



Kill the Stop

Small Cause, Big Effect:
How Stable Processes Lower Costs, Increase
Productivity, and Set the Scene for Industry 4.0

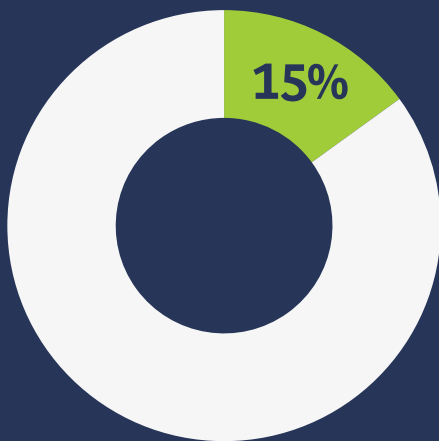
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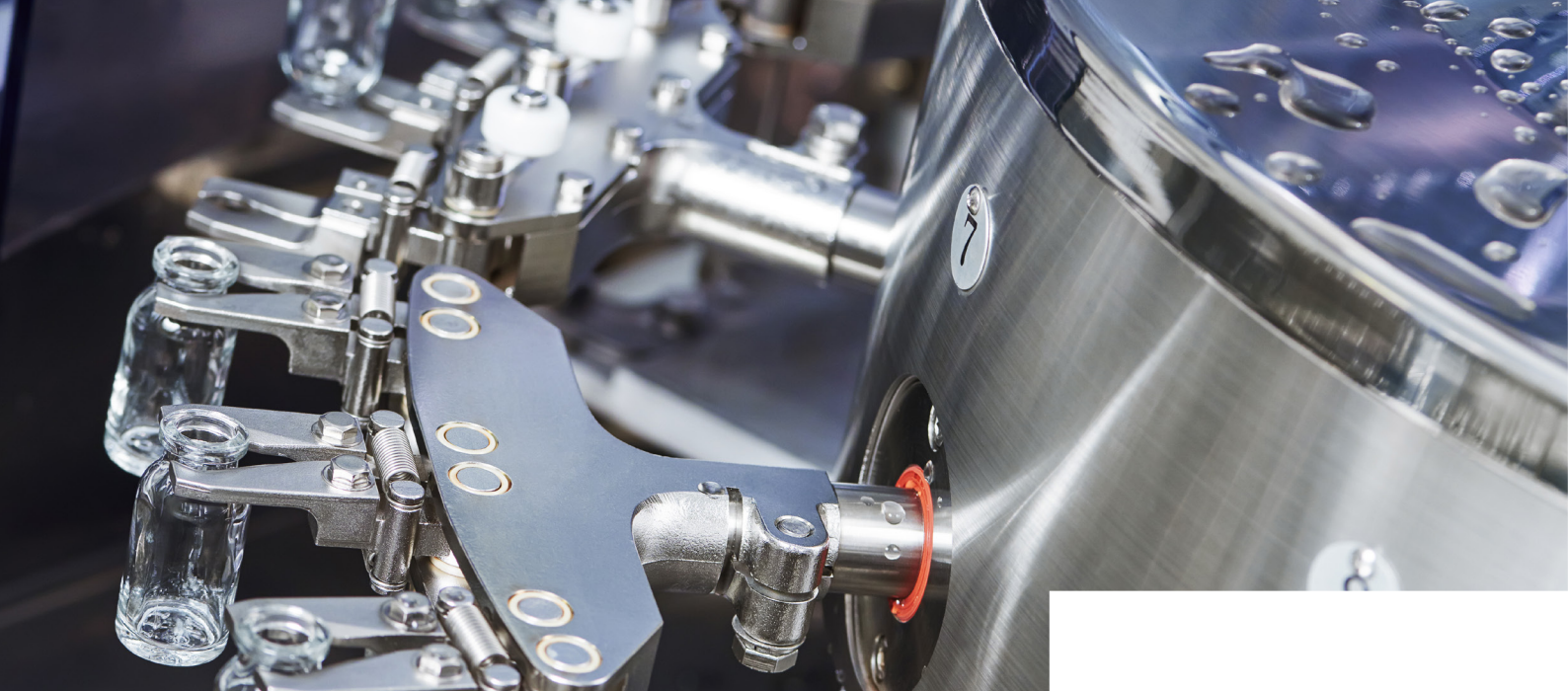
Small cause, big effect: How stable processes lower costs, increase productivity, and set the scene for Industry 4.0

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Many companies have to become faster, more agile, and more productive to ensure they remain competitive, especially in the currently looming economic downturn. Manufacturing is one of the few areas that offer considerable opportunities for improvement in this regard, particularly the elimination of unplanned downtime. Companies that make a concerted effort to eliminate unplanned interruptions in production or speed losses can reduce costs by about 15%.

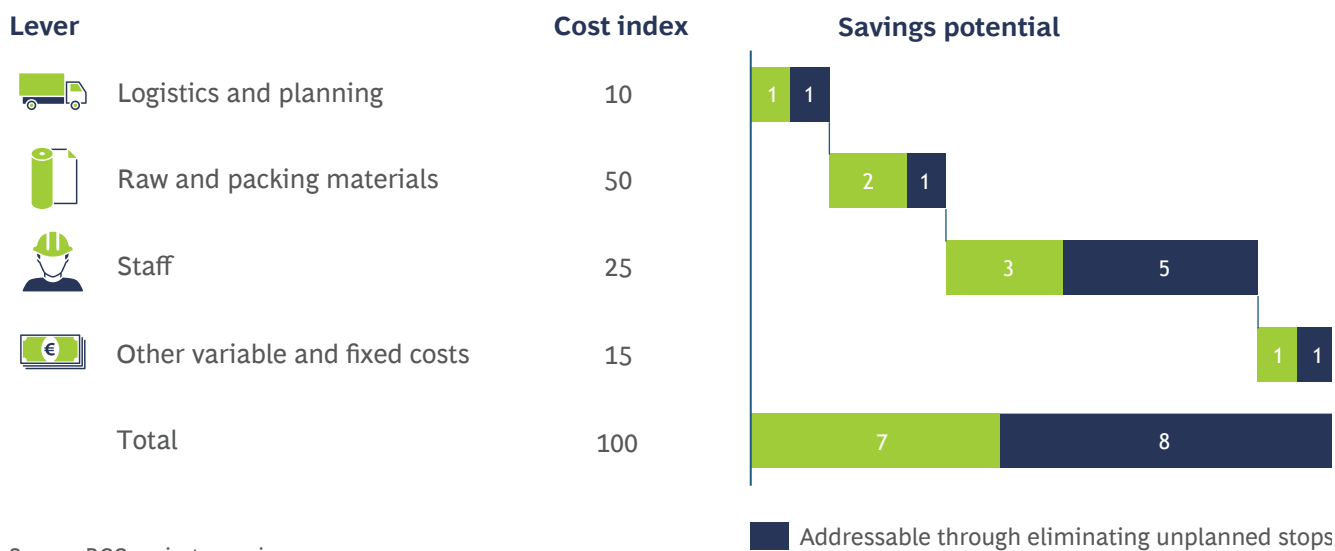
At the same time, they are laying the foundation for full digitization and the vision of “lights-out production.” Successfully reducing unplanned stops calls for autonomous, line-centric teams, increased transparency through real-time production data, an efficient meeting structure and mandatory daily routines.



Production processes hardly seem to offer any opportunities for substantial savings. However, our experience from numerous projects across a wide range of sectors worldwide suggests otherwise: savings worth 15% are feasible. The key is to prevent unplanned performance losses, particularly short interruptions in production, known as micro-stops, which account for about half of the potential in savings (see exhibit 1).

Exhibit 1: Overall savings potential in manufacturing and share of savings by systematically reducing unplanned idle time

Half of the savings potential is related to reducing micro-stops



Source: BCG project experience

During a normal working day, there can be 50–150 such interruptions in one shift. That amounts to up to a million per year across all lines in one plant. The loss is usually not limited to the stop alone; every interruption leads to further unplanned and largely uncontrolled situations, triggering many additional non-value-adding activities. As a result, about half of all available resources end up being used to manage the stops, including fixing it, quality controls and follow-up work. Basically, either the equipment sits idle while the operators wait for help to arrive, or the machines are working and being monitored in anticipation of the next stop. The result: labor costs are high, quality is low, service is poor, and Industry 4.0 remains a remote prospect.

A positive effect on all key metrics

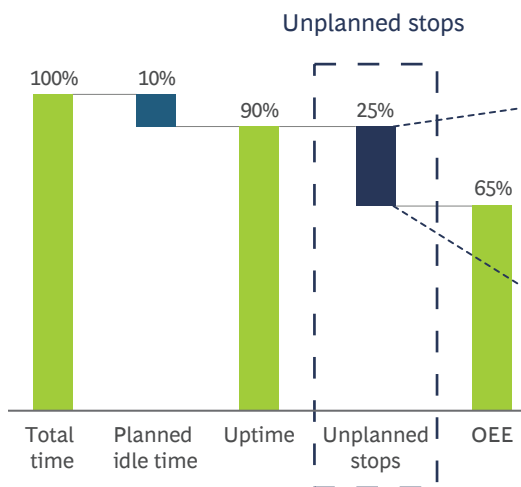
Stable and predictable processes are not only the complete—productive—opposite. They also noticeably impact all relevant metrics: They can bring a 30–50% reduction in safety and quality incidents, a 30% productivity increase as well as improved service levels. In short, the lower the number of stops, the greater the benefit. And the more reliable the working environment becomes, the greater the productivity.

Frequent stops also impact overall equipment effectiveness (OEE). The average OEE of a production line is usually about 65% (see exhibit 2). Some plants achieve more than 75%, while others are well below that level. Very often OEE stands at a mere 45%. Here again, it is mainly micro-stops that hold back performance and productivity. In our experience, the systematic elimination of unplanned stops brings the OEE up to over 80%.

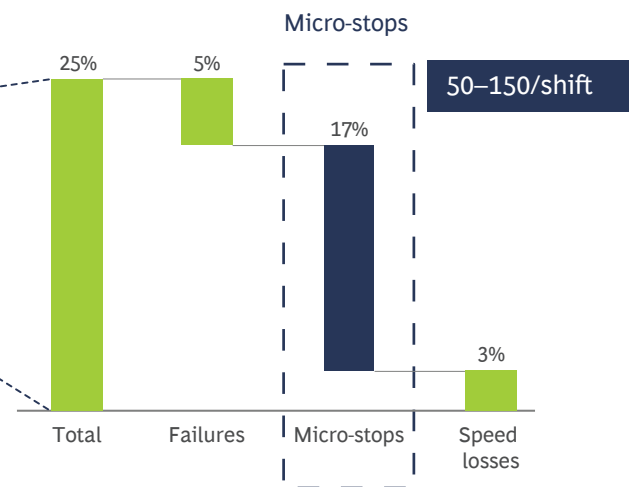
Exhibit 2: A typical line performance equates to an OEE of about 65%

Micro-stops cause the largest OEE losses

Typical plant effectiveness (OEE)



Unplanned idle time from micro-stops



Source: BCG project experience

Rampant idle time can be avoided. In our client work, we have identified four proven levers to reduce or eliminate unplanned stops:

1. Line-centric teams
2. Transparency through real-time data
3. Efficient daily meeting structure
4. Setting standards for the line through daily routines

Exhibit 3: There are four levers allowing for the successful elimination of unplanned stops

Key levers to prevent unplanned interruptions



Source: BCG project experience

Key levers to achieve your goals



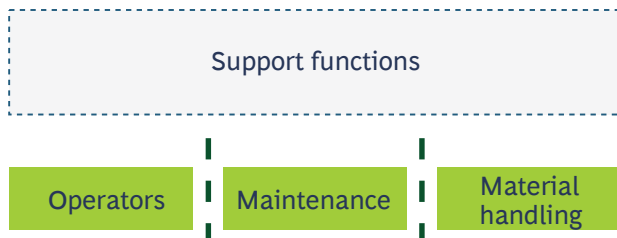
Greater autonomy in line-centric teams

The production line is the key to realigning the manufacturing organization. This is where value is added, and this is where a learning organization with a strong team culture needs to be established. Autonomy is a fundamental success factor for these teams. Every team member must be as close to the line as possible while remaining within autonomous structures. In other words, every line or area team encompasses all the required operational and technical skills, so it can steer the outcome of its line or shift autonomously. This often includes the—very much desired—break-up of the traditional departmental structures and silos, with operators, mechanics and process experts working in the same team. The support teams are also part of this structure. They can then steer the line and its efficiency through continuous improvements and problem-solving as well as optimized standards. On top of that, a narrower span of control ensures effective coaching and feedback.

Exhibit 4: The key to realigning the manufacturing process is a line-centric organization

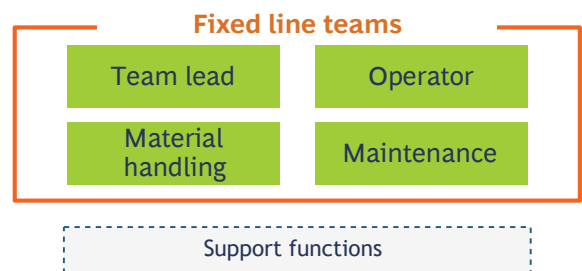
Line-centric organization: Everyone has a clear role

Traditional functional organization



- Silos prevent effective team work in the line
- Team turnover affects identification with the line and the development of specific skills negatively
- Maintenance operates across lines in a firefighting mode
- High rate of support functions that are not clearly connected to the line

Line-centric organization



- Autonomous line teams enable effective teamwork
- Fixed line teams connect each person to the line and enable development of skills
- Maintenance as an integral part of these line teams focusing on preventing stops
- Reduced support functions, all clearly connected to the line

Source: BCG project

Greater transparency through real-time data

The first step towards preventing stops is establishing why they occur and how often. Digital solutions make it easy to capture and tag micro-stops. They are also easy to install and inexpensive.

A clear and simple logic tree should be used to pinpoint the exact cause of each stop and at what part of the line it occurred. It should be adapted to the respective line and create real-time transparency on the biggest stop-related losses. The benefits are obvious:

all the teams have real-time stop data allowing them to effectively prioritize and escalate any incidents. The data also provides an excellent basis for effective problem-solving and monitoring of the effectiveness of improvement measures.



More efficient and frequent meetings

An efficient meeting structure with consistent frequencies and follow-up routines is an additional component in successfully combating unplanned stops.

A standardized daily meeting structure from shift handover all the way up to the site manager ensures clear prioritization, resolution and successful problem escalation at each level. These daily meetings are brief and focused on the daily business, “What do we have to do to be successful today?” They are not about problem-solving; the weekly improvement meeting deals with that by addressing the root causes of unplanned stops. Effective improvement meetings follow a deliberate “plan-do-check-act” routine. In other words: the team should focus on fewer—but invariably the biggest—stops and work consistently to eliminate them.

The effective implementation of the adopted measures and their embedment in daily production are key to the success of both meeting structures. Here, management must do its job by regularly reviewing processes in standardized “health checks”. That is an effective way to share leadership’s expectations and standards.



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Daily routines for sustained peak performance

It is the small, everyday things that determine the outcome of the fight against unplanned stops. That is why daily routines are required to make sure that the line is always in good condition.

- Cleaning, inspection, lubrication: define and execute daily routines to keep the production line in good running condition
- Center-lining: define, implement, monitor, and track critical and relevant line settings
- Rapid changeover: standardize and train for quick and error-free changeover processes
- Defect management: establish a set routine for the definition, escalation, and correction of minor technical line defects
- Breakdown elimination: systematically eliminate major breakdowns through effective problem-solving
- Maintenance planning: establish mandatory maintenance routines with standardized tasks for the production line



Significant impact after just four to six months

Those who utilize all four levers will not have to wait long for results. In our projects it took less than six months on average to achieve:

- 30–50% fewer unplanned stops
- About 10 pp in OEE improvement
- 20–30% fewer rejects

Within a time frame of nine to twelve months, we have seen a reduction of about 80% in unplanned stops per production line in our projects.

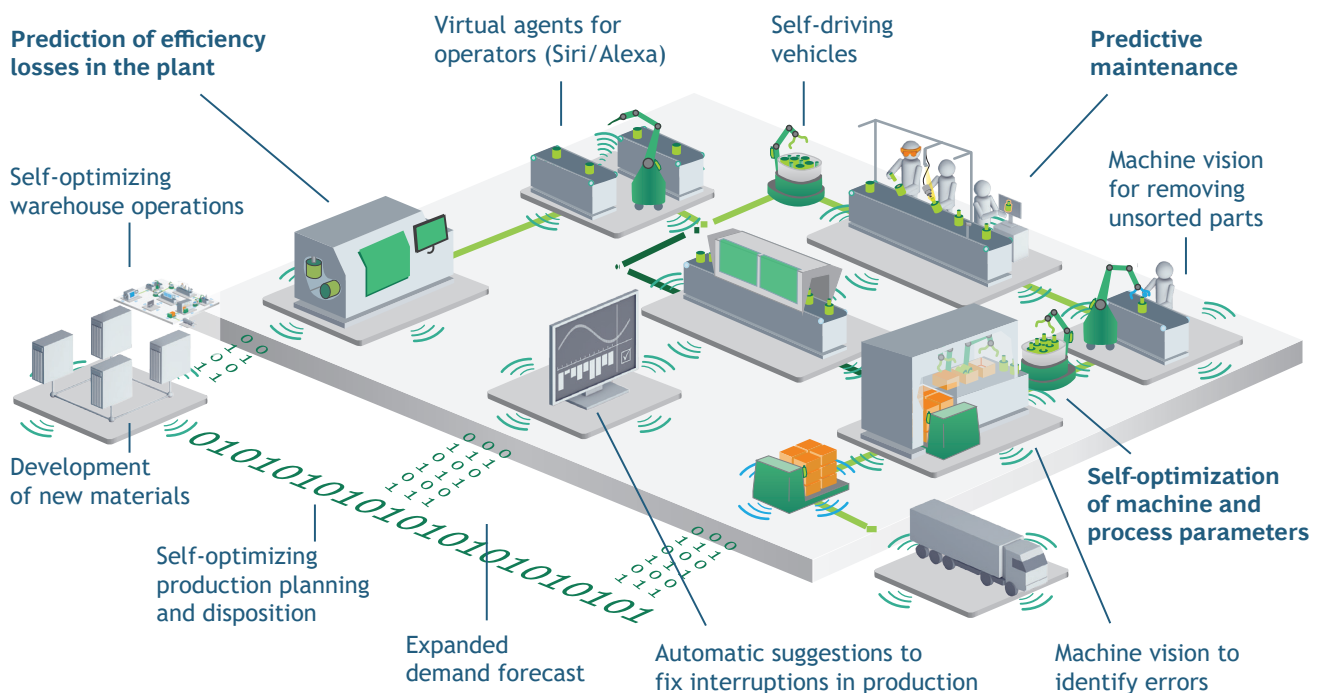
Stable processes: the groundwork for new technologies

As we have shown, reducing unplanned stops is feasible. It is also the crucial first step towards realizing the vision of “lights-out manufacturing”, where cutting-edge technologies, such as cobots coupled with sensors and intelligent algorithms, perform the core tasks and enable a complete redesign of manufacturing; no more fixed lines, just agile teams that always know where they are needed—for example through smart sensors informing them about deviations from the standards.

Some Industry 4.0 applications make this vision appear within reach already. Consider, for example, how sensor technology provides the necessary data, so that humans know where they are needed. Predictive applications are next, although they require a much higher degree of stability, which means that stops would need to be significantly reduced prior to their introduction. That is a prerequisite on the path to the “lights-out factory” controlled by intelligent algorithms.

Exhibit 5: The vision of “lights-out manufacturing” can become a reality—but only once stops have been consigned to the past

Stable processes: the basis for the digital journey to the “lights-out factory”



“Unmanned” plant runs unsupervised. LIGHTS OUT!

Source: BCG project experience



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