

Celina Aluminum Precision Technology, Inc., Celina

Intervention Key Words: Robotic Applications, Robot training and maintenance, Shelved Cart Improvements, Adjustable Workstations, Handle Design, and Self-dumping Hopper

Industry: Manufacturing

Risk Factor(s): Awkward Postures-Back, Wrists, Neck and Shoulder deviations, Repetitive motion, Manual Material Handling-Lifting/Carrying, High Hand Force-Pinching/Gripping

Situation:

Celina Aluminum Precision Technology (CAPT) manufactures high-quality pistons and cylinder heads, using partially and fully-machined technology. Their Cylinder Head department is responsible for 63% of the recordables relating to pain, strains, sprains, CTS, and tendonitis injuries. CAPT formulated a team to determine where the Safety Grant Fund could best benefit the associates. A decision analysis determined the Sand Mold Area in the Cylinder Head Department as a starting point. Sand Mold Operators perform a number of tasks, including reaching to remove sand molds, gripping parts to secure them, lifting parts onto loader, twisting back to shelf area, and removing full shelves, replacing them with empty ones. Risk factors for CTD include power tool gripping, bending forward over workspace, twisting the back, awkward postures, imbalanced walking, and highly repetitive wrist motions.



Sand Mold Operators cleaning molds and stacking on shelves.

Solution:

CAPT's budget for interventions began by including prototype carts and modifying such carts to prevent injuries. This included raising shelves, applying material to make sliding easier, and reduce push/pull forces. Next, they purchased new carts and adjustable workstations, this helping to relieve the bending required while performing certain tasks. Then, CAPT purchased a robot

tooling simulation and installed such tooling designs, with additional tooling for different models. Robots perform automatic de-burring 50-75% faster and better than humans. Additionally, CAPT purchased robot training and programming to ensure safe and proper use and maintenance. Finally, they purchased tool handle improvements and self-dumping hoppers. These final purchases eliminate awkward grips and unnecessary lifting. The total cost for this intervention was \$212,457.05. Safety Grants awarded CAPT the maximum funding of \$40,000 to offset the costs.

Results:

- CTD Risk Factor Scores decreased 59.5% following the intervention, as averaged over 2 tasks.
- CTD rates dropped from 14 to 3, a 79% decrease per 200,000 hours worked, following the intervention.
- Lost Days dropped from 1541 to 45, a 97% decrease per 200,000 hours worked, following the intervention.
- Restricted Days dropped from 1321 to 202, an 85% decrease per 200,000 hours worked, following the intervention.
- Employee Turnover Rates dropped 83% following the intervention, from 409 to 69 per 200,000 hours worked.
- Quality and productivity were increased due to the increase in worker moral and an overall safer environment.