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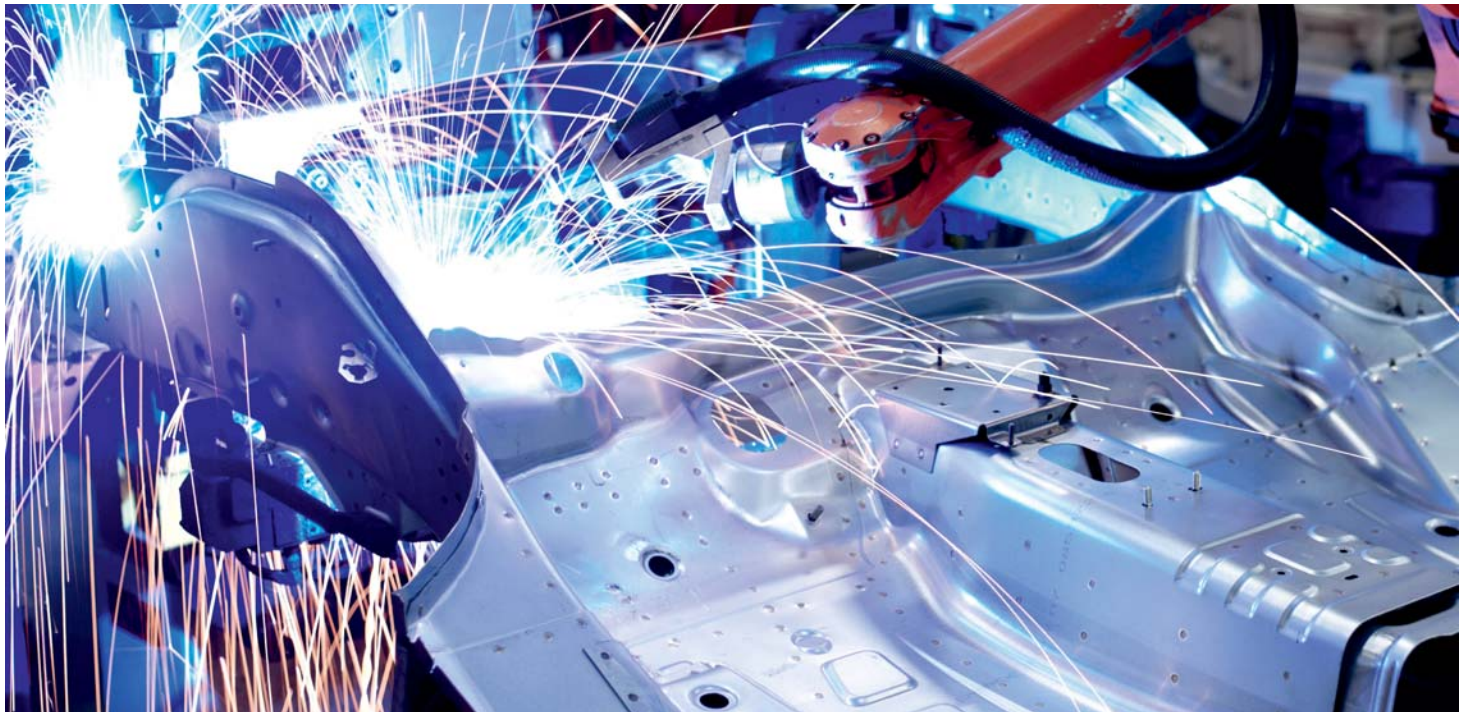

Mastering Complexity Through an Adaptable Production System

Schuh & Company
Complexity Management

Content

Editorial

Diversity, Dynamics, and Interdependences: Complexity has particularly deep impacts on production because of high capital investments typically found in that area, which cause rigidity over a certain period of time.

This characteristic is both a trend and a challenge at the same time. The key to success is systematic and holistic consideration of all factors from strategic orientation of the production system to the operational implementation on the work place level. Questions to be answered include the desirable degree of changeability and adaptability of production systems as well as the most suitable training concept for the implementation of Lean Production concepts. Our first article in this Complexity Management Journal provides you with some answers.

In this issue, we also introduce ACTLean.org, our operational branch for training and implementa-tion of Lean Management concepts. Creating Val-ue without Waste and Complexity Management are topical areas that are closely interlocked with each other. Bringing the various aspects systematically together in your organization allows you to implement what we call Lean 2.0!

Best wishes

Jörg Starkmann
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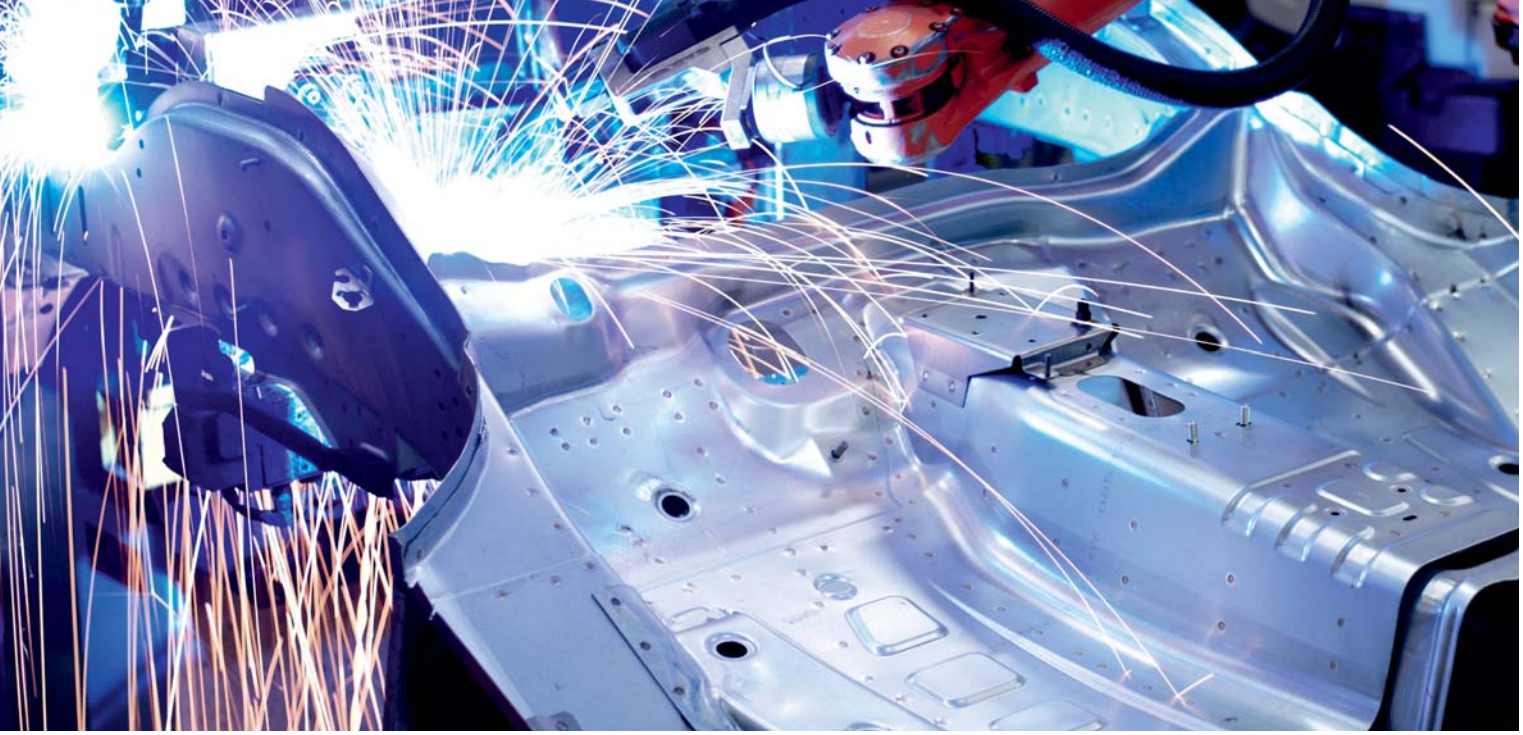

Mastering Complexity Through an Adaptable Production System

Gregor Tuecks/Jan Eilers

Diversification and resource efficiency are the current megatrends when it comes to production systems. But what does this mean for a product line that typically requires capital intense equipment? It is both opportunity and risk at the same time. The key is to design and implement the right level of adaptability in order for the production system to meet the requirements of the complexity in the product system.

Manufacturers in high wage countries are facing challenges that are not just diverse, but increasingly complex. Internal and external factors are determining an environment in the enterprise that is best characterized by diversity, dynamics, and insecurity. In order to be successful, an enterprise must be able to adapt to this environment. The complexity challenge an enterprise is facing can best be described with the following dimensions:

- Diversity within the Production System
  - Heterogeneous and individualized products
  - Diversity of the value streams
  - Heterogeneous resource requirements and constraints in resource usability
- Dynamics within the Production System
  - Shorter product life cycles and more diverse customer requirements
  - Smaller average order size and changing market demand
- Insecurity within the production system
  - Vulnerable processes and logistics chains

Areas of Tension in Complex Production Systems

All decisions related to the configuration of the production system in an enterprise are made based on the two areas of tension known as Production Planning and Production Operation. Both areas of tension are described by two contradicting sets of goals.

In the Production Planning field the goal is the optimization of the value stream using capital intense, highly specialized systems for simulation and planning (focus on planning). At the same time there is a strong desire for maximum flexibility and adaptability of the value streams in the enterprise (focus on value).

In the Production Operation area the trade off is between economies of scale and economies of scope as a result of the structure of external market requirements and internal costs. Therefore, in low wage countries the focus is normally on exploiting scale effects, while in developed areas of the world it is more on the individualization of products in order to meet more heterogeneous customer requirements.

These four dimensions together form a two-dimensional field which is often referred to as the "polylemma" of production (Fig. 1).

The key to successfully deal with the complex challenges lies in the configuration of the production system. This should be done in a way that the contrasts in the areas of tension are disambiguated as much as possible. At the same time, equilibrium between the system complexity and the level of adaptability of the production system must be established.

Fields of Activity for the Configuration of Complex Production Systems

The areas of tension mentioned above can be used to identify areas of activity for the configuration of complex production systems. These can be understood as practical approaches to implement adaptability of production systems. Of greatest interest are topics and industries that are most relevant for industrialized countries (Fig. 2).

Individualized Production System

The best way to address the demand for heterogeneous and individualized products is through the individualized production system that combines aspects of the opposing production concepts of mass manufacturing and individualized production. The goal is to allow efficient manufacturing of highly individualized products, an ability that is particularly important in developed countries. In order to resolve

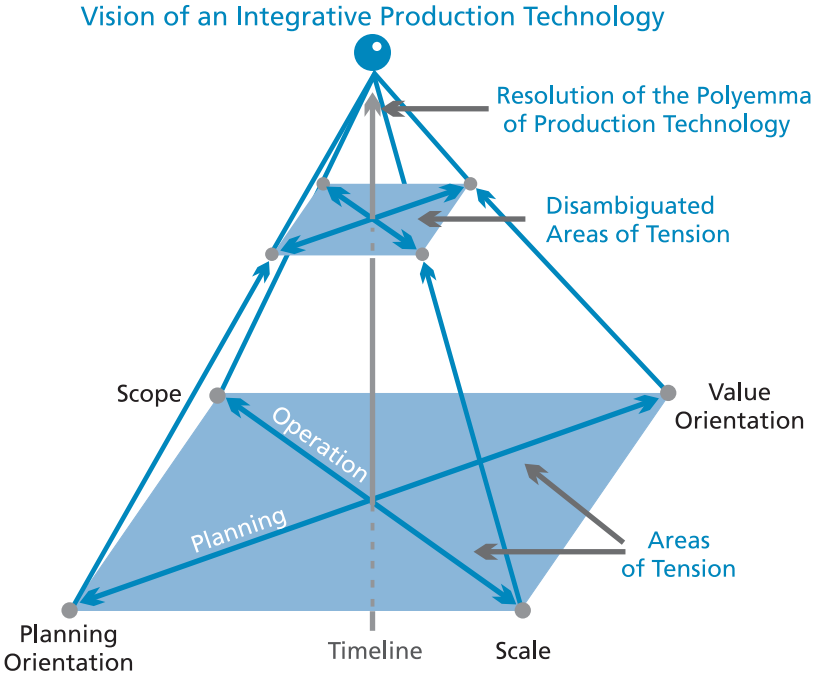

Figure 1: Polylemma of Production

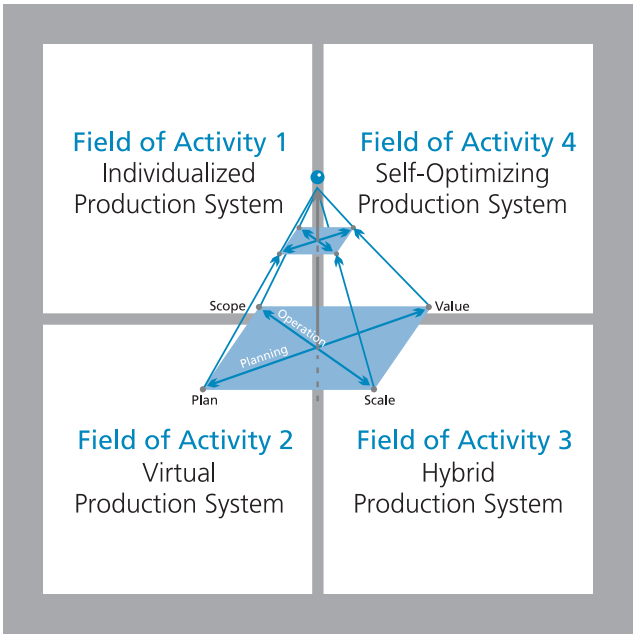

Figure 2: Fields of Activity for the Configuration of Complex Production Systems

the dilemma between economies of scope and economies of scale, the structural elements of product and production structure must be harmonized to the highest possible level.

Accordingly, individualization of the production system must consider both, the view of the customer as well as the view of the production organization. From a customer's perspective, a high level of individualization in terms of a cost vs. value ratio is of interest. From the viewpoint of the production organization however, the focus should be on standardized production processes and equipment. This helps to maintain the highest possible volume effects while still providing individualized products in large enough consumer markets.

Most recent developments in production technology such as Selective Laser Melting (SLM) are examples for how the dilemma between scale and scope will be disambiguated in the future. It allows a close relation between product structure and production process while maintaining efficient manufacturing despite small production lots. As a result, enterprises are enabled to meet individual customer requirements at reasonable development and production costs despite the increasing complexity of equipment and production processes.

Virtual Production System

The goal of the Production Planning tension field is to achieve a continuous optimization of the efficiency and quality in the production processes. This is becoming increasingly difficult when more complex production processes are used, as is normally the case in developed economies. It often can only be done using simulation technology. As simulation itself is not a value creating process, its contribution to the achievement of the goals must be continuously monitored and evaluated. In doing so, the resulting planning quality and the flawless integration in the value creation chain must be systematically improved over time.

A special focus should be on the holistic planning of the production system using cross-departmental simulation methods in order to achieve the next higher level of simulation quality. The most promising approaches combine several methodologies to an integrated simulation system. This allows for a more precise prediction of process results, as factors and effects can be simulated that cannot be considered in simpler systems. Nevertheless, the simulation methodologies used in the sub-systems must also be continuously improved.

Examples for higher level simulations are called Virtual Manufacturing Systems, which are combining a multitude of NC control units, control loops, mechanical equipment, and processes in order to predict both single effects as well as interdependent impacts.

Self-Optimizing Production System

Self-optimization of production systems is focusing on decentralization of planning activities towards local units that are directly embedded in the value creation process. A key capability of a decentralized system is to react autonomously to complex, i. e. quick and frequent changes to external factors such as work load, user interactions, errors, etc. Compared to simple control loops that are designed to control a single output variable, self-optimizing systems have the capability to adapt the production system more dynamically based on the external needs. It does this by using continuous monitoring of a multitude of external values, evaluation of situation specific target values, and an adaptation of the system characteristics in order to meet these target values.

However, preconditions for the successful implementation of a self-optimizing production system are always the precise description of highly complex production processes and the identification of all parameters that must be controlled.

Hybrid Production System

Integration of diverse manufacturing technologies to a hybrid production system allows for achieving several advantages. For example, process chains can be shortened through higher integration, e. g. resulting in a reduction of the number of setups. This not only results in reduced setup time but also in increased quality and minimized risk.

The most significant challenge when integrating processes is to avoid collisions of the individual platforms during the manufacturing sequence. A very precise synchronization of all movements is key, which means that control systems of several, normally individual platforms, must be interconnected. An example of a hybrid manufacturing center is e. g. a combination of a milling center with a handling robot and a laser welding robot to a hybrid machining center.

Conclusions and Recommendations

Configuring the production system in order to meet the requirements of the market system is key to its success. The question to be answered is: How much adaptability of the production system is required to meet these requirements? The trade-off between adaptability and system complexity must be actively managed in order to guarantee robust results and processes. This can only be achieved when using an integrated approach considering all four of the above areas of activity (Fig. 3).

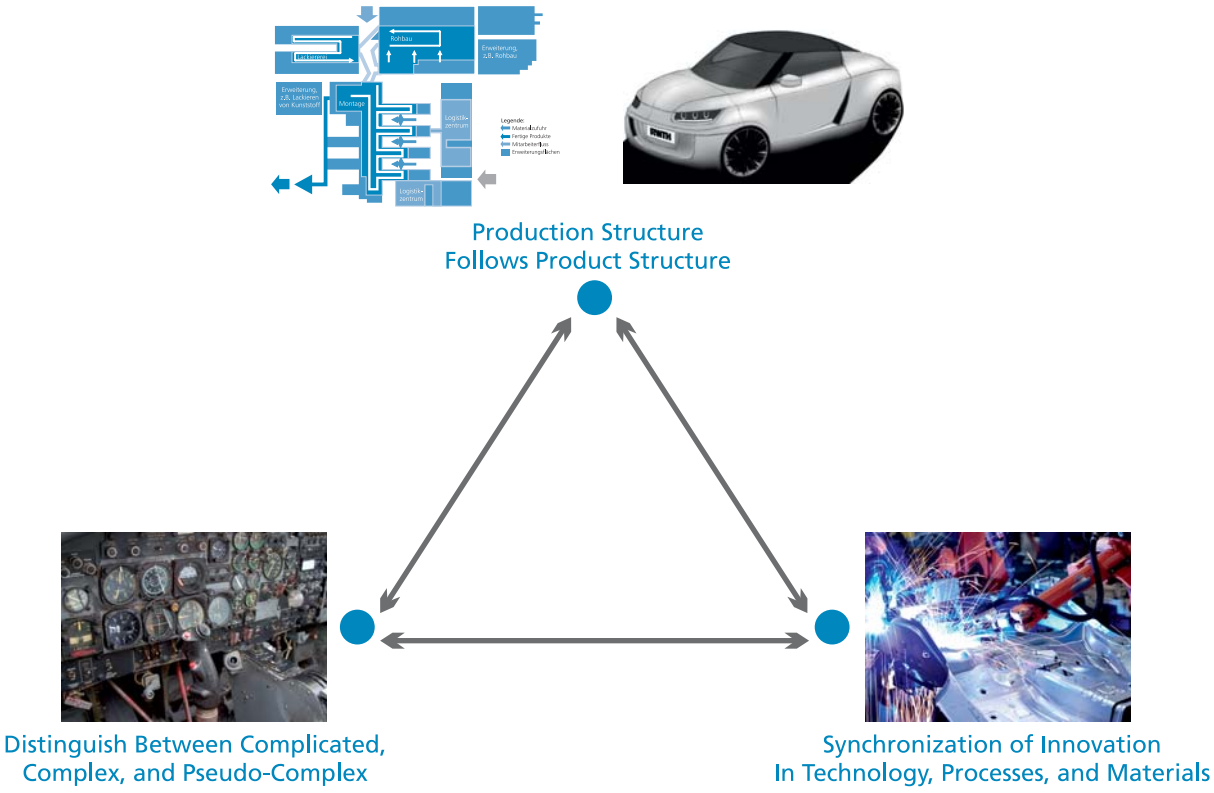

Figure 3: Intergrated Complexity Management to Resolve Areas of Tension

Therefore, the following three recommendations should be considered for the structuring of any production system:

- Production structure follows product structure
  - Create visibility of dependences and define the required degree of adaptability
- Synchronize innovations in technology, material, and processes
  - Harmonize production innovations in the context of the product design process
- Distinguish between complicated, complex, and pseudo-complex
  - Classify production problems, some things only appear to be complex but aren't

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Mastering Complexity in Manufacturing Scheduling

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With the beginning of the last economic crisis, Ortlinghaus-Werke used the situation as an opportunity to improve their internal processes and structures, more than what was possible in previous years where sales were much higher. Integration of the employees in the improvement process through motivation and participation in the success of the measures allowed the company to create an enterprise culture characterized by readiness for change and implementation strength. Cooperating with the Laboratory for Machine Tools and Production Engineering of the Technical University of Aachen, Ortlinghaus-Werke found a partner with whom they were able to develop and implement the concept for mastering the increased manufacturing complexity that has increased because of continuously more demanding customer requirements.

Starting point and goals

At the Wermelskirchen (Germany) location, Ortlinghaus-Werke produces brakes, clutches, and system solutions for diverse applications using single piece and small batch production. As in the past few years, manufacturing continuously improved its processes which allowed for a steady increase of the capacity usage and the production performance. Because of the increased individuality of customer orders and the increased number of manufacturing techniques in the past few years, the market has changed, demanding higher complexity in manufacturing. The introduction of an advanced planning and scheduling system (APS) for the detailed planning of the manufacturing processes should have helped to master the manufacturing processes. Very soon it became clear that such a system alone would not provide the desired success.

Because of this, Ortlinghaus-Werke has asked the Laboratory for Machine Tools and Production Engineering of the Technical University of Aachen to analyze and further develop the current concept of production planning at the Wermelskirchen (Germany) location. The main challenge was additional reduction of order lead time, at the same time increasing the on-time delivery rate. Until then, the IT system with the implemented optimization algorithm had the effect that the results of the planning processes were not accepted by the employees because of their hidden nature. The results were calculated in the computer and no one could understand why the system came up with the outcomes it did. With the help of simpler, rule based control methods the goal was to increase transparency and give the employees a more important part in decision making of the contol system.

Process Complexity as Key Determinant to Design the Manufacturing Control System

Ortlinghaus-Werke has a classical workshop based production principle as it is often seen in small and medium size enterprises. Because of the deep vertical range of manufacturing, most manufacturing processes are structured in several levels so that a high number of machines are actually involved in each section of the manufacturing process. The difference in operation times between individual process steps is sometimes very high. The same is true

for the lead time for sequential orders because of changing lots sizes. The actual value creation takes place on more than one hundred individual machines. As a result there are a high number of different pathways for the products throughout production. High fluctuation of capacity usage of individual resources is the consequence.

This process diversity in combination with different factors, for example changes in sequence of orders, is creating a high complexity in planning and control. So, it is safe to assume that there would be highly fluctuating order lead times, a fact that was confirmed by the analysis of data from individual manufacturing orders (Fig. 1).

The Challenge of A Complexity Optimized Manufacturing Control System

The classical dilemma of product planning and control is to achieve short order lead times and high stability of the production plan even in turbulent markets and fluctuating demand. For this purpose there is a whole series of IT tools that can be used. For example, supply chain management, enterprise resource planning system, and manufacturing execution systems, just to name a few. Especially the increased usage of Advanced Planning and Scheduling (APS) systems shows that enterprises have a high need for mastering complex processes because of the high dynamics. Based on real time data feedback from production, such systems can adapt themselves to changing characteristics of the process. Therefore, they can actually execute four different control tasks which can be defined as follows:

a. Generation of an order has the greatest influence on work in progress in production. The main difference of the used methodologies is how a production order gets triggered. We can distinguish between triggering because of a customer order, triggering based on forecast, or by changes in warehouse levels. (Fig. 1).

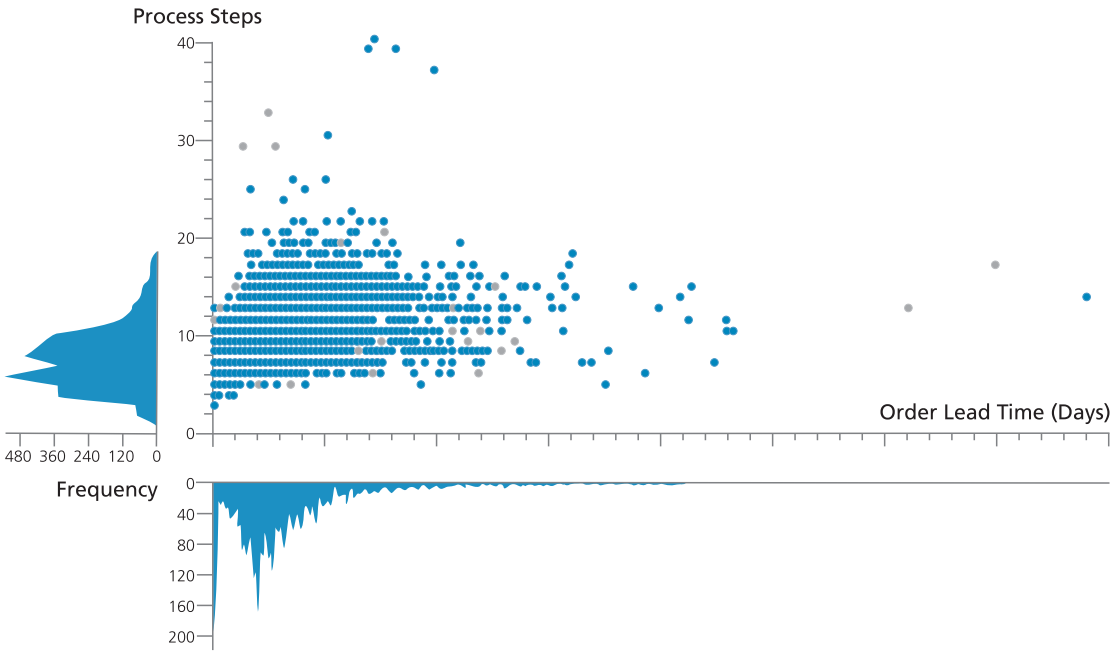


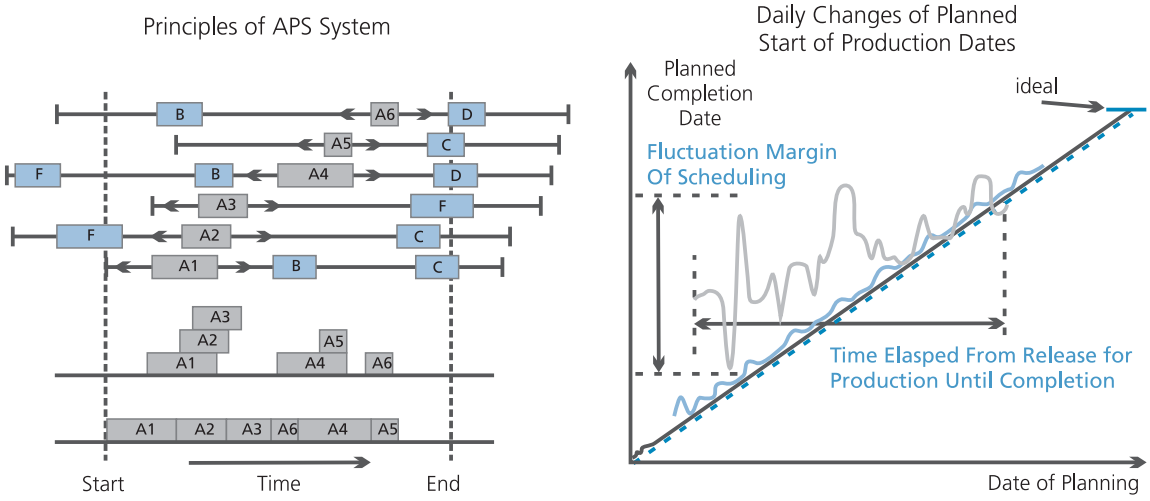
Figure 1: Distribution of Order Lead Time

b. The order release is a task that is often underestimated in industry even though lean principles such as kanban or hijunka would actually lead the focus on the release of orders. The main difference is work in process, meaning materials sitting on the shop floor as well as capacity usage which in turn also influences the average order lead time. It is noteworthy that IT systems with strong support for this task are still not very common. The most MES and APS systems only provide methodology for an occupation planning of individual machines.

c. The creation of a sequence in queues is influencing the distribution of order lead times and therefore also on-time deliveries. MES and APS systems fulfill this task at their core when production is better, more stable, and predictable. If work in progress levels are reduced, more simple rules for the development of the order sequence can be used. On the other hand, stability in complex production can also be enforced by the usage of simple rules for the creation of sequence such as FIFO, first in, first out.

d. The last task is the operative capacity planning and it is actually the longest lever for productivity and production cost. While bottlenecks are systematically opened up, the availability of personnel is uncoupled from the availability of machines, e. g. through cross-training and assignment of several machines to the same operator.

In the case of the Ortlinghaus-Werke an APS system was the central element of production control. The orders provided by the ERP system were converted based on work schedules and available resources, and were assigned a starting time in a way that allowed on time delivery in principle. Using this type of order release, a so-called machine occupation plan was executed by the APS system but the work in progress was not considered for the optimization of the plan. Only on-time delivery is the target criteria. This leads to the fact that individual process steps of an



Assignment of orders to resources creates interdependencies.
Individual scheduling changes can have a major impact on other scheduled tasks.

Figure 2: Advanced Planning and Scheduling (APS)

order could be executed separately with long pauses in between as long as the delivery date was on time. Because of numerous predecessors and successors relationships, a highly complex work order system developed, which in principle, can be executed but is very sensitive against changes of any kind. On the right side of figure 2 we see the shift of a plant start time for a task over time. It is clearly visibly that there is fluctuation of the target time frame which allows the conclusions that planning and control is very unreliable.

Based on the ideas of Deming, who did research using a funnel experiment to analyze how to master processes that are diverse, it can be shown that continuous adaptation in such a system actually worsens the situation. Only a fundamental change in the system structure which requires a deep understanding of the inner workings of the system can significantly reduce the fluctuations in the system. These possibilities are outside the scope of what the individual worker can do, therefore about 80 % of all fluctuation problems are caused by the management.

The next task was using further investigations and analysis to identify true reasons and to answer the question whether such a control system is useful for the type of operation used in this example. Besides many influence factors, for example changing targets times and short time order entry of rush orders, the strongest inconsistency for the development of an order sequence has to be identified. While the APS system provided a daily list of work orders to be executed on each machine, manual optimization of order lead time was performed at the same time on individual orders by changing the order sequence. Therefore some work orders from the buffer were expedited and others were held back. These changes of the sequence had a massive influence on the reliability of the planning process. They were the reason for many changes of planned delivery dates. They were the single most important reason for missed delivery dates, followed by changes of parts dimensions and incomplete routers in the system. It was therefore not possible to comply with this highly detailed manufacturing schedule.

Even though APS systems have been successfully used in many applications there are two reasons why Ortlinghaus-Werke has decided against using them. First, as a result of the product complexity the quality of the material data was not good enough to control production orders. Secondly, the potential for improvement of order lead times and reduction of work in progress was not high enough. Therefore, a new concept for production control had to be developed.

An important part of production control concepts is the consideration of manufacturing bottlenecks. Bottlenecks limit the throughput of manufacturing orders in the system and therefore influence the work in progress. In literature there are several approaches to identify bottlenecks, however many of them are unsuitable for daily practice. For this reason Ortlinghaus-Werke has used the definition given by E. Goldratt, saying the bottleneck is characterized by the longest queue of orders in front of the process. Based on the available data from the shop floor it is possible to identify and measure the orders that are sitting in front of each machine and therefore identify bottlenecks. Because of the complexity of process flow it is possible that several bottlenecks exist in the same process. Furthermore, newly released orders can change the capacity situation so the bottlenecks are dynamic over time. In order to reliably identify the bottlenecks depending on the actual situation, Ortlinghaus-Werke has defined a bottleneck as follows: Any machine or process is a bottleneck if the work in progress in front of that machine is more than three days old or if the queue has orders in it that take longer than three days which have already been sitting there for more than three days waiting for processing. At the start of the analysis those conditions were actually true for 60 % of all manufacturing resources.

Figure 3: Scheduling Board

The tasks of order release and sequencing that had previously been performed by the APS system now had to be performed by different methodology as the introduction of an additional IT solution was not suitable because of the problem described above. Therefore, a rule based production scheduling system was selected. This meant the scheduler had to come more into focus as the decision maker and he would need to be supplied with carefully prepared information in order to be able to make the right decisions. The most significant change was to no longer provide detailed order completion dates as had been provided by the APS system before. As such, information from the system had to be treated as a goal; it was always being used as excuse for not meeting delivery targets.

This was no longer possible with the new control concept. As a result, it became more important to be able to predict the order lead time and completion date which was only possible to achieve by reduction and fluctuation of order lead times. Fluctuation was reduced by simply applying the FIFO rule, meaning first in first out, which was integrated in the manufacturing layout as a restriction to always process the order that has been sitting there for the longest time.

The second element was the bottleneck oriented release of orders with a restriction on releasing additional orders while the buffer in front of a machine was still filled to a specified level. A key tool for this was a planning board that shows the work flow for every day and supports the scheduler with the needed information. At the same time increased awareness of all employees regarding the impact of changes in the order sequence improved the situation in a way that sequence changes only take place prior to the release of the order and delays of other orders are much more visible. In addition, the knowledge of the resource usage on each machine led to a changed approach from daily expediting of orders to a more holistic optimization of the production process. Step by step, WIP levels were reduced which in turn had a direct influence in the order lead time. In some areas the order lead time was reduced by 60 %.

These remarkable successes are also a result of the many ideas that Ortlinghaus-Werke employees contributed into the change process to improve the work environment in the continuous improvement process and to continuously develop the manufacturing control concept further, e. g. by the implementation of new visualization tools.

Conclusions

An important part of this solution is the close monitoring of work in progress and waiting times. In conjunction with selected release of orders, even a complex production system can be controlled with relatively simple tools. This approach has already been used by Ortlinghaus-Werke with very good success and is continuously improved. Even though the individual elements of the solution have been known in theory for a long time there are no other applications in a similarly complex process that is documented. Experiences made with the development and design of manufacturing control concepts is highly valuable. Additionally, the cooperation between Ortlinghaus-Werke and the Laboratory for Machine Tools and Production Engineering also shows the importance of the excitement of all the employees with the application of the new solutions. That is the only way to ensured that there is uninterrupted development of new ideas that lead to continuous improvement.

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Using the Production Audit to Determine your Organization's Lean Maturity Level

Gregor Tuecks

How "Lean" is your current production really? This question can be answered by ACTLean within only one week. To do so, ACTLean has developed a standardized production audit which considers the specific characteristics of an industry. During the production audit, the enterprise's Lean production system is compared to state-of-the-art results from research projects and practical experiences from many training and coaching activities. Furthermore, both hard and soft factors are evaluated. After the audit, participants will know where they stand and what to do next.

The production system of an equipment manufacturer is influenced by the products to be produced and the total market offering. These influences can best be described by terms like "dynamics" and "individuality", which means:

- High volatility of the sales volume makes it difficult to plan the work load and production
  - Changes of monthly order entry volume of 20 to 30 % are very normal.
- A low percentage of purchased components makes the stabilization of the processes more difficult
  - Up to 85 % of the value creation is actually manufactured by order.
- Product diversity creates process diversity
  - A broad range of qualifications is required of the production employees.
- Additional reduction of the vertical range of manufacturing
  - On average less than 50 % of the value creation is done in-house.

The potentials are in the implementation of Lean Management

Successful enterprises in the equipment manufacturing industry cope with the challenges described above by using Lean management principles: Focus on customer orientation, performance visualization along the value streams, excellent coordination and reaction based on the flow and pull principles, standardized and stable processes, and actively designed in-house vertical range of manufacturing, as well as the continual search for perfection, are characteristics for successful enterprises.

This leads to significant competitive advantages that can be measured in quantifiable key performance indicators for the areas of efficiency, agility, and reliability. Enterprises that have introduced Lean production are characterized by

- high on time delivery rate of 85 % and above,
- a low work in progress (typically below 25 % of sales),
- and a significantly higher productivity of their personnel.

All in all, Lean Enterprises experience a balanced growth of both, sales volume and profits.

In order to recognize where the enterprise has its challenges and how it is positioned, ACTLean is providing a complete production audit. It consists of several building blocks that allow for the holistic evaluation of the production process in total. These steps are distinguished between a surface scan and a deep analysis scan. The surface scan allows for a quick benchmark with the Lean database and includes the measurement of relevant key performance indicators based on a series of interviews using standardized questionnaires. The database contains a vast amount of data from several studies regarding strategies for equipment manufacturers that were performed by several research institutes. To insure the actuality of the benchmarking the production audit uses relevant key performance indicators from the annual update of the VDMA KPI compass system. On top of that, the current results of consortium benchmarking projects performed by the Laboratory for Machine Tools and Production Engineering are considered as well.

Of course such KPIs are only relevant if they are related to enterprises that are providing a similar process structure and also have a comparable leadership and personnel structure.

Soft factors are important for the achievement of challenging productivity goals as well

During the audit, not only are questions asked regarding the hard factors like the application of lean methods but also soft factors are analyzed like motivation, behavior, and change culture in production Soft factors are normally not considered during analysis, but in order to achieve high level goals, they are really important.

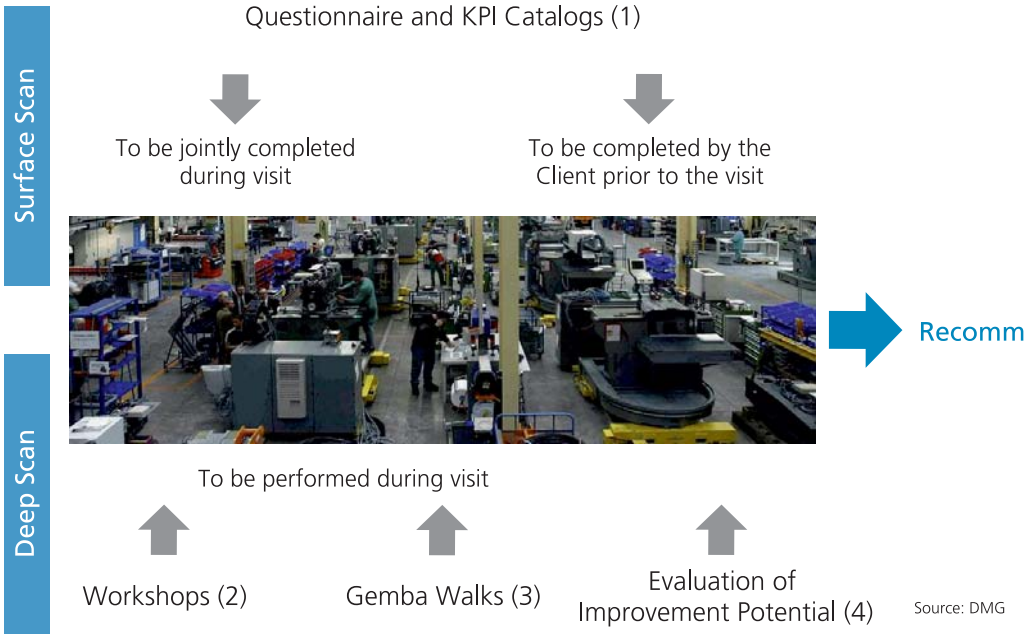

Figure 1: Elements of the Production Audit

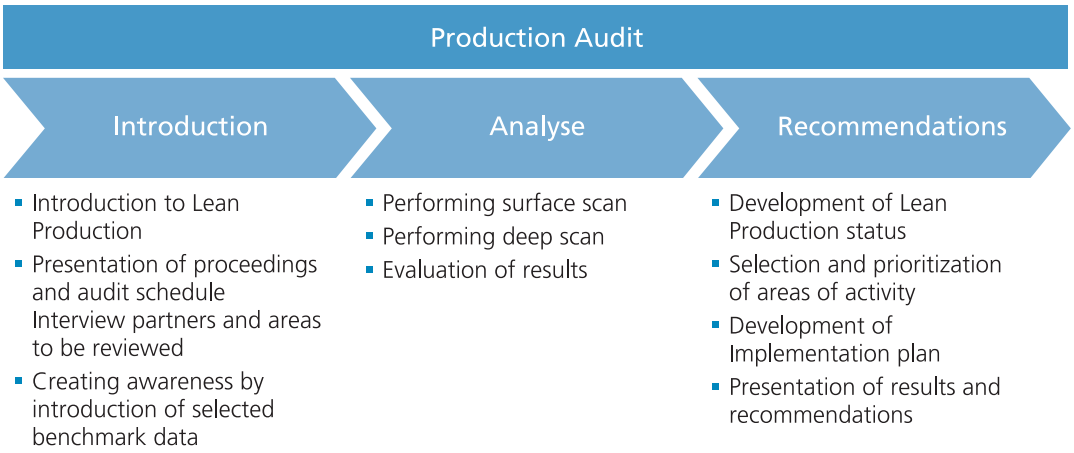

Figure 2: Proceedings Consist of 3 Phases

During the deep scan analysis the results from the surface scan are reviewed and detailed. Workshops regarding value streams and process interfaces are performed with employees from the production department. Gemba walks are also performed together with the employees to understand the production process better. The evaluation of potential combines those two analyses and brings achievable improvement possibilities to the surface. The lessons learned from the analyses are finally documented and transformed into recommendations for implementation.

The production audit provides an overview of the optimization potentials and the specific position of production between efficiency pace and reliability compared against lean production philosophy. The audit provides a true comparison with other enterprises within the industry. Therefore, it is possible to evaluate whether a company is an early adopter or lagging behind with the implementation of lean production. Overall, the production audit provides results in four areas:

1. Identification of their own position in comparison with the competition and top performers in the industry, which is based on benchmarking data.
2. The detailed evaluation of the implementation of lean measures within the company and compared to other implementations within the industry, with special focus on value-oriented coordination, ability to react to the market, simple stability, and orientation towards perfection.
3. Specific information about how to improve the readiness for change toward lean production and how to promote the corresponding leadership culture within the production system.
4. An evaluation of the potential improvements achievable with Lean. In addition, an implementation plan tailored to the specific needs with identification of activities to be preformed, necessary resources and core competences, implementation schedule, and identification of key performance indicators to measure success.

Three phases in one week

The first phase is organized as a kick off meeting. The entire audit team meets with all participants to provide an introduction to lean production in gen-

eral and discuss the proceedings for the upcoming audit. Furthermore, best practice solutions from enterprises within the industry are introduced in order to show participants possible implementation targets and to raise awareness.

The second phase is used to perform the in-depth and surface scan analyses. This includes detailed interviews of employees based on structured questionnaires and key performance indicator catalogs, as well as workshops and Gemba walks. All results are then discussed within the project team and are compiled into the final presentation.

A management workshop at the end of the audit is used to communicate the results and discuss them with the management team. Finally, an implementation plan is handed over to management.

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ACTLean: Lean Competence for Lean Application

Laura L. Lucas/Hans R. Tanner

Lean Thinking is the philosophy of continuous improvement that quickly identifies and eliminates workplace wastes and ineffectiveness. Over recent years, Lean Thinking has become the most effective vehicle to achieve world-class performance and improve market position. The goal of ACTLean is to train employees to become competent Lean Experts and support companies with the implementation of their own Lean Management System.

When implemented, Lean Management helps to develop and maintain state-of-the-art processes throughout the enterprise. They are characterized by crisp, clear definitions of functions and interfaces, executing responsibilities efficiently with as little waste as possible, while continuously producing high quality products with high value for both the enterprise and the customer.

Lean Training Workshops and Mobile Learning Factory

ACTLean provides a variety of different classes and workshops and even customized training to suite every level of need. Our classes include topics such as Lean Management, Leadership, Innovation, Procurement, Production, Sales, Maintenance, Costing, and Administration.

With the development of our Mobile Learning Factory, Lean Training comes to you. Our mobile learning center has all the core elements of an industrial manufacturing and assembly process installed on a standard 50 feet trailer and can therefore provide practical Lean Manufacturing training right on your premises. Some of the benefits to this type of training are the convenience of onsite instruction thereby eliminating employees traveling, your manufacturing processes are not interrupted, and the exact same training can be duplicated at multiple locations.

So now you have gained a significant amount of Lean Training. What's next? Where do you start? The first step towards your Lean implementation is an honest assessment of where your company currently stands. Depending on your needs, we offer three different types of scans.

Lean Implementation Assessments

Quick Scans are based on a questionnaire. They focus on one single topic out of the entire Lean Thinking Methodology. The result of a Quick Scan is a list of gaps between your specific implementation and a world-class operation for the specific topic.

Deep Scans are based on questionnaires and individual interviews. They look at your entire processes and evaluate them for compliance with Lean standards. The result of a Deep Scan is a list of measures to be implemented in order to achieve best-in-class Lean processes.

Implementation Scans are based on in-depth interviews, numerical analyses, and additional questionnaires. The focus lies on developing an action plan for your company, considering all elements in-

cluding the external view. The result of an Implementation Scan is a prioritized action plan, including timeline and resource needs in order to implement world-class Lean processes throughout your entire enterprise.

We firmly believe that in order for a Lean system to be sustainable, it has to be implemented by the company's own resources. However, we understand that it is normal for problems to occur and questions to arise during your Lean Journey.

Tailored Coaching

To help you with your implementation, we can provide targeted coaching during the implementation phase. We help you stay on track and not lose focus.

Coaching activities can cover technical subjects, general project management issues as well as progress monitoring. All coaching is always done based on your individual needs.

Now that you've established the Lean state-of-mind how do you keep it and continuously improve on it? With an established Lean Certification Standard, companies can make Lean activities an integral part of the organization.

Certification

Lean Certifications can help companies support a clear understanding of the capabilities of your resources, structure your Lean training efforts, and provide systematic training. It may also provide systematic mentoring, develop your own internal Lean experts, and standardize Lean practices within organizations, regardless of size or industry.

In our Lean Certification training program we have fully adopted the recently established standard provided by the well known organizations SME, AME, ASQ, and Shingo Prize, consisting of Gold, Silver, and Bronze Certifications.

For each level, we provide specific training, facilitate and administrate the testing process for you in order to make your certification journey as hassle free as possible.

At ACTLean we know that responsible management of a workplace takes many forms, and it is essential to the sustainability of the modern workplace to keep employees satisfied and safe. Our Lean training provides a large variety of topics and certifications; all of them having direct, positive implications for your workplace. Whether the topic is Lean Innovation, Lean Production, or Lean Administration, allowing your enterprise to explore these important issues is the sign of a progressive and successful institution.

You can find more information on ACTLean at http://www.actlean.org

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Lean Is For Everyone – The Lean Institute Offers Holistic Programs

Nicole Udelhofen (ACTLean) in an interview with the complexity management journal staff about new topics in Lean Management, training, learning factories, and coaching.

Mrs. Udelhofen, you are a trainer and coach at ACTLean. From your experiences where do you see the biggest challenges implementing Lean in enterprises?

The biggest challenge really is the mindset of the management staff. Many people still think nowadays that lean is only something for production people or maybe operative staff in administrative and support areas, but Lean is for everybody. There is only one King, the external customer (or the market in general). All leaders need to understand that they are part of a process that needs to be oriented towards the market and that must be improved every day. That means all management staff must become part of the change towards a more efficient and better enterprise and must change themselves. Once the leaders agree to this basic principle, it becomes much easier to provide resources for the development of improvement measures.

The second challenge is continuation. It's very easy to evaluate the efforts needed to conduct lean activities, but it is much more complicated to calculate efforts and costs of missed improvement opportunities.

As you said, lean management is not only used in production but also other areas of an enterprise. What areas are these?

Enterprises that have been dealing with lean for a longer time have recognized that the basic rules of lean are applicable everywhere. The key is to use methods and tools that have proven themselves in the production area and make them usable in other areas as well. The next logical step was to use lean in areas that directly support production, such as order processing or maintenance. Meanwhile, we have successfully implemented lean administration principles in almost all administrative areas such as sales, supply chain, purchasing, etc.

The most recent development is lean innovation. With lean innovation, lean methods and tools are further developed so they can be successfully used in R & D processes. This is a topic that has been successfully implemented in many world-renown enterprises in the mean time. With lean innovation, it is possible to close the last gap in the value creation chain starting from the customer desire where the product is only an idea, towards true customer value, where the customer can now gain value out of the implemented ideas. ACTLean thereby can help to not only optimize the production system but to develop and implement the business system as a whole using integrated and harmonized principles.

How is ACTLean implementing such business systems in an enterprise? Do you have different methodologies?

Successful implementation takes place in three phases.

First, commitment. All employees, and in particular management staff must be informed of everything that will be done and that has to be achieved. Of course they will have to assume different roles.

Second, screening and activation. Together with the entire team, the current state is documented and analyzed from a lean point of view. The employees learn to see things with different eyes and therefore can actively help with the development of concepts for improvements. This promotes identification with the new ways of working and ensures sustainability.

Third, implementation. Concepts must be integrated in daily operations, which is the most difficult phase for all employees. In the beginning there are only a few that are affected by lean and for them it is relatively difficult to survive against the old world. To support them, intensive training can be provided by ACTLean. Coaching of the management staff is also of greatest importance.

Part of our training concept for example is training in one of our learning factories. This training can be stationary or even on a mobile trailer which allows training directly at the premises of the enterprise. Participants can learn in an environment similar to their own process and learn lean methods without risk for failure, collect positive learning experiences, and thereby gain trust in the lean methods. Besides that, simulations and planning games as well as practical exercises are core elements of the training.

Despite all the training, sometimes it's just difficult to transfer the theory into practice. To facilitate that, we provide coaching by experienced trainers, matching the needs of the management staff and providing the security that is normally not available in the beginning of the process.

You talked about learning factories. Are those factories specific for a certain industry or can they be used to train employees in various industries in lean management?

Our trainers are active in almost all industries. This is the case for industries with piece oriented manufacturing where our trainers can support producers of single parts as well as manufacturers of complex equipment like control cabinets or turbines. The same is true for processing industries where we are active in life sciences as well as chemistry.

It is our goal to provide our clients with learning environments that are similar to the processes they experience in their daily life. Therefore, we are orienting our learning factories towards piece based manufacturing as well as continuous manufacturing.

That means training is one of the most important topics at ACTLean?

Yes, indeed. Our training classes are based around the requirements of the SME bronze, silver and gold certificates, focusing on point activities, process improvements, and strategic realignments.

It is safe to say our training meets international standards and the content reflects state-of-the-art methods that are insured by the adoption of the certification standard. That is of greatest importance.

However, for us it is not only learning a theory but primarily the impact that those lean experts will have in their enterprises. This is another reason why we support the SME lean certification standard as practical work is an integrated part of the certification.

Besides training, an often discussed topic is sustainability. What does that mean for lean management and how do you see the need for development from a trainer's point of view?

We are seeing two problem areas:

First, lean thinking is not fully adopted among leaders of today's enterprises. That means the ongoing lean activities are evaluated differently. As a result it is possible that even successful areas can lag behind again after a change of leadership.

Second, lean also means an improvement of processes. Most company's controlling systems however are oriented toward isolated cost centers. That means effects of lean cannot always be shown with the classic controlling systems. Quite often the results will only appear after a while when financial improvements can be seen, making it particularly difficult to implement and sustain lean in large conglomerates. Of course, we are trying to improve the situation. With our lean costing seminar we try to improve communication between controlling and lean practitioners. In the mid-range we try to improve costing and controlling systems in order to support process orientation and value creation.

Thank You for this interesting discussion.

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Company

Schuh & Company focuses on providing solutions and methods for managing the ever increasing complexity of today's enterprises, products and processes. With this approach, the company was established as an implementation-oriented problem solver in the industry. Today the company consists of about 40 people committed to ensure your company's success through their work as strategy and organizational consultants, as well as management coaches.

Schuh & Company is headquartered in Aachen, Germany, with subsidiaries in St. Gallen, Switzerland (since 1991), and Atlanta, GA, USA (since 1997).

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