ERGONOMICS: SAFE USE OF ROTARY DIE CUTTER-PRESS

Overview

From packaging, labels, and displays to commercial printing, rotary die-cutting is used for cutting, creasing, embossing, waste stripping, and blank separating a range of sheet materials, from light papers and carton board, to heavy solid board, plastics, in-mold labels, micro-flutes and most types of corrugated board.

Staffing: Usually 2-4 workers per crew (1 operator, 1 assistant, 1 material handler)

Shift length: 8 or 12 hours

Breaks: 1 lunch and/or dinner, plus 2 to 3 breaks

Issues: Neck, shoulder and lower back strains, hand and arm discomfort

Operator's primary tasks

1. Set up in-feed table for correct box size
2. Set up, install print dies
3. Check to ensure steel die is installed correctly
4. Adjust box scores and rotary knives
5. Adjust feed rollers, guides for box size
6. Perform quality checks and troubleshoot jam-ups
7. Unload, stack completed boxes
8. Enter data into computer system

Risks and recommendations

Identified risk factors for pains and strains, also known as musculoskeletal disorders, include manual handling of pallets, sheets, dies, and work posture. To prevent injury, leading practices include recommendations to improve, reduce, or eliminate manual handling, as well as ensuring a waist to shoulder working height at all times.

1. Risk Factor: Lifting, pulling and handling of wooden and plastic pallets, wood boards

Handling of wooden and plastic pallets at the rotary die cutter-press may place the worker at a significantly increased risk of injury.

Recommendation: Keep manual handling of wooden and plastic pallets to a minimum

- Use a pallet stacker-dispenser to store and dispense pallets when needed
- Use a pallet jack to move pallets to work areas
- Keep height of stacks of pallets to less than 1m in height
- If pallets must be lifted use two workers to lift pallets
- Ensure waist to shoulder working height
- Slide, push, and tip pallets up onto raised conveyors or platforms

2. Awkward postures of back, neck and arms when making machine adjustments, cleaning, and performing other tasks.

Recommendation: Improve work postures required to make machine adjustments

- Extend levers, knobs on the machine to decrease the reach distance to make adjustments
- Use larger hand wheels, knobs
- Install steps, platforms, and railings (based on established standards) to allow workers to more easily get up onto, into, and over the machine where adjustments need to be made
- Provide tools with extensions to reduce the need for awkward postures and reduce the amount of time an awkward posture must be held.
- Ensure adequate access areas for workers to make adjustments without having to adopt awkward postures
- Ensure waist and shoulder working height

3. Risk Factor: Pushing, pulling of pallets, stacks of boxes on roller conveyors

Recommendation: Reduce forces associated with pushing and pulling pallets of sheets

- Provide motorized pallet jacks for use when moving pallets of sheets into or from the press
- Ensure that pallet jack wheels are maintained in good condition
- Ensure work surfaces are maintained to eliminate cracks and bumps
- Use powered roller conveyors that are well designed and capable of easily moving the stacks of sheets

4. Risk Factor: Mounting and cleaning of rubber print dies

Recommendation: Reduce strain related to mounting and cleaning rubber print dies

- Hang print dies at the lowest height possible
- Hang sections of print dies together but separately so workers can pick up one section at a time
- Consider designing print dies with 'handles' to make them easier to lift
- Store print dies as close to the press as practical
- Use carts to transfer print dies from the storage area to the press
- Use steps or platforms to allow the worker to work in a better posture cleaning an mounting the print die

5. Risk Factor: Mounting and installing steel dies

Recommendation: Reduce strain related to mounting steel dies

- Ensure waist to shoulder working height
- Ensure that two-piece dies are stored on separate racks to reduce the risk of one die falling off the other when the die is being moved or removed from storage
- Use well-designed carts to move steel dies from storage area to the press
- Ensure carts are designed to prevent dies falling off while in transit

6. Risk Factor: Manual handling of processed boxes

Recommendation: Improve work postures for workers unloading boxes from the cutter-press

- Use an adjustable height lift to raise and lower conveyor and pallet in unit building station
- Ensure waist to shoulder working height
- Install a load former to eliminate need to lift and handle processed boxes
- Educate workers about risks to the lower back related to material handling and twisting

7. Risk Factor: Manual feeding of rotary die cutter-press

Many die presses require workers to manually feed sheets into the press. Workers will grasp a stack of sheets from the pile on the in-feed pallet, lift the sheets, turn to face the in-feed station, and then add to the stack of sheets in the feeder.

Recommendation: Improve work postures for workers feeding the cutter-press

- Use an adjustable height pallet lift to raise / lower pallet when loading with sheets
- Ensure waist to shoulder working height
- Place loading station/pallet 1m from press out-feed area (encourage workers to turn and step)
- Educate workers about risks to the low back related to material handling and twisting
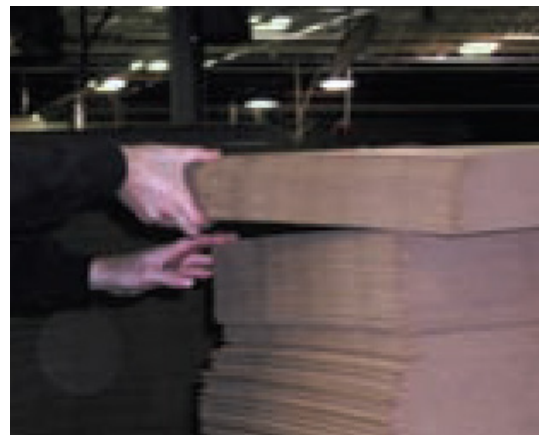
8. Risk Factor: Manual handling of ink pails

Recommendation: Reduce risk to workers from handling ink pails

- Redesign ink pail storage areas to keep the top of the ink pails above knee and below shoulder height
- Consider raising the bottom ink storage shelf 30 cm off the floor
- Use carts / wagons to move ink pails from the storage area to the press
- Store ink pails as close as practical to the press
- Consider the possibility of using larger pails of ink that are moved to the press by pallet jack or lift truck (for high frequency and high number orders).