SAFETY PROCEDURES, EDUCATION AND STANDARDS IN SELECTED OKLAHOMA AGRICULTURAL EDUCATION PROGRAMS

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EDUCATION PROGRAMS

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If you listen very closely you can hear the bell..... "The bell tolls for thee..."
To make it ring so we all can hear it requires your effort..... No excuses accepted!

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CHAPTER I

INTRODUCTION

During the past three decades agricultural education has changed from a program based on production agriculture and on-farm experiences to one of science, technology, off-farm experiences and career education. "During this time lawmakers have reshaped a great deal of educational law and policy. The increasing level of legislation and policy-making is of particular interest to industrial and agricultural educators who deal with such issues as safety and liability" (Gathercoal & Stern, 1987, p. 1). Over the years, a considerable amount of time and effort has been utilized to improve the technological and academic emphasis in schools, but in many cases basic safety and common maintenance practices have been ignored.

Agricultural education programs require extensive periods of instruction in mechanical laboratories, greenhouses and animal production facilities and involve large amounts of hands-on experiences for students. "The possibility of accidents... is considerable because of the nature of the activities which are a normal part of the learning process" (Kigin, 1973, p. 1). This experiential learning or "hands-on" educational methodology increases the necessity that agricultural education teachers and administrators provide a safe instructional environment in which the students develop skills. "The increasing level of legislation and policy-making is of particular interest to

industrial [and agricultural] educators who deal with such issues as safety and liability" (Gathercoal & Stern, 1987, p. 1).

With our changing economic and educational climate, changes in agricultural education curriculum will continue. In 1989, a study by Miller found that as much as twenty-five percent of the typical vocational agriculture curriculum should be dedicated to agricultural mechanics. Williams and Pope (1989) found that agriculture is a continuously changing industry and that the use of robots, lasers, sensors and computers is expanding. They also showed that agriculture has nine functions: manufacturing, communicating, financing, selling and servicing, producing, transporting, processing, marketing and merchandising. With this complexity and uncertainty in mind Harper (1989, p. 11) stated that, "The situation facing our profession is very complicated and, indeed, serious." Therefore, a detailed look at how agricultural education teachers approach safety training of their students in safety awareness is necessary.

"The possibility of legal action is great for those faculty members who teach courses that involve machinery or equipment that, if misused by the student, can cause serious physical injury" (Foldesy, 1991, p. 195). Agricultural education teachers must be aware of the dangers involved to the students under their care and make a concerted effort to use up-to-date teaching methodologies, modern procedures, effective educational technologies, as well as modern business, industry and legal standards when teaching safety and utilizing the facility and equipment.

Safety concerns are of utmost importance in this changing educational and legal climate. The various skills in which an agricultural teacher must be proficient and the

many program aspects leads teachers and administrators to overlook basic safety precautions. Many safety studies have documented unsafe conditions which existed in vocational facilities and agricultural mechanics laboratories in our nation, (Baugher & Slocombe, 1990; Brown, 1977; Bruening, Hoover, & Radukrishua, 1991; Burke, 1989; Fletcher & Miller, 1995: Gleim & Hard, 1988; Gleim & Miller 1992; Hoerner & Bekkum, 1990; Johnson & Fletcher, 1990; Kasim, Lawver & Fraze, 1993; Lamb, 1984, Rudolf & Dillon, 1984; Lawver, 1992; Lawver, 1994; Leaghty, 1971; Miller 1989; Seaboch, 1995; and, Swan, 1993). This list exemplifies the problem facing agricultural teachers and leads to a question as to how safety is taught and practiced in agricultural education in Oklahoma's schools.

Teachers and other educators have recognized the importance of stressing safety and risk management (Baker, 1988; Bear, 1975; Bear, 1980; Bear & Hoerner, 1986; Berkey, 1981; Berkey, 1994; Bowen, 1988; Burke, 1988; Cook, Walker, & Snowden, 1952; Flecher & Miller, 1996; Forsythe, 1983; Hansen and Weeks, 1984; Harper, 1985; Harshman, 1974; Hoerner and Bekkum, 1990; Jacobs, 1979; Kigin, 1973; Lee, 1980; Lindhardt & Long, 1980; Peters, 1988; Reynolds, 1980; Ross, 1980; Shinn, 1988; Todd, 1981; and, Wood & Moore, 1988) . With this overwhelming evidence of the need to stress safety, an in-depth look at Oklahoma's agricultural education program is warranted.

Statement of the Problem

"Since the inception of the Occupational Safety and Health Administration

(OSHA), there has been an increased concern for safety" (Reece, 1980, p. 1). Although educational facilities are exempted from regular OSHA inspections these guidelines may be utilized to show negligence and liability in legal proceedings.

Facility and equipment maintenance, replacement and modernization may have been deemed unnecessary or impossible during the past years of lean educational budgets. This may have reduced the effectiveness of safety awareness in agricultural education programs. For these reasons it is necessary to determine the safety education procedures, safety practices and current standards of facilities currently existing in Agricultural Education Programs in Oklahoma.

Purpose of the Study

The purpose of this study was to determine and assess safety education practices, safety procedures and identify areas of safety compliance in selected Oklahoma schools as a means of improving safety education and the safety environment of agricultural education programs.

Objectives of the Study

In order to accomplish the purpose of the study, the investigation will be directed toward achieving specific research objectives with regard to the study population:

1. To describe demographics of the selected Agricultural Education teachers and facilities in Oklahoma.

2. To determine the safety policies and procedures utilized in selected agricultural education programs.
3. To identify instructional methods currently used in agricultural education safety programs.
4. To determine the extent of compliance with recognized safety standards in agricultural education programs.
5. To identify areas of safety and safety education where inservice education and curriculum and facility changes are needed to help agricultural education teachers become more aware of the expected safety practices and procedures.

Assumptions of the Study

The following assumptions were made regarding the study:

1. The respondents provided accurate expressions of their safety education program.
2. The instrument would provide a realistic assessment of the safety situation.

Scope of the Study

The scope of this study included the Agricultural Education Departments in the Tulsa Professional Improvement Group.

Definitions of Terms

As used in this study, the following terms are defined:

Occupational Safety and Health Administration (OSHA) - A governmental agency authorized to inspect work areas and make a determination as to the degree of safety which is afforded individuals employed or training in these environments.

Realia - The sum total of all resource materials including real situations, direct experiences, and activities used by the teacher to relate instruction to real life. Sometimes referred to as teacher "tools".

Safety Policy- Those procedures or policies formally written and documented and approved by the administration of the school district.

Agricultural Education District Supervisor - The individual responsible for the supervisory role in the agricultural Professional Improvement group. The Agricultural Education Division of the Oklahoma Department of Vocational and Technical Education sets guidelines for the District Supervisor and the Agricultural Education Instructors.

MSDS (Material Safety Data Sheets) - Information sheets explaining in great detail how to properly handle, apply, store and clean up chemicals utilized within the facility.

Professional Improvement Group (PI) - An organization of schools with Agricultural Education Programs which provides in-service training and activities for Agricultural Education Teachers in technical areas and educational methodology and technology.

Animal Facility - A laboratory that is utilized within the Agricultural Education Programs to teach students animal care and management skills. This facility is also easily accessible educational activities.

Agricultural Mechanics Facility - A laboratory that is utilized within the Agricultural Education Programs to teach students general agricultural mechanics skills. Sometimes referred to as the shop.

Greenhouse - A laboratory that is utilized within the Agricultural Education Programs to teach students horticultural skills.

Shop - See Agricultural Mechanics Facility.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of this chapter was to provide a background of safety policy, safety procedures, documentation and facility standards expected in Agricultural Education Programs based upon current trends and the legacy of the past.

In order to accomplish the intent of the study, the literature review was divided into eight major categories impacting Agricultural Education and a summary for the purposes of organization and clarity.

1. Agricultural Education Safety: A Historical Perspective
2. Instructional Technology
3. Instructional Techniques
4. Safety Practices, Material and Equipment
5. Safety Standards and Compliance
6. Litigation
7. Litigation Protection
8. Summary

Agricultural Education Safety: A Historical Perspective

Historically Agricultural Education has developed safety standards based upon the actions of Business and Industry as well as educational expectations.

Reece (1980), reported that Agricultural Education safety standards needed to follow those standards tested and designed by Business and Industry through the Occupational Safety and Health Act.

> The Williams-Steiger Occupational Safety and Health Act, which was enacted by congress in December of 1970, took effect in April of 1971. The purpose of this act, now known as OSHA, is to assure, so far as possible, that every working man and woman in the nation has safe and healthful working conditions so that we may preserve our human resources. With the introduction and passage of this Act, added impetus was placed on the organized accident prevention programs conducted in the school shops of our school systems (p. 5).

More than 20 years after the conception and implementation of OSHA agricultural education is still lagging behind in developing up-to-date safety inspection procedures. Agricultural education is evolving faster than the facilities and equipment modernization can take place. In 1989, Miller suggested that industry is leaning toward a future with growth in lawn and garden, nurseries and landscaping, and food processing. Agricultural educators must begin looking at these areas as a chance to expand and adapt. The future of the agricultural industry and therefore agricultural education further

includes robotics, electronics, lasers, sensors, solar energy, and many other technological advances that will be incorporated into the agricultural education curriculum. Safety in agricultural facilities and programs is of utmost concern in the evolving educational environment.

Safety education in today's perilous legal atmosphere includes such topics as, instructional technology, teaching methodology, safety material, equipment available, safety compliance, inspection procedures, and documentation. In 1974, Harshman (p. 208), stated that, "Employers are willing to teach technical know-how to new employees, but skills such as safe workmanship are expected." Vocational education, including agricultural education, has an obligation to teach students involved in the program in-depth basic skills including safety attitudes and safe use of the tools, equipment, chemicals and other procedures in our areas of responsibility.

Instructional Technology

The use of various instructional technologies for the teaching of safety is necessary to ensure that students have the opportunity to learn safety skills and responsibilities. Teachers largely rely upon lecture to deliver information to students. Learning can be greatly enhanced by employing a variety of technology types to encourage student understanding.

Many studies as well as articles by teacher educators have illustrated the wide variety of technologies and methodologies available for agricultural education instructors

(Blanton, 1980; Harper, 1989; Harper & McManus 1992; Harshman, 1974; Kirk & Hill, 1985; Lindner, 1974; Long, 1989; McCormick & Cox, 1980; Owings, 1974; Steffen & Osborne, 1890; and Townsend & Briars, 1990). The overwhelming number of studies and philosophical statements concerning the importance of using a variety of technologies and methodologies shows the great importance teacher educators place on this matter.

> Filmstrip, slide and overhead projectors were some early forms of instructional technology used by teachers. They provided alternatives to the traditional lecture, but continued to place the student in a passive role. Not very long ago, educators touted the VCR as a revolutionary instructional tool. And shortly after that, microcomputers began to appear in schools and classrooms across the country and around the world. More recently satellites and satellite dishes have shattered boundaries and provided almost universal access to visual information. Nothing has been the same since. Technology has radically changed society -- what we do and how we do it. Schools are no exception (Odell, 1994, p. 5).

"Teachers must decide what to use: Overhead projectors, videotapes, CD ROM, computer technology, multimedia, satellite television -- so many choices" (Osborne 1994, p. 3). The technologies that are available will affect the students' ability to develop a positive safety attitude and safety skills. Also included in the technology area are;

demonstration models, experiments, student developed safety videos and research on the Internet.

The proper utilization and selection of methods and technologies with which to teach about safety are necessary to improve student retention and learning of each of the necessary points. "Laboratory experiences can provide experiences which go beyond recall and develop application, analysis, and evaluation skills used in agricultural industry" (Shinn, 1988. p. 5). The application of proven educational methods and technologies will improve student safety and work skills in laboratory experiences.

Instructional Techniques

Instruction can be enhanced by including a wide variety of techniques. These techniques can include such simple things as using teacher / student interaction, questioning skills, interactive lecture, teacher lead demonstrations, student demonstrations, experiential learning, field trips, guest lecturers and other such techniques. Student learning is greatly enhanced when interaction central to the teaching process and when nontraditional methods are utilized to enhance student interest.

Lawver (1992) and Swan (1993), in studies developed to determine the instructional techniques employed by agricultural mechanics instructors in the agricultural mechanics safety program, contended that inservice programs should be planned and conducted on such topics as planning and implementing comprehensive

agricultural mechanics safety programs. Lawver and Swan utilized the following categories in their research:

Students study subject matter

Teacher conducts hand tool safety demos

Teacher conducts power tool safety demos

Students demonstrate safely use of hand tools

Students demonstrates safe use of power tools

Students must pass safety exam

Students safety exams are filed

Each student has copy of eye safety regulations

Scheduled safety inspections are conducted

Unscheduled safety inspections are conducted

Students have a copy of appropriate safety laws

Cleanup schedule is used

Cleanup schedule designates student safety engineer

Cleanup schedule designates student cleanup foreman.

Other suggestions for instructional techniques are found throughout research studies and teacher educator articles. Schumacher (1989, p. 17) suggested that, "Teaching aids designed to teach such concepts as voltage drop, proper fusing, proper grounding, and Ohms Law .... [helped] to improve instruction in electrical use and safety." The use of experts and/or video tapes of experts was expounded upon by Owings (1974).

A list of realia uses in instruction was developed by McCormick and Cox (1980). This list included introduction (building a case for learning realia) such as: Real materials, models, exhibits, overhead transparencies, slides, filmstrips, chalkboard, bulletin board, charts and graphs, and still pictures. A list of analysis type realia included topics such as: demonstrations, video recorder, field trips, motion pictures, resource people, overhead transparencies, slides, still pictures, tape recorder, radio, land laboratory, chalkboard, charts and graphs, books, bulletins, magazines, and real experiences. A listing of summary and application realia included: field trips, overhead transparencies, slides, chalkboard, graphs and charts, land laboratory, and real experiences. The use of a variety of types of realia can make learning much more effective. Without the variety real learning and teachable moments may be missed. The concept of safety, being as important as it is to business and industry, must be taught in vocational education programs in the most effective ways possible. Of utmost concern to the agricultural teacher should be safety education; and therefore, the use of realia in teaching this topic is a necessity.

In a 1991 study, Foldesy made several recommendations based on case law. These recommendations included the following:

1. Proper supervision - teachers should be physically present in the classroom at all times
2. Proper instruction- In order to comply with this requirement, teachers should establish safety programs that include written and manipulative tests on the proper use of equipment.

3. Enforce rules- Students not following safe practices should be disciplined and even prohibited from operating equipment until they learn and adhere to the proper procedures.
4. Safe environment- This means that the equipment and facilities should be inspected at regulate intervals. Equipment that is not in proper working order should not be used.
5. First-aid procedures should be established and followed in case of an accident.

Studies indicating the need for safety tests and the mastery of each component involved to 100 percent mastery were found to be essential in developing a proper safety attitude and to safeguard any misconceptions or improper safety knowledge (Berkey, 1994; Chancellor, 1983; Forsythe, 1983; Gleim & Hard, 1988; Gleim & Miller, 1993; and, Lawver, 1992). Many other studies recommended safety tests but did not develop a terminal objective of 100 percent as a necessity. Yohe (1992), also recommended that safety contracts should be read and signed by the student, the students' parents and the teacher indicating that the student had received, read, and agreed to the safety rules and procedures provided by the teacher. The filing of these agreements and the safety tests, as well as teach-reteach materials and procedures, is necessary to prove and document proper student instruction as to safety responsibilities and safety understanding and procedure.

Recommendations by knowledgeable professionals in business and industry as to the relevance and necessity of safety tests were found in abundance (Abrams, 1995;

Chad, 1995; Foldesy, 1991; Peters, 1988; and, Yohe & Dunkleberger, 1992). Safety tests and safety instruction are common practice in business and industry and are normally developed utilizing recommended OSHA safety practices. Specific instructions and questions developed to determine student understanding are necessary to provide proof of student understanding.

Pristupa and Foster (1980) made recommendations on ways to improve safety instruction and the overall safety program. The following is a list of their recommendations:

1. Teach an introductory unit in general safety education.
2. Teach specific safety information in conjunction with specific agricultural mechanics units.
3. Administer safety exams (100 percent mastery required).
4. Maintain a safety file for each student.
5. Maintain personal emergency data on each student
6. Train students in first aid, emergency procedures and CPR
7. Require practicum for operating and maintaining power equipment.
8. Involve students in your safety program.
9. Post safety signs next to all power equipment.
10. Safety starts with you- The Instructor (Develop safety attitude and be a good role model)

An all inclusive method for teaching safety is difficult to develop but must be a priority in any vocational facility. Basic strategies such as having a 100 percent eye protection

and a 100% noise protected facility are necessary to build a positive "safety culture". "The culture clearly announces every day to every worker [student] whether safety is a key value and where it fits into the priorities" (Peterson, 1993, p. 20). It dictates how the student will act and how they will be treated if safety violations are found.

"The elements of a safety program -- such as safety policies, manuals, meetings, committees, inspection, investigation of incidents or recordkeeping analysis of records -- are tools of the trade in most companies" (Peterson, 1993, p. 20). This type of program needs to be developed in vocational facilities in order to develop safe attitudes as well as a safe vocational program.

Safety Practices, Materials and Equipment

The availability of safety material and equipment in an Agricultural Education facility is necessary to ensure immediate access if needed. Rules, regulations and procedures are also an important part of the safety readiness within a program.

In a 1993 research study Gleim found that the nonexistence of several safety practices, equipment and materials was discouraging.

> Gleim (1993) found that, "...approximately 12 percent of the administrators reported that first aid kits were not available in vocational laboratories. Additionally, many inexpensive safety materials (color coded power tools, safety zones around power tools, and safety cans for flammable liquids) were not available in some schools. Other materials

> and/or equipment (safety guards on equipment, welding exhaust systems, and safety cabinets for explosive materials) were not available in some schools. Although some of the materials and/or equipment are expensive, their potential contributions to the overall safety of a given vocational laboratory should not be ignored" (p. 1).

"A positive attitude toward skill development is a prerequisite to the safety of an individual. The teacher is responsible for promoting desirable attitudes that assist pupils in developing a proper respect of safety regulations" (Kigin, 1983, p. 41). The primary responsibility for providing safety instruction and a safe working environment belongs to the teacher (McMahn, 1975). With these attitudes in mind the teacher must develop, maintain, demonstrate and enforce safety practices in the laboratory and classroom setting. The utilization of safety materials and an overall "safety attitude" (Gleim & Miller, 1993) is essential for the safe use with minimal danger to the student.

Lawver in a 1992 study defined safety practices and equipment as basic necessities to a shop facility for general safety concerns. Gleim and Miller, (1993) suggested that safety practices should be routinely updated to create a positive safety attitude in students and the instructor. Safety practices, materials and equipment are commonly utilized by business and industry to meet OSHA requirements for developing and assuring a proper safety attitude and an overall safe environment within which to work (Chad, 1995).

Safety practices, materials and equipment can be as inexpensive as OSHA safety posters, business and industry posters, first-aid kits, color coding the facility and

equipment or posting rules in the facility. Expenses for exhaust and ventilation systems, safety guards, safety cabinets and panic buttons on power machinery can become an overwhelming expense for many educational facilities to endure but are indispensable necessities. Several studies recommend that funding should be made available for use in purchasing safety and emergency equipment (Forsythe, 1993; Gleim, 1993; Gleim & Hard, 1988; Lawver, 1992; and, Swan, 1993).

Safety Standards and Compliance

The primary duty of a teacher is to provide a safe environment in which to teach students. This duty includes, for the agricultural education teacher to guarantee the safest facility and equipment possible. Communicating the possible dangers, safety rules and regulations as well as thorough inspection of the tools, equipment and facility is necessary for a healthy learning environment to be developed.

Yohe (1992, p. 147) stated that "consistency in enforcing rules was an imperative part of the safety compliance of students. Simply communicating the rules and expectations to both students and their parents is not enough. It is absolutely essential that the teacher consistently enforce all rules. Courts have held that a rule that is not enforced by the teacher is, indeed, not a rule at all."

In-depth research into safety standards has been completed by several researchers (Forsythe, 1983; Gleim & Hard, 1988; Gleim & Miller, 1993; Lawver, 1992; Schlautman & Silletto, 1992; and, Swan, 1993). The findings in each of these studies

showed that problems exist in the safety programs and facilities across the country and that detailed research is necessary to document problems and to correct these problems.

Hazards are sometimes commonly overlooked, such as with the danger of noise in the shop facility. In a study concerning noise levels and how differences affect learning capabilities Gleim (1988) found that the higher the noise levels the lower the students ability to concentrate. With this being the case steps should be taken by the agricultural teacher to reduce the chance of noise pollution in the facility, so proper concentration can take place when working with tools and equipment.

Gleim (1988) completed research on student arc welding noise exposure in agricultural mechanics laboratories. This study established that the noise levels students are exposed to approach or exceed the levels recognized in research as reducing student performance. "It may be the case that improved student performance of as much as 13% in the cognitive area and 4% in the psychomotor area could be achieved if students were protected from arc welding noise in agricultural mechanics laboratories" (Miller, 1986, p. 17).

The findings of a study completed in Missouri by Weston and Stewart (1980) indicated that noise readings from the use of radial arm saws and similar equipment exceeded the standard in all of the schools tested. This indicates the mandatory use of earplugs or other hearing protection device for use in the facility when any power equipment is in use.

In 1989, Miller warns of the dangers of noise in vocational facilities. Miller explained that "Hearing loss is insidious. The ear warns us with discomfort when we are

in danger, but soon becomes overloaded and the cells which are responsible for sending the frequency and level of sound to the brain stop functioning" (p. 17).

According to the American Speech-Language-Hearing Association (ASHA), a person can tell if the noises are too loud if:

1. You have to raise your voice to be heard
2. You can't hear someone else less than 2 feet away from you
3. Speech around you sounds muffled or dull after you leave a noisy area
4. You have ringing in your ears after exposure to noise

"Workers exposed to hazardous noise levels include ... construction workers, farmers, factory workers, ... truck drivers," according to Dessoff (1995, p. 55) in the Occupational Safety Journal. Dessoff further explains that over 1,000,000 workers have sustained a hearing handicap from noise. This loss is serious enough to interfere with daily activities, reported by the Occupational Safety and Health Administration.

Adequate, organized material storage is a necessity in a laboratory program. "Clean, well organized facilities should be maintained. When not in use, tools and equipment should be in their proper places and in good working condition" (Wallace 1983, p.14). This is reiterated in OSHA guidelines for housekeeping. In a research article in the Occupational Safety and Health Journal, Sluszka (1995) reported that OSHA site inspectors found patterns of apathy and sloppiness on certain jobs. This pattern was later proven to be linked to poor housekeeping and / or related injuries.

Facility ventilation is also of major concern. In a study on the concentration of smoke and dust particulates, Weston, Stewart and Shinn (1981) established that dust

concentration standards were excessive in most of the facilities studied. Carr, Linhardt and Weston (1982) found in research on ventilation of welding fumes, that teachers and students were exposed to a higher level of iron oxide than minimum standards set by OSHA.

The National Institute for Occupational Safety and Health (NIOSH) has developed a guide or listing of rules for administrators and teachers in vocational programs. This guide is entitled Occupational Safety and Health in Vocational Education. The standards set forth in this guide are based upon business and industry criteria and OSHA guidelines. Lindhardt and Long (1980) condensed this guide into a series of short guideposts. This condensed version is as follows:

Management infractions (very little cost, if any, to correct)

1. Fuel and flammable material stored in shop.
2. Blocked area to fuse boxes and main disconnect.
3. Fuse box not labeled.
4. Improper storage of lumber and supplies.
5. Poor housekeeping.
6. Welders left with electrode in holder.
7. Cleaning air pressure too high, over 30 psi.
8. Improper oxyacetylene storage.
9. No eye protection signs displayed.
10. Welder cables not stored properly and in poor condition.
11. Safety glasses broken and dirty.

Maintenance Infractions (Some cost, but necessary)

12. Chisels, punches, etc., with mushroomed heads.
13. Shovels, etc. with cracked or taped handles.
14. Fire extinguishers absent or not maintained within one year.
15. Poor hoist condition.
16. Electric outlets not covered.
17. Uncovered junction boxes.
18. Ladders in poor repair or inadequate.
19. Chains defective.
20. Power tools not anchored to floor or wall.
21. Electric cords in poor condition -- frayed, cracked, not clamped, etc.
22. Hand tool handles need replacing (hammers, files. etc.)
23. Radial arm saw out of adjustment, with return or blade extending beyond table.
24. Power grinder rest out of adjustment, stone not dressed.

Guard Infractions (Many corrections can be made by teacher or students.)

25. Power tools not guarded or grounded.
26. Air compressor belt and pulleys not guarded.
27. Fans not guarded with 1/2 inch or smaller mesh.
28. Table saw not guarded, splitter or anti-kickback missing.
29. Jointer not guarded.
30. Overhead storage area without rail or toe board.

31. Steam cleaner belt not guarded.
32. Drill press belt not guarded.
33. Radial arm saw not guarded.

General Infractions

34. Paint storage not adequate -- paint must be stored in double-wall vented cabinet.
35. Extension cords not grounded.
36. Lack of eye protection.
37. Fuel not stored in spill-proof cans.
38. No eyewash bottle around or near battery charger.
39. No spray painting booth.
40. Inadequate ventilation.

Administration and teachers alike respond that there is little if any funding to correct problems, yet many infractions can be remedied with little cost to the school.

Litigation

In toady's legal climate lawsuits are rampant. Educators are not exempt or protected from lawsuits as can easily be seen in the following cases. The cases presented in this section are by no means the sum total of lawsuits brought against teachers involved in vocational education. These are but a few that seem to have some merit and raise concern to Agricultural Education teachers. Many lawsuits do not even receive

attention from the judicial system because insurance companies and school districts tend to settle out of court. The lawsuits are separated into two groups, the first concerning machinery related accidents and the second illustrating non-machinery related incidents.

Students in vocational agriculture programs are being prepared for jobs and careers in agriculture and outside the agricultural realm. "Our students must be prepared to enter the work force confidently and to have the skills they need to tackle an increasingly complex technology and body of knowledge" (Varella, 1989, p. 20). Agricultural education teachers must utilize business and industry standards as set forth by OSHA and other such agencies and organizations. The resulting benefit to students as well as to schools and teachers is great.

"Among the greatest fears of public school teachers is the possibility of being sued for negligence" (Foldesy, 1991, p.195). Four elements of negligence are necessary for there to be just cause for legal action. These elements are: duty on the part of the teacher; failure on the part of the teacher to abide by a standard of care for the student, equipment and facility; proximate or legal cause or failure of the teacher to use proper conduct; and injury to the student caused by the teacher or another student or person in the teachers charge. Each of these four elements can easily be controlled by detailed safety plans, rules, regulations, and facility and equipment inspection. Business and industry standards set by OSHA should be utilized to appease the majority of the courts judicial expectations of educational vocational facilities.

In one of the earliest cases the teacher was found negligent in DeBennedittis v. Board of Education New York City (1946) when a student lost a finger while working on

a shearing machine when a second student stepped on the foot treadle. "Although the teacher was within nine feet of the spot where the accident happened, the court found the teacher's failure to observe the proper use of the machine and the lack of supervision of the second student to be sufficient cause for negligence" (Foldesy, 1991. p. 197).

In the 1952 case of Meyer v. Board of Education, a student was found to have caused an accident when he switched on a jigsaw, that another student was repairing. "The teacher was found to be free from negligence because all procedures had been followed and proper supervision had taken place" (Foldesy, 1991, p.196).

"Accidents causing student injury when viewed by the courts are generally decided based on the facts as compared to business and industry standard" (Foldesy, 1991, p. 196). In Lehman v. Los Angeles City Board of Education, 1957, the court agreed that the school was negligent based on its not having conformed to the state code regulating use and safety of machines. The same ruling would be made today but with less deliberation when utilizing the OSHA requirements of safety guards on all machinery.

In another case, Matteucci v. High School District No. 208, 1972, the court awarded damages to a student who was injured while operating a machine without a safety guard. The teacher had proven documentation that the student had been properly instructed on the safe use of the machine. Safety guards were in place but the student had removed it to facilitate faster use. The teacher had failed, in the court's ruling, to give proper supervision during the use of the machine.

In the 1977 decision of Ressel v. Board of Education of the Greater Amsterdam School District, the teacher was relieved of any negligence when a student was injured by a power saw. The student charged lack of supervision and instruction indirectly caused the accident. The court ruled in favor of the teacher in light of the students past conduct, experience and knowledge (Foldesy, 1991, p 196).

In a similar case the court found a teacher liable, citing both lack of supervision and negligent care of the machine, when a student lost four fingers in a table saw (South Ripley Community School Corporation v. Peters 1979). The teacher failed to properly supervise the student, even though he was watching through a glass partition. The teacher was also cited for failing to properly lockout, disable or repair the broken guard on the machine.

In a similar incident (Fallen v. Maplewood, North St. Paul District 1984), the teacher was found to be negligent because: (1) the student was instructed not to use a guard on the power saw; (2) a router should have been used rather than a table saw; (3) the teacher did not direct the student to use a push stick; and, (4) the teacher left the room while the student was operating the saw (Foldesy, 1991, p. 197).

In Izard v. Hickory City Schools 1984, the teacher was found to have met the appropriate standard of care and was not responsible for the accident and injury of the student. This case showed an example that proper procedures, instruction and care can help a teacher avoid liability. In this case the student severed several fingers with a power saw while cutting plywood. The procedures the teacher had followed included: (1) giving the student previous knowledge of the dangers; (2) spending 20 minutes on

instruction; (3) supervising the correct operation; and (4) volunteering to make the cuts for any student not comfortable with using the saw. These four steps Foldesy (1991) stated, aided the teacher in creating the safest possible environment for the students as well as protecting the teacher.

Many of these accidents could have been avoided with due care and concern by the teacher and administrators with safety practices, procedures, instruction and inspection. Most cases involving accidents are not taken to the courts. In research completed by Gleim and Miller (1992), it was revealed that accidents occurring in vocational laboratories accounted for 22.36 percent of school accidents. They further found that two lawsuits were filed as a result of school accidents, one of which was settled for $150,000 and the other for $500,000. This exorbitant expense alone is cause for alarm and justifies any expense to modernize equipment and machinery to OSHA specifications.

The majority of accidents that occur in vocational facilities are not machine related (Foldesy, 1991, p. 197). Although the educational facility is ripe with potential problems with the machinery and equipment many accidents occur because of carelessness, horseplay and lack of safety awareness.

In Calandri v. Ione United School District, 1963, a student was injured when a toy cannon built in shop fired and injured a student. The court reasoned that the teacher should have instructed the student of the dangers of loading and firing the cannon.

The teacher in Salyer v. Burkart, 1975 was found liable when an explosion resulted in injury to the student who was welding. The court found that the teacher

permitted the student to work when both the equipment and premises were unsafe for the activity. In a similar case, Danos v. Forget, 1977 the court again held the teacher liable when the teacher was cutting the top off of a cylinder with a lathe, and it exploded, injuring the students hand. The court held the teacher liable, inasmuch as "the student .... did not knowingly place himself in a position of danger" (Foldesy, 1991, p. 198).

Litigation Protection

Agricultural Education teachers can prepare their safety programs to reduce the possibility of accidents as well as decreasing their personal liability in case an accident does occur. Commonly utilized steps found through a review of OSHA standards, Business and Industry educational programs, and Agricultural Education studies and standards are discussed in this section.

Agricultural Education teachers can learn from the lessons of others as well as knowledgeable professionals in education, as well as in business and Industry. Sullivan (1990) in an article entitled "16 Ways To Lawyer Proof Your Lab" stated that liability of a teacher is most likely to result from failing to carry out an obligation, provide safety instruction, or eliminate safety hazards. The following sixteen components make up a comprehensive safety program according to Sullivan:

1. Require a student acknowledgment. (Safety contract)
2. Require a consent-to-use form. (Contract with parents)
3. Administer safety tests. (100% mastery)

4. Post general safety rules.
5. Enforce safety rules.
6. Conduct safety inspections.
7. Establish emergency procedures.
8. Maintain a first aid kit.
9. Document safety instruction.
10. Keep equipment in good operation.
11. Ensure that the laboratory is safe.
12. Report and investigate all accidents.
13. Supervise students.
14. Model safe behavior.
15. Secure liability insurance.

"In many ways the best defense against safety problems is a good offense" (Artz, 1993, p. 19). The teacher must take the lead role in developing proper procedures and policies and in identifying problems in the facility and equipment.

Mallowe (1993) recommended a procedure for preparing for an OSHA inspection that can work well in vocational education facilities. She suggested that the first step is to identify the potential hazards in the workplace and develop a plan to eliminate these hazards. The checklist also includes the following:

1. Create and enforce rules for employees [students] to use safety equipment.
2. Perform and document safety training.
3. Post OSHA notice.

4. Review OSHA standards.

5. Make sure recordkeeping is complete and accurate.

Another important component Mallowe listed is to update and enhance the written safety program and policy.

Summary

This chapter has provided background information concerning the following seven major categories: (1) Agricultural Education Safety: A Historical Perspective; (2) Instructional Technology; (3) Instructional Techniques; (4) Safety Practices, Material and Equipment; (5) Safety Standards and Compliance; (6) Litigation; and, (7) Litigation Protection.

In all Agricultural Education Programs reasonable precautions must be taken to protect the teacher and student from injury or even death. The dangers inherent to the Agricultural Education facility require great care and concern by each instructor. With the use of Occupational Safety and Health guidelines for facility inspection, maintenance and care as well as the use of proven teaching technologies and methodologies, teachers, administrators and students will be as safe as possible in the learning environment of the Agricultural Education facilities.

The utilization and implementation of comprehensive safety programs continues to be of major concern in the Agricultural Education field. In reviewing past litigation and legal resources the safety program needs to be written, documented and used in a

way that promotes the safe and healthy environment expected by parents and the public in our schools. The safety education program needs to be comprehensive, explaining in detail how students are to be taught, the methodologies and technologies utilized, what the rules, procedures and policies to enforce, the consequences of rule violations, facility and equipment inspection procedures, safety training for students and teachers, and documentation of all tests, safety violations, equipment repairs, accidents and accident investigation procedures. Above all else the safety of the student is paramount and should be the first concern for any vocational instructor and the administration in every school system in the state.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to describe methods and procedures used in developing and conducting this study. The purpose of this study was to determine safety education practices, assess safety procedures and identify areas of safety compliance in a selected group of schools as a means of providing improvement of safety education and the safety environment of agricultural education students.

Objectives of the Study

In order to accomplish the purpose of the study, the following objectives were established with regard to the study population:

1) To describe demographics of selected Agricultural Education teachers and facilities in Oklahoma.
2) To determine the safety policy and procedures utilized in selected agricultural education programs.
3) To identify instructional methods currently used in the selected agricultural education safety programs.

4) To determine the extent of compliance with recognized safety standards in agricultural education programs.
5. To identify areas of safety and safety education where inservice education and curriculum and facility changes are needed to help agricultural education teachers become more aware of the expected safety practices and procedures.

Institutional Review Board (IRB)

Federal regulations and Oklahoma State University policy require review and approval of all research studies that involve human subjects before investigators can begin their research. The Oklahoma State University Office of University Research Services, through the Institutional Review Board, (IRB) conducts this review to protect the rights and welfare of human subjects involved in biomedical and behavioral research. In compliance with the aforementioned policy, this study received the proper surveillance and was granted permission to proceed. This research was assigned the following research project number: AG-96-017. A copy of the IRB approval form is presented at the end of this document.

Population and Site Selection

The population of this study consisted of the 24 Agricultural Education programs in the Tulsa Professional Improvement Group of the Agricultural Education Division of

the Oklahoma Department of Vocational and Technical Education. The primary purposes of the Professional Improvement Groups are to provide leadership and to develop program improvement and teacher development programs. This population was selected because the proximity of the area was close to the home base of the researcher and allowed for keeping the cost of evaluation and data collection to a manageable level since data collection required a personal visit to each school. The dissertation committee and members of the Agricultural Education Division of the Oklahoma Department of Vocational and Technical Education supervisory staff, concurred in the selection of the Tulsa Professional Improvement Agricultural Education Group. Schools in this group had considerable variety including single teacher and multi-teacher departments, older and newer school facilities, horticultural and agricultural production programs.

Because of the full cooperation of the 33 teachers in the 24 Agricultural Education Programs in the Tulsa Professional Improvement Group, a 100 percent response rate was achieved.

Development of the Instrument

Various methods of data collection were considered with the personal on-site data collection method being selected as the most appropriate to satisfy the objectives of the study. The researcher felt the necessity of gathering the data with the least amount of teacher bias ruled out all other forms of data collection methods. In developing the instrument to satisfy the objectives of the study, the first step was to review and evaluate instruments used in related studies. Those specifically reviewed included ones conducted

by Baugher and Slocombe (1990), Brown (1977), Bruening, Hoover and Radukrishua (1991), Burke (1989), Fletcher and Miller (1995), Gleim and Hard (1988), Gleim and Miller (1992), Hoerner and Bekkum (1990), Johnson and Fletcher (1990), Kasim, Lawver and Fraze (1993), Lamb (1984), Lawver (1992), Lawver (1994), Leaghty (1971), Miller (1989), Rudolf and Dillon (1984); Seaboch (1995), and Swan (1993). Specific items included in the instrument were also utilized from sources that dealt with legal aspects and court rulings. These sources included Abrams, (1995), Artz (1993), Berkey (1994), Chad (1995), Chancellor (1983), Foldesy (1991), Forsythe (1983), Mallowe (1993), Pristupa and Foster (1980), Sullivan (1990), Varella (1989), and Yohe and Dunkleberger (1992).

Upon the completion of the review of the selected questionnaires, the researcher, thesis adviser and the Northeast District Agricultural Education Supervisor compiled and revised questions and specific items addressing five major components of safety in Agricultural Education Programs. These items relative to safety in Agricultural Education Programs addressed demographics, documentation of safety instruction, safety instruction, availability of first-aid, administrative procedures, accepted facility safety standards and suggested improvements.

The initial instrument was reviewed by a panel of Agricultural Education experts. Faculty members from the Departments of Agricultural Education, Communications, and 4-H Youth Development, Biosystems and Agricultural Engineering and Education Administration and Higher Education at Oklahoma State University critiqued the instrument and offered suggested revisions.

Following this initial review and subsequent changes, the instrument was again reviewed by State and District staff of the Agricultural Education Division of the Oklahoma Department of Vocational and Technical Education. This critique allowed the researcher to identify potential problems and then other minor revisions were made to the instrument.

Following this double review by two panels of experts, a pilot test of the instrument was conducted utilizing three Agricultural Education Programs in the vicinity of Stillwater, Oklahoma and Oklahoma State University. The District Supervisor of the Tulsa Professional Improvement Group accompanied the researcher to the pilot tests, to identify potential problems with the instrument and the data collection process. As a result of the pilot test and the cooperation of the District Supervisor, several items were either reworded or deleted as well as simplified some with regard to the specific item being addressed. This also resulted in the addition of three items that both the researcher and District Supervisor felt necessary to include in the instrument.

Collection of the Data

During the data collection process the researcher recognized the fact that personal credibility needed to be developed before the teachers would openly cooperate and give honest and trustworthy information. To gain credibility the researcher sent a letter to all of the teachers selected for the study explaining the importance of the research as well as stating the confidential manner in which the data gathered would be handled. The letter was signed by the researcher, the District Supervisor and the thesis chairman. To further

solidify the position of the researcher, personal telephone calls were made by the researcher, to each teacher to explain the research project, the confidentiality measures and the expertise of the researcher.

In designing the instrument the researcher recognized the fact that a number of the selected teachers would still be skeptical about the research project. Therefore, in an effort to make the confidentiality concern minimal the researcher developed a code sheet identifying each teacher and school selected. When collecting data on-site the researcher showed each teacher the code sheet briefly and explained that only the researcher had the codes and once the data gathering was completed the code sheet would be destroyed.

Throughout the process of designing and developing the instrument, the length of the survey was of concern. The instrument was designed to require approximately 20 or 30 minutes for the researcher to complete at each site. During the pilot tests each site visit lasted approximately 35 minutes with ample time allowed for discussion and reflection upon the items to determine if they measured exactly what was expected.

It was determined by the researcher and thesis advisor that the instrument be printed on plain white paper, without letter head or imposing headlines and be easily and quickly completed by the researcher. The instrument contained 101 individual items and 3 open-ended questions. The instrument consisted of seven parts: (1) Demographical Characteristics; (2) Administrative Procedures; (3) Documentation of Safety Instruction; (4) Safety Instruction; (5) Availability of First-aid; (6) Facility Safety Standards; and (7) Suggested Improvements. The instrument consisted of forced

response items. The forced response items included "yes" or "no" options for 89 individual items and "yes", "no" or "not applicable" for one of the individual items.

Section I of the instrument included eleven items which were designed to gather demographic information about the Agricultural Education teachers and facilities. Each item was developed to gather specific information about the teacher and the facility. Subsection A consisted of eight items pertaining to the teachers while Subsection B included three items to gather information about the facility.

The subsection devoted to teacher demographics included requests for information concerning the number of teachers in the department, the gender of the teacher, the number of years of teaching experience and the number of hours of agricultural mechanics and safety type classes each teacher had completed in college. This subsection also asked if the teacher was chemical handling certified, had a safety course in college, had a safety course from business and industry and if the teacher had any safety training provided by the Professional Improvement District.

Subsection B was designed gather demographical information on the Agricultural Education facility. The first part indicated the size of the facility in the following ranges: (1) <1000 sq. ft.; (2) 1000 - 1999 sq. ft.; (3) 2000 - 2999 sq. ft.; and (4) >3001 sq. ft. The second part identified the age of the facility in the following ranges: (1) < 5 years; (2) 5 - 10 years; (3) 11 - 15 years; (4) 16 - 20 years; (5) 21 - 25 years; and (6) > 25 years. The final part of the facility demographics identified the type of facility in the following types: (1) Shop Facility Only; (2) Shop and Greenhouse Facility; (3) Shop and Animal Facility; (4) Shop, Greenhouse and Animal Facility. The greenhouse and /

or animal facility had to be consistently utilized and within easy traveling distance to be identified as part of the instructional program.

Section II of the instrument included ten items designed to gather data on administrative procedures. These items were identified as areas of importance in the review of literature. Administrative procedures include items concerning regular inspection of the facility by the teacher, school district administrators and the District Supervisor. This section also concerns common procedures and documentation such as the development and utilization of written safety plans, safety violation enforcement policy, emergency procedures, Material Safety Data Sheets, and accident report forms.

Section III covered items that documented safety instruction. These items were selected specifically from the legal aspect of the review of literature. Each item was found to help support the teacher and school district during court decisions.

The fourth section details the safety instruction and instructional methodology utilized in the program while Section V included the availability of first aid in the facility.

Section VI, Facility Safety Standards, included a detailed description of widely recognized safety standards. Data were gathered by the researcher during an on-site visitation of the facility according to these standards. The subsections included are as follows: (A) General Physical Condition; (B) Housekeeping; (C) Equipment; (D) Electrical Installation; (E) Personal Protection; and (F) Fire Protection. All but two item were identified in a forced response "yes" or "no". The "not applicable" option was utilized on the item concerning stairways and overhead storage and the item concerning

the storage of cylinders 50 feet apart. In both cases several facilities did not have overhead storage or stairs nor did they keep extra cylinders in inventory.

The last section utilized two open-ended questions to gather teacher opinion to the following questions: (1) What would you change about the safety curriculum?; and (2) What would you change about the facility and equipment? This section also included a brief statement from the researcher about the observations and reflections on the facility and the equipment.

Each of the 33 teachers in the selected programs were mailed a letter of announcement explaining the research intent and expectations. A subsequent telephone call to answer questions, set visitation schedules and ensure confidentiality was conducted the following week. The visitations were set according to the wishes and schedules of the teachers in the programs and data was collected by the researcher during an on-site visitation. This technique seemed to work well as all teachers (100 percent) participated and willingly cooperated.

The instrument was duplicated on plain white paper for data collection during the site visitation. The researcher personally visited each program, during the months of March and April of 1996, observed the equipment and facility and completed the instrument. Then, a brief question and answer session was conducted with the teachers to complete the instrument. The teachers and the researcher had the opportunity to ask questions to clarify the items on the instrument. After the instrument was completed the researcher asked the two open ended questions and briefly noted teacher opinions regarding each of these questions.

The completion of the instrument and the brief question and answer session at each site lasted an average of approximately 30 minutes. When the instrument was completed and the researcher had left the facility the researcher recorded personal observations and field notes concerning his reflections were noted.

Analysis of Data

The entire study population of the selected Professional Improvement Group participated in the study; therefore, descriptive statistics were determined to be most appropriate to use to analyze these data. These "... statistics are numbers which are used to describe information or data, or those techniques used to calculate those numbers" (Krejcie & Morgan, 1970, p. 172).

Data were collected personally by the researcher during site visits to each Agricultural Education Program within the Tulsa Program Improvement Group. Quantitative and qualitative data were collected through researcher observations and an interview with each of the 33 Agricultural Education teachers within the group.

Quantitative data were collected on 37 items or standards, through the interview process and 56 of the items were collected personally by the researcher, during the facility analysis and inspection. Three qualitative items were utilized to collect data on teacher opinions and researcher observations during the interview and subsequent researcher reflection.

When all site visits were completed the researcher entered the data into an Excel 5.0 spreadsheet and analyzed the data utilizing frequency distributions, percentages

and means. All data were analyzed by the researcher under the specific direction of the thesis chair and a statistics specialist. All data were processed with Excel version 5.0 on an IBM compatible computer.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to determine safety education practices, assess safety procedures and identify areas of safety compliance in a selected group of schools as a means of providing improvement of safety education and the safety environment of agricultural education students.

Data were collected during the months of March and April of 1996. A total of 24 Agricultural Education programs were selected for the population and all of the teachers that work in those programs, 33 in total (100 percent) cooperated with the study. The researcher personally visited each site to collect both qualitative and quantitative data through facility and equipment inspection and teacher interviews. Approximately 30 minutes were spent at each site during the data collection process.

The objective of this chapter was to present data, in a graphic and succinct manner, that were used to determine the safety education practices, policies, procedures and the extent of safety compliance with recognized standards in agricultural education programs. The data were organized according to and corresponding with the objectives of the study.

Population

The population of the study was located in 24 Agricultural Education programs and included 33 Agricultural Education Teachers in the Tulsa Professional Improvement Group. The support of the District Supervisor overseeing the Tulsa Professional Improvement Group of the Agricultural Education Division of the Oklahoma Department of Vocational and Technical Education supervisory staff was one of the major factors considered in selecting the population.

Demographic Characteristics

Table I was constructed to present data regarding numbers of teachers per department. Inspection of these data reveal over 70 percent of the Tulsa Professional Improvement Group was made up of single teacher programs, while 25 percent consisted of two teachers. There were no three teacher department and only one program with four teachers.

TABLE I

DISTRIBUTION OF AGRICULTURAL EDUCATION PROGRAMS BY NUMBERS OF TEACHERS

Number of Teachers	Number	Percentage (%)
One Teacher	17	70.83
Two Teachers	6	25.00
Three Teachers	0	0.00
Four Teachers	1	4.17
Total	24	100.00

As reported in Table II, the teachers in the Tulsa Professional Improvement Group are overwhelmingly male (96.97%) with only one female teacher among the total population of 33.

TABLE II

DISTRIBUTION OF TEACHERS BY GENDER

Gender of Teachers	Number	Percentage (%)
Male	32	96.97
Female	1	3.03
Total	33	100.00

Table III is a presentation of the distribution of teachers involved in the study by the years of teaching experience. As illustrated it was found that the group was relatively young, with over 24 percent of the teachers having less than 5 years of teaching experience. Also, 15.15 percent of the teachers had 6 to 10 years of experience, and 18.18 percent, had 11 to 15 years of experience. Furthermore, 15.15 percent had 16 to 20 years of experience and 18.18 percent had taught for 21 to 25 years. Of the total group, 19, 57.57 percent, had taught for 15 years or less while in the more than 25 years of experience range there were only three teachers.

TABLE III

DISTRIBUTION OF TEACHERS BY YEARS OF TEACHING EXPERIENCE

Years of Experience	Number	Percentage (%)
0 - 5 years	8	24.24
6 - 10 years	5	15.15
11-15 years	6	18.18
16 - 20 years	5	15.15
21 - 25 years	6	18.18
25 + years	3	9.10
Total	33	100.00

Table IV was developed to describe the number of college level credit hours teachers had in agricultural mechanics or safety type classes. It was found that over 42 percent of the teachers had between 10 and 12 hours of college level classes in agricultural mechanics or safety classes. Inspection of Table IV establishes that just over 24 percent have 7 to 9 hours and that 15.15 percent have 4 to 6 hours of credits. Two teachers or 6.06 percent of the population had completed 3 hours of college agricultural mechanics or safety type classes. It was also revealed that over 12 percent of the teachers had from 17 to more than 21 hours of credits in the agricultural mechanics or safety areas.

TABLE IV

DISTRIBUTION OF TEACHERS BY HOURS OF COLLEGE CREDIT IN AGRICULTURAL MECHANICS OR SAFETY CLASSES

Number of Credit Hours	Number	Percentage (%)
3 hours	2	6.06
4 - 6 hours	5	15.15
7 - 9 hours	8	24.24
10 - 12 hours	14	42.42
13 - 16 hours	0	0.00
17 - 20 hours	3	9.09
21 + hours	1	3.03
Total	33	100.00

The extent of safety education in college and beyond as a professional educator is compiled in Table V. Analysis of these data discloses that 21 teachers, over 63 percent, have received safety education from Professional Improvement Group workshops or training programs. Ten teachers, 30.30 percent, received specific safety training from business and industry while 27.27 percent are certified in the safe handling of pesticides and chemicals. However, it was interesting to note that only 7, 21.21 percent, of the teachers received specific safety training in a specialized college course.

TABLE V

EXTENT OF OF TEACHER SAFETY EDUCATION

Safety Education Type	Number	Percentage (%)
Chemical Handling Certified	9	27.27
Specific Course in College	7	21.21
Specific Course from Business & Industry	10	30.30
PI Teacher Training	21	63.63

Table VI is a presentation of the distribution of Agricultural Education laboratory (agricultural mechanics and horticulture work area) facilities by size. The researcher visually measured the facilities and requested confirmation of the dimensions from the teachers. None of the facilities were found to be smaller than 1000 square feet. It was discovered that 5 facilities, or 20.83 percent, had between 1000 and 1999 square feet of such space and that 6, 25.00 percent, had between 2000 and 2999 square feet of such space. More than one half, 13, 54.17 percent, had more than 3000 square feet of available space to utilize for this portion of the instructional program.

TABLE VI

DISTRIBUTION OF AGRICULTURAL EDUCATION LABORATORY FACILITIES BY SIZE

Facility Size	Number	Percentage (%)
< 1000 sq. ft.	0	0.00
1000 - 1999 sq. ft.	5	20.83
2000 - 2999 sq. ft.	6	25.00
> 3000 sq. ft.	13	54.17
Totals	24	100.00

Table VII contains a summary of data concerning distribution of facilities by age. It was disclosed that 9 facilities, 37.50 percent, were more than 25 years old, while 5, 20.83 percent, were in the 21 to 25 year range and another 6, 25 percent, were in the 16 to 20 year range. A surprising indication was that only 4 facilities are under 15 years old, with only 1 being less than 5 years old, 2 being 6 to 10 years old and 1 being 11 to 15 years old.

TABLE VII

DISTRIBUTION OF AGRICULTURAL EDUCATION PROGRAM FACILITIES BY AGE

Age of Facility	Number	Percentage (%)
< 5 years	1	4.17
6 - 10 years	2	8.33
11 - 15 years	1	4.17
16 - 20 years	6	25.00
21 - 25 years	5	20.83
> 25 years	9	37.50
Total	24	100.00

Table VIII provides a summary of the types of facilities available to programs in this population. The largest proportion of programs 10, 41.67 percent, have a shop and a greenhouse facility, while only 8.33 percent or 2 programs have a shop, a greenhouse and an animal facility. The data further indicated that 6 each, 25 percent, of the programs have a shop only or a shop and animal facility only.

TABLE VIII

DISTRIBUTION OF AGRICULTURAL EDUCATION PROGRAM FACILITIES BY TYPE

Facility Type	Number	Percentage (%)
Shop Only	6	25.00
Shop and Greenhouse	10	41.67
Shop and Animal Facility	6	25.00
Shop, Greenhouse and Animal Facility	2	8.33
Totals	24	100.00

The data in Table IX were compiled to show the distribution of facilities by the supervisory personnel who routinely or "regularly" inspect the facility for safety problems and hazards. It was gratifying to note that 100 percent of the facilities are routinely inspected for safety problems by teachers. Also indicated is the finding that 20, 83.33 percent, of the facilities are inspected by school administrators and that 22, 91.67

percent, of the facilities are routinely inspected by the Agricultural Education District Supervisor.

TABLE IX

DISTRIBUTION OF PROGRAMS BY SUPERVISORY PERSONNEL WHO CONDUCT "REGULAR" INSPECTIONS OF FACILITIES

Facility Supervisor	Number	Percentage (%)
Teacher	24	100.00
School Administrator	20	83.33
District Supervisor	22	91.67

The teachers were asked in a brief question and answer session to indicate in a yes / no manner if the programs utilized each of a set of the safety plans or safety documentation standards. Table X contains a summary of the findings as to the extent of compliance of agricultural education programs with the selected documentation standards. Three programs, 12.50 percent, had a written safety plan for the agricultural education program. Furthermore, it was revealed that 6, 25 percent, utilized a written enforcement policy for safety violations and an equal proportion documented safety violations. For the entire group of programs 22, 91.97 percent, filed accident reports. Inspection of the data also disclosed the fact that 20, 83.33 percent, of the programs had Material Safety Data Sheets available and that an equal percentage had evacuation procedures posted in the classroom or laboratory facility. Also demonstrated in the data

was that 16, 66.67 percent, of the programs had emergency phone numbers posted and available for utilization in event of an accident.

TABLE X

DISTRIBUTION OF PROGRAMS BY EXTENT OF CONFORMITY WITH SELECTED SAFETY PLANS AND SAFETY DOCUMENTATION

Safety Plans / Documentation Type	Number	Percentage (%)
Accidents reports filed	22	91.67
MSDS Sheets available and filed	20	83.33
Evacuation Procedures posted	20	83.33
Emergency phone numbers posted	16	66.67
Written enforcement policy for safety violations	6	25.00
Documentation of Safety Violations	6	25.00
Written safety plan for AgEd Program	3	12.50

The extent of safety instructional methods documentation in agricultural education programs is presented in Table XI. All 24, 100 percent, of the programs keep safety exams on file as part of the safety instructional methods documentation aspect. Furthermore 22, 91.97 percent, utilized a gradebook to document safety instruction. Of the total group 19, 79.17 percent, employed lesson plans as part of the safety instruction documentation process while 12, 50 percent, have developed a documented teach / reteach method for those students not mastering the safety material presented in class.

TABLE XI

DISTRIBUTION OF PROGRAMS BY EXTENT OF SAFETY INSTRUCTIONAL METHODS DOCUMENTATION

Safety Documentation	Number	Percentage (%)
Students exams on file	24	100.00
Gradebook documents safety instruction	22	91.67
Lesson plans document safety instruction	19	79.17
Gradebook documents teach/reteach methods	12	50.00

Table XII provides a summary of the extent of safety education instructional types and methodologies used in the agricultural education programs. Each of the selected items identified in the table are common standards effective teachers could utilize to emphasis the importance of safety and safety education.

All of the programs 24, 100.00 percent, presented material on tools and equipment safety to the students and utilized teacher demonstrations to provide reinforcement on tool and equipment safety, while 14, 58.33 percent, presented biohazard and animal safety information and 15, 62.50 percent, presented material on chemical or pesticide safety to the students. Furthermore, 100 percent of the programs require a safety test with a 100% mastery, before access to the shop facility, tools and equipment is permitted.

Student demonstrations of tool and equipment safety were utilized in 22, 91.67 percent, of the programs while 13, 54.17 percent, included field trips and 11, 45.83

percent, utilized resource people as part of the instructional and methodological types to emphasis safety. Given the entire group of 24 programs 1, 4.17 percent, presented material on first aid methods and 3, 12.50 percent, utilized computer safety programs to emphasis tool, equipment, or chemical safety.

TABLE XII

DISTRIBUTION OF PROGRAMS BY EXTENT OF SAFETY EDUCATION INSTRUCTIONAL TYPES AND METHODOLOGIES

Instructional Type or Methodology	Number	Percentage (%)
Material presented on tools and equipment	24	100.00
Safety test(s) required before lab entry	24	100.00
100% mastery on test required	24	100.00
Teacher demonstrates tools and equipment	24	100.00
Students demonstrate tools and equipment	22	91.67
Teach/reteach procedure established	18	75.00
Material presented on chemical safety	15	62.50
Material presented on biohazard / animal safety	14	58.33
Field Trips are utilized to emphasis safety	13	54.17
Resource people are utilized to emphasis safety	11	45.83
Computer Safety Programs utilized	3	12.50
Students receive First-Aid instruction	1	4.17

The extent of first aid availability for students in agricultural education is summarized in Table XIII. In 23, 95.83 percent, first aid supplies were immediately available for use in the event of an emergency, while an eye wash was available and operational in 21, 87.50 percent and 3, 12.50 percent, had an operational emergency shower available. Furthermore 19, 79.17 percent, had teachers that were first-aid trained and 18 of the 24 programs, 75 percent, had certified personnel available to render first-aid in an emergency situation.

TABLE XIII

DISTRIBUTION OF PROGRAMS BY EXTENT OF FIRST AID AVAILABILITY

First Aid Type	Number	Percentage (%)
First-aid Supplies available	23	95.83
Eye wash is available	21	87.50
Instructor first-aid trained	19	79.17
Certified personnel available	18	75.00
Emergency shower available	3	12.50

Table XIV contains a summary of the extent of facility general physical conditions in agricultural education programs. In the judgment of the researcher every facility was determined to have sufficient lighting available for safe working conditions, all equipment drive mechanisms were protected with permanent guards and at least two exits, while 17, 70.83 percent, had exits that were properly visible signs. Equipment was arranged for safe utilization in 23, 95.83 percent, of the facilities while 22, 91.67 percent were determined to have appropriate or adequate ventilation. Furthermore 16, 66.67 percent, utilized fire resistant curtains for welding areas to reduce welding flash problems and an equal number had safety lanes provided to mark safe passage ways and danger areas. Inspection of the data revealed the fact that 15, 62.50 percent, had safety posters in the shop area to increase awareness of safety problems and as a continuous safety reminder.

It was discovered that 11, or 45.83 percent, of the programs had approved fire resistant cabinets for storage of flammable liquids and chemicals, while 10, 41.67 percent, had smoke or dust exhaust systems in place. The use of non skid surfaces at stationary tools and equipment was found in one facility. Overhead storage with stairways or ladder access was found in 21 facilities and 7, 33.33 percent, were found to meet safety standards for student access.

TABLE XIV

DISTRIBUTION OF PROGRAMS BY
FACILITY GENERAL PHYSICAL CONDITION

Accepted Standard	Number	Percentage (%)
Lab has at least 2 exits	24	100.00
Laboratory lighting sufficient	24	100.00
Drive mechanisms protected with permanent guards	24	100.00
Equipment is arranged for safety	23	95.83
Ventilation is adequate	22	91.67
Safety lanes provided	16	66.67
Fire resistant curtains used in welding area	16	66.67
Exit signs visible	17	70.83
Safety posters in shop area	15	62.50
Fire resistant cabinet used to store flammable liquids	11	45.83
Smoke or dust exhaust system utilized	10	41.67
Stairways are in good and safe condition (n=21)	7	33.33
Nonskid surfaces provided at stationary tools on smooth surfaces	1	4.17

Table XV provides a summary of responses to housekeeping standards in agricultural education facilities. These standards include topics that are involved with maintenance, storage and general cleanliness in the facility and are directly controlled by the teacher or teachers involved within the program. It was gratifying to note that all 24 programs, 100 percent, met the standard of wall and storage areas being clear of objects that might fall and cause injury and also the standard of properly maintained washing and cleanup facilities.

Aisles, passageways and corridors were free of obstructions and all wood and metal was stacked safety and solidly in 22, 91.67 percent, of the facilities. In 75 percent, or 18 of the 24 facilities, the laboratory was judged by the researcher to be neat, orderly, clean and sanitary. Chemicals were stored in a fire proof chemical storage cabinet in 16, 66.67 percent, of the facilities while 7, 33.33 percent, had properly utilized oxygen and acetylene storage that separated the cylinders by more than 50 feet, and had the bottles chained in an upright position or had a concrete wall of the proper height and thickness separating the cylinders if the distance requirement was not satisfied.

TABLE XV

DISTRIBUTION OF PROGRAMS BY SELECTED HOUSEKEEPING STANDARDS

Housekeeping Standard	Number	Percentage (%)
Walls and storage areas clear of objects that might fall	24	100.00
Washing and cleanup facilities properly maintained	24	100.00
Aisles, passageways, and corridors free of obstructions	22	91.67
Stored wood and metal stacked safely and solidly	22	91.67
Laboratory appearance neat, orderly, clean and sanitary	18	75.00
Chemicals are stored in proper cabinets	16	66.67
Cylinders stored separately 50' apart	7	33.33

The extent of compliance with selected equipment standards in the facilities is compiled in Table XVI. The analysis of the data disclosed that all 24 of the facilities met the standards of having all tools in good working order and storing oxygen, acetylene and carbon dioxide cylinders in an upright position. It was also discovered that 23, 95.83 percent, of the facilities had the power equipment electrical controls within easy reach of the operators' position while 21, 87.50 percent, had roller units or stands and had push stick or blocks available and 20, 83.33 percent, used safety guards and kick back devices on stationary equipment and power equipment. The availability and utilization of fire resistant cabinets was found in 11, 45.83 percent; and 16, 66.67 percent, used

TABLE XV

DISTRIBUTION OF PROGRAMS BY SELECTED HOUSEKEEPING STANDARDS

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Laboratory appearance neat, orderly, clean and sanitary	18	75.00
Chemicals are stored in proper cabinets	16	66.67
Cylinders stored separately 50' apart	7	33.33

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color-coded tools and in 6, 25 percent, the stationary tools and equipment were properly anchored.

TABLE XVI

EXTENT OF EQUIPMENT STANDARDS
IN AGRICULTURAL EDUCATION FACILITIES

Accepted Standard	Number	Percentage (%)
Tools in good working order	24	100.00
Upright cylinder storage available	24	100.00
Electrical controls within easy reach	23	95.83
Roller units or stands available	21	87.50
Push sticks or blocks available	21	87.50
Guards and kick back devices in place	20	83.33
Tools color coded	16	66.67
Fire resistant cabinets available	11	45.83
Stationary tools anchored properly	6	25.00

The data gathered for Table XVII summarize the extent of electrical protection in agricultural education facilities. Inspection of the data reveals that all of the stationary tools and equipment were properly grounded in 100 percent of the facilities and extension cords were Universal Laboratory approved in 23, 95.83 percent, while in 12, 50 percent, of the electrical boxes and switches were properly identified and covered to prevent accidental electrocution when working on circuits and equipment. Also to be

found when reviewing Table XVII is that 1, 4.17 percent, of the programs had the electrical cabinets in a power room that was able to be locked and 2 programs, 8.33 percent had Ground Fault Circuit Interrupter cords available for outdoor and / or greenhouse use.

TABLE XVII

EXTENT OF ELECTRICAL PROTECTION IN AGRICULTURAL EDUCATION FACILITIES

Accepted Standard	Number	Percentage (%)
Stationary tools and equipment properly grounded	24	100.00
Extension cords are UL approved	23	95.83
Electrical boxes and switches properly covered and identified	12	50.00
G.F.C.I. cords available for outdoor use	2	8.33
Electrical cabinets and power room locked	1	4.17

Table XVIII was assembled in order to describe the extent of personal protection equipment available in agricultural education facilities. Arc welding helmets and goggles, as well as welding gloves were provided in 100 percent of the facilities while welding aprons, jackets, or shop coats and industrial eye protection were found in 23, 95.83 percent. Further examination of the data revealed that face shields and respirators or dust masks were provided in 15, 62.50 percent; oxyacetylene cutting goggles in 50 percent; and ear plugs or ear muffs in a sparse 7, 29.17 percent, of the facilities.

TABLE XVIII

EXTENT OF PERSONAL PROTECTION EQUIPMENT IN AGRICULTURAL EDUCATION FACILITIES

Accepted Standard	Number	Percentage (%)
Welding gloves provided	24	100.00
Arc welding helmets and goggles provided	24	100.00
Welding aprons, jackets, coats available	23	95.83
Industrial eye protection provided	23	95.83
Face shields provided	15	62.50
Respirators or dust masks provided	15	62.50
Oxyacetylene cutting goggles provided	12	50.00
Ear plugs or ear muffs provided	7	29.17

The summary in Table XIX was developed to illustrate the extent of fire protection available in agricultural education facilities. A fire alarm switch which allowed the alarm to be triggered from the facility was found in 5, 20.83 percent, while safety cans for flammable liquids as well as covered metal containers for combustible wastes were employed in 15, 62.50 percent, of the facilities. Detailed data analysis revealed that 23, 95.83 percent, of the programs had fire blankets available and utilized a maximum distance of 75 feet to fire extinguishers and that, 91.67 percent, or 22 of the 24 facilities had proper fire extinguisher location markings and that fire extinguishers were tested and documented yearly.

TABLE XIX

DISTRIBUTION OF PROGRAMS BY THE EXTENT OF FIRE PROTECTION AVAILABLE

Accepted Standard	Number	Percentage (%)
Maximum distance 75' to fire extinguisher	23	95.83
Fire blanket available	23	95.83
Fire extinguisher locations properly marked	22	91.67
Fire extinguishers of tested yearly	22	91.67
Safety cans used for flammable liquids	15	62.50
Combustible wastes in covered container	15	62.50
Fire alarm switch available	5	20.83

Needed Changes in Curriculum Materials and Facilities and Equipment

This section deals with the opinions, suggestions and feelings provided by the Agricultural Education teachers (respondents) on the open-ended portions of the instrument. A number of issues were addressed by the respondents. However, for the most part, their comments and suggestions focused upon the improvement and modernization of the safety curriculum materials available to them and the facilities and equipment.

The researcher asked each respondent the following questions: "What would you change about the safety curriculum materials?" and "What would you change about the facility and equipment?" The researcher then made note of their responses during the

personal interview. The following paragraphs provide the researchers' summary of these as well as some specific quotes from the respondents.

Curriculum Changes Needed

The need to modernize and develop more detail within the safety curriculum materials were the major points addressed by the respondents. Almost all of them offered suggestions, opinions and feeling about these items. Some of the inputs about safety related curriculum materials in the words of the respondents included:

- "The safety curriculum needs to be supplemented to much, it needs to be more detailed."
- "It is too general and needs to be in a more logical order."
- "Needs to cover each area in more detail."
- "The safety curriculum is just bad. I only use it as a guide to teach from and I supplement it with stuff from text books."
- "It is a great outline but it needs more detail."
- "The safety test needs to be more specific. What is there is not good enough.
- "Needs more work sheets over more tools and equipment and the chemical area too."
- "The new stuff is confusing and is still not enough to teach from."
- "Needs individualized units for each tool or piece of equipment and safety area."
- "Needs to be changed to meet modern needs and equipment we have."
- "A curriculum update is badly needed. Not just putting it in this new order."
- "Safety curriculum is not sequential and needs to be changed to meet today's needs."
- "I like it but it needs some updating."
- "Safety needs to be more specific and detailed. Tests need to be more than true and false tests these don't prove a thing."

- "The curriculum is bad! It's not detailed enough and it's outdated."
- "I use the curriculum as a guide. We need a test on every machine."
- "Curriculum needs updating not putting in a different order!"
- "I use the T&I safety stuff. It is more detailed."

An important aspect identified within the responses was the need to make additions to the general content of the safety curriculum. Several of the comments concerning the suggested additions are itemized below:

- "Need to add some horticultural safety and first-aid. We need a unit with a short test to cover each tool."
- "Include some first-aid information."
- "Give more supplemental materials like videos, slides or places to get it from."
- "Add more electrical safety."
- "Include a new safety contract for the students, parents and teacher to sign."

Facilities and Equipment Needs

The responses to the question concerning desired changes to the facility and equipment generally fell into the area of needing modernization of tools and equipment. Several comments identified a need for specific money to maintain and repair the facility. The following are a compilation of teacher comments and opinions regarding this question:

- "We need money for tools and equipment upgrades."
- "If we are expected to teach new technology we need the equipment."
- "Need some new equipment our stuff is getting old."

- "Need an equipment update."
- "I would like some specific money to make repairs to the shop and classroom."
- "I need all new equipment. Everything is out dated."
- "We could really use some new training kits for small engines."
- "I want a greenhouse and some equipment for the shop."
- "The shop needs modern equipment, most of it is really old. "
- "Need new equipment."
- "I would like to see some matching funds so we can get some new tools."
- "We need money for equipment."

The vast majority of the teacher responses indicated a need for tool and equipment upgrades. Some teachers indicated that a need exists for a greenhouse for the instructional diversification of the program and others identified a need for funds to make repairs and to complete general maintenance within the facility.

Researcher Observations and Reflections

During each site visit and teacher interview the researcher had the opportunity to make general observations and develop his own opinions about the facility and the tools and equipment within the facility. When the site visitation was completed the researcher noted these opinions so that after all the data collection from all of the sites was completed, this aspect could be analyzed.

Based upon these observations and reflections, the researcher felt the facilities in general were in very well kept order and were obviously somewhat old but well maintained. In retrospect the tools and equipment were basic to teach general welding principles but were inadequate to teach the broad scope involved within agricultural mechanics. The majority of the programs had a greenhouse that was well kept and utilized well and in some cases there was a need for a greenhouse laboratory to diversify the instructional program.

In the researcher's opinion much of the equipment was outdated and a definite need exists to modernize most of the facilities. This modernization is needed not only in the welding tools and equipment area but also in the small engines, electricity and wood working areas. The researcher also recognized a definite need for the safety curriculum materials to be reviewed in a detailed manner with large amounts of input from Agricultural Education teachers.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this chapter is to present a summary of the study problem and its environment, the design and conduct of the study, and the major findings. Also presented are conclusions and recommendations that were based upon the analysis and summarization of data collected and upon observations and impressions resulting from the design and conduct of the study.

Summary

Purpose of the Study

The purpose of the study was to determine and assess safety education practices, safety procedures and identify areas of safety compliance in a selected group of schools as a means of improving safety education and the safety environment of agricultural education programs.

Objectives

In order to accomplish the purpose of this study, the investigation was directed toward achieving specific research objectives with regard to the study population:

1) To describe demographics of the selected Agricultural Education teachers and facilities in Oklahoma.
2) To determine the safety policies and procedures utilized in selected agricultural education programs.
3) To identify instructional methods currently used in agricultural education safety programs.
4) To determine the extent of compliance with recognized safety standards in agricultural education programs.
5) To identify areas of safety and safety education where inservice education and curriculum and facility changes are needed to help agricultural education teachers become more aware of the expected safety education practices and procedures.

Design and Conduct of the Study

Various methods of data collection were considered. The personal on-site data collection method was selected as the most appropriate to satisfy the objectives of the study. The necessity of gathering the data with the least amount of teacher bias ruled out all other forms of data collection methods. The selection of those Agricultural Education programs within the Tulsa Professional Improvement Group as the study population allowed for easy traveling to each of the selected Agricultural Education facilities.

For the data collection instrument, an itemized list of standards was developed from a detailed review of the literature and from input from the State and District staff of

the Agricultural Education Division of the Oklahoma Department of Vocational and Technical Education. Items including those relative to safety in Agricultural Education Programs addressed demographics, documentation of safety instruction, safety instruction, availability of first-aid, administrative procedures, accepted facility safety standards and suggested improvements in facilities and equipment as well as some aspects of the available safety curriculum. The researcher personally visited each facility and interviewed each teacher to gather data.

The population included 24 Agricultural Education programs and the 33 teachers staffing them in the Tulsa Professional Improvement Group. Proximity, time, funding, support of the Agricultural Education District Supervisor, and the study methodology were the main reasons for selecting this group.

Section 1 of the instrument was designed to gather demographical data about the Agricultural Education teachers and the facilities. Data were gathered to determine teacher experience, education, and gender as well as identifying the facility type, size and age. Sections II through III were developed to determine administrative procedures, documentation, instructional methodologies and the availability of first aid.

Facility safety standard data were assembled in Section IV and widely accepted standards from business and industry as well as educational sources were employed. This section included topics concerning the general physical conditions, housekeeping, equipment safety, electrical installation, personal protection and fire protection.

The last section utilized two open-ended questions to gather teacher opinions as to the safety curriculum materials, equipment and facilities available to teachers. These

two questions were not only used to gather information but also to lend a sense of credibility to the study.

The researcher visited and collected data during the months of March and April of 1996. A total of 24, 100 percent, of the Agricultural Education Programs were visited and each teacher in these programs (a total of 33), cooperated in the study. The data were coded and entered into Excel version 5.0 on an IBM compatible computer. Since a selected total population was utilized, descriptive statistics were employed to explain the findings. These involved frequencies, distributions and percentages.

Major Findings of the Study

Demographic Information. The population in this study was comprised of the 24 Agricultural Education Programs in the Tulsa Program Improvement Group of the Agricultural Education Division of the Oklahoma Department of Vocational and Technical Education and the 33 Agricultural Education teachers who were responsible for the programs.

A summary of the findings as to selected teacher demographics is presented in Figure 1. Inspection of the years of experience data indicates that almost one-fourth of the teachers have less than 5 years of experience, and that just over 15 percent have between 6 and 10 years of experience. As depicted in this figure similar percentages of teaching experience are represented in each of the categories 6 - 10, 11 - 15, 16 - 20 and 21 -25. However, the percentage abruptly drops in the 25 and above experience range.

A comparison of data concerning hours of safety courses teachers had completed is also shown in Figure 1. This reveals that 6.06 percent of the teachers had 3 hours or less of agricultural mechanics or safety specific college level courses and that just over 15 percent had taken 4 to 6 hours. Also shown is that 24.24 percent had completed 7 - 9 hours of classes. By way of a combined comparison, 45.45 percent of the teachers had 9 or less hours of college level agricultural mechanics or safety specific courses.

The types of teacher safety education and training completed by teachers are also presented in Figure 1. As can be seen, the majority of the teachers rely most heavily upon safety specific training from the Professional Improvement Group educational programs as indicated by the 63.63 percent of the teachers who have received safety training from this system. Furthermore, Business and Industry Training was completed by just over 30 percent of the teachers, safety specific college courses by 21.21 percent and chemical handling training by 27.27 percent. Figure 1 also contains a graphic of the gender of these teachers. As can be determined, 32 teachers, 96.97 percent, were male and only one or 3.03 percent was female.

Figure 2 is a compilation of the program demographics which were investigated. With respect to the number of teachers, the majority of the programs, 70.83 percent, 17, were one teacher while six programs or 25 percent, employed two teachers, and only one program had four teachers.

This graphic also shows the percentages of programs by square footage of instructional laboratory space. As shown, over 50 percent of the facilities have more than 3000 square feet of space. The 1000 - 1999 square footage category included 20.83

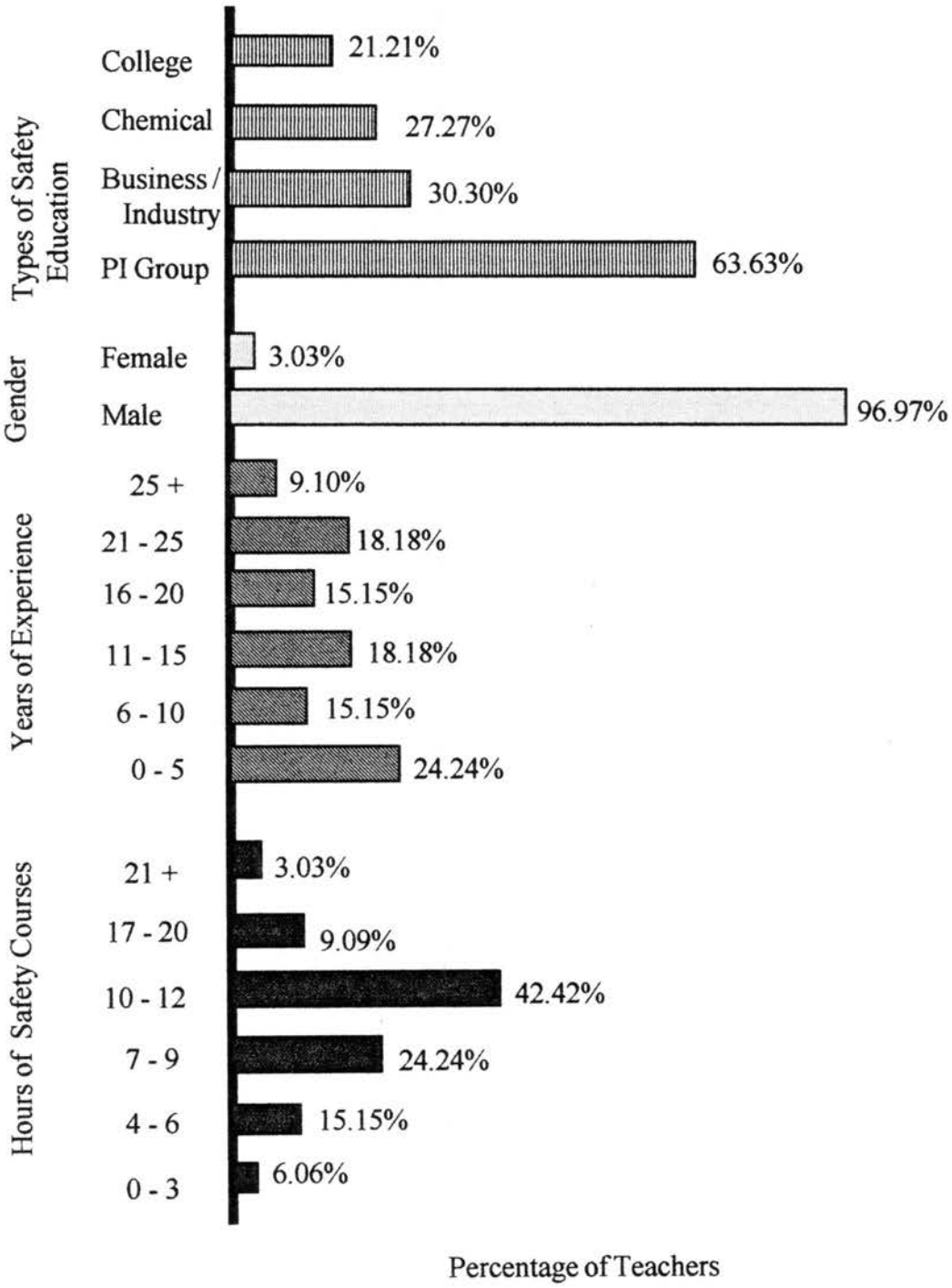

Figure 1. A Summary of Findings as to Selected Demographics of Teachers

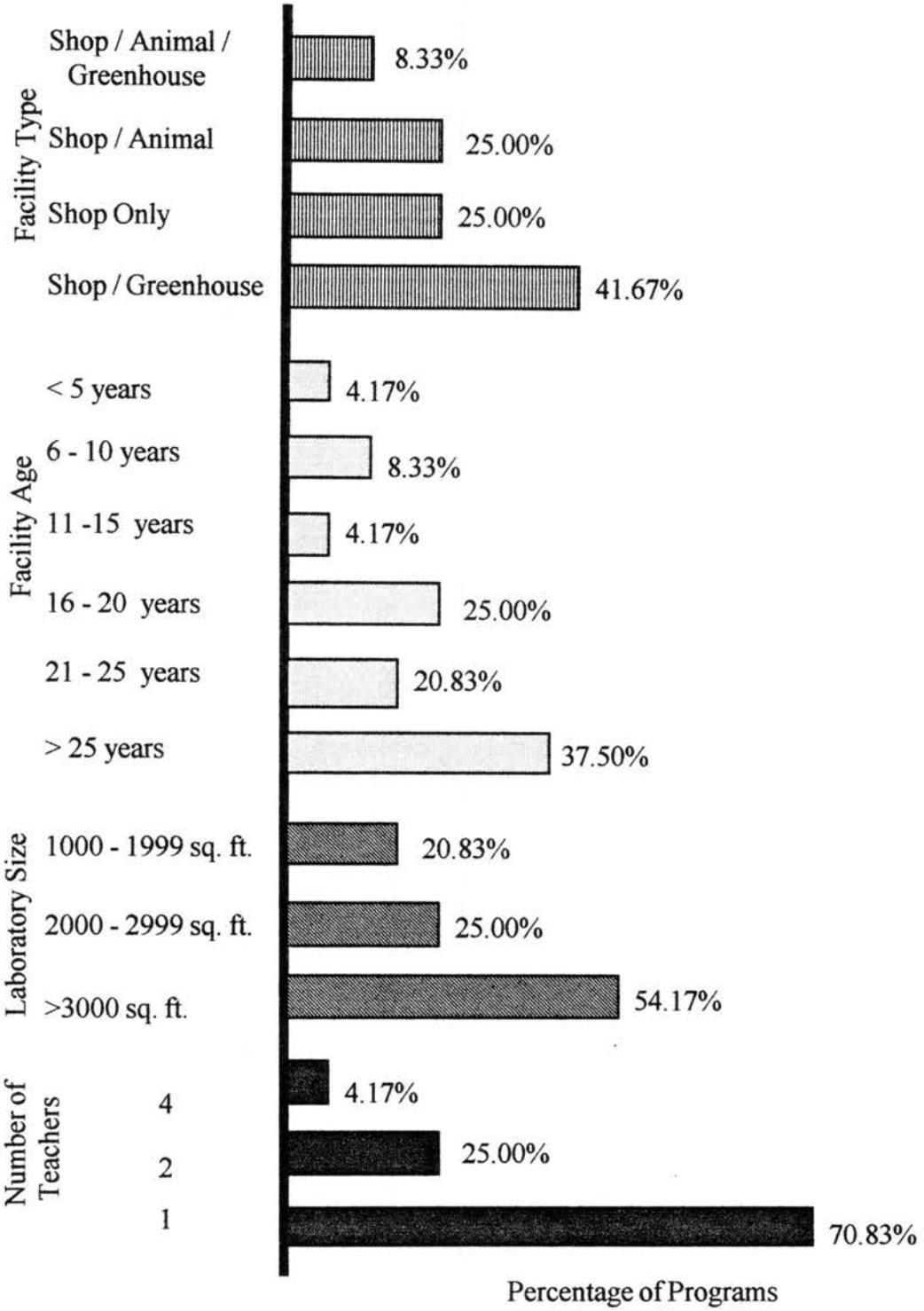

Figure 2. A Summary of Findings as to Numbers of Teachers in each Program, Laboratory Size, Facility Age and Facility Types

percent of the facilities while the 2000 - 2999 square footage category took in the remaining 25 percent. None of the facilities were found to have less than 1000 square feet. The age of the facilities is also presented in this figure. It is rather obvious that the overwhelming majority of programs, more than 84 percent, have facilities which have been in use 16 years or more. This includes 25 percent in the 16 - 20 years of age bracket, 20.83 percent in the 21 - 24 years of age category and 37.50 percent in the group built more than 25 years of ago. This compares to the 12.50 percent of the programs with facilities that are under 10 years of age.

Finally, the types of agricultural education facilities which are utilized within the programs studied are summarized in Figure 2. From these data it was determined that 25 percent of the programs include only a shop facility. Almost 42 percent of the programs utilize a shop and greenhouse combination while only 8.33 percent include a shop, greenhouse and animal facility. The remaining 25 percent have a combination of shop and animal facilities.

Facility Inspections, Safety Plans and Documentation of Safety Instruction. A summary of practices in the programs regarding facility inspections, safety plans and safety instruction documentation is presented in Figure 3. It is gratifying to note that in 100 percent of the programs, the Agricultural Education teachers reported that they oversee the inspection of the facilities and equipment for safety problems. Also shown in Figure 3 is that the Agricultural Education District Supervisor inspects 91.67 percent of the

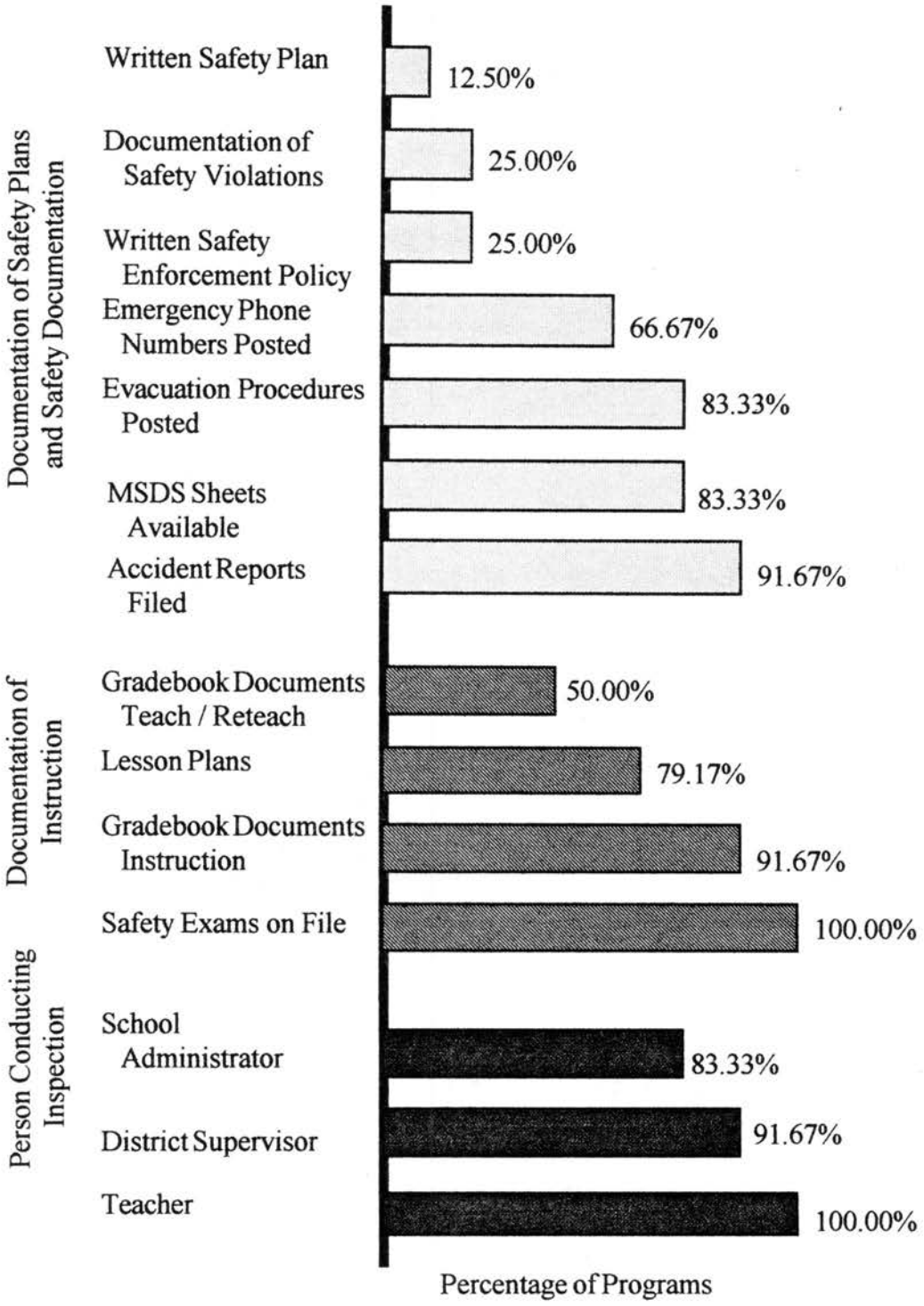

Figure 3. A Summary of Facility Inspection Practices, Safety Plans, and Documentation of Safety Instruction

facilities while the School Administrators examine 83.33 percent of the facilities for safety problems.

This figure also contains a summary of the extent to which selected safety plans and safety documentation were utilized in programs. As can be seen, the data depict that written safety plans are utilized in 12.50 percent of the programs, and written safety enforcement policies, as well as, documentation of safety violations are used in 25 percent of the programs. The posting of emergency phone numbers, although a minor indication of the overall safety program, is practiced in 66.67 percent of the programs, and the posting of evacuation procedures and providing Material Safety Data Sheets were each practiced in 83.33 percent of the programs. The filing of accident reports was done in 91.67 percent of the programs.

The procedures for documentation of safety instruction and instructional methods are addressed as another item in Figure 3. All of the programs, 100 percent, kept student safety exams on file while 91.67 percent utilized the teacher gradebook as a method of documenting safety instruction. One half, 50 percent, of the programs employed the gradebook to document the teach / reteach method for students that did not initially master the material to the 100% criteria. Furthermore, lesson plans were used to document safety instruction in 79.17 percent of the programs.

Safety Instructional Methods, Safety Topics and Instructional Requirements. Figure 4 is a graphic intended as a summary of the types of safety instructional methods, safety topics covered and the instructional requirements in the agricultural education programs.

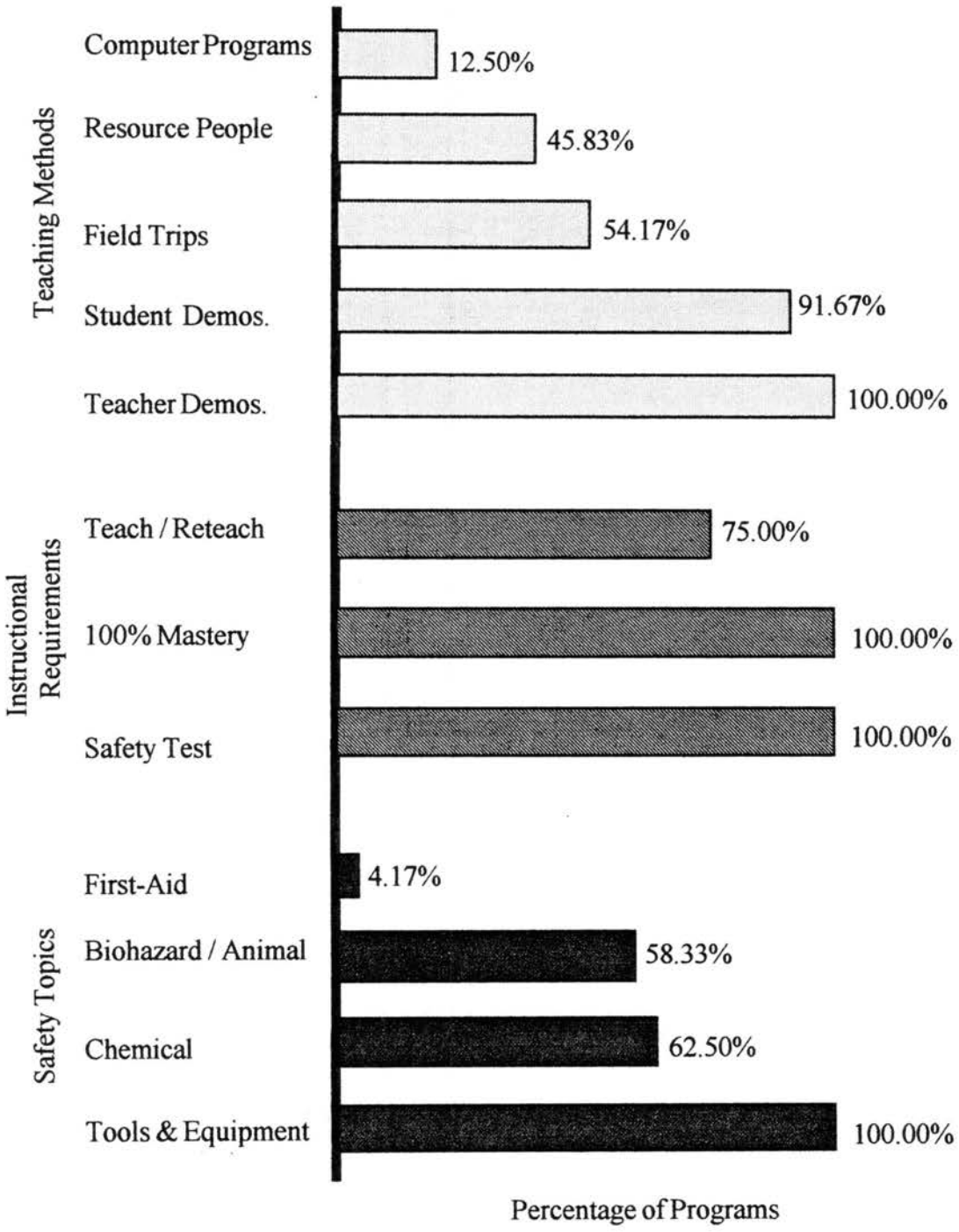

Figure 4. A Summary of Findings as to Safety Topics, Instructional Requirements and Safety Teaching Methods

All programs, 100 percent, presented material concerning tool and equipment safety. Biohazard / animal safety materials were presented in 58.33 percent of the programs, while chemical safety materials were addressed in 62.50 percent of the programs. First-aid instruction was given in only 4.17 percent of the programs.

Figure 4 also displays the minimum requirements within the safety educational programs. It is easily seen that safety tests and a minimum of 100 percent mastery are required in all of the programs. Furthermore, 75 percent of the programs have an established teach / reteach procedure.

A summary of methodologies utilized to teach safety is also exhibited. Computer safety programs were utilized in only 12.50 percent of the programs, while resource people participated in 45.83 percent of the programs and field trips in 54.17 percent of the programs to emphasize the importance of safety. Further analysis shows that student demonstrations were employed in 91.67 percent of the programs while 100 percent utilized teacher demonstrations.

Facility and Housekeeping Standards. Figure 5 is intended as a summary of the distribution of programs by selected facility and housekeeping safety standards. All facilities, 100 percent, met the standards of having all drive mechanisms guarded, sufficient lighting and of having at least 2 exits; while in 70.83 percent of the programs, exits were properly identified with exit signs. Equipment was arranged for safety in 95.83 percent of the facilities and 91.67 percent of the facilities had adequate ventilation.

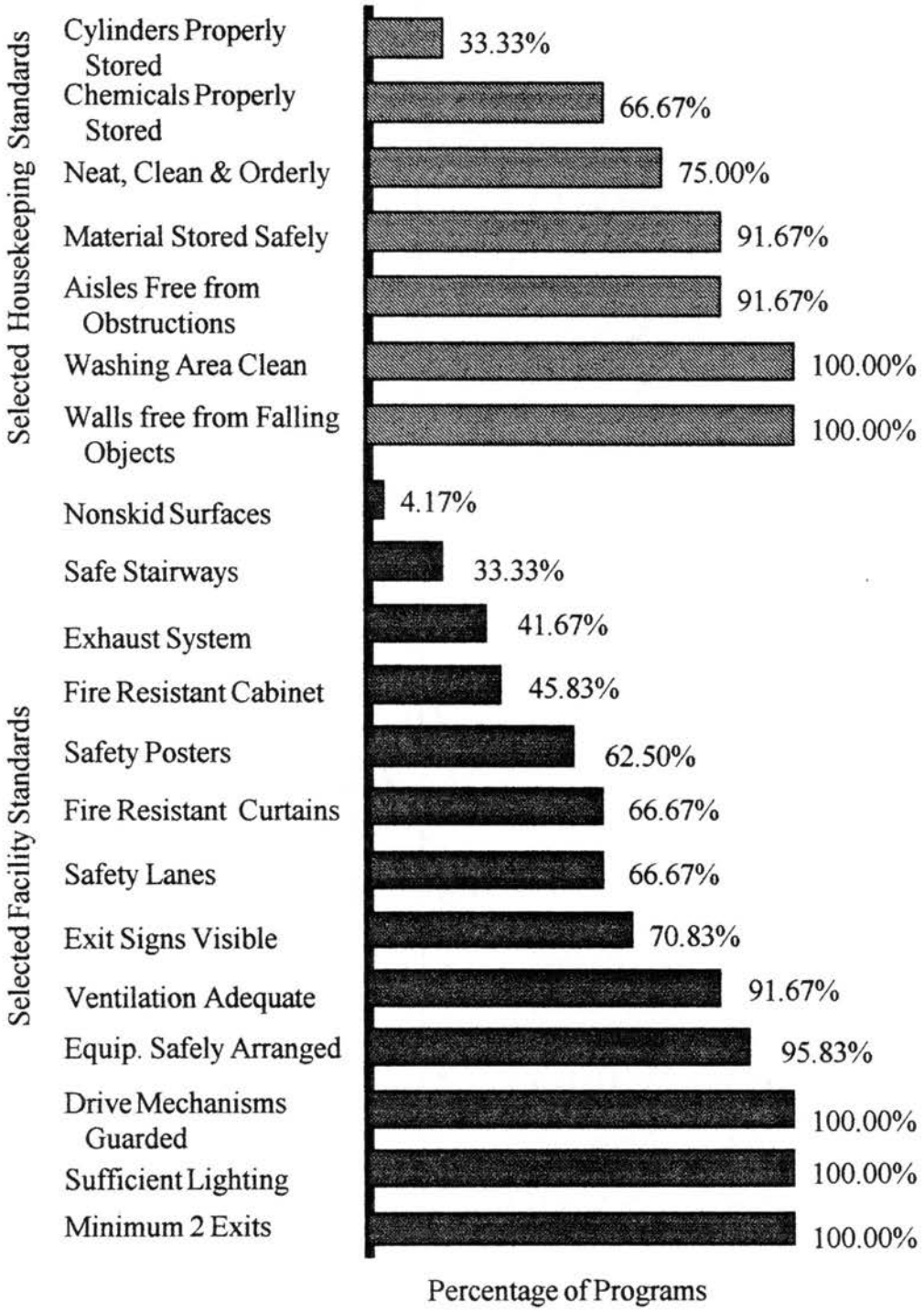

Figure 5. A Summary of Extent of Compliance with Selected Facility and Housekeeping Standards

Close inspection of Figure 5 reveals that fire resistant cabinets were found in 45.83 percent of the facilities, exhaust systems for the removal of noxious welding fumes were identified as adequate in 41.67 percent and safe stairways to overhead storage were adequate in only 33.33% of the programs. Furthermore, 66.67 percent of the facilities utilized fire resistant curtains to reduce welding flash problems, safety posters were encountered in 63.50 percent of the facilities and 66.67 percent utilized safety lanes to identify safe or work zones. The use of nonskid surfaces around power tools and equipment was found in only 4.17 percent of the facilities.

A summary of the extent to which programs meet selected housekeeping standards in agricultural education programs is also presented in Figure 5. One hundred percent of the programs satisfied the standard concerning the maintenance of washing and cleanup facilities as well as the standard dealing with having walls free from possible falling objects. The safe storage of wood and metal safely and having aisles and walkways free from obstruction were fulfilled in 91.67 percent of the facilities while the criteria concerning neatness, cleanliness, and being orderly and sanitary was met in 75 percent of the facilities. The proper storage of chemicals was found to be in compliance in 66.67 percent of the facilities. Further review reveals that the proper storage of oxyfuel cylinders, in an upright position, with bump caps in place, separated by 50 feet and secured solidly took place in only 33.33 percent of the facilities.

Facility Equipment and Personal Protective Equipment Standards. A summarization of compliance with selected tool and equipment and personal protective equipment

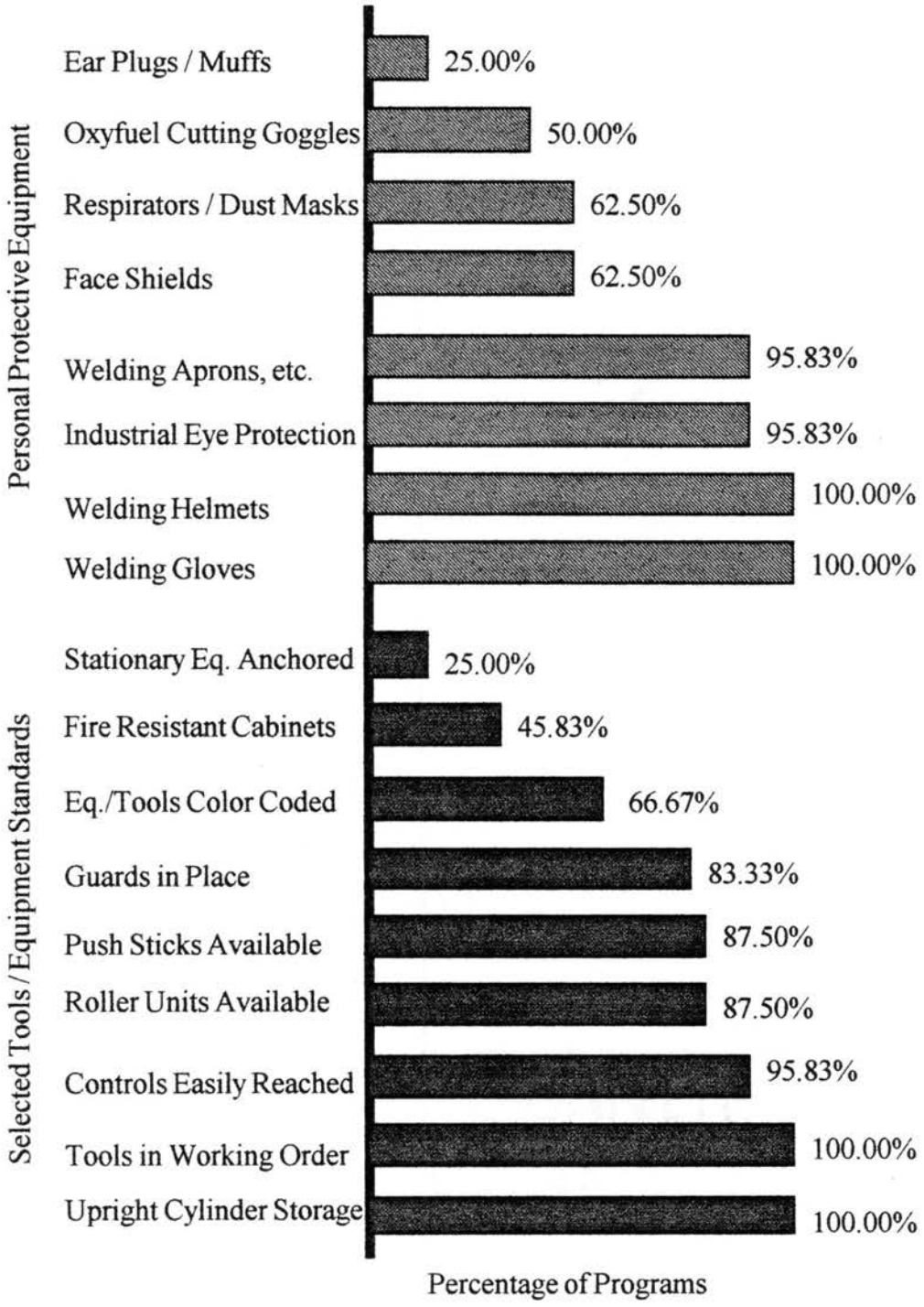

Figure 6. A Summary of Use and Availability of Selected Facility Equipment and Personal Protective Equipment

standards that are considered necessary in safe Agricultural Education facilities is represented in Figure 6. Regarding tools and equipment, upright cylinder storage, as well as the proper working order of all tools and equipment were found to be met in 100 percent of the facilities. Equipment controls were within easy reach in 95.83 percent of the programs. Further review indicated that 87.50 percent of the programs had saw push sticks or blocks available and roller units were available for to hold and move heavy or awkward lumber and metal. Equipment with guards and kickback devices properly mounted and in place were found in 83.33 percent of the facilities while 66.67 percent compliance was indicated with tool and equipment color coding. Only 45.83 percent of the programs had fire resistant cabinets for use when storing chemicals, fuels and solvents. Furthermore, a mere 25 percent of the programs had stationary tools and equipment properly anchored.

A graphic of the availability of personal protective equipment found in Agricultural Education facilities is also contained in Figure 6. Inspection establishes that welding helmets and goggles, as well as welding gloves, were available in 100 percent of the facilities while industrial quality eye protection and welding aprons, jackets or other protective clothing were accessible in 95.83 percent of the facilities. Furthermore the availability of oxyfuel cutting goggles was found in only 50 percent of the facilities, while 62.50 percent had dust masks or respirators and face shields that were in functional working condition. Merely 29.17 percent of the facilities were found to met the requirement of utilizing ear plugs or ear muffs.

First-Aid Resources, Electrical Protection and Fire Protection. Presented in Figure 7 is a graphical representation of the availability of selected first-aid resources, fire protection supplies and equipment as well as electrical and fire protection standards in Agricultural Education facilities.

Inspection of Figure 7 reveals that none of the programs meet all of the selected first-aid resource standards. First-aid supplies were found to be readily available in 95.83 percent of the programs while an operating eye wash was found in 87.50 percent of the program facilities. The majority of the programs, 79.17 percent, had teachers who were certified in first-aid while 75 percent of the schools had a first-aid certified person other than the Agricultural Education teachers readily available to the facility in the event of an emergency, while only 12.50 percent of the programs had emergency showers available and operational.

Furthermore, this figure contains data which show that almost all facilities, 95.8 percent, had a maximum distance to a fire extinguisher of less than 75 feet. Further review showed that fire extinguishers were distinctly and properly marked and fire blankets were available in 91.67 percent of the facilities. The availability of covered combustible waste containers and safety cans for flammable liquids were identified in 62.50 percent of the facilities while a fire alarm capable of being armed within the facilities was found in only 20.83 percent of the facilities.

This figure also displays a summation of selected fire safety protection standards. Power equipment was properly grounded in 100 percent of the facilities and 95.83 percent of the programs utilized extension cords that were UL approved. Electrical

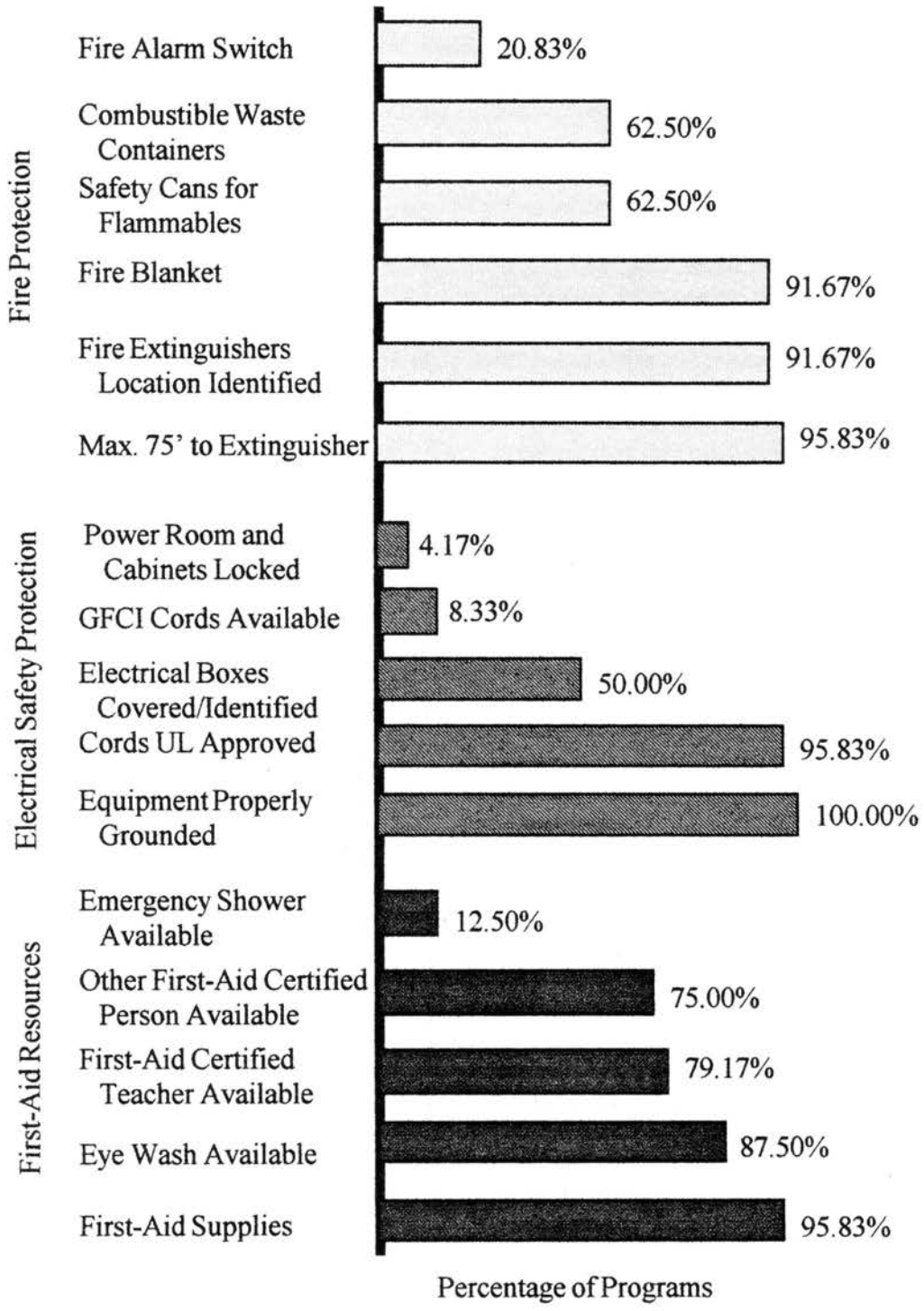

Figure 7. A Summary of Availability of First-Aid Resources, Electrical and Fire Protection

boxes were covered and circuits were properly identified in one half of the facilities while only 8.33 percent of the facilities had Ground Fault Circuit Interrupter cords available for application in a greenhouse or for outdoors. Furthermore, only 4.17 percent of the facilities contained electrical service boxes in a designated power room with the ability to securely lock or secure the switches and breakers.

Teachers Opinions as to Needed Changes in Curriculum and Facilities and Equipment. The opinions, suggestions and feelings provided by the Agricultural Education teachers (respondents) on the open-ended portions of the instrument generally focused upon the improvement and modernization of the safety curriculum materials available to them and the modernization of facilities and equipment.

The need to modernize and develop more detail within the safety curriculum materials were the major points addressed by the respondents. The teachers opinions fell within four broad areas including: (1) the need for the safety material to have more detail; (2) the need for more supplemental materials such as video, texts, slides, etc.; (3) the needs for the safety material to cover modern tools and equipment; and , (4) the need for very specific safety tests within the safety units.

An important aspect identified within the responses was the need to make additions to the general content of the safety curriculum. Some of the suggested additions to the safety curriculum included horticultural safety units, first-aid information, electrical safety units and safety contracts.

The teacher opinions concerning the desired changes to the facility and equipment generally fell into the area of needing money for the modernization of tools and equipment. The vast majority of the teacher responses indicated a great need for tool and equipment upgrades to meet current instructional needs. Some teachers indicated that a need exists for a greenhouse for the instructional diversification of the programs and others identified a need for funds to make repairs and to compete general maintenance within the facility.

Researcher Observations and Reflections. During each site visit, the researcher noted personal observations and opinions about the facility and the tools and equipment within the facility. Based upon these reflections the researcher noted that the facilities were generally kept in order, were obviously somewhat old but were well maintained. In retrospect the tools and equipment were basic to teach general welding principles but were inadequate to teach the broad scope involved in agricultural mechanics. The majority of the programs had a greenhouse that was well kept and utilized well and in some cases there was a need for a greenhouse to diversify the instructional program.

In the researcher's opinion much of the equipment was outdated and a definite need exists to modernize most of the facilities. This modernization is needed not only in the welding tools and equipment area but also in the small engines, electricity and wood working areas. The researcher also recognized a definite need for the safety curriculum materials to be reviewed in a detailed manner with large amounts of input from Agricultural Education teachers.

Conclusions

Examination and analysis of the major findings resulted in the following conclusions:

(1) Teachers in the Tulsa Agricultural Education Improvement Group are primarily located in single teacher programs and are relatively young, and for the most part were early in their teaching careers. Furthermore, the teachers had rather limited formal mechanical and safety training. Training primarily was obtained "in house" through Professional Improvement Group inservice activities although some have utilized programs from business and industry, as well as other sources.

(2) Facilities for programs varied, being of moderate size and somewhat aged. Instructional offerings within the programs were somewhat limited by the age, size and availability of facilities. In many cases there was a relationship between facility characteristics and safety practices, procedures and compliance.

(3) As indicated by inspection practices, local teachers and administrators and the Agricultural Education District Supervisor closely monitor the safety program through regular facility inspections.

(4) For the most part, the programs studied were in conformity with accepted safety administrative procedures with regard to testing, posting information and documenting student knowledge of safety. However, there are areas of concern regarding use of written safety enforcement policies, written safety plans, documentation of student safety violations and documentation of teaching / reteaching of safety topics.

(5) Instruction relating to tools and equipment safety is receiving the greatest amount of emphasis in these programs by means of demonstrations and classroom teaching. Resource people, field trips and computer aids are largely overlooked as methods of safety instruction. Biohazard, animal and chemical safety are taught to a much lesser degree and first-aid instruction is inadequate.

(6) For the most part, programs meet most of the selected standards regarding the availability of first-aid.

(7) The standards concerning the general physical conditions of facilities are met in only a few areas. Minor problems exist in areas such as providing exit signs, safety posters, safety lanes and the use of fire resistant curtains. Serious shortfalls exist in the availability of fire resistant cabinets, exhaust systems and proper stairways.

(8) The most basic housekeeping standards were adequately met. However, there are deficiencies with regard to storage of chemicals and oxyfuel cylinders and provision of non-skid walking surfaces which should be addressed immediately.

(9) Programs are meeting the selected equipment standards, with notable exceptions being anchoring and color-coding stationary tools and equipment and use of fire-resistant cabinets.

(10) There is insufficient compliance with electrical safety standards associated with covered outlets and switches, locked electrical cabinets or power rooms and ground Fault Circuit Interrupters for use in green houses, animal facilities and outdoors.

(11) There are some major shortcomings in meeting selected standards relative to personal protection equipment. In many of the programs there is need for face shields,

dust masks, respirators and oxyfuel cutting goggles. Equipment for protection from noise is almost universally lacking.

(12) Adherence to fire protection standards is generally appropriate, with deficiencies existing in providing safety cans for flammable, covered waste containers and fire alarms within the facility.

(13) Teachers are utilizing safety curriculum materials available to them as well as supplementing these materials with outside materials.

(14) Teachers perceive that their tools, equipment and facilities are inadequate and additional funds are needed to make improvements.

(15) Overall, teachers in these programs are cognizant of the importance of safety education and are attempting to provide safe environments for their students. However, there are a substantial number of concerns and conditions which need to be addressed quickly.

Recommendations

The following recommendations were made as a result of the major findings of this study:

(1) It is recommended that the Agricultural Education Division of the Oklahoma Department of Vocational and Technical Education continue offering safety training and technical updates on tools and equipment safety, repairs and maintenance. Instruction on chemical safety and biohazards / animal safety is lacking and it is highly recommended

that immediate training programs be developed to meet these needs. It would be advantageous to develop such programs in cooperation with Business and Industry, as well as, Oklahoma State University to provide diversified opportunities within these areas.

(2) Development of a safety specific college level course as a requirement for graduation with an Agricultural Education teaching option degree would heighten the sensitivity and skill levels in safety of new teachers entering the profession. Among the topics covered should be first-aid, chemical, biohazard / animal, tools and equipment, electrical, air quality and noise safety, as well as, teaching methodologies, safety documentation and legal aspects of safety education.

(3) It is recommended that a detailed list of expectations regarding safety policies, practices and procedures be developed and made available to the Agricultural Education teachers and School Administrators. Furthermore, guidelines need be developed to explain the roles of Administrators, District Supervisors and Agricultural Education teacher roles in safety education, facility inspections and expectations.

(4) It is recommended that Agricultural Education Division Supervisory Staff develop a written safety plan and detailed documentation system for utilization state wide in order to properly manage the safety program.

(5) It is apparent that the safety curriculum materials must be modernized and updated. This modernization needs to incorporate a more detailed approach to safety and include units on biohazards, animal safety, chemical safety, air quality, noise safety, electrical safety, first-aid and tool and equipment safety. Furthermore instructional aids

in the form of computer-aided instruction, safety posters, safety rules and an emphasis on safety specific field trips, video programs and resource people needs to be included. Teachers should be involved in every phase of the curriculum revision process.

(6) It is recommended that all teachers be first-aid certified as part of the Agricultural Education Division Professional Improvement Groups updates or as a part of the preparation for undergraduates within the Agricultural Education teaching option.

(7) Considering the study's findings it is imperative that additional funding be targeted at tool, equipment and facility modernization and that special emphasis be placed upon identifying and removing dangerous tools and equipment from facilities. Furthermore, emphasis needs to be placed upon providing personal protective equipment, fire protection and tools and equipment maintenance.

Recommendations for Further Research

Further research concerning safety education practices, procedures and compliance as a means of providing improvement of the education and environment of agricultural education students should be addressed in the following areas:

(1) It would be beneficial to conduct a study of Agricultural Education teachers to compare safety knowledge and type and scope of educational training, in order to develop specific guidelines for future teacher training and undergraduate degree requirements.

(2) Additional study should be directed at the District Supervisor's and School Administrator's role in safety, at the program level.

(3) Additional study should be directed at determining where limited funding should be spent to increase efficiency at the programmatic level.

(4) Additional study should be directed at identifying funding sources for the modernization of tools, equipment and facilities.

(5) Additional study should be directed to validate safety standards.

(6) Additional study should be directed at replicating this study across the state of Oklahoma as well as in other states.

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APPENDICES

APPENDIX A

COVER LETTER

March 2, 1996

Doug Ullrich
Oklahoma State University
AgEd., Comm. & 4-H Youth Development
441 Ag Hall
Stillwater, OK 74078
(405)744-6930

[ ]
[ ]
[ ]
[ ]

Dear [ ]:

The Department of Agricultural Education, Communications and 4-H Youth Development at Oklahoma State University and the Agricultural Education Division of the Oklahoma Department of Vocational and Technical Education are in the process of conducting a study to determine the methods and procedures used by agricultural education teachers when teaching safety. Also included in this study is a facility standards review similar to the Safety Checklist used by the district supervisors.

Your department is one of the primary programs selected for participation in this study. The Tulsa Professional Improvement District schools were selected because of diversity, quality and location. The findings will be treated with great **confidentiality** and will not be reported by individual schools. Individual results will be known only to the researcher and the research results **will not** be used for program evaluation by the District Supervisor.

Our goal is to provide a basis for making changes in the Oklahoma State University Agricultural Education Teacher Preparation Program and for making recommendations for inservice training.

We will be contacting each teacher in the Tulsa PI District to arrange for site visits during the next seven weeks.

Thank you in advance for your support and involvement in this important project.

Sincerely,

Doug Ullrich Graduate Student	Dr. Robert Terry Professor	Dr. Ben Shaw Ag. Education Specialist

APPENDIX B

SURVEY INSTRUMENT

code: _____

I. Demographical Information

Teacher Demographics

complete one for each teacher

Teacher Demographics		
1. Number of teachers in department		
2. Gender Male Female		
3. Years of teaching experience at secondary level		
4. Agricultural mechanization semester credits completed		

Teacher Safety Education	YES	NO
2. Chemical Handling Certified		
3. Safety course in college?		
4. Safety short course from industry?		
5. PI teacher training		

Facility Demographics

Facility Demographics	
Size of laboratory	**check one**
1. < 1000 sq. ft.	
2. 1000 - 1999 sq. ft.	
3. 2000 - 3000 sq. ft.	
4. > 3000 sq. ft.	
Age of facility	
1. < 5 years	
2. 5-10 years	
3. 11- 14 years	
4. 15 - 20 years	
5. 21 - 25 years	
6. 25 + years	
Facility Type	
1. Shop only	
2. Shop & Greenhouse	
3. Shop & Animal Facility	
4. Shop, Greenhouse & Animal Facility	

II. Administrative Procedues	Yes	No	N/A	Comments
1. Teacher inspects the facility and equipment for safety problems.				
2. Administrator inspects facility and equipment for safety problems.				
3. District Supervisor inspects facility and equipment for safety problems.				
4. There is a written safety plan for the AGED program.				
5. Program has a written enforcement policy for safety violations.				
6. Safety violation enforcement or discipline plan is documented.				
7. Safety contracts signed by the teacher, student and parent are utilized.				
8. Accident reports are filed and problem corrections documented.				
9. "Material Safety Data Sheets" are posted or otherwise available.				
10. Evacuation procedures posted in the laboratory.				
11. Emergency phone numbers are posted.				
III. Documentation of Safety Instruction	**Yes**	**No**	**N/A**	**Comments**
1. Students' safety exams are kept on file.				
2. Lesson plans document safety instruction.				
3. Grade book documents safety instruction.				
4. Grade book documents teach / reteach instruction.				

IV. Safety Instruction	Yes	No	N/A	Comments
1. Students are presented material on tools and equipment safety.				
2. Students are presented material on biohazard and animal safety				
3. Students receive instruction on greenhouse and chemical safety.				
4. Safety test(s) given to each student prior to laboratory access.				
5. Students must pass safety exam to 100% Mastery.				
6. A teach / reteach procedure is established and documented.				
7. Teacher conducts hand and power tool safety demonstrations.				
8. Students demonstrate safe use of hand and power tools.				
9. Field Trips are used to emphasize safety in business and industry.				
10. Resource people are utilized to emphasize safety and / or first aid.				
11. Computer Safety Programs Utilized				
12. Students receive first-aid instruction				
IV. Availability of First Aid	**Yes**	**No**	**N/A**	**Comments**
1. Each instructor has received first-aid training.				
2. Certified person(s) available to render first aid.				
3. First aid supplies are available and appropriate.				
4. Eye wash is available and working properly.				
5. Emergency shower easily accessible and functional.				

VI. Facility Safety Standards				
A. General Physical Condition	**Yes**	**No**	**N/A**	**Comments**
1. Safety lanes provided around stationary tools				
2. Safety posters are in shop area				
3. Laboratory has at least two exists.				
4. Exit signs visible and directional signs provided if necessary.				
5. Total laboratory ventilation proper and adequate.				
6. Laboratory lighting safe, sufficient, and well-placed.				
7. Fire resistant cabinet used to store flammable liquids.				
8. Drive mechanisms protected by permanent guards.				
9. Fire resistant curtains or shields used around welding areas.				
10. Smoke and dust exhaust hood system utilized.				
11 Stairways are in good and safe condition.				
12. Equipment is arranged for safety.				
B. Housekeeping	**Yes**	**No**	**N/A**	**Comments**
1. Laboratory appearance neat, orderly, clean and sanitary.				
2. Aisles, passageways, and corridors free of obstructions.				
3. Nonskid floor surfaces provided at stationary tools.				
4. Walls and storage areas clear of objects that might fall				
5. Stored wood and metal stacked safely and solidly.				
6. Chemicals are stored in proper cabinets.				
7. Washing and cleanup facilities properly maintained.				
8. Oxyfuel cylinders stored seperately 50' apart.				

C. Equipment	Yes	NO	N/A	Comments
1. Stationary power tools anchored to the floor.				
2. Stationary power and non-powered tools color coded.				
3. Electrical control switches on stationary power tools within easy reach.				
4. Proper kick back divices and guards used to protect users.				
5. Roller units or stands available to assist in moving materials.				
6. Push sticks or blocks available.				
7. Tools kept sharp, clean and in good working order.				
8. Portable power tools and equipment properly stored when not in use.				
9. Upright oxyful cylinder storage available.				
D. Electrical Protection	**Yes**	**No**	**N/A**	**Comments**
1. Electrical cabinets and power room locked.				
2. Electrical boxes and switches properly covered and identified				
3. Stationary power tools and equipment properly grounded.				
4. G.F.C.I. available for outdoor use.				
5. Extension cords are UL approved and proper for loads required.				

E. Personal Protection	Yes	No	N/A	Comments
1. Industrial quality eye protection provided and properly stored.				
2. Face shields provided at each stationary power tool.				
3. Ear plugs and / or muffs are available.				
4. Welding Gloves are available.				
5. Welding aprons, jackets, shop coats or overalls are available.				
6. Respirators and / or dust masks proper and available.				
7. Arc welding helmets and welding goggles in proper condition.				
8. Oxyfuel cutting goggles are provided				
F. Fire protection	**Yes**	**No**	**N/A**	**Comments**
1. Fire alarm provided.				
2. Fire extinguisher locations poperly marked.				
3. Maximum distance to fire extinguisher 75 feet and easily accessible.				
4. Fire extinguishers of proper type, tested yearly and properly documented.				
5. Fire blanket(s) readily available.				
6. Safety cans used for flammable or combustible liquids.				
7. Combustible wastes kept in covered metal containers				

VII. Suggested Improvements

Comments to the following questions:

What would you change about the safety curriculum?

What would you change about the facitlity and equipment?

Researcher observations and reflections on the facility and equipment.

APPENDIX C

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 03-01-96 **IRB#:** AG-96-017

Proposal Title: SAFETY PROCEDURES, EDUCATION AND STANDARDS IN SELECTED AGRICULTURAL EDUCATION PROGRAMS IN OKLAHOMA

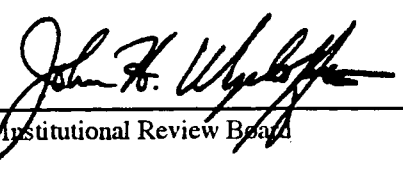
Principal Investigator(s): Robert Terry, Doug Ullrich, Jr.

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature:  Date: March 14, 1996

Chair of Institutional Review Board

VITA

Doug R. Ullrich, Jr.

Candidate for the Degree of

Doctor of Education

Thesis: SAFETY PROCEDURES, EDUCATION AND STANDARDS IN SELECTED OKLAHOMA AGRICULTURAL EDUCATION PROGRAMS

Major Field: Agricultural Education

Area of Specialization: Educational Administration

Biographical:

Personal Data: Born in LaGrange, Texas, August 18, 1964, the son of Douglas R. Sr. and Sedalia Ullrich. Married Johanna Gwendolyn Gorman December 19, 1985. Daughters - Samantha Jordan Ullrich, born March 16, 1989 and Alexandra Paige Ullrich, born October 25, 1992.

Education: Graduated from Round Top-Carmine High School, Carmine, Texas, June 1982; attended Blinn College, Brenham, Texas until May 1984 and transferred; received Bachelor of Science Degree in Agricultural Education from Texas A & M University, College Station, Texas, May 1986; received Masters of Science in Agricultural Education from Texas A & M University, College Station, Texas, June 1990; Completed the requirements for the Doctor of Education degree in Agricultural Education at Oklahoma State University, Stillwater Oklahoma, July 1996.

Professional Experience: Ullrich Ranches, assistant manager, Burton, Texas, until 1986; Socorro ISD AgriScience & Agricultural Mechanics teacher, 1986 - 1987; Goliad ISD AgriScience teacher, 1987 - 1989; Columbus ISD AgriScience Teacher, 1989 - 1995; Graduate Teaching Assistant and Instructor, Department of Agricultural Education, Communication and 4-H Youth Development, Oklahoma State University, 1995 to present.