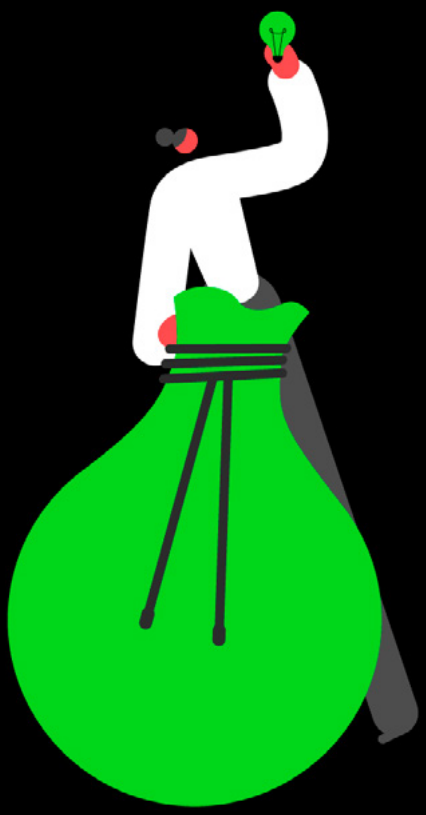
E-book

The seven deadly manufacturing wastes

What they are, and how to avoid them.

Sage

Table of Contents



Introduction

For as long as there has been manufacturing, there has been a desire to get rid of waste—whether it's time, resources, or ultimately money.

'Lean manufacturing' is a systematic method of minimizing waste with the key concept of Muda—a Japanese word meaning 'futility, usefulness, wastefulness'.

Driving revenue and growth gets the headlines as key business goals but getting rid of waste sometimes falls under the radar. This is a mistake for manufacturers because it's a way to cut costs that is completely within their control, unlike changes in the global economy, for example.

In lean manufacturing, waste can be broken down into seven areas, or the 'Seven Deadly Wastes'. These were identified by Taiichi Ohno (father of the Toyota Production System) and are:

1. Overproduction
Manufacturing more products than needed.

2. Waiting
Delays in the supply chain, whether it's people, machinery or product.

3. Transportation
Unnecessary movement of resources, components, and products.

4. Overprocessing
Processing that exceeds customer needs and provides no extra value.

5. Inventory
Storing too may raw materials, components, and goods.

6. Motion
Unnecessary movement of people or information along the supply chain.

7. Defects
Mistakes that force products to be reworked and rebuilt.

The seven deadly manufacturing wastes

Any process that transforms a product in some manner that the customer explicitly wants is value added.

1. Overproduction
Lean manufacturing requires businesses to create what the customer wants, when they want it. Overproduction means that too many products have been made before they are needed —leading into excess inventory. Causes of overproduction include poor supply chain management, inefficient procurement and poor demand planning.

Overproduction will lead to a manufacturer putting cash into materials that are not required, which could lead to business failure when they can't buy the raw materials needed to create the product a customer requires. Creating too much inventory means more needs to be carried around and stored—causing other wastes like transportation and inventory.

What manufacturers must do: They must eliminate the possible causes of inventory waste, such as ineffective forecasting, production, planning or distribution. Technology as part of a business management solution can help manufacturers avoid overproduction wastage through planning and modelling tools. With 3D printing (additive manufacturing), businesses can manufacture products 'as needed'.

Manufacturers should also look at using digital technology which supports them in ramping up production to coincide with customer demands. Using production floor data, managers can identify trends and make decisions to keep the manufacturing workflow moving at the right speed.

2. Inventory
Each piece of inventory stored has a cost associated with it, which means cash is tied up in inventory that cannot be used in other parts of the business. This cost could be due to the actual storage (space and containers for example), administration to track it, and the costs of transportation and insurance. The waste of inventory is closely related to overproduction, and a build-up of inventory could be due to an unbalanced workflow within the manufacturing process.

What manufacturers must do: Fixing overproduction issues through just-in-time production will mean less inventory needs to be stored. They could also look at product design, process and quality control to ensure materials are not wasted.

With real-time data, forecasting and production planning, employees can analyze what's happening in the manufacturing cycle and whether it matches what is being planned. Armed with this information production levels can be modified where necessary.

3. Waiting
Time is money, and any periods spent waiting and not part of the manufacturing process must be considered waste.

There are numerous ways time can be wasted—communication issues can affect the movement of materials internally, and movement of the product externally. Component shortages or unavailability can kill a manufacturing process stone dead. And breakdown and machine downtimes can cause frustrating delays.

What manufacturers must do: They can make use of data analytics to make sure that they closely track the productivity and efficiency of employees and equipment. With business management solutions, manufacturers can draw out the insight and information needed to access one version of the truth without having to unduly wait.

Using real-time information, all employees can use up-to-date displays to reflect changes in information, such as when a work order is started and finished. Armed with this technology, they don't have to wait around, and they spend less time collecting data and producing reports.

4. Transportation
In a manufacturing setting, transport of items, parts and materials that don't add value to the product can a be a significant source of waste.

Avoidable investment in transport operations and skills takes money away from what manufacturers can invest in the production workflow. It could be directly caused by overproduction—it takes money to move supplies, resources and products around—costs could come from the staff needed to operate it, training, safety and space for example. It could also lead onto other types of waste—if a product is delayed due to a problem with transport, it will cause the waste of waiting.

What manufacturers must do: The layout of factories could be improved to create value streams, as production lines contain value adding processes. It might also mean reducing the lines between operations. Manufacturers can also use logistical data to control inventory and transport product in an automated way. With real-time data, logistic workers can communicate and identify trends and issues in real time.

5. Overprocessing
Although a major goal of a manufacturer is to leave a customer satisfied, there is a balance to making sure that they're doing more than the customer requires or pays for.

For example, if there are layers of inspection or extra steps outside the quality-control processes that have been planned for, then that causes waste. Sometimes these steps come about because a defect in the process or product, which could all add costs which affect profitability.

What manufacturers must do: They must look closely look at the technology they're using—there could be improvements in terms of productivity and efficiency if for example, a change in a process (such as automation) saves time and money over the year.

Solving the problem of overprocessing is also about people —manufacturers must ensure the standardization of processes across the company, and support a ramp up of on-the-job training.

6. Motion
Any process that transforms a product in some manner that the customer explicitly wants is value added.

A step that doesn't transform the product in any way can be termed a waste. Any waste of motion in a manufacturing process will lower efficiency, with workers spending time lifting, retrieving and searching, rather than doing the actual assembling. Unnecessary repeated motion can also cause injury both to machinery and humans in the long term, which is not good for the business.

What manufacturers must do: They should look at creating a more efficient working environment where motion is minimized. A review of the whole manufacturing operation and standardized operations could help in reducing wasteful movements to increase efficiency.

7. Defects
Defects occur when the product or service deviates from what the customer has asked for. This can cause significant waste—not only from the need to scrap products, but costs resulting from aspects such as rework, wasted transport and delivery, and the loss of customers.

There are a variety of problems that can cause defects, from processes and equipment, to workflow and non-standardized issues.

What manufacturers must do: They must look at their processes to find ways to prevent defects from occurring in the same place. Technology could help here, as automation will be able to detect when non-standard events have occurred, preventing processes from running or highlighting a need for action. Standardizing processes, training and employee empowerment could help.

Reduce waste with technology

Reducing waste is a priority for manufacturers, because it creates costs that are in their power to control. By using enterprise software such as a business management solution, manufacturers have a way to get rid of many of the old processes that may have been holding them back from being part of the fourth industrial revolution and today's digital economy.

To get rid of the seven manufacturing wastes, a business management solution can:

- Minimize **overproduction** by giving manufacturers visibility and control to align production, purchasing and logistics.
- Avoid **inventory** with demand planning and modelling tools to support just-in-time production.
- Eliminate **wait times** by providing people with the access they need to streamline decisions and approvals with automation.
- Solve **transport** problems by timing production and logistics so businesses don't have to needlessly move goods from one place to another.
- Prevent **overprocessing** and steer manufacturers to actions that only create value—such as the creation of a bill of materials.
- Stop **unnecessary motion** by providing data which ensures your machinery is working in the most efficient, productive and effective way.
- Wipe out **defects** by providing manufacturers the control to see where the deviations are and stop them at source.

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