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## **NIOSH HEALTH HAZARD EVALUATION REPORT**

**HETA #2004-0117-2964  
Good Humor-Breyers Ice Cream  
Hagerstown, Maryland**

**April 2005**

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**DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health**



## PREFACE

The Hazard Evaluation and Technical Assistance Branch (HETAB) of the National Institute for Occupational Safety and Health (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 (OSHA) 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 employers 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.

HETAB also provides, upon request, technical and consultative assistance 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. Mention of company names or products does not constitute endorsement by NIOSH.

## ACKNOWLEDGMENTS AND AVAILABILITY OF REPORT

This report was prepared by Daniel Habes and Richard Driscoll of HETAB, Division of Surveillance, Hazard Evaluations and Field Studies (DSHEFS). Field assistance was provided by Ann Krake. Desktop publishing was performed by Robin Smith and Ellen Blythe. Editorial assistance was provided by Ellen Galloway.

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## Highlights of the NIOSH Health Hazard Evaluation

### Ergonomic Evaluation of an Ice Cream Packing Plant

In April 2004, the National Institute for Occupational Safety and Health (NIOSH) responded to a request from the United Steelworkers of America, Local 9386 for a health hazard evaluation (HHE) at the Good Humor-Breyers Ice Cream plant in Hagerstown, MD. The request indicated that workers were concerned about a variety of health and safety issues.

#### What NIOSH Did

- We interviewed workers regarding safety concerns and health problems they attributed to working in the plant.
- We observed plant operations and specific job tasks, videotaping some jobs for further review.
- We completed ergonomic evaluations for several work tasks specified in the HHE request.
- We reviewed the plant's OSHA 300 logs.

#### What NIOSH Found

- Workers risk musculoskeletal disorders of the neck, upper extremity, and back from repetitive production tasks such as hand packing and from lifting excessive weight.
- Equipment malfunction and line jams occur often, adding to the manual activity of workers and causing them to work in awkward positions until the equipment problem is solved.
- Earning a safety day may encourage workers to work while injured.

- Workers reported and investigators observed several safety hazards.

#### What Managers Can Do

- Increase participation and communication within the ergonomics teams.
- Implement University of Maryland recommendations.
- Eliminate unassisted lifting of containers.
- Deliver materials directly to the production machines rather than on pallets to minimize lifting.
- Eliminate safety day and other practices that discourage injury reporting.
- Address the health and safety recommendations in this report.

#### What Employees Can Do

- Participate in an ergonomics team.
- Report injuries to your supervisor.



**What To Do For More Information:**  
We encourage you to read the full report. If you would like a copy, either ask your health and safety representative to make you a copy or call 1-513-841-4252 and ask for HETA Report #2004-0117-2964



**Health Hazard Evaluation Report 2004-0117-2964  
Good Humor-Breyers Ice Cream  
Hagerstown, Maryland  
April 2005**

**Daniel Habes, MSE, CPE  
Richard Driscoll, PhD, MPH**

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## **SUMMARY**

On March 2, 2004, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation (HHE) from the United Steelworkers of America, Local 9386, in Hagerstown, Maryland. The HHE request indicated that workers at Good Humor-Breyers Ice Cream (GHB) were concerned with a variety of health and safety issues, including awkward and unadjustable equipment located in the hand packing areas and the use of potentially irritating chemicals such as food grade silicone lubricants, hot melt adhesives, and cleaning and sanitizing agents.

During April 28-30, 2004, NIOSH investigators conducted a site visit at GHB. The NIOSH team included an ergonomics specialist, an epidemiologist, and an industrial hygienist. The evaluation consisted of an opening conference attended by the manager of Human Resources, the plant Safety Facilitator, the GHB corporate safety manager, the president of the United Steel Workers of America, Local 9386, the lead member of the Freezer department, and several employees. Following this meeting, we conducted a plant walk-through, interviewed 20 workers, and observed some of the work tasks specified in the HHE request. The closing conference took place on April 30, 2004.

The ergonomics evaluation indicated that some jobs, e.g., hand packing, were highly repetitive, and at times workers were required to reach too high and too far, placing them at risk for upper extremity musculoskeletal injuries. Workers lifting bulk containers of waste ice cream risked musculoskeletal injuries to the low back.

Confidential interviews with 20 workers and our observations indicated several hazards. Wet and sloped floors presented slip and fall hazards to workers. Some chemicals irritated workers' eyes and lungs, while other workers were at risk for acute injuries from boxes falling from overhead conveyors. Improperly installed safety harnesses presented a risk of acute injury to workers who unloaded trucks.

For the years 2002-2003, and the first three months of 2004, there were 82 injury and illness entries on the OSHA 300 log, 38 (46%) for musculoskeletal injury.

Based on observations, OSHA log review, employee interviews, and evaluation of job tasks during this HHE, NIOSH investigators conclude that workers at GHB are at risk of developing musculoskeletal disorders of the neck, upper extremity, and back from repetitive production tasks and lifting. Irritating chemicals, falling boxes, and improperly installed safety equipment present risk for acute injury. This report contains recommendations to reduce the risk of injury to workers.

Keywords: SIC 2024 Ice Cream and Frozen Desserts, ergonomics, musculoskeletal disorders, wet floors, overhead conveyors, repetitive work, hand packing, safety harnesses, floor sanitizers, Haynes spray, headache, dizziness, nausea, sprayon silicone lube, eye irritation, upper respiratory irritation, peracetic acid

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## INTRODUCTION

On March 2, 2004, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation (HHE) from the United Steelworkers of America, Local 9386, in Hagerstown, Maryland. The HHE request indicated that workers at Good Humor-Breyers Ice Cream (GHB) were concerned with a variety of health and safety issues, including awkward and unadjustable equipment in the hand packing areas and the use of potentially irritating chemicals such as food grade silicone lubricants, hot melt adhesives, and cleaning and sanitizing agents.

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## BACKGROUND

Good Humor-Breyers, headquartered in Green Bay, Wisconsin, is the largest manufacturer and marketer of branded packaged ice cream and frozen novelty products in the United States. The company, which employs over 2400 people in six plants across the country, produces Breyers® Ice Cream and Good Humor®, Klondike®, and Popsicle® frozen novelties, four of the oldest brands of ice cream and frozen novelties in the United States.

At the Hagerstown, Maryland plant, about 200 of the 450 employees work on 16 production lines. The plant runs primarily two shifts, with some lines running up to 10-12 hour shifts, and three lines that run 24 hours per day.

## METHODS

### Ergonomic Evaluation

The ergonomics evaluation consisted of a walk-through of the plant to view job tasks. We videotaped some jobs for further review. We selected jobs that appeared to pose a risk for the development of work-related musculoskeletal disorders (WMSDs) such as high repetition, awkward postures, high muscular effort, and manual lifting, or that were specified as problematic at the opening conference.

### Employee Interviews

Confidential interviews were conducted with 20 workers. The local union leadership selected the workers, who had asked to speak with a NIOSH representative. These workers were informed that their participation was voluntary. Workers provided their job title and length of service at GHB, and then described any health problems they attributed to working at this site.

Available Occupational Safety and Health Administration (OSHA) 300 logs were reviewed.

### Other Issues

In addition to visiting the main production lines, the freezer, and the bucket dump room (where unusable ice cream is dispensed for resale as animal feed), we also observed chemicals used in the production processes and evaluated safety concerns discussed during the opening conference.

# EVALUATION CRITERIA

## Ergonomics

Overexertion injuries and work-related musculoskeletal disorders (WMSDs), such as low back pain, tendinitis, and carpal tunnel syndrome are often associated with job tasks that include: (1) repetitive, stereotyped movement about the joints; (2) forceful manual exertions; (3) lifting; (4) awkward and/or static work postures; (5) direct pressure on nerves and soft tissues; (6) work in cold environments; or (7) exposure to whole-body or segmental vibration.<sup>1,2,3,4</sup> The risk of injury appears to increase as the intensity and duration of exposures to these factors increases and the recovery time is reduced.<sup>5</sup> Although personal factors (e.g., age, gender, weight, fitness) may affect an individual's susceptibility to overexertion injuries/disorders, studies conducted in high-risk industries show that the risk associated with personal factors is small compared to that associated with occupational exposures.<sup>6</sup>

In all cases, the preferred method for preventing and controlling WMSDs is to design jobs, work stations, tools, and other equipment to match the physiological, anatomical, and psychological characteristics and capabilities of the worker. Under these conditions, exposures to task factors considered potentially hazardous is reduced or eliminated.

# RESULTS

## Ergonomic Evaluation

### *Job Descriptions and Risk Factors*

Most of the jobs are highly automated, requiring little involvement from the workers until the end of the line, where packing is typically done by hand. Some jobs require support tasks during the work cycle performed by workers further up the line such as adding wafers to the ice cream

sandwich lines, filling the drumstick line with cones and nuts, or supplying cups.

Details and comments about specific jobs videotaped at the facility and analyzed for potential ergonomic problems are as follows:

#### 1. **Gram 3 Line, CarbSmart™ Creamsicle®**

**Pack:** Most lines in the plant have two types of packing positions: primary packing where individual ice cream novelties are placed into packages for point of sale, and bulk packing where primary packages are placed in corrugated boxes for transport to the freezer and delivery to retail stores. Near the end of the line, we observed two workers packing wrapped Creamsicles into primary packages. The first worker placed pre-formed boxes on the line and aligned the Creamsicles as they traveled to the second primary packer, who pushed them, five at a time, across the moving conveyor into the package. The movement seemed to involve little effort but required a full reach by the packer (27 inches) with the trunk in a slight forward flexion posture. This worker performed this movement 45 times in 80 seconds (34 per minute). During the time we observed this job, the boxing line malfunctioned, necessitating removal of the Creamsicles from the line and placement into a plastic tub. The tub was positioned in a convenient location for the packers, but as the tub became filled it had to be lifted off the table and placed on the floor to make room for another empty tub. The line became operational after a brief period, but there did not seem to be adequate room in the work area for many more tubs had the jam lasted longer. When the line resumed, the first worker placed Creamsicles from the tubs into the boxes just before they got to the other packer. This worker had to reach further over the conveyor line than the other packer to position the Creamsicles into the box.

At the end of the line, we observed a worker packing the primary packages of Creamsicles into corrugated boxes. The worker's job was to retrieve packaged boxes and place 12 of them into a corrugated box. The worker was placing packages into the larger box at the rate of 16 per minute. The boxes were formed by another



worker in the area. After filling the boxes, the worker sealed them with tape by hand and carried the box across the aisle to another conveyor.

**2. Gram 2 Line, Fudgesicle® Line:** There were two line workers standing opposite each other transferring fudgesicles from one level on a moving conveyor (39 inches high) into compartments located below it. Each worker placed several items in the compartments at a rate of 24 per minute. Further down the line, two workers packed primary packages into corrugated boxes similar to those in Gram 3, except that the filled boxes were sealed by an automatic machine, and the packers did not have to lift the filled boxes off the line. Each worker reached to the conveyor line eight times per minute while packing the primary packages into the corrugated boxes.

**3. Gram 5 Line, Hand Packing:** Two workers facing each other packed ice cream bars into primary packages. The machine was equipped with an automatic box maker. Alongside one of the workers was a pile of empty formed boxes stored for instances when the box making machine stops or jams. These two workers placed bars in the boxes with both hands at a rate of 30 movements per minute. The set up was similar to that in Gram 3 (creamsicle packing) but instead of always pushing the bars into the box, the workers alternated between pushing them into the boxes and picking them up and placing the bars in the boxes. These workers stood on rubber mats and there was a rail on which they could rest their feet if they desired. A seated worker further down the line aligned the boxes on the conveyor as they made their way to the two workers placing the boxes into larger corrugated boxes. These two workers formed the boxes, filled them, and directed them to the automatic sealer in a manner similar to that which we observed on other packing lines. Each large box contained 12 smaller boxes. The workers placed packages into the larger box two or three at a time at a rate of 13 movements per minute.

**4. Spiral 1 and 2 Lines, Ice Cream Sandwiches:** At the head of the line, workers fill gravity-feed bins oriented in a “V” shape with wafers that comprise the two sides of the ice cream sandwiches. Workers fill these bins with a sleeve of wafers at the rate of four per minute. Boxes of wafers were situated on a table adjacent to the work area. The workers were concerned with this job task because adding a sleeve of wafers to the top edge of the bins required a reach above their heads. The top edge of the bin is 68 inches high. At the end of the line, two workers who formed their own boxes placed 12 primary packages of ice cream sandwiches into larger corrugated boxes at the rate of 16 movements per minute.

**5. Spiral 3 Line, Cupped Sherbet:** At the beginning of the line, workers remove stacks of empty cups from a box situated on a tilt table and feed them into a machine that fills the cups with ice cream. The leading edge of the box of cups is 25 inches high and the back edge is 50 inches high. When loading the cups, the workers reach to a height of 50 inches. One worker was adding cups to two lines at the rate of 13 stacks per minute. Near the end of the line a worker was running a primary packaging operation, which involved holding a box at the opening of the filling machine that inserted 10 cups at a time into the box. The observed rate was five boxes per minute. Another worker sealed the boxes by hand with tape and placed them on a belt conveyor leading to the freezer. This station also had a box maker in the rotation. At the end of the line, two boxes of cups are placed in corrugated boxes by two workers who retrieve them from a conveyor, box them, and place the filled box on a lower conveyor which leads to the sealing machine. These two workers were also forming the corrugated boxes. The floor on which these workers stood slopes upward, resulting in the conveyor ascending from an initial height of 43 inches to 52 inches to line up with the box sealer. The floor was also wet and the workers were standing on cardboard instead of rubber mats, which they said moved around on the wet floor. The worker in the second position where the top conveyor is highest reached to shoulder height to remove the boxes

of ten cups from the line. The smaller boxes were placed into the larger ones at a rate of eight per minute. After sealing, the corrugated boxes are transferred to the freezer by the overhead conveyor system.

6. **K1 Line, Klondike® Line:** This line is highly automated with several rotational positions where the main activity is monitoring the bars for correct spacing and alignment as they go through the various automatic processes. We observed some hand packing into primary containers, but mainly this task was performed by the machine. Two hand packers at the end of the line placed packages of six bars into corrugated boxes. The boxes were formed by a machine and delivered to the packers. One packer folded down the box flaps and the other packed 12 packages of bars into the box. Normally the packer filled the corrugated box by grabbing three groups of four packages from the line, which ran at five full boxes per minute. This packing method resulted in about 15 movements to and from the conveyor per minute. The primary packages fit snugly in the larger box and often had to be pressed down firmly to be positioned properly. After filling, the boxes traveled to the automatic sealer and then to the freezer.

7. **Drum Line:** At the first position, a worker places an array of cones onto a belt conveyor that carries them down the line. The cones are stacked in cardboard trays located behind the worker. The worker can choose the number of layers of cones added to the line with each lift. As the cones move down the line, the worker removes the top layer of cones from the stack and places it on the empty spot at the beginning of the conveyor. Lifting several layers of cones at a time reduces the number of lifts to the conveyor, but increases the weight of each lift and the reach height to the top layer of cones. A layer of cones is loaded onto the conveyor every 15 seconds (four per minute). The worker in this position also fills a hopper that dispenses nuts onto the ice cream cones. Ice cream, chocolate, and nuts are added to the empty cones by machine and each cone is wrapped individually. Further down the line, we observed two workers

placing eight wrapped cones into primary containers four at a time. Each worker put four cones in each box at a rate of 20 per minute. At the end of the line, a worker was placing nine containers of cones into a larger box at a rate of three filled boxes per minute. The workers picked boxes off the line either one or two at a time at a rate of 13 movements per minute. The boxes had no top so they were transported directly to the freezer by means of the overhead conveyor system.

8. **K2-Klondike® Line:** The line was completely automated, staffed by monitoring positions at various points along the process. At the end packages of bars were boxed and sealed by machine.

9. **Bucket Room:** Rejected bulk ice cream or bars and other ice cream novelties are dumped from large buckets into a hopper located in this room. Usually about 100 buckets weighing 120-130 pounds each are dumped per shift. A pump can be used to transfer some soft or melted ice cream, but usually the buckets have to be lifted about 3 feet to reach the hopper. We were told that this area was considered a high priority for an engineering solution, such as sinking the hopper into the concrete floor or installing a ramp or conveyor to direct the buckets to the hopper without lifting.

10. **Freezer:** In this area workers receive boxes of ice cream product from conveyors and load them by hand onto pallets. We did not conduct a thorough evaluation in the freezer because a team of students from the University of Maryland assessed the area in November 2001. The report contained many practical recommendations such as installing pallet lifts and turntables to reduce bending and reaching during pallet loading, and adding accumulation areas at the end of the conveyors to reduce the amount of walking needed to unload cases of ice cream. The Maryland group was scheduled to make a return visit in September 2004 to discuss implementation of the recommended interventions. One issue of concern to the workers is the work/break schedules for those in the freezer. Union contract terms specified 40

minutes of work with 20 minutes in the heat hut, but workers in the area wanted the routine changed to 30 minutes of work and 30 minutes in the heat hut per hour.

11. **Frigo 2 Line:** We looked at one job in this area where the task was to insert flat package stock into a box forming machine. The package stock was delivered to the area in boxes on a pallet. These boxes were then transferred by hand to a table located next to the machine. The worker had to climb to a 19-inch platform to get to the area where the flat package stock is inserted into the machine. According to the worker, the main issues were the height of the step up to the machine and the need to carry the boxes from the pallet to the table next to the machine.

The main risk factors for the development of musculoskeletal disorders in these jobs were as follows:

1. Highly repetitive hand movements during packing operations for some product lines
2. Excessive reaching (both horizontal and vertical) when packing boxes and keeping lines stocked with cups, cones, and wafers
3. Lifting heavy loads

## Employee Interviews and OSHA Log Review

Five of the twenty workers interviewed reported at least one instance of wrist, neck, back, or arm pain. These workers were under the care of a physician and in some cases had undergone surgery to relieve their symptoms. In addition to ergonomic health concerns, workers frequently mentioned safety issues, including slips and falls on the wet floors. Some falls had resulted in leg and hand fractures. Several workers mentioned that management requires workers on restricted or light duty to perform duties outside of their work restriction. They also noted that properly designed and installed fall protection for workers using catwalks above tanks was lacking. In addition, workers were concerned that boxes traveling on the overhead conveyor system could and did occasionally fall near workers.

Review of OSHA 300 forms for the years 2002-2003 and the first three months of 2004 indicated 82 injury and illness log entries, 38 (46%) of which were musculoskeletal disorders. Three workers lost work days as a result of these injuries. In 2002, two workers were absent from work for 2 days each and one worker was absent 95 days in 2003. Most injured employees appeared to remain on the job under work restrictions or assigned to alternative tasks.

## Other Issues

The following are safety concerns noted on the plant tour and during employee interviews:

1. The safety harness worn by workers unloading raw materials from tanker trucks is attached to a support beam in a manner allowing the possibility for a falling worker to hit the ground before the safety lock mechanism engages.
2. An emergency eyewash station is connected to a hot water rather than to a cold water line. The unregulated hot water could scald the face and eyes of a worker.
3. When jams occur on the overhead conveyors leading to the freezer, boxes of ice cream can fall over the guard rail and strike workers below.
4. The floors are wet and slippery in some areas, and in Spiral 3, the floor is also uneven, increasing the risk of workers slipping and falling.
5. The use of silicone spray around hand taping machines can cause an explosion.
6. Improper use of peracetic acid, used as a sanitizer on floors, may cause respiratory problems among the workers.
7. Considerable dust from dumping dry ingredients into hoppers is present in the mixing room. Some employees reported this dust irritated their eyes and lungs.

## DISCUSSION

Each of the three shifts at GHB has an ergonomics team consisting of 10-12 members from management and labor. These teams, formed with the help of a consultant, meet quarterly and conduct walk-through evaluations of plant operations. The efforts of the ergonomics team have resulted in the addition of the foot rail and the chair for the inspector in Gram 5. The union sponsored several members in obtaining certification in job hazard identification. Those who received the additional training feel their expertise has not been fully utilized because they have often not been involved in the ergonomics team walk-throughs either because they were not informed about them or were not given time off to participate. The company management conceded that this sentiment may be an indication of poor communication because their impression is that these union members had been participating on the ergonomics team at their chosen level.

Tools are available to evaluate the risk of injury for highly repetitive jobs such as the hand packing jobs at GHB. Two tools that assess risk based on task frequency, posture, hand force, and work duration are the Moore-Garg Strain Index (SI)<sup>5</sup> and the American Congress of Governmental Industrial Hygienists (ACGIH) Hand Activity Level (HAL).<sup>7</sup> To accurately predict an individual's risk of injury, an SI and HAL would have to be calculated for each job task in a worker's rotation and averaged on a time-weighted basis. This would be difficult because the rotational schemes and staffing levels can change daily or weekly. Another popular method for assessing risk simply states that any job task where a fundamental element or movement occurs 15 or more times per minute should be considered a strong candidate for change.<sup>8</sup> This approach would identify the job tasks in the various rotational schemes that most influence the risk of injury. Many of the workers felt that automation in the plant such as the addition of automatic box makers and sealers reduced the number of lower exposure jobs that workers could rotate into, thereby increasing the

time they had to spend on the more hand intensive packing jobs.

Unintentional but frequently occurring events at GHB that increase the risk of injury to the workers are production line jams caused by a variety of reasons such as packaging machine malfunctions or overhead conveyor breakdowns. When jams occur, workers must remove product from the lines, placing the rejected materials in barrels and bins. Thus, jams add to workers' manual activity, and the presence of the barrels and bins results in a crowded work area. Workers must then use awkward postures to complete their work. In addition, jams deprive the workers in less intensive rotational positions of the rest that the rotational schemes are intended to provide.

An administrative practice that may affect a worker's risk of injury is the safety day. Giving workers a day off if a year elapses without an injury, undoubtedly discourages workers from reporting their injuries. Consequently, injured workers may exacerbate their injuries by continuing to work while injured.

Several hand packing rotational positions would be considered highly repetitive (15 or more repetitions per minute). Some of these job tasks also required workers to reach at shoulder heights and above, which adds to the risk of injury because of the combination of two musculoskeletal disorder risk factors (repetition and awkward posture).

As a general rule, most people can reach about 20 inches forward at waist height without stretching or leaning forward.<sup>9</sup> Highly repetitive jobs should be designed so that reach heights are at shoulder height and below. For women, the 5<sup>th</sup>, 50<sup>th</sup> and 95<sup>th</sup> percentile shoulder heights are 49, 52 and 56 inches, respectively; the corresponding heights for men are 53, 57 and 61 inches, respectively.<sup>10</sup>

The most hazardous lifting in the plant occurs in the bucket room. Unassisted lifting of buckets weighing more than 100 pounds, as often occurs in this area, would be judged hazardous by any

assessment method. The NIOSH Revised Lifting Equation specifies a maximum of 51 pounds for protection of all workers.<sup>11</sup> Other areas where lifting occurs are in the mixing room and the freezer. Some lifting we observed could be eliminated or minimized. In many areas, pallets of packing material are delivered to the work area, and workers lift boxes off the pallet and onto a platform or table located near the machine. For example, on the Frigo 2 Line boxes of material could be delivered directly to the loading platform of a machine instead of by pallet near the machine.

## CONCLUSIONS

1. Many of the hand packing tasks are too repetitive to be completed without a high risk of injury to workers.
2. Workers are often required to reach too far or too high to complete their tasks. Many of the excessive reaches result from removing and adding items from the line due to equipment malfunctions and line jams.
3. Administrative practices such as the safety day and job mishaps such as line jams may add to the workload of workers.
4. Workers are concerned about WMSDs from repetitive production tasks and lifting, but there is also considerable concern about acute injuries from safety hazards such as falling boxes, wet and sloped floors, dust, use of sanitizing chemicals and silicone sprays, and improperly installed eye wash stations.

## RECOMMENDATIONS

### Ergonomic Evaluation

1. Increase participation and communication within the ergonomics teams comprised of representative members of management and labor. This will improve the teams' ability to identify job hazards and formulate effective control measures. During walk-through evaluations, the ergonomics teams should concentrate on job tasks where repetition is high (15 or more cycles per minute), where reach distances and heights are excessive, and where

heavy loads are lifted. Administrative practices for specific jobs such as limiting the number of trays of cones lifted to the conveyor on the drum line, and not filling the wafer bins on the sandwich lines to the very top would be ways of achieving acceptable work heights without changing the physical work layout.

2. Implement the recommendations made by the University of Maryland team that evaluated job tasks in the freezer area.
3. Eliminate the unassisted lifting of containers of bulk ice cream in the bucket room. This could be achieved either through a lift or conveyor to transport the buckets to the dump bin, or sinking the bin into the floor so that bucket contents can be directed to the drain without lifting.
4. Deliver materials directly to the production machines rather than on pallets in the work area wherever possible. This practice would also reduce crowding and clutter in the production areas. For example, this strategy could help the box maker at the head of the line in Frigo 2. Elimination of the 19-inch step in Frigo 2 is also recommended. An additional step between the level of the floor and the work surface should be added.
5. Eliminate the safety day and other administrative practices that influence workers' reporting of injuries.

### Other Health and Safety Recommendations

1. Reconfigure the safety harness attachment so that it cannot be moved more than a foot or two from the manhole cover on the tanker. This would ensure that the safety mechanism would engage before a worker hit the ground if a fall were to occur.
2. Install eye wash stations on dedicated cold water lines to prevent situations where hot water can flow to the eye washers. Standalone eye wash stations with their own gravity-fed bottled water sources, not connected to a plumbed water line, are another alternative.
3. Install guards on overhead conveyor systems that are high enough to prevent boxes from falling to the floor when line jams occur.
4. Ensure that workers wear slip resistant shoes when working in wet areas.

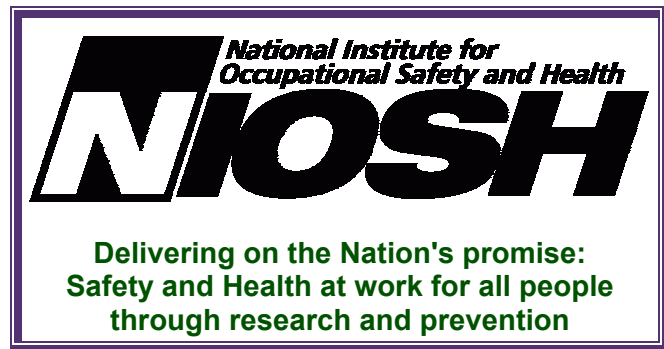
5. Install cushioned floor mats in areas where floors are sloped to reduce fatigue from prolonged standing on uneven surfaces.
6. Use silicone sprays only where necessary and in limited amounts to prevent accidental combustion of the aerosol propellant.
7. Follow the manufacturer's mixing instructions for peracetic acid used as a sanitizer for floors.
8. Evaluate dust levels in the mixing room, and if excessive, install local exhaust ventilation to control exposures.

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