

A study of the social and physical environment in catering kitchens and the role of the chef in promoting positive health and safety behaviour.

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Abstract

This is the account of a mixed method study of chefs and their kitchens in order to identify the nature of their workplace and how this affects their ability to comply with health and safety requirements in the kitchen. It included extended periods of observation, monitoring of physical parameters, analysis of records of reported accidents, and a series of reflexive interviews. The findings were integrated and then fed back in a smaller number of second interviews in order to test whether the findings fitted in with the chefs' understanding of their world. Major factors identified included survival in a market environment, the status of the chef (and the kitchen) within organisations, marked autocracy of chefs, and an increasing tempo building up to service time with commensurate heat, noise, and activity. In particular during the crescendo, a threshold shift in risk tolerance was identified. The factors, their interplay, and their implications for health and safety in the catering kitchen are discussed.

Introduction.

This research was conducted to investigate the factors that influence the safety behaviour of chefs as managers of their kitchens. There were, however, two separate themes which stimulated work in this area. Firstly, the disproportionately high number of injuries which are believed to occur in the catering industry, relative to the inherent risks of catering activities, and secondly, the UK policy of adopting health and safety laws that encourage what is described as self-regulation. These two themes are explained further below.

The catering industry

In the UK there are 250, 000 private catering businesses employing some 1.7 million people (full and part time), (Health and Safety Executive 1997a). Many more of course work in Health Service, Military, Local Authority and other non-private catering operations. The rate of statutorily reportable injuries in the catering industry is believed to be as high as that in general manufacturing, (factories), (Health and Safety Executive 1997a), despite the public perception that kitchen work is relatively safe. Reportable injury statistics are notoriously unreliable because of the very high level of under reporting that is known to exist, (Stevens 1992). Relying on the strong case argued by the HSE (Health and Safety Executive 1997b) for the role of management in health and safety, it is undoubtedly the case that safety management in the catering industry is an area that requires attention.

Self regulation

Occupational health and safety law in the UK has since the 1970s encouraged self-regulation. An important element of self-regulation is the principle that employers should be able to manage safety in their own businesses. Dawson, Willman, Bamford and Clinton (1998), have pointed out that, although it has much merit, the policy of self-regulation also has its limits and may not be appropriate to all workplace circumstances. Nichols, (1997) Has further pointed out that although the support of senior managers is

essential to self-regulation, first line supervisors have a pivotal role in regulating safety at the coalface where safety risks materialise.

Chefs, because of their traditional autonomy and autocracy, are first line supervisors who influence the working of self-regulation in their industry in a unique way. For this reason the chef level of management was chosen to begin the examination of self-regulation in the catering industry.

Lecturer Chefs

The catering industry in the UK is very diverse, ranging from one-person part time businesses to multinational companies. Catering businesses are also, themselves very heterogeneous ranging from a la carte restaurants to production line kitchens. For this reason it is difficult to choose a starting point for research into safety behaviour in the catering industry.

It was decided, therefore, in this study to work with lecturer chefs in teaching kitchens. This enabled the work to be carried out in kitchens where some of the factors, which might influence safety behaviour, were reliably known. For instance, the qualifications and employment status of the chefs and other kitchen workers, the management structure of the organisation and the financial regime that applied were fairly clearly defined. In private companies it would have been much more difficult to gain reliable information on these factors and thus to determine their likely interplay with the other factors that were examined.

The study reported here, therefore, was conducted in the semi-laboratory environment of a teaching kitchen managed by lecturer chefs. This environment itself is described in some detail in the methods section of this paper.

Methodology

Unravelling questions regarding health and safety in catering kitchens necessitates an understanding of the complex interaction of human and

technical processes that result in the meal on the plate. Partly due to the uncertainties which surround human behaviour per se, and also due to the social, individual, and technical unknowns in the catering kitchen, it was considered that a qualitative form of study would be most appropriate.

The study reported here was intended to gain understanding in order to attempt causal explanation of acts as they are symbolised within the chefs' framework (i.e. what did the chef think she or he was doing and what did they think they would achieve by doing it?). For a fuller examination of the theoretical underpinning of the methods used see, among others, G.H. Mead (1967) and symbolic interaction and Weber's ideas of understanding "in terms of motive the meaning an actor attaches" (pp 94,95 Weber 1947/1964).

In understanding chef's behaviour, it is neither desirable nor appropriate to set up detailed hypotheses to test in the kitchen environment: operationalising the indicators for hypothesis testing in sufficient detail has its own methodological problems. In view of the above it was also, therefore, important to work in a form and language which fits with the perceptual world of kitchen practitioners.

The chosen method of research was, therefore, emergent (Glaser and Strauss 1967), i.e., the direction of the study was not totally predicted during the design stage but rather as issues emerged during the research they were pursued. Thus interim findings the further progress of the research. It was also considered to fit into the general field of 'grounded theory' (cf. e.g. Martin and Turner 1986).

In order to achieve the above, the proposed method of study was a mixed one, originally consisting of 'field-work' by observation in the kitchen followed by reflexive interviews with the chef lecturers. In order to improve validity of the findings, this was then followed up by interviews with two of the more senior interviewees. Here tentative findings were tested out and interesting ideas were pursued (c.f. Maguire 1994). An important theme that emerged

early on in the study (i.e. during the initial observation phase), however, was the effect of the heat. Therefore an environmental monitor was set up in the kitchen in order to measure temperature and sound level.

Materials and Methods

Study Forum

The work was undertaken in a leading Hotel School which enjoys a national and international reputation. The Hotel School employs sixty staff, forty teaching, of which fourteen are qualified chefs and practice as chef lecturers. Facilities in the school include a large restaurant with waiter service and a smaller café with attended service. A large teaching kitchen serves each of these. There are also two individual cookery kitchens, a large larder/preparation room, a substantial bakery, two patisserie kitchens and a food science laboratory. These food preparation areas are served by large stores and cleaning sections. Theory teaching takes place in ten class rooms and two IT suites.

Each academic year more than six thousand hours of practical Kitchen based teaching takes place in the school. Much of this is in the preparation of meals for service in the restaurant and the café which serve members of the public and staff at lunchtimes and in the evenings. These are known in the jargon of catering training as *real working environments (RWEs)* as although the students are supervised, the meal produced is for *real paying customers* (another expression from this field).

Although the Hotel School has excellent safety procedures and is very conscious of safety issues such as training, there are inevitably some accidents each year. This means that the lecturer chefs and their students have experience of the kind of injuries that occur in the catering industry. Accident data are collected by the Hotel School. These are summarised in table 1.

Table 1. Summary of accident records collected by the college first aiders between January 1997 and September 1999

<i>Type of Accident</i>	<i>Numbers</i>
Cuts	56
Burns	25
Abrasions from falls	2
Total	83
Requiring Hospital Attention	3
Requiring more than three days absence	3

Kitchen Observations

A series of three kitchen observations were conducted in which the researchers observed preparation activities in the kitchens. The purpose of these observations was to gain an insight into the particular working environments and to inform the interview stage of the study which followed. Three observation periods were undertaken, each of about one hour and thirty minutes. One was performed in the café kitchen and two in the restaurant kitchen. Two observations covered lunchtime service and the other covered service at dinner. In each case the observation included service time itself.

In conducting the kitchen observations the researchers explained the purpose of the work to the lecturer chef in charge and entered the kitchen only at his invitation. The consent of the Hotel School management was also obtained on each occasion. The researchers were introduced to the students by their names only and the general purpose of the work was explained. They wore plain white coats and hats and stood as unobtrusively as possible at a pre-arranged location in the kitchen. They did not speak to the people working in the kitchen unless they were themselves addressed. When this occurred it usually involved an explanation of procedures or techniques.

The researchers did not take notes during the observation periods, as note-taking was considered to be an unusual activity in the kitchen. Instead all notes were written up immediately after each observation period. Despite the difficulties inherent in this kind of work, the researchers strongly believe, for

the above reasons that their presence did not distort the behaviour of those working in the kitchen in a way that would invalidate the findings reported in this paper.

An important principle in ethnographic research is the understanding that the presence of any stranger in a workplace may affect the behaviour of those who work (see for example Hammersley 1983). It is the authors' opinion, however, that their presence did not distort the findings in this particular case. This is because of a number of factors. Firstly, the researchers were already known to the chefs and were sometimes recognised by the students. It is acknowledged that this in itself can cause difficulties, but in this particular environment, the authors believe, from their experience, that limited familiarity between the researchers and the subjects improved the degree of trust in their relationship (see Finch 1993). Secondly, it was very clear that once the momentum of activity builds up in a busy kitchen those who work there have little time to interact with or even notice visitors.

The Measurement of Physical Parameters of the Kitchen Environment

Measurements of air temperature and of sound level were made in a teaching kitchen from the start of preparation until the end of service. These measurements were taken on 23, 24 and 25 June 1999 as preparation for lunch was taking place.

The apparatus used was a *LogIT DataMeter 1000* distributed by Griffin and George of Loughborough UK. The probes used were: a general purpose temperature sensor, range; -10 °C to +70 °C, accuracy ± 1 °C, resolution 0.1 °C and a sound level sensor, range; 50dB to 100 dB, (A) weighted scale. The data were collected, stored and retrieved using purpose designed proprietary software.

This equipment was chosen because of its durable and reliable nature which suits it to the harsh kitchen environment.

Interviews

Eleven of the chefs (ten men one woman) were interviewed (one declined to take part) each for about 45 minutes using an unstructured format and reflexive follow-up to points made by the chefs (for discussion of this approach see Maguire 1997 p. 207). In order to assist in accuracy and analysis, the interviews were recorded using a minidisk recorder and then transcribed.

Second Interviews

Following analysis of the interviews, observations, and environmental readings, two of the more senior chefs interviewed were re-interviewed. On this occasion, a semi-structured format was used. Themes and issues identified in the first interviews, observations, and environmental measures were fed back to them and their reasonableness and fit was assessed.

Results

Observations

The most striking observations in the kitchen related to the increasing pace of work and associated heat and noise. These issues are discussed below.

Environmental Conditions

The following recordings were made:

a) Temperature

Figure 1 shows the temperature in the restaurant kitchen on 24 June 1999. Temperature readings begin at 08:37hrs and show that the temperature at that time in the kitchen was 20.9°C. Temperatures in this range are typical of a mild day in early summer. As service time approached the temperature increased rapidly to levels around 30°C regularly reaching 31°C. Temperatures in this range were maintained for the whole of the service period until around 14:15hrs.

Temperatures of 30° and above for more than two hours will produce a stressful working environment, even taking into account the fact that this

was summertime when people were used to higher temperatures generally.

b) Sound Level

Figure 2 shows the sound level in the restaurant kitchen on 24 June 1999. The sound level increased up to service time in a similar manner to the temperature described earlier. In this case, however, the level is consistently high, often reaching 90 dB(A), and the increase to service time is less noticeable. Another factor, which is apparent from Fig. 2, is that the sound level is very irregular. This is consistent with the sound of clattering equipment and raised voices reverberating around a kitchen where the hard surfaces offer no sound attenuation.

Interviews

(a) Experience and knowledge of kitchen accidents

Interviewees were told that there would appear to be a disproportionate level of injuries in the catering industry. Their emphasis on injury type varied. For example, some emphasised knife injuries while others emphasised slips (although this kind of injury is uncommon in the Hotel school). All were equally emphatic on heat related injuries

(b) Factors identified from interviews

What came from the interviews were a number of dynamic factors which influenced safe behaviour in the kitchen in different ways and at different times both before and during the preparation of the meal. For convenience, these factors have been separated into two classes, each class having several factors (summarised in Table 2). A third 'class' relates to the dynamic interactions of the first two classes and the effects of time.

Factors outside the kitchen (organisational and socio-economic)	Factors inside the kitchen (psycho-social, behavioural, environmental)	Interactions of the factors
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The social status of catering, the chef's status as a professional person	The chef's autonomy, the chef as an autocrat	Social status and professional pride reinforce the need for chefs to maintain autonomy and autocracy
The effects of commercial and market pressures	Heat, Noise, fatigue, the kitchen crescendo and the climax of <i>service</i> time	The effects of market forces and the desire to achieve service on time, combine with the kitchen crescendo, heat, noise, fatigue etc to encourage an increasing tolerance of risks as service time approaches.
	(Tolerance of risks)	Development of professionalism gives a marketing advantage.

Discussion

This section is in two parts. The first and larger part describes in more detail and discusses the findings from both the first and second interviews. The second part synthesises the interview findings with the other findings from the study before considering their implications for health and safety in the kitchen.

Factors identified in the interviews

(a) Social Status

Participants talked of three groups who would appear to 'look down' on chefs, namely their lecturer peers, the general public and, where the catering exists in a larger organisation (e.g. hotel), from the rest of the organisation. Typical comments included:

"Hospitality and catering has always been a Cinderella in HE*. Traditionally we felt that we were looked down on as a profession." *i.e. Higher Education.

This may be, in part, a reaction of the non-chefs due to the fact they “don't feel they know enough to intervene” in the kitchen.

(b) Chef as a job, a profession (or even a calling)

This is the converse of the above problem of social status. Most interviewees saw themselves as professionals. They seek recognition of this and distinction from other food workers who have not taken on the ‘discipline’ (see ‘recruitment’ below).

The idea of a discipline might be a rationalisation for working in poor conditions (see below) or a simple response to market needs (see below). Taken at face value, however, several interviewees talked of their work as a calling, especially where the heights of Michelin stars were spoken about. When one interviewer commented that it sounded “a bit like becoming a monk”, the interviewee agreed. While, in a court of law, this might be called a leading question, it fitted within the context and the comment was appropriate.

Another chef told us of a former pupil now working for a Michelin starred restaurant telling him, “I don't care how much I get paid. I want to do this”. Our interviewee went on to comment “His calling is that he wants to be a chef”.

Some organisations now recognise this professionalism and are “quite happy with Antoine and ‘Antoine runs the kitchen well’” but the same participant warned that leaving ‘Antoine’ alone “can be dangerous if it's too laissez faire”.

Participants talked of the multi-skilling required of chefs, for example “a chef might be able to do the accounts but an accountant cannot run a kitchen. If we put ‘head chef’ onto the duty manager's role it would not happen. The only person who would come up and take on that role would be the second chef”.

c) Recruitment

Four strands of recruitment into catering were identified by interviewees (each was not necessarily exclusive), namely: career chefs, ex-military personnel, those uncertain about career, and those with differing abilities.

Chefs who saw themselves as 'professionals' came from both civil and military backgrounds, but in both cases had entered with the intention of becoming professional chefs. This has not always been the case as one chef talking of the 1960s with the beginning of NHS catering management training scheme, contrasted the situation with its previous state when "the catering managers were ex-army personnel who ended up cooking in the public sector through their army experience".

The matter of status was also mentioned regarding recruitment: several interviewees considered that people were often inappropriately pushed into a career in catering, i.e. catering was not seen as a preferred option but as a career of last resort. This attitude and outcome was seen to detract from the professional image that they sought.

(d) Market dependence and independence

The matter of 'who called the shots' came over from our chefs as an important factor in safety. The need to keep customers coming through the door was necessary for survival for commercial kitchens. Thus everything was geared around getting them in, keeping them in, and encouraging their return.

This was contrasted with organisational kitchens/canteens such as those in the armed forces and the health service who, with their 'captive audience', have greater control. Associated with this difference are matters such as pay, staffing levels, and unionisation but critically there was a view on the part of chefs who had had experience in these situations that they were able to manage time. For example, one stated that the attitude here was "it is better that a meal be five minutes late than to have someone in hospital". This contrasts with

the view of commercial catering that “if a customer has booked a table say for eight fifteen in the evening they expect to be able to have their meal”.

(e) Heat – the metaphor and reality

“It’s very rare to find a well ventilated kitchen that keeps temperatures to a reasonable level, in terms of nice working environment. It can be like working down a mine-working in sweat all day long- it’s extremely uncomfortable”. (One of the chefs interviewed).

The specific conjunction of ideas in any group speeds communication within the group. It also has the effect of making understanding difficult to the outsider which increases the exclusivity of the group and adds to their self-esteem (c.f. Douglas 1992). The reification of metaphor, especially when it has a concrete origin, helps in this process. For the chefs interviewed, the language of “Heat” appeared to hold mythic powers and the power to legitimise. The most obvious example of this resides in the expression “If you can’t stand the heat, get out of the kitchen”. Johns and Menzel’s (1999) study found this expression to be a justification for bullying. . In this vein, heat has been used to punish as was reported when a famous chef branded, with a pallet knife, a junior chef who had made a mistake (Lee and Wilkinson 1999). There is clearly here a sense of the chef feeling that he was acting legitimately and with authority.

One chef that was interviewed talked of the use of heat in times gone by for treating burns.

Most strikingly, expressions used in the kitchen such as the ‘heat is on’ and talk of things ‘hotting up’ were potent ways of describing literally the rise in temperature (see above) but also metaphorically of the increase in tempo (which no doubt also contributed to the perceived and actual increase in physical heat).

The language of heat is used to describe other aspects of kitchen life, for example “why I’m hot on sharp knives, is that I actually cut half my finger nail off”.

(f) The kitchen crescendo

The environmental factors (see above) are familiar to the chefs who talked of the increase in temperature, noise, and tempo of work.

One chef told us that it was “... because obviously you tend to get more pans and more cooking going on, you will find the early hours of any preparation is cold preparation, peeling and chopping and deboning and filleting, and you get more into hot prep as you get nearer- in a la carte cooking, as you get nearer the service, so the physical number of pots tend to build up and the heat builds up from there- as a rule, as a rule that is the case”.

Chefs were also aware of the increase in noise. For example one chef painted a vivid sound picture, saying that “noise level will increase as people are saying.....or the caller in the kitchen could be calling away one meal that has starters and there’s pans clattering around there are fridge doors opening and closing there are oven doors opening and closing there are pans coming on and off the stove, pans are being washed up and replaced back into the rack or storage area so they can be re-utilised again, drawers are being opened as ladles and spoons are being brought in and out and things like that”.

There was a great play on the way that the tempo in the kitchen speeds up as service time approaches such as “the pressures of getting_the job done by a certain time because you are always working to a deadline”.

Bearing in mind the above, the increasing tempo was found to cause factors to interact differently resulting in a threshold shift of risk perception and behaviour. Once this threshold had been deemed to have been crossed (see later), a new set of ‘safety rules’ appears which reduce the margin of safety or as one interviewee put it “people cut corners when there is pressure in meeting service time”.

Examples of the change include:

“In the industry, if the pan is red hot, you put flour on it as a signal to people that it is. Whenever you see flour on something – don’t touch.”

and

“Slipping is a problem. Spilt oil results in a lethal patch. Traditionally people are very good. They throw salt down immediately. There’s not time possibly to clean it up in possibly the middle of service. You can’t call a porter and put up yellow signs around it, not when you’ve 50 people waiting. So we throw down salt to provide an abrasive to stop you skidding.”

Accepting this difference also came across in the problems of managing trainee chefs and informing them of mistakes:

It is difficult to leave it until the end of the shift but it might also be difficult to raise it there and then within the team”

The key to understanding this threshold shift may be in what one chef told us about his experience of catering on the battlefield: “the fact that you’ve got real constraints of money time equipment resources, and personnel, and everything there is stretched to the maximum, and that’s the same as...I should imagine, you walk into any hotel kitchen or restaurant kitchen this week or in fact this week and next week and it will be almost like a battle field”.

(g) Fatigue

“They were tired, very heavy and sick with the drink and the heat, but were living fiercely on their fuddled reserves of nervous energy” (p32, Mervyn Peake 1946/1974).

Fatigue is a problem in kitchens along with its implications for safe behaviour. Chefs saw this coming partly from the increasing pace, the heat, noise and moisture, but also partly from the long and unsociable hours which are worked in kitchens. For example several of the chefs spoke of the split shift system which is quite common: “what have we got? nine ’til twelve-ish, that’s three hours evening work, start at three, service starts at seven, the last hour is normally quite mad....quite...very stressful, it can be very stressful indeed”.

Split shifts can be associated with unpredictability of work load (see also market factors) which must reduce the kitchen worker’s feeling of control over their lives. One chef told us “still today they’ll work split shifts and where they’ll perhaps

do from ten in the morning to two thirty/three o'clock in the afternoon they'll have two hours off and then go back at five and a lot of the time there's a lot of chefs won't do a lot in that two hours, they might go to the shops, they might just sit and play cards depending what environment they're working in. Some establishments bring them in and keep them there till they finish because of the amount of work load they've got going".

While the difference between market driven catering and organisational catering are discussed elsewhere, the key to understanding the fatigue may be, as with the threshold shift in safe behaviour, this feeling of being on the battlefield (see above). One chef told us "when we went out to Kosovo ... the fatigue at those times would be the same as any other hotel or restaurant because you are constrained by how quickly people can be fed and then replaced back on the line".

(h) Chef as autocrat

Considering the factors discussed so far, it becomes apparent that making things happen in a kitchen is a difficult task. The chef has this task. While there is a clear hierarchy, the chef in some establishments is not only the issuer of orders, he (or she) also takes on spiritual (or at least charismatic) properties (see above discussion of the monkish discipline) which vest in him (or her) either an omniscience or at least the ability to detect (and thus appropriately respond to) the mood and moment. Rather like an orchestral conductor, the chef reads the music, listens to the performance, and changes tempo. It is the chef who decides when activity thresholds are crossed.

The autonomy of the chef has military parallels, for example the catering 'unit' in a catering kitchen is termed the 'brigade'. The fact that several of the interviewees were military trained and that many ex-military caterers move into civilian catering may have some explanatory power, for example, the 'ranks' in the kitchen have equivalent military ranks in the military kitchen. This cannot be the only explanation since men and women have organised to cater at least as long as they have organised to fight.

Describing the chef's power has also often evoked an analogy with naval command. Both of us, having been involved with catering kitchens over many years, have often observed the most senior members of an organisation

deferring to the chef and seeking his or her permission before entering the domain.

(i) Tolerance of risks

“They will stand heat, temperature and often rickety equipment”. (One of the chefs interviewed).

A major theme that came across from the interviews was that in kitchens, risk and “minor” injury were accepted, perhaps even expected as these men and women suffer for their art. Comments made include:

“If the head chef can burn himself, if the head chef can cut himself, it’s one of the hazards of the job. To what degree, depends on how skilled you are. If it’s a small splash from a pan, you know, a small nick from a knife you just but when it’s a real burn, then something seriously has happened, what has happened you have to find out, someone will have to do an accident report”.

When asked where the line was drawn between serious and non-serious, the chef replied:

“I don’t think there can be a line. If there is a line it’s too wavy! because I’ve seen. As I said two and a half years ago I burnt myself badly but it was just one of those things- I put something in, in the frying pan, it hit something else and the splash came and the side of the pan I could actually see it coming (makes impact noise) and it hit me, and I was too slow to get to the sink for the it took a hold and it blistered.

When asked what they would say to a young chef who wanted to sue for injuries, one of our interviewees replied “Sorry. Are you in, in the right job mate? Are you coming to work here to be a chef or are you coming to work here to, with a view to suing somebody? You’ve got a negative attitude. I mean there’s no way that somebody can walk round with an ultra safe mentality- can’t do it. You can trip over and, kill yourself. Those shoes may be perfect. Is the pavement? Can’t do it. There’s no such thing as a safe car, no matter how much side impact bars or safety.. or air bags or seat belts or whatever, there’s no such thing as a 100% safe car. Not if a 10 tonne lorry comes bearing down on you at 40 mph and it hits you side on, that side impact bar ain’t going to stop that lorry.”

When asked to summarise the same chef said “The only way I can summarise it is to say you’ll not stop the accidents, you’ll never stop them, they’ll always happen - the small cuts and the burns.”

There were plenty of similar comments but one which also brought out this idea of not only suffering for one’s art was, but also the idea of personal responsibility:

I think it is... part of it is I suppose the pride in the job- I’m not saying you’re proud of your cuts and bruises by any means but, certainly I think people accept minor cuts and abrasions, you know, I mean, you know yourself if you do it, it’s your own, you’ve cut yourself or burnt yourself, it’s your own fault because you’ve not been taking care...”

(j) Effects of the Market on ‘culture’ in the kitchen (and hence health and safety)

Many of the remarks seemed to be driven by survival in a competitive market. Thus for example the disciplined devoted chef is more likely to retain customers. This was born out by the utterances of one chef whose talk of Michelin stars while driven partly by “It’s very attractive. It is, it is the pinnacle of our profession “ seemed also driven by the fact that “when you do make it , yes you can then be quite financially successful: TV, media, etc., er, so there are a few people who have made it and made good livings from it, but, (sucks in air) not for me.”

Synthesis of findings and discussion of their implications

Some of the factors considered above affect the safety behaviour of chefs very directly. An example of this would be the pressure to meet service time and the demands of customers. Other factors such as the professional pride of chefs may affect safety less directly or not at all, but are still part of the kitchen environment and so need to be appreciated if the complex interactions of the commercial kitchen are to be understood.

One overwhelming issue that presented itself to us in our kitchen observations and in the interviews was that of the increase in tempo as service time approaches. This increase in tempo paralleled an increase in the speed at which people worked, increases in temperature and increases in

sound level. These changes were accompanied by a reported increase in perceived stress to kitchen staff and a corresponding feeling of camaraderie in the brigade's desire to succeed by producing the meal on time. This desire to succeed as a group appeared to enable the threshold shift in injury tolerance that was described earlier to take place and had the potential to allow the chef, on occasions, to assume a still higher level of autocracy.

The increases in temperature and noise measured by the equipment (see above) parallel both the perceived increases and the narrative of changes in activity which give rise to the subsequent threshold shift. This may evoke the riposte that this is just another health and safety problem to be managed, i.e. that 'firmer management' would stop kitchen workers being 'so lax'. The battlefield analogy, however, presents an alternative understanding. In this altered state of consciousness, kitchen workers may be even more safety conscious and doing their best 'under fire'. Here the idea that any safe behaviour is better than nothing becomes acceptable among 'comrades in adversity'. It takes someone who has been 'battle-hardened' to control the situation (see below).

It seems that the pressure to achieve *service* on time is what causes the brigade to allow this injury tolerance shift to take place at a time when the risk of injury to people working in the kitchen is already increasing because of fatigue and the increasing tempo mentioned earlier. It also seems that there is a considerable acceptance of the inevitability of injuries in kitchens generally. The chef as autocrat in the kitchen will usually set this background injury tolerance level and control the way in which tolerance is allowed to increase as service time approaches. It is the traditional autonomy and autocracy of the chef which allows him or her to assume this role.

The role of the chef as autocrat is reinforced, it seems, by the professional pride of chefs and the exclusive status achieved by the most senior members of the profession. The low social status of catering generally may serve to cause the brigade to cement itself together in the face of this external threat.

In essence, therefore, the chef leads the brigade in its pursuit of service time and it is the chef who sets the tone and pace of the campaign. The chef also seems to direct changes in injury tolerance whether explicitly or implicitly.

In terms of self-regulation, therefore, the role of the chef as a first-line supervisor and manager will be crucial to the safety culture of the kitchen. The consequence of this is that a chef who gives safety a high priority will make an immense positive contribution to safety in the kitchen. Conversely, however, a chef who views safety as a low priority issue will have a similar negative effect on safety. In the case of chefs, therefore, the policy of self-regulation hands to the first-line manager a very large degree of control and the ability to set safety standards. This was probably not the intention of the Robens Committee (1972), which first advocated the policy with traditional factory workplaces in mind where management power is perhaps more evenly distributed along the chain of management.

While the study was conducted in teaching kitchens rather than fully commercial kitchens, and probably does not fully represent the industry as a whole, it does, however, reveal some general principles of the kitchen culture which may well apply generally. For example, the UK Health and Safety Executive, (Health and safety Executive 1998), have said that high temperature and humidity, due to the lack of adequate kitchen ventilation, are recognised as a major problem in catering. Furthermore they point out that that poor ventilation is seen to contribute to stressful working conditions which can lead to safe systems of work not being followed.

It is also worth pointing out that all of the chefs who took part in this study had extensive experience of working in commercial or institutional kitchens. They, therefore, represent a far wider view than the Hotel School in isolation. The lecturer Chefs were aware of the threshold shift in injury tolerance which have been reported here, despite the fact that they now work in an organisation with a very strong safety culture and very low accident rates.

Conclusions

It is always the case in a study that an understanding must be gained before the topic can be examined and discussed. Qualitative methods aim to achieve that understanding. It does not challenge quantitative methods but complements them or even identifies the need for them. In this particular study, the first phase (the observations) gave rise to the introduction of a quantitative phase (environmental monitoring). The measurements, in turn, corroborated the qualitative findings.

This study suggests the following matters as important in understanding the processes affecting health and safety in the catering kitchen:

- 1) The perception of others (both public and non-kitchen staff) towards catering workers
- 2) the pressure for service
- 3) the increasing heat and tempo.
- 4) The role of the chef in leading and 'orchestrating' the activity.

Without an understanding of these, it is unlikely that the health and safety practitioner (either advisor or enforcer) will effect an improvement to health and safety in the catering kitchen.

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