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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 tree service worker 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 158 tasks were identified. A random sample of 76 tree service firms was obtained. Data were collected utilizing employer and employee questionnaires. Twenty-five questionnaires were returned of which 24 were usable. A compilation of basic sample background information is presented on size of tree service firm, total work experience, employment at current job, and preparation as a tree service 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 Tree Service Worker

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

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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 tree service worker task inventory survey. 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.

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, tree service 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 tree service worker. The specific objectives of this survey were as follows:

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

Definition of the Occupational Area

The tree service worker is employed in privately owned tree service firms which contract services with the public sector. The specific duties performed by the tree service worker will vary with the size and type of business. The tree service worker is usually involved with maintenance of trees and shrubs. In general, the tree service worker prunes trees and shrubs; repairs damaged trees; treats diseased and decayed trees; removes dead or undesirable trees; and maintains the tools and equipment used in his work. In some of the larger firms where the work may be divided between many employees, the tree service worker may have more definitive job titles such as tree trimmer, tree pruner, or tree surgeon.

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 tree service 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 tree service 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, 162 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 privately owned tree service firms. These consultants were either owners or tree pruners.

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 tree service 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. Seven duty areas were eliminated and two duty areas were combined. One new duty area was added.

As a result of the initial task inventory review process, 158 tasks were identified.

Worker Sample Selection

Since the specific duties and tasks performed by individual tree service workers are related to the size and type of business where employed, an attempt was made to survey tree service workers in various sizes and types of businesses. It was not possible to secure a list of specific names and addresses of all incumbent tree service workers in the state. Therefore, a sample of 76 tree service firms was obtained through a stratified random sampling approach. The strata used in the random sampling were type of business and geographical location in the state. The 76 tree service firms to be included in the survey were randomly selected from the appropriate telephone directory yellow pages.

Data Collection

A packet of materials was sent to the owner or manager of the randomly selected tree service firm. 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 tree service 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.

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 25 questionnaires which were returned were checked for completeness and accuracy by the project staff. Information from the 24 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 tree service worker, and the identification of tasks essential to successful performance as a tree service worker.

Description of the Sample

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

Response to the Survey

A total of 76 questionnaires were mailed and 25 replies were received. This represented a 32.7% 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	76	100.0
Total Returns	25	32.8
Usable Returns	24	31.5
Unusable Returns	1	1.3
Nonrespondents	51	67.2

Size of Firm

Tree service workers from various size tree service firms were included in the study. The number of full-time equivalent (two one-half time tree service workers equal one full-time equivalent) tree service workers employed in the firm was used as an index to assess the size of business where the tree service worker was employed. Of the 25 questionnaires received, 20 included information regarding the size of the business. TABLE II summarizes the responses to the question, "How many full-time equivalent tree service workers are employed in your business?" Fifteen tree service workers or 75% were employed in firms employing one to ten full-time equivalent tree service workers. Three tree service workers or 15% were employed in firms employing 11-20 full-time equivalent tree service workers. Thus, 90% of the tree service workers were working in firms employing 1-20 full-time equivalent tree service workers. The mean number of full-time equivalent tree service workers employed in the firms was 107.4. The median number of full-time equivalent tree service workers employed in the firms was four.

TABLE II

SIZE OF TREE SERVICE FIRM WHERE CURRENTLY EMPLOYED

Number of Tree Service Workers Employed in Firm	N	Percent of Respondents
1-10	15	75.0
11-20	3	15.0
21 and over	2	10.0
Total	20	100.0

$\bar{X}$ number of tree service workers in the firm = 107.4
Median number of tree service workers in the firm = 4.0

Total Work Experience

Tree service workers with varying amounts of work experience in tree service work were included in the study. TABLE III summarizes the responses to the question, "How many total years have you worked in the tree service industry?" Twelve tree service workers or 39% had 15 or more total years of work experience in the tree service industry. The total years of work experience in the tree service industry ranged from 1-32 years.

Tree service workers had an average of 13.4 years of total work experience in the tree service industry.

TABLE III

TOTAL AMOUNT OF WORK EXPERIENCE IN THE TREE SERVICE INDUSTRY

Years	N	Percent of Respondents
1-3	2	8.6
4-6	2	8.6
7-10	7	30.4
11-14	3	13.0
15-18	2	8.6
19-22	3	13.0
23 or more	4	17.8
Total	23	100.0

$\bar{X}$ years in the industry = 13.4

Employment at Current Job

Tree service 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?" Ten tree service workers or 34.8% had worked at their present job from one to six years. Thirteen tree service workers or 65.2% had worked at their present job from 7-30 years. The years of work at their present job ranged from 1-30 years. Tree service workers had been employed at their present job an average of 8.7 years.

Preparation as a Tree Service Worker

Tree service 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 tree service worker?" Twenty-three tree service workers or 100% indicated they received training on-the-job. Three tree service workers or 13% indicated they attended a company school or course to receive training as a tree service worker. Three tree service workers or 13% indicated they had received training as a tree service worker by attending a college/university program in

horticulture or forestry.

TABLE IV

LENGTH OF TIME AT PRESENT JOB

Years	N	Percent of Respondents
1-3	5	21.7
4-6	5	21.7
7-10	8	34.3
11-18	2	8.6
19-22	1	4.3
23 or more	2	8.6
Total	23	100.0

$\bar{X}$ years at present job = 8.7

TABLE V

SOURCE OF TRAINING RECEIVED AS A TREE SERVICE WORKER

Source	N	Percent of All Employees In the Survey
On-The-Job	23	100.0
Technical School Program	2	8.6
College/University Program	3	13.0
Company School/Course	3	13.0
Other	4	17.8

Duty Areas of Work Performed by the Tree Service Worker

The 158 tasks were grouped under 14 duty areas. Each respondent indicated whether he performed the specific task in his current position as a tree service 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.

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

1. Performing General Office Work
2. Recording Information
3. Following General Safety Precautions
4. Planning and Organizing Work
5. Maintaining Equipment and Vehicles
6. Using and Maintaining Hand and Power Tools
7. Fertilizing Trees and Shrubs
8. Operating Power Equipment and Vehicles
9. Establishing Trees and Shrubs
10. Maintaining Trees and Shrubs

Duty Areas of Work Essential for Successful Performance as a Tree Service 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 tree service 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. Performing General Office Work
2. Recording Information
3. Following Legal Regulations
4. Following General Safety Precautions
5. Planning and Organizing Work
6. Maintaining Equipment and Vehicles
7. Using and Maintaining Hand and Power Tools
8. Fertilizing Trees and Shrubs
9. Operating Power Equipment and Vehicles
10. Controlling and Preventing Insects and Diseases
11. Establishing Trees and Shrubs
12. Maintaining Trees and Shrubs

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 tree service 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
Performing General Office Work		
File various forms and records	50	2.0
Use telephone	66	2.5
Write memos, notes, and letters	58	2.3
Mean Rating	58.0	2.2
Recording Information		
Record maintenance information on equipment	62	2.4
Record information on customer orders	66	2.5
Mean Rating	64.0	2.4
Inventorying Products and Supplies		
Assist in taking physical inventory	37	1.8
Determine inventory on hand	50	2.1
Mean Rating	43.5	1.9*
Following Legal Regulations		
*Follow laws relating to chemical use	54	2.7
Follow regulations regarding planting and trimming various trees in municipalities	66	2.7
Secure parking permits for street work	25	1.8
Interpret local street laws and traffic regulations	41	2.5
Obtain chemical application permit	4	2.2
Mean Rating	38.0	2.3
Following General Safety Precautions		
Apply first aid to minor cuts, bruises, and burns	75	2.8
Identify potential safety hazards	75	2.9
Store chemicals	41	2.3
Use fire extinguishers	58	2.7
Wear appropriate protective clothing	70	2.8

*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
Ventilate work areas	29	2.0
Interpret information on labels and signs	66	2.8
Use proper lifting and carrying methods	66	2.8
Store inflammable materials	58	2.5
Wear appropriate work clothes	75	2.8
Dispose of chemical containers	50	2.5
Install safety devices	58	2.5
Determine when climatic conditions provide unsafe work situations	79	2.8
Correct potential safety hazards	75	2.9
Remove debris from work areas	75	2.6
Mean Rating	63.3	2.6
Planning and Organizing Work		
Schedule daily work	62	2.4
Establish priorities on various jobs	54	2.3
Work with customer in determining work dates	54	2.3
Mean Rating	56.6	2.3
Selling Products and Services		
Prepare advertising announcements	41	1.9
Mean Rating	41	1.9
Maintaining Equipment and Vehicles		
Add coolant to radiators	70	2.5
Add oil to equipment	75	2.7
Adjust carburetors	54	2.1
Bleed diesel fuel system	20	1.6
Change oil and oil filters	66	2.5
Change thermostats	45	2.0
Clean debris from equipment	75	2.7
Grease equipment	75	2.6
Inflate tires	70	2.5
Inspect cooling system for leaks	66	2.4

TABLE VI (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Install and adjust belts	54	2.5
Install and adjust chains	66	2.5
Service and install battery	54	2.3
Interpret maintenance instructions in operator's manuals	70	2.7
Remove equipment from storage	50	2.1
Repack bearings	50	2.1
Replace and adjust spark plugs	62	2.4
Replace bearings and seals	58	2.1
Replace diesel fuel nozzles	16	1.3
Replace spark plug wires	54	2.2
Replace radiator hoses	58	2.3
Service air cleaners	62	2.5
Service fuel strainer, filters, and sediment bowl	62	2.4
Prepare equipment for storage	50	2.2
Mean Rating	55.2	2.2
Using and Maintaining Hand and Power Tools		
Adjust tools	75	2.7
Clean tools	83	2.8
Identify tools	79	2.7
Interpret tool operation instructions	70	2.7
Recondition tools	58	2.3
Select tools for specific jobs	75	2.7
Sharpen tools	75	2.8
Store tools	75	2.5
Use hand tools safely	83	2.9
Use power tools safely	83	2.9
Set up tools	62	2.3
Mean Rating	74.3	2.6
Fertilizing Trees and Shrubs		
Determine amount of fertilizer to apply	83	2.9
Select appropriate kind of fertilizer materials to apply	70	2.7
Determine when to fertilize	70	2.7

TABLE VI (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Identify nutrient deficiency symptoms in growing trees and shrubs	62	2.6
Interpret labels on fertilizer materials	70	2.7
Mix fertilizer materials	70	2.5
Select appropriate method to apply fertilizers	66	2.5
Foliage feed fertilizer	58	2.4
Root feed fertilizer	70	2.6
Mean Rating	68.7	2.6
Operating Power Equipment and Vehicles		
Interpret gauge readings on equipment	83	2.8
Operate equipment and vehicles on public highways	87	3.0
Add wheel and front end weights	29	1.7
Adjust equipment safety shields	45	2.3
Connect front end operated equipment	29	1.9
Connect hydraulic systems and hydraulic operated equipment	50	2.3
Connect 3-point hitch equipment	45	2.1
Hitch towed equipment	79	2.7
Identify potential equipment safety hazards	75	2.8
Install safety shields and safety devices	58	2.5
Interpret hand operating signals	75	2.7
Interpret safety instructions in operator's manuals	66	2.7
Interpret safety symbols on equipment	70	2.8
Operate equipment under work conditions	70	2.9
Refuel power units	79	2.8
Use appropriate power equipment and vehicles for specific jobs	77	2.7
Mean Rating	63.5	2.5
Controlling and Preventing Insects and Diseases		
Determine amount of chemical to apply	54	2.4
Determine when to apply chemicals	50	2.4
Evaluate influence of diseases and pests on life of trees and shrubs	45	2.3
Evaluate life cycle of insects to determine appropriate control procedures	41	2.4

TABLE VI (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Identify common diseases	50	2.5
Identify common insects	58	2.5
Identify damage caused by insects and diseases	54	2.6
Identify various means by which insects and diseases are spread	50	2.4
Mix chemicals with appropriate carriers	50	2.3
Select appropriate chemicals to control insects and diseases	50	2.5
Use appropriate method to apply chemicals	45	2.3
Use mechanical means to control insects and diseases	41	1.9
Inspect trees and shrubs to determine when infestations require control	54	2.4
Mean Rating	49.3	2.3
Establishing Trees and Shrubs		
Burlap trees	50	2.2
Determine if planting area should be drained	45	2.3
Determine size of planting hole needed	54	2.3
Determine soil texture	45	2.3
Determine when various trees should be moved	45	2.4
Determine which trees may be transplanted	50	2.5
Describe appearance of trees and shrubs	50	2.4
Dig planting hole	54	2.4
Dig tree with soil ball	50	2.4
Heel in trees and shrubs	54	2.4
Identify trees and shrubs	70	2.7
Identify parts of trees	75	2.6
Incorporate soil amendments into soil	37	2.1
Install drain in planting area	33	2.1
Mulch planting area	62	2.4
Plant trees and shrubs	62	2.4
Root prune large trees	33	2.0
Spray trees with anti-transpirants	33	2.0
Store balled trees and shrubs	33	2.0
Support trees with stakes and braces	58	2.5
Tie in tree branches	54	2.3
Transport trees to planting sites	62	2.5
Water trees	54	2.5

TABLE VI (Cont.)

PERCENTAGE PERFORMANCE AND AVERAGE RATING OF IMPORTANCE OF SPECIFIC TASKS

TASK STATEMENTS	Percent Performing	Average Level of Importance
Wrap bare tree roots	50	2.3
Wrap trees	54	2.3
Mean Rating	48.5	2.6
Maintaining Trees and Shrubs		
Apply chemicals for pruning purposes	37	2.0
Apply dressing to cuts and wounds	66	2.5
Clean out tree cavities	70	2.5
Climb trees	79	2.7
Cord wood to sell	45	1.8
Cut trees	70	2.6
Dehorn trees	62	2.5
Determine feasibility of filling cavity	62	2.5
Determine final shrub and hedge form when trimming for appearance	70	2.6
Determine final tree form when pruning for appearance	79	2.8
Determine type of injury suffered by trees	70	2.8
Determine when to prune	66	2.8
Dispose of pruned branches and limbs	79	2.6
Fill tree cavities	62	2.3
Identify branches to be pruned	83	2.8
Install cable and braces to support weak limbs and cavities	75	2.7
Prune suckers or watersprouts	83	2.6
Remove broken and storm damaged limbs	83	2.8
Remove brush and weeds	79	2.4
Remove dead branches	83	2.8
Remove girdling roots	75	2.5
Remove stumps	70	2.5
Remove torn or ripped bark	70	2.5
Trim trees for utility line clearance	70	2.4
Remove V-crotches	58	2.3
Select appropriate bracing materials	62	2.7
Select appropriate materials to fill cavities	62	2.5
Shape tree cavities	66	2.4
Sterilize and dress tree cavities	50	2.3
Mean Rating	68.5	2.6