
Comprehensive transformation of Liebherr-Components Kirchdorf GmbH into lean enterprise

Why active cultural change and achieving quantitative results are not question of sequencing

Lean Base Award 2024

LIEBHERR

Liebherr-Components Kirchdorf GmbH



**Excellence@
Components**

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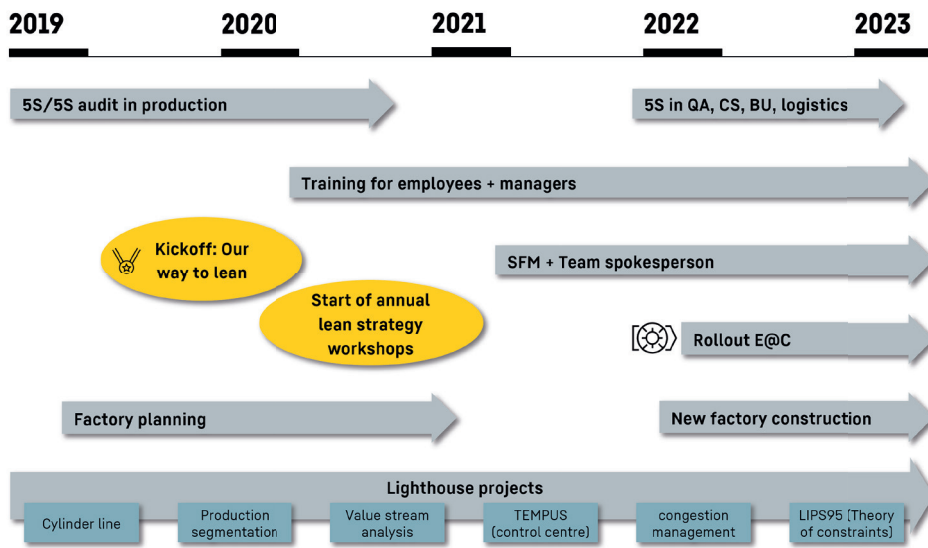


Figure 1: Our Lean Journey over the last 5 years at a glance: Holistic, organic and self-sustaining Various programmes were complemented through strategic lighthouse projects.

Introduction: What makes our approach special

What distinguishes our approach to implementing lean from the traditional approaches taken by other companies can be summarised in the following points:

- Holistic approach, horizontal, vertical and across plant barriers
- Organic, independent, sustainable
- Self-sustaining: From push to pull through continual improvement

We believe that lean can only take root in a meaningful and sustainable way with an organisation when a holistic approach supports it. That's why we have organised our lean training courses for all employees in all departments, from managing directors and management to specialists and workers. From the outset only a cross-functional approach seemed appropriate to us in the implementation of shop-floor management as a centralised tool for on-site management and control. As we identified bottlenecks not only within our own plant flows, but also in the upstream supply chain, we did not restrict the implementation to our plant, but also introduced Lean to our suppliers and even spent several weeks optimising the production of our most important supplier on site. Our central Business System Excellence@Components (E@C) is not called a production system for the good reason that it applies equally to all functions and areas. Without exception all departments have focused on continuous improvement against this backdrop. Of course, the planning of our new plant also followed a holistic approach from the outset with the aim of optimising the overall system. We are building on our existing team. We are therefore developing and empowering our management,

our executives and our employees and giving them the responsibility and freedom to implement what they have learnt in their area.

Of course, we have also learnt from external partners – always guided by the sole aim of quickly consolidating and improving knowledge internally and achieving a high degree of independence as quickly as possible. This way we ensure that the projects, improvements or methods that we implement are sustainable, fully adopted and that we can continue to develop them independently.

Ultimately, lean management has become an essential topic for all managers and employees – irrespective of whether it's a question of knowledge of lean methods or general management tools. In instances where a few years ago we had to „push“ the specialist departments to implement improvements or optimisations, the specialist departments are now approaching our lean experts with their own ideas and approaches, proactively asking for support or implementing improvements in their areas of responsibility themselves.

Lean is often understood as pure process improvement. Lean experts like to counter this by saying that lean is primarily about a new culture, on the basis of which continuous improvement becomes possible. Our approach in recent years has enabled us to demonstrate that active cultural change and the achievement of quantitative results are not a question of sequence. Although we have always kept an eye on the cultural aspect, we have always been keen to celebrate measurable successes and make the added value of lean concrete at every stage.

Figure 1 shows our approach over time in recent years, which we cover in detail chronologically below. Of course, this approach was not predetermined from the outset. However, it has always been important to us not only to focus on the next step, but also to think about the step after that. Consequently, many projects or lighthouse projects were based on the results of previous activities or were determined by external influences, such as the Liebherr family's approval for the construction of our new factory building or the restriction of face-to-face training and workshops during the global coronavirus pandemic.

The starting point of our activities was the „Everything has its place“ initiative, with which we initially implemented 5S in production, thereby achieving a general understanding of the importance of standards and standardised work in the workforce. However, the official „birth“ of our systematic lean activities was a management event called „Our Way to lean“, during which we visited benchmark companies and worked out a common understanding of lean management in workshops. It was clear to us that a targeted and comprehensive qualification of our employees at all hierarchical

levels and functions was essential for sustainable success. This was followed by development and the roll-out of training before the systematic introduction of shopfloor management (SFM). Given the various lighthouse projects that had already been initiated or implemented during this period at Liebherr-Components Kirchdorf GmbH | Lean Base Award 4/13, and on the basis of the first measurable results as well as the positive effects of our lean qualifications offensive, in 2022 we decided to bundle all such activities with the aim of sustainable improvement in our Excellence@Components business system.

Initial situation

Liebherr-Components Kirchdorf GmbH is a comparatively young company within the Liebherr group of companies: Established from our sister company, Liebherr-Hydraulikbagger GmbH, in 2014, we initially had to deal with the challenges and difficulties of establishing ourselves as an independent company. Alongside the development of whole departments and specialist areas, we also had to define and implement new processes. At the same time, we also had to fulfil the high demand from our customers for our quality products. Although we were able to increase sales with each passing year, our delivery performance was consistently unsatisfactory. In terms of the production area in particular, we had to contend with disruption-prone processes, a large production backlog and high production inventory (WiP) as well as a wasteful material flow – especially as assembly, logistics and paintwork had already moved to the new location in the Kirchdorf district of Oberopfingen in 2017, but production initially remained in the old factory premises in Kirchdorf a. d. Iller for an indefinite period.

Until 2019, the term lean was occasionally used in our company, but was understood more as a synonym for 5S and was primarily aimed at tidiness and cleanliness. The dedicated resources (Lean manager / Lean trainer), concrete know-how and a clear roadmap were lacking in the organisation. In short: Lean was not understood as a strategic tool to change the culture and achieve better business results in the long term.



Figure 2: The Liebherr-Components Kirchdorf GmbH production plant in Oberopfingen: Assembly, logistics, paintwork and a large part of the administration have been located here since 2017.

Clear lean responsibilities as an organisational requirement

A huge amount has changed over the last four years: Firstly, Lean was established as a new department together with Industrial Engineering. This created resources to implement projects on behalf of the company management, develop lean training courses and transfer the necessary expertise to the workforce. By incorporating lean responsibility into the

of the Head of the Lean / IE department, the importance of lean management within the company became clear. Since then, strategic decisions at management level have also been viewed and influenced through „lean glasses“.

Internal training as a basis for mindset change

In addition to defining lean responsibilities, we promptly began to develop various lean training courses: primarily a one-day basic lean training course in which employees – regardless of whether they are in production or administration – not only receive general information about lean, but also experience lean first-hand in several simulation rounds. We also developed our own Lean Advanced qualification programme and trained numerous managers in three modules at Liebherr-Components Kirchdorf GmbH | Lean Base Award 6/13 in „Lean Management“, „Shopfloor Management“ and „Structured Problem Solving“ for three days each. The programme includes practical tasks that are integrated into the training and „homework“ for concrete implementation by the participants afterwards. Despite the impacts of Covid, over the last four years 267 employees from Liebherr-Components Kirchdorf GmbH have received basic lean training. We started with the management level and now we are training our colleagues from operative and administrative

areas on a monthly basis. During these training sessions we transfer important lean knowledge and provide a platform for personal exchanges.

We have also qualified and empowered over 40 managers and key personnel in our advanced training programmes. In addition, we have developed an e-learning programme which, of course, does not require participants to master or understand lean, but at least to have heard of lean for the first time and to know that the philosophy of a lean company and continuous improvement are part of our DNA. Our training portfolio is rounded off by workshop training on the topics of quick set-up (SMED), the value stream methods and 5S, which we offer on request. The training courses are so successful that we now offer them in many other Liebherr locations.

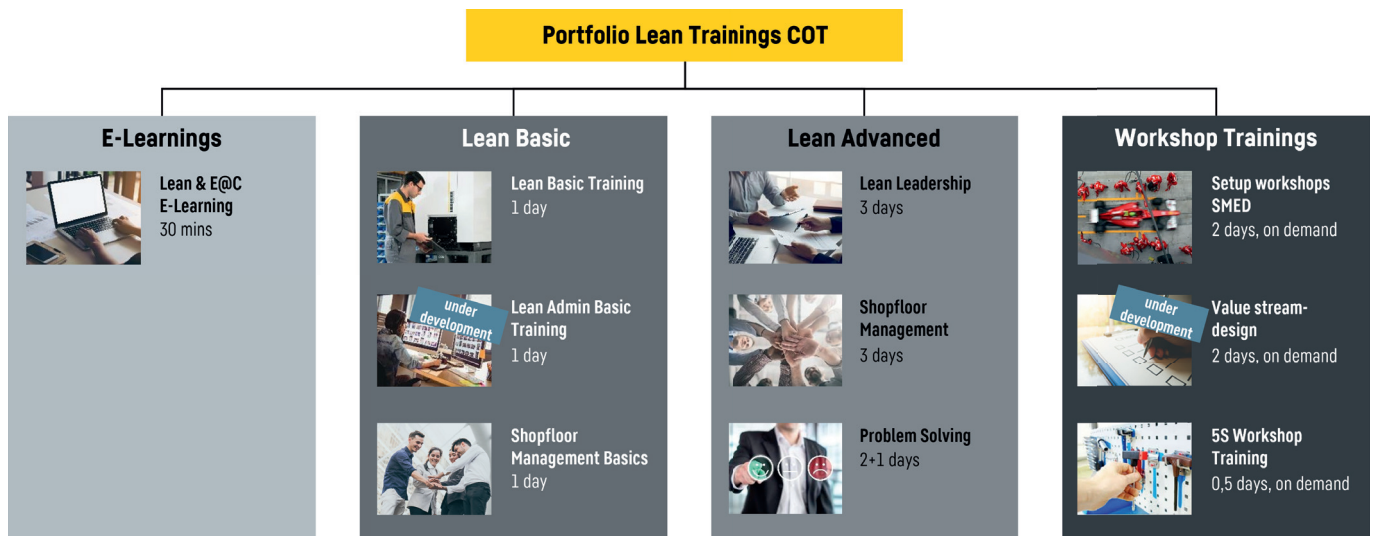


Figure 3: The Liebherr-Components Kirchdorf GmbH lean qualification programme with the learning objectives „Knowing about“, „Knowing“ and „Knowing how“.



Figure 4 and Figure 5: Getting to grips with Lean – Basic Lean training at Liebherr-Components Kirchdorf GmbH.

5s and strong leadership as the key to sustainability

The implementation of 5S in mechanical production and assembly was one of the first projects to be implemented and supported by lean management in a structured and methodical manner. Under the name “Everything has its place”, the methodology was explained in a light-hearted way and gradually introduced in the form of training courses and workshops. The role of employees and managers has been the key to our continued success with 5S from the outset: responsibility for maintaining and improving standards was transferred to the specialist department early on in the process. Employees now complete so-called 5S checklists before starting work to ensure that the defined standards continue to be met in the workplace. Furthermore, the 5S audit form was introduced, which managers use to carry out monthly audits.

There are nine questions which are used to test topics such as safety in the workplace, visual material flow along with defined and labelled location of work equipment. In the event

of divergence or error, the necessary measures are defined and implemented. Colleagues from Lean Management also attend these audits on a random basis. A BI solution makes the consistent implementation by managers and the maturity level of the respective areas transparent. This no longer only applies to production, but also extends to logistics, quality, customer service and maintenance. The multi-stage audit concept ensures sustainability and has already been successfully adopted at other Liebherr plants in our Components product segment.

The factory process as the supreme discipline

In addition to the first visible improvements in operational areas, lean is also playing an increasingly important role on a strategic level. To date, lean was and still is an integral part of factory planning for three new production halls for the relocation of mechanical production to the Oberopfingen site.

Extending over 46,000m² of production surface area, this is one of the biggest relocation and construction projects in Liebherr's history. Lean played a decisive role from the very first planning workshop. Unlike many other factory planning projects, we have consistently planned our new plant from the „inside out“. The entire factory planning process was based on the lean principles of „flow, cycle, pull and freedom from disruption“ and was supported by various lean methods such as material flow analyses and heuristic processes (including the Sankey diagram, Schwerdtfeger and Schmigalla triangular process). The value stream method already formed the basis for this. In addition to expansion scenarios, decoupling points, necessary buffer areas and lean material and personnel flows, we also considered possible automation solutions and minimised handling costs. A clear segmentation of production based on value streams along with the development of a decided production strategy for the further development of the current workshop production formed the basis of the factory planning process. In addition to the first visible improvements in operational areas, lean is also playing an increasingly important role on a strategic level.

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The office design should also promote collective intelligence and encourage departments with many interfaces to come together. So in addition to the traditional departmental offices, we have therefore also provided coworking areas in the new office buildings to make it easier to get together, brainstorm and work together. Due to the location in a water protection area, the planning of a new factory building for a modern mechanical production facility with around 55 NC machines and systems, some with machining lengths of up to 10 metres, represented a particular difficulty for all of us. In the event, this framework condition provided additional motivation in terms of our sense of entrepreneurial responsibility, so that we were not only satisfied with the minimum legal requirements, but also planned our halls in accordance with the KfW 40 standard, including a 3 MW PV system, and can now guarantee 100% green heating.

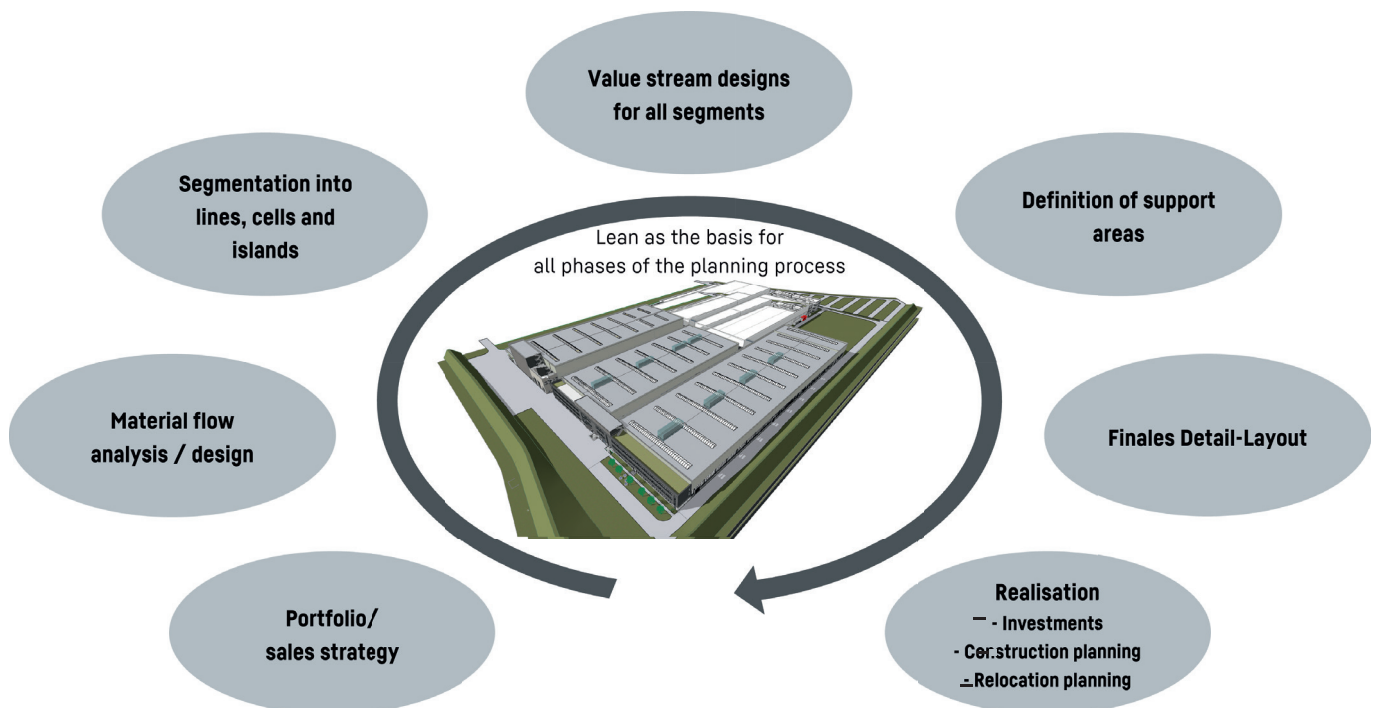


Figure 8: The planning process for our new plant: Systems and method based: "from inside to outside".

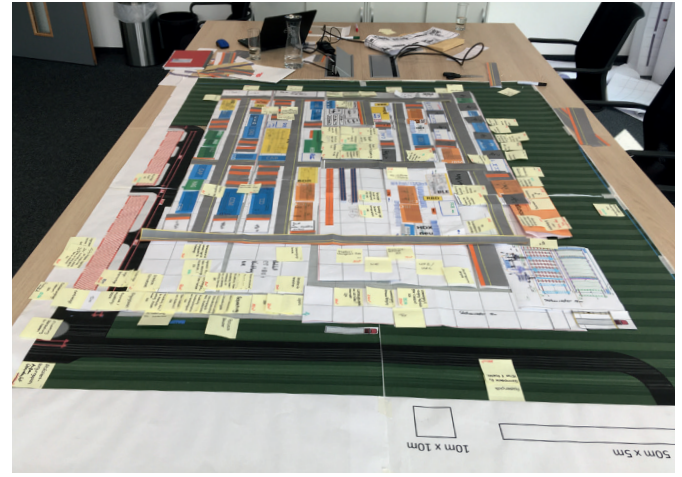


Figure 6 and Figure 7: Interactive factory planning at management level – Visualisation of the value streams in the new hall layout.



Figure 9: Implementation status of the new building in summer 2023: Three new halls for mechanical production, logistics and other areas as well as an additional administration building are being built on 46,000 square metres. In the background are the buildings that have been in use since 2017 for assembly, paintwork and administration.

Improvement project landscape and lean roadmap as central strategy tools

This year, for the fifth time in a row, we determined our so-called improvement project landscape at management level. On the basis of corporate strategy and the current challenges, a joint, binding project portfolio is defined. In addition to strategic projects, it includes operational improvement projects to ensure that key areas of action are clear to everyone and the necessary resources can be reviewed and reserved at an early stage. How and in which areas strategic lean activities take place is therefore determined jointly at

management and department management level. We are also defining our lean activities and projects for the next three years and visualising them in our lean roadmap. This process has become a firm component of the company's strategic development, and lean is now an integral part of that.

Shop floor management as a tool for management and control at the value creation level

In 2021 we introduced our "New Shopfloor Management Structuring" project, as the current situation did not meet our own requirements, nor was the added value at the value creation level fully utilised: the teams usually met once a week for information events on boards, some of which were more like blackboards.

Since then, our new understanding of shopfloor management (SFM) has become firmly established. To our mind, shopfloor management is the tool for managing and controlling on site. In order to introduce „proper“ SFM, we also examined the organisational structure in production: The sometimes broad management spans of the team leaders prompted us, with so-called team spokespersons (Hanchos), to create free capacities for improvement, key figure management, structured problem solving and training for new colleagues. Working in collaboration with Liebherr-Components Kirchdorf GmbH | Lean Base Award 10/13 HR department and our works council, we defined the new team spokesperson role. An investment that has quickly paid for itself through many suggestions for improvement, reduced downtimes and waiting times as well as implemented solutions to problems. First and foremost, however, there has been an evident increase in output, especially as this measure did not require a significant increase in personnel. Meanwhile, we have rolled SFM out in all production areas across the entire hierarchy and have developed the daily cascade up to the management level. It is our company's operating system, which we use to manage our work on a daily basis. SFM is also currently being implemented in the neighbouring production areas. During implementation, we follow our internal standards for the design of the boards and the defined sequence of the stands. All SFM boards are divided into four areas: „Organisation & Information“, „Capacities & Needs“, „Key Figures & Targets“ and „Problems & Measures“. In terms of specific content, for example key figures, there are mandatory and optional requirements. The actual development of the SFM board content is area speci-

fic and takes place during the implementation phase accompanied by a Lean Manager. Against this backdrop, we also introduced and coached the A3 method. Public roadshows of the completed A3s are held regularly, with management itself taking part, thanking the employees and paying tribute to the solutions.

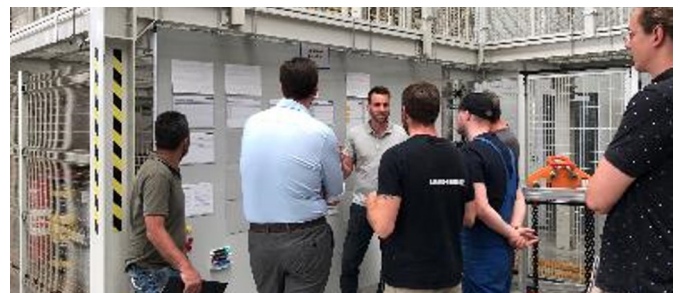


Figure 10 and Figure 11: Shopfloor Management at Liebherr-Components Kirchdorf GmbH: top: during implementation (not yet to design standard), bottom: The shop floor board between the production manager and team leader of mechanical production in accordance with defined company standards.

Theory of Constraints: From radical internal changes to the optimisation of our supplier's production organisation



Figure 12 and Figure 13: Theory of Constraints in Theory and Practice:
left: Sharing the theory with project participants,
right: Implementation of one of our first SMED workshops.

Throughput time became more and more a focus not just in the minds of decision-makers, but also in our strategic goals. Another major project was of strategic importance: the optimisation of our production planning and control, for which we organised several workshops to look at Goldratt's Theory of Constraints – a logical continuation of the proven lean approach. IT, PPS, production, quality, purchasing, lean management – just a small selection of the areas involved in this project – are working together to improve our (control) processes and workflows. In order to reduce the Work-in-Progress (WiP), we stopped releasing new production orders for a certain period of time („choke the release“), introduced a new prioritisation of orders („green-yellow-red control“) and consistently oriented all our activities to the current bottleneck („drum-buffer-rope control“). This made it possible to reduce throughput times (TPT) in mechanical production by 40-60%. Alongside changing the mindset of the management team (away from a general capacity utilisation and towards short, stable throughput times), the planning of smaller batch sizes was a key measure, which in turn required the initial use and subsequent establishment of the SMED method. This has enabled us to reduce set-up times by 20-40% in some cases.

In addition to internal improvement and optimisation opportunities and the search for bottlenecks in our own processes, we also approached nearly all of our suppliers and external processors in order to jointly define and implement possible measures to reduce throughput times. This helped us to identify a further bottleneck at one of our main suppliers. Our long-standing partner faced similar, if not the same, challenges such as long lead times, high inventories and a large backlog. We decided to combine forces in a joint project to improve supplier production organisation. At the beginning of the project, a cross-company project team carried out a value stream analysis of the material and information flow and its weak points in a transparent manner. This was followed by further analyses of the product portfolio and the current backlog. Testing possible layout adjustments, improvements in the organisation and finally holding an SMED workshop were further criteria for success. Together, we were able to increase weekly output, reduce production backlogs and improve the supplier's delivery performance. This in turn has helped further develop and strengthen our long-standing partnership.



Figure 14: The Excellence@Components mission statement: The arrow representation visualises a process on the one hand, but also represents a common direction on the other.

Our Business System Excellence@Components – Our route to holistic, systematic success

Last year we introduced Excellence@Components (E@C) as our holistic business system last year in order to create a complete framework for our efforts. We wanted to make it clear through the term itself that: We are not talking about a production system, but about improvement, and the relentless pursuit of excellence concerns us all. This was also evident in the project team, which was led by cross functional Lean Management members from HR, marketing, production and management assistance. Above all, internal marketing was an essential part of the project and is the first of two pillars that are key to the successful implementation of our Business System. We have developed our own logo and defined the mission statement to establish the business system as an internal brand. These measures were completed with a corresponding key visual, an information flyer, posters and banners. Finally, the mission statement can now be seen on polo shirts that have been specially produced for all employees. These measures are just part of the overall marketing campaign.

The second pillar of the project was actually much more important: changing the culture. Our change story was defined in workshops with management (management and heads of department). Where have we come from, where do we want

to go, what role does E@C play in this for us? In a few of the management workshops with middle management, the questions of what the mission statement actually means for us was discussed: What is “waste avoidance”? What is “management culture”? What does “customer satisfaction” really mean? In addition, each manager has made a commitment to consider several points in their area that they will action differently from now on in order to become more excellent. The topic was then brought to the attention of all employees in small group staff meetings. They were shown a video of a managing director, then with an input from their respective manager to show the importance for the respective department. The meetings were moderated by the project team and complemented by interactive market stalls dealing with the topic.

In the meantime, we are running comprehensive workshops with employees in the various departments to ensure that E@C is consolidated and adopted. In this way, we achieve not only great (improvement) results, which are then implemented under the employees’ own responsibility, but we also bring our teams back together, helping to strengthen the sense of togetherness. A Win-Win-situation for everybody.



Figure 15 and Figure 16: Implementation of the Excellence@Components Business System at Liebherr-Components Kirchdorf GmbH: Workshops with Top Management (top left), management workshops (top right).



Figure 17 and Figure 18: Implementation of the Excellence@Components Business System at Liebherr-Components Kirchdorf GmbH: Staff meetings for all employees with their managers.

Figure 19: The Excellence@Components mission statement visualised in one of our production halls and “translated” for the employees.







Forecast

We are still a long way off the finishing line, as the route to becoming a Lean Enterprise is a long one. Our focus is now on ensuring the sustainability of the activities that have been introduced, the smooth commissioning of our new plant in the coming year and the progress of our lean activities in the administrative areas. And the first successes are already visible: with our Lean@HR pilot project we have used the Swimlane method to analyse the recruitment process, identify improvement potential and define a target process.

There is still too much to do and the “North star” is still far away – however, we are now ready to rise to any challenge that comes our way and are looking forward to the exciting journey ahead of us to become a Lean Enterprise.

