The foodservice sector: assessment and operative instruments to improve the safety

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Abstracts
The foodservice centers, in these last years, increased their performance by increasing productivity and the technological level but, at the same time, still represent a context where worker safety is put at great risk because, especially in the expressed productive organization (the so-called fresh-hot link), the times are very concentrated in order to prepare all meals provided within the time required by the customers. The foodservice personnel is often young, with a very short experience and employed in a seasonal way.

The aim of this study was twofold: firstly to identify the major accidents reported in a catering company in three years, the other to present an equipment analysis methodology in such a way that we can provide, to those who must manage them, an approach based on “risk analysis model”.

Data were collected starting from the analysis of all complaints for accidents recorded in the three years 2006/2008 occurred in a Catering Company. The details were then divided according to type of injury suffered by the worker, the place where the accident occurred, the days of prognosis and possibly the equipment that caused the damage. Through the objective analysis of these data were constructed graphs for equipment deemed most dangerous by relating the severity of the damage with the probability (risk analysis model): then actions to be taken in order to manage equipment safely were identified.

Keywords: risk analysis model, catering, accident

Introduction
The last ten years have been for the catering at a remarkable growth: "eating out" is now a growing habit for common food style. The foodservice centers, consequently, increased their performance by increasing productivity and the technological level but, at the same time, still represent a context where worker safety is put at great risk because, especially in the expressed productive organization (the so-called fresh-hot link), the times are very concentrated in order to prepare all meals provided within the time required by the customers.

Think of a great cooking center, having to produce a few thousand meals, must concentrate all activities in the early hours of the morning in order to allow the logistics deploy on time (European Agency for Safety and Health at Work, 2008)

The personnel involved are mainly young (48% under 35 years old) and often in a seasonal period. Data on total employment in the industry HORECA (HOtel, REstaurant and CAtering) show that the levels are significant throughout all the European context (Fig. 1.a).

The dynamics of the sector have large variability (Fig. 1.b) with significant differences depending on the country considered.(Eurostat, 2011)

The working conditions in the sector are difficult and include irregular, often constraining work hours, atypical forms of employment, comparatively low pay and lack of job stability. And these conditions put workers’ health and safety at risk. However, the incidence rate in the
HORECA sector (3041 accidents per 100,000 workers) for accidents with more than 3 days absence from work, is comparable to the rest of the economy (3176 accidents per 100,000 workers) (European Foundation for the improvement of living and working conditions, 2012).

![Graph showing employment in HORECA in different European countries](image)

**Figure 1** – (a) Percentage (a) and dynamics (b) of employment in HORECA in different European countries (Eurostat, 2011)

The aim of this study was twofold: firstly to identify the major accidents reported in a catering company in three years, the other to present an equipment analysis methodology in such a way that we can provide, to those who must manage them, an approach based on “risk analysis model”.

**Materials and methods**

The analysis of major accidents was conducted in an operational context by partnering with a company of caterers (Serist S.p.A., Milano). It was analyzed the allegations of injury presented to three years (2006, 2007 and 2008). For each injury was defined:

1. **the environment**: the place where the accident occurred, specifying the exact location (kitchen, dressing room, washing area, hallway, elevator, stairs, cold room, administrative offices, storage). The injury was classified as ongoing, when it occurred while the employee was traveling to work or while driving home after work.
2. **the fact**: understood as the activity of the injured at the time of the occurrence of the accident, it is useful to understand how the accident and then classify the equipment.
3. **the equipment**: in case the damage was caused by an apparatus. Is has been classified as equipment including crockery, chopping, cleaning products, tables and knives, as well as the classic equipment used in restaurants as the slicer, the trolley, the kettle, a potato peeler, etc.
4. **the damage**: namely whether it is a burn, cut, bruise, trauma, injury, contact with chemicals, fracture, low back compression, distortion, etc.
5. **day of prognosis**: is the time that the worker had to abstain from work, so as to give an idea of how serious the injury was.

It was made graphs that have allowed to compare annual trends and the influences of individual parameters. Another analysis that was conducted is the correlation between the number of accidents and days devoted to training for the prevention of accidents in the professional kitchen. In the work on the analysis of equipment have been observed in cases...
where an injury has been caused by the use of an apparatus, have been taken into account in the days of the severity and prognosis for the number of injuries resulting from the use of that specific equipment, for the probability. And the type of damage caused to define the danger to which it refers. In doing so it defines the specific risk of any hazards observed, to give, when assessing the degree of specific risk of each hazard. First have been defined various dangers that may or may not be present in the use of a specific piece of equipment, these are:

- danger of cutting \ wound;
- Burn Hazard;
- danger of stumbling \ fall;
- electrical hazards;
- Hazards due to loss of stability of the equipment;
- danger of being crushed.

Once it has defined what dangers may arise from the use of protective gear were assigned scores from 1 to 4 for the probability and severity of the damage, following the steps on Tables 1 and 2. Scores are given by observing the number of cases of injury occurred in the three years analyzed for the probability, and the same day prognosis for gravity.

**Table 1 - Severity of the damage**

<table>
<thead>
<tr>
<th>Value</th>
<th>Level</th>
<th>Identification criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Slightly</td>
<td>Injury or illness, less than 8 days.</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>Injury between 8 and 30 days. Occupational disease with reversible effects</td>
</tr>
<tr>
<td>3</td>
<td>Serious</td>
<td>Injury over 30 days. Occupational disease with irreversible effects</td>
</tr>
<tr>
<td>4</td>
<td>More serious</td>
<td>Fatal accident. Occupational disease with lethal or totally disabling.</td>
</tr>
</tbody>
</table>

**Table 2 - Probability of damage**

<table>
<thead>
<tr>
<th>Value</th>
<th>Level</th>
<th>Identification criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Possible</td>
<td>The observed situation is such as to cause damage only after the occurrence of unforeseen circumstances. You are not aware of similar events</td>
</tr>
<tr>
<td>2</td>
<td>Unlikely</td>
<td>Its occurrence would require uncommon circumstances. Similar events have already occurred.</td>
</tr>
<tr>
<td>3</td>
<td>Likely</td>
<td>There were similar facts. Its occurrence would not provoke surprise.</td>
</tr>
<tr>
<td>4</td>
<td>Very Likely</td>
<td>Its occurrence is almost taken for granted.</td>
</tr>
</tbody>
</table>

The graphs (fig.2) were constructed to have on the abscissa the probability of injury, on the ordinate the severity. Each danger is characterized by a point in the graph whose coordinates are the scores (from 1 to 4) by severity and the probability. The chart is divided into 3 parts as follows:
If the point, of a particular danger inherent to its equipment, is located below the limits of acceptability the risk will be said acceptable. In this case will not be necessary to intervene for the improvement of security.

If you find the point between the limit of acceptability and tolerability limit the risk that it will be tolerable. In this intermediate zone fall assess those risks for which interventions, not immediate, for the improvement of health and safety. Need to be kept under control.

Finally, if the point is above the limit of tolerance is a risk that will be improved, these situations require immediate action to improve safety. In the last part of the work have been highlighted those situations of risk that require immediate action, ie those that are located above the limit of tolerability. They were then dictated the possible corrective actions to be applied to the system or equipment to improve safety.

Figure 2 – Example of graph that characterizes the equipment in terms of likelihood and severity of risk

Results

The analysis of the types of accidents and their characterization are shown in the following graphs (Figures 3, 4 and 5) and it is possible to consider interested dynamics for the management of a safety system for the workplace in the catering.

In particular, Figure 3 refers to the analysis of the environment where accidents have occurred: in the kitchen was closed on average 70% of injuries (60% in 2008, where the largest percentage of accidents in other places related to food). Commuting accidents have a share stationary fluctuating between 11% and 13%.
The analysis of the type of damage (Fig. 4) showed that the cut appears to have a rate of 23%, with a peak of 25% in 2007. The damage caused by cutting may have many causes, one of all is the use of knives, the use of slicing, the breaking of dishes etc.. The cut has different severity, prognosis can be from 3 days as the prognosis for over 60 days, but most are minor. The fall had a peak with 21% more in 2007, has remained static for the rest of values between 13% and 15%, this damage can be caused by a slippery pavement, wet or uneven, the handling of trolleys; by the impact against equipment such as the table. Falling objects, dishes, pots and pans can cause bruises, their frequency is between 17% and 27% in three years. The burns have a relatively low frequency, whereas an environment like the kitchen, even gravity is usually low with poor outcome that rarely exceed 10 days.

Injuries caused by the equipment (Fig. 5) range from 42% in 2008 to 47% in 2006, with 45% in 2007. In all three years the equipment was found to be more dangerous than the knife, the percentages are still declining: from 15% in 2006 to 11% in 2008. The severity of the damage is very variable. The truck has the same trend of the knife, the percentage of accidents caused by this equipment has decreased by 1% each year, however, has values that do not exceed
9%. This equipment due mostly falling damage and by crushing, and, in rare cases, can cause burns in the case where the trolleys are heated. The damage caused by a dish rather an opposite trend compared to the other two facilities analyzed, there is an increase of 1% in three years. The dishes and causing minor damage due to cuts, bruises and burns. The percentage of injuries caused from slicer increased from a maximum of 9% in 2006 to a 5/6% in the other 2 years. This equipment does cause more damage to the cutter, in very rare cases has been found the occurrence of other damages, which are of medium severity. The cleaning products have caused injury mainly in 2008 with a 3%, these products can cause harm by inhalation or contact with eyes.

Figure 5 - Equipment involved in the accidents

The days of prognosis (Fig.6) have undergone a significant change, first of all accidents with prognosis than 15 days has decreased from 47% in 2006 to 37% in 2007 up to 11% in 2008. This is an important finding because the seriousness of the damage is increasingly lowered and, therefore, appear to be less dangerous accidents. As it is easily seen from the graph in 2008 has been an incredible change of direction with regard to this parameter. In 2008, in fact, the prognosis of less than 5 days and those between 5 and 10 days were significantly increased relative to the other two years, as well as those between 10 and 15 groups are significantly decreased. The death in 2008 refers to an event in progress.

Figure 6 - Percentage of days of prognosis in the three years evaluated
The last analysis led to the crossroads with the number of accidents with persons trained on safety (Fig. 7)

As you can see the number of courses taken and the total number of accidents have a relatively proportional, this once again puts the emphasis on how important and how this tool is useful for improving safety in the workplace.

The analysis allowed to identify the equipment most important for assessments in terms of danger and harm: the cart, the knife and the slicer. The cart was involved in several accidents causing different types of hazards. Tripping/falling while cart are handled has a probability but a high average severity. This equipment is moved frequently this leads to dangers such as being crushed against the walls, doors and other equipment. This type of event is likely but its severity is mild. The cart does not appear to be quite stable, there have been several accidents resulting from loss of stability of this equipment, gravity is medium. Other hazards are attributable to the burn, in the case in which are used a heated cart, and the risk of cuts:wound. The risk assessment has led to the graph of Figure 8.

![Graph showing number of persons trained on safety and number of accidents](image)

**Figure 7 - Total persons trained & number of accidents**
As it can easily see, the only danger above the tolerance threshold is the danger of tripping/fall, this danger must implement immediate actions for improvement. The danger of being crushed to loss of stability is at the limit of tolerability and needs of improvement actions in the short/medium term, to not risk the worsening this situation. The danger of scalding is rather limited, in this case it is sufficient to intervene only in the programming phase.

The only risk that one runs when using a knife is the danger of cutting/wound. This type of damage is very common in places like the kitchen and in rare cases the severity appears to be high. Considering the cases of injury resulting from use of this equipment, in the three years analyzed, it was concluded that the danger of cut/wound is above the tolerance threshold (Fig. 9).

The slicer is a tool widely used for slicing meats, cold cuts, cheeses and available in a wide range of models to suit every user. Noteworthy too is the number of available accessories, such as slicercount or device off slices. In any case it is always made up of some characteristic elements: an electric motor, a regulator of thickness for the grammage, a blade and a carriage. There are essentially two types of dangers of using this type of equipment (Fig. 10): the danger of cut/wound and electrical hazards. The danger of cutting wound turns out to be an average frequent with a severity which, for most of the cases, is high.
**Conclusions**

The analytical approach and the technique of Hazard Analysis of catering equipment are two very interesting tools to increase the level of security in the context HORECA an advance logic. The analysis showed that:

1. the formations still constitutes the main tool that allows to reduce significantly the number of accidents;
2. approach based on risk analysis allows to identify the precise technical measures must be undertaken to secure equipment that, while respecting the safety rules, is still the cause of accidents; 3. graphs obtained allow to support preventive interventions with objective evidence coming to raise the security level of the sector.

**References**


Eurostat. 2011. *Accommodation and food service activities (NACE Rev. 2)*, Statistics Explained (2011/10/5)
