THE STUDY OF THE EFFECTS OF THE ENFORCEMENT OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS ON THE INDUSTRIAL ARTS PROGRAM OF OKLAHOMA PUBLIC SCHOOLS

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PREFACE

The purpose of this study is to determine the effects of the adoption and enforcement of "The Occupational Safety and Health Act of 1970" on the Industrial Arts Program of Oklahoma Public Schools. At the present time, there is no occupational safety and health standards covering state agencies of Oklahoma.

A questionnaire was developed to evaluate the present safety situation and conditions of the Industrial Arts School Shops. The primary question of the questionnaire covered the areas that would be effected by the enforcement of the Occupational Safety and Health Administration rules. Questionnaires were sent to 233 Oklahoma Public School Industrial Arts Teachers.

The author wishes to express his appreciation to his major adviser, Dr. Harold Polk, for his guidance and assistance throughout the study. Appreciation is expressed to Dr. John Tate and Dr. Clyde Knight for their guidance and assistance throughout the study. A note of thanks is given to Mr. J. T. Knorpp, Area Director of the Occupational Safety and Health Administration Office, for his assistance in supplying literature and advice on this study. Appreciation is also expressed to Mr. Harold Windborn for his help by providing information for compiling an accurate mailing list.

Finally, special gratitude is expressed to my wife, Sandrea, for her understanding, encouragement and sacrifices.

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CHAPTER I

INTRODUCTION AND BACKGROUND OF STUDY

The Problem

The purpose of this study is to determine the effects of the adoption and enforcement of "The Occupational Safety and Health Act of 1970" on the Industrial Arts Program of the Oklahoma Public Schools (1).

There are no occupational safety and health standards legally binding on any state agency or other political subdivision entity of the State of Oklahoma at this time (2).

It appears that in the future the State of Oklahoma will have to develop occupational safety and health standards which will be legally binding on all state agencies or other political subdivision entity of the state. Because the public school is an agency, it will comply with the developed standards.

This study was an attempt to evaluate the situation that exists and recommend future actions which will better prepare Industrial Arts departments to meet the adoption of the occupational safety and health standards.

Need for the Study

Some Industrial Arts teachers are not aware of the fact that they will be affected by the enforcement of a state occupational safety and health standard. The questionnaire sent out for this study informed

them of this fact. Not only do they need to know, but the school administrators need to be informed so they can support the Industrial Arts teacher in upgrading his laboratory safety.

Information obtained from this study can be used to inform teachers and administrators of the need for safety and health standards in Oklahoma, even though it will be a costly and time consuming project for state and local administrators.

Definition of Terms

Administrators. Administrators are the Superintendent and Principal of an Oklahoma high school with an Industrial Arts machine woodworking laboratory.

Industrial Arts Teacher. Industrial Arts teacher is an Oklahoma Industrial Arts teacher with a high school machine woodworking laboratory.

Instrument. The Instrument is the questionnaire used to obtain data for the study.

OSHA. OSHA is Occupational Safety and Health Administration.

Safety and Health Standards. Safety and Health Standards consist of rules for avoidance of hazards which have been proven by research and experience to be harmful to personal safety and health which are dictated by OSHA (1).

CHAPTER II

REVIEW OF LITERATURE

Other studies have been made on the effects of OSHA on educational laboratories and equipment. A study by Gordon Gavin (3) of Mankato State College, Mankato, Minnesota, obtained information on the effects of "The Occupational Safety and Health Act of 1970" (1) on educational laboratories and equipment of educational institutions in the Mississippi Valley area.

The following states were involved in the study: Illinois, Texas, Indiana, Kansas, Kentucky, Michigan, Minnesota, Ohio, Oklahoma, Tennessee, and Wisconsin (3). Oklahoma, Texas, and Wisconsin were the only states which did not have a state OSHA program in effect (3).

The respondents were asked to rank nine areas according to their laboratories' compliance with OSHA regulations. The nine areas were electrical; facility markings, i.e. exits, stairs, fire extinguishers, etc.; fire protection equipment; floor covering and markings; general housekeeping; machine and tool guarding; noise control; personal protection equipment; and ventilation (3). The area with the lowest compliance ranking was noise control (3). The rest of the areas were ranked in the following order from the lowest to the highest compliance: floor covering and markings, ventilation, personal protective equipment, facility markings, electrical, general housekeeping, machine guarding, and fire protection equipment (3).

The following conclusions were derived from Gordon Gavin's (3, p. 8) study:

1. The majority of the institutions surveyed are in states that have adopted State Occupational Safety and Health Acts.
2. Very little is being done to enforce OSHA standards in industrial education facilities.
3. The Occupational Safety and Health Act has done little to improve safety in industrial education facilities.
4. Areas that appear to be in need of correction are interruptable switches, aisle and floor markings, non-slip materials, and noise abatement.
5. In most cases, institutions of higher education are not complying with the OSHA.

A study by Franklin J. King (4) on "OSHA Effects on Course Structure and Content" covers the effects OSHA will have on the teacher as well as course structure and content. An educational program for pre- and in-service Industrial Education teachers will have to be developed (4). For industrial educators to provide safe working conditions for their students, they will have to write new objectives and new lesson plans to educate the students on the compliances of "The Occupational Safety and Health Act of 1970" (4). Questions posed by this study were (4, p. 5):

1. Will future court cases considering teacher negligence be significantly changed because of the provisions of the Occupational Safety and Health Act of 1970 even though American laws of negligence have been based on the theory of precedent, previous judicial decisions, or established modes of legal procedures?
2. Because of mandatory compliance and extent of the Act, should new courses on Safety in Industrial Education be developed separate and apart from other offerings?
3. Should certain safety units of instruction be included in technical and professional education courses until all aspects of the Act are covered?
4. Should units be developed cooperatively on an interdisciplinary basis such as between Schools of Engineering, Schools of Technology, and Schools of Education?

Wallace L. Johnston's (5) study "OSHA--What It Is and How to Do It" discussed what OSHA is and how it will be applied. At the

present time 25 states have approved occupational safety and health plans (5). Results of this study indicated that OSHA was applicable in the listed areas (5, p. 10):

1. In private institutions OSHA is in effect. Inspections can be made. Employees may request inspections to correct conditions which management has refused to correct. Fines may be proposed for alleged violations. All civil and criminal penalties are in force.
2. In many states, the OSHA compliance enforcement is conducted by state inspectors. The regulations will be at least as effective as federal enforcement. As an example, under federal OSHA, only the employer may be fined. Under many state plans the employee may be fined for his actions which are in violation of standards.
3. Many state OSHA plans include tax supported entities (state schools, highway maintenance departments) under the inspection and citation provisions. Even in those states without approved OSHA plans the government-owned, privately-operated facilities are subject to OSHA.
4. Construction or renovation done by private contractors are covered until completion, even if the state will assume control of the facility and be outside the OSHA regulations afterwards.
5. OSHA--whether federal or state--covers employees. Teachers, maintenance personnel, custodians, administrators, graduate assistants, student laborers are employees.

Accident Prevention Manual for Shop Teachers edited by William A. Williams (6) covers in detail all aspects of school shop safety. The two primary causes of accidents are poor housekeeping and human factor (6, p. 222). Safety consciousness or mental awareness is the responsibility of the teacher (6, p. 60). Many unsafe shop situations are the result of the lack of the administration's support, but a teacher is still legally and morally liable for injuries caused by any unsafe condition that exists in a school shop (6, p. 245).

"Legal Aspects of a School Shop Safety Program" by Clyde B. Knight (7) indicates that a teacher will be held liable for any student accident occurring in a school laboratory.

CHAPTER III

COLLECTION AND INTERPRETATION OF DATA

Description of the Instrument

To develop an instrument suitable for this investigation, the logical first step was to study pertinent literature in order to determine basic safety rules which would apply to an industrial arts laboratory. When the State of Oklahoma develops their safety and health standards, they will likely use the standards set up by OSHA.

A set of standards to cover general industry (1910), construction (1926), and recordkeeping was obtained from the area OSHA office. After investigating the standards, the area of industrial arts which is affected most by the standards would be the woodworking area. From this evaluation, the questionnaire was developed to evaluate the safety standards of an Industrial Arts Machine Woodworking Laboratory.

The initial questionnaire consisted of 40 questions covering nine areas: first aid, ventilation, personal protection equipment, fire protection, machine guarding, electricity, compressed air, safety color code, and walking surfaces (3).

The initial questionnaire was sent to seven local Industrial Arts teachers for evaluation. The seven teachers critiqued the instrument for clarity, simplicity, duplications, and content.

After receiving the critiqued questionnaires, the original instrument was revised to form a new questionnaire consisting of 39 questions

covering the nine areas. An example is shown in Appendix A, page 24.

Methods of Obtaining Data

A list of the public school Industrial Arts teachers of Oklahoma was obtained from Mr. Harold Winburn, State Supervisor of Industrial Arts Education. This list was checked with the Oklahoma Industrial Arts Association Directory to further insure the compilation of an accurate list.

Two hundred thirty-three Oklahoma Industrial Arts teachers were mailed a questionnaire and a letter to inform the respondent as to the purpose of the study being conducted, its importance, and the directions needed to supply the information being requested. An example is shown in Appendix B, page 28. On the initial mailing to the group, a return of 118 questionnaires were returned representing 52.78 percent of the total.

After a reasonable length of time a follow-up letter was mailed to those persons who had failed to respond. An example is shown in Appendix C, page 30. It was reminded that their help on this study was still needed. Twenty-two additional questionnaires were received after the first reminders were sent. This would give the total of 140 returned questionnaires or 60.08 percent.

Three weeks later a second complete mailing package was sent to those respondents who had failed to reply to the first follow-up letter. An example is shown in Appendix D, page 32. Another nine questionnaires were returned after the third mailing, giving a total of 149 returned questionnaires. The final percent of questionnaires returned was 63.94 percent.

Treatment of Data

As the questionnaires were returned, the results were recorded on a score sheet to indicate the number of questions which were applicable to the individual laboratory and the number which answered YES to OSHA standards. The mean of each questionnaire was determined by the number of questions which were applicable to the individual laboratory divided into the number of questions answered in the YES column. This formula provided a means of ascertaining how well the school laboratories are up to OSHA standards.

$$\text{Mean} = \frac{\text{Number of YES}}{\text{Number of Questions Applicable to Individual Laboratory}} \quad (2.1)$$

Each question was treated in the same manner and the results were grouped in one of the nine areas. For each question, the number of DOES NOT APPLY was subtracted from the total number of usable questionnaires returned. This number was then divided into the number of questionnaires answered with YES. This gave a percentage of the laboratories that were up to OSHA standards for that question. The ranking of each individual question is shown in Table I, page 9.

$$\text{Mean} = \frac{\text{Number of YES}}{\text{Number of Returned Questionnaires - Number of Does Not Apply}} \quad (2.2)$$

The results of each question were grouped in one of nine different areas. The nine areas are first aid, ventilation, personal protection equipment, fire protection, machine guarding, electricity, compressed air, safety color code, and walking surfaces (3). To evaluate the nine

TABLE I

RESPONSES AND MEAN OF EACH QUESTION

Question Number	YES Replies	NO Replies	Does Not Apply Replies	Mean
1	112	33	0	77.24
2	79	65	1	54.86
3	34	111	0	23.44
4	94	48	3	66.19
5	130	15	0	89.65
6	130	14	1	90.27
7	99	44	2	69.23
8	127	15	3	89.43
9	57	63	25	47.50
10	117	25	1	81.25
11	110	33	2	76.92
12	38	29	78	56.71
13	55	42	48	56.70
14	87	25	31	76.31
15	93	22	30	80.86
16	76	69	0	52.41
17	108	37	0	74.48
18	81	64	0	55.86
19	87	54	4	61.70
20	27	27	92	50.94
21	26	101	18	20.47
22	24	116	5	17.14
23	21	122	1	14.58
24	40	92	13	30.30
25	18	115	12	13.53
26	106	32	7	76.81
27	65	71	9	47.79
28	128	14	3	90.14
29	46	53	46	46.46
30	116	18	11	86.56
31	46	88	11	34.32
32	65	79	1	49.13
33	92	51	2	46.33
34	68	75	2	47.55
35	57	58	30	49.56
36	75	75	35	68.16
37	95	21	25	81.89
38	95	28	22	77.23
39	116	26	3	81.67

different areas, the area means were calculated by finding the mean of the questions making up each area. The evaluation of the areas is shown in Table II, page 11.

TABLE II

ANALYSIS OF QUESTION AND AREA MEANS

Areas	Questions in Each Area	Question Mean	Area Mean of Yes Answers
First Aid	1 - Medical supplies	77.2	66.0
	2 - Plan of action	54.8	
Ventilation	3 - Sawdust ventilation	23.4	44.8
	4 - Finish room ventilation	66.2	
Personal Protection	5 - Eye protection	89.6	89.6
Fire Protection	6 - Woodworking area fire extinguishers	90.3	82.9
	7 - Finishing area fire extinguishers	69.2	
	8 - Inspection of fire extinguishers	89.4	
Electricity	11 - Do portable power tools have pressure switches	76.9	64.2
	16 - Do fix power tools have locking switches	52.4	
	17 - Do 115 volt wall recepticals have three wire system	74.5	
	18 - Does portable equipment have three wire system	55.9	
	19 - Do extension cords have three wire system	61.7	
Compressed Air	12 - Does air system have an inhose safety valve	56.7	67.6
	13 - Do air nozzles have 30 psi regulation	56.7	
	14 - Does air tank have a spring loaded safety valve	76.3	
	15 - Does air compressor have a pressure gauge	80.9	

TABLE II (CONTINUED)

Areas	Questions in Each Area	Question Mean	Area Mean of Yes Answers
Color Coding	9 - Do fire extinguishers have red background	47.5	24.9
	21 - Are physical hazards yellow color coded	20.5	
	22 - Are dangerous parts of machines orange color coded	17.2	
	23 - Are traffic lanes marked	14.6	
Walking Surfaces	20 - Do portable ladders have nonslip bases	50.9	66.3
	39 - Are EXITS approaches clear	81.7	
Machine Guarding	10 - Are belts, pulleys, chains and gears guarded	81.3	58.8
	24 - Do the radial saws have an upper and lower guard	30.3	
	25 - Will radial saw return to starting position	13.5	
	26 - Does the radial saw have non-kickback fingers	76.8	
	27 - Does the radial saw forward travel stop	47.9	
	28 - Does the jointer have a head cover	90.2	
	29 - Does the shaper have cutter head guard	46.5	
	30 - Does the band saw have a saw guard	86.6	
	31 - Does the band saw have a blade tensioner	34.3	
	32 - Does the table saw have a spreader	45.2	
	33 - Does the circular table saw have a blade hood	64.3	
	34 - Does the circular table saw have non-kickback fingers	47.5	
	35 - Does the belt sander have a nip point guard	49.6	
	36 - Does the abrasive wheel have a spindle guard	68.2	
	37 - Does the off-hand grinder have an adjustable work rest	81.9	
	38 - Do the abrasive wheels have flanges that are no less than 1/3 the diameter of wheel	77.2	

CHAPTER IV

GENERAL FINDINGS

Presentation and Analysis of the Data Collected from the Questionnaires

There were 233 questionnaires mailed, 149 questionnaires were mailed back giving a 63.94 percent return. Out of the 149 returned questionnaires, 145 were usable. Four of these were not usable because they were not completed.

The accuracy of the data received would be totally dependent on the accuracy to which the participator filled out the questionnaire. Of the returned questionnaires, 3.44 percent complied with 30 percent to 39 percent of OSHA standards, 11.72 percent complied with 40 percent to 49 percent of OSHA standards, 33.10 percent complied with 50 percent to 59 percent of OSHA standards, 28.27 percent complied with 60 percent to 69 percent of OSHA standards, 15.17 percent complied with 70 percent to 79 percent of OSHA standards, 5.51 percent complied with 80 percent to 89 percent of OSHA standards, and 2.75 percent complied with 90 percent to 100 percent of OSHA standards. The questionnaire rating scale ranged from a low of 31 percent to a high of 100 percent compliance with OSHA standards. The over-all average for the 145 questionnaires was 60.75 percent.

In evaluating the OSHA standards of the school laboratories by analyzing each question, it can be determined that there are several

different items that exist state wide that are going to require time and money to bring up to OSHA standards.

Only 23 percent of the laboratories were equipped with an exhaust ventilation system which prevents sawdust from entering the student work area. This will be the most expensive of the items that will have to be installed.

Of all the laboratories, 14 percent were painted for traffic lanes around equipment. This would require a lot of time to bring this condition up to standards.

Another item that is weak is the radial arm saw. Thirty percent had a lower guard and only 13 percent would return to the starting position when released by the operator. Both of these deficiencies would require minimum amount of time and money to fix.

Seventy-seven percent of the hand-fed circular table saws were equipped with non-kickback fingers. It would take minimum amount of time and money to install this item.

Presentation and Analysis of the Data of Each Area of the Questionnaire

To obtain a perspective of the areas that are the strongest or weakest, the questions were grouped into nine different areas. The nine areas are first aid, ventilation, personal protection equipment, fire protection, machine guarding, electricity, compressed air, safety color code, and walking surfaces (6). The mean of each question that made up an area were averaged to obtain a mean for that area. The evaluation of the areas is shown in Table II, page 11. The percentage of each individual question is shown on Table I, page 9.

The area that is most deficient was the safety color coding of physical hazards, dangerous parts of machines, and traffic lane floor-markings. Only 24.9 percent of the school laboratories were properly color coded. To correct this area would require the maximum amount of time with minimum amount of cost.

The second rated deficiency, ventilation, will require the most money to correct of all deficiencies. In the area of ventilation with respect to sawdust control, the state average for having an effective sawdust ventilation system was 44.8 percent. Only 66.2 percent were equipped to properly vent the finishing area. This is an area that requires a lot of planning.

The third rated deficiency is the area of machine guarding. An area average of 58.8 percent of the laboratories were equipped with machine guarding safety equipment. This area covers more hazardous equipment than any other area. The injuries caused by the deficiencies in this area are more serious and more frequently occurring than in any other woodworking area. This should be one of the first areas to be corrected. The cost of correcting the machine guarding is minimum compared to the over-all machine cost and injuries it can inflict.

The fourth rated deficiency was the area of electricity. The two primary problems in the electrical area are third wire grounding system and electrical power control switches. The third wire grounding system is a problem in all phases of Industrial Arts Education. If the laboratory has old fixed or portable equipment, they will have to be replaced or wired with a third grounding wire. All extension cords will have to be changed from a two to three wire cord. There are 74.5 percent of the laboratories already equipped with the three prong grounding

receptacle. These deficiencies can all be corrected with the proper material and trained personnel.

The fifth rated deficiency was the area of first aid. There were 77.2 percent which had medical supplies available for first aid treatment, but 53.8 percent had developed a procedure to follow in transporting an injured student to medical facilities. Coordination between teacher and principal can easily solve both of these problems.

The sixth rated deficiency was the area of walking surfaces. The walking surfaces area is an area that applies to ladders and approaches to EXIT doors. Sixty-five percent of the replies did not use ladders. Fifty percent of the teachers that used ladders had them equipped properly. Minimum amount of effort would be required to fix a ladder which would cause serious injuries. Eighty-one percent kept the traffic ways to EXIT doors clear. Minimum time would be used to correct blocked traffic ways.

The seventh rated deficiency was the area of compressed air. The deficiencies that were indicated by the questionnaires were in the problems of reducing the air to a safe working pressure at the tank and air nozzle. Both could easily be corrected by the installation of a pressure regulator at the tank and 30 pounds per square inch regulated nozzle.

The eighth rated deficiency was the fire protection area. It was rated with an area average of 82.9 percent. The deficiencies were in the finish room area. Only 69.2 percent had the Class B fire extinguisher for the finish room. This situation could be corrected easily.

The area with the minimum deficiencies was personal protection

equipment area. Some 89.6 percent of the schools provided or required students to wear eye protection in hazardous areas.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

The purpose of this study is to determine the effects of the adoption and enforcement of "The Occupational Safety and Health Act of 1970" on the Industrial Arts Program of the Oklahoma Public Schools (1).

There are no occupational safety and health standards legally binding on any state agency or other political subdivision entity of the State of Oklahoma at this time (2).

It appears that in the future the State of Oklahoma will have to develop occupational safety and health standards which will be legally binding on all state agencies or other political subdivision entity of the state. Because the public school is an agency, it will comply with the developed standards.

The data used for this study were obtained by the use of a questionnaire containing 39 statements pertaining to the Occupational Safety and Health Administration Standards of a machine woodworking laboratory. The information to develop the questionnaire was obtained from Federal Register, Volume 39, Number 122, Part II, Construction Safety and Health Regulation, and Volume 39, Number 125, Part II, Occupational Safety and Health Standards, U.S. Department of Labor, Occupational Safety and Health Administration.

The questionnaires were mailed to Oklahoma Public School Industrial

Arts teachers who have high school machine woodworking laboratories. There were 233 questionnaires mailed and 149 Industrial Arts teachers participated in the study. The percent of questionnaires returned was 63.94.

The general findings were presented by the use of tables showing responses for each statement and its mean. Each statement on the questionnaire was listed showing the responses of the teachers. The mean score for each statement was listed and is reported in Table I, page 9. The mean score of a question indicated the percent of schools which complied to the question.

In evaluating the OSHA standards of the school laboratory by analyzing each question, it can be determined that there are several deficiencies that exist state wide. Only 14.58 percent of the laboratories complied with the OSHA standards of having traffic lanes marked around equipment. There were 17.14 percent of the machine woodworking laboratories which complied with OSHA standards of orange color coding of dangerous parts of machines. There were 20.47 percent of the laboratories which complied with yellow color coding of physical hazards such as striking, stumbling, falling or tripping.

Only 23.4 percent of the laboratories were equipped with an exhaust ventilation system which prevents sawdust from entering the students' work area. This will be the most expensive of the items that will have to be installed.

Only 13.53 percent of the machine woodworking laboratories complied with OSHA standard of the radial saw returning to the starting position when released by the operator. This deficiency could be easily corrected by leveling the radial saw. Only 30.30 percent of the

laboratories had lower guards to cover the lower exposed portion of the blade on the radial arm saw. There were 34.32 percent of the laboratories which complied with OSHA standards pertaining to band saws having a tension control device to indicate proper tension for the blade.

The statements of the questionnaire were evaluated and placed into one of nine different areas. The nine different areas are first aid, ventilation, personal protection equipment, fire protection, machine guarding, electricity, compressed air, safety color code, and walking surfaces (8). The mean score of each area was calculated. The statement grouping and mean scores of each area were listed and are reported in Table II, page 11.

From Table II, page 11, the areas in which the school laboratories are weak can easily be identified by their score. The area with the minimum number of schools up to OSHA standards was safety color code. Only 24.9 percent of the school laboratories were properly color coded. The next area with the minimum number of schools up to OSHA standards was the area of ventilation. The area mean was 44.8 percent. The third area with the minimum number of schools up to OSHA standards was the area of machine guarding. The area mean was 58.8 percent. The fourth area with the minimum number of schools up to OSHA standards was the area of electricity. The area mean was 64.2 percent. The fifth area with the minimum number of schools up to OSHA standards was the area of first aid. The area mean was 66.0 percent. The sixth area with the minimum number of schools up to OSHA standards was the area of walking surfaces. The area mean was 66.3 percent. The seventh area with the minimum number of schools up to OSHA standards was the area of

compressed air. The area mean was 67.6 percent. The eighth area with the minimum number of schools up to OSHA standards was the area of fire protection. The area mean was 82.9 percent. The ninth area with the minimum number of schools up to OSHA standards was the area of personal protection. The area mean was 89.6 percent.

This study indicates that when the state or federal government enforces a safety and health standard on the Industrial Arts Departments of Oklahoma public schools, the Industrial Arts Departments will only be able to comply with approximately 60 percent of the OSHA safety requirements. The public school systems will have to invest a tremendous amount of time and monies to bring their laboratory standards up to the adopted standards.

Recommendations

Findings of the study suggest the need for the following:

1. Industrial Arts teachers should obtain a copy of the Federal Register, Volume 39, Number 122, Part II, Construction Safety and Health Regulation, and Volume 39, Number 125, Part II, Occupational Safety and Health Standards from the area Occupational Safety and Health Administration Office.

   U.S. Department of Labor
   OSHA
   Room 512
   Petroleum Building
   420 South Boulder Street
   Tulsa, Oklahoma 74103

2. Industrial Arts teachers should obtain a copy of the Labor Laws of the State of Oklahoma, Department of Labor, Edition 1971, State of Oklahoma, Oklahoma City, Oklahoma.

3. Industrial Arts teachers should obtain a copy of the Construction Safety Standards No. 7-B, Edition 1971, Department of Labor, State of Oklahoma, Oklahoma City, Oklahoma.
4. Industrial Arts teachers should study the standards applicable to their own situation.
5. Industrial Arts teachers should evaluate their deficiencies.
6. The administrators should be totally aware of deficiencies (hazards) which exist in their Industrial Arts Program.
7. The school boards and community should be aware of the hazards so they can be corrected with maximum amount of support.
8. Industrial Arts teachers should obtain magazine (free to teachers) "Occupational Hazards" from:

Occupational Hazards
614 Superior Avenue West
Cleveland, Ohio 44113

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APPENDIX A

SAMPLE OF QUESTIONNAIRE

EFFECTS OF OSHA RULES ON WOODWORKING SHOP

Please check your answer in the appropriate column provided.

	YES	NO	DOES NOT APPLY
1. Are medical supplies available for first aid treatment of injuries?	Y	N	O
2. Is a plan of action developed to provide prompt transportation of injured persons to a physician or hospital? Example: Posted phone number of person or persons (principal, physician, ambulance, etc.) to be notified.	Y	N	O
3. Do you have a exhaust ventilation system which prevents sawdust from being expelled into the students work area?	Y	N	O
4. Do you have an exhaust ventilation system which removes fumes, vapors, or gases from the finishing area?	Y	N	O
5. Is suitable eye protection provided and utilized when machines or operations present the hazard of flying objects?	Y	N	O
6. Are Class A (Class A Fire: Wood, Paper, Trash) portable fire extinguishers provided for the woodworking area?	Y	N	O
7. Are Class B (Class B Fire: Paints, Oil, Grease, and Gasoline) portable fire extinguishers provided for the finish room area?	Y	N	O
8. Are fire extinguishers maintained and inspected periodically by qualified personnel?	Y	N	O
9. Do fire extinguishers not red in color have a red background to more promptly identify their location?	Y	N	O
10. On power tools, are all belts, gears, pulleys, sprochets and chains equiped with guards to prevent possible injury to students?	Y	N	O
11. Are hand-held powered tools, such as circular saws, equipped with a constant pressure switch that will shut off the power when pressure is released?	Y	N	O
12. Do air hoses exceeding ½ inch inside diameter have a safety device at the source of supply to reduce pressure in case of hose failure?	Y	N	O
13. When using compressed air for cleaning purposes, do you use an air nozzle or air regulator to reduce the air pressure to less than 30 psi?	Y	N	O
14. Is your air compressor or air receiver equipped with a SPRING LOADED SAFETY VALVE?	Y	N	O
15. Does the air compressor have an Indicating Pressure Gauge?	Y	N	O
16. Do all fixed power driven woodworking tools have a disconnect switch that can either be locked or tagged in the off position?	Y	N	O

		YES	NO	DOES NOT APPLY
17.	Are all 115 volts wall recepticals equipped with three wire type ground recepticals?	Y	N	O
18.	Are all portable or cord and plug connected equipment equiped with the 3rd wire plugs?	Y	N	O
19.	Are extension cords of the three wire type used with portable electric tools?	Y	N	O
20.	Are the bottoms of the two rails on a portable ladder equipped with nonslip bases?	Y	N	O
21.	Are PHYSICAL HAZARDS such as sticking against, stumbling, falling, tripping, and caught between identified with yellow color coding?	Y	N	O
22.	Are dangerous parts of machines which may cut or crush designated by orange color coding?	Y	N	O
23.	Are traffic lanes around equipment indicated by black, white or a combination of black and white floor markings?	Y	N	O
24.	Does your radial saw in addition to the upperhood guard have a lower guard to cover the lower exposed portion of the blade?	Y	N	O
25.	Will your radial saw return to the starting position when released by the operator?	Y	N	O
26.	Does your radial saw come equipped with nonkickback fingers or dogs?	Y	N	O
27.	Does your radial saw have an adjustable stop to prevent the forward travel of the blade beyond the position necessary to complete the cut?	Y	N	P
28.	Does your hand fed jointer have an automatic guard which will cover all the section of the head on the working side of the fence or gauge?	Y	N	O
29.	Does your hand feed shaper have the cutting head enclosed with a cage or adjustable guard so designed as to keep the operator's hand away from the cutting edge?	Y	N	O
30.	Are all portions of the saw blade on the band saw covered except at the point of operation?	Y	N	O
31.	Does your Band saw have a tension control device to indicate a proper tension for the standard saws used on the machine?	Y	N	O
32.	Does your hand-fed circular table saw have a spreader to prevent material from squeezing the blade?	Y	N	O

	DOES NOT APPLY	NO	YES
33. Does your hand-fed circular table saw have a hood to completely enclose that portion of the saw above the table and material being cut?		N	Y
34. Does your hand-fed circular table saw have a non-kickback fingers or dogs to prevent material from being thrown back at the operator?		N	Y
35. Are your belt sanding machines equipped with guards at each nip point where sanding belts run onto a pulley?		N	Y
36. Are abrasive wheel machines equipped with the guards to cover the spindle, end, nut, and flange projection?		N	Y
37. Are your off-hand grinding machines equipped with a work rest which is to be adjusted to 1/8" clearance?		N	Y
38. Are your abrasive wheels mounted between flanges which are not less than 1/3 the diameter of the wheel?		N	Y
39. Are all way of approach to EXITS free of all obstructions or impediments?		N	Y

APPENDIX B

SAMPLE OF LETTER MAILED WITH QUESTIONNAIRE

Dear Fellow Industrial Arts Teacher:

Enclosed is an industrial arts survey instrument. It will require approximately 10 minutes of your time. Please help me in obtaining this information by checking the appropriate column on the enclosed questionnaire. A self-addressed stamped envelope is provided for returning the questionnaire.

Basically, the study seeks to determine the effects that the OSHA regulations will have on the I. A. program in the Oklahoma public schools if they are adopted and enforced by the state.

At the present time the OSHA standards are not legally binding on any state agency or other political subdivision entity of the State of Oklahoma.

Your help will be greatly appreciated.

Yours truly,

Larry Hough
Department of Industrial Arts Ed.
Oklahoma Panhandle State University
Goodwell, Oklahoma

APPENDIX C

SAMPLE OF SECOND LETTER MAILED

Dear

A few weeks ago you received a questionnaire entitled "Effect of OSHA Rules on Woodworking Shops" as a part of a study on the effects the OSHA rules will have on the Industrial Arts program in Oklahoma public schools. I hope you will find time to be a participating member in this study.

Your returned questionnaire is greatly needed to better represent the actual situation which exists in our Industrial Arts Departments in Oklahoma.

Your help will be greatly appreciated.

Yours truly,

Larry Hough
Instructor
Industrial Education
P.S.U.
Goodwell, Oklahoma

APPENDIX D

SAMPLE OF THIRD LETTER MAILED

Dear

Several weeks ago you received a questionnaire entitled "Effects of OSHA Rules on Woodworking Shops" as part of a survey on the effects of OSHA rules on the Oklahoma Industrial Arts program.

Your reply is still urgently needed. Anticipating how busy everyone is during this time of the school year, an attempt was made to minimize the time required to answer this study by merely providing headings which can be easily checked.

In case you have mislaid the first copy, I am enclosing a second instrument with a self-addressed envelope. I would truly appreciate your help and comments on this questionnaire.

Sincerely,

Larry Hough
Department of Industrial Arts Ed.
Oklahoma Panhandle State University
Goodwell, Oklahoma

VITA

Gordon Larry Hough

Candidate for the Degree of

Master of Science

Thesis: THE STUDY OF THE EFFECTS OF THE ENFORCEMENT OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS ON THE INDUSTRIAL ARTS PROGRAM OF OKLAHOMA PUBLIC SCHOOLS

Major Field: Industrial Arts Education

Biographical:

Personal Data: Born in Wichita Falls, Texas, August 7, 1944, the son of Mr. and Mrs. G. L. Hough.

Education: Graduated from Friona High School, Friona, Texas, in May, 1963; received Bachelor of Science degree in Industrial Arts from Oklahoma Panhandle State University in 1968; enrolled in masters program at Oklahoma State University in 1973; completed requirements for Master of Science degree at Oklahoma State University in July, 1975.

Professional Experience: Officer in the U.S. Army, 1968-70; Design Engineer, Beech Aircraft, 1970-71; High School Industrial Arts teacher, Liberal, Kansas, 1971-72; Industrial Arts Instructor, Oklahoma Panhandle State University, 1972-75.

Professional Organizations: American Council on Industrial Arts Teachers Education, Oklahoma Council on Industrial Arts Teacher Education, American Industrial Arts Association, Oklahoma Industrial Arts Association, and Panhandle Industrial Arts Association.