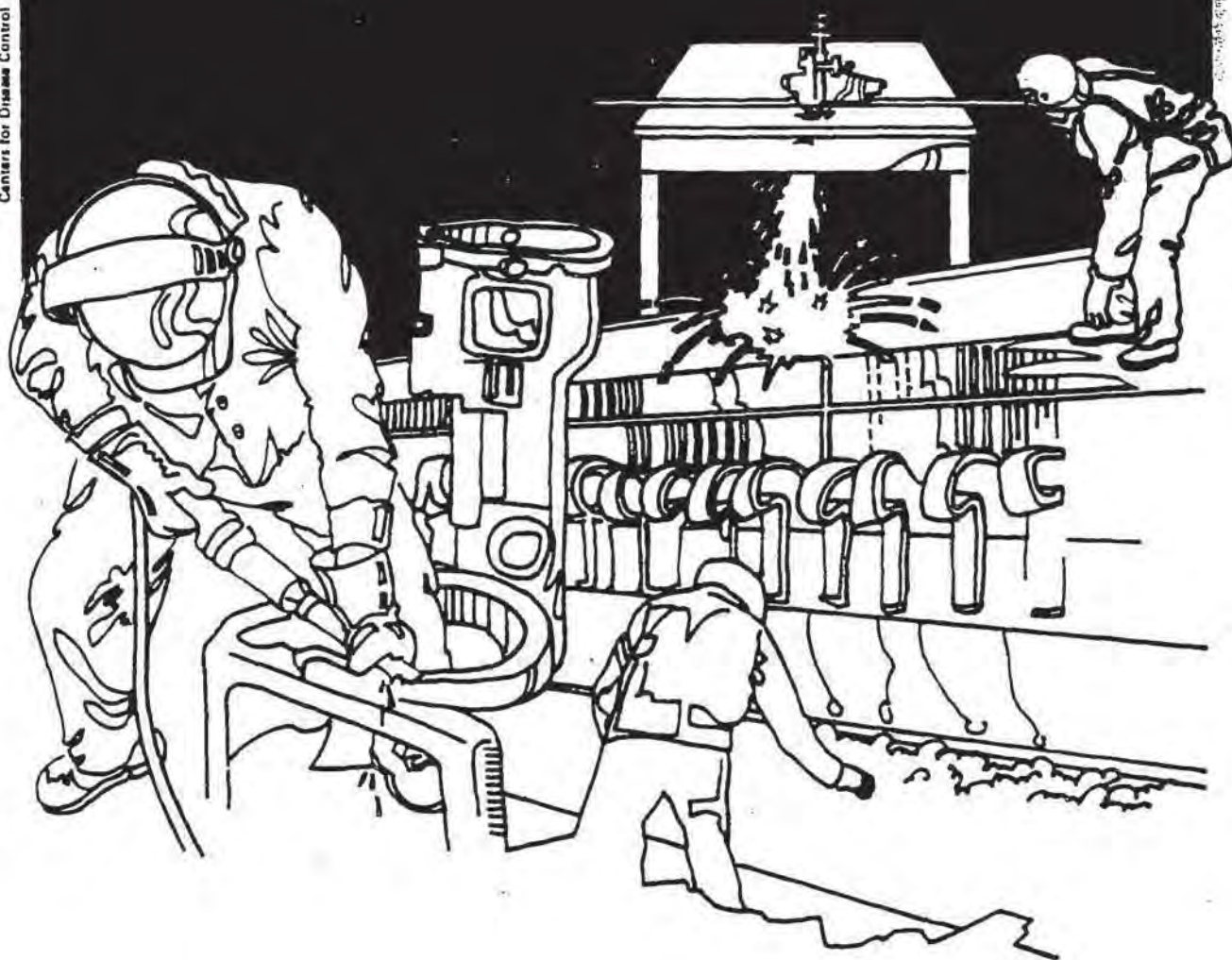


NIOSH



Health Hazard Evaluation Report

HETA 83-053-1554
CHEF FRANCISCO, INCORPORATED
EUGENE, OREGON

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

HETA 83-053-1554
JANUARY 1985
CHEF FRANCISCO, INCORPORATED
EUGENE, OREGON

NIOSH INVESTIGATORS:
DONALD W. BADGER, Ph.D.
JAMES M. BOIANO, IH
THEODORE W. THOBURN, M.D.

I. SUMMARY

On June 8-10, 1983, the National Institute for Occupational Safety and Health (NIOSH) conducted a health hazard evaluation of a reported excess of occupationally induced hand and wrist injuries among workers at Chef Francisco, Incorporated, Eugene, Oregon. The objective of this evaluation was to identify job tasks which might be conducive to the development or aggravation of musculoskeletal (MSS) injuries.

Chef Francisco produces frozen bakery products and soups. At the time of the evaluation, 234 employees (113 males and 121 females) were employed at the plant.

The evaluation included an ergonomic assessment of selected jobs in the Soup, New, and Old Bakery departments and a review of the OSHA log of Injuries and Illnesses and other records. From observations made during the ergonomic evaluation several jobs were identified which imposed stressful ergonomic demands on workers. These demands included unaided heavy lifting and/or transporting of loads; repetitive lifting requiring twisting of the trunk, excessive reach distances, excessive lifting distances, and/or forceful gripping motions of the hands and wrist; and fatiguing postures and motions of the trunk and upper limbs.

The OSHA log data from January 1982 to May 1983 was compiled and tabulated by type of injury, department and job title. Of the 146 total injuries reported during this time, 24 (16.4%) were related to pulled muscles, bursitis, tendonitis, or numbness in the arm. Hand and wrist problems including carpal tunnel syndrome, and smashed appendages each accounted for an equal number (21 or 14.4%) while back strains accounted for 20 (13.7%) of the reported injuries. The type of injury did not focus in any one department or job classification.

On the basis of the information collected during this evaluation NIOSH determined that manual material handling jobs were potentially hazardous to workers by causing back injuries as well as hand and wrist disorders. Recommendations for modifying or eliminating these problems are presented in Section VI of this report.

KEYWORDS: SIC 2038 (Frozen Specialties) musculoskeletal disorders, manual material handling, lifting tasks, ergonomics, carpal tunnel syndrome

II. INTRODUCTION

In October, 1982, the National Institute for Occupational Safety and Health (NIOSH) received a request to perform a health hazard evaluation (HHE) at Chef Francisco, Eugene, Oregon. The evaluation was prompted by a request from members of teamsters Local 670, who were concerned about an unusually high incidence of carpal tunnel syndrome and other hand and wrist disorders among employees, which were thought to be associated with job demands.

We conducted an ergonomic evaluation including a review of medical records on June 8-10, 1983. An interim letter report describing the findings of our investigation was sent to company and union representatives on July 17, 1984.

III. BACKGROUND

A. Workforce

Chef Francisco is one of three plants owned by the LaBatt Company of Toronto, Canada. The Eugene Oregon facility produces frozen bakery products and soups, primarily for the food service industry, but also some for retail sale. At the time of the evaluation, 234 hourly workers (113 male and 121 female) were employed at the plant.

B. Process Description

Soups - Raw materials such as vegetables, noodles, cheeses, meats, spices etc. are weighed and emptied into 650 gallon capacity Crepaco cooking vessels where the contents are mixed with water. The soup is cooked, then piped from the Crepacos to a conveyor line where portions of soup are injected into plastic containers. The containers of soup are sealed, cooled while moving through a spiral cooler, packaged into boxes, palletized, and stored in a freezer prior to shipment.

Bakery Products - The process flow basically is the same as described above. Raw materials i.e., eggs, flour, sugar, butter, spices, etc. are weighed and emptied into a mixer. The batter is then piped to a conveyor line where portions are deposited into cooking pans. The pans of batter are cooked while moving through an oven, cooled, sealed, packaged into boxes, palletized, and stored in a freezer.

The most demanding jobs in terms of causing musculoskeletal disorders were those which were located at the beginning of the soup and bakery processes, where large amounts of foodstuffs were handled. These involved lifting, carrying, and/or moving heavy loads of raw materials such as 100 pound bags of flour, sugar, etc. and carts of vegetables weighing in excess of 1200 pounds.

C. Previous Ergonomic Assessments

Prior to the time we conducted this evaluation, the State of Oregon Accident Prevention Division had received a similar complaint from Chef Francisco workers. On August 26 and October 1, 1981, an industrial hygienist from the State Agency made a detailed inspection of this plant, and prepared a report which identified several specific jobs thought to have demands conducive to the development of MSS disorders of the hand and wrist. This report contained specific recommendations for alleviating the hazards identified. We reviewed this report and Chef Francisco management responses to these recommendations prior to our own site visit. We also reviewed a more general report of plant operations from a consultant retained by the company. There was general agreement in these two independent reports that several tasks at Chef Francisco presented undue physical demands which could be improved by appropriate changes in equipment used or in task design.

IV. METHODS AND MATERIALS

On June 8, 1983 we conducted a tour of the plant to become familiar with plant operations and to identify specific tasks for further evaluation the next two days. Based on observations made during the tour we decided to concentrate on the following problem areas: (1) manual materials handling (2) stressful postures and motions and (3) tool/equipment design. Our findings regarding these topics will be discussed separately in Section VI.

On June 9 and 10, we evaluated jobs in the Soup, New, and Old Bakery Departments. Jobs were evaluated with a twofold objective: (1) to identify tasks thought to be hazardous or fatiguing and conducive to the development or aggravation of existing musculoskeletal (MSS) injuries and (2) to make recommendations for changes in job design or work practices which might reduce the risk of injury. Photographs and videotapes were taken for subsequent analysis, along with relevant data on such task parameters as weight of load, location of load with respect to lifter, frequency of lift, and other factors. Workers were informally questioned regarding perceived task difficulties and suggestions for job modifications which might make tasks less difficult. In addition the NIOSH physician reviewed the OSHA log of Injuries and Illnesses supporting documentation for the period covering January 1982 through May 1983, as well as compilations of carpal tunnel syndrome, tendonitis and other musculoskeletal injuries, and surgical interventions since 1980. The purpose of these latter activities was to correlate this information by department and job type.

V. EVALUATION CRITERIA

Guidelines for determining the relative hazards associated with unaided lifting tasks are provided in the NIOSH Work Practices Guide for Manual Lifting¹ and were used to identify some particularly difficult tasks

(E)

at Chef Francisco. While lifting tasks are most often associated with lower back injury, recent medical information has shown that disorders such as carpal tunnel syndrome (CTS), tenosynovitis and tendonitis can also be caused, aggravated, or precipitated by repetitively gripping loads to lift or move them.²⁻⁵ These disorders have been associated with strong wrist hyperflexion and ulnar deviation, particularly in conjunction with high muscular forces, all of which are assumed to some degree in lifting tasks we observed. Recommendations provided in this report focused on use of engineering and/or administrative controls to reduce or eliminate hazards associated with hand and wrist disorders as well as back injuries.

VI. RESULTS, DISCUSSION, AND RECOMMENDATIONS

A. Medical Records Review

After review of the Occupational Safety and Health Administration (OSHA) Log and supporting documents, copies covering January 1982 through May 1983 were obtained. The company also supplied a review of carpal tunnel and tendonitis injuries and surgeries covering 1980 through May of 1983, and a copy of a discussion on treatment options and costs for carpal tunnel syndrome prepared by a local orthopedic surgeon. The OSHA Log data was tabulated by type of injury, department, and job title. Where treatment data was available, it was incorporated into the tabulation.

Table I presents the lost work days by whether there was surgical treatment, no surgical treatment, or no treatment mode recorded. In essence this compares those with upper extremity problems who had surgery with those who did not have surgery, and with the rest of the injuries (for whom treatment mode was not available). The group for whom treatment mode was available was predominantly those with soreness or numbness in wrist or hand, including carpal tunnel syndrome. Those having surgery lost significantly more days (average 48.2) than those treated non-surgically (average 3.8 days) and those for whom the data was not available (average 5.8 days). Thus, those requiring surgical treatment incur two high cost items: the surgery, and the extended periods off work. Table II presents lost work days and days of restricted work for different types of injury. The differences between the various types of injuries were not significant. It should be noted that the worker with the longest period off did not have a carpal tunnel problem.

The number of injuries recorded in the OSHA log are presented by injury type and department (Table III), and by injury type and job (Table IV). In both tables percentage distributions of both parameters are provided in parentheses. Of the 146 injuries recorded, soreness or numbness in wrist or hand (including carpal tunnel syndrome) accounted for 14%. The groupings of back strains, and of smashed hands, feet, fingers, or toes each accounted for an

equal percentage (14%). The grouping of pulled muscles, bursitis, tendonitis, or numbness in the arm accounted for 16% of all injuries. Thus, although the carpal tunnel injuries may have been the most expensive to resolve, they do not represent the only, or even the most prevalent, injury problem. Further, the only statistically significant ($\chi^2 = 9.354$ (d.f. = 2), $p = 0.008$) difference between type of injury and job title was that employees other than bakers, cooks, sanitarians, or workers were more likely to have cuts, and bakers, cooks, and workers were less likely to have them. When arranged by department, Area 5, the kitchen, the bakeries, and On Call together had significantly less cuts than did sanitation together with the rest ($\chi^2 = 4.505$ (d.f. = 1), $p = 0.036$).

Review of physicians rendering treatment did not show any particular physicians handling excessive numbers of any particular type of injury, and especially no physician handling an excessive number of the surgeries. Review of the list of physicians doing surgeries showed that all of them were in practices which could logically include carpal tunnel surgery.

In informal discussion the company was said to "encourage" reporting of accidents, but that supervisors were not overly sympathetic to the injured worker and if there appeared to be any fault on the part of the worker a redress was likely. The company also experiences a high turnover rate, said to be about 300% when jobs were plentiful.

Although cases of carpal tunnel syndrome, which have required surgery, have been the most expensive injury experienced by the company, during 1982 and the first half of 1983 they represent only a small part of the total number of injuries. Further, they are a part of a more general problem involving all production jobs and areas, rather than a localized problem which lends itself to correction by modifying one or two specific tasks or pieces of equipment. Inappropriate surgeries do not appear to be the problem either. These findings are consistent with the ergonomic findings.

General Recommendations

Give the Safety Committee the responsibility and authority to review all reported injuries for possible preventive actions. For common problems additional investigation should be initiated to find situations where accidents almost occurred so more comprehensive solutions can be found.

Particularly because of the high turnover rate, safety and accident prevention training need to be a part of orientation for all new employees.

7

Provide safety shoes to workers who are involved in manual material handling activities.

B. Ergonomic Evaluation

1. Manual Materials Handling

The request for this HHE was based upon reports that working conditions at Chef Francisco were associated with an unusually high incidence of carpal tunnel syndrome and other hand and wrist disorders. Much of the medical information concerning occupational factors thought to be associated with the development of these disorders implicates tasks of a highly repetitive, production line nature (e.g., assembly tasks, welding, sewing, etc.) usually coupled with forceful grip motions.

However, during our inspection of Chef Francisco operations, most of the high risk tasks we observed involved some kind of unaided lifting or transporting of loads. These are manual materials handling activities; MSS problems associated with these tasks most commonly are associated with incapacitating and expensive injuries to the lower back. Lifting heavy loads, or lifting at excessive reach distances or at high frequencies are examples of factors frequently associated with such injuries.

Several examples of heavy lifting or transporting of loads were observed during our ergonomic evaluation:

a. Lifting and carrying bags from pallets to mixing vessels.

An example, observed in the New Bakery area, involved moving 100 lb. bags of flour and sugar from pallets to mixing bowls. We made measurements of a typical lift by a woman in this area. For a bag of flour on a skid located 18" from the center of her feet at the time of pickup, and raised from the floor to a 30" height, the maximum permissible limit for a single lift is 71 lb. According to NIOSH guidelines, which are based upon extensive epidemiological data, jobs involving loads in excess of these values place the employee at significant risk of injury. In addition, lifts of this type generate considerable intra-wrist forces and are thought to be highly conducive to the development of tenosynovitis and carpal tunnel syndrome.

Recommendations

Locate skids closer to mixing areas. Construct a slide to move bags from pallet to mixing vessel to avoid lifting.

Use load-leveling lifts to keep loads at waist height.

Order bags in 50 lb., rather than 100 lb. units.

b. Repetitive lifting of 50 lb. bags of flour in a restricted working space.

An example of this was observed in the Old Bakery during the preparation of pancake mixes. Lifts of 50 lb. can be performed by a fair percentage of the female population without undue risk, providing reach distances are not excessive. However, in this job, the workspace is restricted and lifts cannot be made without considerable twisting of the trunk. Such lifts are recognized as unusually hazardous and conducive to risk of back injury.

Recommendations

Move flour bag rack beside, rather than behind, operator.

Use a load leveler to keep bags at mixing vessel height.

Slide, rather than lift, bags to edge of mixing vessel.

c. Pushing/pulling hand carts with excessively heavy loads.

An example of this was the Crepaco deck area. Loaded carts (1200 and 2100 lbs.) require considerable effort to move, especially with the wet surfaces employees walk on. In one instance, we observed the cart slip off the rail it rides upon. Considerable effort was required to reseat the cart on the rail.

Recommendations

The design of this work area does not lend itself to simple solutions for reducing hazards. Ideally, a motor drive system (or an effective winch) should be used to move the loaded carts. This should be the top priority. Admittedly this may be difficult, expensive solution.

This task difficulty may be reduced somewhat by removing excess water from the deck surface to provide better footing, and by decreasing the load on the cart. This latter recommendation may not be practical, but should be considered.

In addition to the jobs cited above, several employees in each area routinely perform lifting tasks (loading pallets from production lines, moving foodstuffs to mixing areas,

9

etc.). The recommendations given above can be applied to all such tasks. Some general recommendations include the following:

Use load levelers whenever possible to decrease lifting distances.

Keep loads as close to the lifter as possible. Reach distance is probably one of the most important factors for generating compressive loads on the back.

Order foodstuffs in 50 lb. bags. There are very few lifting conditions which permit lifts of 100 lb. without a considerable degree of risk of injury. This is particularly true for female workers.

Arrange work stations to eliminate or at least minimize twisting lifts. After instructing employees to avoid twisting lifts do not make this impossible by faulty workplace design.

Familiarize safety personnel (including the industrial engineer) with NIOSH guidelines for safe lifts and modify jobs when the lifts are clearly excessive.

2. Stressful Postures and Motions

This category of hazards refers to either the entire body, or to some part of the body. Two components are required: 1) an awkward position, and 2) usually a forceful muscular contraction with a large static, or holding, component. The result of such an action is muscular fatigue. Our contention is that recurrent muscular fatigue from job-related activities has a strong contributory effect to the development or exacerbation of MSS disorders. A considerable body of medical evidence supports this contention.

The simplest example of a job which produces this effect would be:

a. Bending over a workbench for long periods without straightening up.

The best example of this type of a hazard is the operation of the hose nozzles used for cleaning in the Crepaco and other areas in the plant. There is a potential for the development of fatigue to several body parts: the muscles of the back, shoulder, forearm, and hands. The nozzle (and hose) is heavy and awkward to operate. Considerable effort is required to hold the nozzle in position, particularly for operators with low grip strength.

Recommendations

Redesign the hose nozzle to provide less fatiguing operation. We have some preliminary data developed by a consultant which indicates that the nozzle should be oblong in shape, with approximate dimensions of 1.75" x 0.75". The nozzle presently used is too heavy. The weight should be reduced as much as possible. Water flow should be by means of a broad trigger operated by the index finger. Force to operate the trigger should be minimal.

In the cleanup area where blanching vessels are washed, take-up winches suspended from the ceiling could be used to support the nozzles. This particularly would reduce fatigue of the grip muscles.

Rearrange end-conveyor area to eliminate crowding as much as possible. Give palletizers adequate room to move around the pallet to avoid reaching at arm's length with a load.

3. Tool/Equipment Design

The Crepaco working area has several construction features which require strenuous effort to carry out some tasks. Identification of hazardous tasks is relatively easy; cost effective solutions are difficult to identify. Problems associated with moving the food cart have already been described above. Other problems include:

a. Alignment of pumps below the Crepaco deck.

The absence of casters on these pumps makes them extremely heavy to move.

Recommendation

Investigate the possibility of installing casters and brakes on these pumps.

b. Emptying soup baskets under Crepaco deck.

We consider this an extremely hazardous task, since the lift violates just about every rule of good lifting practices. It is performed at arm's length, the starting posture is constrained, a twisting motion is required with the load, the illumination is poor, and the footspace is obstructed.

Recommendation

Correcting this work station should be fairly high priority task.

11

VII. REFERENCES

1. National Institute for Occupational Safety and Health. Work Practices Guide for Manual Lifting. Cincinnati, Ohio: National Institute for Occupational Safety and Health, 1981. (DHHS (NIOSH) Publication No. 81-122).
2. Armstrong, TJ, Foulke, JA, Joseph BS and SA Goldstein. Investigation of cumulative trauma disorders in a poultry processing plant. AIHAJ (1982) 43(2) 103-116.
3. Lind A, et al Final Report, NIOSH Contract 99-74-210, 1977.
4. Hazelton, W et al Influence of wrist position on force produced by finger flexors. J. Biomech (1975) 8(5): 301-306.
5. Feldman, RG, Goldman R, and WM Keyserling. Peripheral Nerve Entrapment Syndromes and Ergonomic Factors Am. J. of Ind. Med. (1983) 4:661-681.

IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

Report Prepared by:

Donald W. Badger, Ph.D.
Research Physiologist
Applied Psychology and
Ergonomics Branch

James M. Boiano
Industrial Hygienist
Industrial Hygiene Section

Theodore W. Thoburn, M.D.
Medical Officer
NIOSH Region VIII

Field Assistance:

Vernon Putz-Anderson, Ph.D.
Applied Psychology and
Ergonomics Branch

Arvin G. Apol
Industrial Hygienist
NIOSH Region X

Originating Office:

Hazard Evaluations and Technical
Assistance Branch
Division of Surveillance, Hazard
Evaluations, and Field Studies

Report Typed By:

Connie L. Kidd
Clerk-Typist
Industrial Hygiene Section

X. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, Publications Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), 5285 Port Royal, Springfield, Virginia 22161. Information regarding its availability through NTIS can be obtained from NIOSH Publications Office at the Cincinnati address. Copies of this report have been sent to:

1. Chef Francisco, Eugene, Oregon
2. Teamster Food Processors, Drivers, Warehousemen and Helpers, Local 670
3. State of Oregon, Accident Prevention Division, Salem, Oregon
4. NIOSH, Region X
5. OSHA, Region X

For the purpose of informing affected employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees for a period of 30 calendar days.

13

TABLE I
Number of Injuries and Lost Work Days as Recorded in the OSHA Log
with Type of Treatment where Recorded

Chef Francisco
Eugene, Oregon

January 1982 through May 1983

| Treatment Group | Number of Injuries | Mean days | Standard Deviation | Range days | L Value diff. from mean | vs. |
|-----------------|--------------------|-----------|--------------------|------------|-------------------------|---|
| Surgical | 6 | 48.2 | ± 41.5 | 20 - 131 | $+ 43.4$ $+ 44.4$ | $\pm 16.3^*$ $\pm 18.4^*$ rest Non-Surg. |
| Non-Surgical | 14 | 3.8 | ± 6.5 | 0 - 20 | - 2.0 | $\pm 10.6^{**}$ Unrecorded |
| Unrecorded | 126 | 5.8 | ± 13.9 | 0 - 89 | | |
| Total | 146 | 7.4 | ± 17.4 | 0 - 131 | | |

Analysis of Variance

$$F(2,143) = 22.52$$

$$p = \text{less than } 0.01$$

* statistically significant (≤ 0.05)

** not statistically significant

TABLE II

Lost Work Days and Restricted Work Days by Type of Injury

Chief Francisco
Eugene, Oregon

January 1982 through May 1983

| Type of Injury | Number of Injuries | Lost Work Days | | | Restricted Work Days | | |
|---|-----------------------|----------------|-----------------------|---------------|----------------------|-----------------------|---------------|
| | | Mean days | Standard Deviation | Range days | Mean days | Standard Deviation | Range days |
| Soreness or Numbness in Wrist or Hand, Carpal Tunnel | 21 | 8.8 | ± 13.6 | 0 - 34 | 1.4 | ± 3.6 | 0 - 15 |
| Pulled Muscles, Bursitis, Tendonitis, or Numbness in Arm | 24 | 10.0 | ± 28.5 | 0 - 131 | 3.1 | ± 8.4 | 0 - 37 |
| Smashed Hands, Feet, Fingers, or Toes | 21 | 4.1 | ± 8.9 | 0 - 36 | 3.1 | ± 5.7 | 0 - 20 |
| Falling Objects, Bruises | 17 | 9.4 | ± 22.1 | 0 - 89 | 1.0 | ± 2.9 | 0 - 11 |
| Cuts | 11 | 0.3 | ± 0.9 | 0 - 3 | 1.2 | ± 3.9 | 0 - 13 |
| Back Strains | 20 | 10.7 | ± 16.9 | 0 - 71 | 1.2 | ± 3.1 | 0 - 10 |
| Falls | 15 | 10.4 | ± 17.2 | 0 - 50 | 0.0 | - | 0 |
| Other | 17 | 2.1 | ± 5.3 | 0 - 20 | 0.0 | - | 0 |
| Total | 146 | 7.4 | ± 17.4 | 0 - 131 | 2.4 | ± 4.2 | 0 - 37 |

(5)

TABLE III

Number of Injuries Recorded in the OSHA Log by Type of Injury and Department

Chef Francisco
Eugene, Oregon

January 1982 through May 1983

| Type of Injury (% of row) (% of column) | Area 5 | | Bakeries | | Kitchen | | On Call | | Sanitation | | Main- tenance | Meat Room | Spice Room | All Other Steam Room | Ware- houses | Other | Total | Other | Total |
|---|--------|------|----------|------|---------|------|---------|------|------------|------|------------------|--------------|---------------|----------------------------|-----------------|-------|-------|-------|-------|
| Soreness or Numbness in Wrist or Hand, Carpal Tunnel | 4 | (19) | 5 | (21) | 5 | (24) | 2 | (10) | 3 | (14) | 0 | 1 | 1 | 0 | 0 | 0 | 2 | (10) | 21 |
| % | (21) | | (28) | | (22) | | (11) | | (8) | | | | | | | | (6) | | (14) |
| Pulled Muscles, Bursitis, Tendonitis, or Numb- ness in Arm | 5 | (21) | 1 | (4) | 5 | (21) | 1 | (4) | 7 | (29) | 2 | 2 | 0 | 1 | 0 | 0 | 5 | (21) | 24 |
| % | (26) | | (6) | | (22) | | (6) | | (19) | | | | | | | | (16) | | (16) |
| Bursitis, Tendonitis, or Numbness in Arm | 3 | | 0 | | 0 | | 0 | | 2 | | 0 | 1 | 0 | 0 | 0 | 0 | 1 | | 6 |
| Pulled Muscles | 2 | | 1 | | 5 | | 1 | | 5 | | 2 | 1 | 0 | 1 | 0 | 0 | 4 | | 18 |
| Smashed Hands, Feet, Fingers, or Toes | 3 | (14) | 2 | (10) | 4 | (19) | 3 | (14) | 3 | (14) | 0 | 1 | 3 | 0 | 0 | 2 | 6 | (29) | 21 |
| % | (16) | | (11) | | (17) | | (17) | | (8) | | | | | | | | (19) | | (14) |
| Smashed Hands or Fingers | 2 | | 1 | | 2 | | 3 | | 2 | | 0 | 0 | 1 | 0 | 0 | 2 | 3 | | 13 |
| Smashed Feet or Toes | 1 | | 1 | | 2 | | 0 | | 1 | | 0 | 1 | 2 | 0 | 0 | 0 | 3 | | 8 |
| Falling Objects, Bruises | 3 | (18) | 2 | (12) | 1 | (6) | 1 | (6) | 5 | (29) | 1 | 1 | 1 | 0 | 2 | 0 | 5 | (29) | 17 |
| % | (16) | | (11) | | (4) | | (6) | | (14) | | | | | | | | (16) | | (12) |
| Falling Objects | 0 | | 0 | | 0 | | 1 | | 2 | | 1 | 1 | 1 | 0 | 2 | 0 | 5 | | 8 |
| Bruises | 3 | | 2 | | 1 | | 0 | | 3 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 9 |
| Cuts | 0 | (0) | 0 | (0) | 1 | (9) | 1 | (9) | 5 | (45) | 1 | 1 | 0 | 1 | 0 | 1 | 4 | (36) | 11 |
| % | (0) | | (0) | | (4) | | (6) | | (14) | | | | | | | | (13) | | (8) |
| Back Strains | 1 | (5) | 4 | (20) | 3 | (15) | 5 | (25) | 5 | (25) | 0 | 1 | 1 | 0 | 0 | 0 | 2 | (10) | 20 |
| % | (5) | | (22) | | (13) | | (28) | | (14) | | | | | | | | (6) | | (14) |
| Falls | 1 | (7) | 2 | (13) | 1 | (7) | 3 | (20) | 4 | (27) | 0 | 1 | 0 | 0 | 3 | 0 | 4 | (27) | 15 |
| % | (5) | | (11) | | (4) | | (17) | | (11) | | | | | | | | (13) | | (10) |
| Other | 2 | (12) | 2 | (12) | 3 | (18) | 2 | (12) | 5 | (29) | 0 | 0 | 0 | 0 | 3 | 0 | 3 | (18) | 17 |
| % | (11) | | (11) | | (13) | | (11) | | (14) | | | | | | | | (10) | | (12) |
| Heat Burns | 0 | | 2 | | 2 | | 0 | | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 5 |
| Specks or Splashes in Eye | 2 | | 0 | | 0 | | 0 | | 1 | | 0 | 0 | 0 | 0 | 2 | 0 | 2 | | 5 |
| Other | 0 | | 0 | | 1 | | 2 | | 3 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | | 7 |
| Total | 19 | (13) | 18 | (12) | 23 | (16) | 18 | (12) | 37 | (25) | 4 | 8 | 6 | 2 | 8 | 3 | 31 | (21) | 146 |

TABLE IV

Number of Injuries Recorded in the OSHA Log by Type of Injury and Job

Chef Francisco
Eugene, Oregon

January 1982 through May 1983

| Type of Injury (% of row) (% of column) | Bakers | Cooks | Total Bakers & Cooks | | Sanitararians | | Workers | | Mixers Dumpers | Other Production | Total | | Others | | Totals |
|---|--------|-------|-------------------------|------|---------------|------|---------|------|-------------------|---------------------|-------|------|--------|------|--------|
| | | | | | | | | | | | | | | | |
| Soreness or Numbness in Wrist or Hand, Carpal Tunnel | 2 | 3 | 5 | (24) | 4 | (19) | 8 | (38) | 3 | 1 | 4 | (19) | 0 | (0) | 21 |
| | | | (25) | | (11) | | (15) | | | | (11) | | (0) | | (14) |
| Pulled Muscles, Bursitis, Tendonitis, or Numbness in Arm | 0 | 4 | 4 | (17) | 7 | (29) | 8 | (33) | 0 | 3 | 3 | (13) | 2 | (8) | 24 |
| | | | (20) | | (18) | | (38) | | | | (12) | | (25) | | (16) |
| Bursitis, Tendonitis, or Numbness in Arm | 0 | 0 | 0 | | 1 | | 4 | | 0 | 1 | 1 | | 0 | | 6 |
| Pulled Muscles | 0 | 4 | 4 | | 6 | | 4 | | 0 | 2 | 2 | | 2 | | 18 |
| Smashed Hands, Feet, Fingers, or Toes | 1 | 3 | 4 | (19) | 4 | (19) | 6 | (29) | 2 | 3 | 5 | (24) | 2 | (10) | 21 |
| | | | (20) | | (11) | | (11) | | | | (19) | | (25) | | (14) |
| Smashed Hands or Fingers | 0 | 1 | 1 | | 3 | | 4 | | 1 | 2 | 3 | | 2 | | 13 |
| Smashed Feet or Toes | 1 | 2 | 3 | | 1 | | 2 | | 1 | 1 | 2 | | 0 | | 8 |
| Falling Objects, Bruises | 0 | 1 | 1 | (6) | 5 | (29) | 6 | (35) | 1 | 3 | 4 | (24) | 1 | (6) | 17 |
| | | | (5) | | (13) | | (11) | | | | (15) | | (13) | | (12) |
| Falling Objects | 0 | 0 | 0 | | 2 | | 3 | | 1 | 1 | 2 | | 1 | | 8 |
| Bruises | 0 | 1 | 1 | | 3 | | 3 | | 0 | 2 | 2 | | 0 | | 9 |
| Cuts | 0 | 0 | 0 | (0) | 4 | (36) | 1 | (9) | 2 | 2 | 4 | (36) | 2 | (18) | 11 |
| | | | (0) | | (11) | | (2) | | | | (15) | | (25) | | (8) |
| Back Strains | 0 | 2 | 2 | (10) | 5 | (25) | 11 | (55) | 1 | 1 | 2 | (10) | 0 | (0) | 20 |
| | | | (10) | | (13) | | (20) | | | | (8) | | (0) | | (14) |
| Falls | 1 | 0 | 1 | (7) | 4 | (27) | 8 | (53) | 0 | 2 | 2 | (13) | 0 | (0) | 15 |
| | | | (5) | | (11) | | (15) | | | | (8) | | (0) | | (10) |
| Other | 2 | 1 | 3 | (18) | 5 | (29) | 6 | (35) | 0 | 2 | 2 | (12) | 1 | (6) | 17 |
| | | | (15) | | (13) | | (11) | | | | (8) | | (13) | | (12) |
| Heat Burns | 2 | 1 | 3 | | 1 | | 0 | | 0 | 1 | 1 | | 0 | | 5 |
| Specks or Splashes in Eye | 0 | 0 | 0 | | 1 | | 4 | | 0 | 0 | 0 | | 0 | | 5 |
| Other | 0 | 0 | 0 | | 3 | | 2 | | 0 | 1 | 1 | | 1 | | 7 |
| Total | 6 | 14 | 20 | (14) | 38 | (26) | 54 | (37) | 9 | 17 | 26 | (18) | 8 | (5) | 146 |