# MEASUREMENT OF PRESENT WORK PERFORMANCE AS A GUIDE IN FORMULATING WORK STANDARDS AT THE MIDLAND HIGH SCHOOL CAFETERIA

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# MEASUREMENT OF PRESENT WORK PERFORMANCE AS A GUIDE IN FORMULATING WORK STANDARDS AT THE MIDLAND HIGH SCHOOL CAFETERIA

By

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# INTRODUCTION

Competent school cafeteria managers are aware that kitchen design and equipment selection are important factors in the control of ever-increasing labor costs. However, the scientifically planned kitchen will fail in its objective of high productivity at minimum labor expense unless the methods used to control costs in industry are effectively adapted to food production.

Homemakers who have had minimal experience in the food service industry, constitute a large percentage of the work force in school lunchrooms. With the exception of homemakers who suffer from cardiac disabilities, little or no effort has been made to introduce principles of time and motion economy into daily household tasks. Thus, each homemaker who joins the school lunch staff brings with her the work habits she has formed at home, many of which are inappropriate for efficient quantity food production.

Any program designed to change work habits meets with resistance because it implies a criticism of the worker. To insure success in the application of work improvement methods to the preparation of school lunches, the worker must experience positive involvement during the process of change.

# MIDLAND

## The City and Its School System

Midland, located midway in the Lower Peninsula of Michigan, has a population of 28,000. Many of the residents are professional people employed by Dow Chemical Company, Dow Corning Corporation, the Board of Education, and smaller units of industry or business. The city is known for its beautiful churches, competence of student musical organizations, emphasis on scientific training, and interest of the community in its schools.

The Midland school system is comprised of seventeen elementary schools, two intermediate schools, and one high school. The two intermediate schools and the high school have lunch programs with the food prepared in the individual kitchens. Only one of the elementary schools has a lunch program. The food for this school is prepared in the kitchen of one of the intermediate schools and delivered by bus.

Citizen committees study instructional methods, evaluate results, and suggest improvements to the school administrators. Science, mathematics, and related subjects are stressed in the curricula. Approximately one-half of the high school graduates attend college. An extensive "co-op" program requires interested junior students to attend summer school, enabling these students to complete high school the following year while employed half days in local businesses.

## The School Lunch Program

Midland began serving lunches to high school students in 1940 when two classrooms were remodeled to accommodate meal preparation and the seating of one hundred students at each of two fifty-minute lunch periods. One cook and a helper prepared and served the food under the supervision of a home economics teacher.

In the fall of 1956, the eighteen hundred high school students moved to a new building. Lunch periods were shortened to three half-hour periods, the federal lunch program was inaugurated, and a nutritionist employed as cafeteria manager. For the first time since the beginning of the local program, adequate facilities were available to serve and seat all the students. The shortened lunch periods made it impossible for all but a very few to go home for the noon meal. Accurate record keeping and close supervision became mandatory with increased volume of business and the advent of the federal lunch program.

In 1959 the food service division became the administrative responsibility of the business manager of the Midland schools and the high school cafeteria manager, who in addition to retaining management of the high school cafeteria, became supervisor of all cafeterias in the school system. Together the business manager and the supervisor of cafeterias plan major policy, financial, and personnel changes which may require subsequent approval of the school administrators.

The duties of the cafeteria supervisor include planning the menus, purchasing the food, consolidating the records, supervising and analyzing the financial situation of each unit monthly and semi-annually, and employing, assigning, and arranging for the training of kitchen staffs.

Because à la carte items are offered in addition to the "Type A" lunch at the high school, food preparation in this unit presents varied experience to the novice. The high school kitchen is used as an employee training center and replacements or additions to other staffs are made from this pool.

All Midland cafeteria workers are hourly workers since they are not employed for an eight-hour day. They are hired for four, five, or six hours daily depending on assignment. Food production workers are on duty normally six hours, from 8:00 or 8:30 a.m. Service staff members normally work five to five and one-half hours from 9:30 a.m. New employees work four to five hours from 10:00 or 10:30 a.m. By maintaining a short work day, more women can be employed at peak hours to serve on the seven serving counters.

To accommodate the work load, hours may vary from day to day at the discretion of the worker or the unit head. This could encourage slowness or loafing, but just the opposite occurs with most employees. The labor hours are totaled daily on the sign-in sheet so the unit supervisor is aware of deviations from the acceptable minimum productivity which is based on twelve meals per labor hour (32, 48). Workers shorten hours on Fridays and the days before school holidays because little advance preparation is made. On Mondays and days following holidays they may increase their hours or schedule a helper to report earlier than usual depending on the menu.

In order to control labor cost which is particularly important in a self-sustaining school lunch program, it is advisable to keep hours flexible without salary guarantee or yearly contract. Employees are paid the prevailing hourly rate of the local industrial cafeterias which is higher by fifty to seventy-five cents per hour than wages of local restaurant or store employees. Because of the short working hours

and vacations which coincide with the schedules of school children as well as the high pay scale, there is a superabundance of applicants.

## A CASE STUDY IN METHODS IMPROVEMENT

Because the high school cafeteria offers a more varied menu than the other cafeterias, the work habits of individual workers in this unit can be a more crucial factor in maintaining proper production cost relationships than in the intermediate schools which serve only a limited menu. For this reason the high school was selected as the base unit for developing and testing a method of measurement of present work performance as a guide to formulating work standards. When a satisfactory method has been developed, other cafeteria staff members will be asked to study the present work performance of their units. A comparison will be made between the intermediate schools because they serve identical menus to approximately the same number of students.

When the Midland High School cafeteria moved operations to the new building, a kitchen staff of fifteen was selected through written application and interview. Although selection was weighted by previous quantity food experience, most of these workers were homemakers who had not worked outside the home for some years, and less than half were acquainted with quantity food preparation and service methods.

Several problems arose from lack of performance and production standards. The cafeteria system supervisor often found it difficult to communicate to the employee the standards used to judge the worker's performance as excellent, satisfactory, or below average. On-the-spot, flash suggestions for improvement of work methods were sometimes poorly accepted by workers and had little lasting effect. Some employees earnestly accepted suggestions for time and motion economy, "how-to-work-smarter-and-easier," while others felt they were doing

a faultless job. Simple suggestions such as using a fully loaded truck for one-trip materials movement, setting up right to left product assembly, and point of use storage were viewed as personal criticisms.

In order to improve work performance, the employee must become familiar with the philosophy, techniques, and methods of work simplification and learn to apply them to her daily routine. The supervisor believed that if employees could bring work simplification ideas into their home kitchens some transfer to the school lunch kitchen would be made. To this end, the principles of work simplification were illustrated by a film showing how a home kitchen was rearranged and daily routine simplified to permit housewives with physical disabilities to perform their duties. Employees' comments following the showing of the film indicated meager comprehension of how to adapt these principles to their own work routine, either at home or at school. Intensive training in applying the principles of work simplification was indicated. However, because of family responsibilities, the employees were not eager to give up evenings or days when school did not convene to attend training sessions.

Applying the techniques of work simplification requires that a job be recorded, analyzed, and reassembled, incorporating suggested improvements in the new method. Various methods of time and motion study have been used by industry to record work in progress. Work sampling at random times in a hospital kitchen was reported by Wise and Donaldson (39). All reported time and motion studies have been made by an observer using flow process charts, job breakdowns, cross-charting, string charts, work sampling techniques, or films.

In Midland the supervisor was not free to act as an observer and trained or professional consultants were too expensive to consider. The answer seemed to lie in on-the-job training. Could the solution be a "do-it-yourself" approach which would involve the worker in

measuring work performance, improving work methods, and formulating work standards? This brought up other questions. Which procedures should be used to secure the interest and cooperation of the employees in a methods improvement study? What tools would be needed and would they be simple enough for the employees to use while performing daily tasks?

## Work Improvement

The adaption of industrial methods and philosophies has been slow in coming to food centers because products vary from day to day and considerable handwork is necessary. Yet, to some degree, all food preparation is repetitive and can be simplified much as highly repetitive operations are simplified through industrial engineering in manufacturing plants.

In industry employees accomplish six and two-thirds hours of productive work during an eight-hour day (24), but only 45 to 50% of the food service worker's time is productive (27). There is need for labor costs, which are nearly equaling raw food costs, to be standardized just as raw food costs have been standardized. An analysis of costs must depend on performance standards, expressed as work counts validated by standardized production routines (4). Just as industrial plants have applied the principles of work simplification and time measurement to set up standards, so must food service managers concern themselves with work distribution, motion economy, and work count to improve and standardize methods and costs.

Managers must become more exacting in the ability to control and reduce expenses. Ganong is convinced that, through her own efforts, every good manager can save at least 10% of present labor and material costs (19, 20). However, a manager can achieve only what the employees

will let her achieve. One of the newest concepts of business today is "materials management" of which employee utilization is a part (17). Wise management subordinates the direction of things to the development of people by supporting and assisting each employee to realize her full potential.

A staff may be motivated to employ the best means possible for efficient operation by a program of intensive analysis, measurement, and reporting (17). Every method can be improved with sufficient study and workers will come to recognize there is a better way to do every job (19, 20).

Employees need to practice procedures for improvement but first they must desire to learn new methods. A good supervisor is constantly searching for means to interest and motivate all employees in learning and improving their performance by stimulating and encouraging in them the will to excel. The skillful manager sets up a number of smaller standards or objectives that must be reached if the major objective of the organization is to be accomplished (9). She may help the worker assume responsibility by careful placement, by establishing high standards of performance, by providing information which the worker needs to regulate and control her production, and by giving her a managerial vision (21). If workers can be induced to plan and evaluate their work, management may benefit more than if a formal program of work simplification is introduced abruptly and without previously developed worker acceptance.

Most texts on management state that 'employee satisfaction' is a prime motivating force that should be fulfilled. Morale, the mental and emotional reaction of a person to his job, affects the amount of work a person does, the quality of the work, and the manner of doing it. Considering that efficient food service is measured by performance of its employees as expressed by quality of food, cost of operations, and

service to the public, the importance of involving workers in changes cannot be minimized. Time is more wisely spent creating acceptance prior to change rather than overcoming resistance later. Groups grow in unity, strength, and effectiveness as individual members find satisfaction of their desires within the group (13).

A methods improvement study should arouse interest in objectives of the school lunch program, make employees aware of requirements for work, and create a desire to increase their knowledge. Extended work improvement programs can develop job skills, improve organization of duties, and indicate leaders of the group.

## A Program to Improve Work Methods

### Involving the worker

> Planning is many things. It is the thinking that precedes the actual performance of work. It may be described as **WORK SIMPLIFICATION** since it is the process of thinking through a job or jobs step by step to find the simpliest and most efficient method of doing the job. IT ESTABLISHES GOALS TOWARD WHICH EFFORTS MAY BE DIRECTED.[1]

The purpose of work simplification is to make work easier for everyone by eliminating the unnecessary parts of a job which add nothing to the value of the product. There are three parts to every job; the get ready, the "do," and the put away. By planning carefully, the time spent in getting ready and putting away can be minimized leaving the greater percentage of time and effort available for the "do" part of the job.

The worker, becoming familiar with work improvement methods, will benefit through increased efficiency and decreased expenditure of

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[1] J. Martin. "What You Should Have Done Yesterday," The School Lunch Journal, (February, 1962), 18-20.

energy. Misunderstanding, confusion, and frustration will be reduced as the worker and the supervisor come to a mutual understanding of the job requirements; what is to be done, how well it is to be done, and what results are to be obtained. Formulation of performance standards will enable each worker to measure her own effectiveness, show where improvement is needed, and increase job satisfaction as the worker emerges as manager on her job. Standardized production routines will aid in training new employees, in distributing work equitably, and in more efficient scheduling.

The unit manager will be able to use performance standards to estimate work capacity; to plan, organize and assign work; to determine who needs training and how much; to provide a positive basis for personnel changes. Comparative costs of factory-prepared versus kitchen-prepared foods, centralized versus decentralized preparation, and realistic pricing to the customer or the satellite kitchen can be based on performance standards.

## Selecting the job to improve

Unit managers and workers must search out the trouble spots in the kitchen. Often, time-consuming menu items or joint use of equipment create bottlenecks. Production or quality problems frequently result in excessive waste of materials or labor and increase these costs. Inadequate training of new employees results in poor organization of workspace or improper sequence of steps in product assembly.

In the Midland High School kitchen, the head of the salad unit had proved to be extremely cooperative, open to any suggestions for trial, aware of the importance of the cost-price relationship, and eager to improve her work methods. She had expressed concern about the production of à la carte salad items. The lack of performance standards

in this area had been keenly felt by management in training new employees, meeting production deadlines, and evaluating the efficiency of helpers. No standard was available to guide improvement or assess performance. The supervisor was concerned as to whether the established à la carte selling price of ten cents per serving was sufficient to cover the total cost of food and labor, especially on items involving considerable handwork or when helpers appeared to work slowly.

The preparation of potato salad was chosen as the specific task to study. The head of the salad unit preferred the product made with potatoes freshly cooked in the skins which necessitated hand peeling and dicing while the cafeteria supervisor felt a considerable saving of time could be effected by using the mechanical peeler and dicer. How much time would be saved and what effect a change in method would have on the product were two questions to be answered by applying three steps in work simplification: recording the present method, taking the job apart, and putting the job together in a more efficient manner.

## Applying work simplification to a specific task

Recording the present method.--On a process chart (Exhibit 1) the salad worker recorded sequentially opposite the approximate time, her present routine in the preparation of potato salad, the amounts of ingredients involved, the number of servings obtained, and the total time devoted to preparation and cleanup. Items in the suggestion column were recorded as they occurred to the worker, to the manager, or to the evaluating team which reviewed the present method.

Taking the job apart.--When the process chart was completed, the evaluating team, consisting of manager and the employee or employees, reviewed the present method by applying the following guide (1) to question the job as a whole.

EXHIBIT 1

PROCESS CHART

| Preparing: Potato Salad | | Suggestions |
|---|---|---|
| 8:00 | Weigh 20# potatoes, wash, put in steamer, set timer for 45 min. | Could potatoes be peeled mechanically, then steamed? |
| | Steam 2 dozen eggs, set timer for 28 min. | Could the eggs be broken and then steamed? |
| 8:15 | Chop coarsely by mechanical means 1# stripped celery with 6 oz. peeled onion; combine with 2# salad dressing, 2 Tb. salad mustard, and ¼ cup each salt, sugar, and vinegar. | |
| 8:30 | Remove eggs from steamer, place under running cold water. | |
| 8:45 | Remove potatoes from steamer, let cool. Shell eggs and dice coarsely. | |
| 9:00 | When cool enough to handle, peel and dice the cooked potatoes. | Could the potatoes be diced on the french fry cutter after cooking? |
| 9:40 | Combine all ingredients, taste. Distribute 12 sauce dishes on a 14x18 tray. With a No. 12 scoop, dish salad from bowl on right. Transfer filled tray to cart. Distribute 12 more dishes on tray, fill and transfer to cart. Repeat six times with the final four servings on the ninth tray. Transport by loaded cart to service refrigerators. | Could they be diced raw?<br>Could trays be stacked with 12 empty dishes on each tray so that the top tray is filled with salad, removed to truck, next lower tray filled and repeated until supply of salad has been exhausted? |
| 10:00 | Preparation of item completed and work space made ready for next item. | |

SUMMARY:

| | |
|---|---|
| Yield | 100 servings |
| Total time | 2 hours |
| Standard | 50 servings/hr. |
| Labor cost | $3.60 |
| Cost/serv. | $0.036 |

1. What was done and why was it done?

2. Where was it done and why there?

3. When was it done and why then?

In answer to what was done and why came the question, is it necessary to make potato salad daily or can it be eliminated as an à la carte choice? Because of the popularity of this item, the team decided to retain potato salad as a daily choice except when either this item or french fries were offered on the "Type A" menu.

Where in the kitchen was potato salad prepared and why at that location? Production of à la carte salads is the responsibility of the salad worker which necessitates use of the steamer and food chopper located in the cooking unit. When potato salad is in on the "Type A" plate lunch it becomes the responsibility of the head cook since it replaces an item of hot food and the increased quantity is adapted more easily to that preparation schedule. Moreover, the cooking unit contains the equipment required for the preparation of the larger quantity.

When was it prepared and why then? À la carte preparation was done as the first morning task because of the need to cook and cool two of the ingredients. The team considered other possibilities. Advance preparation to the extent of combining all ingredients the previous afternoon, although desirable with some food products, is not acceptable from either a safe food handling or a quality standpoint. With the larger quantities advance preparation can be done to the extent of peeling the potatoes, cooking the eggs and potatoes, and cleaning the celery and onions.

The next step in taking the job apart was to challenge each "do" operation by using the following guide (1).

1. Can this operation be eliminated?
2. Can this operation be combined with some other portion of the job?
3. Can the sequence of operations be changed to improve efficiency?
4. Can the job be done better somewhere else?
5. Can some other person do this job more economically?
6. Can the details of the operation as it was done be improved?

Each step recorded in the preparation of the selected item was discussed by the team. Since production methods were acceptable for the preparation of the celery and onions, the methods of preparing the potatoes and eggs appeared to be the only critical factors.

To find answers to the above questions and to evoke suggestions for improving the preparation methods for these ingredients, the technique of brainstorming made popular by executive management was found helpful. In brainstorming, all ideas of those present are expressed and considered. Not all suggestions are usable, but it is important that each contribution be considered regardless of the status of the contributor.

Obviously for the item prepared, potatoes and eggs must be cooked and within the limitations of the total preparation schedules of the kitchen, cooking of potatoes and eggs may be combined with other scheduled items.

Could the sequence of operations be changed to improve efficiency in the cooking of eggs and potatoes? Should the eggs be broken; then steamed? Should the potatoes be cooked in the skins, peeled, and when cool diced by hand, or on the french fry cutter or mixer attachment? Should the potatoes be diced raw and then cooked? Would it be more

efficient to mechanically peel potatoes the afternoon before and dice the following morning?

Could the daily requirement for potatoes be centrally peeled by the cook's helper for use in all menu items? Under such a plan could the potatoes be mechanically peeled on the morning of the day they are to be cooked? To find the most acceptable procedure for product quality the potatoes and eggs were prepared according to each suggestion from the team.

Could details of the dishing operation be improved by distributing 12 of the required number of sauce dishes on each tray and stacking these trays in front of the worker to assure the proper progression of product assembly and economy of the worker's movements?

To stimulate critical thinking for the development of the most efficient production method, principles of motion economy as applied to the work space were examined using the following guide (1).

1. Have a definite and fixed place for all tools and materials.
2. Locate tools, materials, and receiving container close and directly in front of the worker, in arcs rather than in a straight line.
3. Arrange equipment to require the least possible movement on the part of the worker.
4. Use gravity to drop deliveries wherever possible.
5. Locate materials and tools to permit the best sequence of motions, usually right to left.
6. Provide work space of the proper height. Tables should be 37 to 39 inches high, or 4 inches below the bent elbow when the worker's forearm is level, or sufficiently low to enable the palm of the hand to lie flat on the surface when the elbow is straight.
7. Provide a chair capable of adjustment to a height of 25 to 31 inches with a saddle type seat 13 to 14 inches wide.

Principles of motion economy as they applied to the worker's movements were discussed to introduce the following points suggested by Barnes (1).

1. Rhythm is essential to smooth, automatic performance of an operation. Efforts should be made to combat fatigue because it breaks up rhythm and disturbs coordination. Work arrangement should permit an easy and natural rhythm wherever possible.
2. Large sweeping movements are faster, easier, and more accurate than restricted movements.
3. Smooth continuous curved motions are preferable to zigzag or straight line motions involving sudden and sharp changes in direction.
4. Momentum should assist the worker wherever possible. Start a task and keep it going. Don't work in fits and jerks.
5. Use hand and arm movements rather than upper arm and shoulder.
6. Hands start and stop at the same time; they do similar work; and in opposite directions.

Putting the job together.--A revised method, incorporating the suggested changes, was developed and recorded for trial as shown in Exhibit 2.

Even though a 50% saving in labor was demonstrated by the trial production routine for potato salad, there are times when the most efficient way is not the best. Peeling potatoes for salad before cooking and dicing on the mixer attachment saved some preparation time, but the product was found to be better flavored with potatoes freshly cooked in the skins.

The decision to set 100 servings as the determining factor in the method of preparing potatoes for salad was based on two factors: one, that for à la carte daily service less than 100 servings are required; and two, that when potato salad is included on the "Type A" menu 500 servings are required.

EXHIBIT 2

PROCESS CHART

Preparing: Potato Salad - Revised method for trial

| | | Suggestions |
|---|---|---|
| P.M. | Advance preparation-cook's helper mechanically peels 20# potatoes which yield 18# potatoes ready to steam the following a.m. Store in water and refrigerate overnight. | From previous unit studies the performance standard for peeling and eyeing potatoes had been established at 2# per minute. Therefore, to calculate total time required for preparation 10 minutes must be added to cover the advance preparation. |
| Following A.M. | | |
| 8:00 | Put peeled potatoes in steamer, set timer for 45 minutes. | |
| | Break 2 dozen eggs into BUTTERED 12x20x2 pan. Put eggs in steamer, set timer for 12 minutes. | |
| 8:15 | Chop coarsely by mechanical means 1# stripped celery with 6 oz. peeled onion; combine with 2# salad dressing, 2 Tb. salad mustard, and $\frac{1}{4}$ cup each salt, sugar, and vinegar. | |
| | Remove eggs from steamer and let cool. | |
| 8:25 | (Work on other salads - 20 minutes) | |
| 8:45 | Remove potatoes from steamer and let cool. | |
| 8:50 | (Work on other salads - 40 minutes) | |
| 9:30 | By hand, coarsely chop eggs in their steaming pan. Hand dice potatoes. Combine all ingredients, taste. Distribute 12 sauce dishes on each of eight 14x18 trays and stack trays one on another in front of worker. Place 4 dishes on a ninth tray. With a No. 12 scoop, dish salad from bowl on right until top tray is completed. Transfer tray to cart parked on left and repeat dishing operation until supply of salad is exhausted. Transport by loaded cart to service refrigerators. | |
| 9:50 | Preparation of item completed and work space made ready for next item. | |

SUMMARY:

| | |
|---|---|
| Yield | 100 servings |
| Total time | 1 hour |
| Standard | 100 serv./hr. |
| Labor cost | $1.80 |
| Cost/serv. | $0.018 |

Charges for the complete meal are less than the combined prices of equivalent à la carte items. Consequently, the per meal labor cost must be less. The ten hours of time required to hand peel cooked potatoes cannot be justified for a single item on the "Type A" menu.

Therefore, when fewer than 20 pounds of potatoes are to be prepared, they are to be steamed in the skins, then hand peeled and diced. When more than 20 pounds of potatoes are to be prepared, efficiency of method should supersede other considerations and the potatoes are to be mechanically peeled and diced on the hand-operated french fry cutter. The standardized routines to illustrate both methods are shown in Exhibit 3 and 4.

## Establishing the performance standard

The performance standard made with hand-peeled potatoes was established at 50 servings per hour since it required two hours to prepare 100 servings. It can be estimated that every deviation of 10 servings would require 12 minutes less or 12 minutes more of preparation time. When potatoes are mechanically peeled, the established standard was 100 servings per hour. Thus, it can be estimated that the preparation of 500 servings of potato salad would require five hours of labor time.

The direct labor cost was calculated by dividing the pay rate of $1.80 per hour by the performance standard of 50 or 100 servings prepared in one-worker hour. The standardized labor cost amounted to $.036 per serving if potatoes were hand-peeled, or $.018 if mechanically peeled. The addition of labor cost per serving to the raw food cost of $.022 per serving gave a production cost of $.058 per serving for salad prepared from hand-peeled potatoes and $.040 for salad prepared from mechanically peeled and diced potatoes.

EXHIBIT 3

POTATO SALAD: Standardized routine for 100 portions or less

| | 100 servings | *Time<br>Work count | 2 hours<br>50/hour |
|---|---|---|---|
| Potatoes, A.P. | 20# | | |
| Eggs | 2 dozen | | |
| Celery, stripped | 1# | | |
| Onion, peeled | 6 oz. | | |
| Salad dressing | 2# | | |
| Salad mustard | 2 Tb. | | |
| Salt | $\frac{1}{4}$ cup | | |
| Sugar | $\frac{1}{4}$ cup | | |
| Vinegar | $\frac{1}{4}$ cup | | |

Method:

1. Wash potatoes (8:00 a.m.) and steam 45 minutes. Cool.
2. Break eggs in BUTTERED 12x20x2 pan. Steam 12 minutes. Cool.
3. Chop celery and onion coarsely in food chopper.
4. Combine all seasonings and dressing with onion and celery.
5. Chop eggs coarsely by hand chopper in their steaming pan.
6. Peel and dice potatoes by hand as soon as cool enough to handle. (9:00-9:40 a.m.)
7. Combine all ingredients and taste.
8. Distribute 12 sauce dishes on each of eight 14x18 trays and stack in front of worker. Place 4 dishes on a ninth tray.
9. With a No. 12 scoop fill dishes from salad bowl on right. As each tray is completed remove to cart packed within reaching distance to the left.
10. When supply of salad is exhausted, transport by loaded cart to service refrigerators.
11. Preparation of item completed and work space made ready for next item by 10:00 a.m.

*Note: Total time based on one worker.

EXHIBIT 4

POTATO SALAD: Standardized routine for 100 portions or more

| | 500 servings | *Total time<br>Work count | 5 hours<br>100/hour |
|---|---|---|---|
| Potatoes, A.P. | 100# | | |
| Eggs | 10 dozen | | |
| Celery, stripped | 5# | | |
| Onion, peeled | 2# | | |
| Salad dressing | 10# | | |
| Salad mustard | 10 Tb. | | |
| Salt | 1¼ cups | | |
| Sugar | 1¼ cups | | |
| Vinegar | 1¼ cups | | |

Method:

1. Advance preparation the previous afternoon: Peel potatoes mechanically and eye. Allow 10 minutes to clean peeler. Steam potatoes 45 minutes. Place cooked potatoes in shallow pan, put salt and vinegar from the recipe over hot potatoes to facilitate seasoning and refrigerate until following morning.
2. Break eggs in two BUTTERED 12x20x4 pans (8:00 a.m.). Steam 16 minutes because of the additional quantity in each pan. Cool.
3. Chop celery and onion coarsely in food chopper.
4. Combine all seasonings and dressing with onion and celery.
5. Chop eggs coarsely by hand chopper in their steaming pan.
6. Dice potatoes on hand operated french fry cutter (9:25-9:45).
7. Combine all ingredients and taste.
8. Transfer approximately 1/3 of product to 5 serving pans and transport to service refrigerators for the first lunch period. Reserve the remainder for second and third lunch periods. Leave on cart and park in walk-in refrigerator. Refill serving pans for second and third lunch periods.
9. Preparation of item and cleanup completed by 10:30 a.m. Allow 10 minutes cleanup time for each of the following items: Food chopper, french fry cutter, utensils, and work space.

*Note: Total time includes labor time of two workers.

Since the direct labor cost added to the raw food cost did not total the established selling price of ten cents per item, and since this item was prepared daily for the à la carte salad bar, it was not necessary to resort to the mechanically peeled and diced product.

## SUMMARY AND CONCLUSIONS

This study was undertaken to develop a method which would involve the worker in studying present work methods, in applying work simplification techniques to improve her work habits, and in formulating work standards for one à la carte salad item. A process chart, not too difficult or time consuming to keep while working, was used to give a complete and detailed study of the present routine followed in preparing potato salad. The method of preparation was recorded by the head salad worker and the result became a description of all steps involved in carrying out the production of the selected menu item.

The manager and the workers reviewed the steps in the process and offered suggestions for improvement in efficiency of setting up the work space, progression of materials, and mass production methods. The suggestions were incorporated in a modified trial routine and tested. A decision was made to modify the present routine for daily à la carte production of 100 servings or less by simplifying the cooking of the eggs. When larger quantities are prepared, the routine is further modified to employ mechanical means to peel and dice the potatoes.

Employees have accepted as standard procedure the new method of preparing hard cooked eggs in recipes requiring eggs to be chopped. Not only was there a saving of 16 minutes in cooking time by breaking eggs before steaming, but it took less time to break a raw egg than it did to shell a hard cooked egg and the frustration of difficult shelling was eliminated.

In developing a trial method, various ways of preparing potatoes were tried as this seemed to be the most critical factor. It was found that mechanical dicing saved little time since cleaning the dicer absorbed

the time saved in the operation. The shape of the potato when diced mechanically resembled a french fry cut and, since it was larger than when hand diced, was more difficult to season well. Dicing on the mixer attachment resulted in very uneven cuts, some shreds or pulp, less yield in number of servings, and more cleaning time than the french fry cutter. The product was judged superior when potatoes were cooked in the skins, necessitating hand peeling and dicing.

Motion economy of the worker and the proper progression of materials was effected by applying all pertinent points of the guide lists. The most efficient organization of the work space and economical use of the worker's time and energy does not vary with the quantity of food produced. The principles of motion economy so necessary to volume assembly can be applied just as effectively when smaller quantities of food are assembled.

Once the production routine has been standardized, the performance standard can be developed by averaging the work count of several workers, or the same worker preparing the same item on several occasions. From the performance standard, expressed as work count, standardized and direct labor costs can be determined.

The method used for the study of the preparation of potato salad may be applied to any production item, and comparison of work performance between similar production centers may be made.

Information gained from a methods improvement program may serve as a valid basis for determining selling prices, controlling labor costs, comparing factory-prepared foods with kitchen-made products, evaluating worker efficiency, scheduling the flexible on-duty hours, determining the advance preparation time necessary, and arriving at a direct labor cost for major menu items. A knowledge of total production costs of food items may lead to the elimination of those with a high labor

cost, to the use of selected factory-prepared foods, or to the decision to centralize preparation.

Through the use of a simplified process chart the study of present production routines, the employee becomes involved in examining self-performance, in applying the principles of work simplification relating to motion economy, in trying new methods, and in formulating performance standards.

Involving the worker enables the manager to aid each employee in developing skills to perform her job more effectively. The same basic process chart may be used by each worker to record a description of her job. These job descriptions may be given to new employees for training guides or to substitute workers to aid in their management of time.

Additional operational benefits which might be derived from a series of similar studies could include the development of comprehensive cleaning schedules and equitable distribution of cleaning chores, simplified production routines on every recipe, and assessment of adequacy of present equipment for application of work simplification principles.

A methods improvement program is never ending; it must be a continuous process if food service operations are to continue to operate within a framework which is both efficient and economically sound.

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