

## **The incidence of injuries in forestry**

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### **Abstract**

The aim of this work was to investigate about the causes of accidents in the forestry yard studying the international, national and regional literature available. The forestry worker represents a high-risk category because needs a high level of attention and of physical strength during his performance, in order to eliminate or reduce the risk or extent of the potential harm. The data analysis, from a Central statistics institute, was be useful to evaluate the respect of the safety devices and the problems due to the hard shift and over time work.

The results of this study clearly showed that the few numbers of injures registered was to explained with the presence of concealed workers. The risk of the accident increase, in particular, for the older workers (age between 40 and 65 years) as such as the 70% of them have been interested by an accident in workplace because of by-passing a safety devices during the use of the machineries, of a difficult job conditions and of the cumulative fatigue which increases the risk of damage and downfall.

Infact, the most important causes of injuries are the harms from work tools (13,3 %), followed by harms from vegetation (9,08 %) and dawnfalls in the workplace (6,72%).

In the future it's recommended following a guideline provides guidance to officers in the forest industry regarding accountability and responsibility for aspects of health and safety compliance in forestry operations.

**Keywords:** accident, safety, harm.

### **Introduction**

This research includes an investigation and an analysis of accident incidence in the forest sector, so as characterize them as in a highest risk sector, due to accidents and occupational diseases. We described the European, Italian and Basilicata situation, so as to identify the system critical points, cause of existing situation, providing management solutions in order to handle the problem by available means, foresee the situation improvement. To this day the woodman is a key figure in the forest utilization and handling operations process; for this reason he has an abundant fund of knowledges and experiences, able to work cleverly and safely, avoiding that the wood, apparently a place innocuous and balanced, turn into a place of accident and death. Of course that is not suffice, it is necessary whether the correct application of work techniques or the use of appropriate tools to preserving workers and anyone, trying to preserve the ground and the wood from harms.

### **Materials and methods**

Firstly we studied the statistic data about the forest accidents, starting point for the graphical representation of the present situation. The investigation was based on the analysis of accident statistics, whose sources were the most important statistic institutes us INAIL, ISTAT, ISPESL, of observation on European, National and Regional scale.

They were essential for the study of accident phenomenon development and to test out adequacy of preventive and insurance systems, to study and propose/suggest normative and technical solutions necessary to reduce the accident and occupational disease phenomenon.

We provided the exact definition of work accident, in accordance with law on insurance compulsory tutelage managed from INAIL, including: "all accident events owing to violent cause during the work, from which rise the death or a permanent disability, absolute or partial, in other words an absolute and a temporary disability, causing the work abstention for more three days". (From the Dictionary of union and work terms - Edit Coop 2002).

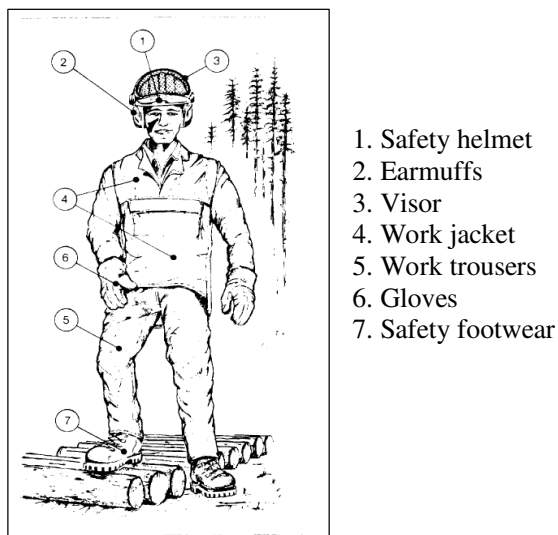
This definition includes also other terms that need further clarification. Firstly the wording "violent cause" refer to external, unexpected and unforeseen factor, that quickly and intensely causes a damaging effect, including whether the aggression that damage psychophysical integrity of the worker or an action due to microorganism or to a physical strain causing torn muscle etcetera. The wording "work occasion" indicate that there is a cause and effect relationship among the working activity of the injured and the accident, although indirect. "Industrial injury" includes all events that cause material and person damages.

The forest worker operates in a place, the wood, where he is exposed to many risks, summarized in the table 1, which reports also the resulting damage and necessary interventions to prevent them. Further there are the risks due to wrong use of machineries and equipments.

**Table 1. Generic risk and preventive actions for those who work in a wood (Reference: Hippoliti e Piegai, 2000)**

	<b>DANGER PRODUCED BY...</b>	<b>RISK CAUSED BY....</b>	<b>POSSIBLE HARM</b>	<b>PREVENTION'S INTERVENTION</b>
<b>RISK CAUSED BY ANIMALS</b>	Small mammals, poisonous snakes, ticks, insects	Bite, sting, infection	Tetanus, rabies, trasmission of diseases, anaphylactic shock	Vaccination, informations about possible pathology on the regions at sea and about emergency provision
<b>RISK CAUSED BY VEGETATION</b>	Trees, shrubs, blackberry bush	Branches fall, lashes and blows against branches and spines	Hurts, crushings, lesions (eyes), borings	Use of PPE, informations about plain dealing
<b>RISK CAUSED BY GROUND OROGRAPHY</b>	Slope and casualness of the ground, presence of snow, ice, rain	Downfall, slip	Sprains, fractures, lesions	Use of PPE (soles high adherence)
<b>RISK CAUSED BY ATMOSPHERIC CONDITIONS</b>	Temperature, sun, meteoric agentes, thunderbolts	Exposure to high and low temperatures, to snows or rain, humidity, exposure to sunbeams, electrocution	Frost-bite, dehydration, stress, sunstroke, burn, hurts, lesions (death)	Work sospension, appropriate clothing, temporary shelters, use PPE

At the present time the available means to the forest worker to face up various risk situations, which he is exposed every day on the work place, classifying in *legislative* and *practical*. Both are connected to Legislative Decree 626/94 and in the first case we refer to obligations deriving for the employer who must supervise under provisions of the law and, on the strength of the risk evaluation, to take preventive measures most proper to the case. The practical means, better-known as Personal Protective Equipment (PPE) for operator, include all precautions that the worker must to wear in order to avoid and reduce the damages due to use of equipments, to the impact of various materials or to downfall, as illustrated in the figure 1.



**Figure 1. Forestry worker wearing Personal Protective Equipments (PPE)**

## Results

The analysis of the data pointed out a worrying picture of the situation; in the agricultural field which includes also the forest sector, the accident risk is high and concerns especially the operators aged between 40 and 65, for the 70%. These accidents are connected to use of machineries and equipments which cause downfall, hurt and limbs contusions. Until May 2008, due date of Legislative Decree 626/94 and become effective of D. Lgs. 81/2008, the application of guardianship law for workers had many difficulties. In fact the enterprises submitted to this decree are 350.000, because are excluded the family concerns and those outsourcing; unfortunately in these excluded firms happened the 70% of injuries. Starting from this datum and by a simple calculation emerged that about 80% of operators in this field was devoid of every safeguard. The data processing pointed out many curious and unexpected aspects.

The first data analysed were those relevant to the body regions most involved by lesions. The graph 1 reports the accident frequency in every body region.

The regions most affected were the upper limbs (42%), then the lower limbs (38%); it is curious their correspondence to personal protective equipment location.

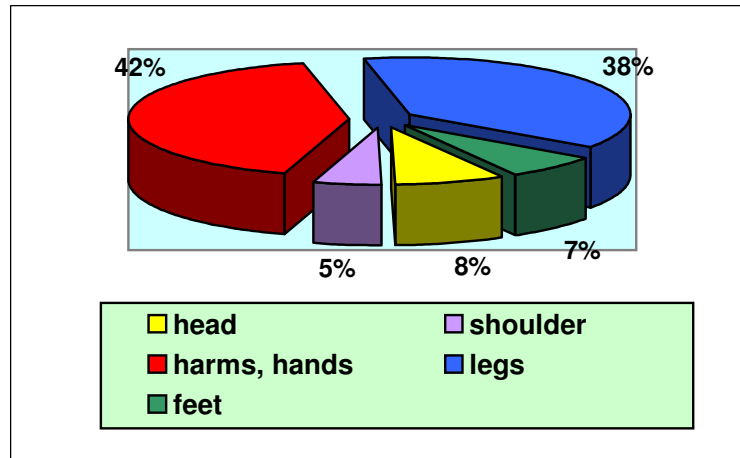
In the graph 2 it is possible to analyse the incidence of injuries in the European Union, registered in the period 2000-2004.

The nations with greater number of injuries are also those that present a most high silvicultural vocation; we refer to nation as Germany, Spain, Italy and France.

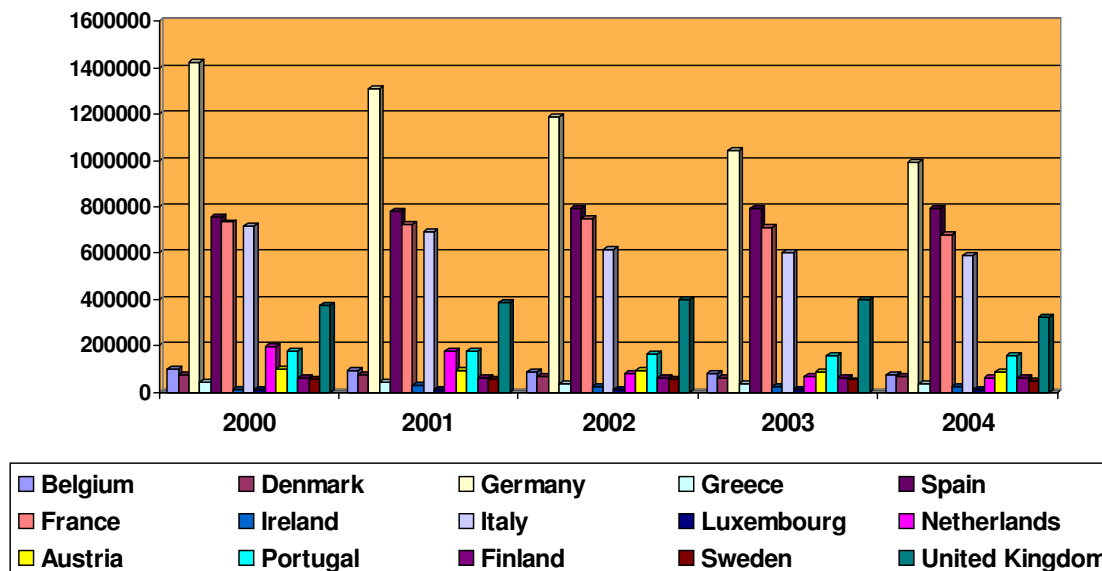
These countries have in common some aspects:

- high percentage of territory occupied by woods;
- growing volume of wood market in the country economy;
- reduced vigilance and control activity for observance of the safety regulations.

In this period there were a gradual reduction of the events, that have peaked in the 2000 in Germany, from 1.424.660 injuries until 990.193 in the 2004, datum related to the same country; very probably thanks to greater energies employed in the improvement of management and prevention activities.



Graph 1. Accident frequency for body's region

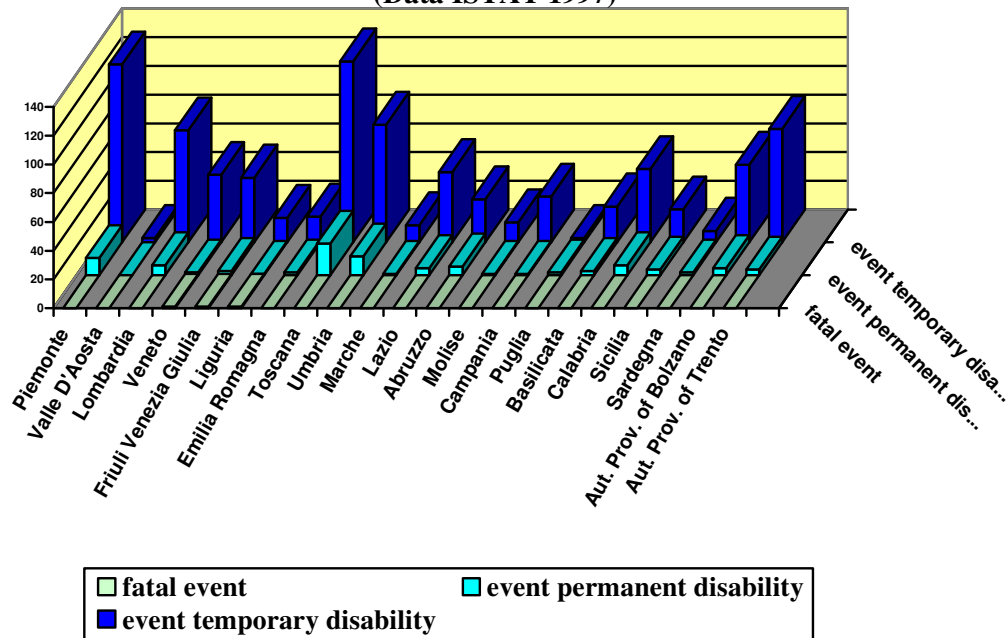


Graph 2. Accident at work in the European Union, 2000-2004 (Reference: INAIL)

The northern countries as Sweden, Denmark and Finland show a high respect of safety regulations but also a low density of population, reducing significantly the injuries risk. Analysing the national situation we can deduce that there was a considerable reduction of injuries equal to 18%, even if in this period the incidence of injuries was high compared with other European countries.

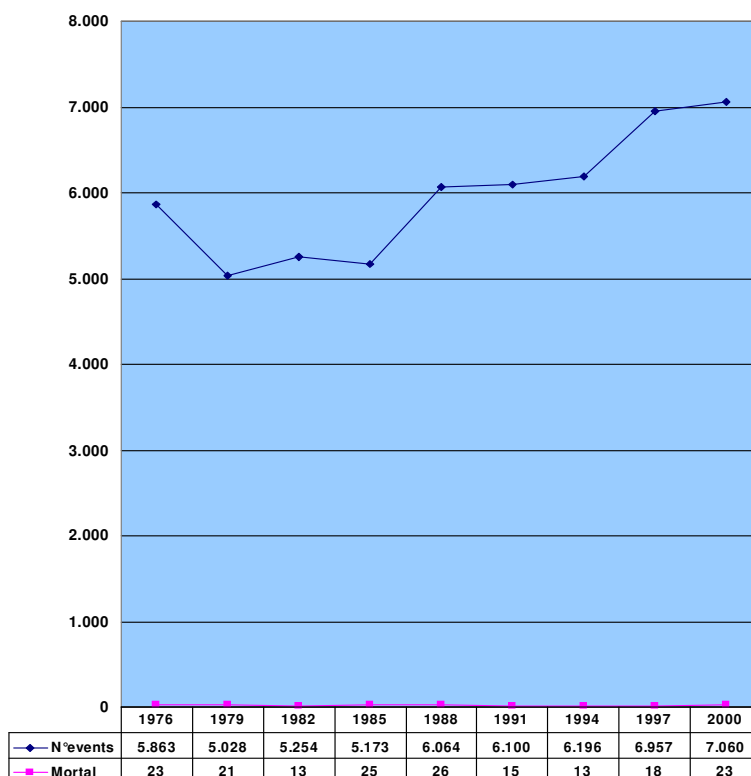
The events was characterised on the strength of the inability, if temporary or permanent or causing the operator death. The results are in the graph 3 and unlike to other graphs the data refer only forest utilization sector and to every Italian region, in the 1997.

**Graphic 3. Event distribution for region of Italy and gravity of inability**  
 (Data ISTAT 1997)



Piemonte, Lombardia, Toscana, Umbria and Trentino Alto Adige present most high number of injuries causing inability. This datum is analogous to how much we observed in the graph 2; or rather, like so in Europe, the Italian regions with the greater number of injuries are those most rich in productive woods, with an intense utilization activity and a profitable wood market.

Particularly in the matter of the injuries happened in Basilicata (graph 4), we can make these observations. In the eighties was a growing rise of injuries, from 5028 in the 1976 to 7000 in the 2000; the injuries survey increased since 1988 while the mortal events decreased since 1994, year of Legislative Decree 626/94 passing. Unfortunately this datum doesn't indicate an injuries reduction in respect to past, but it is due to the obligatoriness of injuries registration, like so imposed by D. Lgs 626/94. Before 1994 the registration was compulsory only for those cases which needed sanitary cures at appropriate structure.



**Graph 4. Agriculture: injuries in Basilicata (1976-2000)**

### Conclusions

In this research work we had various difficulties:

- the high level of underground job, scenario aggravated by several irregular immigrants and deficiency of controls from institutions, damaging the specialization of forestry workers and woodsmen, who were reached gradually thanks to care to guarantee a greater professionalism;

- imprecision and incompleteness of the data, due to inclusion of woody firms in the "Agriculture" sector, so in the forest statistics lack in a word that differentiates them. Further the agricultural enterprises often execute forest works too.

In the matter of injuries survey the firms submitted to D. Lgs. 626/94 are relatively few compared to totality, being excluded those family management and those outsourcing. Thereof we infer the gravity of current situation and that the most of operators is devoid of tutelage. The passage of the D. Lgs. 81/2008 on the 15th of May 2008 is a turning point in the prevention, in the fight against white deaths and in the underground job. In fact it contains the rules of the former Decree and other significant novelty concerning mortal accidents, underground job and sanctions.

Consequently for the future we are hoped for controls most strict and consciousness raising of those people that put profit logic before worker's safety, giving importance only when it runs out and it derives an injury or the death.

This study was unintentionally a background for those that attempt the application of the D. Lgs. 81/2008, providing numbers and figures useful for a comparison among them.

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**Each author contributed in that paper in same measure**