



CASE STUDY: Experience Implementing Ergonomic Changes using the “Participatory Approach” within a Purge Puck Manual Material Handling Task

Background

Quality circles and Change teams are commonly defined as a small group of volunteer workers who, with their supervisor, identify a problem and work together to determine an optimal solution. Traditionally this participatory approach has been used to solve quality related issues, but more recently, a variation of the quality circle, the safety circle, has directed attention to resolving safety and ergonomic related concerns.

In the manufacturing plant of interest, the quality circle approach has been promoted by senior management as method to encourage workers to strive for continuous improvement in their areas of responsibility. In the case presented, workers on an injection molding line initiated a safety circle to address ergonomic concerns regarding the manual material handling of purge pucks. These large mounds of hardened plastic are a result of material purged from the mold machine when changes in molding material are required. To remove the purge pucks, workers are required to lift the pucks from floor height, carry them down a flight of stairs and lower them into a cart. When full, workers push the cart to a gaylord and manually empty the cart puck by puck.

Participatory Approach Details

Safety Circle Participants

- Four volunteer line workers, line supervisor, shop assistant manager
- Support provided from engineering, maintenance and ergonomic consultant
- All workers received ergonomic training upon hire; management received additional training upon promotion

Identify & Breakdown the Problem

- Plant ergonomic risk assessment identified task as high risk
- Ergonomic survey indicated discomfort and requests for intervention
- Workers attributing back discomfort from lifting pucks and pushing cart
- Inspection of work area indicated slip/trip hazard from pucks on floor when cart filled to capacity
- Shift differences in process to discard pucks
- Ergonomic review by outside consultant indicated both the weight of the pucks and the force to push the cart exceeded recognized guidelines and awkward postures were experienced.



Determine Root Cause

- Root cause determined through 5 why process
 - Problem: Purge puck removal is high risk process
 - W1: Weight of pucks and force to move cart exceed recognized guidelines
 - W2: More pucks created due to increased purging for new products and no standard to created by design team to remove them
 - W3: Inadequate task capability analysis by design team
 - W4: Inadequate buy-off and communication between shifts regarding task



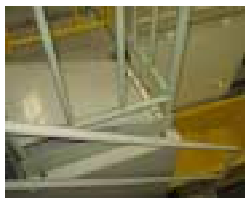
Set Targets/Project Goals

- Reduce task risk assessment to low risk
- Reduce weight of the purge pucks and force to push cart
- Eliminate slip/trip hazard
- Standardize puck removal task including: puck weight, removal frequency, location and responsibility

Brainstorm and Evaluate Solutions

- After identifying the problem and root cause, containment controls implemented while engineering controls investigated.
 1. Communication made to workers to remove purge pucks as they are created to avoid two sticking together, increasing the weight lifted and carried.
 2. Standard established between shifts for cart and gaylord location.

- Evaluation of engineering controls based on ergonomics, safety, space available, cost and productivity:

		Option 1		Option 2		Option 3	
							
		Remove by hand (current)		Gaylord at process with slide		Tipster with slide	
Description	Target	Rating	Value	Rating	Value	Rating	Value
Ergonomics	Risk Assessment (<20)	X	30.87	O	9.60	O	9.60
	Puck weight (<11.1kg)	X	15.2 kg	O	7.6 kg	O	7.6 kg
	Push force (<15kg)	X	15.9 kgf	N/A	N/A (Forklift)	O	7.7 kgf
Safety	# of pucks on floor (0)	X	See "current"	O	0	O	0
Space	Restrictions: 35" high 29" wide 55" long	O	33" high 28" wide 51" long	X	33" high 44" wide 43" long	O	26.5" high 26" wide 49" long
Cost	< \$5000	O	\$0	O	\$0	O	\$2330
Productivity	<15s to load 1 puck	X	28s	O	8s	O	8s
	<5 mins to empty bin	X	6 mins	O	3 mins	O	4 mins 30s
Overall		X		X		O	

Follow Solution Through and Monitor Results

- Tipster with slide implemented on one line to evaluate and generate feedback
- The force to push the puck and cart within recognized guidelines and awkward postures minimized, reducing risk of injury.
- New process communicated to both shifts by safety circle during lunch and learns and feedback collected

Standardize Success

- Standard established between shifts to ensure the task is performed consistently.
- Next goal is to implement solution to additional lines and look for additional areas for ergonomic improvement.



Lessons Learned

- For the participatory approach to be effective, you must be sold on it
- Find opportunity to employ a participatory approach in workers with complaints; provide them with the chance to gather worker feedback and develop a solution for their concerns.
- Start slowly and work your way to a more formal participatory program; take time to determine what works best for your organization.