The key EBITDA levers in a die- casting foundry

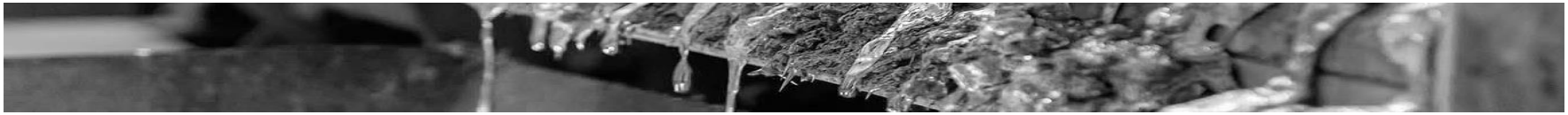
Productivity (Operational Processes)

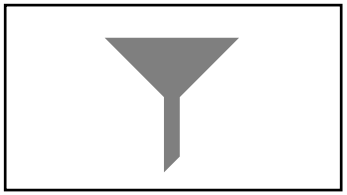
Hünnecke 7 | 59889 Eslohe – Wenholthausen | Tel.: + 49 2973 6021 | Mobil: + 49 151 11519779 | eMail: jm@johannes-messer-consulting.de

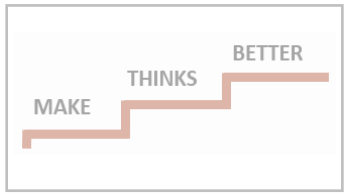
The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

Content







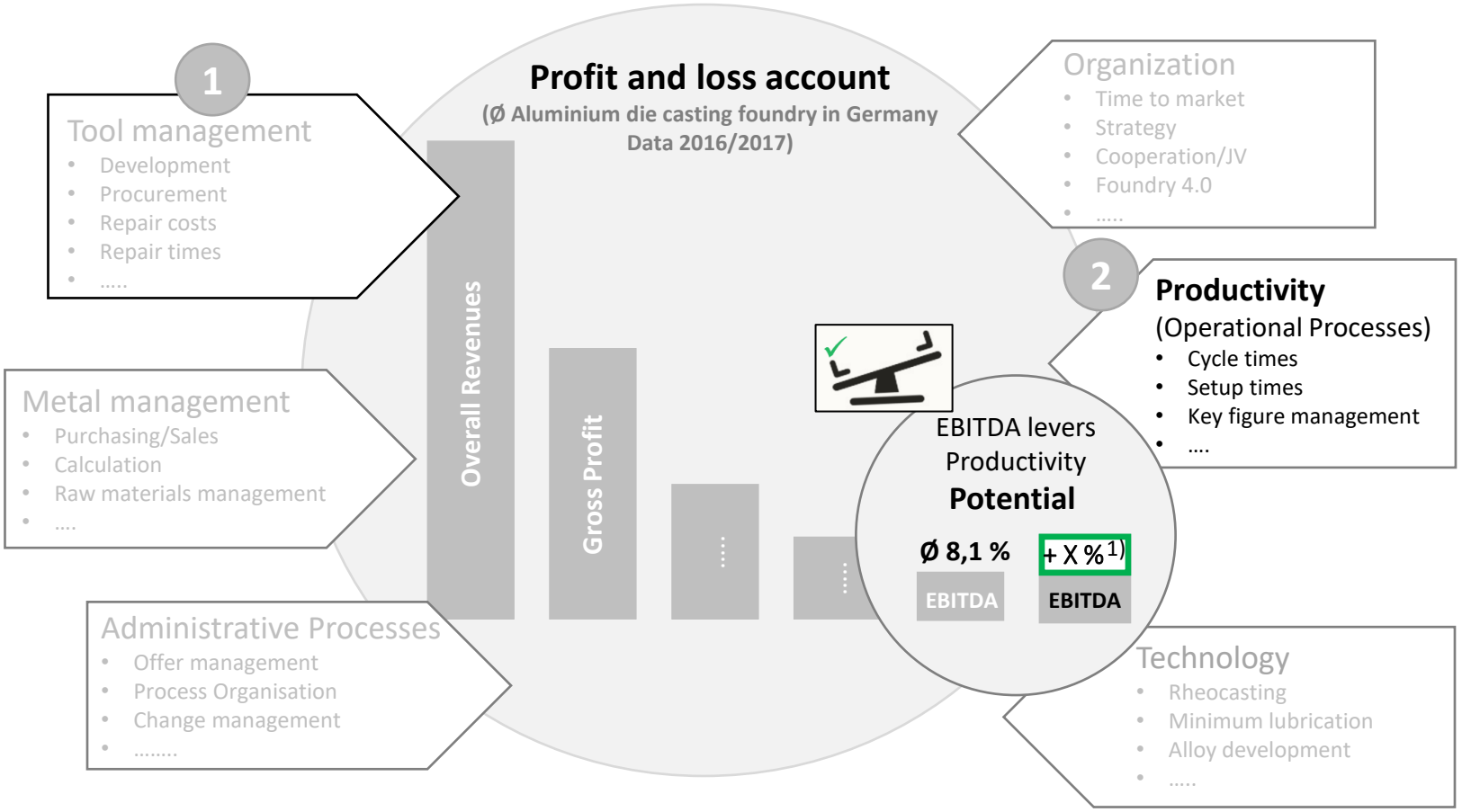
The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

Management Summary

As part of a six-part series, the **main EBITDA levers in a pressure foundry** will be examined in more detail and approaches for the short-term and sustainable improvement of the earnings and competitive situation will be shown.

The key EBITDA levers in a die- casting foundry



[1] The existing potential can only be determined individually.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

Management Summary

In the **first part** of this 6-part series, the subject of **tool management** (https://www.johannes-messer-consulting.de/pdf/Overall_projekt_Part_1_tool_management.pdf) was considered.
The subject of tool management with the main influencing levers of procurement, repair costs and repair times is one of the greatest EBITDA levers in a die casting foundry. Due to the complexity, the high need for know-how and the relatively long project duration, this topic is often given too little importance. The potential savings that can be achieved remain unused in many foundries.

The **second part** of the series looks at projects aimed at improving **operational productivity** in the short term. The turbulent and multi-dimensional field of tension in which the die casting foundries are currently located requires a short-term improvement of the **earnings and competitive situation** now at the latest and with the highest priority.

The short-term improvement of the **earnings situation** is necessary to correct the, in some cases, poor earnings quality in the foundries of recent years and to compensate for the negative after-effects of the crisis (loss of liquidity and equity).

The short-term improvement in the **competitive situation** is necessary, among other things, so that the foundries benefit from the increasing trend towards lightweight construction. This is necessary to compensate for the declining sales in the powertrain area. To this, the foundries must win future sales volumes in the field of chassis and structural parts in the technological and economic competition with other materials (e.g. steel) and other processes (aluminium sheets, aluminium profiles).
(https://www.johannes-messer-consulting.de/pdf/erfolgsgeschichte_teil_2.pdf)

Many improvement approaches around operational processes in die casting foundries are not new and some of them have already been processed in the foundries. However, the existing potentials are often not, or not consistently realized and in the long term.

Management Summary

As an example, three well-known and very different improvement projects in the field of operational productivity were selected in this document.

- Improving cycle times
- Improving setup times
- Optimization of Key Figure Management (KPIs)

The projects differ in the criteria:

- Investment needs
- Personnel requirement
- Know-how needs
- Project term
- Relevance of results

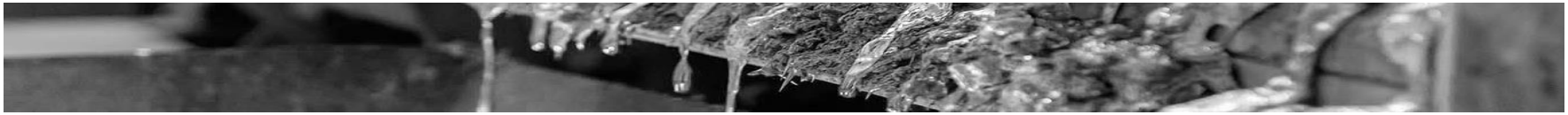
The foundries must themselves select the **"right" projects** for the respective company situation based on these criteria.

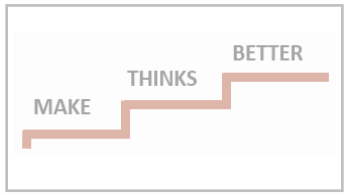
To recognize potential and evaluate improvements, **key figures or measuring values** are required. In many foundries, the **OEE** has established itself as an indicator or measure of operational performance. Since the OEE is a key figure, the definition of which is not stipulated in any standard, the definition used in this document was described on the following pages.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

Content





A

Management Summary

B

OEE
- General
- Definition
- Summary

C

CIP projects
- Project selection
- Cycle times
- Setup times
- Key figure management (KPIs)

Σ

Result
- Impact on profit and loss account
- To do´s

Annex

Johannes Messer - Consulting GmbH
Training Beratung Adaption

OEE General

The management of a company is essentially based on the knowledge of figures, data and facts. The higher the complexity of the decisions to be made, the more important is a detailed but also condensed knowledge base. At this point, key figures find their special meaning and justification.

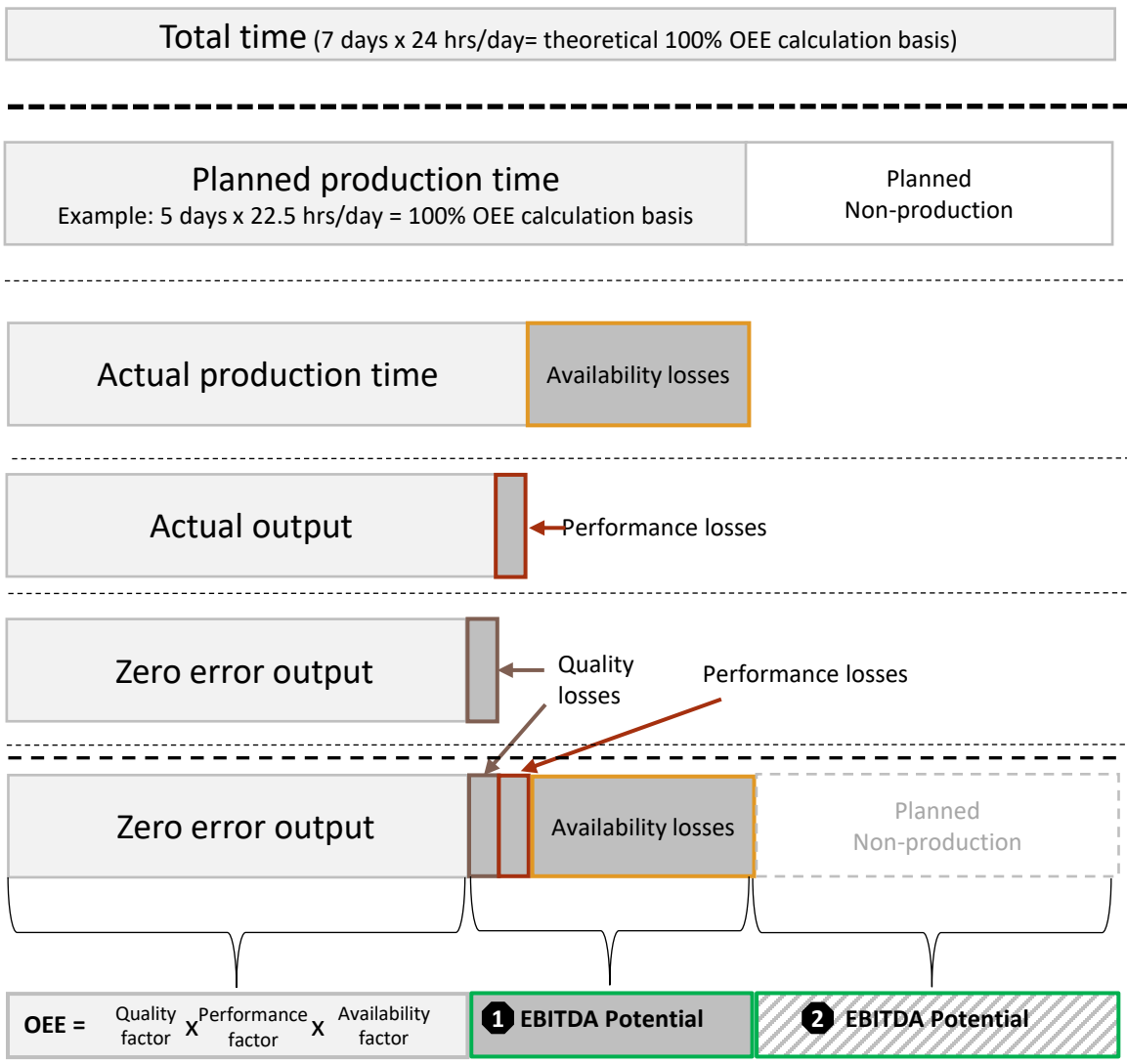
Key figures are often freely defined in companies. The OEE is exactly such a key figure. The definition is not laid down in any standard. The original idea of this key figure is to show all losses or unused possibilities (theoretical production time) to produce value added. In practice, company-specific definitions are used, which often differ from the original idea of the OEE.

The OEE is often used in upper management to assess operational performance. For a comprehensive and clear assessment of the operational performance, it is recommended to use the OEE in connection with other key figures (see key figure management KPIs).

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

OEE Definition



The theoretically available time/week.
This definition is the basis of the original idea of the OEE.

The planned production time/week.
The individually planned and fixed production time is usually used as a 100% OEE calculation basis. It often differs from the theoretically available production time.

Availability factor = actual production time / Planned production time
In some foundries, individual loss times be additionally excluded from the planned production time (e.g., losses due to lack of orders, ..)

Performance factor = actual output / target output
The determination of the target output is very different from one individual to another. Often calculation specifications or the best cycle times ever achieved are taken.

Quality Factor = Good Parts / Produced Parts
There are also differences in the determination of good parts. Some foundries consider, for example e.g., only the scrap parts that are generated directly in the foundry.

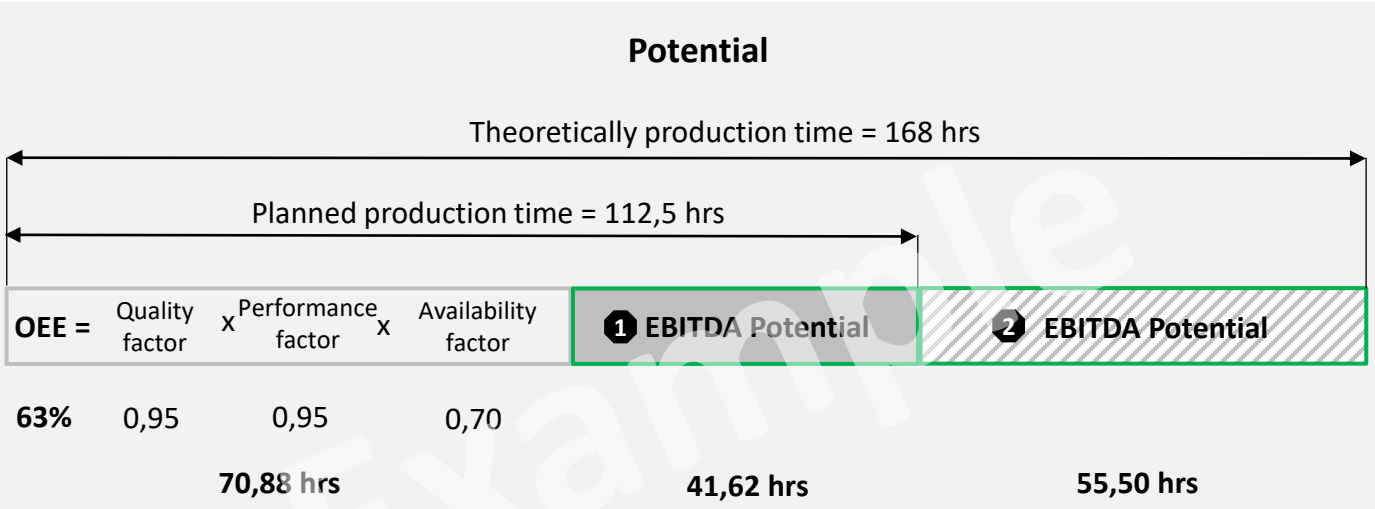
OEE
The definitions of the three loss factors (loss of availability, loss of performance and loss of quality) and production time (theoretical or planned) are determined individually in the companies. To be able to compare, the definitions must first be standardized.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

OEE Summary

The OEE in its original form and idea is very well suited to show **existing potentials** for improving the **results and competition situation**. In addition, the key figure is suitable for tracking and assessing changes in productivity of individual production areas (departments, plants).

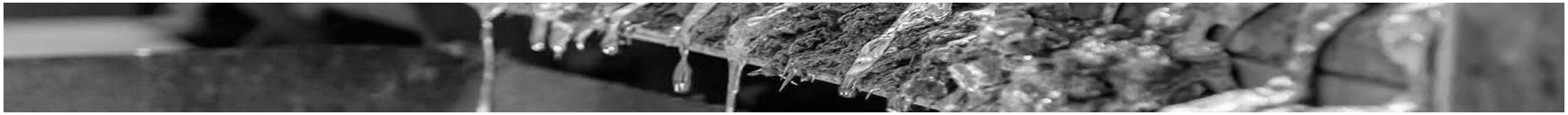


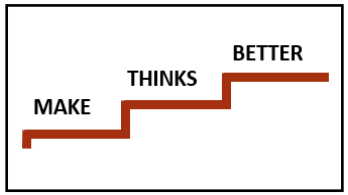
In die- casting foundries, often less than 50% of the theoretically available time is used to produce added value.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

Content





A

Management Summary

B

OEE
- General
- Definition
- Summary

C

CIP projects
- Project selection
- Cycle times
- Setup times
- Key figure management (KPIs)

Σ

Result
- Impact on profit and loss account
- To do´s

Annex

CIP Projects Project Selection

In the current situation of foundries, improving the **results and competition situation** is a top priority and requires short-term action.

1. Improvement of the **results situation** (P&L)

   The drop in sales since the 4th quarter of 2018 and the ongoing consequences of the corona pandemic have further strained the already burdened financial situation of most foundries. With the onset of the Corona pandemic at the beginning of 2020, all foundries have implemented the classic levers to improve liquidity in the short term. The measures introduced were "vital" for many foundries, but at most suitable to avert damage to the company in the short term. Urgently necessary and sustainable improvements to the results situation were implemented only very sporadically during the pandemic. Many foundries are now starting with a cost structure comparable to that before the pandemic. CIP projects are the lever to improve EBITDA in the short term and sustainably.

2. Improvement of the **competitive situation** (casting costs, article calculation)

   To compensate for the long-term losses in sales (powertrain) caused by the transformation in the automotive industry, the foundries must gain significant volumes of chassis and structural parts. The foundries are in competition with other processes (aluminium sheets, aluminium profiles) and materials (steel, fibre-reinforced plastics, ...). Only if it is possible to reduce the current casting costs by 20-30%, larger volumes are possible for the foundries. CIP projects are the main lever.

Improving the earnings and competitive situation must have top priority in all foundries. CIP projects with a focus on increasing productivity are one of the most important levers for this. The **selection of the "right" projects** must be made **individually** in the company.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

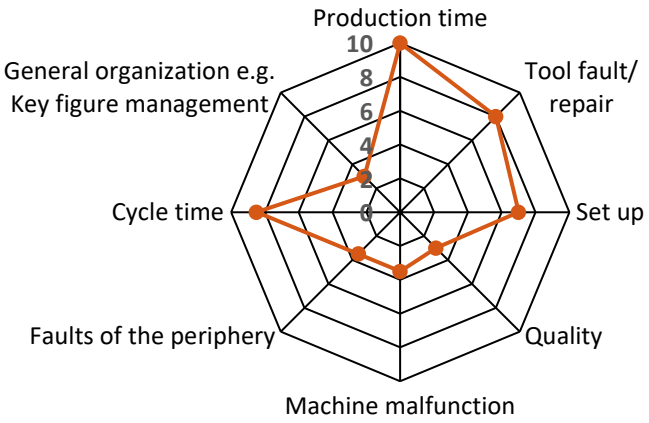
CIP Projects Project Selection

The greatest lever for results is usually in the foundry (department). The OEE figures within a die casting foundry (company) illustrate the potential.

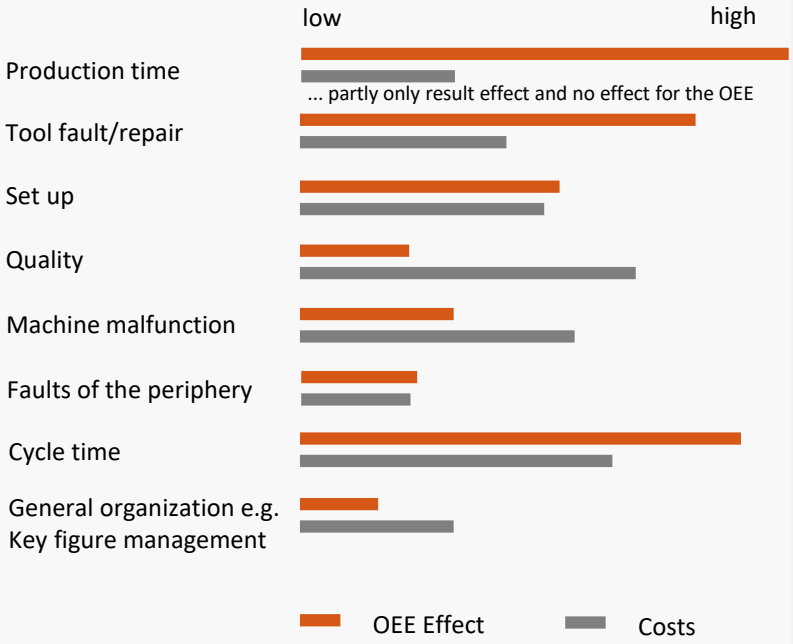
- Foundry OEE 63%
- CNC machining OEE 90%
- Conventional machining OEE 94%

} Example values of an average pressure foundry (definition see appendix)

Essential OEE levers in the foundry (example [1])



Costs/Benefit (example [1])



1) This example is based on experience values based on the Ø die foundry described in the appendix. The actual cost / benefit must be determined individually for the foundry.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

CIP Project Improving cycle times

The reduction of cycle times is an often-unused potential in foundries to increase productivity in the short term.

There are different reasons for this:

- A lack of benchmark comparisons for cycle times has the effect, among other things, that the existing potential is not always recognized. Among other things, this also means that the performance factor is incorrectly selected in the OEE calculation.
- A lack of process standards often means that once achieved benchmark cycle times are not consistently maintained.
- Technologically achieved developments to improve cycle times are in some cases not consistently applied to all possible products.

Experience has shown that projects for reducing cycle times have short-term realizable potential. However, projects often carry a significant risk. As the improvement measures represent an intervention in the casting process in most cases, holistic technological know-how is required. All measures introduced must be assessed both technologically and economically along the entire process chain.

The key EBITDA levers in a die- casting foundry

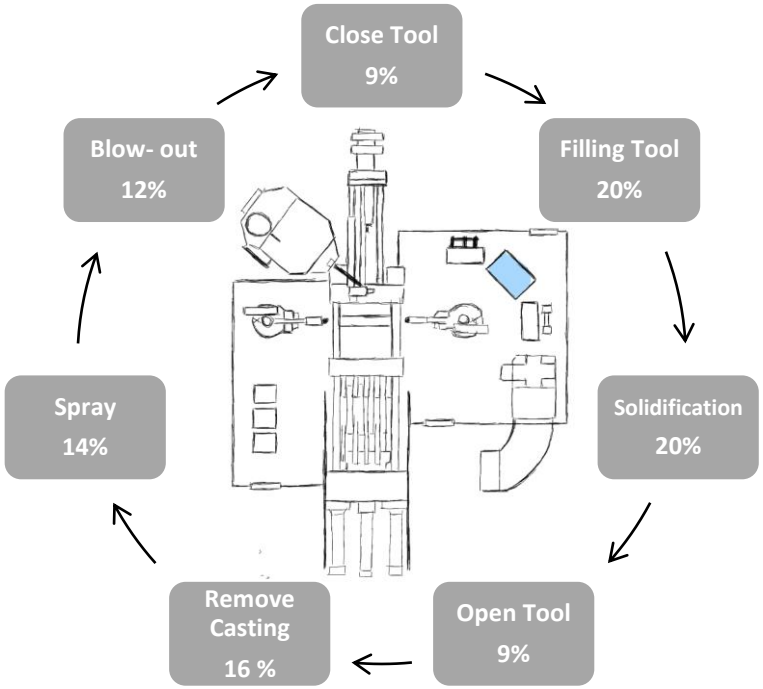
Johannes Messer - Consulting GmbH
Training Beratung Adaption

CIP Project Improving cycle times

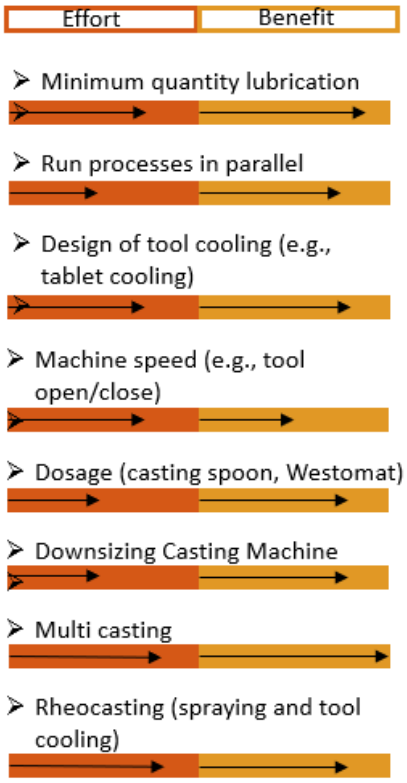
To identify the respective **potentials** of individual castings, it is necessary to break down the casting process for each individual casting in detail into the individual process steps.

Example Structural Parts

Ø Percentage of cycle time



Key optimisation approaches



The respective existing **potential** can only be determined individually. However, empirical values show potentials in the order of scale between 5 - 20% and higher. If one assumes in the first step “only” an improvement in cycle times of 5% across all products, the **EBITDA** (for definition see attachment) would **improve** by **approx. 1%.** In the second step, an improvement of a further 2.5% → **EBITDA 0.5%** should be achieved.

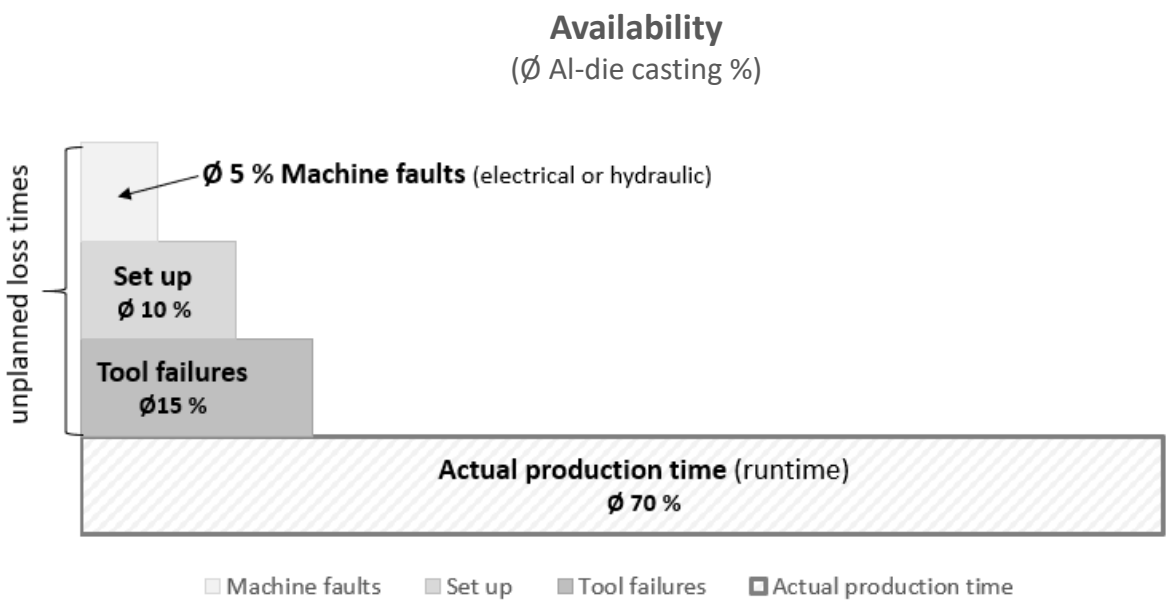
The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

CIP project Improvement of set-up times

Projects to reduce setup time have an impact on individual processes in foundries at several points, and thus on different P&L positions.

- Improvement of availability (OEE of the casting machine, added value, casting capacities)
- Reduction of casting lot size (working capital, quality risk)
- Increased flexibility (response time to demand changes)



Essential Optimization approaches

- Optimized pre-setting (including preheating of the tool)
- Parallel setup of the complete Casting cell
- Standardization of the setup process (e.g., optimization of walking routes)
- Optimization of tool and machine (e.g., quick couplings)
- ..

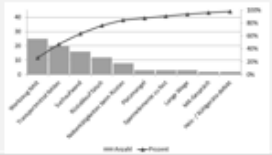
Approaches or projects to reduce set-up times can often be found in die casting foundries. In many cases, however, the **potentials are not fully exhausted,** or a lack of standards means that the values that have already been achieved are not consistently maintained.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

CIP project Improvement of set-up times (Practical example 1/2)

As a practical example, a project to reduce set-up times in a medium-sized die casting foundry is shown here.

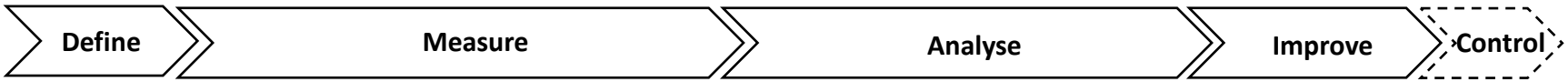
Phase	Procedure (Examples)	Tools (Examples)	
D Define	**Create a project charter** • Analysis of the initial situation • Define project targets • Describe project scope • Milestone planers (project management) •	DMAIC Profile 	SWOT 
M Measure	**Defining measured quantities and measuring process performance** • Measure set-up times = last shot (old) → first shot (new) • Record actual process (for example, measure running paths) •	Data analysis 	Record actual processes 
A Analyze	**Determine the analysis of the actual situation and root causes** • Process flow organization • Pareto • 5 Why •	Ishikawa-Diagram 	Pareto 
I Improve	**Define, evaluate and implement improvement measures** • Cost-benefit analysis • Defining, prioritizing and implementing measures •	Cost-/ Benefit Assessment 	Action Plan 
C Control	**Project results** • Standardize processes • Set / Track Key Figures (KPIs) • Controlling •	Target Process description 	Standards 

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

CIP project Improvement of set-up times (Practical example 2/2)

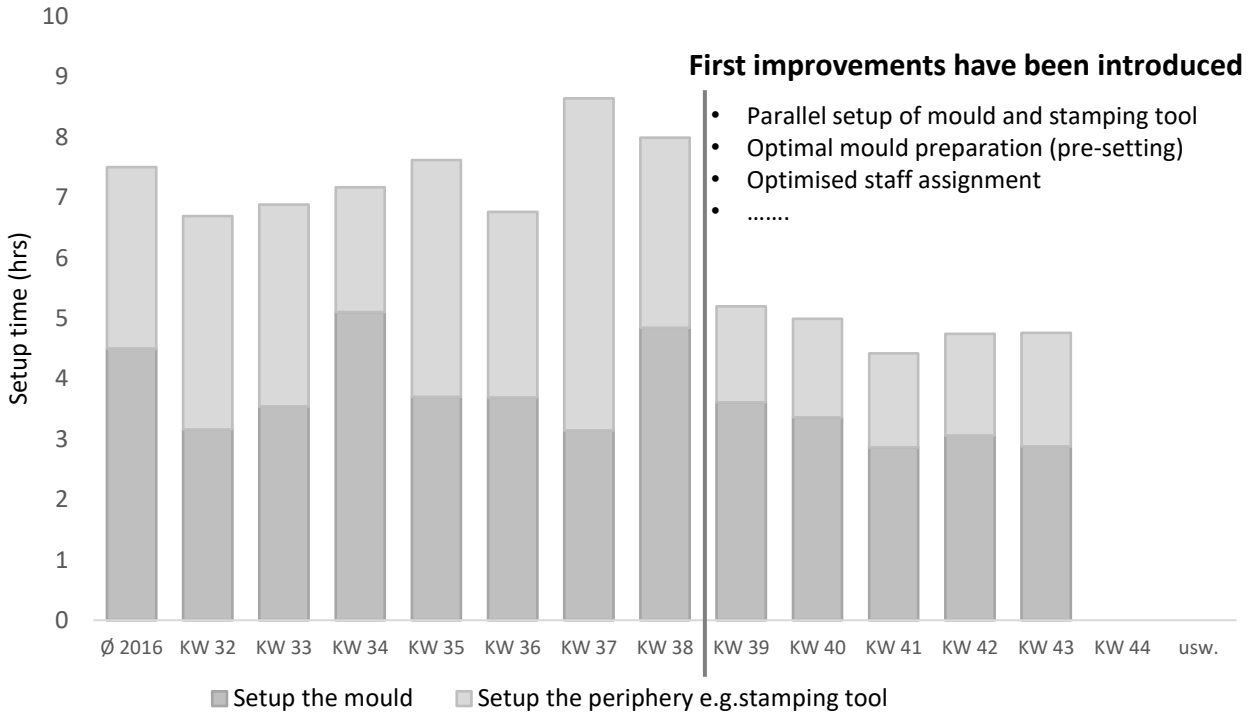
In this project, organizational potential was recognized in the measure phase and implemented in a first (early) improvement step.



Improve 1

- > (.. low hanging fruits)

Setup time optimization



First improvements have been introduced

- Parallel setup of mould and stamping tool
- Optimal mould preparation (pre-setting)
- Optimised staff assignment
- …….

Potential

In this practical example, the set-up time in the early Improve phase has already been reduced by 33%.

The OEE of the foundry was thus improved by about 3%, the **EBITDA by about 1%** (definition of the foundry see plant)

In the further course of the project, the Ø set-up time was reduced to 4 hours **(EBITDA approx. + 0.4%).**

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

CIP-Project Optimisation of Key Figures Management (KPIs)

The corona pandemic hit companies overnight. The necessary transfer of the process organization to the “new normal” has not yet been implemented in many companies. However, there is a need to do this, even after Corona. Topics such as home office will continue to be a fixed component of operational processes in many companies in the future.

One of the consequences of this situation is that individual company information will have to be transported differently in the future than it was in the past. Companies must understand information more than before as an obligation to deliver and integrate it into permanent communication.

The existence and accessibility of key figures must be reassessed based on the changing processes / requirements. The already outstanding importance of key figure management will gain in importance in the future.

In the context of the change and improvement process, the additional requirements become particularly clear. More than in the past, key figures for management must be an indicator of deviating processes. Key figures must partially replace the visual perceptions of the managers due to limited on-site presence (home office).

Regardless of all new and additional requirements, key figures are the basic prerequisite for every change and improvement process.

“If you can’t measure it, you can’t improve it.”

Peter Drucker

Because the all-encompassing key figure for controlling complex processes often does not exist, it makes sense to create a cockpit of key figures. As an example, a key figure cockpit for the upper management of a die- casting foundry is presented on the following page.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

CIP-Project Optimisation of Key Figures Management (KPIs)

Customer

Product sales	day	∑Act. MTD	∑Plan MTD	Δ absolutely	Δ in %
Total turnover [TEUR]		4.303	5.332	-1.029	-19
TEUR/day	219	205	254	-49	-19
Tonnage/day [to]	27	26	33	-7	-21

Order backlog [TEUR]	Order backlog	Sales Plan	Δ in TEUR	Δ in %
January	4.421	5.332	-911	-17
February	4.987	5.228	-241	-5
March	5.038	5.340	-302	-6

Production backlog [TEUR]: Act. day: 383 Ø Previous montht: 420

Number of special trips Act. day: 1 ∑ Act. month: 15

Employee

Sick leave	KW 4	∑ Month	Plan Month
Sick days total	123	456	
Sick days [%]	4,6	5,4	5,3

Accidents at work KW4: 0 Month: 1 YTD: 3

Number of Empoyees	KW 4	Monat	Plan Monat
FTE activ (without apprentices)	536	537	536
Temporary workers FTE (Ø activ)	62	63	25
Total	598	600	561

Presence [hrs/day]	Day	Ø Month	Plan Month
Production	2.161	2.153	2.215
Other Areas	1.117	1.340	1.305
Homeoffice	121	144	121
Total	3.399	3.637	3.641

Processes

Availability	Day	Ø Month	Plan Month
Foundry [%]	74,1	73,6	77,1
CNC Machining [%]	94,4	96,4	95,8

Quality	Day	Ø Month	Plan Month
Total scrapt [%]	4,9	7,0	6,3
Rework [h/day]	77	46	48

Customer Complaint [Number] lfd. KW: 1 ∑ Month: 2 Plan Month: 0

OEE	Day	Ø Month	Plan Month
Foundry [%]	70,4	68,4	72,2
CNC Machining [%]	92,2	90,1	92,2

Value creation/ wage hours	Day	Ø Month	Plan Month	∑ Act. MTD	∑ Target MTD
Foundry [€/wage hour]; [TEUR]	107,4	103,7	95,5	1.053	1.129
Mech.Machining[€/wage hour]; [TEUR]	32,6	30,3	32,9	499	513
CNC Machining [€/wage hour]; [TEUR]	51,9	52,5	54,8	975	1.046
Total	61,9	55,9	57,8	2.527	2.689

Finance

Working Capital	Day TEUR	Day TO	Plan TEUR	Plan TO
Raw material Alu	304	192	432	249
Unfinished Products Alu	3.338	690	2.108	433
Finished Products Alu	1.417	213	1.346	198
Unfinished Tools (montly)	1.993	....	2.400	....
Stock	7052	1095	6.286	880

Receivables Alu + Other	1.916
thereof due	- 111
Receivables Tool	3.314
thereof due	756
Accounts Receivable Trade	5.230
Accounts Payable Trade	1.940
WC	10.342

Liquidity	Day
Free Liquidity [TEUR]	6.637

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

CIP-Project Optimisation of Key Figures Management (KPIs)

The key figures cockpit used here is structured similar the idea of the balance score card. There is a comprehensive view of the entire company. In contrast to the classic balance score card, the key figures are less based on the overarching strategic corporate goals and more on the implementation of the annual plan (budget).

The key figures for this purpose were combined into 4 dimensions.

- Customer
- Processes
- Employees
- Finances

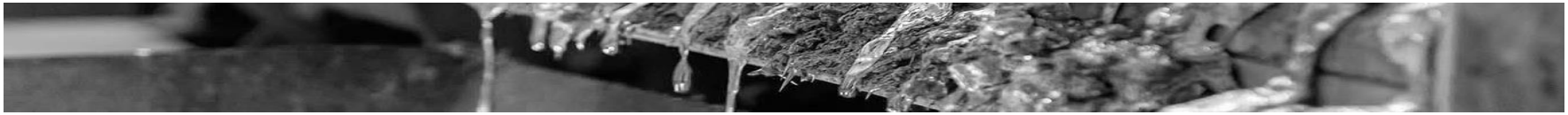
Key figures usually lead to events or processes receiving additional attention. Studies show that the mere existence of a key figure contributes to the conscious and sometimes unconscious work on an improvement.

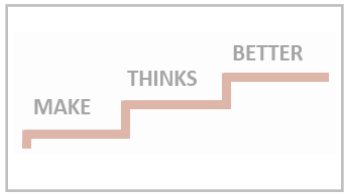
Potential

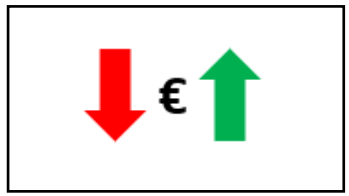
A monetary evaluation **(improvement of the EBITDA)** through the introduction of a holistic key figure management is usually difficult. However, the necessity and benefit are undisputed

The key EBITDA levers in a die- casting foundry

Content







A

Management Summary

B

OEE
- General
- Definition
- Summary

C

CIP projects
- Project selection
- Cycle times
- Setup times
- Key figure management (KPIs)

Σ

Result
- Impact on profit and loss account
- To do´s

Annex

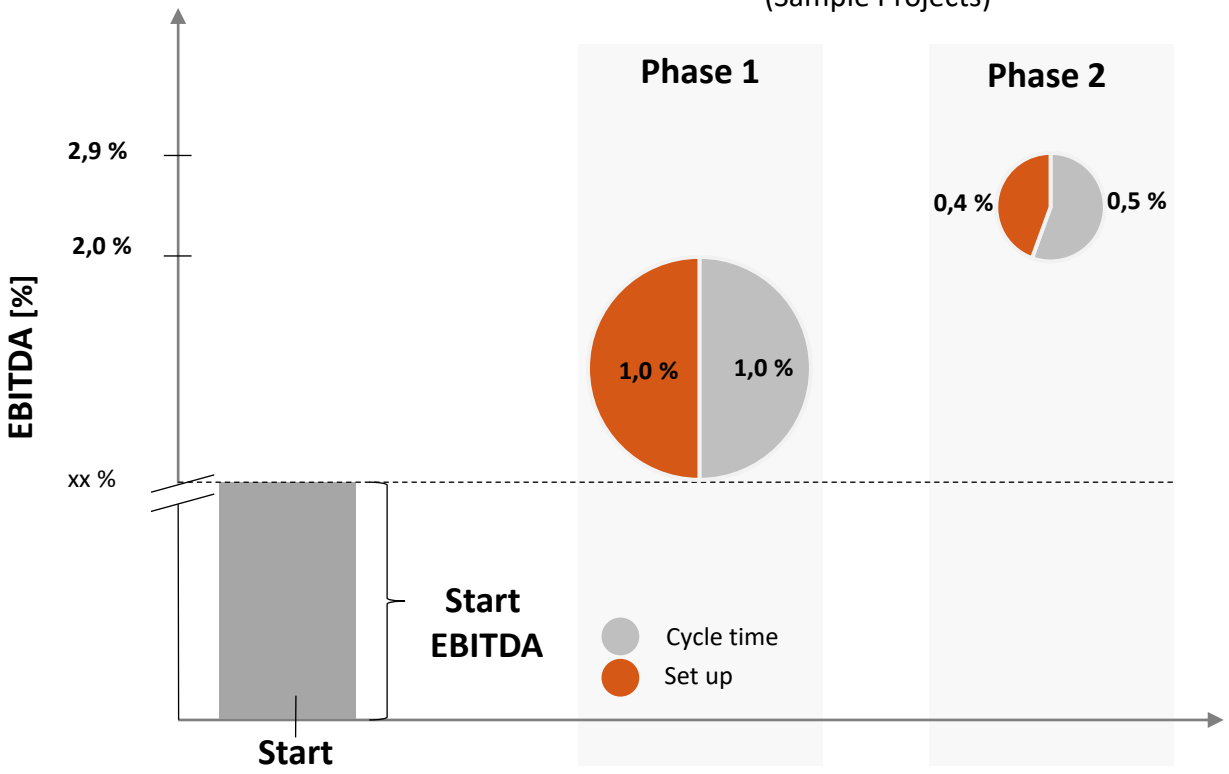
The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

Result Impact on P&L

The CIP projects presented are very well suited to improve the results situation and competitiveness in the short term and measurably. Due to the low investment requirements and the different know-how requirements of the project members, the three-example projects can in principle be started immediately and in parallel in each foundry.

EBITDA Effects ... only in the foundry
(Sample Projects)



... further EBITDA potentials
(.. foundry only)

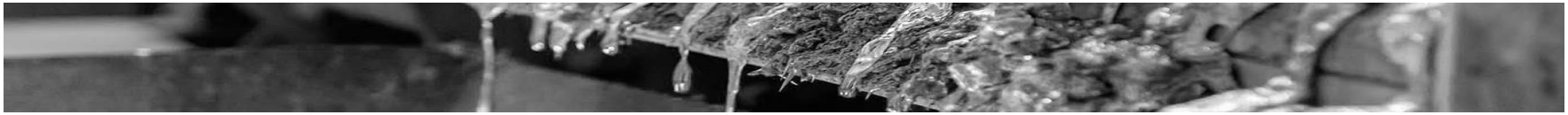
Phase 3

- Setup time optimization
  Target: 2 hrs.
- Cycle time improvement
  target: ∑ -15 to -20%
- Multi-machine operation
- Back-up for allowance times
- Scrap reduction after casting interruption (start-up scrap)
- .....

The potentials are existing, the projects are often known, the work should be started immediately.

The key EBITDA levers in a die- casting foundry

Result To do´s



Foundries must now .....

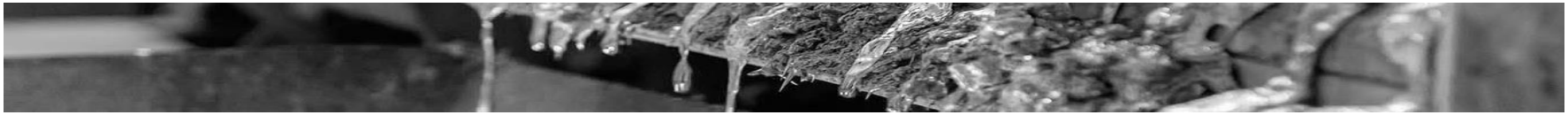
- .. review the previous CIP strategy
- .. select and prioritise the projects individually
- .. align the company structure and culture with the new requirements
- .. initiate and lead the change process from the top management (leadership)

The improvement in **the earnings and competitive situation** does not allow any delay. To be successful in the short term, companies must individually find the right EBITDA levers. The necessary management resources must be made available for implementation. We would be happy to work out an individual roadmap with you and your management team. We support you in the implementation.

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

To do´s



"There is no elevator to success.
You have to use the stairs."

- Emil Oesch -

STRATEGY DEVELOPMENT

MANAGEMENT CONSULTING
INTERIM MANAGEMENT

NETWORKING

COMPANY ANALYSIS

The key EBITDA levers in a die- casting foundry

Johannes Messer - Consulting GmbH
Training Beratung Adaption

Annex Assumptions Ø die casting foundry

A **Ø medium-sized aluminum die casting foundry in Germany** was considered for the present elaboration. The assumptions about the company were used as the basis for calculating possible savings potential (% of sales).
(All values are averaged average values from benchmark foundry comparisons. In the specific application, the values must be replaced by the company's actual values)

Assumptions about the company: Ø medium-sized aluminum die casting foundry in Germany

- Location: Germany
- Sales € 50-70 million
- Clamping force from 500 to 1500 to
- Customers: 100% automotive industry
- Comparable, high degree of automation, in all production areas (Foundry; CNC machining; Conventional machining)
- OEE: 63% Foundry, 94% Conventional machining, 90% CNC machining
  - Quality: 5 % Scrap total → 3%Foundry, 1% Conventional machining, 1% CNC machining
  - Performance level: 95%Foundry; 98 % Conventional machining, 98% CNC machining
  - Availability: 70% Foundry, 97% Conventional machining, 93% CNC machining
  - Production time: 5 days x 22,5 hrs = 112,5 hrs (100 % OEE Calculation basis)
- EBITDA Ø 8,1 %

Conversion (… in this example):

- **1% OEE Improvement i**n the foundry = **approx. 0,3% EBITDA** of the company
- **1% AS Improvement** in the foundry **= ca. 0,5 % EBITDA**