A MES, Manufacturing Execution System, is an important aspect of the digital transformation. It allows the steering, supervision and control of production in real time. As production control and manufacturing system an MES system serves bridge between planning and production. In addition, it allows the connection of machines and productions units to the ERP system. Central performance indicators, such as qualitative or deadline deliverability are generated quickly in real time.
The level at which the customer receives timely deliveries is increased dramatically. Machine and production data acquisition, dashboard functions, detailed scheduling, quality data management, personnel planning or real-time services, such as energy data management, below to the core functions of an MES system. With this insight rich information, an IT supported data stream for the entire company is guaranteed. You can precisely control processes, generate accurate analytics, quickly conduct root cause analysis and optimize production steps.

For a company, an MES delivers the basis for a well-founded decision that impact your production. Integrated order notifications and stock booking lead to transparency on all product and workplace levels. Thereby enabling the granular calculation of production costs, allowing for stock level optimization and make up the basis for a KPI system to evaluate efficiency and productivity. In total the MES increases productivity and thereby reduces production costs.

However, the implementation of an MES is a project, that consumes time and resources as well as capital. In the following paragraphs you will find tips, that often sound obvious, but are critical for the success of the project.

**TIP #1:**

**Step by step to a view of the whole picture**

Start with small steps! Particularly because MES is so a comprehensive topic, you will only be success if you – while maintaining a view of the whole picture – go step by step. But where should you start? The answer to this question is to start where the biggest benefit can be quickly achieved. For the most project this would be by increasing the productivity of machines. Using the rule of thumbs – the most expensive machines first.

Many companies are missing any kind of impression on how (less) productive their machines really are. Because often the exact measurements are missing and the decision is then made by gut feeling.

Due to this the first step: start with machine data collection and use the Overall Equipment Efficiency (OEE) for your improvement processes.

Start with two or three machines and discover the slumbering optimization potential.

The further rollout to other machines only follows the success of this step and after you and your team have collected the initial experiences.
From our experience this first step needs time. Machine data collection (MDC) cannot be implemented on the side and needs 2-4 months challenging work until everyone is working in the same direction. And even after the implementation of MDC it is important that you continue – a machine optimization won’t run itself.

With this experience you can continue with the next steps of an MES implementation even more convinced than before.

Not every MES are equal. Pay attention and make sure that all relevant MES functional modules are available and that you incorrectly decide for a pure Machine Data Collection (MDC) / Production Data Collection (PDC) system. These systems will often be promoted as MES systems. The price can be tempting. However, can be costly after the fact if you will need additional MES modules, such as maintenance, quality or warehouse/logistics. Sometimes you are required to use solutions from third parties, which can require interfaces that can be prone to errors and complicated to integrate, or have different user interfaces, which make use and acceptance from users difficult.

An MES should be built modularly with all the various modules, that you need, to cover all the areas of production. Your system is thereby expandable according to your needs. And this without requiring you to use siloed solutions with new interfaces that must be developed. In addition, your system will work with a uniform data base where all processes perform stable and as expected.

**TIP #2:**

Know what you are buying
**TIPP #3:**

Tackle the biggest problem first

MES modules can be flexibly built together like a building blocks. You can, for example, assemble modules, based on your needs, such as MDC, PDC, Maintenance, Quality, warehouse/logistics, etc. This provides you with the possibility to start the process where optimization is absolutely needed.

By starting here your employees can be convinced of the benefits of the system and can get use to solution. Once you get use to the new system, because you can use it and may have lost any possible reservations, any further modules integration will go smoothly.

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**TIPP #4:**

Involve your union or staff council from the beginning

Your union or staff council should be informed from the start when implementing an MES. By doing so, the collection of person specific information can be accounted for in the employee agreement.

The staff council knows the fears and worries of employee, such as fear of being monitored, changes or losing a job. In this case the staff council can be very helpful and remove any angst an employee might have about a project ahead of time. The can convince the employee that the automated collection of machine data and the feedback of production data can reduce workload and increase productivity and thereby securing employment.

The early involvement of the staff council or union also immensely reduces the risk of refusal after the fact. It is also possible to enthuse these groups for this project, by reducing the workload of employees. In the best cases it would even be possible to have these groups as references for other unions and staff councils.
TIPP #5:  
**No secretiveness: speak about the project often**

You need to information all participants early and extensively on what you plan to do. Gather all members – from Production Supervisor, the IT department and on to the machine operators and the staff council – on board. And only then will the project be successful. Everyone should know about the MES implementation and what it means for everyone. Fears and worries can be cleared out of the way from the beginning – only this way can everyone pull in one direction and maintain the project timeline.

TIPP #6:  
**Successfactor: Projectplan! How to plan realistically**

An MES implementation with take know-how and time, even from your employees. Because of this, it is important to create a project plan, with deadlines and tasks, as soon as possible. Employees that are part of the project team will need to continue their daily business. That is why it should be precisely consider who can be assigned which activity and within which timeframe. It is also important to consider how the team can be optimally prepared for the various activities.

A closely coordinated cooperation with the IT department, who will setup the necessary servers, operating systems and interfaces, is extremely important. Connecting the MES system to your existing IT infrastructure is an important requirement for a successful implementation. In addition, coordination with your electrician to check the network infrastructure in the production hall is needed. Also, colleagues need time to collect machine technical specifications to achieve the ideal coupling of the machine to the system.

Keep in mind that unexpected events in daily business as well as in the implementation of the MES system can bring delays in deadlines. Experience has proven that customers are often too optimistic in planning the amount of work needed for the individual project steps. This generally leads to not reaching milestones in the time planned and pushing back from goals.

Your MES provider will support you in realistically estimating the resources and creating a reliable plan. Trust the project experience of multiple MES projects.
**TIPP #7:** Inform and plan external resources early

When planning the project, you should consider if external resources are needed and if they require a certain amount of lead time. Is there a need to build an interface to your ERP system? Should a network infrastructure to your machine be built and cables laid? These are topics that will most likely require external experts (electricians, ERP Specialists, etc.) that will need to be considered to provide the needed support. Include these topics in your project and cost plans.

Inform your MES provider, if they have the resources, to take over these tasks or support you as needed. This can lead to, with regards to the implementation, a large cost and time advantage. As the coordination of a lot of external partners can be difficult.

**TIPP #8:** Project Team, Project Lead and Key-User

The implementation of an MES system will take up an immense amount of time over the next few months. A smoothly running project is achieved with a diverse team from several different departments that work together on the system requirements. These requirements help in the selection process of several service providers. The team will keep an eye on the project plan as well as taking over coordination of the project. These assignment is not a fulltime job, but the time must be divided among the participants, so that they can adequately take care of the topics.

Most often a in project one person will be the MES project lead, who doesn’t have the needed time for planning and implementation. This can lead to failure of the project. Project delays can lead to lower participant motivation and the initially suggest benefits are no longer visible.

One or more key-users should be selected to work intensively in the MES system and to be trained in the MES software. These key-users are available to support production and administration with problems and questions after the activation and handover of the system (along with the support hotline of the MES provider). They also train new employees and can configure specified areas and to correct user interfaces.

Also, member of the board must be aware that the success depends on their full support. It isn’t enough to approve the procurement and delegate the implementation. It is also important to free up the necessary time for the responsible people, to intensively take care of the success of the project and to ensure the project milestones are achieved as well as getting involved when goals are missed.
TIPP #9:
MES-Workshop – Perfect timing!

One key to a successful MES project is a workshop with all the project participants. But when is the right time for the workshop?

Larger Companies
In larger companies that have already have a project team which have already started selecting solution providers and the system requirements have already been defined. The team is clear about which functionality is desired, which equipment should be connected and which interfaces need to be realized. At this phase, after presentations, reference visits, etc., a workshop will be held with the desired provider. For larger projects it is not out of the ordinary to hold the workshop with two providers.

On top of everything, the workshop secures the decision for the specific solution provider with one more additional step. Because this is where the MES experts with the know-how and creative solutions for complex solutions can be truly convincing. As contact until this point was restricted "only" to sales.

Midsized and smaller companies
The project is mostly in its early phases for midsized and smaller companies. Often there isn’t a detailed system requirement. However, that is not a reason to push back the project. In this case use the expertise of your MES providers. They have generally had implemented several successful projects where the original requirements were described on a single page.

How should the workshop continue?

After the order in most cases there is a pilot installation on your own equipment. This will be the first time your employees can get true hands on time with the system. In this phase it often occurs that the system requirements need to be adjusted. After the successful "pilot" it will continue to the appointment of the complete Roll-out. The "pilot" is there to reassure your decision for the roll-out. That is why the workshop should cover the functional extent of the planned roll-out. Experience shows that planning the functional expansions for future developments doesn’t make sense. This is because requirements will most certainly change until then.

What should you do if, after the workshop, you notice that things don’t fit with the service provider?

You have completed a workshop with the MES solution provider of your choice and determine in the pilot phase that the system doesn’t meet the requirements. This case doesn’t happen very often. However, you haven’t wasted money. The project team is now aware of the project relevant details and pieces, such as system requirements, have already been created. This will reduce the time needed for an additional pilot project by more than half.

We hope we have empowered those who have already seen the necessity of a MES system but have always push it back due to other concerns (lack of time or personnel, etc).

Trust the subject matter competence of the MES provider and make the first step. It is an extremely important topic that impacts your competitiveness. For questions of any type we would be happy to help.
**TIPP #10:**
Training project team and users

To start the project phase the project team should be provided various user manuals and documents that are relevant for operating the MES.

The users are often trained in the use of the MES on location at the customer at the end of the project.

It makes sense to have read the user manual to be able to ask relevant questions for specific areas (e.g. OEE evaluation) during the training.

Only the installed MES modules should be trained. For example, training for the module quality data in a test installation or pilot phase makes little sense. As this only involves a small circle of users and the module should be implemented at a later phase.

The content or the agenda of the training should be agreed with the customer in detail before the training.

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