

ERGONOMICS DEMONSTRATION PROJECT

Aladdin Hearth Products

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Aladdin Hearth Products Ergonomics Demonstration Project Report



Aladdin Hearth Products is a Colville, Washington manufacturer of wood, gas and pellet stoves and fireplace inserts. They have, on average, 240 employees or ‘members’ as they call them, and will need to be in compliance with all of the requirements of the Ergonomics Rule by July 1, 2004.

The company used their recent move into a new facility as an opportunity to design workstations and work methods in order to reduce hazards and work more efficiently. For example, they’ve set up their stove assembly line so that the large, heavy stoves are moved from workstation to workstation on rollers so that they don’t need to be lifted. At each workstation, the rollers are on a height adjustable scissor lift, so that employees can work on the top and sides of the stoves without placing their bodies in awkward positions. They’ve also custom built welding workstations, parts assembly workstations and paint booths specifically for the type of work to be done at them, which has also helped them to avoid working in awkward postures and reduced unnecessary handling of parts. Despite these solutions, and the many others that they’ve put into place, the company still has some risk factors, such as lifting, high grip force and hand-arm vibration, which they are working on reducing.

To help them make these improvements, the company has several innovative processes that it can use. They have closely integrated their safety, ergonomics and quality functions, since each uses similar methods to identify and solve problems. Solutions that are identified will therefore benefit productivity and quality in addition to improving safety and health for the workforce. One of the methods they use to make changes is Ergonomics Rapid Continuous Improvement (ERCI), which is an example of kaizen. This involves dedicating one week to have problem solving teams focus on just one workstation, identifying problems and brainstorming solutions. Many of these ERCI events take place during the summer, which is the slowest time for production. Because the company produces high-end stoves, their focus is on taking the necessary time to ensure product quality, and this translates well into doing the job safely as well.

The ERCI teams rely heavily on employee involvement, since employees have the most direct knowledge about their jobs and often have the best ideas for workable solutions. The company has the advantage of having engineers on staff who can help design and build solutions once the teams have decided upon an idea. To further ensure that employees take an active part in safety and ergonomics, the company has made a “safety ideas program” part of the employees’ performance expectation. In order for an employee to be considered for a pay raise, they need to have submitted an idea to improve safety that can then be implemented.

While the company gets good ideas from employees on the production floor, they also realize the value in seeking input from someone outside of the process. In order to get this “fresh set of eyes” to look at problems, they include a member of the office staff on

the committee that investigates production issues. They've also arranged to exchange safety committee walkthroughs with a local lumber mill, so that each company can benefit from the other's experience. The company has also worked with consultants from L&I to look at jobs to determine if they are covered by the ergonomics rule and identify solutions, both for rule compliance and process improvement purposes.

The ergonomics process that Aladdin already had in place has helped give them a good framework for dealing with the requirements of the Ergonomics Rule. In December of 2001, they trained every employee at the plant on ergonomics awareness and identification. They then went through the plant during the spring and identified all of their caution zone jobs. They worked with employees to identify the hazards in those jobs and are using these teams to actively seek solutions. The company is modifying their ergonomics training for this year to include the ergonomics awareness education video made available to employers by Labor and Industries. They plan to conduct ergonomics training with their entire leadership group and the entire plant again by February of 2003.

Through their efforts the company has developed a number of novel solutions, some of which are detailed in the appendix. There are still several areas where they are hoping to make improvements, though. For example, although they use low-vibration grinders in some of their finishing operations, they're hoping to find a way to engineer out the grinding altogether. Even with a low vibration tool, there are still many other injury risks associated with grinding. They also believe that eliminating grinding will help with productivity as well.

The company reports many benefits from their approach to quality, safety and ergonomics. They have a very low incidence of injury, which helps them to save on both direct and indirect costs associated with workplace injuries. At a time when some of their competitors have gone bankrupt, and following a warm winter when stove sales were low, the company is doing well and has an increasing market share. They have good retention of their long-term employees, which has benefits to both production and the bottom line. The company has calculated that it costs them thousands of dollars to recruit, hire and train a single worker just so that the employee can start in production, and then there are additional costs until that worker becomes experienced enough to be as productive as the worker that left. Realizing the investment they have in their workers has helped them to further justify the effort that they put into safety and health, including ergonomics.

Because of the success they've had with ergonomics, the company is looking at ways to identify and correct strenuous jobs that do not fall under the Ergonomics Rule. It is their belief that relieving the stress and fatigue associated with this type of work has numerous benefits. They believe it will not only help them have a more productive work force, but that it will also decrease absenteeism and increase employee morale.

Appendix: Examples of solutions implemented at Aladdin Hearth Products

Description

Cast iron stoves are very heavy, even when they are only partially assembled. To help reduce awkward and heavy lifting during assembly, Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer uses rollers to move stoves from one workstation to another.



Using rollers to move a partially assembled stove from one process to another.



Workstations with rollers are built right into the line, so product flow is maintained.

Description

Assembly and welding tasks can involve awkward postures such as back and neck bending, especially if the height of the workstation isn't a good match for the height of the worker. A poor fit can also result in awkward postures when lifting parts. To reduce awkward postures at its workstations, Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer has installed height-adjustable workstations on its assembly lines.



A scissor table helps this welder to work in a more upright position.



Welding workstations were specifically designed to allow seated work.



Adjustable workstations allow employees of different heights to place their work in a comfortable position.



Adjustable workstations also allow a single employee to work with different size parts more easily.

Description

Cast iron parts are very heavy, which is something that Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer knows very well. To help reduce awkward and heavy lifting during assembly of the stoves, they use a number of different hoist devices to install parts and to maneuver partially assembled stoves.



Hoist used to install stove faces, which can weigh up to 55 pounds.



Hoist used to install engines in stove frames.



This hoist is specially designed to lift, move and rotate heavy cast stoves.



Hoists can also be used to position parts at a good height for some finishing tasks.

Description

Workers often need access to many sides of a product during assembly and inspection. If the product is large, heavy or otherwise hard to move, workers will often bend, twist and reach to get to the different sides rather than trying to lift and turn it. In addition to increasing the risk for injury, these awkward postures can cause quality control problems, since workers have a difficult time seeing what they're working on. To solve this problem, Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer, installed scissor lifts with turntables on top in their final assembly workstations. The lifts also have rollers built in, so heavy stoves can be pushed on and off the workstation rather than lifted.



Scissor lift with turntable provides access to all sides of a stove during final assembly.

Description

Small and medium sized parts often require processing during sub-assembly, which can result in multiple lifts and frequent handling. To reduce frequent, awkward lifting and handling parts with pinch grips, Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer uses mobile storage racks to move parts from one process to another.



Custom-built mobile racks place parts at a good height and provide easy access to all sides.



Lightweight carts can also serve as mobile workstations for small parts.



Larger, heavier parts can be moved and worked on using a mobile scissor lift.

Description

Workers cutting bricks to size at Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer, were having to bend and reach to pick up bricks from a pallet. Since the bricks are a constant weight, the company was able to install a lift table that raises the pallet automatically as bricks are removed. Now, bricks are always within easy reach so no repetitive bending is required.



Lift table automatically raises the stack as bricks are removed, reducing bending and reaching.

Description

Many large industrial machines are fed and unloaded from platforms that are above floor level. This can result in additional lifting and carrying of parts, sometimes in awkward positions. To solve this problem, Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer, installed lift tables at both ends of a parts finishing machine. The lift tables will lower all the way down to floor level, so that a cart filled with parts can be rolled onto it, and then raised to a comfortable height for loading and unloading the machine.



Cart on the lift table.



Lifting parts onto and off of carts can all be done between knee and waist level.

Description

A cluttered workstation often results in bending and reaching because the part being worked on can't always be placed in the best position. Clutter can also lead to unnecessary lifting, as parts are picked up and over tools and other objects when moving them onto and off of the workstation. To avoid these problems, Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer has worked with their employees to design workstations with built in organization for tools and supplies. The clean worksurfaces allow employees to more easily position parts, and to slide them on and off the workstation without lifting.



A welding workstation with storage for tools and equipment.



A tool and parts stand at an assembly workstation.



A well-organized workstation results in better working postures and greater efficiency.

Description

Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer, has developed an innovative way to use scissor lifts to allow them to move parts from storage to workstations without having to lift them. Flat metal parts, some of which are quite heavy, are stored on tiered shelving next to the workstation. The workstation is set on top of a scissor lift, so it can be adjusted to the same height as the shelf that the desired part is stored on. The part can then be slid over onto the workstation without having to lift it.



Parts storage on elevated shelving on the left, next to a height adjustable workstation on the right.



Adjusting the workstation to the same height as the shelf with the needed part allows the part to be slid across rather than lifted. Rollers on the shelving make sliding easier.

Description

Some jobs involve unnecessary motions that could be reduced or eliminated with a little careful planning. Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer, had one of these jobs in their stove door painting cell. Workers used to paint one side of the door in the paint booth, then push the door out to dry. They would then pull the door back into the paint booth, flip it, paint the other side, and push it back out to dry again. Another worker would then pick up the door, carry it to another workstation, assemble it with other parts, and then lift it again to package it for shipping. The company worked with employee teams to redesign the process. Now the doors are put on a hanger line in the paint booth, so both sides can be painted at once. The doors are left on the hangers and slid out of the booth to dry. The other worker then takes the door directly off of the hanger and assembles it on top of the packaging material. Once assembled, the doors can be packaged without lifting them. This new process is both safer and more efficient.



Recently painted stove doors drying on the hanger line. Doors will be assembled on the packaging material below.

Description

A common concern in assembly jobs is having to hold parts by hand while working on them. Often the hand that is holding the part is actually working harder than the hand manipulating the part or tool. Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer, has solved this problem in their valve assembly job. They use foot- and hand-operated pneumatic clamps to hold onto the valves while parts are added to them, eliminating the grip force for one hand.



Pneumatic clamp used to hold valve parts during assembly.



The clamp eliminates the need to grip the part and leaves both hands free to work.

Description

Aladdin Hearth Products, a Colville, Washington stove and fireplace insert manufacturer, recognized a potential cause of injuries in one of their assembly jobs. Workers had to apply sealant to some of the screws during stove assembly, and repetitively squeezing the tubes of sealant required a considerable amount of grip force. In order to reduce the risk of hand, wrist and elbow injuries, the company now uses automatic dispensers in all areas that require sealant.



Automatic sealant dispenser eliminates squeezing sealant tubes by hand.