



**Facultad de Ciencias Económicas y Empresariales**

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**“THE VOLKSWAGEN PRODUCTION SYSTEM AND ITS DISSEMINATION:  
THE STABILE PRODUKTION”**

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## **ABSTRACT:**

This report was commissioned to examine how the Volkswagen Group maintains its position in the automobile industry, a sector whose most remarkable feature is high competitiveness.

The research draws attention to the fact that despite its competitive environment, thanks to Government aids and continuous development of the sector, companies such as Volkswagen play an important role in developed countries' economy. This is due to the fact that the car is the more technological and cheaper product of the market and the most desirable product for customers nowadays.

Further investigations reveal that different strategies, like decentralization or dismissing in quality are taken from different companies for staying in the market. However, in the Volkswagen case, quality and customer satisfaction are already targets, and standardize its procedures and operations in a Production system is its strategy.

The report evaluates the method for implementing this Production system based on a Len philosophy and its satisfactory results until the moment.

Besides, an important step for achieving this Lean manufacture in the factories is analyze; the ``Stabile Produktion``.

**KEY WORDS:**

Volkswagen

Production System

Lean Production

Training Center

Stabile Produktion

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## 1.INTRODUCTION

Nowadays, we live in a globalization world, with a competitive environment for all the industry sectors, and developing countries such as China , Brazil or India are taking place in the market thanks to their lower production costs. Most of the industries production plants are disappearing in the developed countries for operating in those ones, where having more competitive market prices for their products is possible thanks to lower salaries and raw materials prices.

However this is not a solution for Volkswagen, an automobile car company that maintains its production plants in Europe or United States , being one of the best positioned automobile brand in sales as well as in labor conditions for its employees .But to make this possible , and achieve the objectives of becoming the best employer and leader in that industry , a production system based on a Lean philosophy has been implemented 10 years ago .

For developing this philosophy and its dissemination, a Training Center was created from the consortium .This center is in charge to promote this Lean philosophy trough employees and give them the qualification to be better professionals, and consequently, more motivated.

A current idea in which is working Volkswagen as a basic of its production system ,is the ``Stabile Produktion``.For its implementation in Volkswagen Navarra, together with other departments as the cascade one, one course has been created from the Training Center.

The objective of this his course is to prepare people about the importance of a stable production for the company and its repercussions. It allows to stabilize and reduce the process timing, attaining potential savings, accomplishing at the same time the production schedule. Having a stable production , the Volkswagen group will remarkably reduce its material cost , that suppose the 85% of the car´s cost.

This is a concrete example of how the Group is working for not just stay in the market but to be the best on it.

For understanding all this better , we are going to analyze in a more deeply way the actual automobile environment and the way Volkswagen is working to stay on it.For this , we are going to explain what a production system is and concretly ,the Volkswagen one .

But there is no place for a production system without a Training Center responsible for its dissemination,so , as I am working on the Training Center of Volkswagen Navarra, we are going to explain how it works with a concrete example of the "Stabile Produktion".

### 1.1. The Automobile

Most of the people talk about the light bulb or the wheel as the inventions of the history and nobody could question their implications but if we think in what most of the population need, use and want we will probably agree that is the automobile. Most of us own one if is not several of them , and, although we may be unaware of it , those automobiles , either cars or trucks are important for our everyday lives and trade nowadays. But the important of the automobile's repercussions date back to the origins of the motor industry at the end of the nineteenth century.

Automotive production on a commercial scale started in France in 1890 and years later at the beginning of the 1900's, USA automobile industry was equalizing to that of Europe's.

But, until that moment cars were handmade, what made price to be so high for an average people class and therefore, only few people were able to own one.

From 1904 to 1908, 241 automobile-manufacturing firms went into business in the United States , where a company stood out from the rest. With only \$28000 in cash, Henry Ford started the Ford Motor company in 1903, making a mass produced automobile that changed how the world moved.

The company produced 1,700 cars during its first full year of business starting by produce the Model A to be an economical car, sold for only \$850, becoming a car for the average American. Reaching, by 1920, to sell a million cars. The key to Mass Production was not moving chain or



Illustration1. First Ford Model A

continuous assembly, but the complete and consistent interchangeability of parts and ease of assembly.

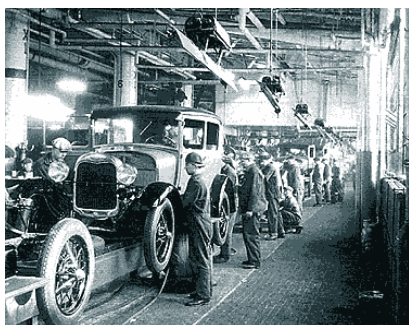


Illustration2. First Ford assembly line

But Ford not only perfected the interchangeability of parts or components, but also the workers. He separated the labor in order the assembly Mass Production to have only one single task. With this separation of labor, assembly was formed in just few minutes.

This model was the first vehicle mass-produced and the beginning of a new of Mass-production for the automobile industry.

At the beginning of the 20<sup>th</sup> century the automobile also entered the transportation market. It became increasingly popular among the general population because it allowed people to travel wherever they wanted. But the popularity of the automobile has consistently moved with the state of the economy, growing during the boom period after World War I. Dropping abruptly, during the Great Depression, when unemployment was high. But the largest increase in mass transit was from World War II.

Is in that moment, in 1934, when Dr. Ferdinand Porsche took the necessary contacts for building his idea of one "Volkswagen", a "car for the people". After preparative character talks, between government officials and the Association of the "Reich", automotive industry have occurred. The 22th of June, a contract with society Ferdinand Porsche GmbH is signing, in which is stipulated that Porsche must build within the next



Illustration3. "Escarabajo" or "Beetle"

10 months the first Volkswagen prototype. The war interrupted more than once the process of building the first Volkswagen factory. However, in 1940 the first mass production car, the Cuba, a car built for military use, went out from the factory. But the war and political circumstances that would slow the project was not released until 1948 on

a consolidated basis, when the "escarabajo" in Spain or "Beetle" in the U.S. from 1959, really misses important dimensions.

But a huge change in the vehicles production took place when in the spring of 1950, a young Japanese engineer, Eiji Toyoda, made an internship period of three months in the Rouge Ford plant in Detroit. Eiji was no ordinary engineer, nor for his ability neither because of his ambition. Having carefully studied every inch of the vast Rouge, which was the largest and most efficient manufacturing facility in the world, wrote to his, headquartered company that "he thought he could improve the system of production." Back home in Nagoya, Eiji Toyoda and his production genius, Taiichi Ohno, soon concluded that



Illustration4. Eiji Toyoda

mass production would never work in Japan. From this beginning, it was born what Toyota came to call the Toyota Production System and finally the "Lean production".

This philosophy, called "Lean" because is focused on reducing any waste in production processes. It is basically about obtaining products with the right quality, in the right place, at the right time and in the right amount, minimizing any waste, based on flexible processes and always opens to change.

Lean producers set their sights explicitly on perfection, and in a competitive sector as the automobile one is, it should be done. Achieving this perfection by continually declining costs, defects and inventories, making at the same time exactly what consumers need and ask.

The consequences of this latest discovery were enormous. Made workers in forging workshops to worry much about the quality and therefore eliminated the waste of large amounts of defective parts only discovered long after its manufacture.

But for it to work this system, which ideally stocks produced only two hours or less, Ohno needed manpower extremely capable and highly motivated. He started to think in Training as a fundamental part of his production system.

Ohno developed a new way of coordinating the daily flow of parts within the supply system, the famous just-in-time system (JIT), called Kanban in Toyota.

The idea was to convert a vast group of suppliers and parts plants in a big machine, specifying which were pieces that had to be produced in each previous step only to meet the immediate demand of the next step.

However this was not easy at all. Eiji Toyoda and Ohno took more than twenty years of constant effort to implement all this set of ideas-including the just-in-time in the assembly of Toyota. But in the end, they triumphed with extraordinary consequences for productivity, product quality and responsibility in changing market demand.

The adoption of this philosophy had "change choices for consumers, the nature of work, the fortune of company and ultimately the fate of nations".

Due to this major improvements and results, other companies from the automobile industry, like Volkswagen, had adopt this philosophy developing a solid and defined production system.



## 1.2 Volkswagen Group

The Volkswagen Group with its headquarters in Wolfsburg is one of the world's leading automobile manufacturers and the largest carmaker in Europe.

In 2013, the Group increased the number of vehicles delivered to customers to 9.731 million (2012: 9.276 million), corresponding to a 12.8 percent share of the world passenger car market.

Its activities may focus on the automobile, but the Volkswagen Group is far more than just a carmaker. A wide variety of mobility-related services round off its portfolio.

The Group operates 106 production plants in 19 European countries and a further eight countries in the Americas, Asia and Africa. Every weekday, 572,800 employees worldwide produce some 39,350 vehicles, and work in vehicle-related services or other fields of business. The Volkswagen Group sells its vehicles in 153 countries.

The Group comprises twelve brands from seven European countries: Volkswagen Passenger Cars, Audi, SEAT, ŠKODA, Bentley, Bugatti, Lamborghini, Porsche, Ducati, Volkswagen Commercial Vehicles, Scania and MAN.



Illustration5. Volkswagen Group brands

Each brand has its own character and operates as an independent entity on the market. The product spectrum ranges from motorcycles to low-consumption small cars and luxury vehicles. In the commercial vehicle sector, the products include ranges from pick-ups, buses and heavy trucks.

The Group's goal is to offer attractive, safe and environmentally sound vehicles which can compete in an increasingly tough market and set world standards in their respective class.

### 1.3 Volkswagen Navarra

Volkswagen Navarra, located in Pamplona is the leader factory in building Polos all over the world, making 1548 cars by day and employing around 5000 people by year. But it is not a new factory and even if its facilities has been changed over the years, its location and



its area is the same as the first one.

The first factory construction dates back to 1965 when the company “Nueva Montaña Quijano” started a partnership with British Motor Corporation. From this partnership was born “Automóviles de Turismo” Hispano Ingleses (AUTHI) and the production in line with it.

Illustration6. First VW Navarra construction During 1965 and 1975 nine different models were built in Pamplona and besides being the first car factory installed in Navarra, this enhanced the presence of a large number of subsidiary industries depending on it.

In 1975 AUTHI’s had not a good financial situation because of the lack of sales in the domestic market. Even that the British Government helped them it was adrift. Finally, the solution came from SEAT that bought AUTHI by 1.100 million of pesetas in the same year.

On January 1976, the first SEAT went out of the plant in Landaben and from that year until 1982, when an agreement was signed between VW and SEAT, 131.603 Seats 124D, 2.750 Lancias and 149.872 Pandas were built.



Illustration7. First seat 124D



Illustration8. First Lancia



Illustration9. First Panda

Between May 1983 and January 1984 the factory was remodeled to produce the Polo and 2 years later The Volkswagen Group acquired 75% of SEAT stocks, buying the remaining capital in 1990. From that moment until now, 6 million Polos have been made in our factory , increasing its production volume each year.

## 1.4 The Automobile Industry ; A Competitive Environment

“Before the automobile, people both lived in the city and worked in the city, or lived in the country and worked on a farm. Because of the automobile, the growth of suburbs has allowed people to live on the outskirts of the city and be able to work in the city by commuting.” It would be impossible to list all of the effects of the automobile on our economy, but the precedent sentence let us to come around to the idea of its repercussions in people lives.

New jobs due to the impact of the automobile such as gas stations, auto repair shops, fast food restaurants etc. allow more employment for the world's growing population, employing just by the automobile industry, 50 million people worldwide.

For lot of countries, motor vehicle exports are essential to maintaining the balance of international trade. In countries such as Japan, France, Italy, Sweden or Germany for example, the automotive industry has become a vital element in the economy of industrialized nations: motor vehicle production and sales are one of the major indicators of the status of the economy in those countries.

This implication is not less in our country where the automobile industry is a pillar for the Spanish economy contributing to its GPD by a 5% and to its employment by a 10% of the working population.

Nowadays 80 million automobiles are selling all around the world and the 50% of them are sold by the 4 Big companies of the automobile Industry: General Motors, Toyota, Volkswagen Group and Ford.

But they are not the only ones present in the market as there are slowly taking hold other car companies such as Hyundai-Kia, that manufacture their cars with cheaper labor force and getting very competitive prices. But it is not just limited to a requirement for price, but to produce what consumers want and need, which are increasingly demanding. With the strong competition from lower cost countries positions ,Volkswagen and specifically

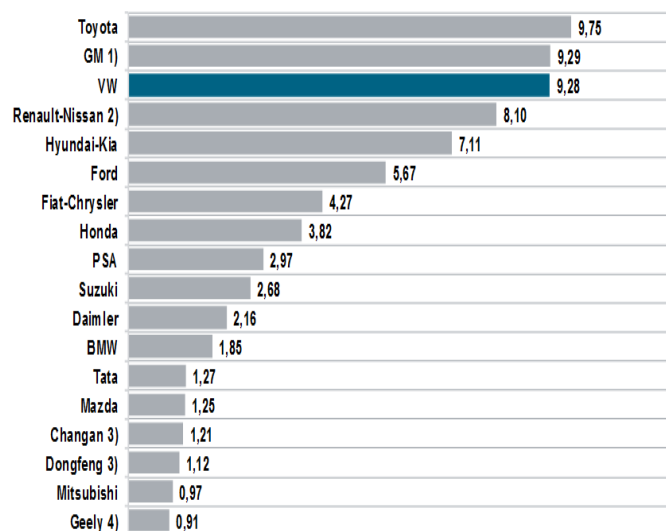


Illustration10. Ranking of automobile companies by millions of cars sold.2013

Volkswagen Navarra, in the future will be with less favorable profiles if no progress is achieved in all areas that determine competitiveness. This is why, the Volkswagen Group have detected a "Need to act" 10 years ago.

Spain is the 3th European Union commercial vehicles producer and the first for industrial ones and close to 1/4 of its exports corresponds to the automobile trade. The peripheral nature of our country in the European Union and the fact that sector companies have a character of subsidiaries of multinational companies, make the competitiveness of our industry is basic to stay at current levels of production. Even though, there are not predictable investments in new plants in Spain in the immediate future, so it must be designed to encourage the best use of existing and construction of new models in them.

These investments will always be conditional on greater efficiency, productivity and flexibility compared to the obtained in other plants of each brand installed inside and outside the European Union.

This is the actual situation of Volkswagen Navarra, an old factory that has to make a continuous improvement in its production system for being competitive in a period of great change in global markets increasingly competitive, that affect all fields of the industry.

For make this possible 10 years ago, from the Volkswagen consortium, a production system has been to dictate clear objectives for becoming the more competitive company of the industry as well as how to achieve those goals. By building the Training Center as well as different departments of production system, Volkswagen Navarra is working on the implementation of the VW Lean production system philosophy and, is already the most productive factory of the polo model of all the consortium, contributing to the goals set by the consortium for the next 2018.



Illustration11. Distribution of the automobile factories in Spain

## 2) PRODUCTION SYSTEM

### 2.1 Need to act

In that competitive environment, when new developing countries have started to operate with lower cost and much more competitive market prices, most of the industries production plants have been moved from developed countries to developing ones. This is the case of the textile one in China or the navigation to India.

Because of the economical repercussion of the automobile industry, as we have explain before, most of the developed countries government are making investments in the sector in order not to lose it. But this is not enough, for obtaining benefits with the lowers marginal benefits that have the cars, firms need to make a change, improve and become more competitive.

The Volkswagen Group aim to be leader in the automobile market.

The Strategy 2018 focuses on positioning the Volkswagen Group as a global economic and environmental leader among automobile manufacturers.



Illustration12. Volkswagen Mach 18 objectives

From the Group they are focusing in particular on the environmentally friendly orientation and profitability of their vehicle projects so that the Volkswagen Group has the right products for success even in more challenging economic conditions. At the same time, this will mean that capital expenditure remains at manageable levels.

Their attractive and environmentally friendly range of vehicles, which they are selectively expanding, and the strong position enjoyed by its individual brands in the markets worldwide, are key factors allowing Volkswagen to leverage the Group's strengths and to systematically increase its competitive advantages.

For becoming most successful and fascinating automaker in the world by 2018 four goals have been defined by the Consortium.

The Volkswagen Group look at customer satisfaction as one of the key requirements for the Company's long-term success, so, first of all, it intends to deploy intelligent innovations and technologies to become a world leader in customer satisfaction and quality.

The second marked goal is related to sells. Volkswagen tries to increase unit sales to more than 10 million vehicles a year; in particular, it intends to capture an above-average share of the development of the major growth markets.

The third target is about reaching a solid financial position and to guarantee an ability to act even in difficult market periods by aim a long-term return on sales before tax of ,at least 8%.

Last, but not less, and in the one that Training Centers of all the consortium are working, is about becoming the most attractive employer in the automotive industry by improving its employees qualification.

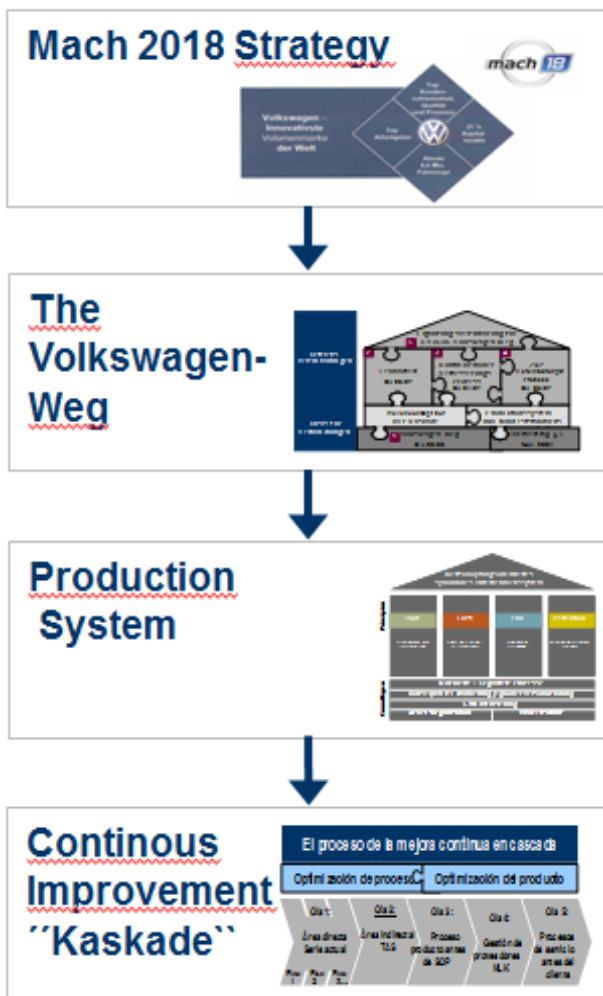


Illustration13. Volkswagen Production System Flow

To achieve those objectives set by the Mach 18, it has been created the "Volkswagen Weg", a detailed path that every company must follow. It deeply defines specific objectives for each factory department in order to achieve the Mach 18. It is the way Volkswagen organizes and continuously improves its work to develop and manufacture the highest quality cars and profitability for its customers.

One fundamental factor for achieving those targets is the agreement with the labor unions. It allows implementing, jointly with the employees, a learning organization that can design their structures and processes in an optimal way.



But this commitment between Volkswagen and the employees must have a return flow.

By these agreements the Group becomes committed to maintain the employed in the factory even if there exists a technological improvement with which they need less people, giving them economic stability and not dismissing their wages. Moreover, Volkswagen is going to continuously improve their factories in order to make employees conditions even better, studding and improving their ergonomic work conditions.

But , as we have said before, this is a mutual agreement in which both parts contribute , so Volkswagen assures the previous condition in exchange of a more implicated employees, more productive and effective. Finally, and one of the more important points of these agreements is about the employees qualification ,in which Volkswagen is committed to give a continuing education and training in order them to be the highest qualified and motivated ones.

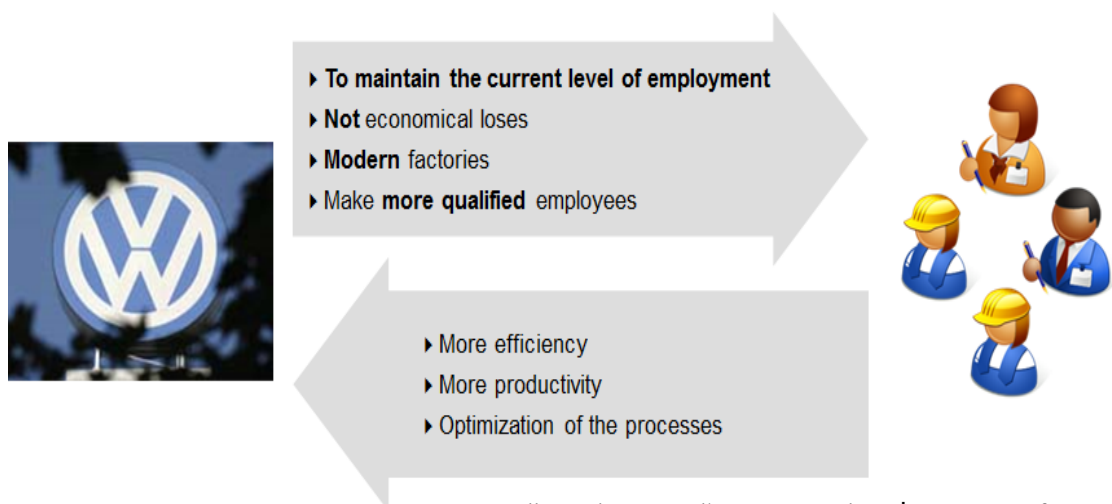


Illustration14. Volkswagen-employee's agreement features

To build the best vehicles, we need the best team in the sector; highly qualified, fit and, above all, motivated. That is why, is the employee's qualification one fundamental factor of those agreements. In order to make it continuous and not just nice words , a department called ``Training Center `` was created some years ago for giving them the highest qualification ,a fundamental base of the Volkswagen Production System.

## 2.2 Production System

A production system provides a structure which streamlines the description, implementation and approach to an industrial process. This system is the foundations and pillars that govern the workings of the company so that the quality and productivity targets set could be achieved. This philosophy set the standardized way to proceed in all areas of the company, from managing decisions, to address the manner in which the line operators work.

But ``how we make things dictates not only how we work but what we buy, how we think, and the way we live``, and the implementation of Lean Production System in factories changes first the way people work but therefore the way they think and live. This philosophy of production changes the meaning of professional careers. Calling for learning far more professional skills ,and applying these creatively at teamwork at the same time that gives subordinates more responsibility keeping them highly motivated ,what will have repercussion in the products quality.

The Volkswagen Production System Consortium is based on this philosophy of work, pursuing a clear objective, to achieve a synchronized be oriented company and value.

This is quite new in Volkswagen and it has completely changed the way the business works. By eliminating all possible wastes, increasing quality and reducing manufacturing times, focusing directly on reducing manufacturing costs, Volkswagen is becoming a more competitive company, trying to become the first one in its sector by the next 2018.

Other companies such as ``Mercadona``, ``el Corte Inglés `` and ``Ikea`` have implemented a production system. This could be detected , for example , in the case of Mercadona , in the standardized way of working of all its supermarkets .



Illustration15. Logos of companies with a production system



## 2.3 Volkswagen Production System

The production system is the response that is generated from the production area to help achieve the strategic objectives of the company (Mach 18) based on a Lean Production. It provides methods and tools to improve quality and productivity, reduce costs, time step and ensure better compliance with deadlines.

The production system represents a change in productive thinking based on the continuous improvement of the Volkswagen manufacturing processes. Thus, a synchronized value-oriented company is achieved.

Its production system is part of a common system for all models of the consortium, which is being introduced with the same methodology and identical procedures by the "Volkswagen Weg".

The demands of Volkswagen regarding design, quality finishes and innovative technology are very high. Providing all this at a competitive price against a variety of models increasingly high is a major challenge. That is why a system is needed to take root throughout the template thinking continuous improvement of all processes as a basic pillar.

Volkswagen wants to be the engine that drives this change and thus help to achieve the objectives set in the "Mach 18". Only then will get to be market leaders.

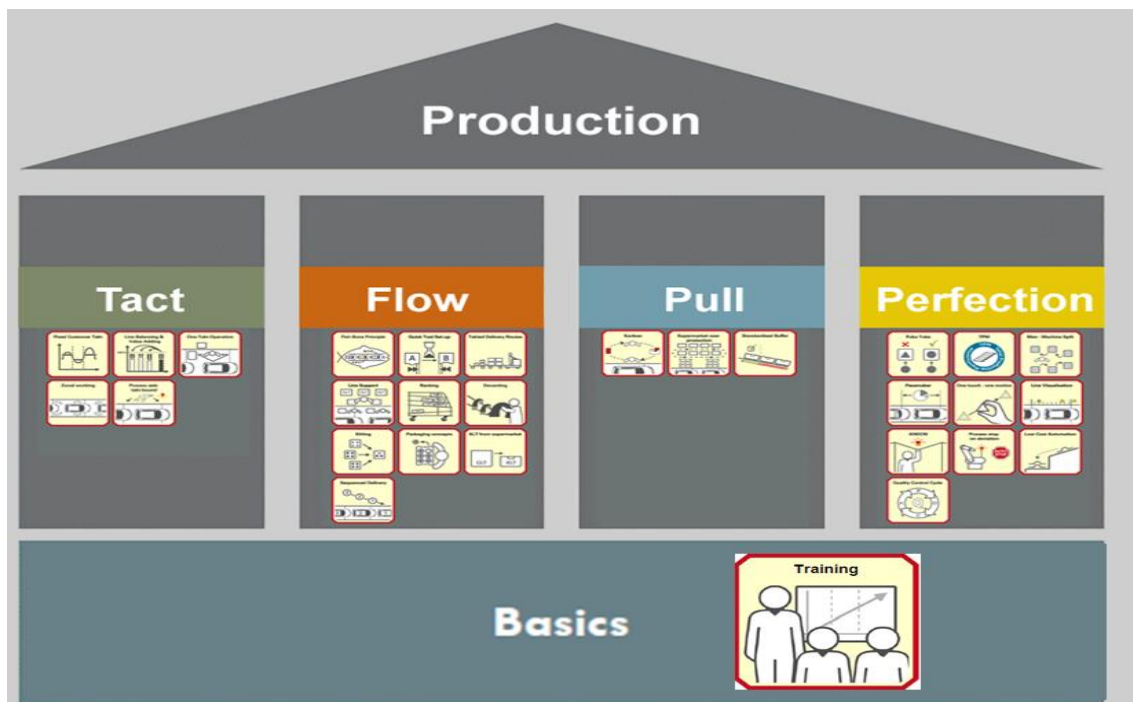


Illustration16. Volkswagen Production System house

The production system provides methods and tools to improve quality and productivity, reduce costs, transition times and achieve higher delivery reliability. Just like a house, the foundations are solid foundations for columns: Tact, Flow, Pull and Perfection.

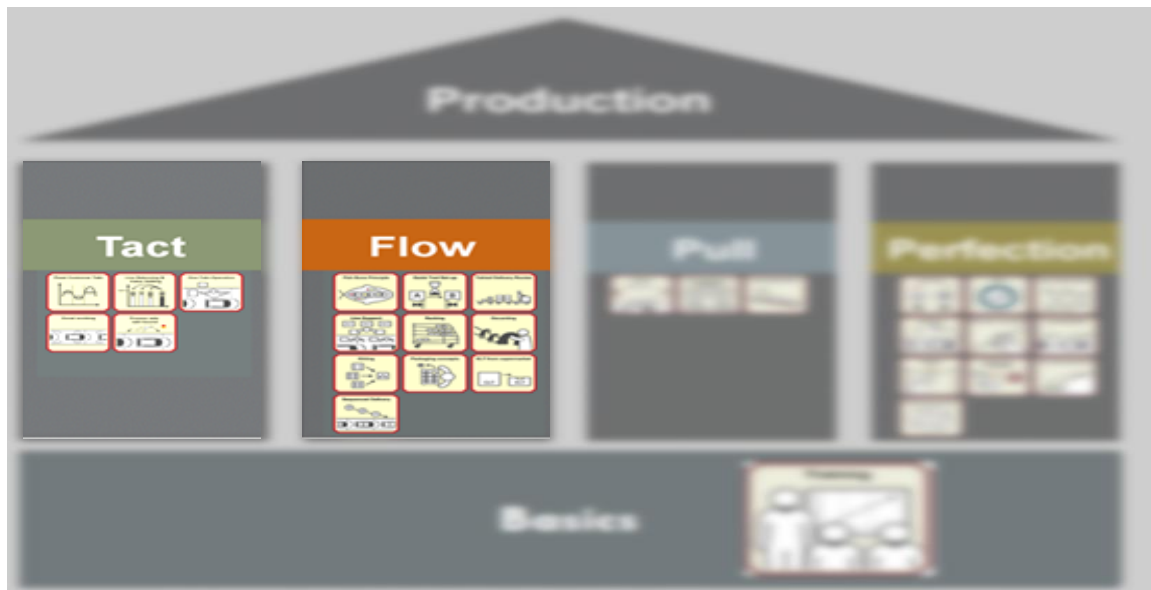


Illustration17. Volkswagen Production System house :Tact & Flow

The central elements of the Volkswagen Production System is the Tact principle which central element is the fix customer tact .The customer tact determine the rhythm of production and represents the heartbeat of the company, it is the pacemaker of the company’s production .The fixed client tact is essential for a stable and robust manufacturing processes and it is essential for the application of the principle of perfection’s contents.



Illustration 18. Tact Principle : Fixe Customer Takt

The flow principle ensures the continuous supply of the system and reduces the time step.

The flow principle guarantees that the information and materials circulate in touch function of the client tact. To ensure this, the central elements are the reduction of lots and individual pieces as well as the configuration of the processes according to the Fish Bone Principle.



Illustration 19. Flow Principle : Fish Bone Principle

This concept is about Grouping of sub-assemblies or preparations close to the main line, that work and deliver synchronized (in tact) with standardized buffers.

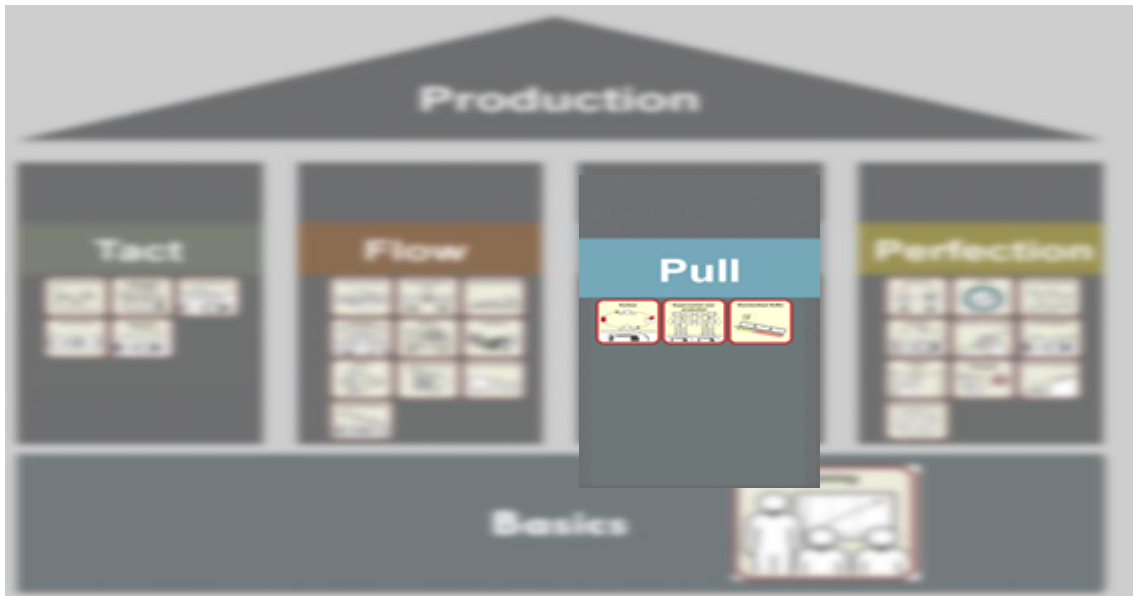


Illustration 20. Volkswagen Production System house: Pull

The next pillar of the Volkswagen Production System is the Pull principle.

The principle of Pull manages the flow in terms of time and quantities in all the connection points of the system. Those connection points are generated on the system by tact time deviations between principals and secondary lines, necessary transportation process and recovery times higher than the tact time. That way is just produced what is necessary in the next process, what the client needs.

This principle consists of 3 methods: Kanban, Standardized Buffer and the method of positioning the supermarket near to the production line.

Kanban is a method to pull material from the up-stream process .With the Kanban method, a visual process management system is achieve, in the Volkswagen case with Kanban cards, that tells what to produce, when to produce it, and in which quantity. The other methods are about having standardized buffers (supermarkets) and get them close to the production line.

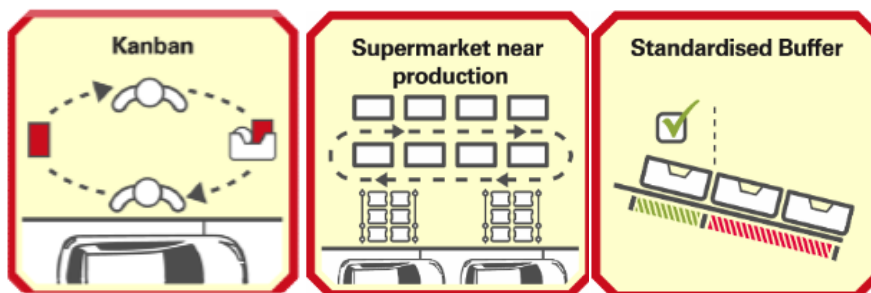


Illustration 21. Pull Principles : Kanban, Supermarket near production and Standardized Buffer

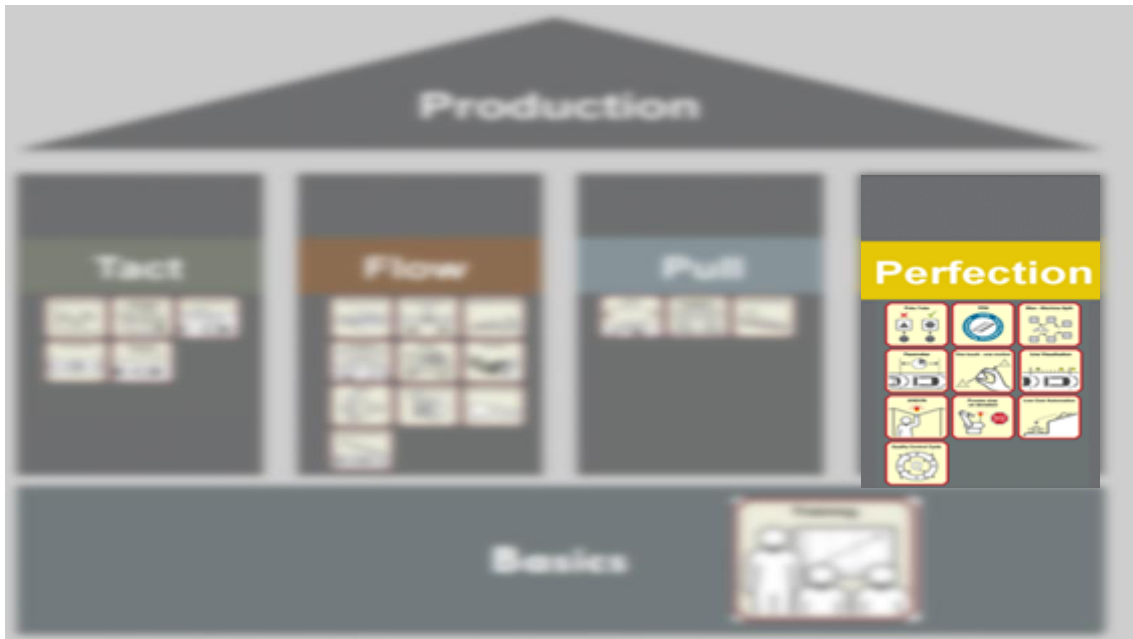


Illustration 22. Volkswagen Production System house: Perfection

The Perfection principle stabilizes and improves the system. The processes are organized in such a way that errors are avoided and that problems are detected in situ and can be removed without recurrence before detection. Due to that, this principle is based on the continuous detection and elimination of errors by the work-shops teams. The core elements of the Perfection Principle are Poka-Yoke, one-touch-one-motion and TPM.

The Poka-Yoke method consists on avoiding human error by taking product, facility or organizational actions. As the Aim of this method is a basic avoidance of errors or immediate error detection, a higher reliability and less waste within the process (process reliability) is achieved.

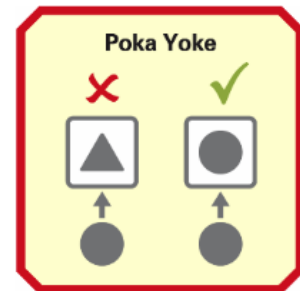


Illustration 23. Perfection Principle : Poka Yoke



Illustration 24. Perfection Principle : One touch - one motion

The second essential method for achieving the Perfection Principle is the method called 'One touch-one motion'. This process is about a product design impact to achieve simple manual processes by creating simple and straight, thus ergonomic activities can be completed in one movement. By implementing

the one touch-one motion method, product, process aids and processes are in place to ensure a simple, fast and safe working

with the least possible effort, ensuring good ergonomic conditions. Last but not less the TPM method, total productive maintenance. This is about a continuous maintenance and cleans of the production installations in order to increase the productivity of plant and equipment with a modest investment in maintenance.

But no one of the previous concepts could be built without a previous fixed and consolidate base, the base in which we have said that one fundamental item is the Training. For the dissemination of all those methods of production, a Training Center, which works on the way to do this is needed and that is why, in parallel with the Volkswagen Production System, from the Volkswagen consortium the idea of Department for train was created.

Its goal is a synchronized and added value oriented company, a company focused on short-time step, low stocks and continuous improvement, based on clearly defined standards and considering human capital as the most important. That is why the base of the house is the employee's qualification development by training.

Each household item is built through their corresponding methods. The methods are the tools that allow building a robust and stable home. Using them for the foundations and pillars, as in a building would be a concrete mixer, a crane, a wheelbarrow or shovel.

All activities of the company are formed from the base of a qualified risk assessment taking into account the environment protection. Thus jobs, safe products and processes are designed.

Working with standards backed by a visual management is essential to ensure the quality and promote continuous improvement. Through a consistent and continuous removal of the wastes Volkswagen can eliminate all things that cause losses and increased manufacturing costs.

To be successful in implementing systematic and structural changes, the employees must have the opportunity to acquire new knowledge.

Formation and continuous training , both individually and collectively , helps the company staff to expand their methodological and social skills to optimally fulfill their role as carriers of knowledge and innovation.

By optimizing "from the inside out," a culture of constant problems-solving and search for improvement, Volkswagen wants to become a true learning organization. That way visual deviation from standard in process and production flow (equipment failure, missing or wrong delivery, differences in production flow e.g. speed, batch size) is achieved, having a

Controlled stock and clear layout. But for make it, as the rest of the pillars of the production system, is necessary to have a clear base of standardization.

### 3. TRAINING CENTER VOLKSWAGEN NAVARRA

#### 3.1 Mission & Philosophy

An organization of people-oriented job in which teamwork and continuous training is prioritized is the basis for a successful production system.

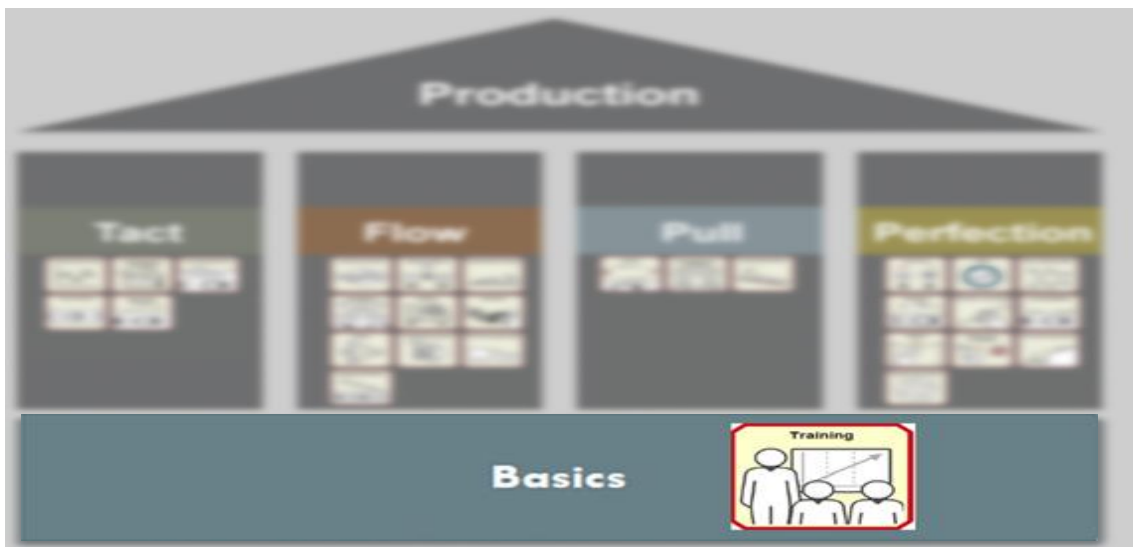


Illustration 25. Volkswagen Production System house: Basic ; Training

But what is to train? Training is not just to train for content relevant across workplaces but to enabling employees to perform their tasks with the necessary safety, quality and quantity within the specified time in the specified area. This means to create and consolidate routine and security in the work process by ensuring optimal ergonomic conditions.



Illustration 26. Basics: Training

There exists a different situation within the company, like new employee incorporation, a change in the product, an introduction of new standards, or just for maintaining the qualification level or the work routine, where training is necessary.

However, not just the circumstances make the company to train people but also, Volkswagen has specific objectives in order to achieve its targets where a training process is required, those are the following ones:

- To create consciousness between employees ( To create a Company Culture)
- To create prerequisites for fulfilling tasks with regard to work and quality safety (ergonomic conditions), productivity and costs.
- To maintain the qualification level
- To further develop employees with regard to working together and team/group flexibility
- To create a basic understanding (objectives, relationships and content) for a synchronous, value creation-oriented production/company system.
- To define the principle of continual improvement and training for the methods , as well as the procedures of the cascade and the problem solving processes
- To fulfill legal requirements

From the Volkswagen training Center, the company is continuing improving and working in better methods to train employees and over this qualification, to build the rest of the production system .But how does it works?

As at the rest of the organizations levels, the training strategy for the production system, as well as the way to operate (Training Center), comes from the consortium and has to be built as its standards.

From Wolfsburg, where the central of the Volkswagen Group located, is headquarter the Group Lean Centre, which defines the training strategy for the production system and develops the training modules for the Lean methods and basic skills.

In Wolfsburg, all principles and standards of the Group are defined in order all the plants of the Group to implement them once they are proved and piloting in the Group Lean Centre.




Lean Academy			
	Group Lean Centre	Brand Lean Centre	Training Centre
 Location	<ul style="list-style-type: none"> <li>Centrally in the Group (Wolfsburg)</li> </ul>	<ul style="list-style-type: none"> <li>Decentrally in selected main plants for the brands and regions, usually in the pilot hall</li> </ul>	<ul style="list-style-type: none"> <li>Full coverage in all regions and plants, usually in the pilot hall</li> </ul>
 Key functions	<ul style="list-style-type: none"> <li>Define the training strategy for the production system</li> </ul>	<ul style="list-style-type: none"> <li>Implement the strategy on brand level and apply the training concepts</li> </ul>	<ul style="list-style-type: none"> <li>Implement the strategy on plant level and apply the training concepts</li> </ul>
 Main focus of tasks	<ul style="list-style-type: none"> <li>Develop the training modules for: <ul style="list-style-type: none"> <li>Lean methods</li> <li>Basic skills and working with standards</li> </ul> </li> <li>Developing and piloting pro rooms* (1 example/craft)</li> <li>Definition of Group standards</li> <li>Driving continuous improvement <ul style="list-style-type: none"> <li>Carry out lean training</li> <li>Explanation of principles</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Apply the training strategy: <ul style="list-style-type: none"> <li>Carry out lean training</li> <li>Training for basic skills and working with standards</li> </ul> </li> <li>Consideration of brand-/location-specific features</li> <li>Report improvement ideas to Group Lean Centre</li> </ul>	<ul style="list-style-type: none"> <li>Apply the training strategy: <ul style="list-style-type: none"> <li>Carry out lean training</li> <li>Training for basic skills and working with standards</li> </ul> </li> <li>Consideration of brand-/location-specific features</li> <li>Report improvement ideas to Group Lean Centre</li> </ul>
Equipment	<ul style="list-style-type: none"> <li>Maximum equipment</li> <li>Actual equipment</li> </ul>	<ul style="list-style-type: none"> <li>Equipment according to training strategy</li> <li>Expansion of existing solutions while ensuring the same principles</li> </ul>	

Illustration 27. Volkswagen Lean Academy Organization

After have been proved in the Group Lean Centre, the strategy is implemented in a brand level , where the training concepts are applied taking into account brand-location specific features. That way, improvement ideas can be reported to the Group Lean Center for making it better and a more general brand adaptation could be implemented, always under the Group standards.

Once is implemented at a brand level, plant Training Centers of each factory starts to work on it , making adjustments for adapt each training to its specific circumstances , never getting out of the Group standards and the Lean philosophy.

But the Training Center has a specific way to make things based on this Lean philosophy. It has been proved that the way we are trained conditions the way we learn and this is why a practical train is needed in order to make it effective .By just hearing , a 70 % of the contents is got by the trainees and after the next 3 weeks only a 10% is remembered. If we add a visual techniques to this, the grade of remember increases a little, overall in the 3-months long-time, but this increase is not so significant and most of the train is going to be forgotten in a long period time.



However, if we add a practical train to the training, and this is how we work in the Volkswagen Training Center , an 85% of the contents are learned by the trainees and after 3 months , they are already remember a 65 % of it , what is an important level of learning.

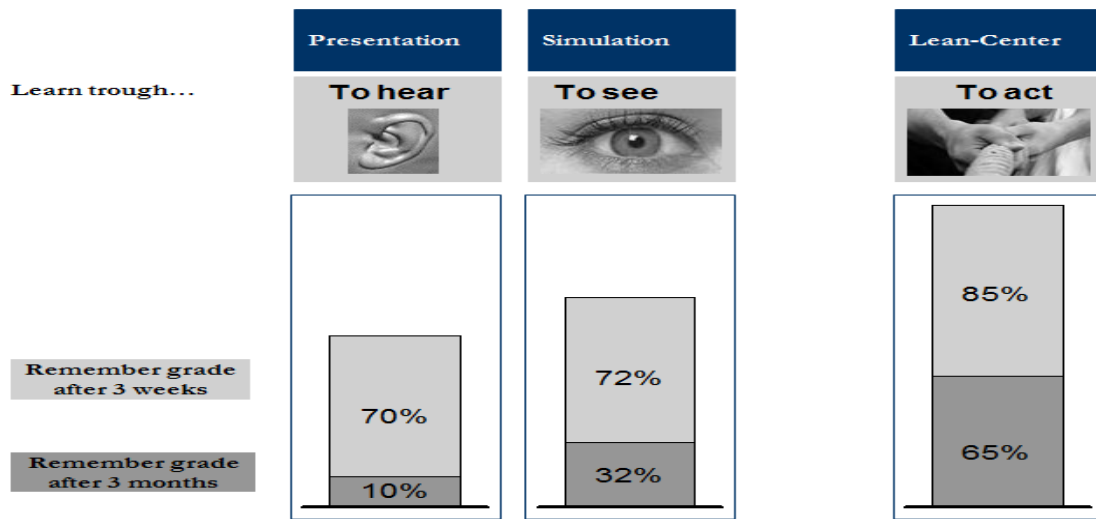


Illustration 28. Level of learning depending the training method

In all the trainings of the Training Center, basic skills and Lean training are trained.

By a practical training in the process, (representing a real and theoretical situation) and with a real representation of the materials and information factory flows, employees receive a good qualification by the combination of heard, see and act.

### 3.2 Structure

All Training Centers, no matters at which level of the Company, have the same structure. The Training Center consist of two training areas, the Lean-Training and the Basic Skills-Training, ideally under the same roof.

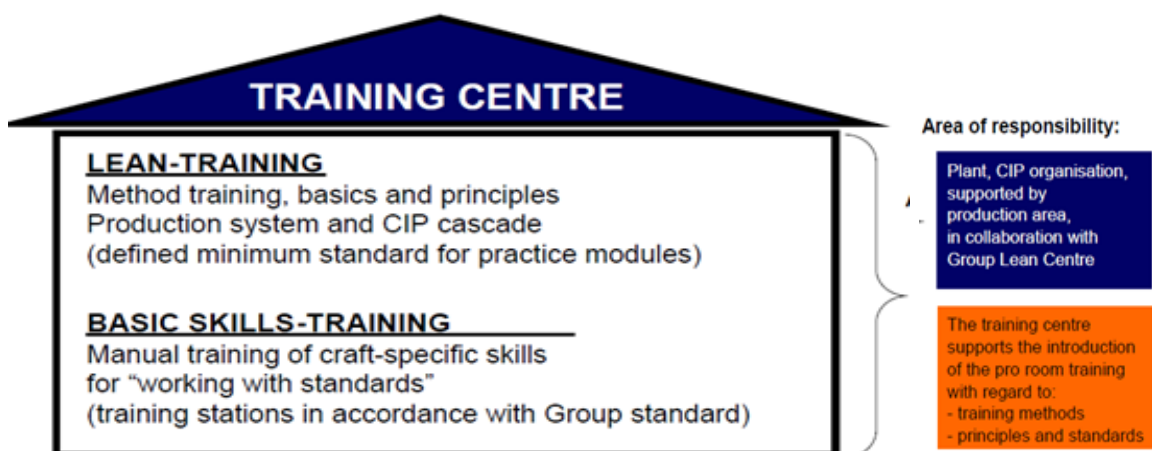


Illustration 29. Training Center structure

The Lean-Training, is the training of the methods about the bases and principles of the Production System as well as the cascade processes.

In the Lean Center, practical representations of the real situation are made in order to show people how, the ideas and philosophy of the Volkswagen production system, would work in the real situation.

As we are going to see afterwards , with the Stable Production explanation , when a new improvement in the production process has to be implemented ,practical modules are created in order to see how it will affects the factory situation as well as the employees. From the Lean Center minimum standard are defined for those practical modules and the way to proceed as well.



Illustration 30. Lean Center ; pictures of the different courses

However, in the Basic Skills Training( Grundfertigkeiten), instead of make an ideal situation, accurate representations of reality are built.

In those classrooms ,in order to train direct assembly line employees how to work with the specific process of their body shops ,manual training of craft-specific skills for ``working with standars`` and the basic skills, are bulit in the following way; elements skills and process.

Nevertheless they do not just receive from the Training Center but they cooperate in the training with their knowledge and profesionnal key ideas .

The process of fundamental skill trainer is divided in 3 steps , from the more basical activities(basis) to a complete process , working between them in an intermediate step called element.

But none train can be started without previous recommendations and instruction, and that is why ,a previous warming is doing and theoretical instructions are given.



Illustration 31. Grundfertigkeiten training process

For divided the complete work of the employees in each step , specialist study the work in order to make it standarized for guaranting the best ergonomic positions for the employees and quality level of the process.

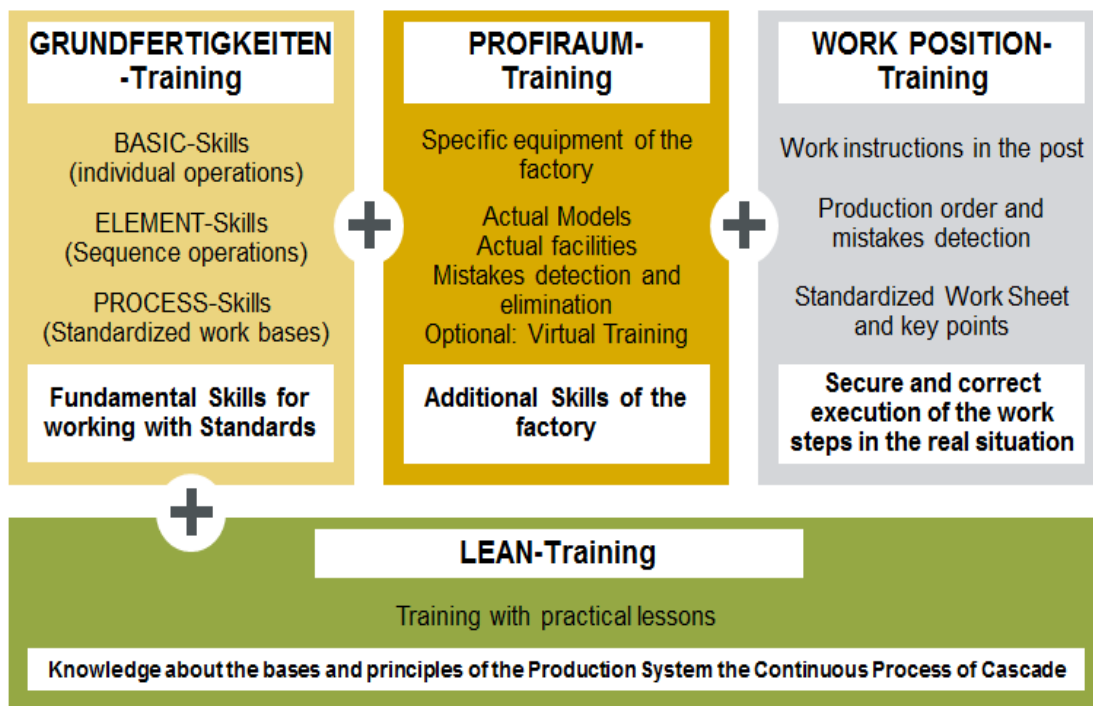


Illustration 32. Training Center structure

But this part of the Training Center allows to a third field of training , more professional and specific of each factory and model that is the Profiraum Training.

A training in a production level in which a employees receive a training with real equipments and facilities , it use to be in the body shop.This training is more specific and in real time ,in order to solve the day to day problems when they happen and to prevent new ones in the real work positions.

## 4. STABILE PRODUKTION

### 4.1 Stable Production Concept

Stabile Production is “to produce the product orders as they have been planned”. By trying to maintain a stable production, the company could stabilize and reduce its process timing, accomplishing at the same time the production schedule.

The stabile production is a basic for the Volkswagen production system because of the results of its implementation. The Stable production make the production process narrower, allowing to a Lean manufacture.

Manufacturing a vehicle in line with the planned bodywork sequence ensures that the production schedule is followed and lead times are established. But the benefits of having a stable production go further than that; however, for understanding them, we need to understand the current situation first.

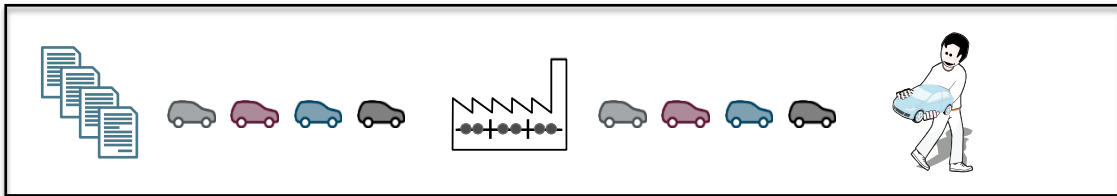


Illustration 33. Stable Production concept representation

The actual situation of Volkswagen, and specifically of Volkswagen Navarra, because as we are going to explain afterward, the Stable Production concept has already been implemented in other factories of the concern, is so far from this stability.

Significant flow disruption in the planned production sequence is a common feature of the current production process. By some reworks, but overall, because of the way each garage's production is achieved by sets, changes in the production line order have been made.

The actual situation of Volkswagen follow just by a 77.2% the “perlenkette” concept after body shop, having a 66.7% pearl change grade after paint shop and, is in the assembly, when the definitive order is planned.

Before explaining this ideal situation, we are going to explain the current one of Volkswagen Navarra, a factory that even if is accomplishing with most of the Production System elements and bases, because of several circumstances, it has not a stable production and they have started to work on it, couples of months ago.

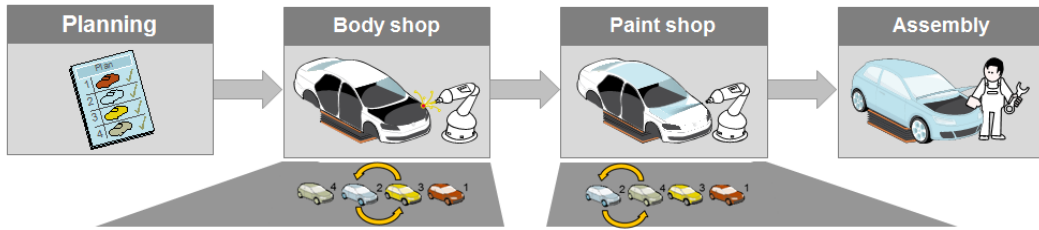


Illustration 34. Stabile Produktion concept representation

First of all ,and for understanding the rest of the explanation , it has to be known that in Volkswagen Navarra , as in the rest of the concern factories , all cars tha are made is because they are already order by the clients. Moreover , they are build with the specific requirements demanded by them.

That means that not all cars are the same , and therefore , not all cars can be made in the same way , taking different production times , even if we try to standarized.



*“You can have it in any colour as long as it's black.”*

To build different models ,obliges each garage to work as it is more convinient for them. That forces them not to follow a planned list from the beginning of the process ,as it should be fixed and follow with the perlenkette production concept.

Illustration 35. Ford mythical

In the first step of the production, in the body shop, cars are just different in the number of doors (2 or 4) or in the roof, so they have to change the hooks and geometrics of the tables for making this differentiation. That is the reason why, in order not to have time wastes by changing those hooks or geometric tables, the produce by sets of 42 and after they change the model.

This happens also in the Paint shop, where is more economical to paint sets of cars by colors. In that way, there is no fixed order until the body, already painted, arrives to the assembly line, where the production is sequenced.

For having this sequenced, and taking into account that not all cars take the same time to be built (average difference on time of 21 seconds), the sequence is

VOLKSWAGEN Navarra S.A.		CARGA DE TRABAJO				PLAN: ECU 406 OP. LMI 7-473-VER_1		
CENTRO DE COSTE / ZONA		Nº OPERARIOS		Puesto trabajo:		Ultimo Modificador:	RESPONSABLE:	
PRODUCCION/TURNO	788 / 218	1		1900		EGUINGA	ESCORZA	
473						LMI	T4	
						FECHA DISTRIBUCION		
						21.05.2014		
Nº OP	Descripción	T	%MX	T0	1-071 2 puertas	2-071 4 puertas	3-2 puertas	4-4 puertas
PR1A190001	DESPLAZAMIENTO COCHE A COCHE	0,06	100	0,06	0,06	0,06	0,06	0,06
PR1A190002	MANTENIMIENTO Y LIMPIEZA ZONA TRABAJO/COMPROBACION PROCESO. AVISO DE DEFECTOS (D)	0,01	100	0,01	0,01	0,01	0,01	0,01
3605K63006	FLUJAR TORNILLOS PRISIONEROS FLUJACION PUERTA ANT LID CON ATORNILLADOR ELECTRONICO	0,15	100	0,15	0,15	0,15	0,15	0,15
3620K67006	FLUJAR TORNILLOS PRISIONEROS FLUJACION PUERTA POST LID CON ATORNILLADOR ELECTRONICO	0,13	66	0,09	0,13	0,13		
3605K63016	FLUJAR TORNILLO BARRERA PUERTA ANT LID CON ATORNILLADOR ELECTRONICO	0,13	100	0,13	0,13	0,13	0,13	0,13
3620K67016	FLUJAR TORNILLO BARRERA PUERTA POST LID CON ATORNILLADOR ELECTRONICO	0,11	66	0,08	0,11	0,11		
3501K50002	MONTAR 1+1 TOPE DE GOMA AJUSTABLE DE CAPO CENTRAL DA CON PISTOLA	0,17	99,8	0,17	0,17	0,17	0,17	0,17
5403E11147	FLUJAR BORNES NEGATIVOS BATERIA MALETERO APUNTANDO TUERCIA QUE VIENE EN CAJA MALETERO RETIRANDO PROTECCION BORNES Y DEPOSITAR	0,35	15	0,05	0,35	0,35		
TOTAL ACTIVO		0,74		0,67	1,11	0,52	0,76	
TOTAL PASIVO		0,78		0,68	0,93	0,41	0,17	
TOTAL		0,93						0,93

1- 071 2 puertas \*TFO Motor Ocho 4 cilindros 1.4L motor D3C.H (ALU) \*D80 Motor Ocho 4 cilindros 1.2 177 KW TSI motor básico: TWDTPI \*1A2 Sistema de combustible inyección directaCdo. FSI \*0A1 2 puertas \*223 Batería 260A (55Ah) \*ABH Equipamiento Top-deportivo \*01C Cambio automático de 7 marchas \*1DL Outil izquierda \*3SD Piso de carga plano posterior  
2- 071 4 puertas \*TFO Motor Ocho 4 cilindros 1.4L motor D3C.H (ALU) \*D80 Motor Ocho 4 cilindros 1.2 177 KW TSI motor básico: TWDTPI \*1A2 Sistema de combustible inyección directaCdo. FSI \*0A2 4 puertas \*223 Batería 260A (55Ah) \*ABH Equipamiento Top-deportivo \*01C Cambio automático de 7 marchas \*1DL Outil izquierda \*3SD Piso de carga plano posterior \*4X3 Arriaga laterales anterores con arriag de cubaja  
3- 2 puertas \*0A1 2 puertas  
4- 4 puertas \*0A2 4 puertas

Illustration 36. VW Work timing sheet

studied in order to take times from one car to the other .That different of time depends of the model and, because as we have explain before , not all clients want the same features for their cars.

This sequence is prepared before the assembly process in a previous buffer (warehouse, called that way in the factory).This implies a suppliers JIT(just in time ) with just few hours for produce what is needed in the way is needed for the car , providing them just in the moment the body enters in the assembly line.

All this, added to the reworks in the total production process, do not allow the factory to have a stable production in which, as it is pretended to be after work on this concept, a fixed sequence of cars is established and maintain during all the process .

But the Stabile Production wants more than just a fixed sequence from the beginning until the end of the production process, but also, to set this sequence 6 days prior to the start of assembly.

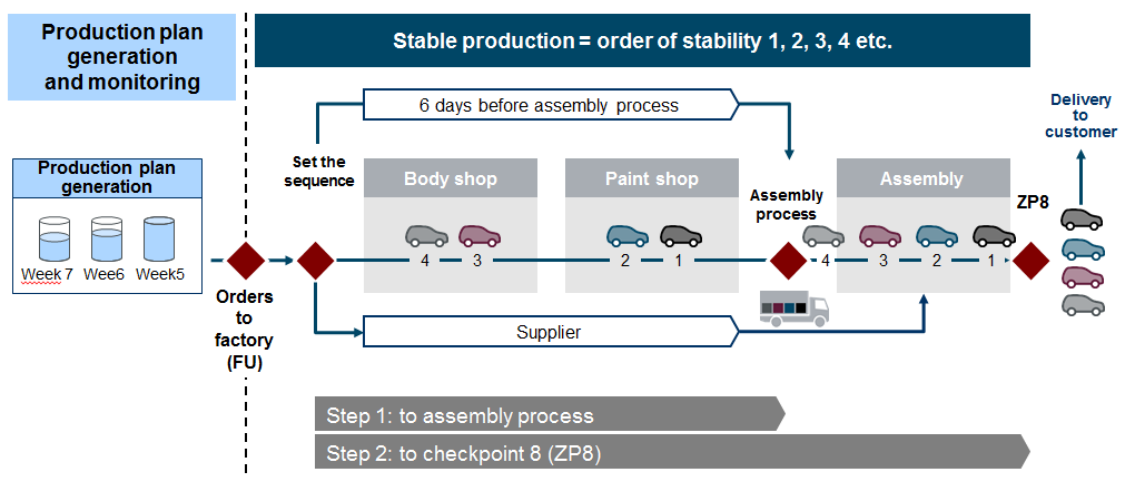


Illustration 36. Stabile Produktion concept representation

This makes sense when we think about the suppliers actual situation and the benefits of planned those sequences 6 days before the start of the production process.

Nowadays, the suppliers receive the order for producing ,between 1.5 and 5 hour before it has to provide them to the factory . This is the time a car takes from the start to the end of the assambly line , where the parts are added to the body.Those suppliers have not so many time for make them , what forces them to have warehouse with half made parts.Having all this provisions implies money for them,and therefore the price of those supplied parts is much more higher for us than it could be by having one week to produce the parts, when no intermediate parts are needed .



Taking into account that an 85% of the polo's cost is from those materials, the price of the polo could fall down making it much more competitive in this warring environment.

But this is not the only benefit of adopting an stable production process .Even if it could be the more important one in the long-term , short-term improvements have been already shown in the pilot factories where the stabile production has been implemented.

In the next graph we can see all this benefits by comparing the actual situation with the target one.

An actual situation with huge different between the suppliers call-offs and consumption exists.As we can see in the graph , with the stabile production ,besides reducing the procurement cost by demanding them the specific consumption that is needed,we can have long-distance just in sequence suppliers , what reduce sequencing costs and staging areas.

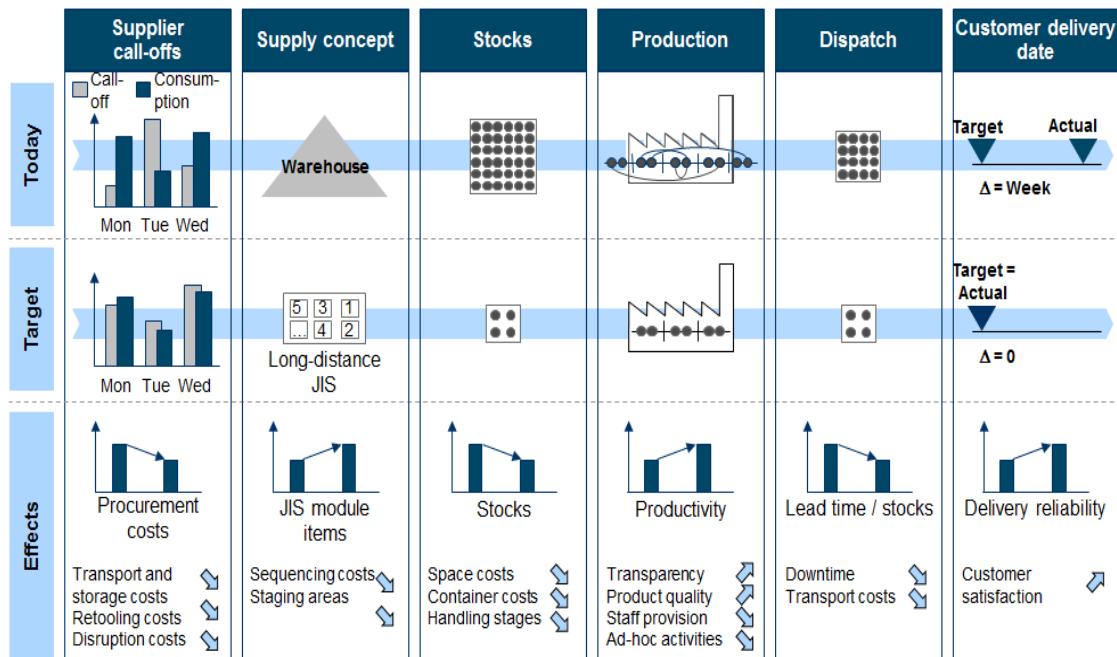


Illustration 37. Stable Production benefits

But we can see the benefits also inside our factories.

Firs of all, demanding exactly what we need ,without changes in order, helps us to reduce the stocks in the buffers what suppose a huge reduction of costs.Not only because of the space , that in most of the cases if not all is from Volkswagen ,but also for the containers cost that are rented to another company of the group.

However, benefits go further than just the cost ones. By having a stable production, a more transparency and quality in the process is achieved. Transparency in the way that all cars follow an order and each time one car does not arrive, the point of disturbance is perfectly detected, and therefore, an immediate solution is given, what improves the quality. This diminishes the ad-hoc activities (extra activities) or reworks.

As Volkswagen is a customer-oriented company, so all improvements have a final objective of customer satisfaction and stable production is not less. With current production instability, not all cars are built in the order that are demanded by customers. This implies a warehouse of finished cars after production, before trains or trucks take them for delivering, what implies a margin of a week in the final delivery to customers.

With the stable production, where all cars are made in the order they have been demanded and not changes in the order appears during the production process, cars are going to go out of the factory in the same order. This makes possible to reduce this week from one to zero, growing up the delivery reliability and, therefore, customers satisfaction.

#### 4.2 Project procedure

Before analyzing those results in the factories where the Stable Production has been implemented, it's necessary to understand the procedure of the project and how this idea started for achieving the "Mach 18" objectives.

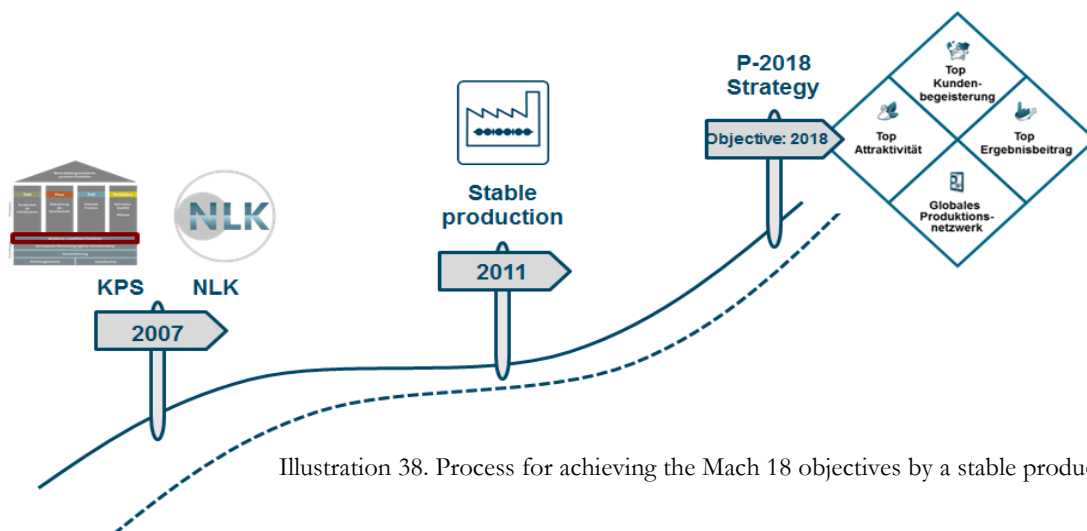


Illustration 38. Process for achieving the Mach 18 objectives by a stable production

As we have seen when talking about the 'Mach 18', being a value-oriented and synchronous company is a crucial factor, and taking into account all benefits explained before, having a stable production is fundamental for achieving it.



In the year 2010, where a 20-50% of stability was detected by average in the factories, this idea was studied with the goal to implement it in 8 pilot factories, starting on one production line and moving on to the rest. This was made in order to prove its effectiveness before being implemented in all the factories of the consortium.

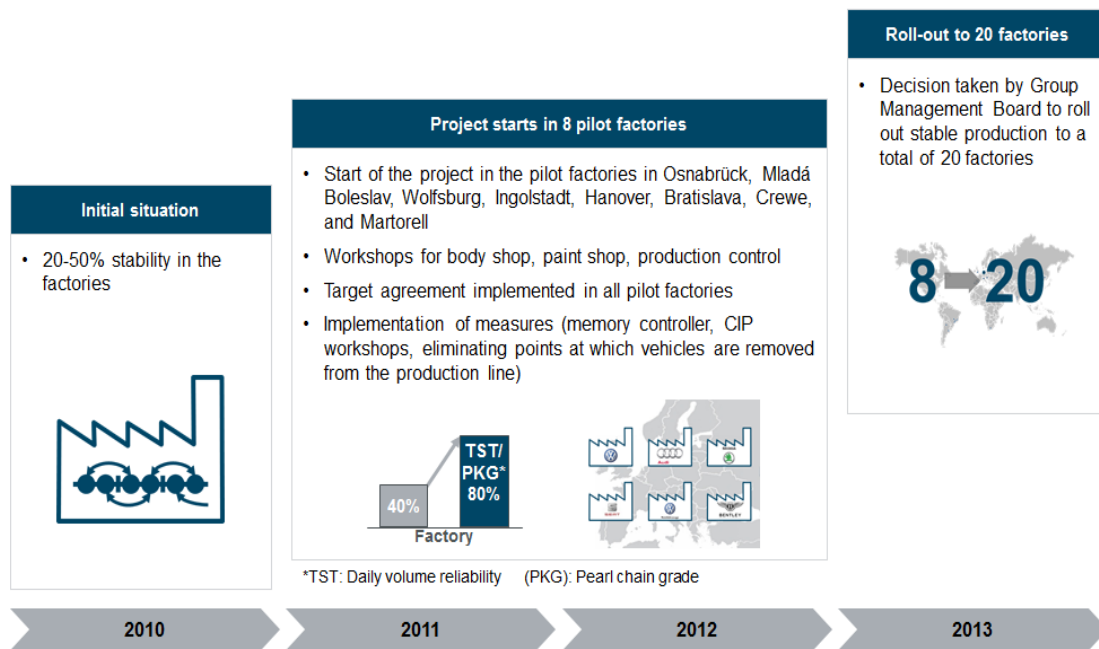


Illustration 39. Stable Production concept rollout

Eight pilot factories, with different brand productions, were chosen in order to prove this effectiveness and, the general process of an idea implementation has been done.

As we have started to do in Volkswagen Navarra 2 months ago, and we are going to explain in the point 4.4, games(courses) to show the idea with realistic representations were created from the Training Center(Lean Center) of each pilot factory. Those courses helped people to better understand the concept and the follow implementation.

Once the concept was analyzed by the Training Center and the boards of directors, many workshops took place in the different production shops. In order to study their actual situation and the possible implementation measures to achieve this objective, experts from the garages met each other to analyze the situation.

Different measures were implemented as memory controller or CIP workshops for make the production more stable, and most of the points at which vehicles are removed from the production, were eliminating.

The results were totally satisfactory but it couldn't be possible without the assistance provided by the Group during the complete process ; methods and tools of a standardized procedure and a constant knowledge transfer to the factories.

Once the effectiveness has been proved and results shown an increase of the pearl chain grade (PKG) from a 40% to an 80%, from the Group Management Board, a decision to roll out stabile production to a total of 20 factories was taken.

### **4.3 Pilot factories examples**

For understanding the effectiveness of the project and how to achieve it, we are going to see specific examples of the benefits and the measures that were implemented in the pilot factories, finishing by see how we are implementing it in our factory of Volkswagen Navarra.

Regarding the previous explained benefits and following with the same type of graph, we are going to analyze the case of Neckarsulm and Zuffenhausen, factories that demonstrate the potential of the process by making substantial savings.

As we can see in the graph, by the implementation of the stabile production, several benefits in the supply orders and concepts, as well as in the internal factory production management, have been achieved.

In Neckarsulm, an Audi production factory, 7 items were reduced of the industrial parks of the suppliers by equalizing the call-offs demand and the consumption , what allowed work on real time and reduce warehouses.

That way, a reduction on sequencing costs were achieved, in particular a reduction per vehicle of 24 euros in the model A8 and 14 euros in the A6, what is a considerable saving. Benefits were achieved also inside the factory by reducing the buffer space by 12500 m2 and the complexity management. Least but not less, a reduction of handing stages from 7 to 3 was achieved. This fact reduced the material lead time by a 18%.

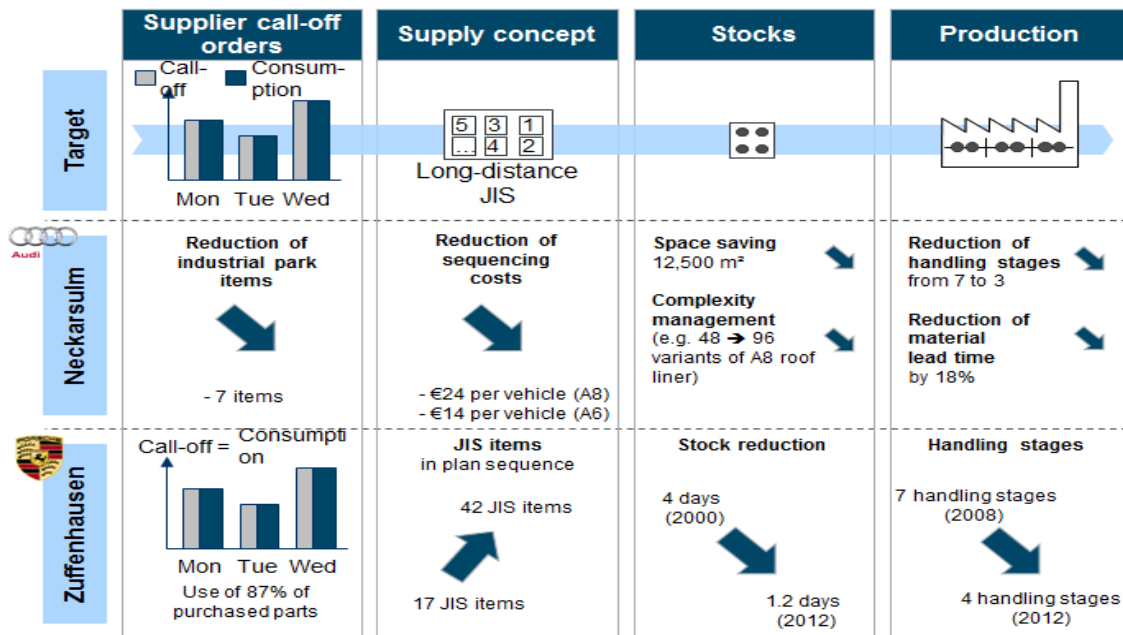


Illustration 40. Stable Produktion pilot factories benefits

The benefits in Zuffenhausen, a Porsche production factory, are not less considerable. By the supplier side, call-off and consumption were equalized and 87% of the purchased parts are used today. Besides, the just in sequence items grew up from 17 to 42 what reduce the factory stock from 4 days to 1, 2 (buffer capacity).

As in the case of Neckarsulm, handling stages were reduced by 3 in this case, what has an important repercussion in customer satisfaction.

After having implement all the activities for the Stable Production project in the 8 pilot, and increase of the stability in the factories of a 20% has been proved.

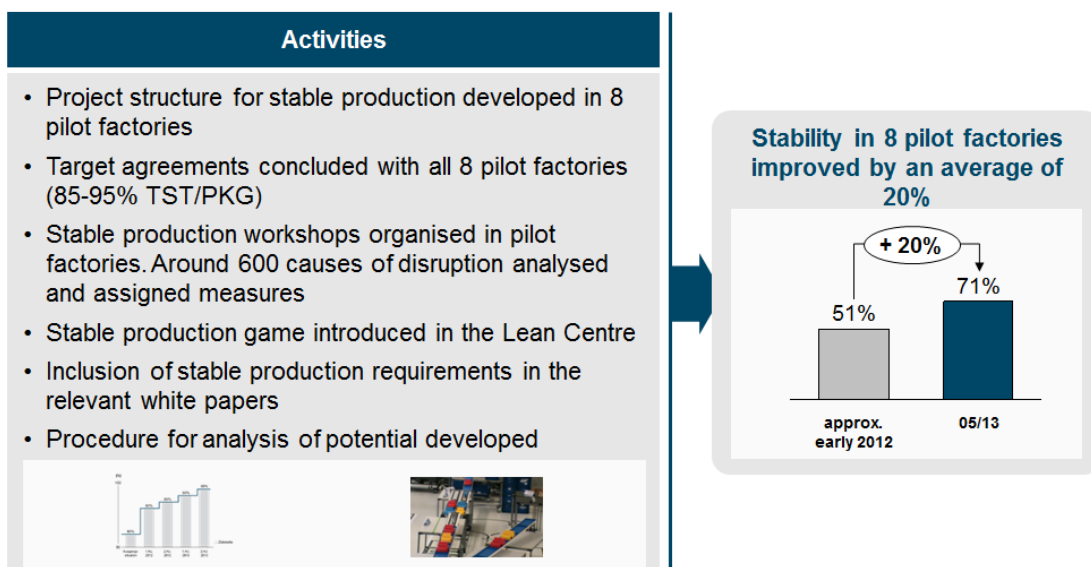


Illustration 41. Stable Produktion activities and results

But the important and more difficult factor is arriving by workshops to identify those improvement measures for achieving the stability.

Not all factories circumstances are equal ,even if there exists standards for the consortium, and that is why ,even if the procedure to follow is the same , each specific factory has to work hard in order to find the best practices for its production line.

Nevertheless, for understanding better how to achieve this complex project, we are going to see some specific measures that have been implemented in the pilot factories.

For example, working in a management level , in Neckarsulm, Osnabrück and Hanover, process transparency has been achieved by measuring and monitoring stability by section.

Before working on the stability of the plant, no measurement and visualization of process stability for individual sections of production existed, what leads to suppose a lack of transparency, where no weak points were identified. However, by reporting indicators throughout the entire process, key areas of focus are transparent and therefore, targeted measures can be introduced and their effectiveness can be monitored.

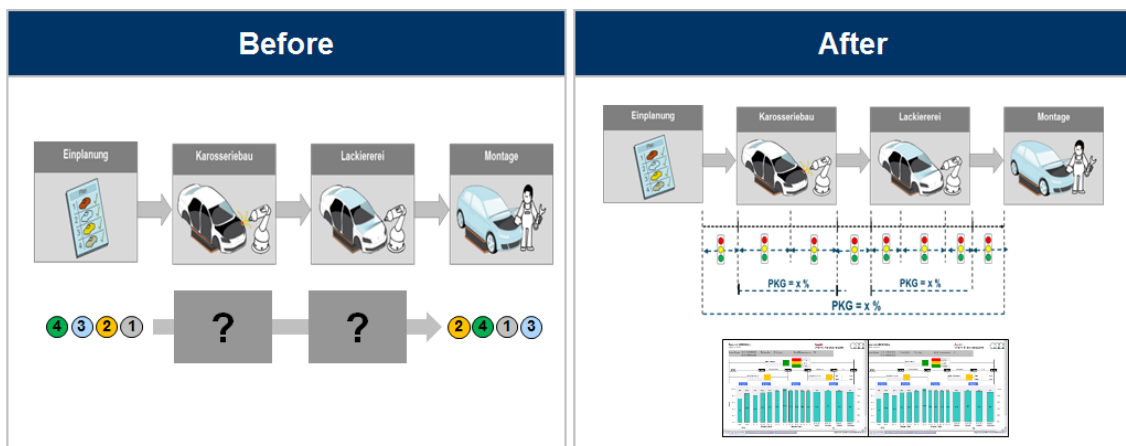


Illustration 42. Best practice implemented in Neckarsulm, Osnabrück and Hanover

Another best practice, in this case for body shop and implemented in Hannover is to follow-up work prioritized for delayed vehicles.

Before the implementation of this measure, vehicle bodies which required rework were removed from series production before checkpoint 5, and the rework was carried out in bays. This made the processing sequence to be arbitrary. That way the body was taken from bay following no order and the perlenkette sequence was lost.

By prioritizing delayed vehicles, by a monitor positioned in front of the bays displays the upcoming rework and lists the vehicle bodies according to the degree of delay, we have a more targeted rework and ,the most delayed vehicle bodies are prioritized.

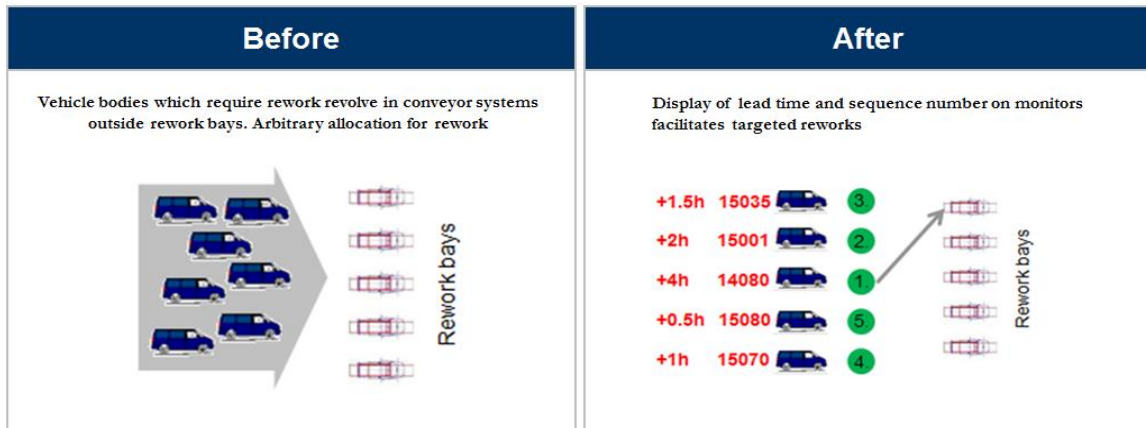


Illustration 43. Best practice implemented in Hanover

Another example of an implementation measure in a pilot factory is the one made in the paint shop of Neckarsulm and Osnabrück .By a continuous control of the vehicle body flow and color block formation in accordance with the sequence a more stable production have been achieved.

Before the implementation of this measure, the internal paint shop system did not use DISPO sequence numbers so the flow of vehicle bodies could not be managed in sequence. By creating an interface for the transmission of DISPO sequence numbers to paint shop systems (Called EMOS), buffers can be controlled in sequence in order to restore the sequence in before enter in the assembly line.

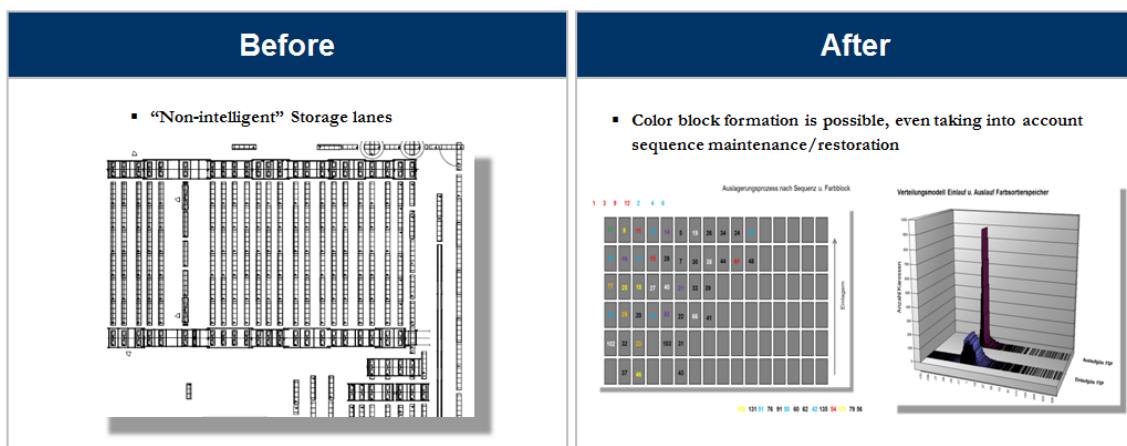


Illustration 44. Best practice implemented in Neckarsulm and Osnabrück

Those are examples of different measures in different factories and ,even if each factory have its own conditions and take different improvements measures , most of them are considered “Best Practices “.Those Best Practices are sent to the rest of the factories in order to study if their implementation is possible.(This is the case of the previous ones).

Volkswagen Group wants to share the ideas of the factories so that benefits are shared. The implementation of Best Practices is quite complicated because each factory is in a different situation. For instance, ideas that came from factories in which different car models are built, are very tricky to apply in other factories and usually they require big changes so that they can be adopted and finally implemented. In the end, it is not economically profitable.

Something similar happens with factories that are new or are in a developing phase. Many of their ideas are not applicable in developed factories because they already have implemented those ideas.

#### 4.4 Adaptation and Implementation to Volkswagen Navarra

The implementation of each project in a factory takes different time. In the case of the Stable Production , it has been fixed a period of 20 weeks for the adaptation of the project to the factory ,and around 2 or 3 years for the implementation of the improvement measures .

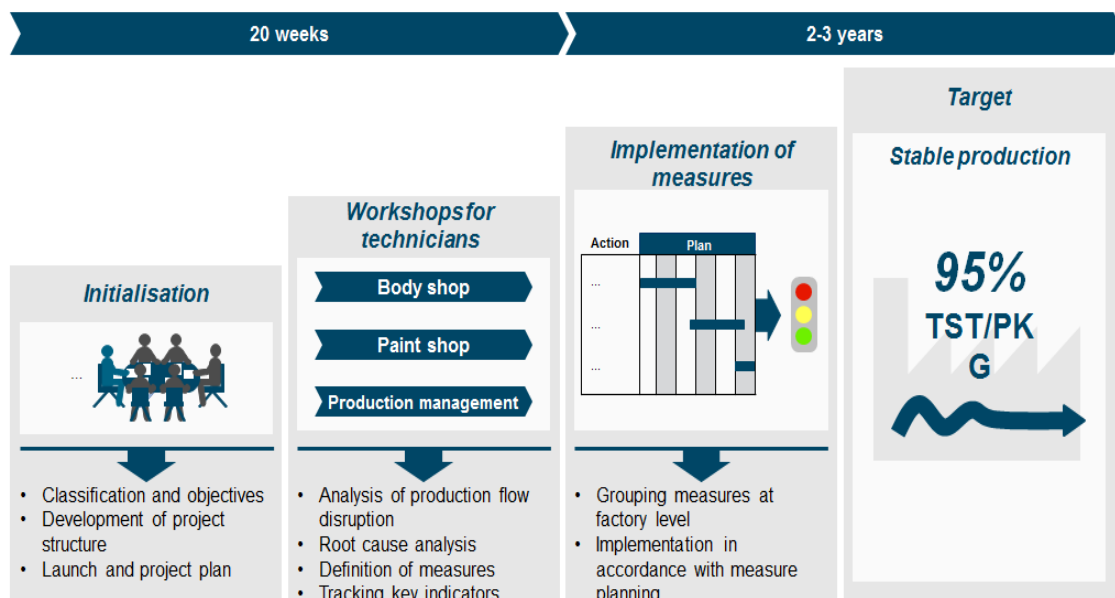


Illustration 45. Stable Produktion implementation process

Above all else, it takes place the process called "Initialisation", in which we already have worked from the Training Center of Volkswagen Navarra.

Once pilot factories results were checked and we were selected by the Group Management Board for being one of the next factories to implement the Stable Production, many meetings took place in the Board of directors of Volkswagen Navarra for fixing objectives.

Together with the Training Center it was developed a project structure and plan.

First of all, we took all the support material given by the consortium and we adopted it to our factory. For make it possible, as the first step, we translated some power point presentations as well as posters in order to prepare the course.

Once the concept was clear for us, we started to work in the creation of a game representation of the current situation of our factory. That way, we could detect the disruption points and start to think on how to change it for becoming a more stable factory.

With the Trilogiq team, a garage of Volkswagen Navarra that built all materials for the works shops like closets or tools required for the production, we built a structure for the course. With this structure and truck toys that were bought from a Poland supplier we built an imaginary factory. This factory was built as similar to the real one as possible.



Illustration 46. Stable Production course material

Last 7<sup>th</sup> and 8<sup>th</sup> of May, to experts of this project, Thomas Nethert from the Logistic consortium department and Maik Tessmann from the Trainings Center Consortium, came to Volkswagen Navarra for giving us a pilot course of the course.

Even if we already have created our own material, they came with the original one and gave the course to a total of 20 people. Between the presenters, we have been all the Training Center staff as well as people from other factories like Seat or Volkswagen Palmela. In order to learn how to do it well, and reproduce it to all the company indirect employees during the next 2 years, we did not just attend the course but we participated on it.

Besides, the certificated our material and course by the consortium standards, what is compulsory for being correct.



After receiving the course, we started to work hard, together with technical experts from each garage as well as quality and maintenance staffs, we organized meetings (called workshops) in order to study the current situation of each work-shop. Week-long workshops are held to analyze and optimize the bodywork flow. The actual situation of the factory is analyzed in order to take our own improvement measures.

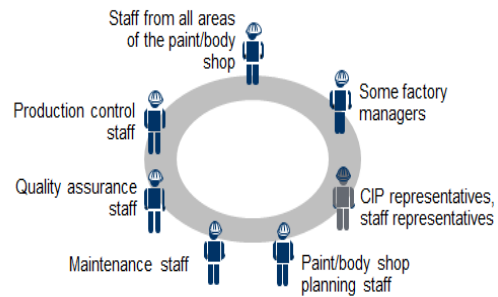


Illustration 47. Participants of the SP workshops

The first workshop that we have organized was in the Paint-shop, for carrying on with the body-shop and the assembly line. But all workshops, not matter in wick garage, have the same structure but not the same duration.

Week-long workshops for a factory's body shop and paint shop staff ,but just a 2-3 day workshop is required for production control staff.

Visualisation in the workshop:

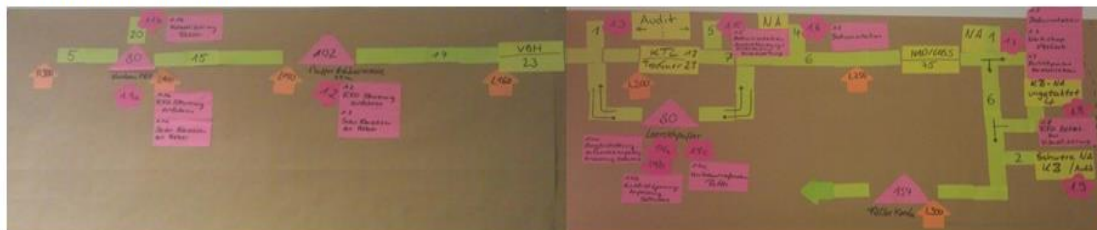


Illustration 48. Workshops visual panel

About the structure, all workshops work with a visual panel in which they express their ideas. For represent all the ideas in those pannel a 3 step process is followed.

Firt of all , usually in the first workshop day , the current situation of the workshop is analyze and its flow is recorded in the way we see in the previous picture.

Once the flow is examined to ascertain any production flow disruption, a standardized work-sheet is completed with the production flow disruption points and each one of the points is analyze. This process use to take about 2 days in the body and paint shops and around one for production control staff workshops.



VERWIRBELUNGSPUNKTANALYSE												
Nr.	Beschreibung	QUALITÄT	RECHENWEIT	PARALLEL	ANZAHL PRO TAG	WARTUNG	RECHENWEIT	RECHENWEIT	RECHENWEIT	RECHENWEIT	RECHENWEIT	RECHENWEIT
		ANZAHL PRO TAG A	VERWIRBELUNGEN DER KARDIEN B	VERWIRBELUNG S-GRAD A x B								

Illustration 49. Workshops standardized work-sheet

After have being analyze the flow disruption point and have reported them , the more important points and ,sometimes the one that takes more time arrives;’’ the definition of the measures for improve and drive out those points’’.

Nr.	Maßnahme	Verantwortlicher	Termin	Fortschritt	Status	Wirksamkeit
1	Beschreibung der Maßnahme		KW/Jahr			→

Nr. 1   .	
<b>Verantwortlich:</b> → ..	<b>Maßnahmenplan:</b> Status: 
<b>Ausgangssituation:</b> → Beschreibung Verwirbelungsursache „vorher“	<b>Maßnahmenschnitt:</b> 
<b>Zielsituation:</b> → Beschreibung idealer Zielzustand „nachher“	<b>Bemerkung:</b> → ..

Illustration 50. Workshops standardized work-sheet for defining the problems and measures

For do it , a work-sheet is provided to each factory by the consortium in order to writte the measures down in a standarized way , where timing , and level of implementation is controlled during the process ,as well as the results of each measure.

Its primary focus is the implementation of measures and improvement of reliabilty figures.

This workshops procees is not an aislate process and , at the same time , we are still working on the course implementation from the Training .

The work of the Training Center does not end with the preparartion of the material and the pilot course , now is the time to make it by our own.





Illustration 53. Stabile Produktion pilot factories

As we have explain before , a 2-years period of time is considered for implementing all the measures in each fatory. But the importance of the results is worthwhile and after have been working sucesfully in the pilot areas , we have started to work hard and with high prespectives on the Stabile Produktion project.

Although ,the Stable Produktion project is not the first neither the last course that is prepared in the Training Center.

All concepts that have been implemented in the consortium have followed the same process of implementation and was the Volkswagen Training Center the first of work on it.

The Training Center goes togetuher with all important improvements that are implemented in the company , coloborating to the evolution by working around one year before , with courses, to the preparation and training of all employees.And we are going to continous in that way , with futur courses about ergonomic and sophfloor manmanagement, other important techniques for improving the production of our factories and consequently the quality of our cars and customers satisfaction.

Even if just the analysis phase and measure definition phase have been completed in the eight pilot factories, important benefits of the project have been already detected.

## **5.CONCLUSION:**

In this competitive environment where only the bests prevail in the market ,the Volkswagen Group is continuously working in the improvement of the quality of every process as well as of its employees .

Based on a Lean philosophy and working with standards, Volkswagen is working in the implementation and dissemination of its own production system: the Volkswagen Production System, through a fundamental base of training to all its employees.

To have the best results , Volkswagen created 6 years ago a departement called Training Center in which all ideas and improvements are spread out .This is the case of the current situation of the Group . Which , by a concept called Stabile Produktion ,wants to stabilize and reduce the process timing, attaining potential savings this way and accomplishing at the same time the production schedule.

This is the VW way for becoming the most competitive company in the sector, having the most motivated and qualified employees and the car with the ebst quality in 2018.

Because even the best should improve and we are working for it.

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