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ERGONOMICS EFFORTS IN THE RETAIL FOOD INDUSTRY

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This panel is composed of individuals from retail, ergonomic consulting firms, equipment manufacturers and NIOSH, who are currently involved with ergonomics efforts in the retail food industry. Presenters summarize their ergonomics efforts and discuss key challenges in the industry today.

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PANEL SUMMARY

Thomas J. Sluchak, IBM

Generally, the public does not think of work in the retail food industry as hazardous or stressful. But, when examined closely, the ergonomic stresses associated with the retail food industry are markedly similar to those in traditional manufacturing and assembly industries: manual material handling, physiologically demanding work rates, and mental pressures associated with time and quality expectations. While it is true that ergonomists have worked for years to improve the workplace in traditional industrial settings, ergonomists have largely ignored the retail food industry. The human factors and ergonomics community is only now beginning to recognize the ergonomic stresses in this non-traditional industry and actively deal with them.

Since the 1960's, only a handful of human factors types have worked in the retail food industry. Coming primarily from companies like NCR and IBM, these ergonomists concentrated their early efforts on improving point-of-sale (POS) equipment design at the front-end workstation or checkstand. Within the retail food industry, the components of what we today call an ergonomics program fell within the scope of the safety and risk managers and the industrial engineers. As the specter of cumulative trauma disorders (CTDs) began to rise in the mid-1980's, the POS

ergonomists and industry safety personnel recognized that ergonomics would play an increasing role in the future health of the retail food industry.

In 1991, there were over 3.2 million employees in the retail food industry as estimated by the Food Marketing Institute (FMI), a major trade association for retail grocery and wholesale companies in the United States and Canada. Of the 3.2 million employees, about one million work, either full- or part-time, as cashiers in the United States today. Researchers have noted that cashiers can come in contact with 500 to 1000 items per hour and handle nearly 6000 pounds of groceries in a work shift. Cashiers and their union have alleged that increased physical demands on cashiers combined with inadequate design of POS workstations (checkstands) or the equipment therein have resulted in cumulative trauma disorders among cashiers.

Although CTD allegations get most of the attention in retail industries today, injuries to the back and other large muscles are also now getting attention. According to the U.S. Department of Labor's Bureau of Labor Statistics, in 1990, GROCERY STORES (SIC 541) had an OSHA incidence rate of 12.1, higher than that of the MINING industry where the incidence rate was 10.4. For 1991, GROCERY STORES accounted for over 238,000 injury and illness cases, third behind EATING AND DRINKING PLACES and HOSPITALS, but ahead of MOTOR VEHICLE &

EQUIPMENT MANUFACTURING and MINING. Thus, the retail food industry (with other service industries) does warrant attention.

In view of the large numbers of workers potentially affected, the National Institute for Occupational Safety and Health (NIOSH) is pursuing ergonomic investigations on an industry-wide basis in food stores, warehouses and distribution centers. In some situations, NIOSH researchers have indicated that order selectors employed in food distribution centers need the aerobic capacity of a marathon runner and the physical strength of a weight-lifter to accomplish the job set for them using traditional time-and-motion analysis.

Since the late 1980's, the number of consulting and research ergonomists involved with the retail food industry has grown. This panel is an attempt to assemble a few of these ergonomists and industry representatives to discuss the ergonomics state-of-the-art both at checkout and in general material handling areas of the retail food industry.

This panel is composed of a retail safety and health manager, two ergonomists experienced in point-of-sale equipment design who consult regularly with retailers on the design of their store workstations, an ergonomist who consults on warehouses and distributions centers, and a government ergonomist currently investigating working conditions in the food distribution industry. Collectively, the panelists are familiar with all pertinent ergonomics aspects of the retail food industry.

The objectives of the panel are:

1. Summarize current ergonomics activities within the food and retail industries, and
2. Address key questions surrounding the role of ergonomics in retail industries today.

Specifically, presenters will summarize their ergonomics activities, concentrating on:

- The intent and scope of their work,
- Methods employed, noting significance and limitations, and
- Insights and conclusions they have determined from their work.

Given the large numbers of workers and workstations involved in retail industries, this panel should provide greater recognition within the Human Factors and Ergonomics Society of the necessity for state-of-the-art ergonomics work in non-traditional industries, like retail.

RETAIL WORKSTATION ERGONOMICS - A CONSULTANT'S ROLE

Douglas C. Antonelli, ERCON

A variety of external forces are shaping the retailer's perspective of ergonomics. Unions, government, trade associations and other concerned outsiders are providing more "help" than many retailers, especially some smaller firms, can deal with. Employee health and safety has quickly risen to be one of the top issues that needs to be "managed". Compensation costs have risen dramatically and the retailer must focus on getting these costs under control or be faced with serious profit erosion.

From customer service to worker health and safety, the retail workstation serves as a focal point of both risk and opportunity for today's retailer. The retail workstation includes more than just the point of sale terminal. The workstation entails all work elements required by the operator(s) and the consumer that are necessary to complete the sale.

The consultant's role will be discussed. Specific attention will focus on those issues that have shown to be important to retailers because of their nomination for investigation and implementation activities. An overview of these issues will be presented and a proactive strategy for consultant activities relating to retail workstations will be described. One such issue is that of CTDs (Cumulative Trauma Disorders), the "Occupational Epidemic of the 90's". Examples will demonstrate that food retailers are not the only ones with risk potential in this area.

Current trends and Governmental focus, along with examples of research and study techniques related to the design and development of retail workstations will be presented. Items such as identification of consultant sources, reasons for selection, topics for attention, methods of approach and probability of implementation will be discussed.

ERGONOMICS IN SUPERMARKETS - A RETAILER'S PERSPECTIVE

Pat Bower, Associated Grocers

The retail food industry employs thousands of individuals in a variety of jobs - warehousing and distribution, stocking and bagging, customer service and shopper checkout, personnel and materials

management, and many other areas. Within the food industry, employee safety and loss prevention are major considerations for every retailer. Much effort and money is spent on providing all employees with a safe and productive workplace.

In recent years, ergonomics activity in the food industry has risen. But, close ties between the food industry and the ergonomics professional community are limited. Food retailers are open to help in several areas, such as:

- Better understanding of human behavior and body mechanics, especially while scanning and bagging at the front-end of stores.
- Improved programs and techniques for education and training of employees in all jobs.
- Guidelines or standards for checkout operations and better workplace design for stores and distribution areas.
- Pallet design and materials management approaches that are both productive and cost effective.
- Cost-benefit and payback analyses that prove to retail management that workplace design changes lead to greater profit in the short- and long-term.

Ergonomics as a science should be able to help the food retailer identify and solve problems. To the extent that ergonomics can assist the food industry improve its efforts to better the working conditions of its employees, especially in a cost-effective manner, retailers want to work with organizations such as the Human Factors and Ergonomics Society and its members to make that happen.

ERGONOMICS CONSULTING IN THE SUPERMARKET INDUSTRY: A CATALYST FOR CHANGE

Mark S. Hoffman, NCR

During the past decade, Point Of Sale equipment suppliers and checkstand manufacturers have been credited with responsibility to ensure that retailers who use this equipment provide a safe work environment for their employees. The increased awareness and concern to reduce occupational injuries has resulted in numerous consulting opportunities for ergonomists. Some of the areas in supermarket that have recently received attention include: the checkout, meat, bakery and floral departments, and the stock room.

Many supermarket companies employ industrial engineers. Most of these individuals reside in staff positions. Their assignments cover a broad spectrum of areas within the company's operations. Although ergonomic problems are important to them, the amount of resources directly under their control and the breadth of their assignments often requires using ergonomic consultants to assist in solving potential ergonomic hazards.

Ergonomists representing the equipment and/or workstation suppliers have the opportunity to be an effective catalyst for change in most areas of the supermarket because there is no single equipment supplier that provides the entire solution. The ergonomist's efforts can effect overall change by improving the usability of the designs of equipment and tools used in the supermarket, and by providing ergonomic guidance to specific problems in store operations.

Ergonomists function in several roles within the supermarket industry because of their strategic position: product designer, researcher, and consultant. Their challenge is to balance these roles to champion effective changes in the user's work environment.

Product Design Ergonomist

This has been the traditional role of the ergonomist, that is, to provide usability parameters to product design engineers, and to support marketing and product managers as the products are introduced into stores. Most of the larger equipment suppliers, like IBM and NCR, have employed ergonomists in this role. Product usability issues range from simple issues that can be resolved from the human factors literature to complex issues that require applied and/or empirical research.

Research Ergonomist

The challenges of the research ergonomist are becoming more numerous with advancements in technology, equipment design, and workstations. Supermarket retailers are concerned about managing the introduction of new equipment and workstations into their stores. Ergonomic projects occur on two levels: (1) those that immediately impact the design of new equipment currently going into supermarkets and (2) those dealing with issues that require basic research because of a lack of empirical knowledge to adequately address the problem and identify solutions.

Product Usability Research: The challenge of the research ergonomist is to design, administrate, and maintain an applied ergonomic research program in parallel with product development responsibilities. This requires the ergonomist to identify and maintain funding and support groups to conduct these studies as an on-going activity. The ergonomist has opportunities to provide to the supermarket industry information that further advances knowledge of ergonomics and to provide an information resource to improve the usefulness of empirical research programs. Factors that impact the potential success of the research ergonomist in this role are the freedom and support provided by the employer as well as his/her own research and marketing skills.

Basic Research: The most common scenario is that as technology changes, the product user interface improves. The intended net results are usually improvements in productivity and reductions in unsafe behaviors; however, subtle changes in the user interface can result in unpredicted new behaviors. Thus, an evolution of automation and ergonomics has occurred with many types of equipment used in the supermarket.

The research ergonomist has opportunities to further our empirical understanding of human behavior by conducting basic and applied research or by sponsoring it. The challenge is to secure resources. One of the more effective methods is to attract several companies that share mutual concern for improving the ergonomics of the work environment. With the many retail equipment suppliers, merchandise suppliers, trade associations, and supermarkets retailers, the ergonomist can rally support from these other companies to provide sufficient funds to sponsor a level of research needed to address the ergonomic issues. In the retail food industry, such an approach led to the creation of the Food Marketing Institute's Ergonomics Task Force and its research program.

Ergonomics Consultant

The consultant ergonomist representing the equipment manufacturer can take on a dichotomous role as a consultant. A result is that information about user behavior in the supermarket, gathered while researching specific usability parameters of currently-used equipment with a motive of generating data for potential new product opportunities, is often sufficiently detailed so as to be useful for the retailer to learn more about store operations and to serve as a performance benchmark

against which future changes in store operations can be compared. The challenge for the ergonomist is to assure the retailer that both he and the information gathered during the research studies are objective.

In summary, there are opportunities for ergonomists to make significant contributions to the supermarket industry, in three potential roles: product designer, research ergonomist, and ergonomics consultant. The supermarket industry is concerned with protecting its work force because a safe, healthy work environment is critical to the success of the industry.

ERGONOMICS: PRACTICAL APPLICATIONS FOR RETAIL DISTRIBUTION CENTERS

Gary B. Orr, Auburn Engineers

For several years, Auburn Engineers has been involved in ergonomic improvement of retail distribution centers. Practical applications of ergonomics for food distribution warehouses might be summarized into the following two-step approach.

1. Don't fix everything. And, don't fix everything the same way. Start by breaking items down into three categories:

- **Category A - Don't handle items:** These are high volume, heavy or bulky items, and approximately 20% of the stock keeping units (SKUs).
Ergonomic Strategy: Reduce handling or use mechanical handling aids.
- **Category B - Improve handling items:** These are most items in warehouse - moderate weights, moderate volumes, and approximately 50-60% of SKUs.
Ergonomic Strategy: Reducing exposure to risk, reach and travel distances, forces, and frequencies. Lift in strongest position.
- **Category C - Okay as is items:** These are low volume, light weights, and approximately 20-40% of SKUs.
Ergonomic Strategy: Leave as is or change later. Change if easy/inexpensive to do.

2. Implement ergonomics changes based on the three categories above.

- **Category A (High volume, heavy items, bulky items):** Take the *hand* out of manual handling. Ship in pallet quantities; direct ship from vendor to store; etc.
- **Category B (Moderate weight, moderate volume items):** Apply traditional ergonomics analyses to reduce exposure,

use mechanical assistance, minimize reach, etc.

Some recommendations regarding what should be a part of an ergonomics program in food distribution centers include:

- Administrative improvements: Reduced pick hours, increased rest breaks, improved staffing techniques, reasonable time and motion expectations, job rotation, etc.
- Medical Management: Nurses on site, identified restricted-duty jobs, early symptom reporting.
- Training.
- Worker surveys and management awareness programs.
- Improved work practices: Pick heavy items first, ensure selectors are not stuck in "difficult aisles", allow selectors to get the closest case, sequence pick list properly.
- Use of personal protective equipment: Absorbing soles on safety shoes, proper gloves.
- Changes to product being handled: Handles on cases, reduced weight, etc.
- Changes to warehouse design and practices.

ERGONOMIC ASSESSMENTS IN THE FOOD DISTRIBUTION INDUSTRY

Thomas R. Waters, NIOSH

Only recently, has the professional ergonomics community and management from the food distribution industry begun to recognize the extent of ergonomic hazards associated with repetitive manual handling of grocery products. Thousands of American workers are employed in food distribution jobs that require varying amounts of manual material handling and awkward postures. One of the more physically demanding jobs is the grocery order selector, who must handle large volumes of grocery products in grocery warehouses and distribution centers. Other demanding tasks include grocery store personnel who are responsible for restocking items on the store shelves and checkout cashiers and baggers who must manually handle each item before it leaves the store. All

of these jobs have the potential to increase the likelihood of an occurrence of a serious musculoskeletal disorder or injury above an acceptable level.

The National Institute for Occupational Safety and Health, in cooperation with the Food Marketing Institute, has recently investigated some of the ergonomic risk factors associated with two of the most demanding food distribution jobs: *grocery order selectors and cashiers*. The purpose of this discussion is to present some preliminary results from our investigation of the ergonomic hazards to the low back associated with the job of grocery selectors.

In a recent field study at a large mid-west grocery warehouse, NIOSH staff collected information at the work site to quantify the magnitude and effects of five work-related factors, each of which is a recognized risk factor for overexertion (fatigue) and/or low back pain. The risk factors included: (1) load weight, (2) lifting postures, (3) trunk rotations, (4) work duration/intensity, and (5) heat stress. We also surveyed the workers and reviewed OSHA logs and medical records to determine the extent of the recorded injuries and lost time. As part of the assessment, we determined variations in load weights and the types of stressful lifting postures that we had observed, we used a state-of-the-art device to measure trunk rotations, and we examined the effects of lifting frequency and work duration as they affected oxygen use and heart rate. The results indicated that there are excessive biomechanical and physiological stresses that must be considered when setting performance standards for grocery selectors.

To reduce the risk of injury to grocery selectors, ergonomic principles should be used in the design of racks, physical layout, size of the order and arrangement of grocery items. These measures should minimize the biomechanical and physiological demands of the work, reduce injury and illness to order selectors and improve productivity. Also, overtime should be kept to a minimum as the energy requirements for the job are very high. If overtime is necessary, it should be made voluntary so that a tired worker with a limited aerobic capacity is not forced to maintain a certain level of performance after an eight-hour work day.