DOCUMENT RESUME

ED 115 809 95 CE 005 632

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TITLE An Empirical Determination of Tasks Essential to Successful Performance as an All-Round Logger. Determination of a Common Core of Basic Skills in Agribusiness and Natural Resources.
INSTITUTION Ohio State Univ., Columbus. Dept. of Agricultural Education.; Ohio State Univ., Columbus. Research Foundation.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
BUREAU NO V0033VZ
PUB DATE 75
GRANT OEG-0-74-1716
NOTE 20p.; For an explanation of the project, see CE 005 614-615, and for the other occupations, see CE 005 616-643

EDRS PRICE MF-$0.76 HC-$1.58 Plus Postage
DESCRIPTORS Agricultural Education; Blue Collar Occupations; Job Analysis; *Job Skills; *Lumber Industry; *Occupational Information; Occupational Surveys; *Off Farm Agricultural Occupations; Tables (Data); *Task Analysis; Vocational Education
IDENTIFIERS Loggers

ABSTRACT

To improve vocational educational programs in agriculture, occupational information on a common core of basic skills within the occupational area of the all-round logger is presented in the revised task inventory survey. The purpose of the occupational survey was to identify a common core of basic skills which 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 107 tasks were identified. A random sample of 110 logging operations based on the directory of the Ohio Forestry Association, Inc. was obtained. Data were collected utilizing employer and employee questionnaires. Twenty-four questionnaires were returned of which 16 were usable. A compilation of basic sample background information is presented on size logging operation, total work experience, employment at current job, and preparation as an all-round logger. 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 An All-Round Logger

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AN EMPERICAL DETERMINATION OF TASKS ESSENTIAL TO SUCCESSFUL PERFORMANCE AS AN ALL-ROUND LOGGER

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1975

PREPARED AS APPENDIX XXVI

Of A Final Report

On A Project Conducted Under

Project No. V0033VZ

Grant No. OEG-0-74-1716

This publication was prepared pursuant to a grant with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official U.S. Office of Education position or policy.

U.S. Department of Health, Education and Welfare
U.S. Office of Education

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 all-round logger task inventory survey. The data reported were collected as part of a more comprehensive thrust designed to develop a common core of basis 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, all-round logger. 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 an all-round logger. The specific objectives of this survey were as follows:

1. Develop and validate an initial task inventory for the all-round logger.
2. Identify the specific tasks performed by the all-round logger.
3. Determine the relative importance of the specific tasks to successful employment as an all-round logger.

Definition of the Occupational Area

The all-round logger may be either self-employed or employed by a privately owned timber harvesting firm. The all-round logger works in the forests in harvesting wood products for transport to lumber mills. The specific duties performed by the all-round logger will vary with the size of business. In general, the all-round logger fells, limbs, and bucks trees; transports logs to loading areas; loads trucks for the transport of logs to mills; and repairs and maintains logging equipment. In some larger logging operations, he may have a more definitive job title such as timber faller, marker, or bucker.

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 all-round logger 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 all-round logger. 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, 94 task statements were included in the initial task inventory.

Initial Inventory Validation

After the initial task inventory was constructed, it was reviewed by four consultants employed in the logging industry. These consultants were either loggers or managers of logging operations.

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 all-round logger.

3. Make changes in the wording of tasks to help add clarity to the statements.

The comments from the four consultants were pooled and needed revisions were made. Three duty areas were combined and one new duty area was added as a result of the review process.

As a result of the initial task inventory review process, 107 tasks were identified.

Worker Sample Selection

Since the specific duties and tasks performed by the individual all-round logger are related to the size of the logging operation where employed, an attempt was made to survey all-round loggers employed in various size logging 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 110 logging 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 and geographical location.

Data Collection

A packet of materials was sent to the owner or manager of the randomly selected logging operations. The packet of materials

included:

1. A cover letter from the Agricultural Education Department at The Ohio State University.
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 all-round logger 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.

A final follow-up of non-respondents was initiated four weeks after the initial mailing. A telephone contact by a project staff member was made with 50% of the non-respondents. The non-respondents were asked to complete the questionnaire and emphasis was placed on the importance of their response to the success of the project during the telephone conversation.

Data Analysis

The 24 questionnaires which were returned were checked for completeness and accuracy by the project staff. Information from the 16 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 all-round logger, and the identification of tasks essential to successful performance as an all-round logger.

Description of the Sample

Information regarding the performance of tasks and the importance of the tasks to successful employment as an all-round logger was obtained from all-round loggers in various logging operations across Ohio.

Response to the Survey

A total of 110 questionnaires were mailed and 24 replies were received. This represented a 21.8% rate of return. The response to the questionnaire is summarized in TABLE I.

TABLE I

EMPLOYEE RESPONSE TO THE QUESTIONNAIRE

	N	Percent of All-Round Loggers in the Survey
Employees in Survey	110	100.0
Total Returns	24	21.8
Usable Returns	16	14.5
Unusable Returns	8	7.3
Nonrespondents	86	78.2

Size of Logging Operation

All-round loggers from various size logging operations were included in the study. The number of full-time equivalent (two one-half time all-round loggers equal one full-time equivalent) all-round loggers employed in the operation was used as an index to assess the size of logging operation where the all-round logger was employed. Of the 24 questionnaires received, 14 included information regarding the size of the logging operation. TABLE II summarizes the responses to the question, "How many full-time equivalent all-round loggers are employed in your logging operation?" Seven all-round loggers or 50% were employed in operations employing

seven or more full-time equivalent all-round loggers. Five all-round loggers or 35.7% were employed in operations employing one to three full-time equivalent all-round loggers. Two all-round loggers or 14.3% were employed in operations employing four to six full-time equivalent all-round loggers. The number of full-time all-round loggers employed in the firms ranged from 1-19. The average number of full-time equivalent all-round loggers employed in the firms was 7.0.

TABLE II

SIZE OF LOGGING OPERATION WHERE CURRENTLY EMPLOYED

Number of All-Round Loggers Employed in Firm	N	Percent of Respondents
1-3	5	35.7
4-6	2	14.3
7 or more	7	50.0
Total	14	100.0

$\bar{X}$ number of all-round loggers in the firm = 7.0

Total Work Experience

All-round loggers with varying amounts of work experience in the logging industry were included in the study. TABLE III summarizes the responses to the question, "How many total years have you worked in the logging industry?" Four all-round loggers or 25% had from 15-18 total years of work experience in the logging industry. Four all-round loggers or 25% had 23 or more total years of work experience in the logging industry. Three all-round loggers or 18.8% had from 19-22 total years of work experience in the logging industry. The total years of work experience in the logging industry ranged from 1-30 years. All-round loggers had an average of 18 years of total work experience in the logging industry.

Employment at Current Job

All-round loggers 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?" Five all-round loggers or 33.3% had worked at their present job from 19-22 years. Four all-round loggers or 26.7% had worked at

TABLE III

TOTAL AMOUNT OF WORK EXPERIENCE IN THE LOGGING INDUSTRY

Years	N	Percent of Respondents
1-6	1	6.2
7-10	2	12.5
11-14	2	12.5
15-18	4	25.0
19-22	3	18.8
23 or more	4	25.0
Total	16	100.0

$\bar{X}$ years in the industry = 18.0

TABLE IV

LENGTH OF TIME AT PRESENT JOB

Years	N	Percent of Respondents
1-10	2	13.3
11-14	3	20.0
15-18	4	26.7
19-22	5	33.3
23 or more	1	6.7
Total	15	100.0

$\bar{X}$ years at present job = 16.0

their present job from 15-18 years. Three all-round loggers or 20% had worked at their present job from 11-14 years. The years of work at their present job ranged from 1-25 years. All-round loggers had been employed at their present job an average of 16 years.

Preparation as an All-Round Logger

All-round loggers obtained training for their job from one major source. TABLE V summarizes their responses to the question, "Where did you receive your training as an all-round logger?" Sixteen all-round loggers or 100% indicated they received training on-the-job.

TABLE V

SOURCE OF TRAINING RECEIVED AS AN ALL-ROUND LOGGER

Source	N	Percent of All-Round Loggers in the Survey
On-The-Job	16	100.0

Duty Areas of Work Performed by the All-Round Logger

The 107 tasks were grouped under ten duty areas. Each respondent indicated whether he performed the specific task in his current position as an all-round logger. 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.

Duty areas of work in which 50% or more of the incumbent workers performed the tasks were:

1. Following General Safety Practices
2. Planning and Organizing Logging Work
3. Maintaining Logging Equipment and Vehicles
4. Using and Maintaining Hand and Power Tools
5. Operating Logging Equipment and Vehicles
6. Delivering Logs or Bolts to Sawmills
7. Felling, Limbing, and Bucking Timber
8. Skidding Logs or Bolts
9. Cruising, Scaling, and Grading Timber and Logs

Duty Areas of Work Essential for Successful Performance as an All-Round Logger

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 an all-round logger. 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 Practices
2. Planning and Organizing Logging Work
3. Maintaining Logging Equipment and Vehicles
4. Using and Maintaining Hand and Power Tools
5. Operating Logging Equipment and Vehicles
6. Delivering Logs or Bolts to Sawmills
7. Felling, Limbing, and Bucking Timber
8. Skidding Logs or Bolts
9. Cruising, Scaling, and Grading Timber and logs

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 all-round loggers. 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
Following General Safety Practices		
Apply first aid to minor cuts, bruises, and burns	68	2.3
Follow safe work habits	68	2.6
Identify potential safety hazards	62	2.6
Store chemicals	25	1.7
Use fire extinguishers	59	2.2
Wear appropriate protective clothing	62	2.1
Interpret information on labels and signs	62	2.2
Use proper lifting and carrying methods	56	2.6
Store inflammable materials	50	2.4
Wear appropriate work clothes	62	2.3
Adjust safety devices	62	2.8
Install safety devices	56	2.4
Determine when weather conditions provide unsafe working situations	68	2.4
Correct potential safety hazards	68	2.4
Remove debris from work areas	68	2.4
Locate escape routes for loggers	56	2.4
Use logging safety and warning terminology	56	2.2
Mean Rating	59.2	2.3
Planning and Organizing Logging Work		
Plan cutting schedules	56	1.7
Work with personnel in planning logging activities and work dates	43	2.1
Establish cutting pattern for wooded areas	56	2.3
Plan and lay out skid trails and logging roads	56	2.7
Mean Rating	52.7	2.2
Maintaining Logging Equipment and Vehicles		
Add coolant to radiators	62	2.6
Add oil to equipment	75	2.9
Adjust carburetors on power saws	75	2.7
Bleed diesel fuel systems	56	2.3
Change oil and oil filters	75	2.9

*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
Change thermostats	50	2.6
Remove debris from equipment	68	2.6
Grease equipment	75	2.9
Inflate tires	68	2.8
Inspect cooling systems for leaks	62	2.7
Install and adjust belts	62	2.6
Install and adjust chains	68	2.7
Install and service battery	75	2.5
Interpret general maintenance instructions in operator's manuals	62	2.6
Remove equipment from storage	37	1.9
Repack bearings	62	2.4
Replace and adjust spark plugs	75	2.8
Replace bearings and seals	62	2.7
Replace diesel fuel nozzles	56	2.2
Replace radiator hoses	68	2.7
Service air cleaners	75	2.9
Service fuel filters, strainers, and sediment bowl	68	2.9
Prepare equipment for storage	37	1.9
Mean Rating	53.0	2.6
Using and Maintaining Hand and Power Tools		
Adjust tools	68	2.7
Clean tools	68	2.7
Identify tools	58	2.3
Interpret tool operation instructions	50	2.2
Recondition tools	68	2.3
Select tools for specific jobs	62	2.5
Sharpen tools	75	2.9
Store tools	43	2.2
Use hand tools safely	68	2.6
Use power tools safely	75	2.6
Set up tools	43	2.0
Mean Rating	61.6	2.4
Operating Logging Equipment and Vehicles		
Interpret gauge readings on equipment	75	2.9

TABLE VI (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Operate vehicles on public highways	68	2.4
Add wheel and front end weights to power units	18	1.9
Adjust equipment safety shields	50	2.6
Connect hydraulic systems and hydraulic operated equipment	50	2.5
Correct potential equipment safety hazards	62	2.6
Hitch towed equipment	50	2.3
Identify equipment safety hazards	62	2.6
Install safety shields and devices	43	2.4
Interpret hand operating signals	31	2.2
Interpret safety instructions in operator's manual	43	2.4
Interpret safety symbols on equipment	50	2.3
Operate equipment under work conditions	50	2.5
Refuel power units	56	2.4
Use appropriate equipment and vehicles for specific logging jobs	50	2.4
Mean Rating	50.5	2.4
Delivering Logs or Bolts to Sawmills		
Select appropriate delivery route	62	2.8
Attach tongs and crotch lines for loading	37	2.2
Bind logs with chains and binders	62	2.8
Sort logs according to specie for loading purposes	50	2.3
Load according to vehicle load limits	62	2.6
Transfer logs to carriers	37	1.8
Unload logs	43	2.1
Mean Rating	50.4	2.3
Felling, Limbing, and Bucking Timber		
Buck trees	59	2.1
Climb trees	6	1.1
Determine amount of trim allowance needed	43	1.8
Determine area and direction trees are to be felled	62	2.6
Follow established cutting patterns	62	2.2
Identify tree parts	62	2.3
Identify trees by name	56	2.4

TABLE VI (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Identify trees marked to be felled	50	2.4
Inspect area for physical conditions that may damage felled trees	56	2.4
Limb logs	56	2.3
Make back cut	50	2.1
Make sidenotch	56	1.9
Make undercut or face cut	56	2.1
Measure for bucking	56	2.1
Top trees	31	1.8
Mean Rating	50.5	2.1
Skidding Logs or Bolts		
Attach chokers to logs	75	2.8
Bunch logs to be skidded	43	2.1
Develop log landings	68	2.6
Develop skidding roads and trails	68	2.6
Mean Rating	63.5	2.5
Cruising, Scaling, and Grading Timber and Logs		
Determine cubic foot content of a log	43	1.9
Determine number of logs in tree	68	2.4
Determine the diameter breast height	37	1.9
Determine which trees to cut	68	2.5
Estimate tree yield	56	2.0
Mark trees to be cut	50	2.3
Scale cut logs	50	2.2
Grade cut logs	43	2.2
Mean Rating	51.8	2.1
Recording Information		
Record equipment maintenance information	50	1.9
Record OSHA information on record forms	25	1.6
Record work information on record forms	43	1.8
Mean Rating	39.3	1.7