Veoneer Excellence System
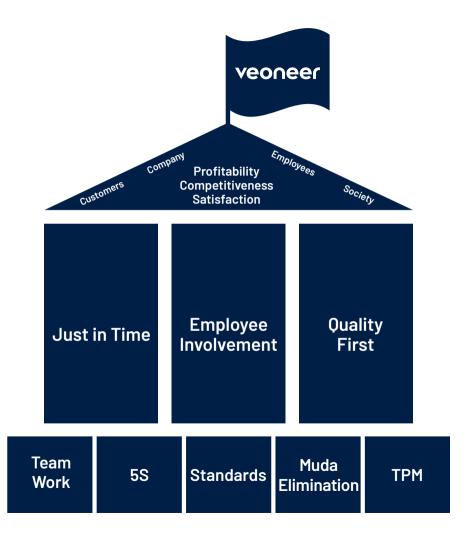
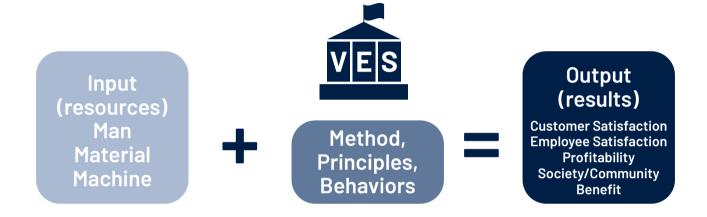veoneer

Veoneer Excellence System

Introduction

VES (Veoneer Excellence System) is the formalization of Veoneer's culture towards operational excellence.

VES describes the methods and principles that lead us towards excellence constantly improving Profitability, Competitiveness and Satisfaction.

The purpose of VES is to meet the needs of our Customers and Employees, ensure the success of our Company and improve Society.

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Customers   Company   **Profitability Competitiveness Satisfaction**   Employees   Society

Just in Time

Employee Involvement

Quality First

Team Work | **5S** | **Standards** | **Muda Elimination** | **TPM**

Input (resources) Man Material Machine

+

VES

Method, Principles, Behaviors

=

Output (results)
Customer Satisfaction
Employee Satisfaction
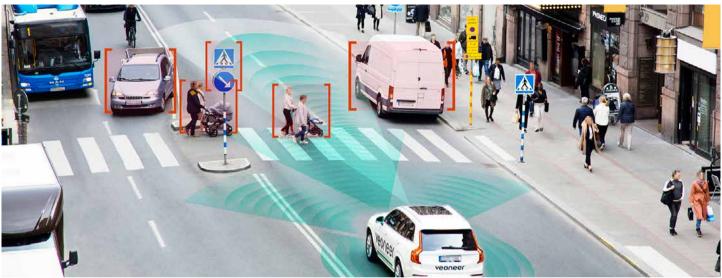**Profitability**
Society/Community Benefit

The most important items of our excellence system are described in this booklet.

This booklet is the culmination of Veoneer's worldwide experience. Several sites from around the world have contributed to the development of the Veoneer Excellence System by sharing experiences and best practices.

The Veoneer Excellence System is a combination of methods, principles and behaviors to help every single Veoneer site grow towards excellence. With VES, each site is working from this same booklet. This booklet has been translated into several languages.

Who will benefit from implementation of VES?

- Car users through high quality life saving products.

- Car makers through competitive and high quality products that are delivered on time.

- Shareholders through profit and stock values.

- Veoneer employees through stable employment, good work environment, opportunities to influence the way work is done and personal training and development.

- Our society through community involvement and good corporate citizenship.
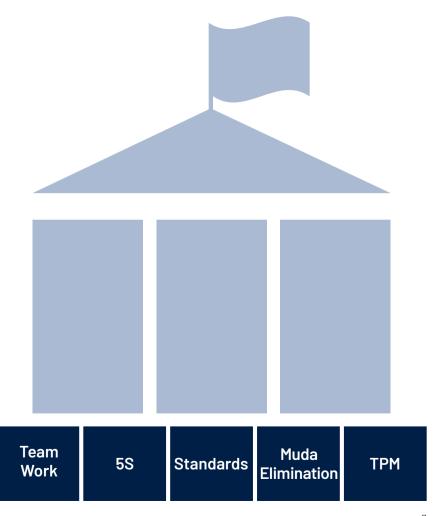
The VES House

Veoneer has chosen to use a house to illustrate VES. To build a strong, aesthetically pleasing house requires know-how, teamwork, perseverance, and a will to do the job well.

As you proceed through this training, you will see how the Veoneer Excellence System will help structure your know-how, teamwork, perseverance and will to do a good job to help Veoneer build a strong company that will exist for a long time.

Foundation
To be sure our VES House will hold for a long time, we first must build a strong foundation. This foundation consists of 5 elements: Teamwork, 5S, Standards, Muda elimination and TPM.

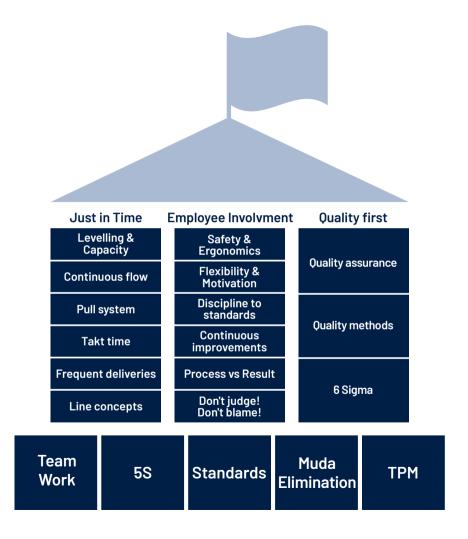| Team Work	5S	Standards	Muda Elimination	TPM

Pillars

Now that our foundation is complete we will start to build the pillars of the house. The pillars must exist before we build the roof.

The three pillars of the VES house are:
• Just-In-Time
• Employee Involvement
• Quality First

Just in Time

- Levelling & Capacity
- Continuous flow
- Pull system
- Takt time
- Frequent deliveries
- Line concepts

Employee Involvment

- Safety & Ergonomics
- Flexibility & Motivation
- Discipline to standards
- Continuous improvements
- Process vs Result
- Don't judge! Don't blame!

Quality first

- Quality assurance
- Quality methods
- 6 Sigma

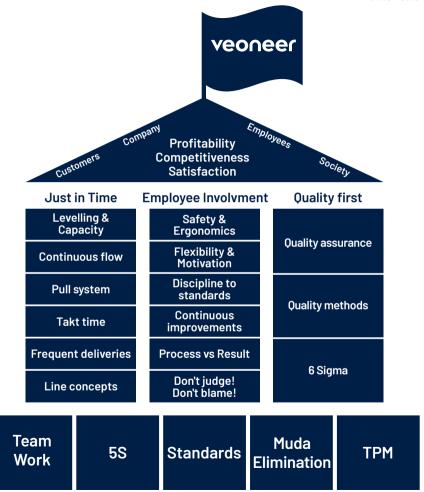| Team Work	5S	Standards	Muda Elimination	TPM

Purpose

Now that we have built the pillars, we can put the roof on the house. The roof represents our purpose and is supported by the foundation and pillars.

The purpose of VES is to meet the needs of our Customers and Employees, ensure the success of our Company, and improve Society.

VES is centered around people with a focus on all areas of our business, constantly improving Profitability, Competitiveness and Satisfaction.

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Customers Company Employees Society

**Profitability
Competitiveness
Satisfaction**

Just in Time

- Levelling & Capacity
- Continuous flow
- Pull system
- Takt time
- Frequent deliveries
- Line concepts

Employee Involvment

- Safety & Ergonomics
- Flexibility & Motivation
- Discipline to standards
- Continuous improvements
- Process vs Result
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Quality first

- Quality assurance
- Quality methods
- 6 Sigma

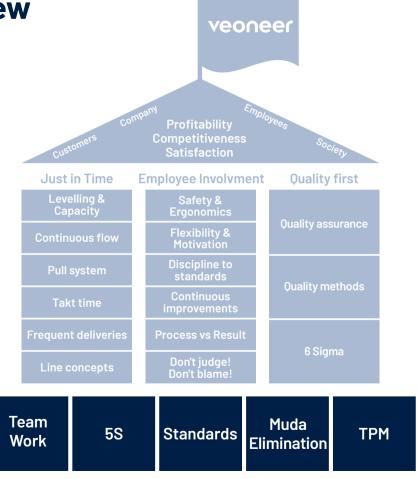| Team Work | 5S | Standards | Muda Elimination | TPM |

VES Elements overview

Team Work

Team work is the most effective way for solving problems and achieving defined results.

Team work provides an opportunity to share experiences and results in stronger commitment.

Teams should be cross functional and be empowered to act autonomously in order to deliver the results required in their assigned process.

5S

5S is a workplace organization method that creates and maintains an organized, safe, clean and efficient working environment.

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Customers Company Employees Society

**Profitability
Competitiveness
Satisfaction**

Just in Time	Employee Involvment	Quality first
Levelling & Capacity	Safety & Ergonomics	Quality assurance
Continuous flow	Flexibility & Motivation	
Pull system	Discipline to standards	Quality methods
Takt time	Continuous improvements	
Frequent deliveries	Process vs Result	6 Sigma
Line concepts	Don't judge! Don't blame!	

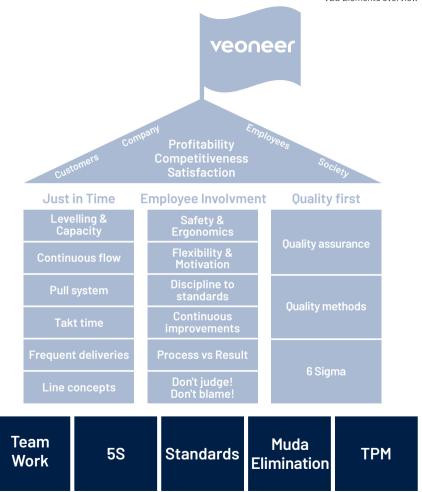| Team Work	5S	Standards	Muda Elimination	TPM

Standards

Where no standard exists, there can be no improvement. Standards reflect the best, easiest and safest way currently known to accomplish a task. Standards should be improved continuously.

Muda Elimination

To maximize value added work we must identify and eliminate all waste, Muda, in our processes.

TPM

Total Productive Maintenance, TPM, is an innovative approach to maintenance that prevents problems and promotes auto-nomous maintenance through day-to-day activities involving the total workforce.

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Company Employees

Customers Society

**Profitability
Competitiveness
Satisfaction**

Just in Time	Employee Involvment	Quality first
Levelling & Capacity	Safety & Ergonomics	Quality assurance
Continuous flow	Flexibility & Motivation	
Pull system	Discipline to standards	Quality methods
Takt time	Continuous improvements	
Frequent deliveries	Process vs Result	6 Sigma
Line concepts	Don't judge! Don't blame!	

Team Work	5S	Standards	Muda Elimination	TPM

Just In Time

The objective of Just In Time is to create a continuously improving system which corresponds to customer demand respecting what they want, when they want it, while maintaining minimal inventory and at a cost remaining efficient regardless of the customers variation, whether customers are external or internal.

Employee Involvement

Employee Involvement is at the center of VES. Everyone has a role to play and everyone benefits. To be successful with VES we need skilled and motivated employees and teams to apply all the elements of the VES house.

Quality First

The objective of Quality First is to create a reliable system where quality is built in at the point of value add in order to achieve zero defects. Prevention activities are promoted through solid root cause analysis continuously moving from reactive to proactive approach.

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Customers — Company — Employees — Society

**Profitability
Competitiveness
Satisfaction**

Just in Time

| Levelling & Capacity |
| Continuous flow |
| Pull system |
| Takt time |
| Frequent deliveries |
| Line concepts |

Employee Involvment

| Safety & Ergonomics |
| Flexibility & Motivation |
| Discipline to standards |
| Continuous improvements |
| Process vs Result |
| Don't judge! Don't blame! |

Quality first

| Quality assurance |
| Quality methods |
| 6 Sigma |

| Team Work | 5S | Standards | Muda Elimination | TPM |

Team Work

Mission Statement: Cross functional teams are organized to capture problems early, and then act swiftly to correct. Regular proactive actions are geared to maintain a stable operation at the Genba. Teams seamlessly act horizontally and vertically to implement calculated actions which align with Policy Deployment.

Get Results

Accountability

Focused Action

Commitment

Roles and Responsibility

Communication and Collaboration

Trust

Team work is the first element of the foundation of the VES house. Veoneer places a lot of importance on teamwork. Team work is the most effective way for solving problems and achieving defined results.

- We are all members of Team Veoneer. We are also members of our site team, department team, and workgroup team. Team work has proven to provide better results.

- Team work provides an opportunity to share experiences and results in stronger commitment.

- Team work is essential for the successful launching of new products or equipment, as well as for improvements.

- A group is stronger than an individual. A proposal or suggestion coming from a group has usually considered more aspects of a problem than an individual can.

- Teams should be cross functional and be empowered to act autonomously in order to deliver the results required in their assigned process. Examples of this include the AMO (Autonomous Manufacturing Organization) and the Project Platform teams.

- Team work may take the form of a dedicated team assigned to a specific issue (VES workshop for example). A workshop is a team, coming from several departments assigned to work on a challenge chosen by management in a predetermined amount of time. The team first grasps the current situation, understands the problem, sets expectations and follows up. At the end of the workshop the team presents the results they achieved and the standards they have implemented.

5S

Mission Statement: Create a continuously improving environment where everyone can work safely, easily tell normal from abnormal at a glance, and naturally understand the work. All employees understand the connection between 5S and high efficiency. Create an environment where Customers and Stakeholders automatically have a positive perception based on the 5S conditions.

The 5S is the first 5 initials of Japanese words, the translation of which is:

Seiri = Sort
Seiton = Set in order
Seiso = Shine
Seiketsu = Standardize
Shitsuke = Sustain

5S is a rigorous approach to housekeeping that provides a step by step disciplined way of establishing standards to maintain a safe, clean and efficient working environment that we can all be proud of.

Step 1: Seiri = Sort

Find/Decide what is necessary and what is not:
• Define area where 5S is to be done.

• Look trough all documents, physical as well as electronic, and items in the area.

• Decide what will not be used in the area to be 5S'ed and remove them from the area.

• Throw out removed items unless they can be saved and reused in other areas.

Step 2: Seiton = Set in order

• Defined location

• Defined item

• Defined quantity
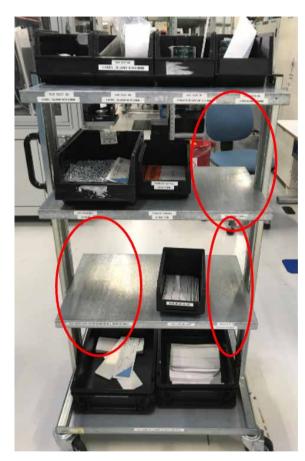
Step 3: Seiso = Shine

• First perform a deep cleaning

• Catch dirt at its Source

• Eliminate leaks

• Correct disorders

• Look for improvements in order to ease cleaning (easy access)

• Provide necessary means to perform cleaning (create a list and storage place for the material needed to clean; vacuum, cleaning products, etc.)

Step 4: Seiketsu = Standardize

Define cleaning and tidying tasks:
• Make a preventive cleaning form (Who, What, When, Why, Where, How, How Long) to be done after first deep cleaning to help maintain level of cleaning.

• Use simple and visual rules.

• Tidying
  – Use drawings, photos, colors, anything visual

• Cleaning
– Develop a preventive cleaning schedule
– Use control boards where possible
– Standardize and plan preventive maintenance

• Use simple methods to maintain cleanliness
– Mark normal operating levels (example: green/ red mark on a manometer)
– Conceive equipment so that one can look inside cupboards or machines
– Anticipate having cleaning material at the station

• Inform and train the entire team to the standards

• Display standards

Standardize supporting visual management.
Example: It is apparent if an item is missing.
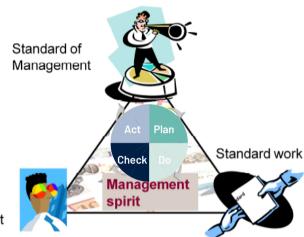
Step 5: Shitsuke = Sustain

Respect and improve standards:

• Respect rules

• Implement regular self-audits (daily or weekly)

• Implement regular cross-audits (weekly or monthly)

• Improve standards

Respect of standards calls for everyone's rigor and self-discipline

5S Summary:

• 5S must be done by the people working in the area concerned

• The 5S process never ends

• Improvement by tidying and cleaning never ends

• 5S audits is not just a way to create discipline, but to continuously improve on the work environment and share best practices across the site

• New ideas, employees, offices, equipment, lines etc. . . might be the start of a new 5S activity with its 5 steps

Standards

Mission Statement: Working processes are standardized resulting in work that is performed the exact same way by everyone. The culture demands exactness in following the standards (Work instructions, VS, VESS, MPS, local standards, etc.). The standards are continuously improving and immediately updated.

Standards are a key element for having a strong foundation in our house.

Veoneer defines standards as:
• Formalization of any work related activities resulting in a clear, concise and measurable outcome. Standards reflect the best, easiest and safest way currently known to accomplish a task.

Standards result in:
• A safe workplace

• Quality products

• Early identification of abnormalities

• All employees using best practices

• Variation is under control

Standards become the basis for verification and diagnosis, for training, maintaining best practices and improvement. Standards have to be improved continuously.

Muda Elimination

Mission Statement: To deeply under-stand where Non-value added operations exist, and take strong actions to reduce and eliminate waste throughout the entire value stream. To have a strong understanding of how Mura and Muri contribute to and cause Muda.

Another key for Veoneer to succeed is to maximize value added work. To do this we must identify and eliminate all non-value added work – waste. Muda is the Japanese word for waste.

Value added work:
- An activity that transforms or shapes raw material or information to meet customer (internal or external) requirements.
- The part of work for which the customer pays.

Example:
Value added = assembly of components
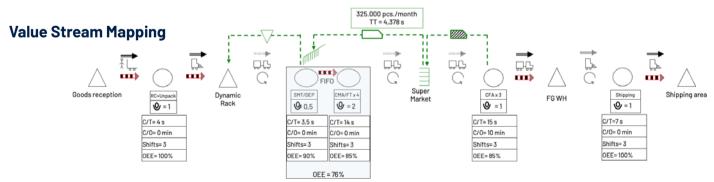
Waste:
- Activities that consume time, resources and/or space, but do not contribute to transforming or shaping materials and information to meet customer needs.

Example:
Non-value added = transporting components

To identify Muda we use Value Stream Map-ping (VSM) as a tool to visualize a product's flow from the beginning to the end, by drawing a map of every process step of both the information and material flow.

Value Stream Mapping

There are 7 kinds of Muda

1. **Waiting/Delay:** Waiting for material or previous processes.
2. **Over-Production:** Producing more than the customer requires.
3. **Rework/Producing defective product:** (nonconformance) Producing a product which does not meet customer (internal or external) requirements.
4. **Motion:** Actions of people or equipment that do not add value to the job.
5. **Processing (over processing):** The addition of unneeded steps of work activities.
6. **Inventory:** (machine, materials, manpower) Holding or purchasing unnecessary raw material, work-in-process, and/or finished goods, maintaining extra equipment or manpower.
7. **Conveyance/Material movement:** Multiple handling and staging of material.

Over Production is the worst waste of all because it leads to more waste.
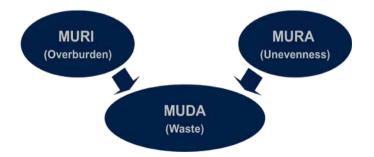
The 3 M's – Muda, Mura, Muri

To find the root cause of **Muda** and eliminate it permanently we have to understand two other types of waste:

Mura: Unevenness in an operation; for example an uneven work pace in an operation causing employees to hurry and then wait.
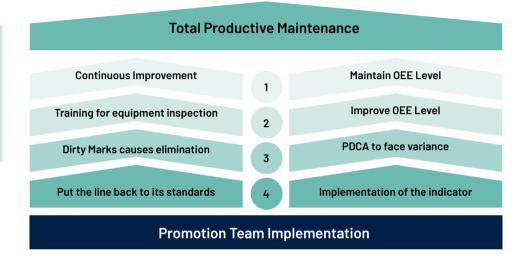
Muri: Overburdening equipment or employees by requiring them to run at a higher or harder pace with more force and effort for a longer period of time.

Take a careful look at your Mura and your Muri as you start to tackle your Muda.

MURI (Overburden)

MURA (Unevenness)

MUDA (Waste)

TPM

Mission Statement: Equipment is always kept operational with no breakdowns, faults, or quality issues. This condition is obtained by developing employee's skills and ability to continuously improve methods, and maintain them with perfect execution.

Total Productive Maintenance

Continuous Improvement	1	Maintain OEE Level
Training for equipment inspection	2	Improve OEE Level
Dirty Marks causes elimination	3	PDCA to face variance
Put the line back to its standards	4	Implementation of the indicator

Promotion Team Implementation

TPM (Total Productive Maintenance) is the 5th element of our foundation.

In TPM, it is essential that all employees take ownership of the machines in their area and are empowered to perform basic maintenance and improvements on those machines.

TPM is an innovative approach to maintenance that prevents breakdown and promotes autonomous operator maintenance through day-to-day activities involving the total workforce.

TPM is a method of evaluating, maintaining, and improving machine performance, that includes:

• Standard daily, weekly, monthly preventive maintenance

• Records of equipment performance (up time) and maintenance

• Focused evaluation and improvement activities by multidisciplinary teams

This will result in an improvement in our Overall Equipment Efficiency.

Total Calender Time (24 hours – 365 days a year)		
Total Scheduled Time		Not Scheduled Time
Planned Production Time	Planned Shutdown	
Operating Time	Availability Losses	

Operating Time	
Net Operating Time	Performance Losses

Net Operating Time	
Fully Productive Time	Quality Losses

In order to follow up equipment performance, we use the OEE indicator (Overall Equipment Efficiency). OEE is the rate between <<quantity of good parts produced>> and <<quantity of parts theoretically producible within the planned production time>>, without any disturbance (breakdown, defects, minor stoppages, etc.).
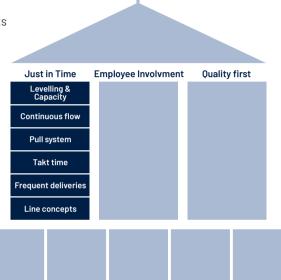
Just In Time

Mission Statement: Create a continuously improving system which corresponds to customer demand respecting what they want (model & quantity), when they want it (date & time) and where they want it (plant & location), while maintaining minimal inventory (goal is zero inventory). Required principles, tools, methods and thinking of "how to harmonize with proper timing" are well known.

The Just In Time (JIT) pillar consists of 6 elements:

- **Leveling & Capacity**
- **Continuous flow**
- **Pull system**
- **Takt time**
- **Frequent deliveries**
- **Line concepts**
  - Flexible capacity
  - One Piece flow

Just in Time	Employee Involvment	Quality first
Levelling & Capacity		
Continuous flow		
Pull system		
Takt time		
Frequent deliveries		
Line concepts		
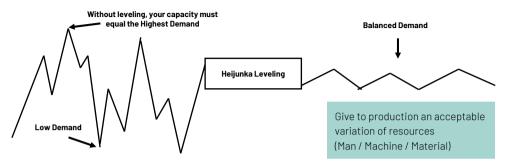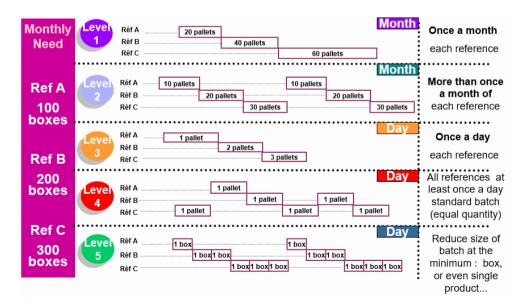
The objective of Just In Time is to achieve the delivery of goods and services at the right time, in the right amount, at the required quality and at a cost remaining efficient regardless of the customers variation, whether customers are external or internal.

- What is needed
- When it is needed
- Amount that is needed

Leveling & Capacity

Heijunka leveling is a Japanese word meaning to level production volume and variety over a given period of time (monthly is recommended). When you level the customer demand, it gives you an opportunity to level your Manpower, Material and Machines.

Without leveling, your capacity must equal the Highest Demand

Balanced Demand

Heijunka Leveling

Low Demand

Give to production an acceptable variation of resources
(Man / Machine / Material)

Monthly Need	Level 1	Réf A	20 pallets			**Month**	**Once a month** each reference
		Réf B	40 pallets				
		Réf C	60 pallets				
Ref A 100 boxes	Level 2	Réf A	10 pallets	10 pallets		**Month**	**More than once a month of** each reference
		Réf B	20 pallets	20 pallets			
		Réf C	30 pallets	30 pallets			
	Level 3	Réf A	1 pallet			**Day**	**Once a day** each reference
		Réf B	2 pallets				
Ref B 200 boxes		Réf C	3 pallets				
	Level 4	Réf A	1 pallet	1 pallet		**Day**	**All references at least once a day standard batch (equal quantity)**
		Réf B	1 pallet	1 pallet			
		Réf C	1 pallet	1 pallet	1 pallet		
Ref C 300 boxes	Level 5	Réf A	1 box	1 box		**Day**	Reduce size of batch at the minimum : box, or even single product...
		Réf B	1 box 1 box	1 box 1 box			
		Réf C	1 box 1 box 1 box	1 box 1 box 1 box			

Capacity

Capacity is our ability to meet customer demand at its highest volume. We must ensure our capacity can adapt to the variable need of the customer; that means:

• When the equipment is needed to run, it must be ready to run.

• Demand can not exceed capacity.

• Be sure that our capacity can adapt to the requirements of the customer.

A key to success with Leveling and Capacity is to visualize the planning process. In production and logistics environments, we use the Heijunka together with a rail on each line that shows the production queue. For other processes that needs to be planned and followed-up we can use the Visible Planning and Scrum methods.
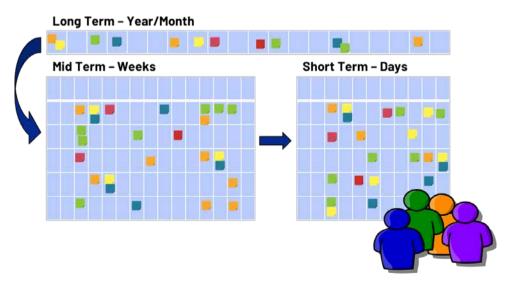
Visible planning
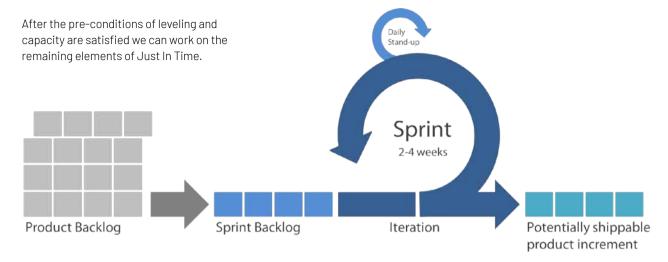
This is a tool to visualize the planning process and level the workload in a team. It consists of three parts:

• Long-term plan – Shows the span of the process/project with major mile stones.

• Mid-term plan – Shows the breakdown in to individual tasks or area tasks.

• Short-term plan – Detail breakdown of activities with frequent follow-up meetings

Scrum

Scrum is an agile framework for managing work. Tasks can be completed within timeboxed iterations, called sprints, where progress is tracked and re-planned based on outcome.

Long Term – Year/Month

Mid Term – Weeks

Short Term – Days

After the pre-conditions of leveling and capacity are satisfied we can work on the remaining elements of Just In Time.

Continuous Flow

Conventional Organization Definition:
Let's assume that we have three different parts that are processed as sub-assemblies that then come together in a final assembly process. In a traditional plant, all of the sub-assemblies of the same type would be grouped together. Experience shows us that there will be inventory between the processes, long lead times, and problems will be hidden.

Multi Process Organization Definition:
In a multi-process organization, all the processes needed to produce one part are located in the same location in a laminar flow where the paths of the parts never split, merge or cross. This results in no inventory between processes, shortened lead time, problems are visible, and improved efficiency of manpower. Now that all processes are part of the same line, we can apply the one piece flow production system.
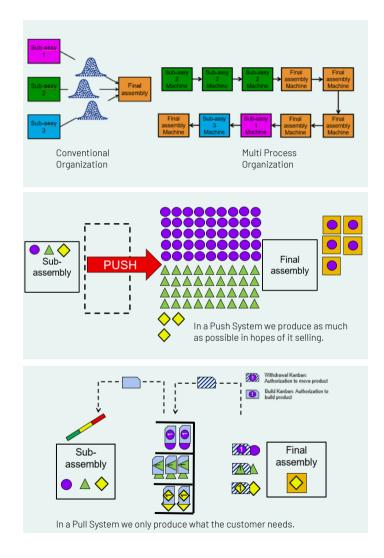
Pull System

A Pull System gives less inventory than a Push System and the level is always controlled.

In a Pull System, all processes in the chain are connected with Kanban. Kanban is a Japanese term meaning signal. Kanban informs the supplier what the customer needs. Information flows upstream (Kanban) and material flows downstream (product).

We use three different Kanban loops:
- Production/Build Kanban – used as authorization to build product.
- Component/Withdrawal Kanban – used as authorization to move product or component.
- Supplier Kanban – used as authorization for suppliers to ship component.

Conventional Organization

Multi Process Organization

In a Push System we produce as much as possible in hopes of it selling.

In a Pull System we only produce what the customer needs.

Takt Time

The pace of production, Takt time, is the time required to produce a single component or an entire product in order to meet and not exceed customer demand.

How do we get takt time?

$$\frac{\text{Total available production time}}{\text{Customer demand}} = \text{Takt Time}$$

Takt time is introduced to the production process at one single point that is called the pace maker. The flow upstream from the pace maker is controlled by a Pull System and the flow downstream is a Push System controlled by FIFO-lanes (First In First Out).

Did you know?
Takt time is a borrowing of the Japanese word takutotaimu (タクトタイム), which in turn was borrowed from the German word Taktzeit, meaning clock interval. The word was likely introduced to Japan by German engineers in the 1930s.
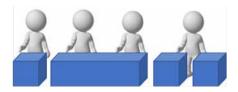
Line Concepts
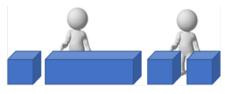
Line concept is divided in two elements: flexible capacity and one piece flow. Flexible capacity means:

- Heavy automation and complicated machines should be replaced with simple, smaller machines. The target is to have the station size the same as point of value add.
- Process must be flexible. The number of operators must be adjusted to the capacity required with the same Time Per Unit at any Takt Time. No isolated operators or lines.
- In order to increase flexibility of the line, and to reduce stock, we need to reduce change-over time.
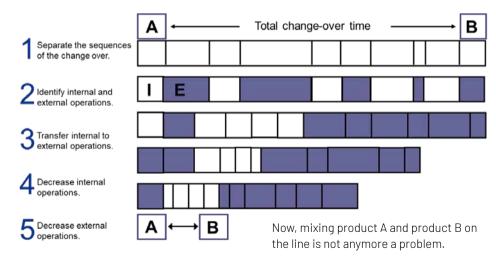
Change-over time is the time between << the last part of product A >> and << the first part, produced at full speed, of product B >>. The target is to achieve change-over within Takt Time. For that, we use the SMED methodology (Single Minute Exchange of Die). It takes 5 steps:

High capacity required

Low capacity required

1 Separate the sequences of the change over.

2 Identify internal and external operations.

3 Transfer internal to external operations.

4 Decrease internal operations.

5 Decrease external operations.

Now, mixing product A and product B on the line is not anymore a problem.

Batch production

One Piece Flow

Frequent Deliveries

Suppliers should deliver smaller lots more frequently. The benefits are:

• Less money tied up in raw material and finished goods. Less warehouse space needed for storage and fewer employees and forklifts to manage and track inventory.

• Raw material is purchased, manufactured into finished product, and shipped in a shorter amount of time. This shorter lead time reduces the amount of money tied up in inventory.

• Quality defects are noticed and reported to supplier in a timely manner thus allowing these abnormalities to be fixed with minimal scrap and rework. Internally at our sites the frequency of delivery is defined by Pitch. Pitch is a consistent increment of time in which material and work is managed. It is the timing of the factory.

Pitch helps us control the flow and determine the amount of material needed.

One Piece Flow

One Piece Flow is the most efficient way to manage manpower and material resources. When using one piece flow, each operation must be balanced to Takt Time.

The Benefits are:
• The inventory between each process can be eliminated (less Work In Process).

• Products are created one by one (shortened lead time).

• When changing builds there are less products to purge (Improved change-over).

• Product moves through the process in the same order it was delivered (First In First Out).

• If a quality problem occurs there are less products to sort/scrap.

• No extra space required on the line for buffers.

In One Piece Flow, parts can only be found in the machine being processed or in the hands of the operators. To achieve this we need to apply the "Chaku-Chaku" principle where the machine automatically ejects the part to make it available for the operator to load in the next cycle.

Quality first

Mission Statement: Create a reliable system where quality is built in at the point of value add in order to achieve zero defects. To improve this system, the quality tools and methods are understood and used properly. Prevention activities for new launches are promoted through solid root cause analysis. Continuously moving from reactive to proactive approach.

The Quality First pillar consists of three elements:

• Quality Assurance
• Quality Methods
• 6 Sigma

To understand the importance of quality in our process we must keep in mind three rules:

These rules must be applied also within our sites, between our internal suppliers and customers.

Just in Time	Employee Involvment	Quality first
		Quality assurance
		Quality methods
		6 Sigma

A
Supplier
Do not Receive Poor Quality

B
Veoneer
Do not Produce Poor Quality

C
Customer
Do not Ship / Pass on Poor Quality

Quality Assurance

In all our processes we could have failures for different reasons: e.g. bad quality of components, machine failures, bad methods, no discipline... At the end, all of these things are Muda and we must avoid them. To prevent and avoid this, we must achieve quality assurance by:

• Materials
• Man
• Machines
• Man / Machines (autonomation)

Materials
In order to build quality products we must have quality materials. To do this we must involve the supplier in the early phases of the development of our products. We have to establish an ongoing partnership with our suppliers. With early supplier involvement we have seen that we can continue to improve our level of quality supplied to our customers at a lower cost because we don not have to inspect, scrap material or stop assembly lines.

Man
Use the human senses and abilities to observe, identify and react when a problem occurs.

• Observe visual aspect
• Training and self-learning
• Analyze situations
• Ownership and responsibility

Quality Assurance

Machine

Build machines that are able to recognize abnormalities, stop and notify an operator.

- Poka yoke built in.
- Artificial vision.
- Operator panel displays information.
- Andon (light coding).

Man and Machine (autonomation)

The aim is to be able to prevent defects in our processes. One example to illustrate this is the use of "Poka Yoke" in our assembly process. "Poka Yoke" is error proofing either by product design or process design.

- With Poka Yoke we will avoid the possibility to produce defects.
- Even with our best efforts to prevent quality problems in our processes, the defects might occur.
- In the case of an occurrence we must detect it immediately at the point of value add and stop and fix the problem. This will avoid additional Muda.

Our main objectives are:

- Reduce risk for critical quality issues and 'near misses'. Drive toward zero customer issues and zero defects.
- Provide customers with products and services of value that is and is perceived to be higher than anyone else's.
- Reduce waste and internal errors.

Zero Defect

Zero Defect is a key mindset for Quality Assurance that starts with Jidoka. The word Jidoka, translated as "autonomation" in English, includes two different definitions:

- One definition is the "Machine Jidoka" about "intelligent automation", meaning a machine automation which stops the process when a problem is detected. This type of automation implements some supervisory functions rather than production functions.

- The other definition is "Human Jidoka", it refers to the act of creating machine-like human ability that can identify or even sense abnormalities in a product or a process and stops the process in accordance. The term Jidoka here is also extended to an environment in which human can easily identify abnormalities.

1. When any abnormality is detected then the machine stops the process.

2. When any defect is detected then the machine stops the process.

3. The employee stops the process immediately when she/he observes or believes an abnormality has occured.

"Stop the Process" is the key action in all cases!

- When an abnormality happens, we have to take problem solving actions to prevent re-occurrence.

- To solve the problem, catching the root cause is essential.

- To determine the root cause, we have to go to Genba and see the actual thing (Genbutsu) where the abnormality happened.

Quality Methods

Many methods could be used to build quality assurance in our processes and products. We've already mentioned Poka Yoke. Some others are:

• 5 Why

• Pareto Diagram

• SPC

• Quality Matrix

• Cause and Effect Diagram (fishbone diagram)

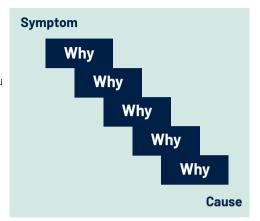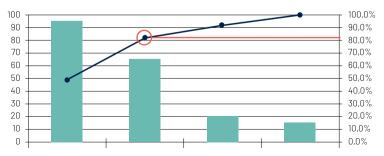• 8D Problem Solving Process

• FMEA

• PDCA Wheel

• CPC

5 Why
When you are in faced with a problem, ask yourself the question "WHY?" five consecutive times. Each answer must be more precise than the previous one. That way, you will identify the cause of the cause… of the problem.

This tool is generally used to identify what really happened for the present occurrence of a problem instead of what are the potential causes.
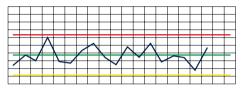
Pareto Diagram
The pareto diagram is the tool that shows the contribution of several causes to a problem. We draw it with the most frequent cause on the left hand of the diagram as follows: The highest bar indicates which cause must be attacked first to be more efficient.
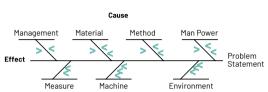
There is a general rule that says that if you correct 20% of the causes, you will solve 80% of the problem. This rule is named <<80/20 rule>>.

Quality Methods

Where produced

Cause

SPC – Statistical Process Control

SPC is a way to measure and maintain the reliability and capability of a process. By sampling, you continuously measure a parameter and draw the obtained value on a graph.

SPC enables us to identify whether a process stays inside the limits or not and if there is a trend. This allows us to start corrective action at the first signs of drifting out of control.

Quality Matrix

Quality Matrix is a tool for improving quality by making visual <<where a defect has been produced on the line>> and <<where the defect was detected>>.

For each defect, we take actions to eradicate the defect, but also to detect at the exact place where it was produced. The target is to have Quality built in at point of value add.

Cause and Effect Diagram

The Cause and Effect Diagram is a tool to list the potential causes to a problem. It is also referred to as the Ishikawa- or fishbone diagram. We write the effect in the head of the fishbone. The different bones are dedicated to a category of causes where the core-lines are the main causes, and the lines coming off those are the sub-causes.

Quality Methods

8D Problem solving process

8D is both a method and a presentation form for problem solving.
8D stands for 8 Disciplines and it includes the following steps:

D1 Form a team
Appoint a leader for the team. Establish a small group of people with process and/or product know-ledge, allocated time, authority and skills in the required disciplines.

D2 Describe the Problem
Completely understand the problem in specific, concise, quantifiable terms: Who, What, Where, When, and How Many?

D3 Implement Containment Actions
To protect the next customer from any additional non-conforming products/services by implemen-ting Interim Containment Action(s) until corrective actions are in place.

D4 Identify Root Causes
The purpose of root cause analysis is to determine the technical cause(s) for the problem occurring, and not being detected.

D5 Choose and Implement Corrective Actions
Select, implement, verify and control Corrective actions that will eliminate or reduce the effect of the root causes found in D4.

D6 Evaluate Results
Confirm that the corrective actions have suffi-ciently solved the problem, and also consider the customer perspective.

D7 Prevent Recurrence
Identify and standardize performance improve-ments. Ensure the solutions are sustained over time and throughout the organization (Yokoten).

D8 Congratulate the Team
Recognize the success of the team and the individual contributions

Quality Methods

FMEA

Failure **M**ode and **E**ffects **A**nalysis can be performed about:

• Product Design Concepts (D-FMEA)

• Process Concepts (P-FMEA)

• Machines

• Logistics (L-FMEA)

FMEA is a method performed by a cross functional team, to predict and prevent defects before they occur by analyzing the product design or production process. Each potential problem can be quantitatively analyzed with Risk Priority Number (RPN).

Severity: what would the consequences be if the defect occurs?

Occurrence: what is the probability for the defect to occur?

Detection: what is the probability for detection of the defect before or after it occurs?
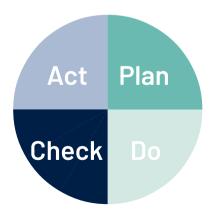
$$S \times O \times D$$

Each parameter is given a value between 1 and 10, where 10 corresponds to high probability and serious consequences. The result will be a number between 1 and 1000 and the potential problems with the highest RPN will be corrected first.

PDCA Wheel

The PDCA Wheel is a methodology to apply solutions to a problem to ensure the problem will not occur anymore. The methodology is described in four steps:

1. **Plan**: Set objectives and build an action plan.

2. **Do**: Provide resources and do it.

3. **Check**: Check results by indicators and react if necessary.

4. **Act**: Standardize the solution to prevent recurrence.

Quality Methods

CPC (Change Point Control)
To increase the awareness of all team members to change points in the process we need to manage changes in a good way and ensure proper reaction from appropriate team members. We call this method Change Point Control.
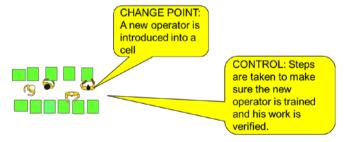
• Changes occur in every process.

• These changes are risks for defects to occur.

• CPC is a method to control changes.

• Even small changes can have dramatic consequences.

CPC uses the Visible Planning technique where both intentional (planned) changes and accidental (unplanned) changes are managed.
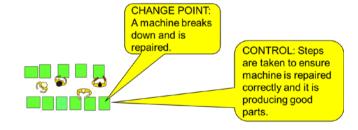
• Management team, production team leaders and other stakeholders are to meet daily in front of the change point control board.

• The team discuss previous day's change points and today's change points.

• Each stakeholder to present past and coming change points.

• The role of management is to make sure standards are being used and provide support to team whenever it is needed.

The objective of change point control is to properly manage each change to ensure zero defects. A very high percentage of defects come from change points in the process. The better change points are controlled the less risk of creating defects. The key to effective CPC is follow up at the worksite to personally verify the effect of the change.
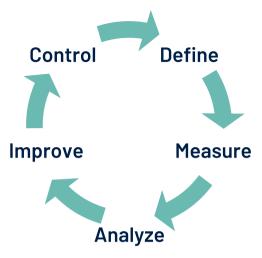

Example of an intentional/planned Change Point.

Example of an accidental/unplanned Change Point.

6 Sigma

The target of the 6 Sigma methodology is to reach 3,4 dpmu (defect per million units). A 6 Sigma workshop leads to improvement of the product and the process, based on the reduction of their variability, and is a tool we use for more complex problems where the root cause can not easily be found.

A 6 Sigma workshop is completed in 5 steps (DMAIC):

1. **Define** the problem or the challenge, to listen to the <<voice of customer>> (VOC),

to identify all important parameters for the process, from Supplier to Customer, and to determine which parameters are critical to quality (CTQ).

2. **Measure** the frequency of defects, define performance standards and validate the measurement system.

3. **Analyze** when and where defects occur, by establishing product capability, defining performance objectives and identifying variation sources.

4. **Improve** the process, by screening potential causes, and establishing operating tolerances.

5. **Control** the process so that it stays fixed by validating the measurement system, determining the process capability and implementing process controls.

DMAIC workshop is used for improving existing product/process. 6 Sigma can also be used for new projects, for that we use Design For Six Sigma (DFSS) workshop.

Employee Involvement

Mission Statement: To create a culture where all employees naturally respect standards as a way to ensure safety and continuous improvement. To increase the number of employees who have a high degree of flexibility and motivation to do the work. To create the environment where "Ordinary people do extraordinary things everyday".
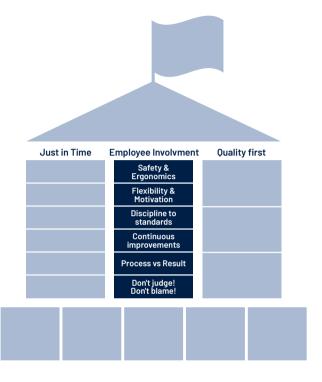
The most important pillar of the house is Employee Involvement.

Employee Involvement is at the center of VES. Everyone has a role to play and everyone benefits. Employees are the most valuable resource of our company.

- The success of our business is dependent on the planning, control and improvement of all elements of our business and this can only be done by people.

- Every employee has knowledge and experience which may provide the key to solving a challenging problem or improving our processes so that they perform even better.

There are six key elements to Employee Involvement:

- Safety & Ergonomics
- Flexibility & Motivation
- Discipline to standards
- Continuous improvements
- Process vs Result
- Don't judge! Don't Blame!

Just in Time	Employee Involvment	Quality first
	Safety & Ergonomics	
	Flexibility & Motivation	
	Discipline to standards	
	Continuous improvements	
	Process vs Result	
	Don't judge! Don't blame!	

Safety & Ergonomics

Since employees are our most valuable resource it is very important that all jobs are designed to be performed safely and ergonomically.
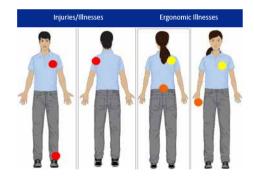
Safety
When we design any job it must be designed to be able to be done safely. This means that all aspects of the job need to be considered from the environment, to the equipment, to the motion. As employees of Veoneer we will be provided with training on safety and safe behavior. It is up to us to apply this knowledge to our daily jobs.

Ergonomics
Ergonomics relates to the study of human motion. Certain motions and posture are shown to cause injury when performed in a repetitive manner. As Autoliv employees we must educate ourselves on these hazardous motions and postures and passionately pursue elimination of these conditions. Prevention activities can include exercises, stretching, and conditioning ourselves to perform a task as well as the design of equipment and work stations.

For our key performance indicators (SQDCM) we have put S (Safety) as the first letter. This shows that we always put safety of our employees as the highest priority.

Flexibility & Motivation

A company such as Veoneer is built on people's knowledge and their will to make it run. A good way to keep an accurate mind is to regularly change the tasks we do. In that way, flexibility and motivation appear as key points. Managers care to give their employees the opportunities to use their flexibility and consequently keep their motivation level. Recognition too, contributes to keep motivation.

To provide a visual management tool to quickly understand where ergonomic symptoms and injury illnesses occur in a site, we use a Injury & Ergonomics Board.

Discipline to Standards

Why Discipline to maintain standards is necessary:

Without standards there can be no improvement! In basketball it takes five players working to the same standards to win the game. If one player breaks a standard by committing a foul it could cause the team to lose the game. The same holds true in a manufacturing environment. If one team member doesn't follow the standard it can cause the company to not reach it's objectives.

• Education is necessary for each employee to gain the understanding of the standards required to perform their job.

• Each employee must develop the discipline to follow the standards.

• Following the standard guarantees the success of our job.
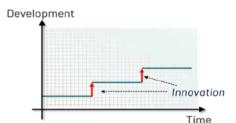
Continuous improvements

Employee involvement is critical to sustaining continuous improvement (Kaizen). There are several ways that we can be involved in continuous improvement:
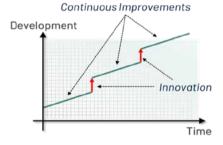
• Participation in suggestion system.

• Participation in cross functional teams.

• Participation in problem solving.

No work station or job is ever perfect. There is always room for improvement. Continuous improvement must come from each of us:

• I can influence my work and make a difference. It starts with me!

• I can share my ideas to others and together we can improve our jobs!

Development without and with continuous improvements. When involving all employees in continuous improvements the company will develop in a faster rate.

Process vs Result

- In VES employees should focus on the process not the end result.
- If we focus and fix the process we will get good results. What comes first, the machine breaks or machine downtime?

The machine breaks before we have machine downtime. The desired result is machines that run continuously. How we can guarantee that the machine runs is by focusing on the preventive maintenance process. Preventive maintenance is an example of a process that leads to improvement in productivity which is the desired result.
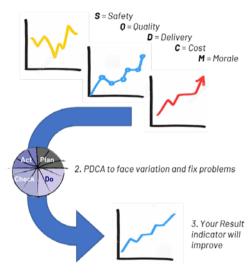
- A good way to improve a process is to identify and eliminate Muda and to avoid variability through information and training.
- Other examples of processes are training, kaizen suggestion system, 5 why, 8D, etc.
- Focusing on fixing our processes will produce our desired results.
- Of course, it is also important to check the result and to take it into account, in order to confirm that the process is good!

Don't Judge! Don't Blame!

When something is going wrong (fault defects...) or you want to perform an improvement on any situation, go, see and listen with an open mind. Problems are not linked to people. If people are afraid to be judged and blamed in case of a problem, they will hide the problems. If the problem is hidden then we can't imagine any improvements.
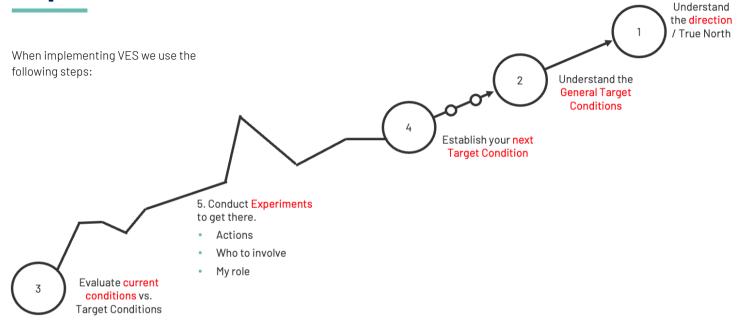
Blaming someone does not solve the problem. We all have to support our teams without judging and blaming.

1. Put your Process indicators in place

S = Safety
Q = Quality
D = Delivery
C = Cost
M = Morale

2. PDCA to face variation and fix problems

3. Your Result indicator will improve

We measure our Results through SQDCM indicators where we can see current status, the trend and the actions we are doing to improve. A good way to analyze any situation without any judgement or blaming, is to set the habit to speak with clear data.

Implementation

When implementing VES we use the following steps:

Understand the direction / True North

1

Understand the General Target Conditions

2

Establish your next Target Condition

4

5. Conduct Experiments to get there.
- Actions
- Who to involve
- My role

Evaluate current conditions vs. Target Conditions

3

1. Understand the True North conditions and design the long-term future state.

2. Understand the General Target Conditions

3. Thoroughly understand the current conditions by studying the process.

4. Use General Target Conditions to Establish your next Target Condition that will start the journey towards the True North.

5. Create the itinerary and start to experiment!

Inspired by "Toyota Kata" by Mike Rother

Definition of True North

True North is a vision of the **ideal condition** for both the customer and the supplier.

True North is about **perfection**. It describes "What should be" and not "What can be."

True North is meant to **challenge** the status quo.

Definition of a Target Condition

A Target Condition is a simple statement describing a '**desired state'** leading us on the journey to **True North**.

Top Level Target conditions for True North

Just in Time	Employee Involvement	Quality First
Work at takt time in a reliable way	Skilled and motivated teams everywhere	Zero Defects

What are Target Conditions?

What it is...

1. Strong principles that guide us on our way to True North.

2. Principles that once defined are like gravity.

3. Principles that once defined and learned help us see the problems and Muda.

4. Target conditions enable breakthrough thinking and innovation.

5. Principles, if used correctly, will support in getting to the end result.

What it is NOT...

1. Target conditions is not a performance metric or indicator. We do not use it to compare one site to another.

2. Target condition is not the end result. It shows us the way to get closer to True North.

Target Conditions are meant to be challenging. They are ambitious on purpose.

We will not achieve them overnight. The point is to keep trying and not give up.

Getting to the detailed
Target Conditions...

Target conditions for Plant Layout and flow

1. Safety and Ergonomic design

2. Laminar flow

3. Continuous flow

4. Pull flow

5. No isolated operators or lines

6. Frequent deliveries

7. Feed and pull from one side

8. All lines running to the same shift pattern & hours

9. Master planning for scalability & flexibility

Target conditions for a Production Line/Cell

1. Safety and Ergonomic design

2. Quality built in at point of value add

3. Laminar flow

4. No isolated operators or lines

5. One piece flow

6. Same TPU at any takt time

7. Change over within takt time

8. Station size same as point of value add

9. Generic modular reusable design

Target conditions for a Product Design supporting the Process

1. Design Robust products that incorporate Poka Yoke features

2. Minimize the number of components and maximize commonality in and across product lines

3. Components are self-locating and self-fastening using gravity

4. No blind operations

5. Modular and One sided assembly.

6. One touch assembly

7. Add product differentiation as late in the process as possible

8. Smart packaging designed for a pull system

VES Guiding Principles

True North

Deliver 100% good parts matching customer demand

Deliver on time

Cost efficient no matter how demand changes

VES Principles

Continuous Flow

Right Quality, First and Every Time

Visualization

Teamwork and Involvement

Achieved Through

Involving all employees

Embrace Veoneer Beliefs and Behaviours

Apply VES tools efficiently, same way everywhere

Continuous Flow

Always establish a continuous flow of materials and information. All processes between customer and supplier should be linked to form one connected path, producing goods or services at the pace of sales.

Right Quality, First and Every Time

Embrace and promote the culture of STOP, CALL and WAIT for any kind of abnormality. Achieve sustainable zero defect by driving proactive quality measures that ensure we do the right thing first time, every time.

Visualization

The true purpose of visualization is to make it fast and easy to see abnormal from normal. It ensures the entire team shares the same understanding of the worksite's current, actual condition.
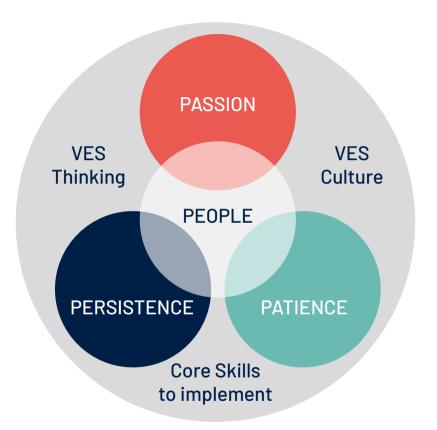
Teamwork and Involvement

We achieve more as a team. The more people are engaged; the more we will achieve, and the better our performance. Everyone should be involved finding problems, solving problems, defining standards, etc.

Conclusion

We hope this booklet has given you a good overview of the Veoneer Excellence System.

As VES is centered around people we need to respect, challenge and develop our employees and teams. To be successful with this in the long run we need to show three things:

• Passion
• Persistence
• Patience

VES Thinking

VES Culture

PASSION

PEOPLE

PERSISTENCE

PATIENCE

Core Skills to implement

Notes