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AUTHOR	Waddy, Paul H.; And Others
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ABSTRACT

To improve vocational educational programs in agriculture, occupational information on a common core of basic skills within the occupational area of the sawmill worker is presented in the revised task inventory survey. The purpose of the occupational survey was to identify a common core of basic skills whcih are performed and are essential for success in the occupation. Objectives were accomplished by constructing an initial task inventory to identify duty areas and task statements for the occupation. The initial task inventory was reviewed by consultants in the field, and 84 tasks were identified. A random sample of 78 sawmill operations based on the directory of the Ohio Forestry Association, Inc. was obtained. Data were collected utilizing an employer and employee questionnaire. Thirty-five questionnaires were returned of which 33 were usable. A compilation of basic sample background information is presented on size of sawmill operation, total work experience, employment at current job, and preparation as a sawmill worker. A compilation of duty areas of work performed and work essential for the occupation is given. Percentage performance by incumbent workers and the average level of importance of specific task statements are presented in tabular form. (Author/EC)

DETERMINATION OF A COMMON CORE OF BASIC SKILLS IN AGRIBUSINESS AND NATURAL RESOURCES

An Emperical Determination Of Tasks Essential To Successful Performance As A Sawmill Worker

DEPARTMENT OF AGRICULTURAL EDUCATION
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO 43210

AN EMPERICAL DETERMINATION OF TASKS ESSENTIAL TO SUCCESSFUL PERFORMANCE AS A SAWMILL WORKER

Paul H. Waddy

Edgar P. Yoder

J. David McCracken

Department of Agricultural Education
in cooperation with
The Ohio State University Research Foundation
The Ohio State University
Columbus, Ohio
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FOREWORD

The Department of Agricultural Education at The Ohio State University is involved in a major programmatic effort to improve the curricula in education programs in agriculture. One product in this effort is this report of the sawmill worker. The data reported were collected as part of a more comprehensive thrust designed to develop a common core of basic skills in agribusiness and natural resources.

It is hoped that the revised task inventory contained in this report will be useful to curriculum developers working for improved occupational relevance in schools. Twenty-seven additional inventories in other occupational areas are also reported from this project.

The profession owes its thanks to Paul H. Waddy, graduate research associate, for his work in preparing this report. Special appreciation is also expressed to Tom Higgins, Executive-Director, Ohio Forestry Association, Inc., for his input and help in securing the cooperation of those employed in this occupational area.

J. David McCracken
Project Director

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INTRODUCTION

Occupational information is needed to develop and revise vocational and technical education curricula. Teachers and curriculum developers generally determine which skills might be taught in a program based upon teacher expertise, advisory committee input, informal and formal community surveys, and/or task inventories.

The Agricultural Education Department at The Ohio State University has utilized and revised a system for obtaining and using occupational information as an effective aid in planning, improving, and updating occupational education curricula. This report presents the results of a survey of the occupation, sawmill worker. The information contained herein may be used by curriculum development specialists, teachers, local and state administrators, and others involved in planning and conducting vocational and technical programs in agriculture.

Purpose and Objectives

The major purpose of the occupational survey was to identify the skills which are performed and essential for success as a sawmill worker. The specific objectives of this survey were as follows:

1. Develop and validate an initial task inventory for the sawmill worker.
2. Identify the specific tasks performed by the sawmill worker.
3. Determine the relative importance of the specific tasks to successful employment as a sawmill worker.

Definition of the Occupational Area

The sawmill worker is employed in privately owned sawmills. The specific tasks and duties performed by the sawmill worker will depend on the size and type of business where employed. In general, the sawmill worker may cut and saw logs into the desired lumber sizes; stack and dry lumber; operate and maintain sawmill equipment; and sort and grade cut lumber. In some cases the sawmill worker may be called a lumberman, sawer, lumber grader, or dry-kiln operator.

METHODOLOGY

Objectives were accomplished by constructing an initial task inventory, validating the initial inventory, selecting a sample of workers, collecting data, and analyzing data.

Initial Task Inventory

Duty areas and task statements for the sawmill worker were identified by searching existing task lists, job descriptions, curriculum guides, and reference publications. Additionally, contacts with several industry personnel aided in clarifying the specific responsibilities of the sawmill worker. All the tasks that the project staff thought to be performed were assembled into one composite list.

The initial tasks were grouped into functional areas called "Duties".

After the task statements were grouped under the proper duty areas, each task statement was reviewed for brevity, clarity, and consistency. In all, 90 task statements were included in the initial task inventory.

Initial Inventory Validation

After the initial task inventory was constructed, it was reviewed by six consultants employed in sawmills. These consultants were either sawmill owners or managers.

The consultants were asked to respond to the initial task list inventory by performing the following activities:

1. Indicate whether any of the tasks listed were not appropriate.
2. Add any additional tasks they believed were performed by the sawmill worker.
3. Make changes in the wording of tasks to help add clarity to the statements.

The comments from the six consultants were pooled and needed revisions were made.

As a result of the initial task inventory review process, 84 tasks were identified.

Worker Sample Selection

Since the specific duties and tasks performed by the sawmill worker are related to the size and type of sawmill where employed, an attempt was made to survey sawmill workers employed in various sizes and types of sawmill operations. It was not possible to secure a list of the specific names and addresses of all incumbent workers in the state. Therefore, a sample of 78 sawmill operations was obtained from the directory of the Ohio Forestry Association, Inc. using a stratified random sampling approach. The strata used were size of operation, type of operation, and geographical location.

Data Collection

A packet of materials was sent to the owner or manager of the randomly selected sawmills. The packet of materials included:

1. A cover letter from the Ohio Forestry Association, Inc.

2. An employer questionnaire printed on blue.

3. An employee questionnaire printed on yellow.

4. A stamped and self-addressed return envelope.

The manager or owner was instructed to complete the employer questionnaire and to have a responsible sawmill worker complete the employee questionnaire. The manager or owner was instructed to collect the employee questionnaire and return both the employer and employee questionnaire in the stamped and self-addressed return envelope by the date specified in the cover letter.

A follow-up of non-respondents consisted of mailing a packet of materials two weeks after the initial mailing. The first follow-up consisted of a packet of materials identical to the initial packet except that a cover letter on Ohio State University stationery replaced the cover letter on Ohio Forestry Association, Inc. stationery.

Data Analysis

The 35 questionnaires which were returned were checked for completeness and accuracy by the project staff. Information from the 33 usable responses was coded on Fortran coding sheets for key punching. In addition to coding appropriate respondent background information, each specific task statement was coded as to whether it was performed (1 = Task performed by respondent; blank = Task not performed by respondent) and the level of importance of the task (3 = Essential; 2 = Useful; 1 = Not Important). The information was keypunched on IBM cards and verified by personnel at the Instruction and Research Computer Center at The Ohio State University.

The data was analyzed using the SOUPAC computer program and the facilities of the Instruction and Research Computer Center. Consultant assistance for analyzing the data was provided by personnel at The Center for Vocational Education. The SOUPAC computer analysis resulted in the computation of relative frequencies, means, and rankings for each task statement. The results of the computer analyses were printed in tabular form for ease of interpretation.

FINDINGS

Objectives of the study resulted in the compilation of basic sample background information, the determination of tasks performed by the sawmill worker, and the identification of tasks

essential to successful performance as a sawmill worker.

Description of the Sample

Information regarding the performance of tasks and the importance of the tasks to successful employment as a sawmill worker was obtained from sawmill workers in various sawmill operations across Ohio.

Response to the Survey

A total of 78 questionnaires were mailed and 35 replies were received. This represented a 44.8% rate of return. The response to the questionnaire is summarized in TABLE I.

TABLE I

EMPLOYEE RESPONSE TO THE QUESTIONNAIRE

	N	Percent of All Employees In the Survey
Employees in Survey	78	100.0
Total Returns	35	44.8
Usable Returns	33	42.3
Unusable Returns	2	2.5
Nonrespondents	43	55.2

Size of Sawmill Operation

Sawmill workers from various size sawmill operations were included in the study. The number of full-time equivalent (two one-half time sawmill workers equal one full-time equivalent) sawmill workers employed in the firm was used as an index to assess the size of operation where the sawmill worker was employed. Of the 35 questionnaires received, 33 included information regarding the size of the sawmill operation. TABLE II summarizes the responses to the question, "How many full-time equivalent sawmill workers are employed in your operation?" Twelve sawmill workers or 36.4% were employed in firms employing six to ten full-time equivalent sawmill workers. Twelve sawmill workers or 36.4% were employed in firms employing 11 or more full-time equivalent sawmill workers. Nine sawmill workers or 27.2% were employed in firms employing one to five full-time

equivalent sawmill workers. The number of sawmill workers employed in the firm ranged from 3-50. The average number of full-time equivalent sawmill workers employed in the firms was 14.9.

TABLE II

SIZE OF SAWMILL OPERATION WHERE CURRENTLY EMPLOYED

Number of Employees in Firm	N	Percent of Respondents
1-5	9	27.2
6-10	12	36.4
11 or more	12	36.4
Total	33	100.0

X number of sawmill workers in the firm = 14.9

Total Work Experience

Sawmill workers with varying amounts of work experience in the timber industry were included in the study. TABLE III summarizes the responses to the question, "How many total years have you worked in the timber industry?" Eleven sawmill workers or 34.3% had 23 or more total years of work experience in the timber industry. Five sawmill workers or 15.8% had from seven to ten total years of work experience in the timber industry. Four sawmill workers or 12.7% had from 19-22 total years of work experience in the timber industry. The total years of work experience in the timber industry ranged from 1-55 years. Sawmill workers had an average of 18.6 years of total work experience in the timber industry.

Employment at Current Job

Sawmill workers in the survey had spent varying amounts of time in their present job. TABLE IV summarizes the responses to the question, "How many years have you worked at your present job?" Nine sawmill workers or 28.1% had worked at their present job from one to three years. Five sawmill workers or 15.6% had worked at their present job from four to six years. Five sawmill workers or 15.6% had been employed at their present job 27 or more years. The years of work at their present job ranged from 1-55 years. Sawmill workers had been employed at their present job an average of 13.9 years.

TABLE III

TOTAL AMOUNT OF WORK EXPERIENCE IN THE TIMBER INDUSTRY

Years	N	Percent of Respondents
1-3	3	9.3
4-6	3	9.3
7-10	5	15.8
11-14	3	9.3
15-18	3	9.3
19-22	4	12.7
23 or more	11	34.3
Total	32	100.0

$\bar{X}$ years in the timber industry = 18.6

TABLE IV

LENGTH OF TIME AT PRESENT JOB

Years	N	Percent of Respondents
1-3	9	28.1
4-6	5	15.6
7-10	4	12.5
11-14	2	6.2
15-18	1	3.2
19-22	3	9.4
23-26	3	9.4
27 or more	5	15.6
Total	32	100.0

$\bar{X}$ years at present job = 13.9

Preparation as a Sawmill Worker

Sawmill workers obtained training for their job from various sources. TABLE V summarizes their responses to the question, "Where did you receive your training as a sawmill worker?" Thirty-one sawmill workers or 93.9 indicated they received training on-the-job. Six sawmill workers or 18.1% indicated they received training as a sawmill worker from other sources. Two sawmill workers or 6% indicated they had received training as a sawmill worker by attending a technical school program.

TABLE V

SOURCE OF TRAINING RECEIVED AS A SAWMILL WORKER

Source	N	Percent of All Employees In the Survey
On-The-Job	31	93.9
Technical School Program	2	6.0
Other	6	18.1

Duty Areas of Work Performed by the Sawmill Worker

The 84 tasks were grouped under eight duty areas. Each respondent indicated whether he performed the specific task in his current position as a sawmill worker. The percentages of respondents performing each task were averaged for all tasks under each duty area. The mean percentage of incumbents who performed specific tasks in specified duty areas is presented in TABLE VI.

The duty area of work in which 50% or more of the incumbent workers performed the tasks was:

1. Following General Safety Precautions

Duty Areas of Work Essential for Successful Performance as a Sawmill Worker

A level of importance rating was obtained for each task. The respondent could rate the task as essential, useful, or not important for successful performance as a sawmill worker. A ranking of essential was assigned a numerical rating of "3", useful a numerical rating of "2", and not important a numerical

rating of "1". The level of importance ratings for each task were averaged for all tasks under each duty area. The average level of importance ratings for the specific tasks in the specified duty areas are presented in TABLE VI.

Duty areas of work which received a 2.0 or higher level of importance rating by incumbent workers were:

1. Following General Safety Precautions
2. Marketing Products
3. Maintaining Mill Equipment and Vehicles
4. Using and Maintaining Hand Tools
5. Operating Sawmill Equipment and Vehicles
6. Scaling and Grading Cut Logs and Cut Lumber

Percentage Performance and Level of Importance Ratings of Specific Tasks

The percentage performance by incumbent workers and the level of importance for each specific task is also presented in TABLE VI.

It is recommended that the results for each specific task be examined by educators and others who are developing educational programs to determine curriculum content for preparing sawmill workers. Specific tasks with a high level of performance and a high level of importance rating should be given more emphasis in the educational program than specific tasks with a low level of performance and a low level of importance rating.

TABLE VI

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE* OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Recording Information		
Complete lumber tally card	43	1.8
Mean Rating	43.0	1.8
Following General Safety Precautions		
Follow safe work habits	78	2.8
Identify potential safety hazards in the mill	71	2.8
Use fire extinguishers	65	2.6
Wear proper protective clothing	65	2.6
Ventilate work areas	50	2.4
Interpret information on labels and signs	65	2.4
Use proper lifting and carrying methods	59	2.9
Store inflammable materials	50	2.6
Wear proper work clothes	68	2.6
Adjust safety devices on mill equipment	56	2.7
Install safety devices on mill equipment	46	2.6
Correct potential sawmill safety hazards	56	2.7
Remove debris from work areas	65	2.8
Use electrical connectors and safety devices	37	2.4
Identify safety zones around mill equipment	56	2.7
Mean Rating	56.6	2.4
Marketing Products		
Describe products to buyers	43	2.1
Determine when products need to be ready for customers	43	2.3
Greet buyers and customers	40	2.0
Price products for customers	40	2.1
Take customer orders by phone	40	2.1
Mean Rating	41.2	2.1
Maintaining Mill Equipment and Vehicles		
Add oil to equipment	65	2.6
Adjust carburetors	21	2.0

*Average rating of importance may range from 1-3 with 3 being the highest

TABLE VI - (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Bleed diesel fuel system	21	2.0
Change oil and oil filters	40	2.4
Clean debris from equipment	46	2.5
Grease equipment	56	2.8
Install and adjust belts	53	2.5
Install and adjust chains	50	2.5
Install and service battery	34	2.1
Interpret general maintenance instructions in operator's manuals	37	2.3
Repack bearings	37	2.3
Replace bearings and seals	37	2.2
Service air cleaners	40	2.5
Service fuel strainer, filter, and sediment bowl	31	2.2
Repair damaged electrical cords and wires	31	2.2
Lubricate and clean electric motors	28	2.2
Oil equipment	56	2.8
Replace pulleys and sprockets	53	2.2
Reset electric motors	34	2.2
Sharpen saw teeth	43	2.4
Replace saw bits and shanks	43	2.4
Sharpen dogs and headrig	34	2.2
Take up slack in setworks of headrig	37	2.2
Take up end play on trucks	28	2.1
Align tracks on headrig	28	2.3
Maintain foundations of edger and trimmer	28	2.2
Adjust saw tension	21	1.8
Mean Rating	38.2	2.3
Using and Maintaining Hand Tools		
Adjust tools	43	2.3
Clean tools	46	2.6
Identify tools	46	2.4
Interpret tool operation instructions	43	2.3
Recondition tools	21	2.0
Select tools for specific jobs	46	2.5
Sharpen tools	37	2.3
Store tools	43	2.3

TABLE VI (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Use hand tools safely	56	2.8
Mean Rating	42.3	2.3
Operating Sawmill Equipment and Vehicles		
Interpret gauge readings on equipment	46	2.6
Operate vehicles on public highways	28	2.1
Adjust mill equipment safety shields	50	2.7
Connect hydraulic operated equipment	37	2.3
Correct potential equipment safety hazards	50	2.6
Hitch towed equipment	25	2.0
Identify mill equipment safety hazards	50	2.6
Install safety shields and safety devices	43	2.5
Interpret safety and operating instructions in operator's manuals	43	2.6
Interpret safety symbols on equipment	53	2.6
Operate mill equipment under work conditions	56	2.6
Refuel power units	31	2.2
Mean Rating	42.6	2.4
Scaling and Grading Cut Logs and Cut Lumber		
Determine cubic foot content of logs	37	1.9
Estimate log yields	31	1.8
Scale cut logs	40	2.1
Grade hardwood and softwood logs	34	2.1
Determine specific lumber to be cut from logs	40	2.2
Grade cut lumber	31	1.8
Identify hardwood and softwood species	59	2.4
Identify lumber defects	53	2.4
Classify lumber	40	2.1
Mean Rating	40.5	2.0
Stacking and Drying Lumber		
Identify lumber defects occuring during drying	25	1.6
Measure moisture in lumber	18	1.6

TABLE VI (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Regulate dry kiln temperature	6	1.2
Sort lumber	40	2.2
Spray chemical on lumber	6	1.5
Stack lumber	43	2.5
Mean Rating	21.6	1.7