WOODFOLD-MARCO MFG., INC.
PO BOX 346
FOREST GROVE, OR 97116

WORKSITE REDESIGN PROJECT GRANT

Made possible by Oregon D.C.B.S.

DESIGN OF A POWERED

VINYL HINGE APPLICATOR

QUARTERLY and FINAL REPORTS

BACKGROUND

Woodfold-Marco Mfg., Inc. was formed in 1957. Woodfold produces accordion folding doors, interior wood shutters, roll-up doors and a line of hardwood kitchen components. Woodfold has always understood that our employees are our most valued resource and with the recent conversion to an employee owned company this philosophy is ingrained even deeper. Thus we have always made it a practice of returning employees back to light duty work from injuries or illnesses as soon as possible. In doing so we have made use of the Employer-At-Injury Program and for more permanent disabling injuries we have utilized the Preferred Worker Program. Both programs have been instrumental for our company in bringing employees back to work and has educated us in becoming more aware of ergonomic changes that can be made to a workstation, making them more user friendly and often more productive.

CASE STUDY

Our case study involves a work station were the vinyl hinge is manually glued and pressed into each of the panels when manufacturing our accordion doors. During peak production period, 44,000 lineal feet is applied daily by 11 workers who rotate to other positions every other week. The critical workplace ergonomic problems inherent with this task, is the heavy force and repetitive use of the shoulders, arms and wrists, as well as the deviation of the wrists and constant pressure on the palm of the hands from the hand tool. The ergonomic problems were identified by Oregon OSHA consultants, Workers' Compensation consultants and physicians of injured employees. In the past five years we experienced 8 Workers' Compensation claims of which 3 were disabling. The types of injuries stemming from this workstation were back, shoulder, and wrist strains, carpal tunnel syndrome, and tendonitis in the shoulders, elbows and wrists.

LOSS CONTROL EFFORTS

Woodfold has made accordion doors for over 40 years and during this time we have continuously evolved and implemented various loss control strategies. In 1981 we had a machine made to apply the vinyl hinge, but it didn't work. Over the next 15 years we had several engineers approaching us again claiming they could build us a machine that would work. But after experiencing our first automated failure, Woodfold was reluctant to allocate any further resources, with out first seeing the machine working, and at the same time we found no engineers that would commit to building a machine without being paid up front. In 1988 we found that heating the vinyl hinge made it softer and easier to apply. In 1990 we made some changes to the profile of the vinyl hinge which also made it easier to apply. As we became more aware of ergonomics we began to utilize the expertise of insurance consultants and Oregon OSHA consultants. In 1991 we had an Oregon OSHA consultant visit our facility to identify any ergonomic problems we might have. The consultants recommended that the employees adjust their work heights and rotate to other tasks, which we now do. It was also recommended that we install a power assisted tool, designed to eliminate the required force needed to apply the vinyl hinge. In 1993 we contracted two occupational hand therapists to train the employees on proper hand stretches, hoping this may help reduce the number of injuries from applying the vinyl hinge. Despite all of our efforts our trends showed a minimal decrease in the number of injuries, and the injuries that we were still experiencing tended to be more severe, requiring surgery, therapy and time loss.

WORKSITE REDESIGN PROJECT

Our search to eliminate the ergonomic problems associated with this workstation brought us to this project of designing and building a PROTO type machine to press and glue the vinyl hinge into each panel of our accordion doors. The design and fabrication of this machine was accomplished by hiring a mechanical engineer. The machine was designed to eliminate the heavy forces and repetitive use of the shoulders, arms and wrists. The machine was also designed to eliminate the deviation of the wrists

and constant pressure on the palm of the hands from the hand tool. This machine did not replace the worker, who will still needs to inspect and sort the wood panels and place them into position.

GRANT APPLICATION

At the end of 1995 we had just finished returning an employee back to their original job with the help of the P.W.P. After going through this process with the P.W.P. we began to investigate as to whether this same program could help us with other workers who had been injured from applying the vinyl hinge. But as it turned out that having already given the injured employees other permanent suitable employment made us ineligible for assistance through the P.W.P. But like the last piece in the puzzle, came the Worksite Redesign Program. So I invited Mary Hoskens to come to our facility and look at our troubled workstation to see if this was a possible application for this new program, which she did agree it was. Next we invited five engineering firms to come out and look at the application and give us a proposal. After picking the best proposal I then started processing the grant proposal. At first I was a bit over whelmed with the prospect of creating a grant proposal. But as I started working through the grant application I found that I already had most of the information being asked, it was just a matter of organizing it. Any questions that came up were quickly answered by the Reemployment Assistance Staff. I did complete the application early and sent it in, taking advantage of their recommendations, so that they could review the application and then allow me an opportunity to add information that may be of benefit.

CONCLUSION

In conclusion the process of developing a PROTO type machine brought some surprises and was very educating. First of all, the project took twice as long as was initially projected. Second even spelling out as many parameters as we thought possible, the machine still required a great deal of redesigning to meet production needs. I'm told this is all to be expected when building a PROTO type machine. The success of the machine was based on whether the machine could apply the vinyl hinge at a rate not less

than 8 feet per minute and an error rate no greater than 1 in 70 cycles, while eliminating the repetitive use and force required by the wrists, arms and shoulders. After completion of the PROTO type machine we have found that all of these qualifications will be satisfied. However more conclusive results of any reduction of injuries will be more evident after 1 or 2 years with the PROTO type machine implemented at all workstations.

PROJECT COMMUNICATION

The project's results will be communicated through the Workers' Compensation Division, sharing with any interested party this final report, the supplied video and equipment drawings.