

Folder Gluer Machines

General Data

- Staffing:** Usually 2-4 workers per crew (1 operator, 1 assistant, 1-2 material handlers)
- Shift length:** 8 or 12 hours
- Breaks:** 1 lunch and/or dinner, 2 or 3 10-minute coffee breaks
- Issues:** Neck, shoulder and low back strains, hand and arm discomfort

Tasks Descriptions

Operator's primary tasks

- set up and adjust feed rollers
- make adjustments to machine
- glue settings, glue gun, machine speed
- flap folders, support bars, feed supports and gates
- carriers and folding section
- adjust stacker / out feed section
- perform quality checks and troubleshoot jam-ups
- feed and load the machine with boxes
- enter data into computer system
- move pallets of flat boxes to machine and remove empty pallets (1)

Assistant's primary tasks

- manual stacking, piling, strapping, or packaging of processed boxes (2)
- clean up around folder gluer
- on occasion assist with operator tasks

Material Handler's primary tasks

- manual stacking, piling, strapping, or packaging of processed boxes (2)

Note: the Assistant may perform or assist with Operator's tasks.

Identified Risk Factors for Musculoskeletal Disorders

The key risk factors for work-related musculoskeletal disorders that are associated with the tasks performed at a folder gluer are documented in the following pages. (3)

The application of ergonomic principles in the workplace is essential to the prevention of work-related musculoskeletal disorders—MSDs

References

- (1) – unpowered roller conveyors are often used to deliver pallets of flat boxes to folder gluers which require forceful pushes
- (2) – processed boxes are stacked into shipping units or put into shipping boxes, some boxes are strapped in small lots before being stacked
- (3) – based on observations of 4 different folder gluers in two different work locations
- (4) – most workplaces deliver flat boxes to the folder gluer on wood/plastic pallets. Wood boards may be lifted / placed on top of stacked boxes



Folder Gluer Machines

Risk Factor 1: Lifting, pulling and handling of wooden and plastic pallets / wood boards (4)

Handling of wooden and plastic pallets at the folder gluer may place the worker at a significantly increased risk of injury. Placing wood boards on top of a unit of processed boxes is also a hazard. Factors that may increase the risk of injury include:

- weight of pallet (20 – 38 kg) / boards (11 kg)
- height / location of pallet or board when first lifted
- height / location of pallet when put down
- method used to handle pallet
- frequency of pallet / board handling
- state of repair of pallet

Risk Factor 2: : Awkward postures of back, neck and arms when making machine adjustments

Workers must adopt awkward postures when making the many and various adjustments to the folder gluer. The design of the folder gluer typically requires the worker to bend at the waist, twist, and reach out to adjust rollers, guides, glue guns, flap folders, supports, etc. Workers do not usually hold these postures for a significant duration. The frequency that workers adopt these postures will depend on the product mix being processed and the make, model and year of the folder gluer. Factors that may increase the risk of injury include:

- duration of time awkward postures are held
- frequency of adopting awkward postures
- number of extreme postures adopted
- accessibility to adjustment areas (machine design)



Risk Factor 3: : Pushing / pulling of pallets of boxes on roller conveyors

Pallets of sheets may be delivered to the folder gluer via roller conveyors or pallet jacks. If the conveyors or pallet jacks are not powered, then the worker must manually push the pallets into position for feeding the folder gluer. Some newer folder gluers have systems for automatically stacking the processed boxes. With these machines the worker may have to manually pull/push the full pallet of processed boxes from the machine to a storage area. Factors that may increase the risk of injury include:

- force required to push/pull pallets (10 – 35 kg)
- condition of roller conveyor or pallet-jack
- method used when pushing/pulling the pallet
- frequency of pushing/pulling



Folder Gluer Machines

Risk Factor 4: Manual handling of processed boxes

In most workplaces, workers are required to manually handle boxes that have been processed through the folder gluer. Workers may gather up a number of boxes, align them into a short stack, and then place the boxes onto a pallet and/or bottom sheet on a roller conveyor, piling the boxes up into a shipping unit. Workers may grasp a number of boxes, align them into a short stack, strap the boxes in the stack together and then pile them up into a shipping unit. Workers may grasp a number of boxes and put the flat boxes into a larger shipping box. Factors that may increase the risk of injury include:

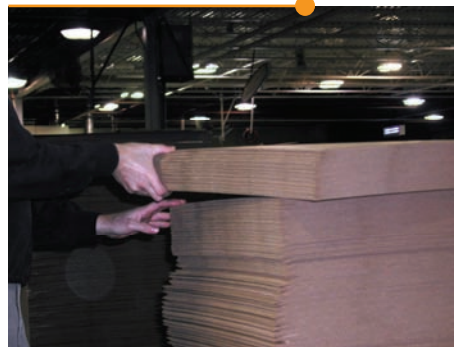
- weight of flat boxes
- number of boxes grasped
- height of flat boxes when picked up
- frequency of handling
- height of bottom of shipping unit
- height of top of shipping unit
- location / height of shipping box
- method used to gather/ handle flat boxes



Risk Factor 5: Manual feeding of folder gluer

Most folder gluer machines require workers to manually feed flat boxes into the in-feed of the machine. Workers will grasp a stack of flat boxes from the pile on the in-feed pallet, turn with the boxes to face the in-feed of the machine, and then place the stack of boxes into the feeder (onto boxes that are already in the feeder). Factors that may increase the risk of injury include:

- weight of flat boxes
- number of flat boxes grasped and type / width of grasp
- height of boxes when lifted
- height of boxes in feeder
- method used to move sheets
- frequency of handling



Recommendations

Recommendation 1:

Eliminate / reduce / improve manual handling of pallets / wooden boards

Consider the following to keep manual handling of wooden / 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
- Slide, push, and tip pallets up onto raised conveyors or platforms



Recommendation 2:

Improve work postures for feeding folder gluer

Consider the following to improve work postures for workers who manually feed the folder gluer:

- Use an adjustable height pallet lift to raise / lower stack of sheets
- Inset pallet lift table into floor to allow high stacks to be lowered below shoulder height
- Train workers to keep lifts below shoulder and above knee height
- Place pallet of sheets 1m away from press in-feed to force workers to turn and step
- Educate workers about risks to the low back related to material handling and twisting



Recommendation 3:

Improve work postures when making adjustments to machine

Consider the following to improve work postures for when adjustments are being made on the machine:

- Extend levers, knobs, etc. so that workers do not have to reach so far to make adjustments
- Use larger hand wheels, knobs, etc. to reduce forces
- Install steps, platforms, and railings to allow workers to more easily get up onto / into / over the machine where adjustments need to be made
- Provide tools with extensions to reduce the need for awkward postures and/or reduce the amount of time an awkward posture must be held
- Ensure that adequate space is allowed for workers to access areas that need adjustment without having to adopt awkward postures
- Look for ways to raise the height of low level adjustments



Recommendations cont'd

Recommendation 4:

Improve work postures for unloading the folder gluer

Consider the following to improve work postures for workers who manually feed the press:

- Use an adjustable height table / lift to raise / lower height of unit when manual stacking of boxes is required
- Inset pallet lift table into floor to allow worker to keep all lifts below shoulder height
- Install load former units to minimize lifting and/or need for pallet handling
- Train workers to keep lifts below shoulder and above knee height
- Place unit stacking station 1m from folder gluer out-feed area to force workers to turn and step
- Educate workers about risks to the lower back related to material handling and twisting

Recommendation 5:

Reduce grip width when handling flat boxes

Consider the following to reduce the strain on workers forearms when handling sheets:

- Educate workers about the extra risk / strain associated with using a wide pinch grasp
- Encourage workers to handle a smaller number of sheets at one time
- Use automatic sheet feeders to eliminate manual feeding of folder gluer

Recommendation 6:

Reduce forces associated with pushing/pulling pallets / stacks of sheets or completed units of boxes

Consider the following to reduce the strain on workers when pulling/pushing pallets / stacks of sheets:

- Provide motorized pallet jacks for use when moving pallets of sheets into or from the folder gluer
- Ensure that pallet jack wheels are kept in good condition (not cracked, well greased, etc.)
- Ensure that workers are not required to push the pallet jack up and over ridges, bumps
- Keep the floor area where a pallet jack is used free from bumps, holes and cracks
- Provide well-designed power rollers on conveyor to eliminate or assist with moving sheets or folded boxes
- Ensure that sections of conveyor are properly aligned and at the same level
- Ensure that roller conveyors are well maintained and that all rollers at the same level and moving freely

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