to the benefits; financial and non-financial that can be seen in the organisation as a result of the activities in food safety. It is the mix and the linkage of hygiene and food safety with the effectiveness of the organisation in economic terms that is important. Without obvious benefits, no one is going to invest in food safety. Executive management board review will focus attention and drive improvement through the company. Without this support there will be little improvement.