Joint Poultry Industry Safety & Health Council

Ergonomics in the Poultry Industry
A Review of 25 Years of Industry Efforts

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This White Paper is an historical look at the efforts of the poultry industry to implement ergonomics in poultry and egg processing facilities. It does not constitute, nor can it be used as evidence to establish, industry recognition of hazards that may or may not exist in the poultry industry or feasible means of abatement to address same. It does not establish a standard of care for poultry processing facilities and may not be used in any enforcement proceedings brought under the Occupational Safety and Health Act of 1970 or any other state or federal law.

Introduction

For the last twenty-five years, the poultry industry has been at the forefront of efforts to reduce musculoskeletal disorders (MSDs) in the workplace. MSDs can become serious, debilitating injuries to the men and women that work every day at poultry facilities across the country. The industry's engagement on the prevention and early treatment of MSDs can serve as a model for other industries that are also facing the challenges of dealing with the difficult issues associated with these injuries.

The poultry industry recognizes that its efforts are ongoing. The prevention of MSDs is a constant challenge. While the past twenty-five years has seen a dramatic decrease in the numbers and rates of MSDs occurring in the industry, the industry cannot afford to stop seeking new and innovative ways to protect its workforce. ***Since 1992, MSD rates have fallen over 75%.*** The industry has much to be proud of, but more work to do.

"Ergonomics in the Poultry Industry: A Review of 25 Years of Industry Efforts" chronicles the progress made and the successes earned with respect to ergonomics, including the significant decrease in MSDs. It also discusses how OSHA has focused its attention on the poultry industry over this period and the positive results that have come from joint OSHA and industry efforts. Finally, it unveils the results of a new survey that the poultry industry has conducted that gauges the penetration of the industry's ergonomics efforts to poultry facilities across the country.

This review is sponsored by the National Chicken Council, the National Turkey Federation, and the U.S. Poultry & Egg Association. Collectively, the member companies of these organizations produce approximately 95% of the poultry products in this country and employ hundreds of thousands of workers.

The Industry's 25 Year Effort on Ergonomics

Perhaps more than any other industry, the poultry industry over the last several decades has focused its energies on the prevention of MSDs in the workplace. The work in poultry processing is manually-intensive and thus a proactive approach to MSDs is necessary to ensure the safety and health of poultry industry workers. The poultry industry was one of the first to recognize the value of implementing ergonomics principles in the workplace.

The Industry Develops the Medical Ergonomics Training (MET) Program

In the mid-1980s, the industry created a task force to develop a comprehensive, preventative approach to MSDs. With the increasing public demand for deboned products in the 1980's, the incidence of MSDs in the industry increased. The goal of the task force was to counter this trend and develop and distribute a practical document to help the poultry industry reduce the incidence of MSDs. Safety and health professional volunteers from the broiler chicken and turkey industries comprised the task force.

The task force reviewed several different approaches to reducing MSDs in the workplace. It ultimately identified the "triad strategy" of training, ergonomics, and medical intervention as the key common denominators for successful preventative efforts and incorporated these concepts into the groundbreaking document entitled "The Medical Ergonomics Training Program: A Guide for the Poultry Industry" (the "MET Program"). What made the document unique at that time was that it included not only a description of the general principles of training, ergonomics, and medical intervention, but also provided specific, practical suggestions for poultry employers on how to implement the triad strategy. The MET Program document was released in 1986.

The industry followed the release of the MET Program document with two hands-on training videos to educate poultry processing companies and their employees on the triad strategy. "Doing it Right" and "ErgoFit: Fitting Your Job to You" were enormously successful at conveying the principles of medical intervention, ergonomics, and training to employers and employees throughout the poultry industry.

While the MET Program is over 20 years old, it still has value today. Many of the core concepts developed by the industry in that document were picked up by others, and even OSHA, in later guidance and regulatory materials. Poultry companies can still use the MET Program document today and effectively implement successful solutions to MSDs.

The "Triad Strategy"

Training

The MET Program identified seven basic steps to developing and implementing an effective training program: identify training needs; determine content; determine approach; select training objectives; select and train trainers; develop training activities; and conduct training.

Several key points were also emphasized. First, training must take into consideration the existing knowledge base of the individual. Companies should not presume that individuals have the same base level of knowledge with respect to program content, hazards at the worksite, and signs and symptoms of MSDs. Second, training in the poultry processing industry should involve practical, hands-on activities where manual skills are involved. Because of the unique aspects of the poultry processing industry, on the job training is a must, from both a business and safety and health standpoint. And third, all training should be documented. Documentation is particularly useful to ensure that all employees have received the required training.

Ergonomics

The poultry industry recognized early that implementing ergonomics solutions in the workplace improves the safety and health of employees, but also improves business efficiencies. The ergonomics solutions presented included:

- Proper workstation design, including work elevation and foot support, sit-stand, and lighting.
- Job Methods/Work Practices, including task analysis, methods modification, and job rotation.
- Automation.
- Hand tools, with good hand design and a strict sharpening schedule.

Medical Intervention

The task force also recognized the value of medical intervention in preventing the onset of serious MSDs. The document identified the following as goals of medical intervention: to minimize employee pain and suffering; maintain employee morale; maintain efficiency and productivity; and minimize dollar losses. "Early detection and aggressive treatment of [MSDs] is a key in averting a problem and perhaps disabling injury," the task force concluded. The document specifically identified early symptoms and treatment for such MSDs as tendinitis, carpal tunnel syndrome, tennis elbow, and so on.

Development of the MET Program for Supervisors

Recognizing the key role that supervisors play in injury and illness prevention, after the successful publication of the MET Program document, the industry developed "The Met Program for Supervisors." This second document built upon the triad strategy, but targeted guidance to supervisors, who are on the front lines with respect to preventing MSDs in the workplace.

The document contained key practical guidance to help supervisors deal with MSDs. In particular, the document emphasized spotting and treating symptoms of MSDs early:

- Pain, swelling, or tenderness of the elbow or shoulder;
- Limited motion of the arm;
- Pain, weakness, numbness, clumsiness, and tingling of the hand, especially at night;
- Lack of sweating of part of the hand;
- Tenderness when moving the thumb;
- Crackling or grating sound when extending or bending the thumb;
- A weak grip;
- Locking fingers;
- Fingers that turn pale first, then blue;
- Pain, swelling, or tenderness of the forearm; and
- Cracking noises when moving the shoulder, elbow, wrist, or thumb.

Also described were practical ergonomic solutions, such as work station height, foot support, work area design, and sit-stand workstations. The document also emphasized the key to success with ergonomics – having employees help with job hazard analyses.

The document stressed the need for both formal and informal training, but stated that whenever practical, new or inexperienced workers should be started on separate lines set up for training. Supervisors were cautioned not to neglect follow-up. Training must be documented and checked regularly to ensure that it is working.

The Industry Focuses on Information Sharing

Also during the 1980's, and later through the 1990's, the industry aggressively engaged in focused communication to share the best practices on ergonomics that were starting to develop. The industry formed the Joint Poultry Industry Safety and Health Committee (the "Safety and Health Committee" or "Committee"). Started as an ad hoc group of poultry industry safety and health professionals to improve workplace safety and health in the industry, the Safety and Health Committee developed a more formal structure a few years later.

One of the early successes of the Committee was to launch, with Georgia Tech's Agricultural Technology Research Program ("Georgia Tech" or the "Research Institute"), the annual National Safety Conference for Poultry Processing in 1984 (the "Poultry Safety Conference"). The goal was to "spread the word" on safety and health in the industry, and, in particular, on the prevention of MSDs. In 1990 for example, five top ergonomic specialists working in the poultry industry spoke at a special afternoon session of the Poultry Safety Conference to discuss ergonomics problem areas and solutions. Safety and health professionals from virtually all of the poultry processing companies throughout the country attend the Poultry Safety Conference each year.

The Committee also helped launch with Emory University the industry's Conference on Medical Management of Cumulative Trauma Injuries, which took place in 1991, 1993, and 1995. Aimed at poultry industry health care providers who must respond to MSDs in the workplace, the conference shared the latest medical management information amongst those professionals.

The Committee pursued other practical ergonomics improvements during this same time period. It engaged Chicago Cutlery to help develop special, ergonomically-designed knives for use in poultry facilities. These knives were particularly effective at reducing certain ergonomic risk factors and are still widely used today. The Committee presented this work along with the "MET Program for Supervisors" to the then-Assistant Secretary of OSHA, who praised the industry's willingness to proactively engage the problem of MSDs in the workplace.

The industry's close, collaborative relationship with Georgia Tech over the last twenty years also has resulted in significant improvements in worker safety and health. The mission statement of the Research Institute is to promote the economic growth of Georgia agribusiness (especially the poultry industry) through:

- Research focused on the development of new technologies that improve productivity and efficiency;
- Exposure of students to the challenges of developing and adapting these technologies;
- Technical assistance to Georgia-based industry members with special problems;
- Release of information on emerging technologies and improved operational management through newsletters, articles, seminars, and presentations to speed ultimate commercial use.

The Research Institute has worked to improve safety and health through ground-breaking research and associated information sharing. Just recently, researchers, in conjunction with certain poultry companies, have been working to develop an instrument to assess MSD risk in poultry tasks. Georgia Tech researchers have developed a tool to measure fore- and upper-arm muscle stress/strain associated with poultry deboning and cutting tasks. Researchers also anticipate that developments in this area will be expanded to include assessments of the back and other tasks within the poultry processing environment.

The poultry industry has worked closely with Georgia Tech to develop important ergonomics materials. At the industry's urging, the Research Institute applied for and received a Susan Harwood Training Grant from OSHA to develop a National Ergonomic Training Program. This program provided state-of-the-art training and materials to plants across the industry.

The primary component of the grant was a train-the-trainer course. Georgia Tech and the industry conducted a three-day ergonomics training course designed to help individuals in the poultry industry who are charged with setting up and implementing ergonomics training to better understand basic ergonomics principles, analysis techniques, design tools, successful intervention programs, and so forth. Upon completion of the course, the

trainers could apply what they learned to training employees in their poultry plants, along with training materials provided to them in the train-the-trainer sessions.

The train-the-trainer course provided 18 hours of classroom interaction on the following topics:

- Introduction to Ergonomics
- Risk Factors
- Physiology and Anatomy of Hands and Arms
- Anthropometry and Workstation Design
- Physiology and Anatomy of the Lower Back and Lifting Guidelines
- Worker Safety Analysis Techniques
- Engineering and Administrative Controls
- Successful Ergonomics Program Elements and Case Studies
- Helpful Websites and Resources
- OSHA's Ergonomics Agenda
- Effective Training Techniques
- Demonstrations

As a result of this important grant program, almost 200 ergonomics trainers were trained and over 15,000 workers subsequently received ergonomics training.

Working with OSHA to Improve Safety and Health

Recognizing the key part that OSHA plays in the safety and health of its workers, over the last twenty-five years the industry has invested significant resources working with the agency to improve safety and health in poultry facilities.

In 2004, OSHA, with input from the industry, developed ergonomics guidelines specific to poultry processing. "Ergonomics for the Prevention of Musculoskeletal Disorders: Guidelines for Poultry Processing" (Poultry Guidelines) was the third in a series of four industry-specific ergonomics guidelines issued by OSHA over a six year period. For the poultry processing industry, the guidelines built upon the concepts included in OSHA's Ergonomics Program Guidelines for Meatpacking Plants issued in

the early 1990's, but tailored them to the unique aspects of poultry processing.

The Poultry Guidelines described the basic process for addressing MSDs in the workplace: providing management support, involving employees, identifying problems, implementing solutions, addressing reports of injuries, and evaluating ergonomics efforts.

Perhaps the most useful tools for the industry in the document, however, were the solutions identified. The document provided over 20 separate solutions and examples of PPE. These ranged from workstation design solutions, to engineering devices, to manual handling solutions. The document also recognized the importance of administrative solutions in the poultry industry in terms of injury prevention. The key administrative solutions included:

- Job rotation;
- Staffing "floaters";
- Break-in periods;
- Pauses to relieve fatigued muscles;
- Cross-training and job enlargement; and
- Routine and preventive maintenance on equipment.

Also in 2005, the National Chicken Council and the National Turkey Federation entered into an alliance with OSHA "to provide information, guidance and access to training resources to ensure the safety and health of workers throughout the industry, with a particular emphasis on reducing and preventing exposure to ergonomic-related hazards." As a result of the alliance, the industry and OSHA appeared at the Poultry Safety Conference to discuss the alliance and the industry worked closely with Georgia Tech to develop and implement the Susan Harwood Grant ergonomics training materials discussed above.

Of course, one of the most impressive resources is the poultry industry e-tool. This web-based product provides significant safety and health information to employers and employees in: receiving/killing, evisceration, cutting, deboning, packout, and warehousing. While the e-tool addresses all possible hazards that could be present, the prevention of MSDs is a primary focus.

The e-tool analyzes various jobs for the hazards present and then recommends possible solutions. For example, in the discussion of live-hang, the e-tool advises that "Ergonomic hazards of reaching down to access birds on supply conveyor and reaching up to hang them on the shackle conveyor can lead to shoulder, back, and neck strain because of awkward postures and repetitive motion." To address this situation, the e-tool recommends minimizing forward reaches by moving the shackle conveyor towards the employee, rotating employees up and down the hanging line to vary the rate at which they perform the task, providing height-adjustable stands for shorter employees, and providing anti-fatigue mats. And this is just one of literally dozens of job tasks analyzed in the e-tool.

Through its relationship with Georgia Tech, the industry helped review the e-tool and is in the process of providing additional comments to the agency on the e-tool to further improve its effectiveness.

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Decline in MSDs in the Poultry Industry

The results of these initiatives can be seen in the significant decline in MSDs in the poultry industry since 1992. A review of Bureau of Labor Statistics (BLS) data from 1992 through 2007 shows stunning decreases -- over 75% -- in MSDs in the poultry industry.

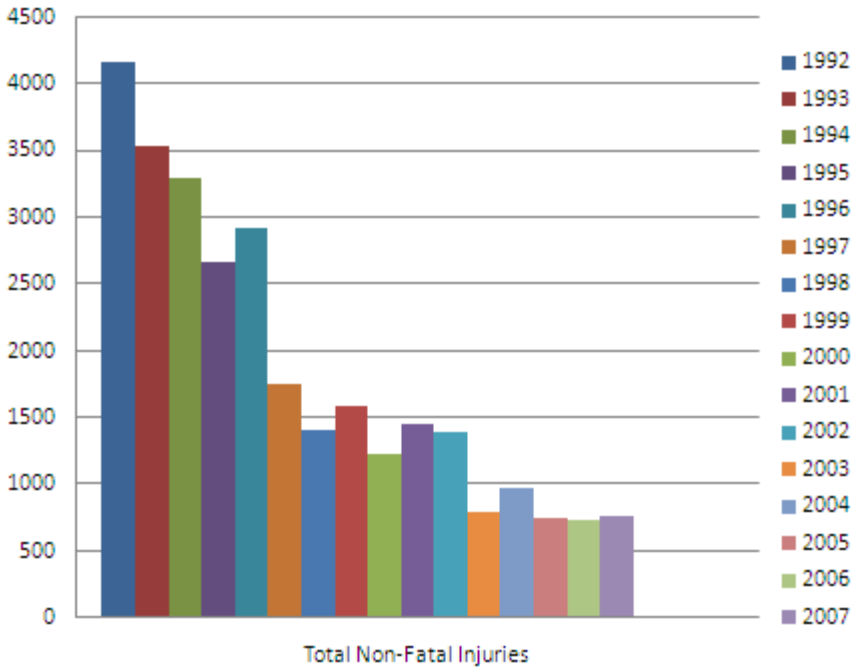
Table 1 below lists the number of MSDs recorded by BLS involving days away from work from 1992 through 2007. This is also shown graphically in Figure 1.

Number of nonfatal occupational injuries and illnesses involving days away from work in the poultry processing industry 1992 – 2007

Table 1

Year	Sprains, strains	Carpal Tunnel Syndrome	Tendonitis	Soreness, pain	Back pain	Total
1992	2601	503	390	558	115	4167
1993	2153	542	275	446	130	3546
1994	1862	406	313	553	170	3304
1995	1610	284	230	488	52	2664
1996	1904	356	161	420	82	2923
1997	986	232	145	292	98	1753
1998	838	162	87	275	47	1409
1999	952	159	95	278	108	1592
2000	736	138	126	178	51	1229
2001	989	185	58	174	45	1451
2002	786	149	77	326	55	1393
2003	410	100	20	220	40	790
2004	580	120	20	210	40	970
2005	430	90	40	160	30	750
2006	470	70	30	120	40	730
2007	410	70	30	200	50	760

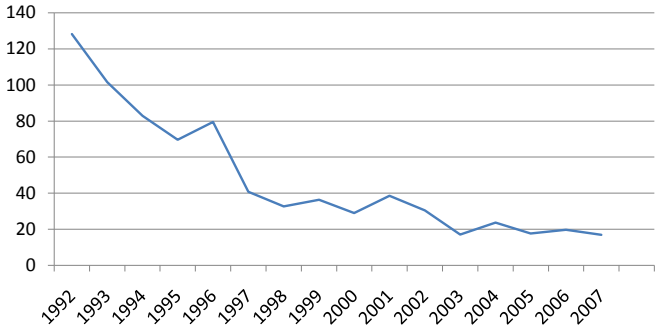
Figure 1



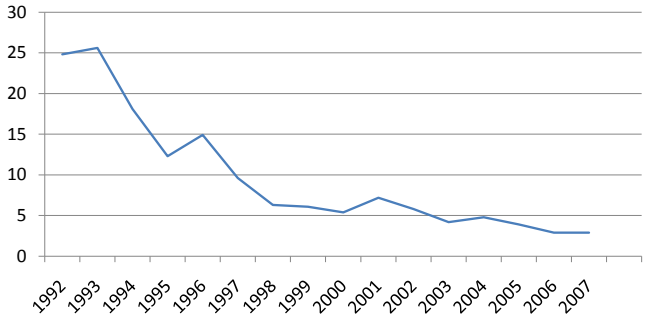
The decline in the total number of MSDs is important. However, an even better representation of the strides the industry has made can be seen in an analysis of the number of MSDs occurring in the industry per 10,000 full-time workers. MSD incidence rates adjust for any changes in the total employee population working in the poultry industry. As shown in the graphs below, the significant decline in overall numbers of MSDs are mirrored when MSD incidence rates are examined.

Incidence Rates
(Number of injuries per 10,000 full-time workers)

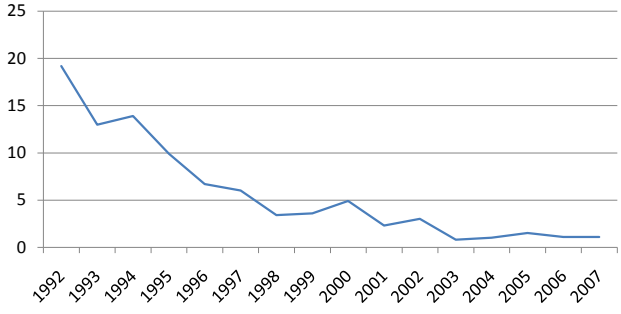
Sprains & Strains



Carpal Tunnel Syndrome



Tendonitis



Implementation of Ergonomics Principles Throughout the Poultry Industry

Numerous companies within the poultry industry have had success with the implementation of ergonomics, which supports the declining injury rates above. Ergonomics "success stories" are almost too many to mention. Some notable successes that have been presented at the Poultry Safety Conference are presented below:

Success Story 1

Tender Grading Bagging Station

The Problem

Employees standing at the end of a tenders grading table put tenders in 10 pound bags. Poor ergonomic design of the work station resulted in long reaches, excessive bending, and raised arms. This resulted in complaints of shoulder and neck pain, product falling on the floor, decreased production levels, turnover, and poor morale.

The Solution

An ergonomics committee at the facility evaluated the job and recommended improving the workstation design by raising the table, adding a product flow chute and basket to better distribute tenders going into the bag, and moving the job nearer to the deboning line.

The Benefit

Employee complaints of pain and difficulty doing the job were greatly reduced. Turnover was reduced and productivity gains were achieved through a reduction in rework. Employees indicated the redesigned workstation was a good improvement. Overall investment paid for itself in terms of

productivity gains and cost savings from reduced turnover in less than 4 months.

Success Story 2

Front Half Loading Station

The Problem

Employees were lifting 70 pound tubs from the filling hopper to a transport conveyor. These lifts involved heavy weight, twisting, and high frequency. This raised concerns over potential back strains for employees making the transfer.

The Solution

Engineers and ergonomics committee members at the facility designed a flutted conveyor to move tubs from the fill hopper to a perpendicular conveyor system.

The Benefit

Implementation of these modifications reduced the potential for back injury while also eliminating the need for one employee in performing the job. Employee feedback was very positive.

Success Story 3

Safety Levers on Automated Cut-up Machines

The Problem

A commercial automatic breast cutup machine design employed safety levers on each side of the feed station requiring the operator to pull both levers after placing the bird top half onto the feed cone before the next cone would advance. This prevented the employee from getting his hand caught in the mechanical feed mechanism and from being

pulled into the machine. Unfortunately, these safety levers were oriented in such a way as to put mechanical stress on the wrist and palm of the operator and resulted in awkward wrist flexion when the levers were engaged. While no medical complaints had been reported after the machines were introduced, one company had received a few employee complaints of hand and wrist soreness.

The Solution

The two levelers were replaced with two large plastic mushroom-shaped buttons. A different start/stop mechanism was also added.

The Benefit

Workers were able to perform the job with no wrist flexion and minimal mechanical stress to the hand and wrist. One employee commented that the new buttons were "much better" because they put "less pressure on the hands." The employee also stated that he could now perform the job "faster." The cost of the new equipment was relatively inexpensive (approximately $60 per machine).

Success Story 4

General Plant Workstation Redesign

The Problem

A poultry processing plant had problems with employees developing carpal tunnel syndrome. The reported incidence rate plant wide was 9 cases per 200,000 hours. An ergonomic evaluation of trouble spots was conducted to determine the nature of the stresses that could be leading to the problem and a series of controls were implemented along the eviscerating and cut-up lines to reduce these stresses.

The Solution

The conveyor height was adjusted and platforms provided for short individuals allowing the work to be performed 2 inches below elbow height without stooping or hunching the shoulders and back. Forward reaches were limited to 18 inches and the work oriented no closer than 6 inches from the workers body to promote sound body mechanics. One-inch thick rubber pads and foot rests were provided at standing and sitting workplaces to reduce pressure on sensitive areas of the body. Three control measures were added relative to knife use that included: sharpening schedules, a means of removing grease from knife handles, and a training program on cutting techniques.

The Benefit

Due in part to these engineering and administrative controls, the company was able to reduce the incidence of carpal tunnel syndrome in a five year period from 9.0 to 3.0 cases per 200,000 work hours, a 67% reduction.

Industry Implementation of Ergonomics

The industry realizes that individual success stories, while important, are not the end of the process. They are the beginning. The key measure of success with ergonomics is industry penetration and the extent to which facilities across the country have implemented the same types of safety and health improvements. Taken as a whole, the industry has invested significant resources to prevent MSDs and, overall, the decline in injury and illness rates support the effectiveness of these efforts. But another question is how much of the industry has taken significant steps to address MSDs. Is it a select few companies or a wide range of companies throughout the country?

To answer this question, the Poultry Safety and Health Committee sent a survey out to member companies and asked the following three questions:

1. What percent of your company's facilities have an ergonomics program (including management commitment

and employee participation, hazard analysis and control, and medical intervention)?

2. Recognizing that hazard analysis and control is an ongoing process, what percentage of the jobs in your company's facilities have **not** been analyzed for ergonomic improvements?

3. Please provide from the list below the three control measures that have been implemented in your company's facilities that you have found to be the most effective at addressing risk factors for musculoskeletal disorders.

   Engineering Controls
   Workstation design (height, angles, reach, etc.).
   Mechanical devices (scissor lift, hoists, vacuum systems).
   Equipment (adjustable height stands, roller tables, conveyors, augurs).
   Tool design (hand tool design, e.g., knives, scissors, spray nozzles).
   Other.

   Work Practice Controls
   Proper work technique (neutral positions, body mechanics).
   Job conditioning (work hardening).
   Design of work methods.
   Employee training.
   Other.

   Administrative Controls
   Job rotation.
   Rest breaks.
   Stretching.
   Knife/scissor sharpening.
   PPE.
   Job enlargement.
   Adjusting work schedules or pace.
   Other.

The response to the survey was strong. Companies representing over 75% of the United States broiler production responded to the survey and companies representing over 60% of the turkey production responded. The survey results found that of the companies who responded, over 75% of their facilities had an ergonomics program including management commitment and employee participation, hazard analysis and control, and medical intervention. Furthermore, the vast majority of individual jobs at the facilities had been analyzed for ergonomic improvements. According to survey participants, only 27% of the jobs in the companies' facilities had **not** been analyzed.

With respect to the effectiveness of controls, the companies who responded indicated that workstation design was the most effective at addressing MSDs, followed by job rotation, and proper work technique (neutral positions, body mechanics).

While the degree of implementation is impressive, it confirms that additional work remains. The industry is committed to increasing the penetration of ergonomics efforts to as many facilities as possible.

Next Steps for the Industry?

The industry's successes with ergonomics have been significant. Poultry companies can take pride in the significant decline in MSDs in the industry. These declines are real, as are the numerous success stories and the implementation of ergonomics throughout a broad spectrum of the industry.

The industry, however, is looking for additional ways to further improve the safety and health of its workforce. As mentioned above, the Poultry Safety and Health Committee is reviewing OSHA's poultry processing e-tool with the goal of improving its effectiveness to employers and employees in the industry. The industry will also continue its close relationship with Georgia Tech to support implementation of the innovative technologies emerging from the Research Institute. The industry is also launching a new safety award to recognize poultry and egg processing companies that are leaders in safety and health and have demonstrated consistent success in the reductions of injuries and illnesses.

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