Is Forklift Free For The Fastener Industry?

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Over the past several years a growing material handling strategy has been emerging in the U.S., particularly within automotive manufacturers and their tier one suppliers. Forklift free production floors have been mandated as the new standard operating procedure (fig. 1.1). What is driving the change and does it make sense for other market segments such as the fastener industry? The answer to that question lies in a clearer understanding of the factors motivating the move to forklift free plants and how the system works in other manufacturing situations.

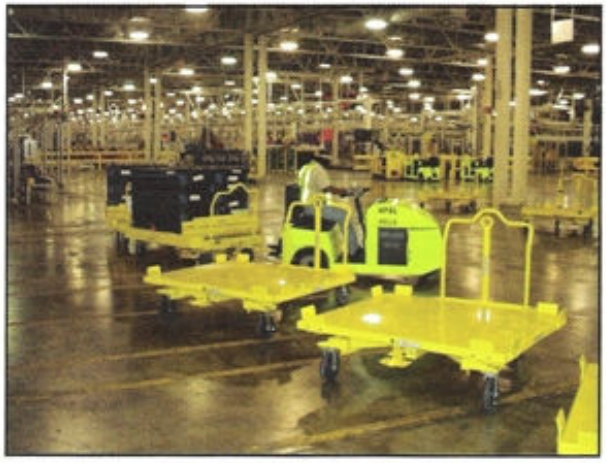

Figure 1.1 Market staging area

Plan for Safety

Without a doubt, reducing forklift accidents is the number one motivator for forklift free operation.[1] Government reports on forklift safety have all stressed the need for maintaining forklift awareness training for operators and pedestrians alike.[2] The human cost and its resultant impact on operations represent risk that can be minimized by reducing the quantity of fork trucks required in the plant and their interface with employees.

Even though the reduction of forklift accidents is by far the attention grabber, there are many other advantages associated with forklift free practice that can lead to significant on-going improvements. Typically these advantages impact investment costs, inventory, material flow, material handling labor and system maintenance by targeting inefficient practice.[3]

Remove Waste

Sound familiar? This is the fundamental principle of the lean production system with its relentless attack on the eight forms of waste.[3] Forklift free operation is a key tool in the lean toolbox that helps identify and reduce wasteful practices in the material handling system.

1. Overproduction - producing goods before they are required. *FF operation* - production material is only delivered to the line on a demand or pull basis initiated by the line side operator.
2. Waiting - caused by inefficient layouts or a poor match to demand. *FF operation* - uses planned replenishment routes for faster response to inventory calls with a smaller handling team.
3. Unnecessary Transportation - moving or "touching" goods frequently. *FF operation* - demands that "touches" be minimized. Articulated carts with goods flowing directly from the market area to line side within the operator's reach (fig. 1.2).

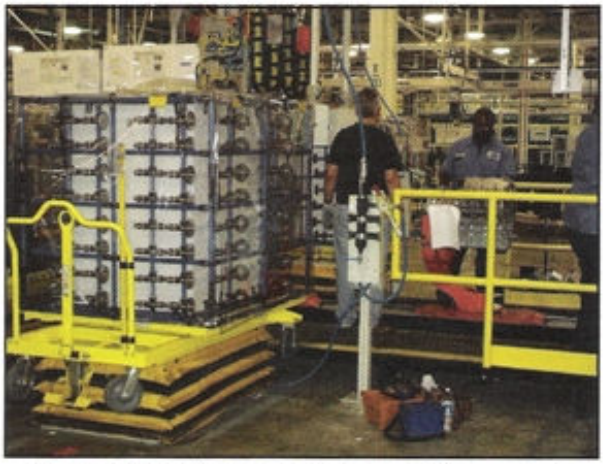

Figure 1.2 Tube frame presentation cart for cam shafts

4. Inappropriate Process - using complex processes when simpler ones will do. *FF operation* – flexible flow systems eliminate hand-off to other devices (such as carousels, monorails, shuttles, etc.) and make it easy to change the process without removal of costly systems.
5. Unnecessary Inventory - caused by uncertainty with regard to quality levels, delivery, lead times, etc. *FF operation* - commonly use an hour of visual inventory on the line and vendors provide smaller, more frequent deliveries resulting in less in-plant inventory.
6. Unnecessary/excess motion - caused by poorly designed process. *FF operation* – process design starts with focus on the machine operator proceeds to the handling operator and ends at the shipping or receiving docks. It mandates that wasted motion, ergonomic and safety issues be addressed at every step.
7. Defects - create uncertainty in the process and diminish production capacity. *FF operation* - decreases the capacity for damage by reducing handling and making it easier for employees to do their jobs.

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8. Underutilization of employees - companies do not fully utilize the skills and decision making capabilities of their employees. *FF operations* - depend on the machine operator to call-out inventory need and the supply team to recognize and correct short falls in the replenishments process on a continuing basis.

The auto industry and their tier one suppliers are realizing millions of dollars in annual savings and have significantly reduced serious human injury from fork trucks.

XYZ Fastener Present Condition

1. Forklift unloads full containers of castings from supplier.
2. Forklift delivers container of castings from stores to the machining center for dump loading. Machine operator positions empty container under output chute with pallet jack.
3. Forklift picks up full container of fasteners from the machining center and delivers it to the packaging line for staging.
4. Jib boom at packaging line loads fasteners into feed hopper for boxing, palletizing and stretch wrapping.
5. Forklift picks up boxed and wrapped pallet of fasteners from packaging line and places it on the inventory racks.
6. Forklift picks up pallets of fasteners from racks and loads into trucks for shipping.

Exhibit 2.1

XYZ Fastener Proposed Condition

1. Forklift unloads full containers of castings from supplier.
2. Forklift loads trains of carts with casting containers from stores. Tugs bring trains to the machining centers. Carts are unhitched and pushed over lift / tilt device for dump loading. Machine operator positions carts with empty containers under output chute.
3. Tug picks up carts with finished fasteners from the machining center and delivers to the packaging line for staging.
4. Containers with fasteners are rolled off carts into hopper loader for boxing, palletizing and stretch wrapping.
5. Boxed and wrapped pallets of fasteners are rolled onto carts for transport to inventory.
6. Forklift picks up pallets of fasteners from racks and loads into trucks for shipping.

Exhibit 2.2

Walk the Path

But what if your plant does little or no assembly, makes small parts on a batch basis and measures inventory in weeks not hours? Consider hypothetical plant XYZ. A common technique that helps to understand the present condition of material handling is to walk the "path of the part" starting from the shipping dock and working backward to the receiving dock. This reveals the number of touches the parts receive along the way as well as chances for employee and forklift interaction. Suppose XYZ makes special fasteners. The flow report is shown in Exhibit 2.1. In this hypothetical case, the parts are touched six times during the process. In addition, the machining center operator depends on the forklift to dump raw castings into the machine. If the forklift operator is not immediately available during the course of a day, this may add up to many minutes of lost production time leading to pockets of extra inventory in the machining center (to reduce travel time from the stores) which also adds extra touches. Likewise, the packaging machine depends on a steady flow of product to

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Figure 1.3 Loading trains in market area

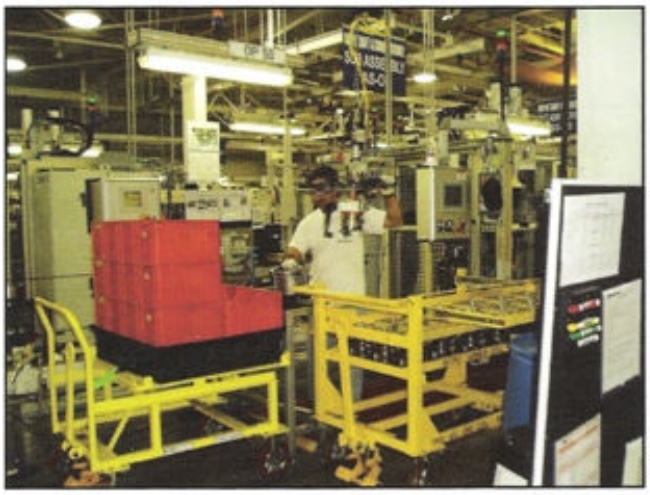

Figure 1.4 Presenting small parts for machining

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assemble truckload shipments. Finally, it is impossible to limit forklift use to the shipping and receiving zones so the chance of an employee and forklift being in the same area is high.

Flow and More Flow

How would a forklift free system help XYZ? Visualizing the forklift free system and its components will allow us to rethink the part flow with the goal of making it easier to move parts. One configuration would use carts with roller decks, work cell ergo-assist devices and tugs. The flow report, Exhibit 2.2, details the proposed handling concept using the forklift free system as outlined. Again in this hypothetical case, the parts are touched eight times but only require forklifts in the market area to load trains and in shipping to fill trucks (fig. 1.3). The machining and packaging centers operate without the need for forklift intervention and depend only on carts and human power to load and unload their cells (fig. 1.4). Since a mid-range tug can handle up to 4-6 loaded carts (8,000lb. rating) at one time, cart trains have up to six times the capacity of a one pallet forklift per delivery cycle! That translates to less time for replenishment, faster call-out response, less delivery personnel and the confidence to eliminate back-up inventory at the work centers. Most importantly forklift movement and employee contact zones are minimized. Other benefits include the need for fewer forklifts thereby reducing lease and maintenance costs, minimal cart and tug maintenance and the absence of certification for tug operators.

Sensible Approach

Does XYZ have the ideal, "blue sky" forklift free layout? No it does not. But it does represent an easy to implement, sensible phase I scenario that could produce immediate measurable gains. A phase II approach might attack other sources of waste such as part touches, simplifying the loading of machines, redesigning containers (for volume control, improved handling) and receiving smaller, more frequent releases from the suppliers. Is forklift free for the fastener industry? You can take it to the bank!

(Footnotes)

1 National Traumatic Occupational Fatalities (NTOF) Surveillance System
http://www.cdc.gov/niosh/pdfs/2001-109.pdf
2 NIOSH, http://www.cdc.gov/niosh/2001-109.html#6
3Forklift Free Justification Issues, http://www.ktecinc.com
4J. Womack and D. Jones, *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, revised and updated (New York Free Press 2003).