Development of an ergonomics guideline for the furniture manufacturing industry

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Abstract

Industry-specific ergonomics guidelines are an important component in the four-pronged approach to workplace ergonomics currently pursued by the United States Occupational Safety and Health Administration. The American Furniture Manufacturers Association has taken the initiative of developing such a guideline for its members. The result of this effort is the “AFMA Voluntary Ergonomics Guideline for the Furniture Manufacturing Industry”, a document that includes basic information about ergonomics program components as well as a compilation of work-proven, ergonomics best practices as submitted by members of the furniture manufacturing community. This guideline was developed through an industry-research-government partnership and made strategic use of the unique attributes that each sector brought to this effort. Outlined in this paper are some of the characteristics of this partnership including, the roles played by each, the different motivations for pursuing the guideline, the challenges faced during the development of the document, the successes experienced in this process, as well as a proposed outline for measuring the effectiveness of this effort. The hope is that this summary, and some of the lessons learned contained herein, would be helpful to others considering the prospect of developing such a guideline for their industry.

Keywords: Furniture industry; Ergonomics guideline

1. Introduction

A brief discussion of the history of the ergonomics-related activities of the Occupational Safety and Health Administration in the United States (herein simply referred to as “OSHA”) will provide a context and motivation for the development of the “AFMA Voluntary Ergonomics Guideline for the Furniture Manufacturing Industry” (AFMA, 2003). In 1987, OSHA issued its first ergonomics directive that established regional ergonomics coordinators to provide technical assistance to OSHA area offices, mandated training for compliance staff, and directed compliance safety and health officers to consider ergonomic violations under what is known as the “General Duty Clause”. The General Duty Clause requires an employer to “furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees”. Without a specific rule or regulation related to ergonomics, OSHA’s compliance personnel used (and continue to use) this General Duty Clause to develop ergonomics-related citations—often leading to the development of settlement agreements that involve(d) the development of an ergonomics program.

In addition to the efforts in the area of compliance, the late 1980s and early 1990s saw OSHA involved in the development of ergonomics assistance materials to help industry deal with the growing problem of work-related musculoskeletal disorders. In 1990, OSHA began the trend of providing industry-specific ergonomics guidance by publishing the “Ergonomics Program
Management Guidelines for Meatpacking Plants” (OSHA, 1991) to help this particular industry address their historically high prevalence of musculoskeletal disorders. While this document was developed specifically for the meatpacking industry, many other industries viewed this document as valuable guidance in the process of developing ergonomics programs and, as such, formed the technical foundation for most programmatic efforts across a diversity of industries.

While the General Duty Clause citation was being used as an enforcement tool in the area of ergonomics, many felt the need for a specific standard/rule addressing ergonomics. In 1992, the Advanced Notice of Proposed Rulemaking for an ergonomics standard was published requesting public input regarding the development of an ergonomics standard. In early 1995, OSHA began discussion with stakeholders to identify appropriate approaches to a draft ergonomics standard, but this effort was met with great resistance from Congress in the form of a prohibition of the use of 1995 and 1996 federal funds for this purpose. These restrictions were gradually relaxed in subsequent years and on November 23, 1999, OSHA published its proposed ergonomics standard for comment in the Federal Register (a daily government publication, wherein rules and proposed rules are formally published). Over the next year OSHA received nearly 11,000 comments on this proposed standard and continued to revise the proposed standard based on these comments.

On November 14, 2000 the Final Rule was published in the Federal Register. This rule was a “triggered” program standard, indicating if the “action trigger” was met (an employee working in the job must have incurred a relatively severe work-related musculoskeletal disorder and the job must contain recognized risk factors for the development of work-related musculoskeletal disorders) the employer must establish an ergonomics program for that job. It is important to note that this rule also specified that whether or not a full program was required, all covered employers had to provide their employees with basic ergonomics information. This rule went into effect on January 16, 2001. Slightly more than 2 months later, a joint resolution of congress disapproving this ergonomics standard was signed, noting a strong opposition from industry.

A little more than a year later, the US Secretary of Labor (in the United States OSHA falls under the Department of Labor) presented OSHA’s four-pronged approach to ergonomics. One of these components was an emphasis on enforcement—continued use of General Duty Clause to issue citations relative to ergonomic hazards. The second was outreach and assistance to help business proactively address ergonomics in their workplaces. The third component of this approach was to develop a National Advisory Committee that was to be focused on the research and science of ergonomics, helping to identify gaps in our knowledge. The final component of this four-pronged approach was the development of guidelines for specific industries. Initially, these guidelines were to be developed by OSHA in conjunction with the industry for which the guidelines were developed. At the time of this writing, three guidelines have been developed: one for the nursing home industry (OSHA, 2003), one for the poultry processing industry (OSHA, 2004a) and one for retail grocery stores (OSHA, 2004b). OSHA has also indicated that a draft guideline for the shipyard industry is in development. In addition to these OSHA-developed guidelines, OSHA also encouraged other industries to develop their own industry-specific guidelines and it is this opportunity that the furniture manufacturing industry has pursued. It should be noted that not all efforts to develop industry-specific guidelines/assistance have been influenced by this new OSHA emphasis. Examples of industries that have this type of focused guidance include the agriculture industry (NIOSH, 2001), the construction industry (CSAO, 1993), office ergonomics (e.g. WHSCC, 1999), the soft drink beverage delivery industry (http://www.cdc.gov/niosh/96-109.html) while other industry-specific guidance can be found in the Health and Safety Executive (http://www.hse.gov.uk/).

2. Motivation

With this historical context as the backdrop, the question is “Why would an industry (such as the furniture manufacturing industry) be motivated to develop an ergonomics guideline without being mandated to do so by OSHA?” The answer to this question is threefold. First of all, many companies in the furniture manufacturing industry have been keenly aware of the importance of ergonomics and the positive impact that ergonomics can have both in terms of loss prevention and productivity. The very nature of the product that is manufactured in the furniture manufacturing facilities is challenging to handle (heavy, bulky and awkward) and often requires a great deal of manual work (sanding, rubbing, stapling, and spraying). Recognizing the considerable physical demands of many work tasks, most furniture manufacturing facilities have implemented targeted ergonomics solutions, and many have fully embraced ergonomics as an integral component to their operations. Before discussion of the development of a voluntary ergonomics guideline even began, a number of the furniture companies represented on the AFMA Safety Committee were able to show significant reductions in workers compensation costs and increases in productivity with the implementation of ergonomics practices and/or ergonomics programs, and were eager for others in the furniture manufacturing industry to experience the same benefits. Second, it was recognized by most of the individuals on the committee
that there would eventually be a federal ergonomics standard. It was reasoned that if the furniture manufacturing industry were to take this proactive step, their guidelines might be grand-fathered in as an alternative to future rules or regulations. Finally, there had been a beneficial collaborative industry-research partnership in existence for 8 years prior to considering the development of this guideline. This relationship had developed to the point that the industry was beginning to adopt some of the ergonomic interventions that had been developed through the research process and they were beginning to see the potential impact of these interventions in their own injury prevention experience. Expanding this general concept further, it was felt that the potential sharing of effective solutions across companies could net great benefits for all furniture manufacturers in much the same way that the industry was collectively benefiting from the results of the university-initiated research. Using a best practices approach to this guideline could provide an excellent vehicle for this dissemination.

3. Participants

The process began when the Deputy Commissioner of Labor for North Carolina approached the AFMA about developing its own ergonomics guideline. A meeting was held in July 2002 wherein the idea of developing a furniture industry guideline was proposed to the AFMA Safety Committee. After some deliberation and assurances that the ergonomics guidelines would not be used as enforcement tool against furniture manufacturing companies, the AFMA Safety Committee agreed to pursue this project and a guideline development committee was formed.

This development committee included the eight active AFMA safety committee members, three individuals from the North Carolina Department of Labor, one researcher from academia, one person from the consultative services sector, one person actively supporting the AFMA in the development of training materials and two individuals from AFMA headquarters. The members of the AFMA Safety Committee that participated in the development of these guidelines represented some of the largest furniture manufacturers in the United States. These companies included Thomasville Furniture Industries, Broyhill Furniture Industries Inc., Bernhardt Furniture Company, Klaussner Furniture Industries Inc., Henredon Furniture Industries inc., La-Z-Boy Incorporated, Pulaski Furniture Corporation and collectively had broad coverage of both the casegoods and upholstered furniture sectors of the industry. In addition to the AFMA member companies represented on the development committee, it should be noted that there was significant input provided by many other companies from the furniture manufacturing industry at-large throughout the process. The primary role played by the industry members of the team were to provide work-proven solutions from their own experience as well as act as a conduit for work-proven solutions from their industrial colleagues that were not on the development team. The role of the members from the North Carolina Department of Labor were to provide their insight into the regulatory aspects of the project, maintain communications with the federal OSHA (keeping track of OSHA-developed guidelines, keeping OSHA apprised of our progress, etc.), and provide the day-to-day administrative function of drafting and editing of the manuscript. The role of the researcher and consultant were to bring to the group a broader perspective of ergonomics including work-proven solutions (assessment tools, engineering solutions, program management techniques, etc.) from other industries as well as a more fundamental understanding of the broad issues in ergonomics. The individuals from AFMA headquarters and support staff provided a legal/compliance implications and visual/graphical design perspectives, respectively. All development team members participated in all meetings. One subcommittee was formed to focus on the gathering of engineering solutions and small (2–3 member) groups were formed to write individual sections of the document, based on the areas of expertise of the individuals.

4. Process and approach

Over a period of 12 months the development team met regularly to first identify the specific components to be included in the document, then to gather the necessary content and finally to draft the document. In the early stages of this process there was some discussion as to the form that the guidelines should take and it was resolved that the body of the document should contain the basic programmatic components (see appendix of this paper for the Table of Contents of the Guideline), but that the guidelines were going to be heavily supplemented by materials provided by the furniture manufacturing community. This approach was taken in an effort to make the document more universally relevant to current problems faced by furniture manufacturers, as the solutions that would be submitted from industry would be those found to address injuries/illnesses of either high incidence levels or high severity, or both. Once this was agreed upon, a letter was drafted and sent to the AFMA membership asking for their active participation in the development process by the submission of effective engineering controls that their company had developed/employed. Accompanying this letter was a template that requested specific details of the intervention (cost of intervention, before and after description of work tasks, any challenges faced in the implementation of the intervention, any secondary benefits gained) so that the form of each of the ergonomic solutions page in the appendices was consistent across
There were a number of challenges that the team faced in the process of developing the guideline. First, there was strong concern on the part of the members of the AFMA Safety Committee that this document would be used as an enforcement tool by OSHA such that the voluntary nature of the document would be lost and all furniture companies would have to adopt the ergonomic solutions and program components put forth in the document. This was a major point of discussion when the idea was first presented to the committee and the committee only agreed to pursue this project if a letter stating the voluntary nature of the guidelines was provided from OSHA. The second major challenge was engaging the furniture industry at large in the process of developing the document. It was our intention to include the solutions of as many furniture manufacturers as possible in the best practices appendices. A letter that encouraged this participation was sent from the AFMA to its membership. There was a disappointingly small response from this first solicitation. Direct contact between committee members and various individuals in other companies was shown to be a more effective way of engaging these other companies, resulting in a wider level of participation. The third challenge was the timeframe for development. Most of the development team members had full time duties at their regular appointments and typically fit the work on this guideline when able. This led to a development process that took a full 12 months. A much shorter turnaround time would have been possible if a small group within the development team were to simply develop the document and then pass it around for approval, however, the general consensus of the group was that full participation in the writing of the document by all development team members was vital to establish ownership of the work, as the industry representatives on the team were going to have to support this document when completed.

6. Successes

The main success story of this development process comes in the collegial collaboration among the research—industry—government alliance. Each of these groups brought important assets to the development process. The industry representatives brought a perspective on what the industry needs in terms of the document and supporting materials as well as representative samples of work-proven solutions for furniture industry problems. The government representatives were able to bring their perspective on the regulatory environment in which ergonomics is viewed as well as resources in terms of time and money for the development of the document itself. The research/consultant representatives brought a broader perspective on the state of ergonomics across the spectrum of industries, which included some solutions and analysis tools that were adopted for use in the guideline. While each group had its own motivation for participation in this effort, the common goal of reducing the incidence and severity or work-related musculoskeletal disorders was always foremost in our minds.

7. Measures of effectiveness

Quantifying the level of success of this effort will occur both in terms of long-term effectiveness and short-term utilization. Most importantly, the long-term expectation is to see a reduction in various measures of incidence and severity of work-related injuries to the musculoskeletal system. The plan will be to evaluate these measures over a period of years to assess changes at the industry Standard Industry Classification (SIC) code level as well as at a more
individual level through surveys of furniture manufacturers to establish a relationship between use of the guideline and reductions in these measures. As part of an on-going research project (Mirka et al., 2002a, b) we have established the baseline levels of these measures and are able to evaluate these changes annually to measure any effect. These clearly are more long-range measures of effectiveness. In the short term, as the AFMA will continue to publicize the availability of the guideline to the industry through mailings and presentations at industry meetings, the plan is to assess the level of access to the information by documenting requests for the hard copy of the document, and monitor the hit rate for both the electronic version (pdf) of the document and the Engineering Controls webpage. Another measure of the effectiveness of this process will be to keep a running count of the numbers of new solutions that are submitted as work-proven engineering controls for inclusion in the Engineering Controls webpage. This will gauge a general awareness of this resource and enthusiasm for participation.

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AFMA Voluntary Ergonomics Guideline
Ergonomic Interventions

Name: Automatic Frame Spring Puller
Primary Task: Attaching seat springs to the frames
Description: The puller automatically stretches the springs and attaches them to the clips in the seat frame.

TASK DESCRIPTION

BEFORE
The employee had to grab each spring and pull against significant tension to the clip on the opposite end of the frame.

AFTER
Employee attaches the spring to the mechanism and it pulls all springs simultaneously to the clip on the other end of the frame.

Ergonomic Impact: Relieved stress on the hands, wrists, elbows, shoulders, and back because the employee doesn’t have to stretch the springs by hand.

Special Points of Interest: The machine does not hinder the operation of the employee because the times between the hand springing and the machine springing are almost identical.

Estimated Cost to Purchase or Manufacture: Manufacture for approximately $750.00 each.

AFMA Voluntary Ergonomics Guideline
Ergonomic Interventions

Name: Spring-Loaded Fabric Buggy
Primary Task: Transport and acquisition of rolls of fabric
Description: Weight-calibrated springs are integrated into the cart mechanism that raise the rolls of fabric for easy lifting.

TASK DESCRIPTION

BEFORE
The operator bent down into the fabric buggy (often to 6–8 in from the ground) and lifted the roll of fabric to shoulder level.

AFTER
The spring-loaded system raises the fabric to near waist level to reduce the awkward posture of the back.

Ergonomic Impact: Reduces the opportunity for back injury due to excessive bending and lift heavy fabric rolls off of the buggy. Also reduces shoulder stress.

Special Points of Interest: These spring-loaded systems can be custom built and placed in virtually any cart system.

Estimated Cost to Purchase or Manufacture: Purchased for $135.
References


OSHA, 2004a. Guidelines for poultry processing: ergonomics for the prevention of musculoskeletal disorders. US Department of Labor, Occupational Safety and Health Administration, United States Department of Labor, OSHA 3213-09N.

OSHA, 2004b. Guidelines for retail grocery stores: ergonomics for the prevention of musculoskeletal disorders. US Department of Labor, Occupational Safety and Health Administration, United States Department of Labor, OSHA 3192-05N.