Tackle the Seven Wastes of Lean
Weighing Improves Production

We all have been preached the power of Lean Manufacturing – high-quality products, more punctual deliveries and a significant reduction in stock inventories. Sounds great, right? Well, it is, if your business can manage to address the seven wastes of Lean Manufacturing.

When manufacturing hundreds of parts and components, the cost of production defines your competitiveness and your success with customers. While parts and components differ among factories where they are produced, the typical wastes found in discrete manufacturing environments do not. With weighing, you can eliminate the root causes of the common sources of waste.

The definition Lean Manufacturing is a process-management philosophy derived mostly from the Toyota Production System. It identifies seven wastes to be avoided in a modern, efficient production process. Wastes, such as over-production, product defects and unnecessary transportation time stem from inefficient and disharmonious production processes.

Scales and balances not only fulfill their weighing tasks within the process, but they also contribute to process improvements on the shop floor. Let’s take an in-depth look at the wastes of lean and how weighing can prevent them.

Please find more information about “The 7 Wastes of Lean” on page 2–3.
### 1 Transport time

Transporting products during production is a cost that adds no value to the product. Save time in warehousing and production with mobile counting. Simply put compact scales on trollies and transmit data wirelessly. That facilitates a 98 percent reduction in walking. To weigh bigger loads, use a pallet truck scale to move and weigh goods at the same time.

### 2 Unnecessary inventory

Reduce your inventory and make your warehouse lean. Weigh deliveries from suppliers right at the receiving department. The weighing data gives you an overview about date, time and quantity of goods that entered your facility. You can keep track of your stock items by counting them when they enter the warehouse or upon production. Count smallest quantities of high value goods with high-precision counting scales or verify complete batches with floor- or pallet scales.

### 3 Unnecessary motion

Unnecessary motion includes operator movements that are not related or required for the processing of a product. That kind of motion not only sacrifices your production efficiency, but also results in increased labor costs, injuries and accidents. To avoid those issues, scales can be installed and terminals can be mounted in various ways to fit the operator and workplace for more ergonomic motion.
7 Defects and rework

Checking quality using scales is a simple method to avoid costly recalls due to damaged or incomplete products. Place a product on a scale or weigh module and check for completeness against a preset target. With that, you can identify out-of-spec products quickly and reliably in manual or automated processes.

6 Overproduction

Producing too many parts and components result in high storage costs. Weigh production output at the end of your production line to know the right time to stop producing. That not only saves you money, but it also allows you to verify stock quantities more easily. With scale-assisted parts counting, you can also improve your intra-logistics and supply your shop-floor workstations with the exact material counts.

What works for your processes can satisfy your customers as well. Use scale-assisted packing to ensure precise package counts. Fulfill your shipments while the box is placed on a scale to eliminate under- or over-filling.

5 Inappropriate processing

Using the right weighing equipment for your processes is important for product quality. Using the wrong weighing equipment can lead to poor quality, product defects and rework. This results in significant monetary loss over time. Scales have to fit your application, tolerances and work environment. Select the right scale for your production with GWP®.

4 Waiting

Whenever products are not moving or being processed, the waste of waiting occurs. We are dedicated to helping you speed-up weighing tasks for high throughput even in manual assembly. Therefore, our scales are equipped with the colorWeight® display function that indicates weighing results using a simple color code. It increases handling speed by 30 percent and reduces misreadings to zero.

You may also have to wait for scale data to upload. To ensure weighing data gets to every scale on the shop floor as quickly as possible, we recommend using databICS software and WLAN for easy data management and fast distribution.

Further Informations

To make sure you use the right equipment for your application please consult our good weighing practice team:

▶ www.mt.com/gwp-rec-counting-in

For more Information about Lean Manufacturing visit:

▶ www.mt.com/ind-lean-manufacturing-in
Weighing processes can present safety risks that should be identified and properly analyzed so you may take appropriate counter measures. Our experts share which considerations are the most important for immediate safety improvements within your processes.

1. Equipment-handling risks
The material quality, design and construction of weighing equipment can contribute to injuries. For example, sharp edges on the load plate or unprotected cabling can be hazardous.

In the case of dynamic checkweighers, pinch-points created by moving components, such as conveyors and automatic reject devices, can pose a safety risk.

Floor scales can present slipping and tripping risks or, if equipped with insufficient lifting mechanisms, may lead to serious injuries if the load plate collapses.

2. Process-safety risks
In some cases, insufficient weighing accuracy can pose a safety risk. For example, when a catalyst is dosed into a reactor by weight, even small deviations might cause an out-of-control reaction with serious consequences for workplace safety. Those weight deviations can come from different sources, including weighing on a scale that does not provide the required accuracy for the process. Operator error, such as using the wrong scale, measuring inaccurately or even measuring the wrong material may also contribute. Such operating mistakes can be eliminated by using advanced weighing systems that guide the operator through the process or that automate the weighing process altogether.

3. Explosion risks
Many weighing processes are located in potentially explosive environments. There, it is essential to use only weighing equipment that is approved for the respective hazardous-area. Safe weighing applications can be realized with equipment that is designed according to intrinsic-safety protection principles. Regular equipment inspections are mandatory to identify possible hazards in a timely manner.

The chemical industry has worked hard to eliminate the major hazards which are inherent to the business. To further improve workplace safety, companies need to address the hidden hazards. The good news is that weighing safety risks can often be eliminated with simple improvements to equipment and processes.
Expert Interview
Safe Material Handling with Floor Scales

Gary, what are the biggest risks when handling floor scales?
The most common accidents that happen with floor scales involve slipping and tripping. Especially when liquid materials are weighed on the platforms, spilling can cause operators to slip and injure themselves.

“Special surface design prevents slipping.”

Floor scales often extend up to 20 centimeters above ground, which can present a tripping risk. In addition, elevated floor scales require ramps to move the materials onto the weighing platform. That requires a lot of power from operators and can lead to accidents, such as materials falling over or pallet trucks running away.

So, what can be done to reduce the risk of slipping and tripping?
The slipping risk can be reduced by using load plates and ramps with a special surface design to ensure safe footing. Regarding the tripping risk, there are two approaches to improve safety. Either the floor scale can be installed in a pit, which makes it level with the floor. Or, a low-profile floor scale can be used, which is much easier and safer to operate than a standard product. In either case, the floor scale should be located away from through-traffic to reduce the tripping risk.

“No more tripping with low-profile platforms.”

Are there specific risks related to liftable floor scales?
Floor scales with lifting mechanisms provide great benefits, such as easy servicing or fast and efficient cleaning procedures. But this type of floor scale also may pose a safety risk to the operator if the load plate is not held securely in place.

“Beware of insufficient lifting mechanisms.”

What safety aspects should be considered for those products?
The load plate of a liftable floor scale can weigh up to 200 kilograms. Just imagine the damage that can cause when the holding mechanism does not function properly. We use reliable pneumatic springs with our floor scales for easy opening and secure holding of the load plate. For added safety, we include additional locking mechanisms, such as notches or wedges that keep the scale deck in place.
High Precision Weighing

Occupies 70% Less Space
Cuts Installation Time in Half

Our new high-precision weigh module is very slim and compact even though it has internal electronics, connectivity and calibration capabilities. A manufacturer for vial-filling systems took advantage of those features and cut in half the integration time for 12 weigh modules.

The machine is equipped with an array of 6 dispensing heads for parallel filling of 6 vials. Each dispensing head includes a volumetric-dosing device to fill the correct quantity. However, the quantity in each vial is verified by weight after the filling operation to adjust the volumetric dispensing device if the amount is not correct. As a result, the machine includes two arrays of 6 individual weigh modules, one for each dispensing head. One array of weigh modules is placed before the filling process to determine the tare weight of the vials and one array is placed after the process to determine the final gross weight.

No additional boxes to place
The machine manufacturer requested a slim weigh module to achieve a very small pitch and limit the space needed for those 6 weigh modules. The new WMF weigh module fully complies with that requirement. Inside its 25-millimeter wide housing are all of the electronics with fieldbus connectivity and calibration weight. It plugs into the PLC directly. As a result, the WMF weigh module occupies 70 percent less space in the machine and saves half the installation time.

Occupies 70% Less Space
Cuts Installation Time in Half

Integrated calibration
for accuracy
The WMF weigh module features an integrated calibration weight to verify functionality at any time. This is ad-

Overload Protection
Ensures High Uptime

The weigh module is protected from overload in the event of malfunction of handling devices or mistakes during installation.

Quick Functionality and Accuracy Test

The internal weight can very useful, especially when there is no physical access inside the machine to place a test weight.
vantageous, because access to the weigh modules inside the machine is difficult to achieve and it is not practical to place physical test weights on top of their weighing pans. For verification with the integrated calibration weight, it is not necessary to dismount the holding device for the vials placed on top of the weighing pan. This reduces recalibration time by two hours for the 12 weigh modules.

**Fast integration into PLC**

Fully-engineered Device Description Files make integration of the weigh module into PLC programs very easy. The weigh module provides filtered-weight values, so there is no need for additional software in the PLC to filter disturbances.

**Plug & Communicate with PLC systems**

**WMC204C Weigh Module**
- Capacity: 220 g * 0.1 mg
- Repeatability: 0.1 mg
- Linearity: 0.4 mg
- Stabilization time: 0.15 – 0.8 sec

**WMC303C Weigh Module**
- Capacity: 320 g * 1 mg
- Repeatability: 1 mg
- Linearity: 2 mg
- Stabilization time: 0.15 – 0.8 sec

All fieldbus-related electronics for communication are incorporated inside the weigh module. Just plug it in and communicate immediately.
Do You Really Know What’s Going On? 
Gain Insight Into your Production

Do you know how efficient your production operations really are? Now you can find out by using your weighing data. Our new software, Collect+™, collects, visualizes and publishes your relevant data in real-time on a comprehensive dashboard.

View Production Output
Gather Shop-floor Data
Make use of your production data
Get informed about your production output. Let Collect+ software gather data from your counting-scale stations. For example don’t rely on inaccurate molding-machine counters. With this information, you can lower the risk of restarting or retooling a machine.

Collect Quality Data
Support Quality Initiatives
Visualize production quality
Variations in your weighing results can indicate quality problems. Use checkweighers for quality or completeness checks and display the results in with Collect+. Reduce rejects, material waste and process variances. Optimize and view improvements right away.

Check Operator Efficiency
Optimize Workflow
Speed up manual workplace workflow
If weighing is performed manually in your company, use Collect+ to check worker efficiency. Check the throughput for different product lines or verify if products are within tolerance. Change processes if inaccuracies occur and check the results in real-time.
Collect
• Receive weighing data from all measuring devices on the shop floor, no matter the location
• Collect data from application associated devices such as andon lights, bar code scanners, etc.
• Get data from third party devices
• Suitable for automated production
• Online results with 30-second refresh rate

Visualize
• Production output
• Production output prediction
• Worker efficiency
• Quality data (input output of spec)
• Yield analysis
• And more

Publish/Share
• Results on a comprehensive modern dashboard
• Share with colleagues
• View on mobile devices

Make use of Weighing Data with Collect+

Collect+ gives you a competitive advantage
Machines on the shop floor constantly provide data, and you can use it to gain a competitive advantage. Collect+ is new data-collection software that captures production-weight and process data from every scale on your shop floor, including third-party weighing devices. Collect+ is updated every 30 seconds, giving you online insights into your production, no matter if automated or manual. Make use of weighing data for quality initiatives, process optimization and production control.

www.mt.com/collectplus-in
Content Control Made Simple
Thanks to All-in-One Terminal

A leading British manufacturer of chilled desserts decided to export its products so that consumers around the world can enjoy them. Expanding and exporting comes with additional regulatory challenges, but an easy-to-install terminal provides security and optimizes filling procedures.

Heaven Made Foods is an award-winning producer of jellies and summer puddings. Proprietary recipes combined with culinary creativity and unique jelly molds have helped the traditional creations increase in popularity. For more than 25 years, British consumers have loved the desserts and now the company wants to export its products.

**Global demand**
In fact, volume has increased so much that Heaven Made Foods needed a way to ensure they were meeting EU net-content control legislation. The new solution had to be simple to operate and quick to settle while integrating seamlessly into its production process.

Heaven Made Foods Managing Director Oliver Elmer and Technical Manager Darren Lawley approached their local METTLER TOLEDO representative to see if there was a scale/terminal combination that would fit the bill.

Their solution? METTLER TOLEDO’s stand-alone terminal IND890SQC. It offers the net-content control assurance the company sought, providing the finishing touch to their production like fresh coulis on a summer pudding.

**Optimized filling procedure**
Today product information is entered quickly and easy via IND890SQC’s large, brightly-lit TFT touchscreen. Elmer placed the IND890SQC in the process directly after the filling step. It controls the
weight of each dessert and optimizes the filling process. Every overfilled milliliter adds up to costs that can be saved. With this type of ongoing monitoring, both under-filling and over-filling can be eliminated by adjusting the filling machine.

**In harmony with legislation**

IND890SQC automatically records data for every product that leaves the factory and provides statistical reports in pre-defined formats. Such simple recordkeeping ensures that Heaven Made Foods is meeting net-content legislation and global guidelines from important retailers, such as International Features Standards for Food and the British Retail Consortium.

“In total, METTLER TOLEDO is helping ensure Heaven Made Foods is ready for its next step in becoming a supplier to independent shops and larger distributors beyond the channel,” Elmer says. “We look forward to continued expansion of the business, both in the UK and abroad, allowing an entirely new customer base to enjoy the high-quality desserts that have been loved by the UK for the last 25 years.”

www.heavenmadefoods.co.uk

www.mt.com/IND890SQC-in

**IND890SQC Statistical Quality Control provides:**

- Fewer costs by reducing overfilling
- Easy product management
- Touchscreen data entry
- Various standard statistical reports

**Video IND890SQC**

See how a food manufacturer uses IND890SQC and reduces overfilling costs by two percent.

www.mt.com/ind890SQC-in
Are You Testing Enough?  
Or Too Much?

ISO9001 requires that weighing equipment must be calibrated and verified at defined intervals. But how those tests should be done or how often is not specified. Our GWP® Verification service provides testing recommendations based on your process requirements.

Minimize risks and reduce costs
- Optimize your routine testing to ensure consistent weighing results.
- Save costs by eliminating unnecessary tests.
- Assure traceable documentation including testing procedures and frequencies.

Improve Your Scale Testing
» www.mt.com/gwp-verification-in

www.mt.com
For more information