

## **Coping with the risk in the wine cellar: the use of check lists to identify hazards**

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### **Abstract**

Safety has become an imperative in Europe, in all aspects of the human life. Only improving safety at every level, the length and the quality of life can be increased. The aim of the present work was to set up a method of analysis of the safety levels in the wine industry. To assess occupational risks at the workplace in the wine cellars, we have collected information by using check lists expressly created for this research. The check lists were three, in order to analyze the safety under three aspects: safety of the operator, of the food and of the environment. To each answer we have assigned a score from 1 to 4. The scores are plotted in a radar graph which allows an immediate representation of the “strength and weakness” points of the firm. Food safety has underlined the problem of the formation of the workers (especially if seasonal) and of the traceability (tracking) and the tracing of the product. Within the worker safety, a critical point represented by the management of the emergencies, mainly due to the characteristics of some wine cellar, located in old buildings difficult to manage in terms of safety. In terms of environmental safety, clearly emerges indifference, a closing toward the recourse to energetic alternative sources. The critical points so collected allow the entrepreneurs to quickly formulate a synthetic judgment about the safety levels into their firm. In addition, the method is characterized by its “modularity”: the same approach can be used also for the management systems of operational safety and health and of environmental control.

**Keywords:** integrated safety, control list, radar graphs.

### **Introduction**

Every few minutes somebody in the EU dies from work-related causes. Furthermore, every year hundreds of thousands of employees are injured at work; others take sickness leave to deal with stress, work overload, musculoskeletal disorders or other illnesses related to the workplace (OSHA fact sheets, 2005). All this despite safety has become an imperative in Europe, in all aspects of the human life. Only improving safety at every level, the length and the quality of life can be increased.

Since the employ is the place where we spend the most part of our time, the reduction of the accidents at work and of the professional illnesses contributes in substantial way to improve this quality and this expectation of life. It's important to ensure the health, safety and welfare at work of the employers. Hazards in the workplace, in fact, can be a risk, and need to be managed. So, risk management must become a component of best practice management. The main aim of occupational risk assessment is to protect workers' health and safety. Risk assessment helps to minimise the possibility of the workers or the environment being harmed due to work-related activities. It also helps to keep your business competitive

and effective. Under health and safety laws, all employers must carry out regular risk assessment (OSHA, 2007).

Farming has long been recognized as a hazardous occupation: farmers are exposed to a variety of hazards; they often work long hours under severe time constraints and many use older model farm equipment that lack safety features (De Roo, 2000).

Despite recent improvements in Italian directives concerning safety at the workplace, however, agriculture, in fact, still remains one of the sectors of economic activity in which accidents are still occurring with a high frequency (INAIL, 2007).

In Friuli - Venetia Giulia (North-East of Italy), the wine production sector is particularly important, both from the economic and of the public image point of view. But despite this development, very little information is available concerning safety levels. Consequently, in this direction we have turned our research by using check lists to carry out a survey able to identify hazards associated to the work in the wine cellars. The check lists were also used during a previous work (Gubiani et al, 2007; Gubiani et al. 2002; Zappavigna et al. 2002). The score obtained with this study represents a system to determine the possible risk level. The system of attribution of the score allows for a reasonably accurate evaluation and shows a good agreement with the level of risk in the wineries, but is not easy to fix it. It's necessary to train people to compile the check list.

### **Materials and methods**

The aim of the present work was to set up a method of analysis of the safety levels in the wine industry. To assess occupational risks at the workplace in the wine cellars, we have collected information by using the check lists, that represent a rapid tool already used in previous works (Gubiani et al, 2007; Gubiani et al. 2002; Zappavigna et al. 2002). The check lists were three, (Tab. 2) in order to analyze with an integrated approach the safety under three aspects: safety of the operator, of the food and of the environment. This method was based on 10 macro indicator. To each answer of the check lists we have assigned a score from 1 (to indicate the most critical situation) to 4 (for the optimum one). In this way, with a simple algorithm, every macro-indicator can be evaluated, by investigating 3 aspects:

- the “significance” (**R**) of the problem (to be more precise: how important is considered a particular aspect by the firm we are studying)
- the “structural-plant/technological” aspects (buildings, plants, etc.)(**S**)
- the “organizational managerial” ones (**E**) (for example: the division of the duties).

If we had more questions for factor, we calculated their average. Finally, for each aspect we multiplied the 3 factors. By multiplying them, we can calculate the priority level (P):

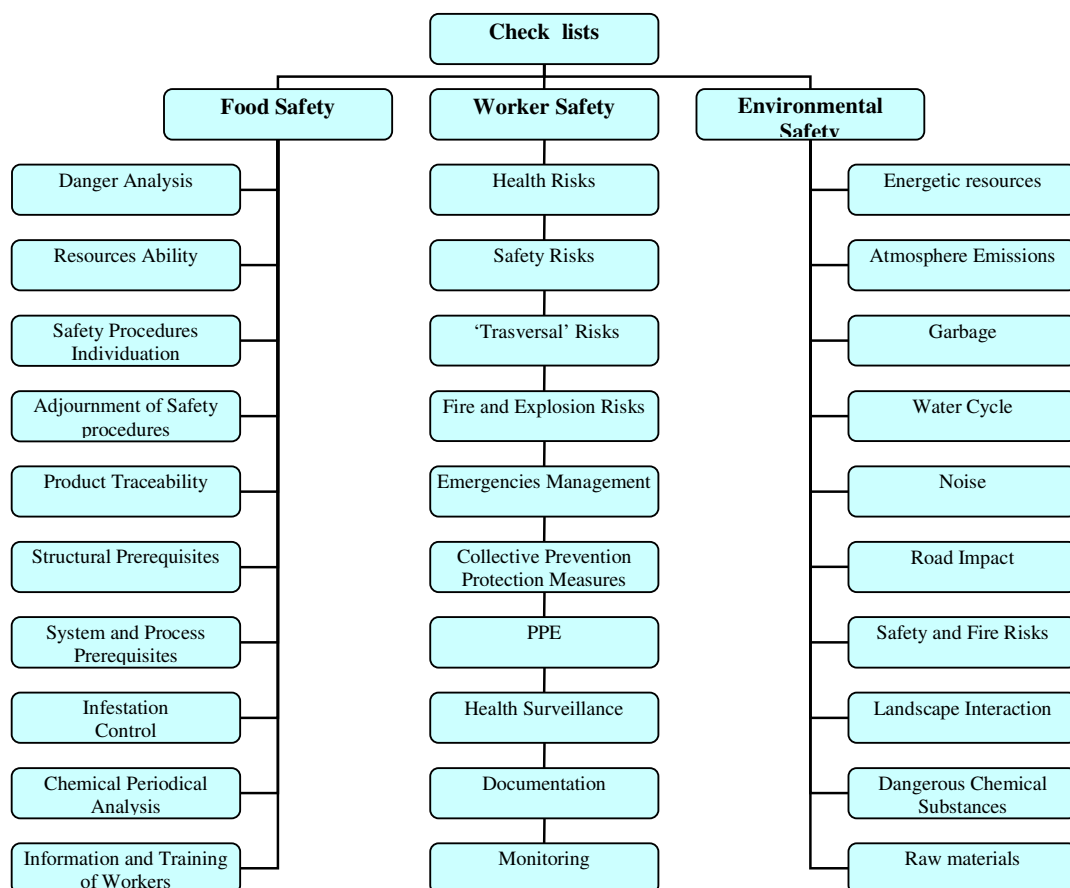
$$\mathbf{P = R \times E \times S}$$

The value we obtain, represented by a number between 1 and 64, gives us some first indication about the actions to undertake for the continuous improvement of the safety management.

SCORE	EVALUATION
1-16	Insufficient
17-32	Sufficient
33-48	Good
49-64	Very good

**Table 1. Score Assignment**

The scores are then plotted in a radar graph (Fig.1, 2, 3) which allows an immediate representation of the "strength and weakness" points of the firm. The global "safety degree" of a firm can be so represented by the area of the graphics. Data have been collected in a sample of 25 wineries, located in Friuli-Venezia Giulia (North-east of Italy), during 2006-2007. They covered all geographical areas (lowlands, high plain and hills), production volumes (from 1,000 hl to 50,000 hl) and production types (high or medium quality). Before using the check list, our collaborators have been trained about point's assignation. The above data were inserted into a Microsoft® Excel worksheet and then processed using the Cohort® ver.6 statistics software.



**Table 2. General scheme of the check list**

## Results

The analysis of the risks gives us a summary of the situation in the wineries. This allows a discussion over the three main areas.

The first area we have analyzed (fig. 1) shows that generally all the wineries record a medium score. The lowest value is obtained by the question concerning the information and training of personnel and it's due to the presence of a lot of temporary workers. The employers, in fact, are certainly aware of the necessity of a theoretical and practical preparation of the whole working personnel inside the firm, both for the guardianship of the safety the health of the workers and for the control of the quality of the foods. The necessity, however, in determinate periods, of huge temporary manpower, not always easily available, makes to fall the choice on that a little specialized, often foreigner and without experience. The brief period of permanence of the workers makes the formation and the training not easily practicable but these workers suffer the high frequency of accidents.

Another emerged critical point is represented by the traceability of the product, resulting from a lacking or incomplete application of the system HACCP (the systematic preventive approach used in the food industry to identify potential food safety hazards). The same low score is also recorded by the question regarding the application, maintenance and update of the safety procedures: this is a crucial point in order to have, in the course of time, an efficient system of food safety control. The high score (close to 40) obtained by the area concerning the analysis of dangers and the chemical periodic ones are due to the easiness in the control of these macro-indicators and to the fact that many dangerous chemical parameters are controlled by law. Another important note is represented by the lack of a very good score in all cases. This still means a low attention in the food safety in the wineries, even if the wine is considered as a healthy food.

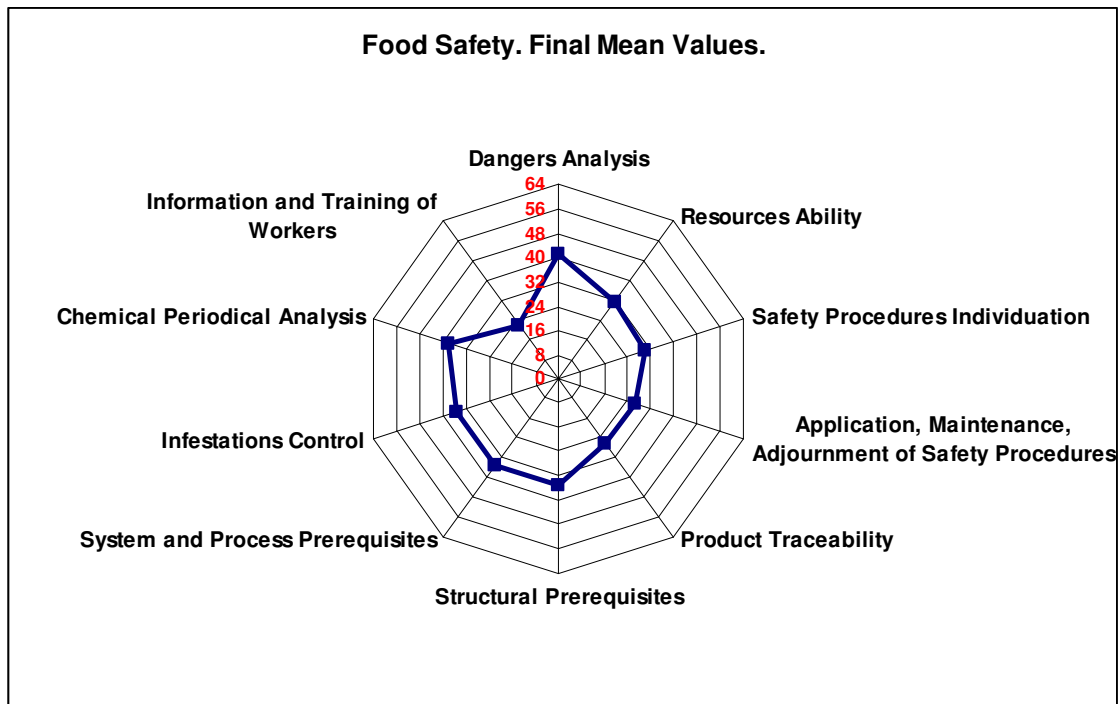
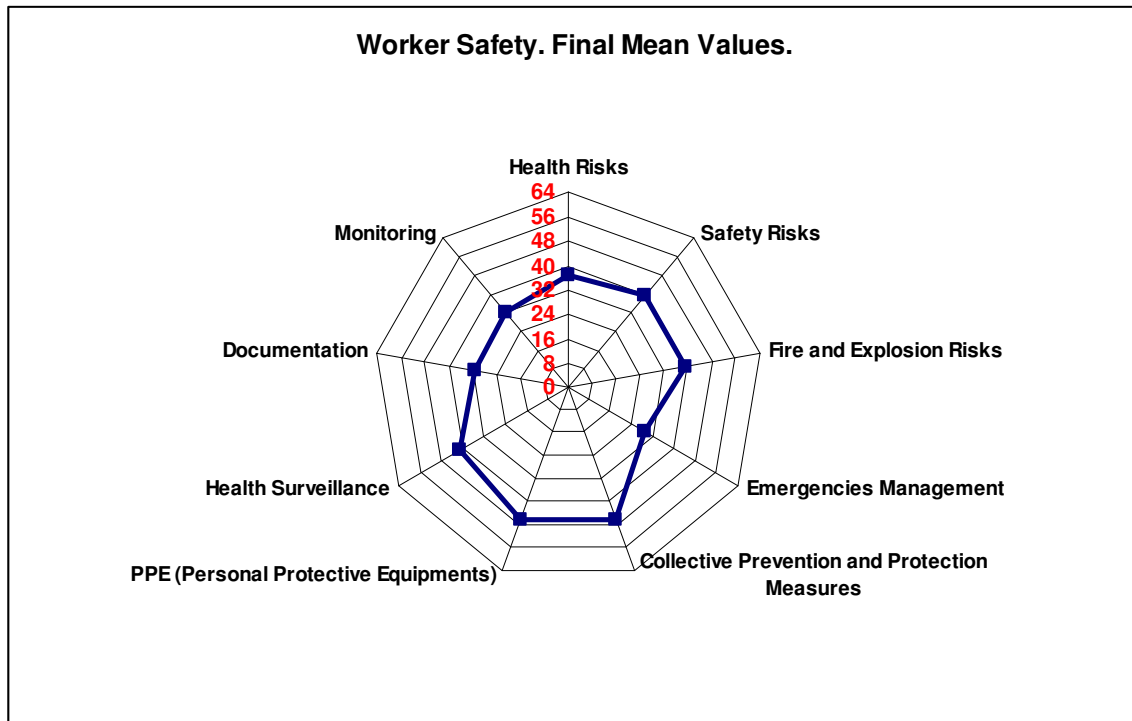


Figure1. Food safety: final mean values

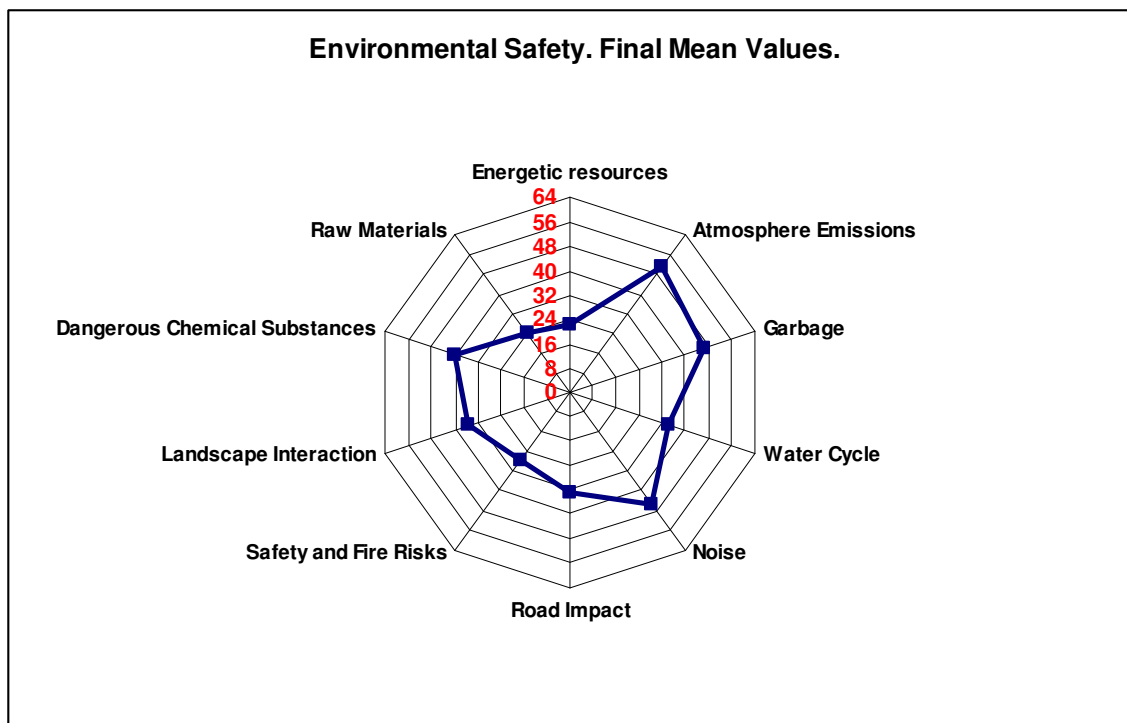


**Figure 2. Worker safety: final mean values**

The macro-indicator pertained to the safety of the operator (fig. 2) shows the greatest problem in the management of the emergencies. This is what clearly emerges in this study, due to a lack of suitable plans, lack of system of signs, insufficient training of the workers and often imputable to the same characteristics of some wine cellar, located in old buildings, even of great beauty, but difficult to manage in terms of safety. This is a great problem in safety, because nobody is trained to cope with emergency: this underlines a lack of culture of prevention that often dramatically is translated in case of accidents. The monitoring is on the same level of score and this depends on a lower level of culture of prevention; the monitoring must be always carried out in order to obtain a high safety. So, if monitoring records a low score, also the documentation is at same level. More attention has been found in the PPE equipment and in the collective prevention and protection measures (score about 48). This latest indicator is provided for law in almost all cases.

As it regards the environmental safety (fig. 3) what clearly emerges is an indifference, a closing toward the recurs to alternative energetic sources.

A better use of energetic resource is a new issue for wineries. The value found (the highest one) is due to a scarce attention, up to the present, paid at this aspect and only in the recent buildings of the wine cellars a technology in oenology machine or in building construction with energy meter is adopted. In particular, the wineries still haven't adopted machinery with low energy consumption and the renewable sources of energy (i.e. photovoltaic panels) are not still installed. The recovery systems (water, heat, etc) are used only in a sample case, not in all wineries. Also in this case the best score was obtained by the organization and by the sensibility of those people who live around the wineries, more interested in a better use of energetic resources.



**Figure 3. Environmental safety: final mean values**

The aspects with a great impact are represented by the raw and auxiliary materials whom input/output doesn't verified the environmental preservation. In the wineries, on the other hand, it's necessary to use much stuff (material for filtration, bottling, package, pesticides, etc.) and is very problematic to control all. Another critical aspect is correlated to the cycle of water. The winery usually consumes a lot of water, that and in this area of Italy abounds: only the new wineries paid attention to reduce or recovery it. Aspects under control are those controlled by law (air emission, hazardous waste, noise, solid waste); the landscape interaction has a good score because many wineries practise the 'tourism of wine'. So, the presence of tourists in wineries or winery insertion in the tourist itinerary aids the winery choice to a good landscape insertion of the buildings and the vineyard.

### Conclusions

The use of the check lists to collect data has allowed an immediate representation of the real condition of a farm from the safety point of view: this is important especially in the wine-cellars sector of Friuli-Venetia Giulia, in which there is a lack of studies about safety levels. We have also obtained a picture of the sensibility to the safety problem and the score, also it is not a very fine system for the analysis, is sufficient for the evaluation of the situation of the wineries checked over. Therefore, if for a particular aspect, the score is high; this means that must be controlled by the owner. If the score is low, that particular aspect is under control. In this work we found a high score for those aspects that have a specific regulation (waste and dangerous chemicals) while for others the score is lower. The aspects concerning farm choices (energetic resource, water cycle) have a big impact because, until now, they have

been neglected. The choice made in this work, which is to show the aspects by radar graphics, allows a fast representation of the phenomena: in addition, this type of graphic is still used for taste analysis of the wine and so is well known by the winemakers.

At the last, this work can allow a first assessment of the wineries, to discover the critical points, and can be performed by the wine maker itself.

The method is characterized by its "modularity": the same approach can be used also for the management systems of operational safety and health and of environmental control.

With this study we believe to increase the safety culture in viticulture and in the agriculture sector in general, because only throughout the culture of safety a decrease of the accidents and professional disease will be possible; we could also have a better environment of work for younger people, that could in this way choose to remain in the agriculture sector.

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