

"Back Injury Prevention Pilot Program at the Philadelphia Electric Company" - a task force was established to develop an effective intervention mechanism which would reduce back injury frequency and severity across the Company. The study was designed to consider these strategies, back school, back belts, back school and back belts and a control group.

UTILIZATION OF TRAINING AND BACK SUPPORTS

TITLE: "Back Injury Prevention Pilot Program"

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SUMMARY: This seven month study, covered 472 employees. Individuals were matched by occupation where possible, other factors need further definition. Effectiveness was measured by back injury accident reports, OSHA recordable back injuries, lost work day cases and lost work days, and back injury restricted work days. Two questionnaires were administered to give feedback on employee application and perceived benefits of the intervention methods..

CONCLUSION: Employees utilizing the back school and back belt strategy experienced the greatest magnitude of back injury reduction both in terms of frequency and severity. A cost benefit analysis was conducted which indicated the highest net savings to be provided by the implementation of this strategy.

PHILADELPHIA ELECTRIC COMPANY

INDUSTRIAL HYGIENE & SAFETY BACK INJURY PREVENTION PILOT PROGRAM

.July 1992 - January 1993

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BACK INJURY PREVENTION PILOT PROGRAM

PHASE I

INTRODUCTION

Much has been written about the incidence and costs of low back injury in current occupational health and safety literature. The underlying message is that back injuries represent a significant loss of productivity each year.

Recent statistics show that back injuries:

- * cost American business \$30 billion in 1992
- * cost on average \$9,000 without surgery and between \$30,000 and \$40,000 with surgery
- * account for 25% of all accidents
- * account for 33% of all lost time accidents
- * last 50% longer than the average of all lost time cases
- * are principally caused by lifting (>50%)
- * primarily involve injury to the lower back (>90%)

While cost figures associated with back injuries are difficult to come by within PECO, injury/illness records for 1991 and 1992 reveal that back injuries accounted for 25% of all injuries and 40% of all lost time.

Unfortunately, the disconcerting statistics relating to back injuries are not new to PECO. In past years, preventative techniques aimed at employee behavior modification (back school) and injury management have been implemented to control back injuries, without significant impact on year end statistics.

In October 1991, a Back Injury Prevention Task Force was formed for the purpose of developing a Back Injury Prevention Program (BIPP) to provide a long term solution to the back injury problem. More specifically, a program which would reduce back injury frequency and severity across the Company. The Task Force consisted of representatives from the County Divisions, Production, Nuclear, Conowingo Power Company and Occupational Health and Safety.

The Task Force recognized early on that back injury prevention is a process that considers employee selection, employee behavior modification, ergonomics and injury management. All four facets of this process must be developed and exercised to effectively manage and control back injuries. Developing and implementing a comprehensive program, however, requires a significant amount of time and resources which, in the short term, would have little or no impact on the injury problem.

The Task Force efforts were then directed toward providing an effective intervention mechanism which could be applied immediately until a more substantial program could be established. Behavior modification was targeted for short term intervention.

Phase I of the Back Injury Prevention Program, then, involved initiating a pilot program to evaluate selected behavior modification intervention strategies, the most effective of which would be refined and applied throughout the Company.

PILOT PROGRAM METHODOLOGY

The Pilot Program was designed to consider three strategies:

- I. Back School
- II. Back Belts
- III. Back School and Back Belts

I. Back School

Chester County Electric and Gas operations employees (n=152) were provided back school training and education (T&E). The "classroom" didactic training was conducted by Sports Physical Therapists Inc and consisted of instruction on the anatomy and physiology of the back, proper body mechanics (lifting techniques), strength and flexibility exercises, nutrition and early treatment of mild back pain. The session lasted 60 minutes. A reinforcement training and education meeting (30 minutes) was held with the employees four months into the program. Participants completed a feedback questionnaire at the time of the reinforcement training.

II. Back Belts

Peach Bottom Atomic Power Station, Conowingo Power Company and Materials Management (Berwyn) employees (n = 79) were provided with back (abdominal) support belts. The belts chosen for this study are manufactured by Safeguard Technologies and incorporate air support chamber technology into the belt. Two models (Comfort Plus and Air Temp Advantage) were available for employee selection. Issuance of the belts was accompanied by didactic training on the mechanics, use and care of the belt (30 minutes). The participants were subsequently fitted with the proper size belts.

All employees receiving belts were instructed to wear the belts during the entire workshift. Reinforcement training and questionnaires were completed four months after program initiation.

III. Back School and Back Belts

Montgomery County Electric and Gas operations employees (n = 241) were given both back school and back belts. Each session lasted 90 minutes. Supervisors of all participants in the Pilot Program also participated in back school and back belt training and education. The Pilot Program began with supervisory training in June 1992. Employee training and education began in July 1992. The Pilot Program was to run through January 1993

PILOT PROGRAM SAMPLE

The actual demographics of the four study groups needs to be further defined. Chester County and Montgomery County Gas and Electric personnel were similarly matched in terms of occupations - linemen, splicers, helpers, mechanics, laborers, welders and foreman. The back belt intervention group consisted of linemen, mechanics, truck drivers, stockmen, building mechanics, storekeepers, foreman and supervisors. Sex, age, height, weight, years experience and previous back injury histories require further definition.

STUDY PARAMETERS

Injury statistics

A number of factors were evaluated to determine the effectiveness of the intervention strategies .

- * Back injury accident reports
- * OSHA recordable back injuries
- * Back injury lost work day cases
- * Back injury lost work days
- * Back injury restricted work days

These parameters were generated for each study group from the compilation of back injury data covering a time period prior to the initiation of the pilot program (1/91 through 6/92) and over the course of the pilot program (7/92 through 1/93) .

Questionnaires

Two questionnaires were developed for this study:

- Back School questionnaire
- Back Belt questionnaire

The questionnaires were administered to the study groups at the time of reinforcement training. The questionnaires were designed to give feedback on employee application and perceived benefits of the intervention methods.

PILOT PROGRAM RESULTS

Injury Statistics

The actual rates for each parameter are tabulated in Table I. A graphic comparison of each parameter for all the study groups before and during the pilot program is also presented.

Three parameters were considered for describing back injury frequency and severity. OSHA back injury recordable rates were utilized as frequency indicators while lost time and restricted time rates were used to characterize severity. A before-after comparison of the rates indicates:

The Back School intervention group experienced a 4% increase in back injury frequency and severity.

The Back Belt intervention group experienced a 19% increase in back injury frequency and a 65% reduction in severity.

The Back School/Back Belt intervention group experienced a 79% reduction in frequency and a 66% reduction in severity.

The Control Group experienced a 29% increase in back injury frequency and a 19% increase in severity.

While the magnitude of the reductions in back injury rates experienced in the back belt and back school/back belt intervention groups is encouraging, it is not known statistically whether the reductions are significant. A statistical analysis similar to that which was conducted on the back injury report data, needs to be conducted to determine the significance and confidence of the apparent reductions in injury frequency and severity.

The back injury report rate data which pre to post intervention decreased 21%, 30% and 67% for the back school, back belt and back school/back belt intervention groups respectively, was forwarded to Dr. Roger Nelson of the Thomas Jefferson University College of Allied Medicine for statistical analysis. His statistical analysis of this data (Table II) did not find a statistically supportable difference in back injury accident reports pre to post intervention. Statistically, there was no change in the number of back injury reports filed for those intervention groups.

Questionnaires

Two hundred and twenty five employees (55% return) completed the questionnaire addressing back school. 87% of the employees indicated a higher level of awareness in applying proper body mechanics during manual lifting. There was an increase of 17% in the number of individuals performing on the job strength and flexibility exercises and a 14% increase in the number of employees performing strength and flexibility exercises off the job. 85% of the employees felt this approach was beneficial to prevention of back injuries and would recommend the program for fellow employees .

One hundred and fifty six employees (49% return) completed the questionnaire addressing back belts. 56% of the employees issued the belts actually wore them during the pilot program. Of the employees that wore the belts 61% wore them for half the day or less. There were a number of individuals (17%) who also wore the belt off the job. 49% of the employees felt this approach was beneficial to the prevention of back injuries and would recommend the program for fellow employees.

COST BENEFIT ANALYSIS

A cost benefit analysis was conducted utilizing the lost work day case rates, pre and post intervention, for the three intervention groups. Assuming the cost of a LWDC to be approximately \$24,000.00, the analysis showed a potential net savings of:

- Back School - \$20,000. - \$64,000.
- Back Belts - \$4,000. - \$52,000.
- Back Belts/Back School - \$31,000. - \$127,000.

DISCUSSION

The results of this Pilot Program are inconclusive in terms of recommending the most effective behavior modification intervention method for reducing the risk of back injury. However, considering the magnitude of injury rate reductions pre to post intervention, it appears that a program incorporating the use of back school and back belts is the best approach to preventing back injuries and reducing lost time from work. The statistical analysis of the accident report data, however, shows that presumed reductions are not always supported by statistical significance.

It is evident that the study design could be improved through better matching of the intervention and control groups and by applying statistical analysis to all the categories of injury data. Actual cost figures for back injuries within PECO would also enhance the cost benefit analysis.

CONCLUSION

The findings of the Pilot Program were presented to the Back Injury Prevention Task Force on May 12, 1993. The consensus opinion of the Task Force was to recommend the implementation of a behavior modification program utilizing a combination of back school and back belts.

The decision was predicated upon the following points:

- 1) The employee group utilizing this intervention strategy experienced the greatest magnitude of back injury reduction.
- 2) The back belts alone did not give evidence of significantly impacting back injury statistics.
- 3) Available industry studies and experience suggest that, minimally, back belts enhance the training and education received in back school.
- 4) Employees and management throughout the Company are enthusiastic about using back belts as part of an injury prevention program.

**TABLE III
SUMMARY STATISTICS DESCRIPTIVE TRENDS**

PARAMETER	MONTCO	CHESCO	PCB	CONTROL
Accident Reports	↓	↓	↓	↑
OSHA Recordables	↓	↑	↑	↑
Lost Work Day Cases	↓	↓	↑	↑
Lost Work Days	—	↑	↓	↑
Restricted Work Days	↓	—	↓	↑

Assumptions:

- OSHA Recordable rate is an indicator of back injury frequency.
- Lost Time & Restricted Duty rates are indicators of back injury severity.
- MONTCO (BELTS & SCHOOL) - reduction in frequency & severity.
- CHESCO (SCHOOL) - increase in frequency & severity.
- PBAPS/COPCO/BER (BELTS) - increase in frequency & reduction in severity.
- CONTROL - increase in frequency & severity.