

ERGONOMICS AND THE PURCHASING PROCESS

BYERS JANE

Occupational Health, Safety and Workers' Compensation, City of Toronto, 55 John Street,
4th Floor, Toronto, Ontario, Canada, M5V 3C6. jbyers@city.toronto.on.ca,

McLWAIN LINDA, HARDY CHRISTINE, RAYBOULD KAREN

City of Toronto, Toronto, Ontario, Canada

Abstract

This paper discusses the importance of considering ergonomics and health and safety issues in the process of purchasing vehicles, furniture and equipment at a large public sector employer. It outlines the necessary components of a purchasing policy and the steps that ergonomists should take when involved in a purchasing process. It also discusses other tools that are helpful in developing purchasing specifications such as job demands analyses and the existence of general vehicle/equipment specifications. A number of case studies are included in which ergonomics issues were considered at the outset of the purchasing process. These include design specifications for side-loader garbage trucks, evaluation of firefighter protective clothing and the development of purchasing specifications for safety footwear.

Keywords: Purchasing, prevention, ergonomics

L'ERGONOMIE ET LE PROCESSUS D'ACHAT

Résumé

Le présent article traite de l'importance de prendre en considération l'ergonomie, la santé et la sécurité dans le processus d'achat de véhicules, meubles et équipement pour les gros employeurs du secteur public. Il décrit les grandes lignes des éléments nécessaires d'une politique d'achat et les étapes que les ergonomistes devraient suivre lorsqu'ils participent au processus d'achat. L'article énumère également d'autres outils qui peuvent s'avérer utiles à l'élaboration des critères d'achat, telles des analyses des exigences du travail et l'existence de spécifications générales relatives au véhicule ou à l'équipement. Un certain nombre d'études de cas sont incluses dans lesquelles les questions d'ergonomie ont été prises en considération au tout début du processus d'achat. Elles comprennent : les spécifications de conception pour les camions à ordures à chargeur latéral, l'évaluation des vêtements de protection des pompiers et l'élaboration de critères d'achat pour les chaussures de sécurité.

Mots clés : Achat, prévention, ergonomie

Introduction

In today's work environment with its constant change and demand for fiscal responsibility, it is essential to make the most efficient use of ergonomic resources and expertise. It is well recognized that injury prevention initiatives are more effective than reactive ergonomic interventions done after a system or piece of equipment is in place. Incorporating ergonomic principles into policy development and providing ergonomics input in the specification and purchase of furniture, vehicles, and equipment are two such prevention activities that are essential components of a comprehensive ergonomics program.

The City of Toronto is a municipal level government with approximately 26,000 employees as well as an additional 20,000 employees of agencies, boards, and commissions that are directly affected by its policies. In such a large organization, it is imperative to have ergonomic principles incorporated into the specifications developed for purchasing equipment, vehicles, and furniture. It would otherwise be unmanageable to have ergonomics staff individually monitor each and every purchase. The existence of a purchasing process that includes ergonomic considerations allows an organization to integrate ergonomics principles more fully into purchase decisions.

The need for a purchasing policy became more apparent with the amalgamation in 1998 of seven former municipalities into one large organization. Given the fact that each municipality had their own prior policies, procedures, and business practices, it was important that a consistent approach to purchasing be implemented. The amalgamation presented an opportunity to introduce proactive ergonomic policies and procedures that could be adopted across the organization. With the existence of an ergonomically-based purchasing policy, ergonomics is woven in the fabric of the organization rather than added as an afterthought. This, in turn, impacts the cost of managing injuries and illnesses.

Purchasing Overview

The City of Toronto's "Policy for Incorporating Occupational Health, Safety and Ergonomics Principles into the Purchasing Process" (referred to in this document as "the Policy") was developed, in part, as a result of varying degrees of success in achieving input into vehicle purchase specifications over the years. Unfortunately, many ergonomics issues were raised after vehicles had been purchased. Retrofitting involves considerable expense and down time, not to mention hazards to the users prior to the retrofit completion. Despite early successes with ergonomics involvement in purchasing vehicles for Solid Waste Division, other departments did not always consider ergonomics issues. Across the organization, there was an inconsistent approach to consideration of occupational health, safety, and ergonomic issues prior to purchasing vehicles and equipment.

The first step in ensuring that ergonomic issues are addressed in purchasing decisions is to establish a corporate policy that requires ergonomic principles to be considered in the purchase of any vehicles, equipment, or furniture. This requirement is included in the City's Policy and has been of great benefit in injury prevention initiatives. The second step is to involve an ergonomist in the multi-disciplinary team tasked with developing the design specifications for each purchase. These activities are supported by having accurate job demands analyses in place for all jobs and developing standard vehicle and equipment specifications for common items.

All large vehicle purchases at the City of Toronto incorporate a set of specifications developed by the ergonomics staff. These specifications outline criteria for such features as step heights, driver compartment dimensions, design of controls, and grab bar handle heights. In addition, an ergonomist is involved early on with the purchasing team for each large purchase. The team problem-solves specific issues related to the piece of equipment being purchased, e.g. garbage trucks have special requirements and considerations that are not covered in the general large vehicle recommendations.

The City of Toronto's Policy, in place since April 2000, is intended to:

- establish an efficient, cost-effective and consistent process for identifying and addressing potential health, safety and ergonomic risk factors prior to the acquisition of products
- assist service areas in meeting their operational goals by reducing injuries and illnesses
- maintain compliance with occupational health, safety, and ergonomics legislation
- sustain efficiency and productivity by minimizing the need for costly retrofits

The Policy outlines responsibilities for the operating departments who are going to be purchasing and using the equipment, the Purchasing and Materials Management Division, occupational health, safety and ergonomics staff, Joint Health and Safety Committees, and end-users. This multi-stakeholder approach ensures that the City takes every precaution reasonable for the protection of workers in purchasing products that have the potential to affect the health, safety, and well-being of its employees.

When ergonomics staff are involved in the development of specifications for vehicle, furniture, or equipment purchases, they consider: the demands of job tasks by reviewing job demands analyses (JDAs); the history of injuries and incidents using existing similar equipment; end users' feedback on similar equipment; and, any regulatory requirements or standards. Task analysis is one area where ergonomists can positively influence the outcome of purchasing by ensuring that product specifications truly reflect the demands and conditions of the job.

The following case studies highlight the impact of ergonomic involvement in purchasing vehicles and equipment at the City of Toronto.

Case Studies

Firefighter protective clothing: Ergonomics input was sought early in the development of the specifications. This was partly due to the Policy being in place, but was also a result of requests from firefighters to consider such things as comfort and fit in addition to the federally regulated specifications such as thermal protection and heat loss. The Fire Department felt it needed assistance in measuring comfort and fit and hence involved the ergonomics staff. A fire bunker suit is the most important personal protective equipment (PPE) for firefighters. Its main purpose is to provide thermal protection. However, the multiple fabric layers result in an ensemble which, while providing excellent thermal protection to the wearer, is bulky, heavy and inflexible (Huck, 1988). If firefighters' PPE limits their mobility, they will be less adroit during emergencies. Fit and comfort can have significant impact on performance of fire fighting duties and hence should be considered in purchasing decisions.

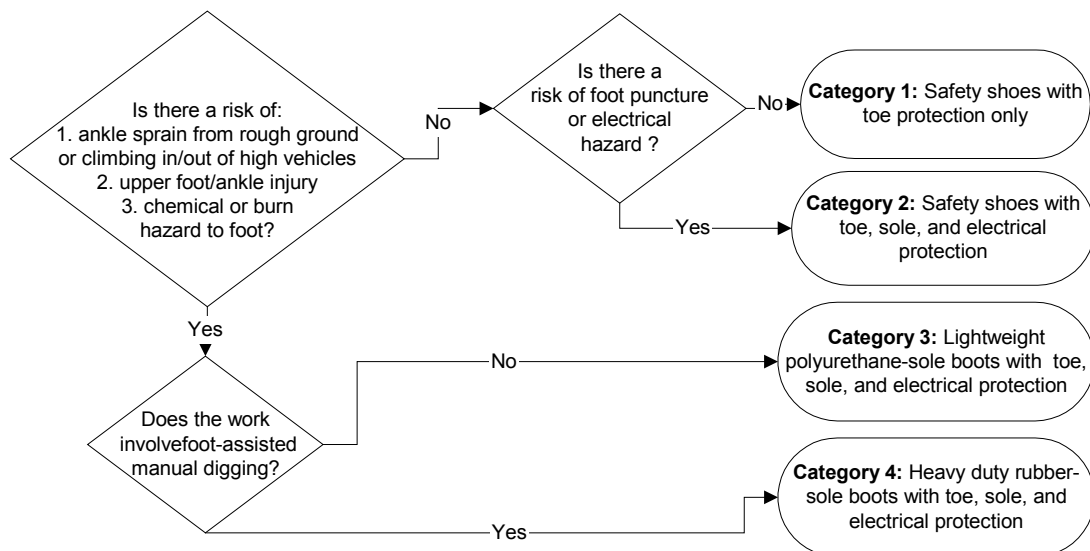
Ergonomics involvement included developing an evaluation tool for fit and comfort, administering the tests, and analyzing the results. The evaluation criteria were determined by reviewing the job demands analysis for the firefighter position, researching standardized test criteria for protective clothing, and simulating firefighter postures and activities. The

evaluation tool measured features such as mobility, ease of movement, comfort of padding in the knees, and subjective feelings of heat gain during simulated fire-fighting activities. The fit and comfort tests were carried out for all suits submitted by bidders using firefighters from Toronto Fire Services who volunteered to participate in the testing. The results of the fit and comfort tests were given considerable weight (35% of overall score) when determining the successful bidder for the Bunker Suit contract. This is a difference from previous decisions where the lowest bidder that met the requirements under the Canadian General Standards Board won the contract without consideration for fit and comfort. In this case, ergonomic involvement directly impacts the performance and safety of firefighter bunker gear.

Safety Footwear: Purchasing and Materials Management Division asked the ergonomics unit to be involved in the purchasing process for safety footwear. The task was to develop evaluation criteria and then evaluate safety footwear bids for the citywide contract worth approximately \$2M. It was essential that a consistent and fair approach to footwear entitlement be developed and implemented because, prior to municipal amalgamation, workers from different geographic areas had different entitlements that were not necessarily reflective of current job duties. Workers working side by side, performing the same duties, were sometimes entitled to different levels of safety footwear protection.

Task analysis and the review of JDAs were invaluable in the determination of footwear needs based on job function. Using this data and the working knowledge of the ergonomists in consultation with departments, a list of categories of safety footwear was completed. The ergonomics staff developed an automated flow chart for supervisors to determine a) the need for footwear, and b) the type of footwear required (see Diagram 1). This facilitates a consistent approach to entitlement based on job requirements across the organization. In addition, extensive ergonomics input was provided in the development of footwear purchasing specifications and the evaluation of bid samples in the safety footwear tender. In all, 20 different categories of safety footwear were evaluated.

Diagram 1: Summer Safety Footwear Entitlement (an excerpt from the automated flow chart)



Side-loader Garbage Packer Truck: Recently, the City's ergonomics staff were involved in the retrofit of side-loader packer vehicles used in the collection of garbage and recycling materials. Issues raised by employees at the Joint Health and Safety Committee included the limited tailgate opening clearance to enter the storage compartment. Upon investigation, it became evident that there was also a pinch point hazard with the tailgate safety strut when the operator had to reach within the pinch point zone to activate the strut. The safety strut is necessary to allow safe entry and exit into the storage compartment for maintenance purposes. As a result of the investigation, the purchasing specifications for side-loader packer vehicles were changed. The ergonomist specified a new safety strut design that eliminates the pinch point hazard and increases tailgate opening clearance from 60 cm to 100 cm to allow large workers to enter the compartment with ease, even if dressed in bulky winter clothing. All new side-loader packers must meet the new specifications. This change will eliminate this hazard at the vehicle design stage and will thereby reduce the down time associated with vehicle retrofit in order to eliminate hazards.

Ergonomics Role in Purchasing

When involved in the purchase of vehicles and equipment, the ergonomist should function as part of a multi-disciplinary team that includes the purchasing department, the operating department, the end-users and Joint Health and Safety Committees. An ergonomist should:

- review applicable regulations and standards to ensure all health, safety, and ergonomics requirements are addressed in purchasing documentation
- review information provided by departments re: operational requirements
- review job demands analyses to gain a full understanding of physical/cognitive demands
- consult with end-users to determine their experience with current and prior equipment
- review injury and illness reports and/or statistics
- review information provided by joint health and safety committees
- participate in the development of purchasing specifications to meet ergonomic needs
- participate in the evaluation of bid samples to ensure compliance with specifications

At the City of Toronto, the major challenges being faced in the full implementation of the Policy are communication and compliance with all departments, due in large part to the enormous size of the organization in relation to the resources available to implement the policy. Overall, the existence of the Policy has resulted in ergonomics being considered in the purchase of vehicles, furniture, and equipment in a much more consistent manner than previously encountered.

Summary

Ergonomics professionals have long recognized the value of considering ergonomics in the initial design phase of a project. Similarly, ergonomists know the value of being part of the purchasing process from its initial stages. In a large organization, an institutionalized approach is required to ensure that this timely ergonomic input occurs in every purchase with ergonomic implications. A purchasing policy that ensures the integration of ergonomic principles is not only an efficient and effective use of the skills of an ergonomist, but a financially sound business decision on the part of organizations.

References

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