

# ARBORICULTURAL ACCIDENTS - CAUSE AND CONTROL<sup>1</sup>

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**Abstract.** This research developed a production and safety training program that can be used on the job site by industry personnel. A literature review and insurance data analysis revealed that the major accident expense to tree care firms was worker compensation-related injuries. A knowledge of required safety and production-related competencies could reduce the number of accidents. A safety competency needs analysis was developed in conjunction with the National Arborist Association (NAA) to guide curriculum design. The competencies were transformed into a training program which focused on groundsmen. A Vest Pocket Field Guide, using a programmed instruction format, was the major component.

**Key words:** Accidents, arboriculture, arborists, competencies, training, safety.

The arboricultural industry is forced to hire workers who are unskilled or who lack in proper productivity and safety skills. Workers today need to be better trained in order to do the job correctly and safely. Employers are required to do this training.

Pressure to train is also applied by OSHA and the insurance industry in order to reduce the number of accidents. The Occupational Safety and Health Act became law in 1970. While OSHA does not write regulations for the tree care industry, it does cover tree work under the general duty clause. Section 5A states, "The employer shall provide a workplace, free from recognized hazards."

In the tree care industry, the recognized hazards are defined by the American National Standard Institute. The American National Standard Z-133.1-1987 is very explicit about this: *3.1.3. Employers shall instruct their employees in the proper use of all equipment provided for them and shall require that safe working practices be observed. A job briefing, work procedure and assignment shall be worked out carefully before any tree job is begun (1).* The Z-133 standard was first approved and printed for distribution in 1972. Yet, during 1983, twelve tree workers died of

electrocution while on the job. An analysis of arboricultural accidents and a training curriculum are needed to develop an understanding of the problem.

The intent of this research project was to identify causes of arboricultural accidents and to design an appropriate safety training program that could be used on-site by the arborist industry. The program's curriculum is based on the National Safety Standards and on identified industry competencies, the purpose being to field test a training program that will be relevant to the small firms that make up much of the arborist industry. It was also the intent of this study to work with the National Arborist Association (NAA) in order to develop a curriculum that will be valid today.

## Arboricultural Accidents

The NAA estimates that there are approximately 11,000 tree care firms in the United States of America which produced more than a billion dollars in gross sales during 1986. This large number of companies makes accident investigation difficult because the accident records are not all reported to one agency. During 1982, the NAA instituted its own tree care insurance program for members. This program was successful: 85 of the 460 member companies were participating companies. This source of data involved a significant number of companies. Unfortunately, this program was terminated on July 1, 1985 (2).

The tree care industry is a high risk industry with a poor safety record. Tree care companies now trying to renew policies are finding that premiums have increased as much as 300% since 1985. During the period from January 1984 to January 1985, the total amount paid or reserved for payment by the 85 participating firms was \$865,725. How this money was distributed is

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shown in Table 1. Note that the workers' compensation totaled \$659,113 or 70% of the total. The remainder of this paper will confine itself to accidents involving workers compensation payments.

Workers' compensation is a measure of how safe a company or worker is. The more accidents a company has the higher the workers compensation cost. The worker's compensation cost increased steadily during the three years of the study. This increase took place even though there was a decrease in the number of accidents. A review is presented in Table 2.

The increase in cost per accident, can be explained by either more serious accidents or a higher medical bills accident. The reason for the increase is difficult to determine without access to the individual accident reports and court records. In either case it becomes clear that a poor safety record is directly related to increased production costs.

*A Safety Training Program.* Safety training programs are available for commercial arborists (13) yet accidents continue to occur. Why? Although some good programs have been developed, they either are not being used, or they are not taken seriously. Robert Felix, Executive Vice President of the NAA, feels that perhaps we have been training the wrong people. We have been training employees because they are in production and are having the accidents, Felix states that "employees are trainable, employers are not" (3). Many employers view safety training as infringing upon production time (15). For this reason, safety and production competencies must be presented at the same time.

Safety starts with management. One of the best ways to boost profit is to maintain a safe working environment. Every accident results in two kinds of cost: increased insurance cost and uninsured costs, the latter are probably five times greater than the former (7). Examples of uninsured costs are lost time, damaged equipment, and lost customers. Employers have to realize the importance of these costs and start to support effective training programs.

Bill Frey, a loss control consultant working with the NAA, feels that any safety program that is implemented must have the full support of manage-

ment (4). Stanley emphasizes the same point, "If the supervisor will devote the same effort to the prevention of production interruptions caused by accidents as he does to the elimination of all other difficulties...he will find that his job becomes easier. Success in the prevention of accidents is not easily gained. It requires the same kind of persistent effort that is needed in any worthwhile line of endeavor" (14).

In order to reduce accidents employers must have a safe and productive company and get employees involved. When a worker knowingly chooses a risky shortcut to accomplish a task, it means that he is not convinced that the precautionary measure is necessary (7). It is this area that must be improved through the identification of competencies and improved training methodologies.

### Identification of Competencies

Competency-based training identifies those skills required to do a particular job. The employee is taught by a variety of methods how to perform a task and then is evaluated on his/her ability to complete the task. With this method of training, employees are not compared to others but are evaluated on their own ability to perform an oc-

**Table 1. Total amount of insurance money paid out or reserved for the 85 participating National Arborist Association firms during 1984 (12).**

<i>Accidents</i>	<i>Cost</i>
Auto liability	\$ 66,665.51
Auto collision	12,431.33
Auto, all other	2,903.53
General liability	59,749.92
Property	64,862.13
Workers' compensation	659,113.03

**Table 2. A review of arboricultural worker compensation accident numbers and cost per accident between July 1982 and July 1985.**

<i>Date reported</i>	<i>No. of accidents</i>	<i>Total cost</i>	<i>Cost/accident</i>
7/1984-7/1985	201	\$659,113.03	\$3,279.16
5/1983-7/1984	261	489,266.21	1,874.58
7/1982-7/1983	216	130,953.67	602.10

cupational skill. Several articles, based primarily on surveys of employers, have identified arboriculture/urban forestry competencies (5, 6, 9, 10, 11, 15, 16). A review and an analysis of these tasks indicate that safety procedures are not treated in as much detail as are production tasks. This lack of detail may be due to a lack of safety awareness on the part of the employers and the researchers. A major deficiency of all but one of the lists was the failure to subdivide the competencies into worker category. Thus, it was impossible to determine if a skill was required by both a groundperson and a climber. A more practical approach was presented in McClay's 1978 study for the U.S. Department of Health, Education and Welfare (8). This study separated the competencies into five worker classes.

The arboricultural production and safety competencies should be based on company work situations. Field training should combine the production competencies along with the safety training required by the Z-133. The literature at present does not contain a competency list for both production and safety. Yet, these competencies are required for the safety of the worker, fellow workers, and the general public and are required for the proper completion of the work.

### Curriculum Development

This research focused on the development of an arboricultural safety training curriculum that can be used in the field by a foreman to train groundsmen. The guidelines for development were twofold: 1) competency based on productivity and safety, and 2) individualized learning packages for field use. Each competency identified was transferred to a 3x5 inch Vest Pocket Field Guide, the assumption being that the foreman is an experienced arborist who knows how to do the job. A long description of tasks, thus, is not required and would, in fact, reduce the effectiveness of the curriculum. The foreman was supplied with a list of tasks that the groundsmen need to know in order to work in a safe and productive manner. The foreman proceeds through the list not forgetting to convey important safety information.

A field card (Fig. 1) was developed for each task that a groundsmen needs to know in order to be

**Figure 1. Example of a 3x5 inch Vest Pocket Field Guide card used by a foreman as an aid to training a groundsmen on How To Safely Start a Chainsaw, the Z-133 reference can be used by the foreperson to guide the trainee.**

Trainee	
SKILL: Starting a Chainsaw	Z-133 Ref.
Chainsaw	6.2.1
	6.2.3
Gas, Oil, Chain, Starting Rope	6.4.4
Starting	6.2.5
Start in Clear Area	6.2.6
Two Hands on Saw	6.2.7
Avoid Kick-Back	6.2.8
Avoid "drop" Starting	

productive and safe on a job site. This is the first time that the safety standards from the Z-133 have been incorporated into an on-site training program. Each task was subdivided into steps that are not too detailed nor too general. The key item with this curriculum is its simplicity and the ability of the foreman to go through the cards on the job site. Most arborists are outdoor people and do not like the structured classroom environment, but are able to adapt and learn quickly in the field.

In summary, the Vest Pocket Field Guide was developed as a training aid for field use by field personnel. Since it is able to fit into a shirt pocket or lunch box there is no reason to leave it back at the shop with the other training programs.

Ten arboricultural firms were selected from a list supplied by the National Arborist Association. The Vest Pocket Field Guide was field tested by the foremen and groundsmen of the selected firms. A structured interview was administered to evaluate the Vest Pocket Field Guide and to determine if it was an effective aid in the training of new personnel. Seventy percent of the foremen interviewed agreed that they could train personnel effectively using the Vest Pocket Field Guide. Fifty percent of the foremen reported that their companies do not now adequately train new employees in safety competencies.

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## Abstract

**KOSKI, ANTHONY J. 1986. Can you feed your turf and still starve your ornamentals? Am. Nurseryman 164(6): 70-73, 76-77.**

While most grounds managers are quite aware of the importance of turf fertilization, they may tend to disregard the important role that proper fertilization can play in the care of trees and shrubs. It is often assumed that turf fertilization alone will provide enough nutrients for both the turf and the woody ornamentals growing in the landscape. However, some experts emphasize the importance of fertilizing trees and shrubs that are growing outside their native habitats, such as those planted in lawns. The most important nutrient in a turf fertilization program is nitrogen. The concept of late-season turf fertilization appears to be quite compatible with typical recommendations for tree and shrub fertilization. Application in mid-November (or whenever the plant is completely dormant) is recommended for plants in clay or clay-loam soils. Spring application (before bud break) is best for plants growing in sandy or loam soils. When Kentucky bluegrass is the predominant turf species, you should apply fertilizer at rates that provide a total of 4 to 6 pounds of nitrogen per 1,000 square feet per year. Three pounds of nitrogen per 1,000 square feet per year should maintain healthy trees. Trees that appear to be in poor health due to low fertility levels may require up to 6 pounds per year. Problems may arise, however, if turf and woody ornamental fertilization is performed at separate times or by different parties. In such a situation, as much as 6-12 pounds of nitrogen per 1,000 square feet per year could be applied to the turf beneath a tree -- if the fertilizer meant for the tree is broadcast over the turf. Excessive, unsightly turf growth, and possibly even turf damage, may result.