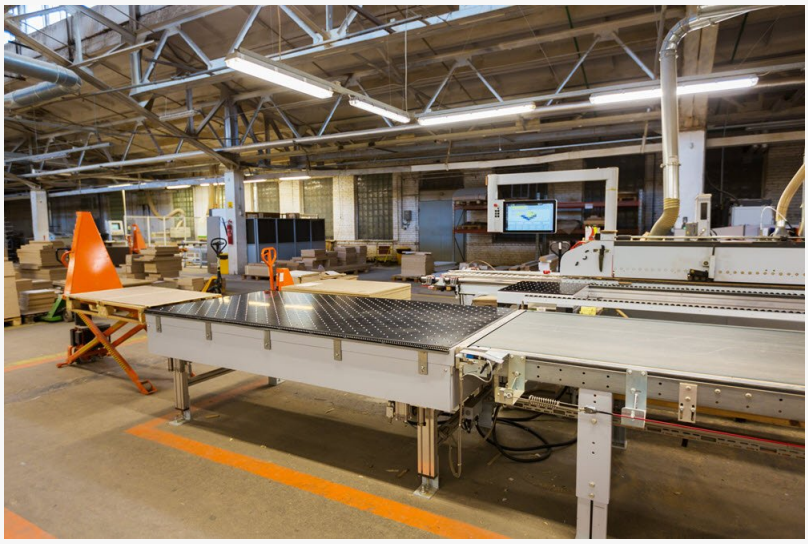
How to Reduce Waste in Manufacturing

Are you able to quickly spot inefficiencies in manufacturing processes? It's a valuable skill to have because losses due to manufacturing inefficiencies.



Furniture manufacturing facility

AUSTIN, TEXAS, USA, November 4, 2019 /EINPresswire.com/ -- As you may know, Formaspace not only builds custom manufacturing furniture solutions for industrial customers (ranging from SpaceX to Dell Computer), we also provide onsite consulting services, such as our Rapid Plant Assessment (RPA) service.

The idea behind RPA is to walk through a production facility — to ask questions and make observations — in order to provide an independent assessment of a manufacturing facility.

Which things do we look for?

One of the things we take into account is the seven classic cases of manufacturing waste* as defined by the principles of Lean Manufacturing.

*The acronym TIMWOOD is often used as a mnemonic for each of the seven wastes:

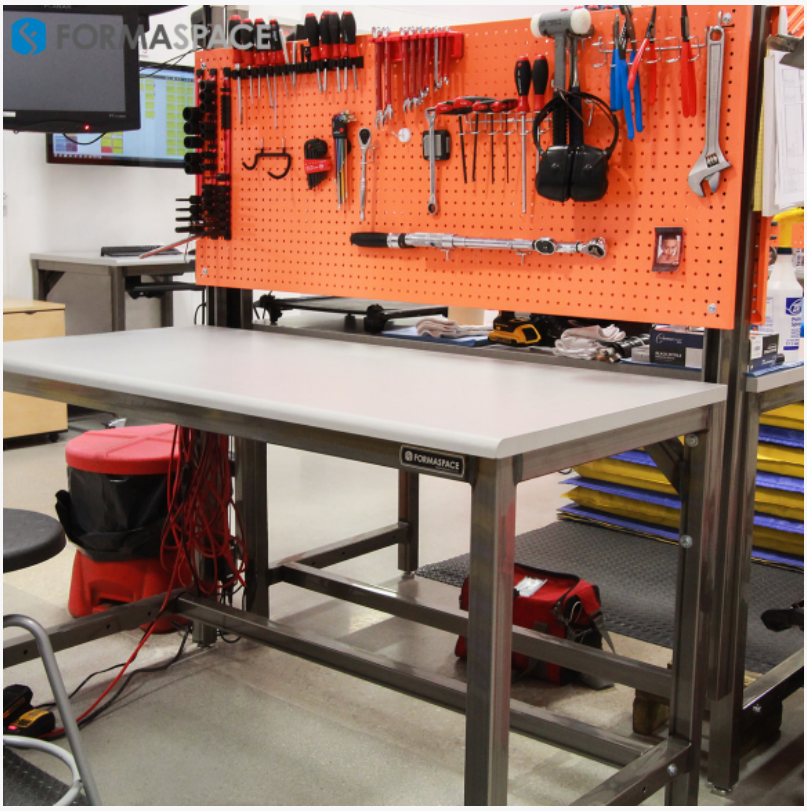
•Transport
•Inventory
•Motion
•Waiting
•Overprocessing
•Overproduction
•Defects

Industrial flow rack

You may also hear of these wastes by the Japanese term "muda", which was the original term used by the Chief Engineer of Toyota, the late Taiichi Ohno, who is credited as the driving factor behind the development of the world-renowned Toyota Production System (TPS), which has evolved into today's Lean Manufacturing philosophy.

Let's look at each of the seven wastes in Lean Manufacturing and consider some of the most useful questions you can ask to evaluate how "lean" and efficient the production process is at a particular facility.

Custom material handling benchmarx


Pump manufacturing workbench

1. Transport Waste And Why It's A Problem
The cost of material handling (known as transport waste in lean manufacturing lingo) drives up the cost of final manufactured products without adding value. Moving raw materials, Work-in-Progress (WIP), and finished goods back and forth require additional staffing resources and storage costs, and it increases the risk of expensive damage to materials and goods.

Here some of the key points you should look into to identify transport waste:

•Are production materials stored beside the line?
•Is material moved only once and for a short distance (in appropriate containers)?
•Is the production flow a continuous line layout?
•Is the factory clean, orderly, and quiet?
•Does visual labeling identify everything?
•Is everything stored in its own dedicated place?

2. Inventory Waste And Why It's A Problem
On-hand inventory levels of raw materials, Work-in-Progress (WIP), and finished goods need to be managed carefully. If inventories get too low, there will be delays in production or in providing finished goods to customers. On the other hand, if inventories get too high, expenses grow quickly, due to increased inventory carrying costs, increased demands on limited factory floor space or the need to allocate storage to hold excess inventory, and general confusion across the organization about the true requirements for efficient production.

Here some of the key points you should look into to identify inventory waste:

•Are sufficient production materials stored at the side of the line, e.g. not too little, not too much?
•Are inventories being built up in certain areas, or is excess inventory hidden away, e.g. transported to remote warehouse storage, etc.?
•Is there is a pacing system that controls the production line system to keep everything synchronized?
•Are there visual cues (such as the use of Kanban (□□) style bins holding raw materials and Work-in-Progress) that show at a glance if there is too much or too little inventory on hand for production?

Integrated stainless steel workbench

3. Motion Waste And Why It's A Problem
In a lean production environment, workers and machines shouldn't have to spend a lot of time moving from one point to another; in lean terms, this is known as motion waste. Ideal workflow designs should bring the work to the employee and/or the machine — is an efficient, straight-line flow. Bad ergonomics is another form of motion waste: employees shouldn't be asked to lift heavy objects, perform extensive overhead work, or contort their bodies into odd positions to complete their tasks.

Here some of the key points you should look into to identify motion waste:

•Do workers have to walk from their work stations to retrieve or deliver raw materials or Work-in-Progress?
•Do workers need to bend, stretch, lift, or reach items at unusual angles?
•Are workers equipped with convenient, ergonomic workspaces that offer a safe, clean, orderly, and quiet place to work?
•Is there sufficient, dedicated storage to keep the most commonly used tools and materials are close at hand?
•Formaspace can help you create a clean, safe, ergonomic workplace. Our Sit-to-Stand workbenches keep everything organized, yet they can move up or down at the touch of a button to accommodate short and tall workers, as well as providing different work heights (sitting and standing) during the shift to help improve worker wellbeing.

4. Waiting Waste And Why It's A Problem
We all hate to wait: it's inefficient and demotivating. Whether the cause is a broken machine, a shortage of raw materials, a bottleneck caused by a slow batch-and-queue process, the result, waiting waste, is a serious disruption to the lean manufacturing ideal of constant, efficient production flow.

There is an exception: the original Toyota Production System calls for each worker to be empowered to stop the production line when a defect is found, which kicks off a "5 Whys" investigation to find the root cause of the problem — and avoid exacerbating the problem by continuing to produce defective products, which would need time-consuming (and expensive) corrective repair.

Here some of the key points you should look into to identify waiting waste:

•Are inventory levels building up in one area of the production workflow yet are found to be too low in other areas?
•Do maintenance and production records point to a recurring bottleneck failure point in a particular process?
•Is deferred maintenance a possible cause for repeated bottlenecks?
•Could batch-and-queue processes be broken up into shorter production runs to even out the overall workflow?
•Does it make economic sense to invest in more machines to operate in parallel to reduce bottlenecks? (Such as those causes when machines need preventative maintenance.)
•Are external suppliers meeting their specific quality, delivery, and cost performance metrics to deliver their contributions in a timely fashion?
material handling workbench integration

5. Overprocessing Waste And Why It's A Problem

Proponents of the Lean Manufacturing process tout the importance of establishing balance in the factory. One way to do this is to avoid overprocessing waste, e.g. processes that are inappropriate for the job at hand. What are the examples of this? One common situation is investing in very expensive and complex automation solutions that, despite all promises, fail to increase productivity and, due to downtime for maintenance, actually creates a bottleneck that slows down production that doesn't break the flow of production. Another type of overprocessing waste comes from complicated product designs that are difficult to manufacture to high-quality standards and/or have expensive to build features that end customers don't accept as worth the additional cost.

Here some of the key points you should look into to identify overprocessing waste:

•Is the manufacturing line highly dependent on expensive machines (often the source of production bottlenecks) when cheaper, simpler alternatives exist?
•Could the design of manufactured products be revised (in a process known as DFM – Design for Manufacturing) to make them easier to manufacture and ship, perhaps by reducing the number of fasteners, having more components serve multiple functions, or configuring parts that weigh less or lie flat for shipping in a flat pack?
•If the product is 'overbuilt' to specifications beyond what the end consumer expects (e.g. machining to overly high tolerances, some parts much stronger than others), could the product be redesigned, for example, to use less expensive alternative materials? (This approach is known as Value Engineering.)
•Could the suppliers in the Supply Chain revise their component designs as well? For example, would it be cost-effective to have the supplier provide pre-assembled components for your final assembly plant?

6. Overproduction Waste And Why It's A Problem
Overshooting inventory demand for finished goods is one of the most serious, costly waste categories in Lean Manufacturing. Overproduction waste can lead to a myriad of problems: capital is tied up in final goods, warehouse space is filled, and unsold products lose value over time in comparison to competitors' newer product offerings. How does it happen? In some cases, production is ramped up prior to the public launch of a new product, but the demand doesn't meet sales projections. In other cases, production builds a buffer of finished goods "just in case" when they should be scheduling the production to deliver "just in time!"

Here some of the key points you should look into to identify overproduction waste:

•What management process is in place that's responsible for matching production with product

introductions and consumer demand?
•What is the decision making process to halt production, e.g. who in management or on the line makes the decision?
•Do these decision-makers have clear visibility of accurate sales projections and production schedules (ideally supported by real-time sales and production figures)?
•Is the job production method being used appropriately for this product and current market conditions (e.g. product sell-through)? If not, can it be switched to another approach?

7. Defects Waste And Why It's A Problem
Product quality can make or break a company's reputation with customers. And thanks to social media and consumer review websites, consumers have a bigger platform than ever to express dissatisfaction — and they are much more likely to tell their friends about bad experiences than good ones. But the damage to one's reputation is just one of the high costs created by defects waste. Even if poor quality production is detected within the factory itself before reaching consumers, the need to rework or scrap finished goods is both time-consuming and expensive — the very definition of waste.

Here some of the key points you should look into to identify defects waste:

•Look for implementations of "mistake-proofing"(known as Poka-yoke (□□□□) in the Toyota Production System) that can help reduce human error on the production line by helping workers spot common mistakes visually (such as a missing part) before moving production work to the next step.
•Are the workers able to stop the line when a mistake is found? This principle (part of the Jidoka (□□□) approach to quality in the Toyota Production System) enables workers to stop production (an action known as Andon □□□□ in Japanese) and call for assistance when a quality abnormality is detected. Production is stopped to allow time to either fix or correct the immediate condition or, if needed, investigate the root cause and install a countermeasure.
•Does the production facility encourage their employees to provide suggestions for improving production quality from its workers (and reward them for it)? Effective employee participation is critical in lean manufacturing for achieving continuous improvement (or Kaizen □□ in Japanese) that makes production more efficient over time while reducing defects.

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