The Manual Handling risk in Vine Growing and Wine Production: a Survey in Friuli-Venezia Giulia

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Abstract
Vine growing and wine production are key sectors in the regional economy of Friuli-Venezia Giulia (North-East of Italy), with increasing quality levels in the final products and a high potential for export. This has encouraged in the last years the use of machinery both in the field and in the wine cellar, but manual handling of loads is, nevertheless, still necessary in most of related activities, and still represents a difficult-to-solve problem. In fact, the number of accidents and professional illnesses reported in 2008 has increased by 68% over the previous year (INAIL), with a substantial share (10%) of skeletal muscle pathologies. The objective of the present research has been to analyze the worker's exposure due to the manual handling of loads, and to define the most critical risk profiles related to the specific activities. In order to asses safety risks related on manual handling operations, a representative sample of 40 vine-growing and wine-producing farms was selected in Friuli-Venezia Giulia. The most critical risk profiles in the vine-growing sector were related to (mainly) seasonal workers employed in the cultivation / management of the vineyard, and grape harvesting. A substantial percentage of situations involving a Lifting Index (LI) higher than 1.25 (as defined by Italian law, D.L. 81/08) was found. Only 50% of the surveyed farms were applying periodical medical inspections, as required by the law in such cases, which also represents a clear indication of how much the problem is still being underestimated.

Keywords: survey, safety, risk analysis, wine cellars

Introduction
Vine growing and wine production are key sectors in the regional economy of Friuli-Venezia Giulia (North-East of Italy), with increasing quality levels in the final products and a high potential for export. This has encouraged in the last years the use of machinery both in the field and in the wine cellar, but manual handling of loads is, nevertheless, still necessary in most of related activities, and still represents a difficult-to-solve problem. In fact, the number of accidents and professional illnesses reported in 2008 has increased by 68% over the previous year (INAIL, Workers Compensation Authority), with a substantial share (10%) of skeletal muscle pathologies: many studies report that muscle-skeletal disorders (MSDs) are a major cause of disability in the working population. As reported by OSHA, they cover a broad range of health problems. The main groups are back pain and injuries, and Work Related Upper Limb Disorders, commonly known as "repetitive strain injuries" (RSI). Lower limbs can also be affected. MSDs are one of the most common work-related health problems affecting millions of European workers across all employment sectors at a cost of billions of Euros to European employers. This is not surprising, as 45% of European workers report working in painful or tiring positions; 33% are required to handle heavy loads in their work. European workers commonly report MSDs as a work related health problem: 30% complain

of backache; 17% complain of muscular pains in their arms and legs. The 30% who complain of backache each year amounts to a figure of 44 million European Workers. Health problems range from discomfort, minor aches and pains to more serious medical conditions requiring time off work, medical and hospital treatment. In more chronic cases, treatment and recovery are often unsatisfactory, and the result can be permanent disability, with loss of job. However, much of the problem could be prevented or reduced by complying with existing health and safety law and following guidance on good practice. Musculoskeletal disorders are a particular problem in agriculture, where almost 60% of workers in agriculture and fishing are exposed to painful positions at work half the time or more, the highest of any sector; nearly 50% of workers in agriculture and fishing carry heavy loads half the time or more; over 50% of workers in agriculture and fishing are exposed to repetitive hand movements half the time or more. Workers in the agriculture and construction sectors are most at risk to lower back disorders, and those in agriculture, forestry, and fisheries face the greatest risk of work related upper limb disorders. Consequently, in this direction we have turned our work: the objective has been to analyze the worker's exposure due to the manual handling of loads, and to define the most critical risk profiles related to the specific activities.

Methods

In order to asses safety risks related on manual handling operations, a representative sample of 40 wineries was selected in Friuli-Venezia Giulia (table 1).

Sample N.	Vine Area	Full time workers	Seasonal workers	Sample N.	Vine Area	Full time workers	Seasonal workers
W 1	35	1	5	**W 21**	70	6	9
W 2	73	16	7	**W 22**	5	1	0
W 3	42	11	9	**W 23**	7	1	1
W 4	17	5	12	**W 24**	12	1	2
W 5	30	4	4	**W 25**	22	4	0
W 6	45	5	11	**W 26**	90	11	10
W 7	25	3	12	**W 27**	45	2	2
W 8	32	1	3	**W 28**	200	6	6
W 9	45	5	11	**W 29**	28	2	3
W 10	60	8	15	**W 30**	20	2	3
W 11	60	15	15	**W 31**	140	9	7
W 12	150	22	30	**W 32**	38	2	9
W 13	75	7	2	**W 33**	25	3	4
W 14	8	1	1	**W 34**	230	11	12
W 15	10	1	0	**W 35**	140	9	7
W 16	130	10	25	**W 36**	38	2	9
W 17	35	6	3	**W 37**	np	3	1
W 18	21	2	2	**W 38**	np	6	0
W 19	15	3	1	**W 39**	np	4	1
W 20	35	4	2	**W 40**	np	4	1

Table 1. Analyzed sample

From a methodological point of view the survey has been developed during 2009/2010, by dividing the search into three phases:

1. cognitive analysis;
2. risk evaluation and identification of critical points;
3. analysis of compliance in terms of safety at the workplace and management of the manual handling risk.

The starting point has been the reconstruction of the working phases in which the risk of manual handling of loads is more present; the definition of risk profiles, then, led up to the identification of 4 main tasks: seasonal agricultural laborer; tractor driver; cellar laborer; store man. Concerning the exposure analysis, the working time involving manual handling of the loads have been detected. For a validation of cognitive analysis, during the last phase of the works a questionnaire has been handed to the employer in order to verify the collected data and the operating environment.
The assessment of manual handling risk took place by recurring to the "Niosh" method, for the calculation of the lifting compound index: in order to assist employers in reducing the risk of lifting-related injuries, the National Institute for Occupational Safety and Health (NIOSH) developed a lifting equation designed to determine the safety of lifting tasks. The NIOSH lifting equation is one of several important tools used in a comprehensive effort to prevent overexertion injuries. The estimate of the level of physical stress is defined by the relationship of the weight of the load lifted and the recommended weight limit. For an analysis of multi-task manual lifting jobs (in which there are significant differences between tasks) a specialized procedure is used: the Composite Lifting Index (CLI) , that equals the sum of the largest Single Task Lifting Index (STLI) and the incremental increases in the CLI as each subsequent task is added. The incremental increase in the CLI for a specific task is defined as the difference between the Lifting Index for that task at the cumulative frequency and the Lifting Index for that task at its actual frequency. This method has been used to analyze collected data, according to parameters and risk levels showed in the following table:

Value	situazione di rischio
CLI < 0,75	Acceptable risk level
0,75< CLI <1,25	Threshold level
1,25< CLI <3	Not acceptable risk level

Table 2. Parameters for the discovery of the critical points.

Concerning the analysis of the conformity in terms of safety, risk management and manual handling of loads, the last phase of experimental protocol foresaw the compliance with the legislative obligations, in particular regarding:

- presence of the risk assessment document;
- hierarchical organization in terms of safety at the workplace;
- evaluation of the manual handling risk;
- information and training of workers about the manual handling risk;
- activation of health surveillance.

Results

y analyzing the loads handled by 4 profiles, the weights are very variable, ranging from a few kg up to handling barrels (56 kg) and bags weighing 50 kg. In all operations workers operate alone and this dramatically increases the risk.

Also in the wineries where the most part of productive processes are mechanized (in the vineyard) and technologically advanced (in the wine cellar), the lifting index stands above the limit of 0.75. The most critical risk profiles are mainly related to seasonal workers employed in the cultivation/ management of the vineyard and grape harvesting. In the wine cellar, the most exposed profiles were related to moving and/or lifting operations while using small machinery such as pumps, cleaning operations of wine containers, and storage - displacement of materials. Only 50% of the surveyed farms were applying periodical medical inspections, as required by the law in such cases, which also represents a clear indication of how much the problem is still being underestimated.

Conclusions

Analyzing the situation of safety in a sample of wineries, a substantial percentage of situations involving a Lifting Index (LI) higher than 1.25 (as defined by Italian law, the Legislative Decree 81/08) was found. This work wants be a starting point for further analysis concerning safety at the workplace in this particular sector, with a further aim of creating (or diffusing) a culture of safety.

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