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Material handling considerations for flexo folder gluers

Scope

When selecting a flexo folder gluer (FFG), a consideration of equal importance is the selection of the material handling equipment for supplying board to the FFG and removing the finished product away from the FFG. To get the best performance from the entire line, a “systems” approach which examines each part of the line needs to be applied to adequately understand if any operating limitations may be present. Since the tasks to convert stacks of blanks into stacks of finished value-added products are all sequential events, the FFG line will only perform as fast and as well as the slowest link allows.

Safety precautions

No specific safety precautions are associated with this TIP.

Material handling considerations between the corrugator and the FFG line

Today’s modern converting plants use two main systems to take board away from the corrugator – mobile methods such as forklifts, and stationary methods such as multiple banks of fixed floor conveyor.

Forklifts are typically used in plants where the available floor space may be limited, unusually shaped, or otherwise not favorable to a large fixed conveyor installation. In layouts where the converting lines are not oriented perpendicular to the corrugator, or may be oriented in multiple different directions, the use of forklifts may be the only practical method to transfer the stacks to the finishing lines. Similarly forklifts may be the only viable choice for sheet plants that purchase their sheets from another facility.

Advantages –

- Lower initial costs than automated fixed conveyor systems.
- Few, if any, facilities modifications.
- Easy to implement.

Disadvantages –

- Higher maintenance costs.
- Higher labor costs to operate the forklifts.

- More potential for incurring damage to the sheets due to multiple handling events, movements, and stacking of loads on top of each other.
- Inventory systems for temporary storage needs to be established.
- Potential safety issues with multiple moving vehicles in limited areas inside a plant.
- The plant usually must operate with pallets of multiple sizes, and have equipment required for handling the pallets. Pallet storage and handling occupy valuable floor space inside the plant.

Stationary floor conveyor systems are typically favored in larger plants where floor space is available and the orientation of the FFG lines with respect to the corrugator is not an issue. These fully automatic systems use shuttle carts to pick up stacks off the corrugator and transfer the stacks to conveyor lines to build queues for orders. The conveyor lines are usually comprised of standard powered roller conveyor, but some installations are now favoring the new European-style chain link conveyor.

Advantages –

- Lower direct labor costs than forklifts.
- Automated movement decreases chances of material damage during transport.
- Inherently safer than moving forklifts.
- Can operate without pallets.

Disadvantages –

- Higher initial costs than forklifts.
- Large floor space required.
- Central plant computer controller required to schedule, store, and track work-in-process.

Feeding the FFG

Once the stacks of corrugated sheets arrive at the FFG line, they are temporarily queued on a section of staging conveyor to wait for feeding. The length of this incoming conveyor is usually at least 15 ft to 20 ft long – longer section of conveyor are desirable to allow for longer periods to begin reloads.

Manual feeding is the original method of feeding blanks into a FFG. To minimize lifting, manual feeding stations typically feature a scissors-lift type device to elevate the lower portions of the stack up to the level of the FFG feed table. Depending on the blank size and the plant regulations, one or two operators will unload the stack by taking one handful of sheets at a time and placing it in the FFG feed table hopper. The operators must properly orient the outside liner of the blank for proper processing through the converting machine.

Advantages –

- Most inexpensive method to feed sheets into an FFG.
- Easy to implement, simple to understand, no training required.
- Can be feasible for smaller, easily-handled blanks (such as what is found on mini-lines).

Disadvantages –

- Labor-intensive, difficult to retain operators to perform this task.
- May not work with taller stacks, depends on blank sizes.
- Becomes progressively more difficult to accomplish as blanks get progressively larger.
- FFG productivity is paced by the operator's limited ability to feed blanks into the FFG feed table.
- Can increase the possibility of injuries due to heavy lifting, repetitive motions, and monotonous work.
- May not be suitable for use with larger top-printing FFG's due to need to invert sheets prior to feeding.

Automatic prefeeders were developed in the 80's to eliminate the inherent limitations of manual feeding and provided immediate productivity increases along with higher effective FFG line speeds.

The first generation of automatic prefeeders elevated the entire incoming stack and fed sheets off the bottom of the stack. These "bottom feeder" designs were simple, fast, and performed well with smaller sized blanks. However,