

Guest Editorial

Considerations for Going Forklift Free

by John Neumann, Larry Tyler and Mike Urban
for Kinetic Technologies, Inc. (K-Tec)

Companies mandating the move to forklift-free production floors are doing so on the basis of safety improvements and reduced forklift lease and maintenance costs. However, other less visible advantages with direct and secondary benefits may play an important role in reducing costs and improving customer response. Identifying these benefits requires an overview of the project and an understanding of the impact on each department and supplier.

Implementing a forklift free factory plan can be extremely challenging, as many familiar habits of both the material handling support and production assembly personnel will be changed. Additional complexity may be added by the physical plant, assembly line and storage constraints, packaging changes, budget limits, ergonomic issues and project completion time. Working through these problems will require input from top management, affected departments and suppliers who will share ownership of the plan.

The Case for Forklift Free

There is no question human loss and liability cost relative to forklift injuries has been the number one driver for forklift free (also called fork-free) plant floors. Each year in the United States, nearly 100 workers are killed and another 20,000 are seriously injured in forklift-related incidents. Forklift overturns are the leading cause of fatalities involving forklifts, representing about 25% of all forklift-related deaths.¹

The Hyster Company estimates that businesses waste over \$1 billion in unnecessary operating costs associated with material handling equipment. A recent study suggested that, unfortunately, only 6% of end-users actually know their real maintenance costs. Even fewer have programs in place to reduce these expenses.² An old industry axiom states that on the average over the life of a forklift, 20% of its cost is ownership and 80% is its operating cost.³



Cart on cart.

On the flip side, forklift free programs can contribute value in areas relating to reduction of inventory, improvement of material flow, reduction of line-side handling equipment and floor space, improved operator ergonomics, cycle efficiency and reduced need for coordination between forklifts and operators for replenishment. A summary follows:

Justification for Forklift Free

1. **Improved** worker and investor perceptions relating to the company's plan to reduce forklift activity in response to injury or death situations involving forklifts.
2. **Decreased** lost worker production, compensation and litigation costs associated with less forklift injury claims by going forklift free.
3. **Reduced** costs for forklift leasing, purchase, maintenance.
4. **Reduced** forklift operator costs (direct labor and benefits).
5. **Cost avoidance** due to fewer and less expensive line-side handling equipment.
6. **Cost avoidance** of extra line space required for forklift replenishment.
7. **Improved** scheduling flexibility by not needing tight coordination between line operators and production floor material handlers (built-in system using RF, Kanban, etc.).
8. **Decreased** total WIP (work-in-process) inventory.
9. **Improved** control of FIFO (first in, first out) products delivered line-side.
10. **Reduced** coordination time between forklift operators and production floor material handlers.

Macro Issues

Building a forklift free program requires a significant amount of time be spent on the "front end" of the process – clarifying plan targets, goals, identifying waste, ergonomic and safety threats by asking how the forklift free system might impact operations and the supply chain. Manufacturing or industrial engineers and material logistics personnel are typical forklift free project leaders who make decisions after input from safety and ergonomic teams, production managers, line operators, proposed tug drivers, market supply teams, purchasing and suppliers. Poor communication is the root cause of ineffective forklift free programs that add waste, increase costs and create the "tried it once, not going to try again" mind set.

Questions should be asked to help uncover possible problems and define framework of the plan. This will give affected personnel and departments a clear picture of changes to existing procedures and new responsibilities that may be required under a forklift free plan.

Objectives

1. What are the goals of the forklift free program? Can they be clearly defined, measured and shared with all personnel?
2. Do proposed plans and actions support the goals of the target?

Personnel

1. How many material handling support personnel are needed for forklift free (FF) replenishment? How is this better or worse than present forklift manpower?
2. How closely will ergonomic guidelines be followed?
3. Will material handling (MH) operators be loading/unloading carts to conveyors?
4. What maximum weights, frequency, distance will MH operators need to push, pull?

Example 1.1

Injection Molded Housing Forklift Free Analysis

Receiving

Standard Forklifts — Original part is delivered from outside supplier two times a week in 96" long x 45" wide containers, with 10 stacks of 50 each container, 5-6 containers per delivery. Production uses approximately 10 containers/week. Maximum market inventory: 3000 units.

Forklift Free Approach — 10 stackable, gravity slide tube racks with 125 units each are delivered four times a week from supplier. Racks are forklift loaded in receiving area onto low push/pull towable carts and staged in market area. Maximum market inventory: 1250 units.

Line-Side Delivery

Standard Forklifts — Forklift operator delivers one container to line at start of each shift for two shifts. Assembly operator places remaining parts in new container, forklift driver removes empty container, loads new container on a lift and tilt device. Load time: 10 minutes.

Forklift Free Approach — Every two hours the tug operator tows one rack to line. Tug operator rolls out empty rack (placing any remaining parts on the new rack) and pushes new rack over a small footprint lift. Maximum inertial push/pull forces do not exceed 40 lbs. Load time: 4 minutes.

Assembly Operator Actions

Standard Forklifts — Operator works from one side of tilted container, walking length (96") of unit to unload. Line space required: 81" linear (36" for operator and 45" for container width), plus 96" depth. Average cycle: 45 seconds retrieve/install, 12 seconds rest.

Forklift Free Approach — Operator works from back of cart rack (end facing the line). As parts are removed, gravity slide rack feeds new parts to operators allowing them to stay in one area. Line space required: 42" for operator/rack width, plus 75" depth. Cart rack double slides accommodate required part volume. Average cycle: 20 seconds retrieve/install, 37 seconds rest (opportunity to increase line speed or add second operation)

Return

Standard Forklifts — Forklift picks up empty container line-side, moves it to shipping and stacks two high on the floor for next vendor pickup.

Forklift Free Approach — Empty rack is towed to shipping and forklift separates base from rack assembly and stacks rack two high on floor until next vendor pickup.



Carts pulled by tugger.

5. Will assembly operators move containers or carts?
6. Will MH operators be required to get in and out of units repeatedly? Stand up vs. sit down designs? Ergo impact?
7. What union regulations and issues are related to FF changes?

Parts Presentation

1. Are mixed product lines with complex parts change outs being used?
2. Will they be handled with sequencing or kitting part configurations?
3. What criteria determines where containers will be "pushed" to/from conveyors or containers on carts will be "exchanged" in work cells?
4. Will suppliers (internal/external) support different container

**Specify CROSS
Fluid Power...**

Proven Performers
PRESSURE, FLOW and
DIRECTIONAL VALVES

GEAR PUMPS
and MOTORS

RELIEF VALVES

TIE ROD CYLINDERS

MADE IN AMERICA...
SERVING THE WORLD

50+ plus years experience, our personal commitment to continuous improvement, quality and customer satisfaction — gives you the best product at the right price.

Call, fax or e-mail today for complete information.

CROSS

100 JAMES H. CROSS BLVD.
LEWIS, KS 67552
(620) 324-5525
FAX (620) 324-5737
E-mail: info@crossmtg.com
180 0001
CL11111111

configurations and more frequent deliveries? What are the costs?

Logistics

1. Where will forklifts continue to be used?
2. Will there be one market area and/or multiple smaller staging areas?
3. How much inventory can be removed from the floor?
4. How much can be removed from the market?
5. Will forklifts load forklift free supply carts in the market areas?
6. What kind of tugs will be acceptable for drivers, maintenance and loads handled?

Micro Issues

Serious handling problems can be avoided if the forklift-free system designer role-plays with the personnel who must “touch” material in some way. Tracing the flow of material (and containers) from supplier to receiving dock through assembly station and back to shipping dock for *each part or part group* can provide the insight into troublesome details that might otherwise not surface until the first run-off. In example 1.1, the movement of one part (and its container) used in one production cell location is compared to a forklift free strategy. As details unfold, note the number of operational issues, personnel and supplier changes that must be in place.

Plant Considerations

Working through the details of forklift-free changes, even when approached carefully, in existing plants (Brownfield) is more difficult than in new or remodeled facilities (Greenfield) where constraints can be adjusted on the drawing board. Narrow aisle widths, blind aisles, poor floors, variable conveyor heights and set backs from aisles, limited linear line space, ceiling height and poor market (inventory stores) locations are just a few of the basic challenges. Table 2.1 lists more examples of micro issues

that need to be addressed.

Brownfield forklift-free conversions work best when done incrementally by addressing one to two work cells or common assembly areas. A good place to start is in an area where a Kaizen event or new product or process is being implemented, so the material flow process can be changed at the same time. Brownfield conversions can yield good results if it is understood that changes may require more customized solutions, higher initial costs and longer implementation times.

Converting to a forklift-free plant floor is a significant technical challenge. Whether the plant is a Greenfield or Brownfield installation, material movement into and through the plant can be systematically analyzed and improved. Getting the best possible forklift-free plan depends on detailed input from affected departments and management. It is equally important to find suppliers with forklift free implementation experience who will provide useful plan feedback, suggest creative approaches and help avoid application pitfalls.

AgEM

- 1 National Institute for Occupational Safety and Health (NIOSH) at www.cdc.gov/niosh/2001-109.html
- 2 The Hyster Company, www.hysterusa.com/fleetsvc.html
- 3 Materials Handling Equipment Co., materials-handling-eqp.com/forklift/significantly-reduce-forklift-operating-costs.htm

Kinetic Technologies, Inc. (K-TEC)

info@k-tec.bz

www.k-tec.bz

Editor's note: Please send comments on the contents of this White Paper to Mary Shepherd (mshepherd@cfu.net) with the subject line Forklift-Free Comments. Comments received will be shared with the authors and published in a future issue of Ag Equipment Manufacturer.

Table 2:1

<u>Area</u>	<u>Issues</u>
Operator Ergonomics/Safety	Push/pull forces, rotational forces, reaching distance, lift height, bending/twisting needs, pedal forces, tripping, pinching, crushing or impact hazards
Part Picking, Sequencing, Presentation	Line-side configuration (cart exchange vs. push) relative to high density/low density parts, dunnage type, weight, size, and line space
Operator Efficiency (prod.)	Cycle time targets, eliminate wasted motion or action
Zero Line Stops	Simulation models, real variable assumptions
Line Space Required	See parts presentation, page 11
Operator Efficiency (MH)	Market: loading/unloading dunnage, conveyor vs. forklift, tug speeds, market to line cycle times
Plant Constraints	Floor types/condition/flatness, column locations, aisle widths, production line set backs, turn around areas, market areas vs. high volume assembly locations
Equipment Constraints	Existing conveyors, lifts, tilters, etc. that compromise ergonomics, forklift free loading, cart geometry/alignment (to conveyors), number of carts/train
Financial Constraints	Poor planning/business case, cost overruns, budget cutbacks (at expense of long term forklift free gains)
Replenishment Signals	Determining the appropriate type of pull signals such as Kanban cards, electronic RF calls, etc.
Visual Factory/Error Reducing	Color coded inventory containers, open racking for easy identification of inventory, color coded delivery locations