handbook on participatory ergonomics

Handbook on Participatory Ergonomics

UNITE HERE! CANADA

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Handbook on Participatory Ergonomics

Published by UNITE HERE and the Labour- Management Partnerships Program, Department of Human Resources and Skills Development Canada.

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Preface

WHO IS THIS HANDBOOK FOR?

- Labour and management at clothing companies that would like to know more about participatory ergonomics programs and how to start one.
- Labour and management that are interested in simple solutions to ergonomic problems.
- Labour and management in companies with a *small* budget, looking for ergonomic solutions with *medium* effort and *large* results.

WHAT WILL YOU FIND IN THIS HANDBOOK?

- Information on how to set up an ergonomics program.
- Where to go for assistance.
- A case study showing the whole ergonomics process.
- Testimonials on some of the benefits and challenges that can be experienced.
- Examples of simple and inexpensive changes made in an actual clothing factory.

This handbook builds on the first volume: Ergonomic Handbook for the Clothing Industry published in 2001 (available at *info@unitehere.ca*). The first volume presented common ergonomic problems and possible solutions in the clothing industry. The present handbook discusses how solutions can be implemented through the development of a participatory ergonomics program. This project was initiated by UNITE HERE to help workers in the clothing industry who want to prevent injuries.

The content in this handbook is from a study funded by UNITE HERE and the Labour-Management Partnerships Program, Department of Human Resources and Skills Development Canada. The purpose of the project was to develop a model participatory ergonomics program at two clothing plants: John Forsyth Shirt Company in Cambridge, Ontario and Ike Behar, Inc. in Guelph, Ontario. Both participating plants will provide further information if requested.

Acknowledgments

This project, LMPP # 2003-005 "Participatory Ergonomics" was financially assisted by UNITE HERE and the Labour-Management Partnerships Program, Department of Human Resources and Skills Development of Canada. The members of the Steering Committee for this project included:

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Other collaborators in this project included the Ergonomics Change Teams at the Forsyth and Behar plants, all of the workers who participated in workplace changes, Maureen Mossey (UNITE HERE representative) and the University of Waterloo.

Introduction

WHAT IS PARTICIPATORY ERGONOMICS?

Participatory ergonomics is defined as a process of solving ergonomic problems that involves the collaboration of the *workers* as well as the input from other stakeholders (for example, management, supervisors, union representatives, engineers) in the workplace.

WHAT IS THE PURPOSE OF PARTICIPATORY ERGONOMICS?

The objective is to identify potential ergonomic risks and make the necessary modifications to minimize risks and maximize productivity.

WHO IS INVOLVED?

Participatory ergonomics involves the development of an *Ergonomics Change Team (ECT)* composed of representatives from various areas within a company including the plant manager, human resources, health and safety representative, engineer, union representative and workers. The ECT benefits from the experience and expertise of all its members. An ECT composed of members from a variety of different areas within the company is likely to be a better rounded team, which can lead to more effective changes to fix ergonomic problems.

It is also vital that the ECT seek the input of the *workers* since they are the true experts on the job. This helps to eliminate potential errors and increases the acceptance of the changes by the workers. Even the best intervention is ineffective if the workers do not accept the changes.

Involving workers in the solution process facilitates the implementation of changes and has a greater potential to reduce injuries.

WHAT DOES THE ERGONOMICS CHANGE TEAM DO?

The ECT's goal is to identify the potential risk factors of jobs and workstations and to perform the necessary interventions to reduce the risk of injury.

HOW MUCH TIME WILL AN ERGONOMICS PROGRAM REQUIRE?

An ergonomics program does not require a lot of time. Short meetings once or twice a month is all that is needed to discuss the ergonomic issues and solutions. Tasks can be delegated to members of an Ergonomics Change Team.

HOW MUCH WILL AN ERGONOMICS PROGRAM COST?

Ergonomic changes do not require a large budget. Simple, inexpensive changes can be very effective. In-house solutions and modification of existing equipment can help keep the costs down.

WHAT OTHER BENEFITS DOES A PARTICIPATORY ERGONOMICS PROGRAM HAVE?

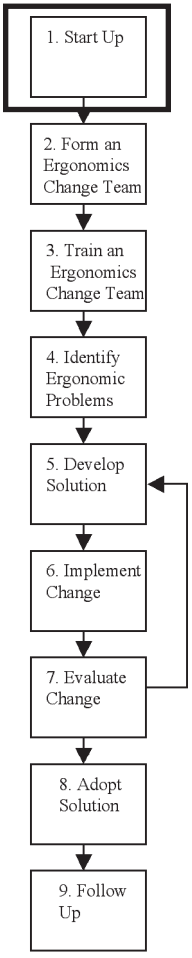
A participatory ergonomics program can help improve productivity by eliminating unnecessary motions (for example, extra reaching, and double handling of parts). It can also help increase product quality by fitting the job to the person, thus ensuring that it is performed correctly.

A participatory ergonomics program can also help to increase the communication and knowledge within a company by the joint collaboration of individuals from

different sectors. Posters, newsletters and presentations by the ECT can also help to increase communication.

A participatory ergonomics program can help to increase employee morale through involvement in the improvement process.

Developing a Participatory Ergonomics Program



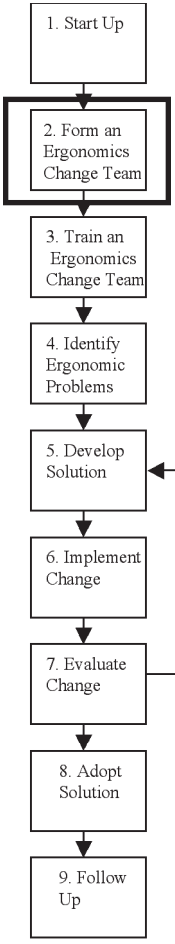
Different models of participatory ergonomics programs are available (see References at the end of the handbook). This handbook is a summary of these programs designed specifically for the clothing industry. The figure on the left shows the steps involved in the program.

STEP 1: START UP

Commitment from management

- A strong commitment by management and the union if present is required for the success of the program as well as involvement at every stage.
- The company must define the resources available for the program. This includes the time the team members need to take off their regular jobs to attend meetings as well as allocating the time and resources required for the actual changes.
- Management must establish a two-way information flow between themselves and the workers (operating through the union). The workers are the experts at their jobs and can provide valuable information with respect to problems and possible solutions in the work-place. A good relationship between management and workers and open communication will increase the success of the program.

STEP 2 – FORM AN ERGONOMICS CHANGE TEAM



The essence of a participatory ergonomics program is the Ergonomics Change Team. This group of people is responsible for identifying areas for improvement and making the necessary changes. They do so by meeting on a regular basis to discuss issues and assign responsibilities to members. The selection process of the ECT can be done by appointing team members that the company believes should take part and by asking for volunteers.

An ECT should have representatives from the following areas:

- Workers
- Union representatives
- Management
- End users (the workers directly affected by the changes)

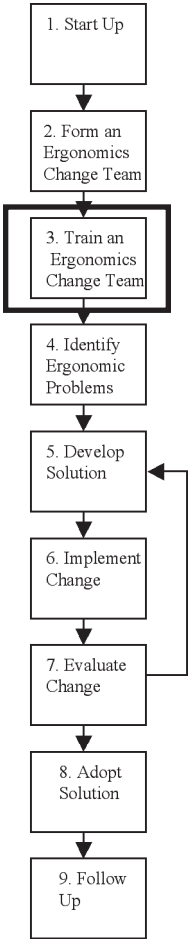
If possible, members from other areas should be included as well. These areas include:

- Health and safety representatives
- Maintenance
- Engineering
- Human resources
- Occupational nurse
- Purchasing
- Supervisors

The size of the ECT will vary depending on the plant's size and needs.

STEP 3 –TRAIN AN ERGONOMICS CHANGE TEAM

In most cases, clothing plants do not have ergonomists. If that is the case, training can be provided by:



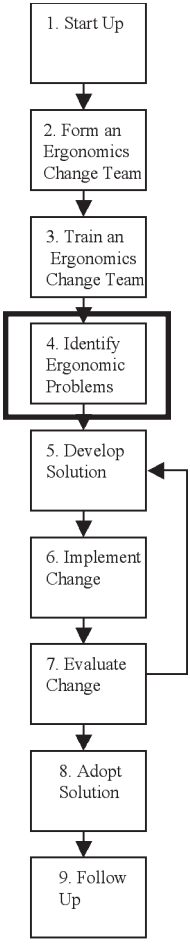
- Ergonomics consultants – contact the Association of Canadian Ergonomists (*www.ace.ergonomist.ca*) or your local university for ergonomic consulting and assessment services.
- Ergonomics students - check with your local or closest university.
- Unions (for example, UNITE HERE) – the union in your workplace may have an ergonomist or may provide training.
- Workers Health and Safety Centre (for example, *www.whsc.on.ca*).
- Health and Safety trained personnel – the Health and Safety certification includes a section on ergonomics. H&S personnel may be able to train the ergonomics team.
- Other workers trained in ergonomics.

The following topics should be covered in order to provide the necessary background information so that the ECT members can make informed decisions:

- Introduction to ergonomics
- Risk factor identification
- Methods of analysing jobs and workstations
- Worksite analysis tools (Please refer to Appendix for a list of tools and sources)
- Documentation process
- Follow up process

STEP 4: IDENTIFY ERGONOMIC PROBLEMS

Continuous documentation is necessary to monitor changes and to provide information for future changes. The ECT should make sure that every step is well documented.



Where to start

There are three types of approaches for identifying ergonomic problems:

- Review company records to identify patterns of injury and signs of work-related musculoskeletal disorders.
- Use worksite analysis tools to identify high risk areas and prevent injuries before they happen.
- Put a suggestion box in the plant for workers to communicate any concerns that they may have related to their job.

Most ergonomics teams will start with the first approach to help those workers that have already experienced pain and/or injuries.

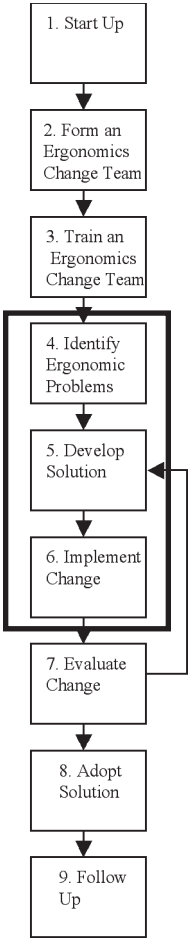
Prioritize a list of jobs and their potential risk:

- Rank jobs in descending order starting with the job with the highest injury rates and severity first and ending with the job with the lowest injury rate and severity.
- The ECT should identify the risk factors using the worksite analysis tools (see Appendix) learned to determine causes and develop solutions.

Things to look for:

- How the job is done
- Awkward postures (bending, reaching)

- Sustained postures (constant standing or sitting)
- Effort required to perform a task
- Location of the tools, equipment and parts used or handled
- Speed and frequency of tasks
- Duration and repetition of tasks
- Design of tools, equipment and parts
- Environmental factors such as light, noise, temperature and air quality



The first few projects should be simple ones so that the ECT can gain experience and build confidence. Tackling a large project to start off with can be overwhelming and lead to frustration. It is also important to set goals that are realistic and well organized. Demonstration of success by the ECT will help build experience as well as credibility.

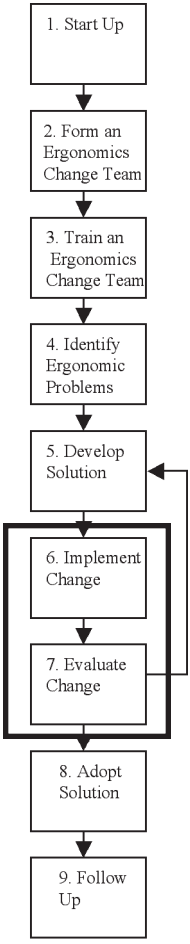
STEP 5: DEVELOP SOLUTIONS

- Once the problem has been identified, brainstorm possible solutions.
- Discuss each idea to determine the most appropriate and feasible one for implementation.
- Add this information to the job list.
- Record all ideas on paper or electronically for future reference.

STEP 6: IMPLEMENT CHANGE

Communicating information on an ergonomics project

- All workers and supervisors that will be affected by a change should be notified and appropriate information should be provided to them by the ECT regarding the change.



- *Operator earnings* must be maintained and protected during testing in order to expect fair cooperation.
- Communication to the rest of the plant on ergonomic issues and information about the projects in progress is important to increase cooperation and credibility among the workers and management.
- A brief description of a project can be placed on a bulletin board set aside for ergonomic issues.

Testing solutions

- The solution should be tested first on one operator or workstation for a week or two to allow enough time for a fair assessment.
- Where necessary a prototype can be built to test the intervention.
- Documentation should be kept to track the advantages and disadvantages of the change as well as suggestions for improvement.

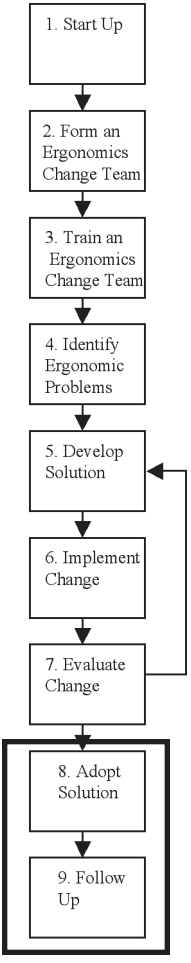
STEP 7: EVALUATE CHANGE

Evaluation of an ergonomic change

- Evaluation of the change should include an analysis of the job using the worksite analysis tools learned (see Appendix) as well as the documentation from the implementation phase.
- If the intervention needs to be altered, the modified prototype should go back to the implementation phase, *Step* 5. In this case *Steps* 5 – 7 should be repeated until the intervention is ready to be adopted.

STEP 8: ADOPT SOLUTION

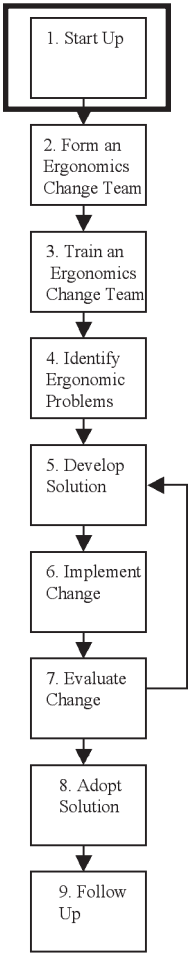
- If the intervention is successful, the solution can be adopted by other operators on the same operation and then in other areas in the plant with the same problem.
- It must be determined how the change will be introduced.
- In most cases resistant operators will eventually realize the benefits of a good change. A voluntary approach that is highly encouraged may allow these operators the time they need to convince themselves of the benefits.



STEP 9: FOLLOW UP

- The effects of the changes should be monitored and documented after the intervention is adopted.
- Periodic evaluations of the changes should be conducted to help solve other problems that may arise at a later date as well as provide valuable information for new jobs or workstations.

A Case Study of a Participatory Ergonomics Program in a Typical Clothing Plant



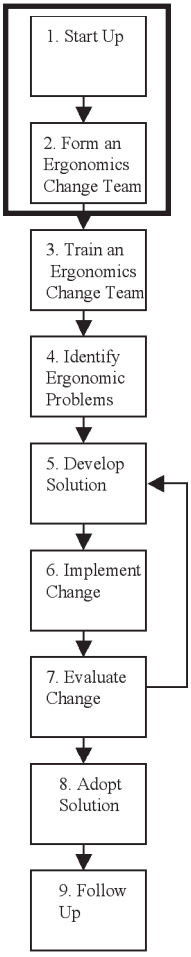
The following case study was based on a research project designed to evaluate the development of a participatory ergonomics program in a typical clothing plant. A project manager was assigned to this project and acted as an ergonomics consultant.

STEP 1: START UP

Commitment from management

- The union approached Company X about starting up a participatory ergonomics program to help reduce injuries and cut down the costs associated with worker compensation and turnover rates.
- Commitment was provided by management. Management agreed to support the program by helping to form an ECT and gave them the time to meet on a regular basis and perform their necessary duties on the team. However, the company did not want people spending a lot of time in meetings so they had to be well organized.
- The company had a *very limited budget* but agreed to provide the necessary resources and time required to make the changes. The maintenance department personnel were asked to work on the changes as permitted by their schedule.

- The company could not afford to increase its product cost so projects with a clear *attractive return on investments* were easier to justify.



STEP 2 – FORM AN ERGONOMICS CHANGE TEAM

The selection process of the ECT involved the plant manager approaching representatives from management and workers that he believed would make a successful team based on their background and knowledge of the plant. Other members joined the team by answering an ad posted on the plant bulletin board. A team was formed with the following members:

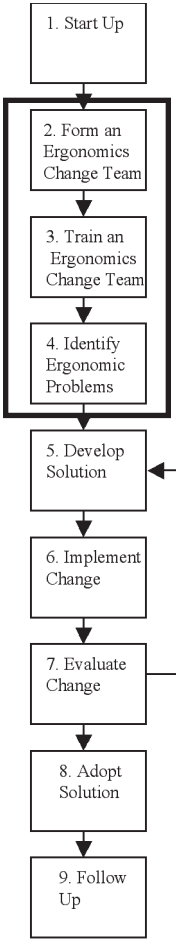
- Workers
- Union representatives
- Management
- Supervisor
- Plant engineer
- Health and safety representatives
- Maintenance
- Human resources
- Occupational nurse

End users were also asked to take part in the meetings to help the ECT on changes related to their job.

First Meeting

The team had an initial meeting to discuss the goals of the project and to start training. The following issues were discussed:

- Overview of the project.
- Benefits of the project to the plant.



- Identification of members' background on ergonomics (any courses taken? Joint Health and Safety members?).
- Introduction to the participatory ergonomics process.
- Team's involvement (length of meetings, how often).
- Who would chair the meetings (can rotate among members).
- Who would be responsible for the agenda and take the minutes at each meeting (can rotate among members).
- Obtain team members' e-mail addresses or determine the best method for distributing the minutes and communicating ECT related issues.
- Schedule next meeting.

In this particular plant the ECT agreed to meet every other week. Initially each meeting was scheduled to be three hours.

The meeting time will vary between plants depending on availability and the number of projects that the team decides to take on at a time. Also, once the ECT becomes familiar with the process, the time required will decrease.

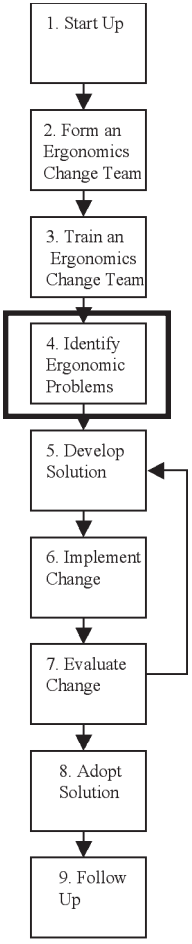
STEP 3 –TRAIN AN ERGONOMICS CHANGE TEAM

The ECT was trained by the project coordinator over three days. As part of their training the team went through the steps in the participatory ergonomics program using an example from the plant.

STEP 4: IDENTIFY ERGONOMIC PROBLEMS

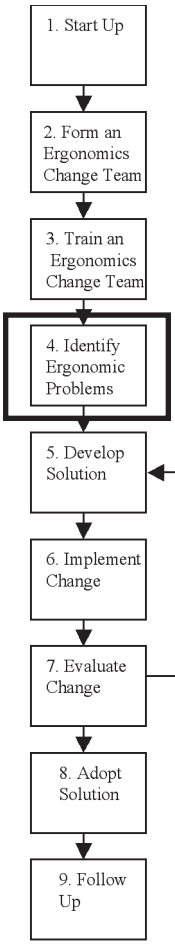
Each team member made a list of the jobs s/he considered to be in greatest need of ergonomic improvement. Workers' claims data were also available.

- All of the jobs were written down on a board. In total, 19 jobs were identified.
- Each team member ranked the jobs in order of priority.
- A list with the top nine jobs was made for the team to start working on. This list is shown below.



Job/Issue	Why is this job a concern? (Complaint, Injury/ First Aid)	What body part is affected?	Impact of change
1.Cart/Bin wheels caught due to thread dropped on floor	-Wheels jam with thread making it difficult to push/pull carts. -WSIB claim filed	Arms, Shoulders, Back	High impact
2.Trucks holding fabric for backs (Tie-up)	-Trucks are old and difficult to push/pull. -Height of trucks is below optimal range. -Stacking of scales on carts. -WSIB claim filed. Complaint from operator.	Shoulder, Back, Arms, Knees	Medium impact
3.Raising bins in packaging and assembly	-Forward bending to retrieve bundles of shirts from bottom of bin. -WSIB claim filed	Shoulder, Arms, Back	High impact
4.Folding and examine/bag/ box	-Forward bending and above shoulder height reaching to dispose/retrieve shirts. -Pushing pins into shirts. -WSIB claims filed.	Whole Body	High impact
5.Spreading	-Jumping from tables. -Material handling of paper rolls. -Spreading the fabric. -WSIB claims filed.	Back, Shoulder, Knees, Legs	Medium impact
6.Chair backrests	-Broken backrests or lack of adjustability leading to poor sitting posture.	Back, Legs	High Impact
7.Final inspection	-Arms held above shoulder height for long periods. -Forward bending to retrieve bundles of shirts from bottom of bin. -WSIB claim filed.	Shoulder, Back, Arms, Legs, Wrist	Medium impact
8.Pocket hem/set	-Slots carts are above/below optimal height.	Back, Shoulder, LE, Neck	Medium impact
9.Cabinet press	-Above shoulder height reaching. -Forward bending to straighten shirt.	Shoulder, Back, Arms	Low impact

EXAMPLE: Raising bins in packaging and assembly.
The ECT spent time observing the workers to determine the potential problems associated with this job. A picture was taken to include with the documentation.



The workers were asked for their input regarding the tasks required by the job as well as suggestions for improvements. All these comments as well as the ECT's observations were documented for future reference.

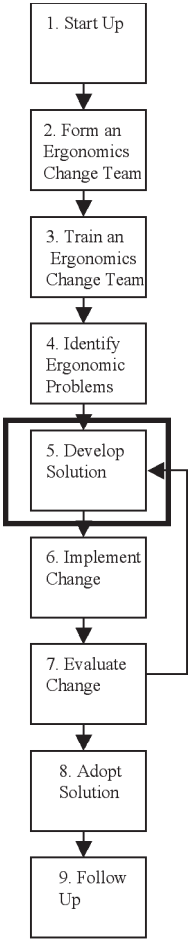
For this particular job, the following worksite tools were used: NIOSH equation and Snook tables (see Appendix). These tools help to evaluate the concerns related to lifting fabric from the bin.

Once the job was analyzed, the ECT met to discuss the problem:

- Bins were too low forcing the operators to bend forward into the bin to handle fabric. The greatest degree of back flexion occurs when the operator handled fabric at the bottom of the bin.
- Improper bins can affect the back, shoulders and arms.

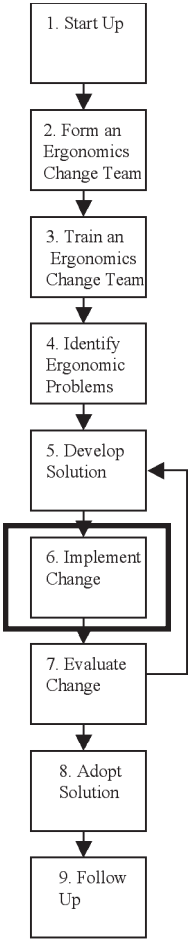
STEP 5: DEVELOP SOLUTIONS

Potential ideas were brainstormed and written down. Each idea was then analysed in order to pick the best possible solution.



Solution	Comment
1. Buy new bins	-Expensive -Do not have the budget
2. Raise bins	-Easy to do -Inexpensive -May create above shoulder reach
3. Spring loaded bin	-Difficult to add to existing bins -New bins required – too expensive
4. Raise and cut bins	-Easy and inexpensive -Solves above shoulder height problem mentioned in #2

It was decided that solution #4 (Raise and cut bins) was the most appropriate since it eliminated the problem in a simple and inexpensive manner.



STEP 6: IMPLEMENT CHANGE

A prototype was constructed by the plant's maintenance department. The side of the bin was cut out to allow easy access into the bin and it was raised to eliminate back flexion. The entire change took approximately **30 minutes** worth of carpentry work using material available at the plant. The total cost of this change was **under** $50.

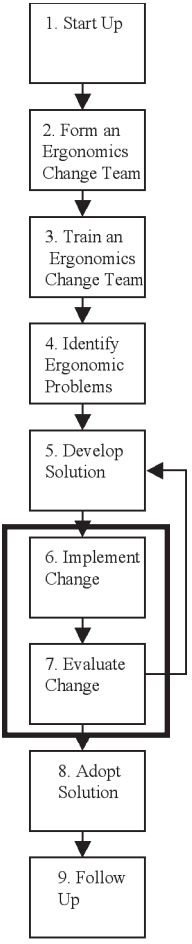
Prototype:

Before: The bin was low to the ground

After: The bin was raised and the side was cut out.

The change was communicated to the operators testing the prototype as well as the supervisor. Until the operators agreed to have their workstations altered, no changes were made.

In order to give the prototype a fair assessment, it was tried for two weeks and then the operators were surveyed regarding the advantages, disadvantages and suggestions of the change. This information was recorded and filed for future reference.



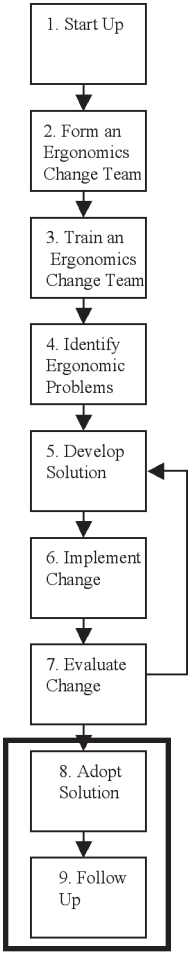
STEP 7: EVALUATE CHANGE

Results: Raising the bins reduced the amount of back flexion required to handle fabric, especially at the bottom of the bin. The cut out on the side of the bin allowed the operators easy access to the fabric without having to reach over the bin.

Comments from the operators: The workers were surveyed about the advantages, disadvantages and suggestions for the change. The results from the surveys that were distributed showed that the workers believed that it was an improvement over the existing bins since they did not have to bend as far to get the fabric from the bin. The bins were easy to move around and did not affect the operators' work.

STEP 8: ADOPT SOLUTION

Outcome: The prototype was successful and was adopted. More bins were modified throughout the plant. The bins were altered in the test area first and then throughout the plant.



STEP 9: FOLLOW UP

The bins were monitored on a daily basis by the ECT to ensure that they were not over stacked and to make sure that they were used properly. This was placed as an item on the meeting agenda.

Benefits of the Participatory Ergonomics Program

ERGONOMIC AWARENESS

The training and experience that the ECT received helped them to acknowledge the potential safety problems within the plant that were previously overlooked. Ergonomic improvements became a daily occurrence at the plant. The word spread quickly to the point where workers were aware of ergonomic risks and were asking for specific ergonomic improvements:

> Being on the Ergonomic Team I've learned a lot. Like there's little things that I see out on the floor … sometimes people stop me even if it's a bit of fatigue matting, because sometimes people are overlooked or their machines are changed or they never had it before. I had one lady for instance that all of a sudden had to do another job; it was a stand-up job. And she said to me one day, "Oh, my feet are really bothering me because I'm not used to standing", and I looked down and here she had no fatigue matting so I went and talked to [our mechanic] and got me a piece of fatigue matting…So things like that I notice because of being on the team. (ECT member/worker)

The participatory ergonomics program has provided the ECT members with the necessary training to be able to

identify ergonomic problems and come up with solutions that they did not think were possible:

> On operations like button-sew, inspect, I would never probably have thought about asking for a change … I figured, this the way it is, that's the way it is supposed to be … If it never happened, the Ergonomic Change Team was never formed, I don't think any of those changes would have ever been made. (ECT member/worker)

Initial scepticism is to be expected from the ECT members as well as the workers but once they have gone through the process a few times and start seeing positive results, the benefits become apparent:

> At the beginning I wasn't sure until I started going to the meetings, and then I got a full understanding of what it was all about… The purpose of it? It was to benefit the worker… to make their job easier health-wise in the long term. (ECT member/worker)

DECREASING WORK-RELATED MUSCULOSKELETAL DISORDERS

The presence of the ECT, and the ergonomic changes in the plant, had an effect on the amount of pain reporting that the Human Resources manager received:

> I think I have less complaints about "Gee, my neck is sore, my shoulder's sore". I have had a LOT less this, for almost a year…I just think the understanding you guys [the ECT] have helped

> them sit differently, you've made adjustments to machines, and I see a big difference in our, in the WSIB claims coming through right now. (Human Resources manager)

INCREASED TRUST ABOUT APPROACHING THE ECT MEMBERS

The increased ergonomic awareness and increased confidence in the ECT members after some successful projects helped to increase the communication between the ECT members and the workers:

> They're more familiar with what's happening. They can see the benefits from other girls and things that you're doing. As a matter of fact, a couple of people ASKED for it [changes to be made to their workstation]. (Plant mechanic)

Overcoming Challenges

RESISTANCE TO CHANGE

Becoming accustomed to change takes time, and in the clothing industry, time is money when a worker's pay depends on how fast s/he works. Change means getting used to a new situation:

> That comes back to the piecework issue. They [operators] think the ergonomic changes will slow them down. They think that tilting their machine a few degrees will slow them down. (Project coordinator)

In most cases the workers are more concerned with a possible loss of money than with the long term benefits of an ergonomics change:

> They know what to do to boost their units out, which in turn boosts their money up. So I think when you change a method it might slow them down a bit, in the beginning. Now, yes, they're going to get back up to speed, but I think because it's piecework you may have a little more hesitation. (Human Resources manager)

This resistance can be minimized if management and the union make sure that the workers' earnings are maintained during their learning process.

LIMITED FLOOR SPACE

Floor space in a plant can be very valuable since there is a limited amount of it. At times, ergonomic improvements may require the workstations to be rearranged. This can be difficult if there are space constraints:

> We're presently using a lot of vertical space. To be more ergonomically friendly it [the workstations] would have to be turned, using more horizontal space, which is floor space, which is at a premium. (Plant engineer)

At times, the company had to put some creative effort into determining how to reorganize the layout of the workstations to accommodate the ergonomic change.

LANGUAGE BARRIERS

It was believed that the language barrier had an effect on the willingness of the operators to try changes to their workstation because they did not understand that changes to their workstations could benefit them:

> …when you've got this many people of different nationalities … people just want to come to work, make their money and go home and they don't think about the long term effects of working. (ECT member/worker)

Co-workers who acted as translators were used where possible to communicate with individual workers and the ECT made sure that communication was a priority.

CONSTRAINTS ON TIME AND RESOURCES

Production is often the most important concern at a plant. If a machine is down, it must be repaired immediately in order to resume production. In order to keep the costs down, the plant mechanics are asked to perform the ergonomic improvements. However, the mechanics are generally very busy and ergonomic improvements tend to be done whenever they have the time:

> They wanted everything in-house at a very low cost and using their own mechanics and maintenance people. They were not able to dedicate full mechanic time. That may have slowed down some of the things. (Researcher)

Despite the time constraints, the mechanics made ergonomic improvements to 27 operations, involving 20 types of changes and 97 operators in the first 2 years.

Examples of Simple and Inexpensive Ergonomic Changes

HEIGHT ADJUSTMENTS

Before

After

Concerns of the job: The height of the shirt racks was too high for the operators requiring above shoulder height reaching.

Body parts affected: Shoulder, arms, back.

Solution: Lower the racks. This involved cutting down the bars.

Cost: Under $50.

Outcome: The racks were lowered eliminating the above shoulder reach.

LIGHTER WEIGHT TOOLS

Before

After

Concerns of the job: The old irons were made of heavy material requiring the operators to handle heavy loads.

Body parts affected: Shoulder, arm, wrist.

Solution: Replaced old, heavy irons with new, lighter irons.

Cost: Under $50.

Outcome: The irons were replaced with lighter weight ones reducing the loads handled by the operators.

TILT WORK SURFACE AREA

Before

After

Concerns of the job: The worktable required the constant neck flexion of the operator while ironing shirts.

Body parts affected: Neck, shoulders, arms, back.

Solution: Wooden planks were placed on the far end of the worktable to increase the angle of the workspace.

Cost: Under $50.

Outcome: The tilted worktables helped to reduce the degree of neck flexion.

WIDEN PEDAL

Before

After

Concerns of the job: A one-foot pedal was used by the operator leaving the non-driving foot at a lower level.

Body parts affected: Legs.

Solution: A wide pedal was made by mounting a rectangular wooden plank to the original pedal.

Cost: Under $50.

Outcome: The pedal was widened to allow both feet to be at the same level. This allowed for two-foot driving. A footrest made to the same height as the pedal can also help to reduce the stress on the non-driving foot.

REPLACE CARTS BY MODIFYING OTHER CARTS USED IN PLANT

Before

After

Concerns of the job: The carts being used were old and hard to push/pull. The height of the carts was also below optimal range requiring the operators to bend forward to handle parts. Fabric was also stacked on the carts requiring the operators to pull the desired fabric from underneath a stack.

Body parts affected: Shoulder, arms, back.

Solution: Existing bins were modified to hold smaller bundles of fabric. Only the same type of fabric was placed on each cart thus eliminating the need to pull a specific fabric from underneath the pile.

Cost: Under $50.

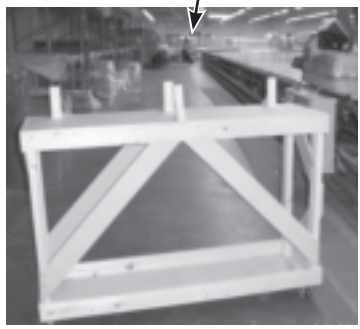
Outcome: The push force required to move the carts was reduced from 6.1kg to 3.1kg.

MODIFY EXISTING CART ROLL HOLDER

Before

Removable front pin to allow roll to slide onto table

After



Concerns of the job: The original carts required the operators to lift the rolls from the carts onto the table.

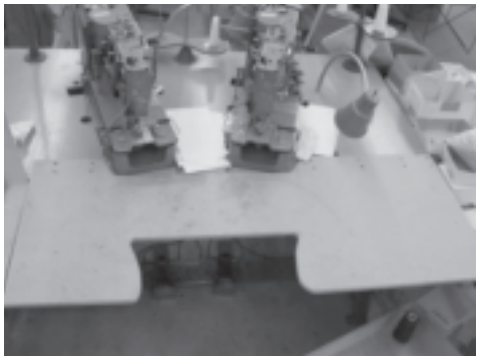
Body parts affected: Shoulder, arms, back.

Solution: The roll carts were modified to include a removable pin that allowed the operator to slide the roll onto the spreading table.

Cost: Under $50.

Outcome: The modified carts eliminated the need to lift the rolls onto the spreading table reducing strain on the shoulders, arms and back.

ADDING ARM RESTS TO WORKSTATIONS



Concerns of the job: The job required the operators to hold their arms at the same position for long periods of time while sewing.

Body parts affected: Shoulder, arms, neck, back.

Possible solution: Wooden arm supports were installed on the worktables.

Cost: Under $50.

Outcome: The arm rests provided support for the operators reducing the stress on the shoulders and arms.

TILTING WORK AREA

Before

After

Concerns of the job: The worktable required the operator to work with a flexed neck to process the parts.

Body parts affected: Shoulder, arms, back.

Possible solution: An adjustable work surface was created by adding an adjustable stand. Operators could easily change the height of the surface to meet their optimal level.

Cost: Under $50.

Outcome: The adjustable tilt on the workstation reduced the degree of neck flexion and could be changed to fit different operators.

REDUCING BACK STRAIN

Before

After

Concerns of the job: The job required the operator to stand throughout a work shift.

Body parts affected: Back, legs.

Possible solution: A foot rail was placed underneath the worktable for the operator to adjust her posture throughout the day. Operators could shift from one leg to the other to vary their posture.

Cost: Under $50.

Outcome: The foot rail reduced back strain by allowing the operator to vary her posture.

ADJUSTING HEIGHT OF SLOTS CART

Before

After

Concerns of the job: The slots in the cart were below optimal height requiring severe back flexion to handle fabric in the bottom slots.

Body parts affected: Back.

Solution: The carts were raised.

Cost: Under $50.

Outcome: The raised carts reduced the degree of back flexion allowing the worker to handle fabric in an improved posture.

ADDING WASTEBASKETS TO MINIMIZE THREADS DROPPED ON THE FLOOR

Before

After

Concerns of the job: The wheels on the bins and carts jammed with threads thrown on the floor making it difficult to push/pull them.

Body parts affected: Shoulder, arms, back.

Solution: Wire wastebaskets were installed at the side of each workstation. The wheels on the carts and bins were cleaned to remove the threads and oiled to allow for easier movement.

Cost: Under $50.

Outcome: The wastebaskets reduced the amount of thread on the plant floor. The force required to move the bins and carts was reduced.

SEAT ADJUSTMENTS

Before

After

Concerns of the job: Operators were not adjusting their chairs and thus were working with their legs at non-optimal postures.

Body parts affected: Legs, Back.

Solution: The operators were given an information session on proper chair adjustment.

Cost: Under $50.

Outcome: The operators adjusted their chairs to the optimal level reducing leg and back discomfort.

Conclusion

This handbook demonstrates that a participatory ergonomics program can help to reduce complaints of pain, injuries and compensation claims by introducing inexpensive ergonomic improvements. Such a program also provides education on ergonomics to the ECT members, supervisors and operators and can improve communication between the workers, through their union, and management. A participatory ergonomics program is easy to implement and does not require a large time or budget commitment from a company. Even companies with *small* budgets can perform ergonomic solutions of *medium* effort and obtain *large* results.

For more information on the project please visit the following websites:

- UNITE HERE: *www.unitehere.ca*
- Institute for Work & Health: *www.iwh.on.ca*
- Occupational Health Clinics for Ontario Workers: *www.ohcow.on.ca*
- John Forsyth Shirt Company: *www.forsythshirt.com*
- Ike Behar: *www.cline.ca*

Appendix

WORKSITE ANALYSIS TOOLS

Worksite Analysis Tools	Purpose	Source
NIOSH lifting guidelines	Developed to reduce back pain related to lifting tasks.	Waters, T., Putz-Anderson, V., Garg, A. and Fine, L. Revised (1993) NIOSH Equation for the design and evaluation of manual lifting tasks. Ergonomics. 36(7): 749-776.
Snook Tables	Developed to reduce low back pain related to lifting, lowering, pushing, pulling and carrying tasks.	Snook, S.H. and Ciriello, V.M. (1991). The design of manual tasks: revised tables of maximm acceptable weights and forces. Ergonomics. 34(9), 1197-1213.
Rapid Upper Extremity Assessment	This tool is used to investigate jobs that are associated with upper limb disorders.	McAtamney, L. and Corlett, E.N. (1993). RULA: a survey method for the investigation of work-related upper limb disorders. Applied Ergonomics. 24(2), 91-99.
Moore – Garg Strain Index	Designed to assess jobs for risks of work-related musculoskeletal disorders of the distal upper extremities (hand, wrist, elbow).	Moore, J.S. and Garg, A. (1995). The Strain Index: A proposed methods to analyse jobs for risk of distal upper extremity disorders. American Industrial Hygiene Association Journal. 56, 443-458.
ACGIH TLV 2004	Provides threshold limit values for the workplace	www.acgih.org

References

Karwowski, W., and Marras, W.S. (eds) (1999). *The Occupational Ergonomics Handbook.* CRC Press, New York.

NIOSH (1997). Elements of Ergonomics Programs: A Primer Based on Workplace Evaluations of Musculoskeletal Disorders. U.S. Department of Health and Human Services, National Institute for Occupational Health and Safety, Cincinnati, Ohio.

State of Washington Department of Labor and Industries (2004). Fitting the Job to the Worker: An ergonomics program guideline. http://www.ergoweb.com/resources/refernces/guidelines/fittingjob.cfm

Wells, R., Norman, R., Frazer, M., and Laing A. (2001). University of Waterloo Ergonomics Program Implementation Blueprint. http://www.ergonomics.uwaterloo.ca/bprint.html

Notes

Notes

Handbook on Participatory Ergonomics

Participatory ergonomics is the process of solving ergonomic problems through the joint collaboration of the labour and management. The objective is to identify potential ergonomic risks and make the necessary modifications to minimize risk and injury.

In this handbook you can find:

- Information on how to set up an ergonomics program.
- Where to go for assistance.
- A case study showing the whole ergonomics process.
- Testimonials on some of the benefits and problems that can be experienced.
- Examples of simple and inexpensive changes made in an actual clothing factory.

This handbook is designed as a staring point for labour and management to start participatory ergonomics programs in their workplace. For more information contact UNITE HERE at *info@.unitehere.ca* or visit *www.unitehere.ca*.

Photo: Stefica Majpruz, UNITE HERE Local 2643, Cambridge, Ontario (photos by Julianne Natale).