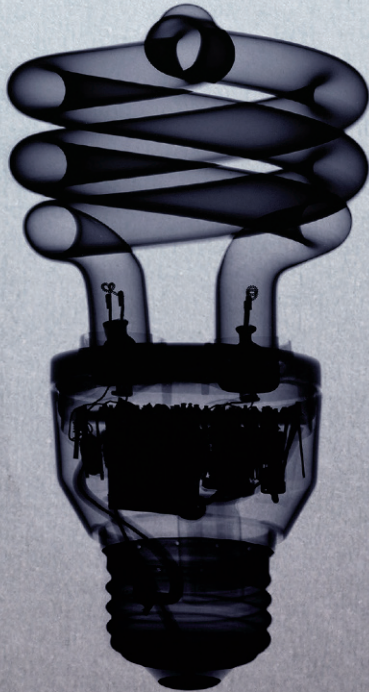


PETTER ØSTBØ, ROBIN CATTERMOLLE
and MARK WETHERILL

LEADING BEYOND LEAN

THE SEVEN DRIVERS
OF PRODUCTIVITY



Leading Beyond Lean

The Seven Drivers of Productivity

Petter Østbø
Mark Wetherill
Robin Cattermole

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WHY YOU SHOULD READ THIS BOOK

If you want to learn more about productivity—and who doesn't?—then this book is for you. If you want to achieve greater productivity, it will guide you through the essential steps to get you there. Along the way, it will help you understand how to set up and manage the full range of efficiency, organizational and financial initiatives that make up the ideal bespoke productivity system—and then how to extract the best returns. Whatever the size and scale of your business, finding new ways to improve productivity is a constant. For example:

- You may be in charge of one or more sites that are large enough to matter, but too small to warrant a lengthy improvement process with a large team of experts.
- You may have discovered that Lean, Six Sigma and other improvement techniques are fine in the factory environment, but provide only some of the components needed for a successful, first-rate productivity system.
- You may have read or heard plenty of theory on Lean manufacturing, but not seen the tools put to use.

Whichever of these applies most to you, this book will take you through all of the steps and procedures an organization needs

to put in place to develop a fully functioning productivity system that helps to drive your business to new levels.

Do not be frightened. You do not need a team of consultants or a degree in Japanese to make this happen. Nor do you need an operation with hundreds of employees for this book to be of value to you. The approach recommended here has been successfully applied to sites with fixed costs ranging from under USD 1 million per annum up to tens of millions, helping to bring about safety and performance benefits that last.

With this book, you will learn how to set up a holistic productivity system that adapts to individual site characteristics, whilst still retaining overall standards and controls. Use it to start your own journey to greater productivity.

Common Pain Points

You may already have a suspicion that things could be done better within your own operational units. If you recognize any of these productivity pain points or other similar issues, this book is for you.

Variability

You have a range of sites with different sizes, different levels of expertise, different cultures, different legacies and different ways of working—each having to solve its problems by itself. But they are all united by one vision: to have higher profitability, fewer safety issues, more motivated employees and sustainable futures.

Lack of Oversight

Performance reporting is not truly visible at sites or higher levels in the organization, and costs are creeping up. Operational problems are not highlighted or escalated. Best practice is not shared across sites, let alone actively encouraged. This prevents you from easily identifying and rectifying performance issues. Local initiatives may not be rewarded nor learning shared. Complexity is increasing. More and more time is spent addressing seemingly trivial issues, preventing your company from focusing on your customers' and shareholders' needs.

Lack of Productivity Management Expertise

You may be witnessing a pattern of frequent equipment breakdowns, excessive manual handling, too much re-work, lower-than-desired quality and frequent customer complaints. Possibly you do not see the anticipated rewards from recent investments.

Lack of Employee Development

On the human-resources side, you see little evidence of structured training and performance management or of opportunities for personal development. You may have a higher-than-normal turnover of employees and employee satisfaction is probably not high nor regularly measured.

Safety Weaknesses

Safety performance is not at the level you are targeting. Issues may become visible only when serious accidents occur. You know that reported incidents are just the tip of the iceberg and suspect that other safety issues, and even accidents, may be underplayed or even escape being logged. The lack of a true safety focus not only skews the statistics, but also makes it difficult to identify and solve underlying issues.

Lack of Time and Resources

You know you need a process for overall productivity improvement and you want it fast. At the same time, you recognize it will be impossible for you personally to spend enough time visiting each site to align its processes and ways of working.

But you know things need to change if obstacles such as the above are to be dealt with and the pain of poor productivity removed.

The Payoffs

Change for change's sake serves no purpose. It must be driven by the needs of the business. Moreover, any improvement program, particularly one as far-reaching as a holistic productivity system, needs firm objectives and a reasonable prospect of valuable gains. So what can you expect, if you pull together and bring this system to life in your site? Experience proves that the payoff will come both in safety and productivity. As a result, sites become more economically viable, frequently evolving from "problem sites" with uncertain futures into vibrant sites that attract reinvestment and growth. They become cleaner, safer and better organised, and therefore more attractive places to work in. More frequent measurement, performance monitoring and problem-solving demand greater employee involvement. Consequently, employees can clearly see the impact and value of their efforts. Not only that, but they can also see that others recognize their contribution, so motivation increases across the site. It is not uncommon to see an attitude of indifference turning into real pride in the job and what has been achieved. Finally, the structure, standardization and reporting mean that management has greater control, can make better decisions and effect more timely intervention than previously.

Also, a further benefit is that any acquisitions can be integrated and synergies gained faster with a holistic productivity system in place.

On-Site Look and Feel

How do you know you are succeeding? A site with a good productivity system in place is inherently calm and smooth running, with little fuss and firefighting. Performance measurement is clearly evident, particularly on the shop floor. It is obvious where everything is and equipment will always be in good working order. Even more importantly, you know how your resources will be deployed tomorrow, next week and beyond, because you have planned it that way in advance.

Standards and Flexibility

The framework for a holistic productivity system should be adaptable to the specific characteristics and requirements of individual sites. Many potentially efficient plants are stifled, because they are forced to conform to a “standard” system that makes no concessions to individual characteristics that may actually be the source of its competitive advantage.

The Productivity System

We’re going to look at a system—which we are calling the UniversalCo Productivity System—or UCoPS—that embodies this principle of adaptability. In other words, it is absolutely clear in terms of what is required as an outcome or standard, but not overly prescriptive on the exact method of deployment.

The Truths Behind the UniversalCo Approach

The story of UniversalCo (UCo) describes one company’s journey toward productivity. The story embraces many challenges along the way and explains how the productivity system’s goals were attained. A fictitious company, yes, but one that will be familiar and with which you can identify. Why? Because, in many ways, it is your story, too. So let’s have a closer look at this company, from the inside. UCo is a

global industrial manufacturing business with an extensive network of logistics and production sites spread around the world.

Its story is based on the experiences of a real company and real people over a period of a couple of years. As with virtually every successful business in the world today, Lean plays a large part in its thinking and the way it operates and plans for the future.

More than Lean

What may surprise you is that UCo does not regard Lean as the only driving force of its productivity system. It recognizes that the successful implementation of such a system demands the merging of multiple elements, of which Lean is one.

The seven key elements that combine to create UCoPS are:

1. Safety
2. Employee development
3. Business planning
4. Capital spending
5. Performance management
6. Quality
7. Lean

The success of the company's approach does, however, also demand that you have people with Lean insight who are able to translate standard Lean methodology into something manageable and appropriate within the overall productivity system. You, and they, will also need a thorough understanding of the business processes that influence productivity not only within a pure production environment but also from other areas that impact productivity, such as supply chain and human-resource management.

What you don't need is an over-reliance on the jargon of Lean. Understand that Lean is simple, good operational common sense: nothing more complicated than adding value and systematically eliminating waste.

Successful implementation of the principles described in this

book is more easily achieved if you keep the tools, processes and communication simple and resist the temptation to bombard employees with unnecessary labels.

You might, for example, want to consider reducing the Japanese terminology around Lean and focus instead on its practical, clear-cut and systematic aspects. Because nothing about Lean needs to be mystical, complicated or expensive.

The UCo productivity system is holistic in nature and supports the company by “operationalizing strategy.” In other words, it creates a clear flow from the more strategic elements, such as road maps and business plans, through to factory performance boards and the minute-by-minute performance monitoring on the shop floor. It aligns these with safety, quality, employee development and continuous improvement processes. All the system’s parts are interlinked, with the efficiency of one dependent on the other—together they create productivity.

Stagger the Approach

When implementing a productivity system, quite a lot can be achieved in a short time, providing you have a receptive audience and tailor the introduction of tools and procedures to the reality on the ground.

You typically get 80% of the performance from 20% of the efforts in any change process. Therefore, start with the most important improvement tools and get everyone up to a good standard swiftly; save the more advanced and complicated techniques, and the move toward perfection, for later. Don’t aim for absolute perfection from day one.

Of course, sites vary in their readiness to implement productivity improvements. A site needs to be, at the very least, stable and operating soundly to reap the full benefits from implementing a productivity system. At sites that are well functioning, for instance, you can normally go full speed ahead and target rapid complete implementation. At other sites, with greater challenges, it will usually be a case of carrying out a fast-track improvement of “housekeeping” to put the

basics in place first. The foundation of any operational improvement program is always a clean, tidy and organized workplace, and everything else flows from there.

People

Changes to the way people work are often greeted with initial skepticism, and even resistance from some quarters. Unless the right people are seen to be endorsing and supporting change, this can be difficult to overcome. For your improvement processes to succeed, you will need the full support of senior management and the involvement of local site managers, especially when it comes to implementing what has been agreed. Unless that happens, local management may feel change is being forced upon them. Therefore, make sure you get buy-in at an early stage and keep your eye on ensuring that your hard-won buy-in does not waiver along the way.

In practice, what you need to do is to find the people who are willing to learn and willing to change, and to invest in them. There will often be a few who are not willing to do so, despite support, coaching and clear reasons to make the transition. It's a harsh reality, but for their own good and that of the company, they might find working elsewhere better suited to their needs. At the same time, there will also be individuals on the shop floor who are receptive early adopters. Invest in them and you will be well rewarded.

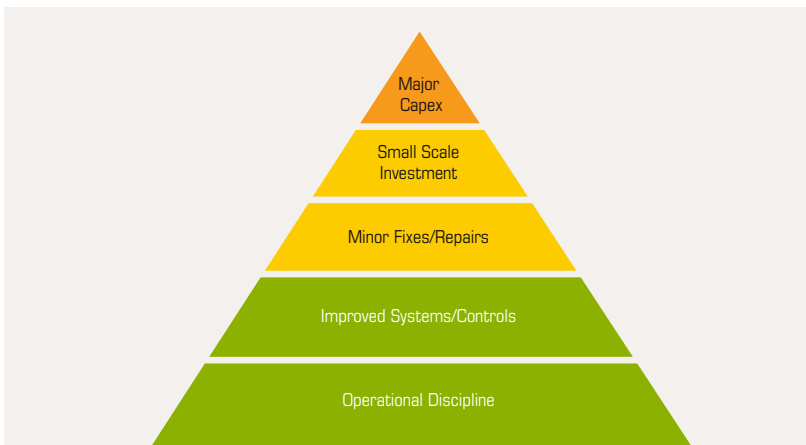
It Doesn't Have to Cost Much—But Sometimes It Does

The majority of the tools and processes described in this book require little or no capital investment—most are achievable through mental and physical effort. What is required, though, is investment of management time and a strong commitment to coaching and communication.

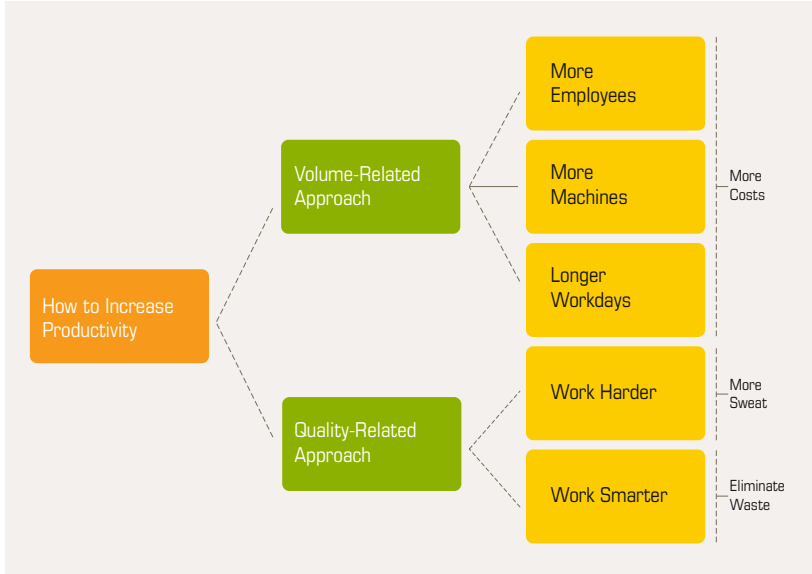
In essence, improving productivity is not always about capital investment—you often get most effect from improving how you work with what you have.

The “Sometimes it does cost” proviso has two elements. First, it means that when you do invest, do so wisely in equipment that is correctly specified for the scale of the operation or process, and therefore entirely fit for purpose. Saving one dollar on investment can lose you ten dollars over the lifetime of the investment. Secondly, it is a matter of sequence: at the start of the implementation, you will usually get little improvement from new machines, but plenty from better operations, so you naturally start there. Think of it like learning to ride a bicycle: there is quite a long period of learning before the bike becomes the limiting factor. Sometimes, however, the equipment really is not up to the task. Maybe you have an unbalanced production line where one machine is too slow to keep up, or an old, badly maintained site where a lot of investment is needed in basic infrastructure, such as buildings, roofing, handrails, footbridges, roadways, etc., to get the place up to standard. Of course, as time goes by and your site is operating at maximum efficiency, you will get to a point where investments are sensible, i.e., when the marginal return from improving “as is” is smaller than the incremental return from investing.

Concepts Illustrated: Productivity Improvement Triangle



Concepts Illustrated: Options for Increasing Productivity



Authors

Petter Østbø—Business Unit Director, Initiator of the Yara Productivity System

“In any collection of factories, there will be good practices and there will be poor. However, you will be unlikely to find one site that is as good as or better than others in all aspects. Relying on local employees to develop best practices from scratch at every site will not only yield poor results, but is unfair to the employees. The benefit from reducing complexity cannot be overvalued.”

Mark Wetherill—Factory Manager, Lean Expert and Content Lead

“By demystifying Lean, we make it more understandable, more accessible and more relevant to us. By emphasizing the common sense elements of Lean and its adaptability, we make it far more powerful and collaborative.”

Robin Cattermole—Global Operations Director, Yara Productivity System Architect

“The implementation of improvement projects always makes major demands upon everyone involved. But there will be far less risk, less pain and far more sense of achievement if you pay as much attention to site culture as you do to site processes. Get the communication right and you will get easier acceptance of changes and even enthusiasm for further improvements.”

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The rest of the book is set out as a fictional narrative following the design, implementation and rollout of a productivity system based on a true implementation exercise. The narrative is accompanied throughout by a selection of top tips and toolkit examples to help explain the productivity concepts and ways of working introduced in UCo. We trust that you will find it interesting and helpful in your own journey to productivity.



1.

UCo, its People and the Right Productivity System

THE BEGINNING

Aksel is the CEO of UCo and he is becoming more and more concerned about the company's competitiveness in a challenging global market. He has recently brought in Gary as the company's operations director, a new executive position, on the strength of his performance at a world-class manufacturing company in Canada. Gary's role is essentially to ensure safety and productivity performance across UCo and his first assignment is to assess what he feels is required to improve both the company's safety performance and its cost competitiveness. Based on his discussions with Aksel, Gary knows that there is a need to streamline operations and bring consistent standards to a range of sites working under very different conditions.

As part of his induction and linked to his first assignment, Gary has visited sites across five continents on a whirlwind fact-finding trip; he has seen for himself some of the common pain points, such as a lack of productivity measures, inadequate employee development, unacceptable housekeeping and unsafe conditions that are clearly going unreported. Although he identified a number of obvious productivity weaknesses, he also witnessed some good examples of best practices. Even so he has had to admit that it was immediately clear to him that there are no common working procedures or standards to unite the wider organization.

On the plane home, Gary isn't sure whether the airborne wireless Internet service is a blessing or a curse: his boss and UCo director Aksel has e-mailed him. Known as much for his

liking of rapid action as his focus on structured improvement programs, Aksel asks Gary to report on the state of the company's operational network, comprising almost 100 plants. With no hard comparative data to draw on, Gary can see he's in for a difficult time.

From his background, Gary knows what's needed and has the experience to develop a bespoke productivity system that will answer the performance, safety and governance challenges at a fundamental level. He's seen them in action and he knows what is required to set one up. He is fairly certain he could get the approvals and the budget to do it. But he also knows that it is no small undertaking, given the scope of the operation and the limits of both his time and the company's willingness to invest. He has got to find a way of managing it efficiently, producing good results at an early stage without either breaking the bank or overly impacting his home life.

Leaving the airport in a preoccupied state of mind, Gary can't help noticing a familiar sight: crowds of tired tourists trying to work out exactly where they are supposed to queue for a taxi. "Why," he ponders, "is it so difficult to buy a bit of paint and mark out where the people should stand, and which direction they should face? It would just take half an hour to inject order into chaos." Of course, he realizes what has prompted this thought: he's been thinking about Lean and how it could help him drive the new productivity framework through the UCoPS

network. He can see the parallels only too clearly. The common sense approach that would solve the airport's problems is also typical of the clear, rational thinking that would really get the UCoPS in motion. Gary knows that Lean will definitely be his engine of change and he knows exactly what sort of individual fits the bill to put what is required into place.

Gary knows that he can create the architecture of UCoPS and make sure it addresses all the key top-level performance issues, including employee development, quality and safety management, as well as the need for strong business planning, performance management and understanding what customers value. Also he knows that he does not have the time or the background to handle the whole UCoPS implementation himself—he will need help with the key aspects relating to Lean. He is a business school graduate, and while he has a sound operational background, he does not have recent shop floor or true Lean implementation experience. Without that familiarity he is aware that it would be harder to carry operations people with him. To make sure that UCoPS gets the time, dedication and expertise it needs, he is going to have to find an enthusiastic person with front-line operational experience to help implement the productivity system and, in particular, get the key Lean aspects implemented successfully. First, before progressing any recruiting, he is absolutely certain that if UCoPS is to succeed he must get UCoPS appropriately anchored in the company.

Anchoring the System at the Heart of the Company

Gary has already in his first few weeks with the company become aware that UCo has a high-level steering system that outlines the mandatory rules and operating standards that its units must follow.

In UCo the steering system contains all the normal components that you would expect to see at an industrial company operating globally. It is heavily loaded toward safety, some key financial and HR issues are targeted as well as many documents covering the essentials around governance and compliance. However in UCo as is normal in similar companies the steering system fails to cover productivity issues in a holistic manner.

One positive aspect of the UCo culture, Gary has learned, is that if something is described in the steering system it tends to get followed. Gary is aware that for his productivity system to be a success he needs to get it anchored in the company at the right level. He knows that Aksel is supportive, which is a very good start, but he also knows that he must find a way of getting his productivity system anchored into the steering system. This will be a vital signal to the organization that there is nothing optional about UCoPS and hence ensure its success.

Gary gets to work and drafts his UCoPS steering system document detailing the high-level architecture of the productivity system. As Gary is clear in his own mind what is required, it does not take long. After first getting a few key UCo operational managers to proofread the document to help future buy-in and check that it makes operational sense, Gary sends the draft to Aksel.

Aksel is immediately supportive and, following inclusion of a few of his suggestions, he and Gary close the formalities and get the documents published.

The UCoPS steering system document goes live and becomes the implementation bible. Quite simply, what is written in the document is what will be implemented. Gary has got the mandate he needed.



Top Tip—Steering Document

Whether your organization has a sophisticated steering system or not, it is essential to begin the journey to productivity by documenting what you are trying to achieve and by anchoring this at the right level. This will help make sure everyone is aligned. Consider documenting in a vertical format, such as Word, rather than in a presentation, such as PowerPoint. There is sometimes nothing better than a good old-fashioned memo to get your point across (see page 193, Appendix: Steering Document).



Toolkit—Self-Assessment Questionnaire

How do you measure that your productivity system implementation is progressing in line with expectations? To measure progress, you need to have a baseline to start measuring from. A good way to do this is for the sites to perform a self-assessment. In the UCoPS, the sites are asked to assess themselves honestly in the format of a scorecard to get an initial starting measure across all key areas of the UCoPS.

This scorecard will be updated and progress monitored over time. The challenge here is to get the balance right between introducing administrative burden and ensuring essential progress monitoring. Target setting and progress monitoring are a continuous theme in any productivity system. In UCoPS, performance monitoring and continuous improvement never stops.



Top Tip—Employee-Satisfaction Survey

Consider doing some sort of employee-satisfaction survey as part of the early implementation. This will be a powerful benchmark against which progress can be measured. It can also help convince skeptics that things are going well.

Finding the Right Person

With the anchoring UCoPS and the steering document behind him, Gary reverts to his key recruitment need.

Gary knows he will need help in implementing UCoPS successfully, especially Lean. He knows the right person will be as much a “lean navigator” as an implementation manager, finding the smoothest and most direct route to a successful outcome in each of the plants that come on board. This navigator will have the experience and expertise to translate the high-level principles and purposes of Lean into something that is immediately comprehensible to people working in each of these plants. He or she must be able to tailor the general framework of the UCoPS to answer the needs of individual sites, using what is relevant and not wasting time on processes that add little value. Finally, the navigator must be able to recognize processes that already work well and efficiently at each site and make sure that they are captured to develop the productivity system itself.

Gary draws up a mental checklist of the kind of person he is looking for. Ideally, someone with an operational background—a former plant, factory or shift manager, or an industrial engineer—who will be convincing on the shop floor. Someone with a knack for handling people and an understanding of the production processes on site will immediately have the kind of credibility that would take far longer for someone without operational knowledge to achieve.

Gary knows that he wants someone with Lean expertise, but also recognizes that he must avoid hiring someone whose Lean philosophy smacks of a theoretical and “one-size-fits-all” solution. The ideal candidate will have practical, hands-on experience of implementing Lean according to the needs of individual sites. He will also need to be aware of potential cultural obstacles and be prepared to negotiate a path through the difficulties that will inevitably arise when a central unit is perceived to be “imposing” itself on line organizations. The candidate should know that the productivity system will need to achieve a careful balance of support from both the shop floor and management.

Gary recognizes that it isn’t practical to spend more than one day a week supporting the UCoPS implementation himself. With a lean navigator on board, however, the company will have someone who is dedicated to the program full-time, ready to visit sites, to provide guidance and to solve both collective issues and those that are specific to individual units. Basically, an expert resource to ensure that the Lean requirements in the productivity system are implemented successfully and subsequently thrive.

Gary gets back to his boss, Aksel, and explains his overall plan, making it clear how the components of the productivity system interlock. He also tells him that someone with good Lean experience will be required to ensure that the whole process starts out on the right footing. Most of all, he stresses the need for full executive support. If everyone involved is clear that there is top-level focus on the program and strong pressure to make the whole thing work, it will maintain momentum even when things get tough. Without that support, it is likely that progress will stall almost from the start. Aksel agrees not only to give UCoPS his full backing, but to also make sure that the entire organization knows that he is committed to its success. Aksel and Gary work together to identify a few potential pilot sites. They also plan the rollout process and the mechanism by which they will update and tune their approach as they gather experience and information.

Introducing UCo's People

CEO—Aksel

A top-level executive, Aksel has seen the benefits that Lean and agile operations can bring. Aksel puts Lean implementation in his units at the top of his list of priorities, alongside safety, the need to be competitive and clear financial reporting.

OPERATIONS DIRECTOR—Gary

Recently hired as UCo's operations director, a new executive position, Gary is ultimately responsible for the implementation of the productivity system. He has a sound operational background and is aware of Lean and what it can do but is no Lean expert. He must make it happen. All sites report to Gary in a matrix.

LEAN NAVIGATOR—Britta

She is the expert who trains the trainers—or “lean multipliers”—at each site and coordinates their efforts to sustain the productivity system. She is appointed by and reports to Gary.

SITE MANAGER—Alejandro

As site manager, Alejandro runs his operation well and has a firm grasp of the essentials for a productive plant. He is open-minded to Lean as a way of formalizing and structuring these common sense measures into a framework to get even more productivity out of the site.

SITE MANAGER—Daniel

Responsible for managing UCo's facility in Canada, with the best safety record of all UCo's sites.

LEAN MULTIPLIER—Rodrigo

A bright and enthusiastic site employee from UCo's first implementation site, he is responsible for helping to sustain the productivity-improvement efforts after Britta has completed the initial training process. In UCo, each unit (or sub-group of units) needs a lean multiplier, who is networked and coordinated by the lean navigator.

PRODUCTION OPERATOR—Joachim

A senior and experienced operator who is excellent at fault-fixing/ firefighting. He enjoys prestige and respect among his coworkers and is influential in issues regarding the site. Britta tries to find employees like Joachim at each site supporting the lean multiplier.

HEALTH, ENVIRONMENT, SAFETY AND QUALITY MANAGER—Kristine

The head of UCo's Health, Environment, Safety and Quality department (HESQ). She sees the sense of integrating the practices and tools used in the area of HESQ with the ones in use in the productivity system, as well as the benefits of having common HESQ/ productivity goals.

**Top Tip—Lean and the People Perspective**

Most successful productivity-system implementations have a clear chain of responsibility and this is something that UCo fully intends to establish across its operations, namely:

- A top-level executive (Aksel) who is aware of the benefits of a productivity system and considers such a tool to be an essential part of a successful business.
- An operations director (Gary) who has line or matrix responsibility for units and ultimate responsibility for the productivity-system implementation, and has an appreciation for and awareness of the benefits that Lean brings to operations. Someone who truly believes in continuous improvement.
- A lean navigator (Britta) who is experienced in the practical application of Lean techniques and their implementation.
- Site managers (Alejandro and Daniel) who value common sense, are receptive to change and see the power of continuous improvement.
- Every site should have a Lean champion, typically called a lean multiplier (Rodrigo). These multipliers help form the critical mass of Lean expertise and the continuity.

And, finally, you cannot make real progress toward your goals without enthusiastic converts (Joachim), who you will identify as the program is rolled out. It will also become clear how productivity is linked to safety, and the local safety manager responsible will also most likely become one of the early champions.



Top Tip—Competent Operational Managers

Make sure that you have competent operational managers. One of the first rules of any successful productivity system is that it's just not possible to achieve your goals without such people. Using operational common sense, leadership skills and a sound knowledge of “how things work” across the unit, these managers can make a vital contribution to developing the systematic and structured approach needed. Lean typically yields efficiency improvements that clearly reward time spent and the best operational managers will make the most of this. One thing that Lean is not is a “spare time” activity—it needs to be at the heart of every working day and a regular part of your operations.



Top Tip—Lean Needs Solid Foundations

You can achieve quite a lot in a short time—providing you have a receptive audience. Lean builds on sound foundations. It does not create sound foundations. If you are tripping over material and cannot find your tools, you need to improve your housekeeping before trying to introduce more advanced Lean tools. Get your house in order before implementing your productivity system. UCoPS and Lean tools then make your tidy house a better and more highly functioning property.

Lean Targets and Pitfalls

Britta is one of the candidates for the role of lean navigator. Britta is impressive, not just because of her obvious grasp of how to seek the benefits of Lean in the context of a rollout of a new productivity system, but also in her quick and open assessment of potential dangers. She outlines the Lean targets: the elimination of waste, coupled with a production ethos centered on creating the right quality at the lowest possible cost.

Britta believes the key potential dangers are:

- Lack of buy-in from skeptical staff or distracted management
- The confusion that can result, if the correct benchmarks, targets or metrics are not clearly set from the beginning
- The likelihood that everything that has been achieved can still be lost, if the productivity program is not followed through

She also identifies clearly the pitfalls of trying to do too much, too quickly.

Gary is particularly swayed by her belief that a Lean implementation needs to be tailored to suit the particular requirements of the site and its staff. Britta explains that, in her approach, each site will target the tools best suited to improving the key tasks carried out on that site, while each employee will get the training that precisely addresses what they need to know to do their job.

“Train everyone, but at the right level, is my belief, from the most junior person on the floor to the lean multiplier and plant manager,” Britta says. Everyone gets the training they need. And the site gets the tools it needs, too.

She says, for example, that some sites may need to focus heavily on reducing their changeover times, while this may not be an issue for others. Identify and select the techniques that will deliver the improvements you are looking for and that mirror the site’s specific improvement goals. Do not force all the techniques available on

every site.” Gary can see clearly that Britta’s practical and flexible interpretation of Lean—combined with her essential floor-level experience—will make a convincing impact at plant level. She gets the job.

Lean Mentality

With Britta firmly on board, she and Gary have more time and opportunity to explore her concept of Lean and how she intends to tackle the early stages of UCoPS. First, Britta explains that too many people are unjustifiably worried by the whole idea of Lean: “There is nothing complicated or mystical about its essential principles. At its core, Lean builds on simple common sense and makes the most of it.” She admits that there are many definitions of Lean, but says it can most simply be described as “the systematic and continued elimination of waste.” “In fact, all the rest, 5S, Six Sigma, Just in Time (JIT) and so on are only tools. The real principle is no waste, be it of time, energy, raw materials or anything else” Britta says.

By stamping out waste, creating better flow and centering production around the needs of the customer anyone can have the fundamentals of a Lean business, Britta insists.



Top Tip—Lean Mentality

The Lean mentality is very much about structural problem-solving and continuous improvement. In a manufacturing context:

- Always look for opportunities to fix the underlying causes of waste, inflexibility, lack of flow, etc.—don’t just fix the issue at hand.
- Even if a process is running well, ask yourself if it could run better.

Remember that “waste” is not just what we throw away—it is anything that uses time, effort or resources without helping to achieve a product or service that the customer wants and is willing to pay for.

Lean Manufacturing—the Basic Principles

Lean is generally recognized as rejecting traditional production-model thinking that goods must be either high quality and high cost, or low quality and low cost. With Lean the goal is the **right** quality at the lowest possible cost. Consequently, if the customer hasn’t requested it, you do not produce it. As far as possible, Lean aims to produce to order, providing customers with precisely what they want, when and where they want it, at the lowest possible cost and with minimal waste along the way.

From Britta’s perspective, the other basic premise for a successful Lean implementation is to move toward a “path of perfection” through a succession of many small steps, with each measured and monitored along the way.

Lean may have simplicity at its core, but aiming for perfection isn’t easy, Britta adds. When it comes to tackling the tangible challenges of improving operations, there are some uniquely Lean principles that differentiate it from traditional models.

The Lean manufacturing approach focuses completely on the customer’s perspective when examining product value. By understanding and identifying what creates customer value, we can then concentrate on eliminating, as far as possible, anything in UCo’s production process that does not add value to our products in the eyes of the customers.

This way of thinking differs from a traditional manufacturing approach in several key ways, Britta points out. Lean sees the traditional practice

of satisfying customer orders from stock and adjusting stock levels according to forecast demand as inexact and wasteful. Better to trigger production according to orders, as required, and have a team that works flexibly—that can then adjust factors such as operating time, manning levels and shift schedules—as demand dictates.

In a Lean manufacturing context, waste has a wider meaning than “trash” or physical waste that you throw away. Waste also applies to anything that does not directly achieve what the customer is willing to pay for in a product—this can also mean the waste of using time or resources to pursue levels of quality that exceed what the customer needs or wants. Or holding stock the customer does not ask for. The target is to deliver the right product, the desired product—with minimum expenditure, she reminds them. A process is “value adding”, if the customer wants or needs it and is willing to pay UCo for doing it.

Lean Manufacturing Principles





Toolkit—Lean Manufacturing Principles

The Lean manufacturing approach centers on **five key principles**:

1. Understand and specify what creates **value** within the operation from a customer’s perspective.
2. Identify all of the **process steps** in the operation. Where possible, eliminate those that do not create value.
3. Make these “value adding” process steps **flow** as smoothly as possible.
4. Produce only what is required—or “**pulled**”—by the customer.
5. Eliminate **waste** in ALL its forms.



Toolkit—PDCA

Lean is about creating flow and producing what the customer wants, be it a manufactured product or a service, as efficiently as possible, while eliminating waste. All of this can be based on the simple “Plan, Do, Check, Act” (PDCA) cycle. The basis for ALL improvement is founded on this:

- Plan:** develop a plan with expected results
- Do:** implement
- Check:** what was achieved versus what was expected
- Act:** review, refine and do it again



Starting Right

Gary is growing more and more confident that Britta has both the technical knowledge and the people skills to make a success of the program. But he is still concerned about getting the early stages right, given the size and diversity of the company and the need to show early progress.

UCo has too many sites to implement its system using the traditional approach of a three-month “diagnose, design, implement”-type project without incurring high costs or spending too much time on implementation. Together, they review the options. Gary is relieved to find that Britta completely shares his view that, in a multinational manufacturing business with both large and small sites and highly variable skills and practices, they need to learn to walk before they run.

Lean Lite

Gary and Britta discuss the merits of first implementing a “Lean Lite” approach. Although Lean Lite has Lean principles firmly at the core, it also allows sites to reach a good standard swiftly and move toward perfection later. They agree that an implementation like this, tailored to each site, is the best way forward.

Their Lean Lite approach means that, instead of following the textbooks with a fully fledged Lean implementation over several months at any one site, they can pick the most relevant and useful Lean tools to secure low-hanging fruit and ensure rapid uptake of the essentials.

They decide to start at the UCo site in Argentina, because it is appropriately challenging and demanding and not a simple, easy fix. Britta will use the initial rollout there to develop simple-to-use manuals and instructions for dispersing across all sites, combined with high-level training for managers. The aim is to achieve full implementation of relevant tools at key sites, while ensuring that some implementation and good groundwork is carried out across all sites.

Groundwork at the Pilot Site

To get the UCoPS program started, Britta makes plans for her first visit to the site in Argentina. Gary wants to observe the start of the UCoPS process also and decides to travel with her, so that he can introduce her to the site manager there, Alejandro, and ensure that he is also visible and supportive from the start. The long flight will also give Gary a chance to discuss with her in greater detail what Britta will be looking for on this visit and how she intends to introduce Lean.

The site in Argentina has been chosen for a number of reasons—it has a sound operational infrastructure, but also plenty of scope for improvement. On top of that, it has had problems not consistently delivering on time in full (OTIF) to its customers. Gary believes that Alejandro is the right kind of site manager to host UCo's maiden Lean program. He possesses operational common sense, he has always had a keen eye for how to improve ways of working and he is ready to listen to anyone with a good idea. It is one of the company's largest and most complex sites and, Gary says: "If they can do it here, they can do it anywhere."

Back on the ground in Argentina, Gary and Britta head to the site and meet with Alejandro. Gary introduces UCoPS to Alejandro to ensure his buy-in but also lets him know that implementation will be mandatory across the company. Britta then briefs Alejandro about Lean thinking and the way it applies to normal plant processes. As Gary had hoped, Alejandro is not only receptive, but keen to point out how compatible it is to his own way of thinking. He says he has always considered keeping an eye open for small adjustments that create significant improvements as a fundamental part of the job.

By way of example, Alejandro relates a story from a test facility at the site. Here, product samples were regularly prepared for quality testing on a rolling cart, bearing several levels of trays. Filling each level tray with nine boxes of measured samples and then sending it to the lab was a regular routine. One day, a member of staff suddenly stepped up and asked:

“Could the size of the boxes be changed slightly, so that more samples could fit on each tray?” One quick and simple alteration to the existing system and they were able to set up twelve samples per tray—a thirty-three percent rise in efficiency that added up to real savings over the course of a busy year. A clear case of thinking outside the box!

It’s easy for Alejandro to quickly grasp the practical aspects of Lean thinking. Its simplicity makes him appreciative of Lean’s power to initiate positive change in a systematic way. His previous experience makes him quick to see the wisdom of using a structured framework, and the potential benefits of injecting common-sense thoughts and working procedures into an organized system.



Top Tip—Choosing Where to Start

Be ambitious. Take a meaningful and challenging location as your test site. This will then serve as a model that you can use both for the continuous development of your productivity-system and as an example of best practice to other sites awaiting their turn.

Do not start with an easy-fix, unrepresentative site. Yes, there is always that temptation to play safe, trying to ensure that, if things go wrong, at least it’s not an important site. But this mindset brings its own problems. It shows a lack of commitment and belief in the system. Also, a small-scale success does not provide a convincing or compelling case that suggests the system will work on the larger, more complex or strategically important site. It encourages the belief that success was purely due to the site being small and simple to fix. Or, worse still, that it was such a mess it had to get better, no matter what you did!

So, the advice is to design your system well, believe in it yourself and go for one of the most challenging sites from the outset.



Top Tip—80-20

You typically get 80% of the performance from 20% of the tools. In any system, you should start with the tools with the highest improvement potential and save the more advanced and complicated techniques for later. Always simplify Lean implementation to what is appropriate for the site complexity. Do not treat your site as if it is a Toyota car plant—it is definitely different and probably significantly simpler, too.

Waste Walk

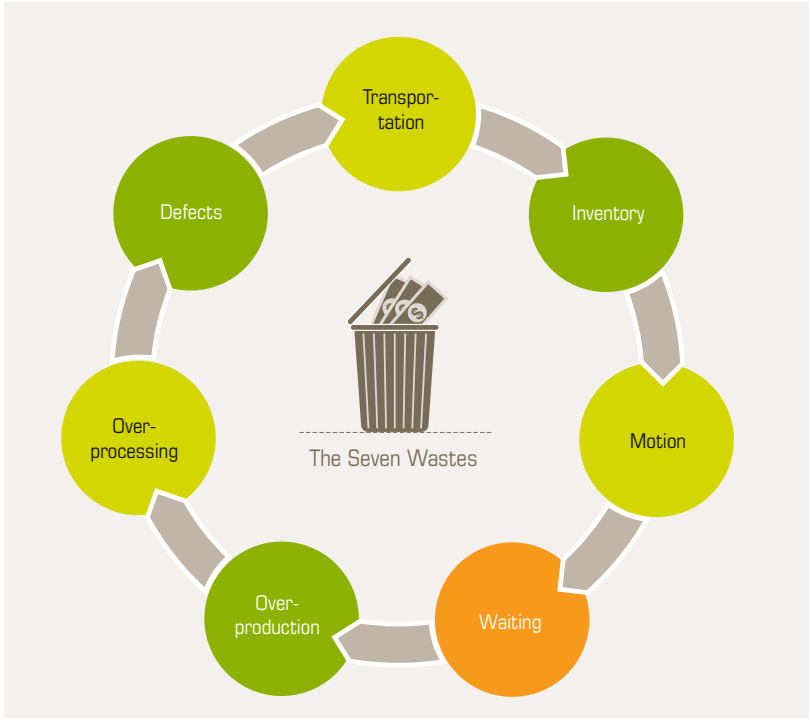
On the first day in Argentina, Britta suggests that Gary and Alejandro accompany her on a waste walk, one of the simplest ways to get acquainted with some of the fundamental Lean concepts. She explains that this should take no more than half an hour, and they will only need to be armed with the most basic and essential of Lean tools, a notebook and camera. In many respects, this will feel like a safety walk, a common type of inspection where a manager will tour a site to observe and discuss safe working practices, but now the group will be looking for inefficiencies, rather than potential hazards. This takes no real training, just an understanding of the seven wastes. Or, as Britta calls it, a quick introduction to “Tim Wood,” an acronym to help people remember all seven of these wastes.

The Seven Wastes

The seven wastes that the group are looking to identify on the checklist during the waste walk fall under the following categories:

- Transportation
- Inventory
- Motion of people
- Waiting time

- Overproduction
- Overprocessing
- Defects



As they undertake the waste walk, Britta talks Gary and Alejandro through examples of the seven wastes they are observing: cases where ingrained working habits could qualify as minor, but clear examples of waste and of working practices that can easily be improved. Alejandro mentions a fairly common situation where irritation levels rise steeply on the shop floor when workers are losing time, trying to find equipment that has not been returned to its proper place. He also notes that the “proper place” could be much closer to where this equipment is used most often. It would be simple to solve this by establishing a new location for storing tools, saving time, avoiding pointless wandering around and thereby reducing motion, one of the seven wastes.



Toolkit – The Seven Wastes

The Seven Wastes Checklist:

Transportation—A typical example of this type of waste is inefficient moving of things around the site. This could include forklift trucks with too small a load capacity, resulting in them needing to make more runs. Poor flow or site layout can also result in things having to be moved long distances—for example, packaging too far away from packing lines or raw materials too distant from the production unit.

Inventory—In simple Lean terms: stock is waste. The cause can be poor planning or forecasting, or poor purchasing. Inventory can also be in the form of too much work in progress. This may arise if a process is not balanced. For example, the packaging line cannot match the speed of the production unit. Another potential cause is inefficient quality-control procedures, resulting in a buildup of intermediate product waiting for inspection or analysis.

Motion of people—This can also be caused by poor site or workplace layout, or poor ergonomics. Simple examples are toilets in the wrong place, essential tools not to hand, switches and control panels located inconveniently, etc. A poorly designed workplace layout will cause unnecessary motion for the people who work there. People should be at the center of the process where things are easy to see and easy to find with a minimum of movement.

Waiting time, delays—People waiting to do work. They could be waiting for product, waiting for more people (late staff), waiting for instructions, etc. Vehicles can be halted waiting to be loaded. Production-line imbalances also cause waiting time.

Overproduction —We have already seen how this goes against the grain of Lean manufacturing. Producing more than is required to meet customer orders or demand is waste. And it also produces a waste of inventory!

Overprocessing—Producing something with overly high specifications. Some good examples of cutting this type of waste come from the automotive industry, such as fitting a lower spec carpet in the trunk, replacing etched switchgear with printed ones or replacing full-size spare tires with space-saver tires.

Defects—Easy to spot. These can include product that is out of spec, out of date, wrong, scrap or needs reworking.

Britta is very pleased with this observation, takes a few photos with her camera and ticks this off as an example of a waste that can be solved immediately. She highlights that finding one example of waste that can be resolved with a swift and simple solution is an ideal component of a waste walk. Britta points out that improving transportation can also fix waste in the form of motion. For example, moving product closer to its next stage of operation, rather than requiring people to take time to transport it where next needed, not only eliminates wasted motion, but also lessens the risk of product damage or accidents through reduced handling.

As their tour continues, Alejandro notices that a storage area not only needs better organization, so that components used can be located more quickly, but also contains items that are no longer in regular use.

Britta again takes a few snapshots with her camera, as Alejandro finds more examples of waste. Photographs help to make examples clearer and also act as a first step in preparing visual aids to illustrate improved methods. They provide the material for before-and-after depictions of how processes should be done. Remember, she says, it is always best to ask permission before taking a photo of someone—they could get upset otherwise, and if you ask they rarely refuse.

When the trio get to their final destination, a storage area for finished products, Britta asks Alejandro if they are seeing an outwardly normal and orderly procedure that could still be disguising potential improvements. For example, is the amount of inventory a sign of

overproduction? Perhaps too much is being produced too early and production is not optimally aligned with order pull? Or perhaps the storeroom is holding products that have been delayed in delivery? Maybe some of the products have been found to be either faulty or not exactly what the customer wanted?

Alejandro and Gary think these questions over as the three of them head back to the office. In just this short exercise, they have seen how many things can be improved by focused, common-sense thinking, and also how back-office planning impacts plant efficiency in subtle ways.

Such exercises are, of course, pointless, if, following observation of the waste, you do not target elimination in a structured way. What you observe must be actioned. At the same time, don't overload, but instead focus on the important, achievable issues. A good idea is to identify three things after each waste walk:

- One thing you will improve now
- One thing you will improve within one week
- One thing you will improve within one month.



Top Tip—Seven Wastes are Everywhere

The structured elimination of the seven wastes can be applied to a warehousing situation, an office environment, transactional or support-service activities and many other work functions that are not necessarily manufacturing or operational in nature. The seven wastes provide a fairly simple but effective framework for identifying and eliminating waste everywhere.



Top Tip—In the Picture

Camera, action! If you watch any experienced lean navigator in action, you will see that a camera is an essential part of his or her toolkit, because they know from experience that something noteworthy is bound to show up and they want to capture that moment.

Also make sure you keep checklists. They are indispensable for doing waste walks or safety walks. They are also valuable when it comes to organizing operations, ensuring that everything is recorded and that everyone has access to the same information, with one agreed way of doing things. Well-constructed and -maintained checklists, reminding everyone on the shop floor how things should be done, can even save lives. A picture is also Lean. Nothing is truer, or leaner, than a picture that saves a thousand words.



Toolkit—The Waste Walk

A waste walk is an easy introduction to basic Lean thinking. It also shows that positive changes can be spotted and fixed quickly. A waste walk is ideally done with a small group, but can be carried out alone. It should take about half an hour, focus on one designated area and combine observation with keeping the seven wastes in mind. Record all examples of waste, with a checklist and camera. Remember that even normal or essential parts of an operation may contain some wasteful elements that can be improved later. Finally, try to find at least one example of waste that can be corrected immediately, to show how simple and effective Lean can be.



UCo Waste Walk Sheet

Waste Walk		Muda Category (Seven Wastes)							Facility			
Observation		Overproduction	Transportation	Motion	Waiting	Processing	Inventory	Defects	Safety	Environmental	Space	Energy
1	Waiting for Line Leader following toolbox talk.											
2	Empty pallets at end of line – not stored in the designated area.											
3	2 pallets of packaging – floor marked out for 1 (plus not in correct place).											
4	Manually making boxes.											
5	Double taping box seams.											
6	Operative collecting own packaging. Line Stopped.											
7	Cleaning equipment is without a designated area and difficult to locate when needed.											
8	Manually placing filled bottles into boxes.											
9	Manually placing empty bottles onto filling line.											
10	Not utilizing vacuum lifter for manual handling tasks.											
11	FLT in wrapping area – keys in and engine left running for +/- 15mins.											
12	Unutilized powder bins.											
13	20-litre containers left out from previous production run. Should be returned to stock.											
14	3 Operatives waiting for management instruction.											
15	Unidentified yellow cone in walkway.											
16	Layer pads for Line 2 stored in incorrect area. i.e. Pallet at end of Line 1.											
17	Line 1 – should vac lifter be used?											
18	Manually labeling packaging.											
19	Incorrectly positioned switches.											
20	Changeover tools not returned to shadow board.											



2.

Defining and Understanding the Core Lean Tools

BRITTA TAILORS THE EFFORT

To determine which of the Lean tools will be implemented at the Argentinian site, Gary asks Britta to compile an overview of the tools that she feels will be most relevant to UCo overall. Britta will present these to Alejandro and his team and agree on the techniques that they think will have the greatest value and benefit to the site.

Britta suggests that the UCoPS should focus on the following tools:

- 5S
- Visual Management
- Standard Work
- Process Mapping
- Overall Equipment Effectiveness (OEE)
- Asset Care/Planned Preventive Maintenance
- Continuous Improvement/Kaizen
- Just in Time/Kanban
- Takt Time/Line Balancing
- Single Minute Exchange of Die (SMED)
- Problem-Solving and Root-Cause Analysis/5 whys

5S Workplace Organization

Britta decides her first priority will be to introduce the concept of workplace organization and the proven systematic approach known as 5S. She explains that 5S is a simple but very effective way to improve housekeeping, reduce all forms of waste, optimize resources and standardize the cleanliness of the workplace. Britta knows that good workplace organization will also have a direct and positive impact on safety. A safe and productive workplace requires a structured and disciplined approach to housekeeping.

5S provides exactly the structured framework for systematic organization of the workplace and gets its name from the five steps to improvement:

1. Sort
2. Set in order
3. Shine
4. Standardize
5. Sustain

The 5S system aims to put “the house” in good order and keep it that way—this really is the first step to implementing a highly productive Lean culture within UCo. The benefits of 5S will also be directly felt by the employees themselves, as they will soon enjoy a safer and more pleasant working environment, have input into how the workplace should be organized and know exactly what is expected.

So, let’s now look in more detail at each of the five steps as we follow the 5S route to improved workplace organization.

Sort is the first “S” and the obvious starting point when improving our workplace. This is the process of removing anything that is not required or necessary in the work area. If there are items that are not needed to get the work done, then these are simply taking up valuable space, getting in the way and possibly creating confusion. In this first 5S step we must remove all that is not necessary by asking, Do we

need this? When was it last used? Should it go somewhere else? Do we need to store these for so long? etc.

For any items that you feel might not be required, a useful technique during the sort phase is to make these items more visible by simply attaching a red tag. This immediately signifies in a highly visual way that someone questions why it is here. This allows us to keep track of our progress and we can set deadlines for deciding the fate of each item.

Britta issues a final caveat. For some people, the act of throwing something away is counterintuitive! This has to be overcome at this initial stage—strong discipline is needed. Maintenance departments can often be particularly challenging in this regard.

Set in order is the next step (the second “S”) that can only be applied once we have removed all unneeded items during the sort process. Now we can arrange the placement and storage of the necessary



Set in order: simple, but effective: everything in its place—visible and simple to access—and very easy to put things back in their proper place after they’ve been used.

items more efficiently by standardizing the naming of objects, using a system of colors for easy identification, identifying the contents of shelves, cabinets and tool racks. The objective is that there is a specific place for everything, and everything is in its correct place.

Britta then asks people to analyze how materials, tools and equipment are used, and works to arrange and locate items as efficiently as possible. The goal is to reduce time needed for storage and retrieval and to streamline routine activities.

Shine is our third “S” and is centered on achieving thorough cleanliness of the workplace and the equipment. Because we already removed the unneeded items during the “sort” phase, we are able to focus our efforts and not waste time on cleaning items that are not required!

By keeping both equipment and the workspace clean we can improve access and reduce safety risks by removing potential hazards. Cleanliness also allows for early identification of possible equipment problems and detection of faults. With a clean plant and equipment, things like oil leaks, product spillage and dust will be more visible and therefore noticed earlier. Cleanliness becomes everyone’s responsibility.

Standardize is the process by which we lock in the improvements that were made during the first three steps. This fourth “S” in the process requires us to fully define what is expected in terms of a clean and organized workplace. All stakeholders within the workplace must have the relevant knowledge, training and information to achieve this standard—all of which should be supported by strong and clear visual management.

Sustain is the discipline that ensures that workplace organization is fully embedded and becomes a habit—the way things are now done. This requires commitment from all stakeholders, not least the management. “I’m a big believer in weekly 5S management audits,” concludes Britta. “They also fully involve the people who work in the area.” Weekly 5S audits are a routine that allows for measurement

of performance, which then plays a big part in sustaining the standardization effort.

The benefits of using 5S will quickly become apparent, Britta promises. Correct and visible placement of equipment makes it less likely things will be lost or go missing. Clutter is removed, eliminating hazards and reducing the risk of accidents. Maintenance problems can be identified at an earlier stage, reducing production downtime due to mechanical breakdown, which means financial savings. Everyone takes responsibility for the cleanliness of their work area and their environment is more pleasant and less stressful to work in.

Britta explains that a good approach is to divide the work area into zones and prioritize your attack. One advantage this brings is that you can designate a single trial area as “an island of excellence.” Once you have applied 5S to this location, you will have created a highly visible example of what can be achieved, establishing a clear benchmark that can be rolled out to other areas of the plant.



Top Tip—Order First, Lean Afterwards

To reap the full benefits of Lean, make sure that your site is well maintained, with a proper infrastructure and good housekeeping in place. If improvements need to be carried out to bring the site up to an acceptable standard, implement a fast-track 5S as the first step. 5S, as outlined above, is simply a structured way of getting rid of what you don't need, finding a suitable location for the important things, keeping the site clean and making sure it is then kept at that level.



Top Tip—Order at a Glance

Take a close look at your site. You can tell whether it is well run by this simple measure alone. Think about a professional carpenter's shed where everything is in the right order on the wall, with outlines drawn to show what tool fits where, and labeled below. You always know where to find things, where to put them back after you have used them and what you have—and, therefore, don't have.

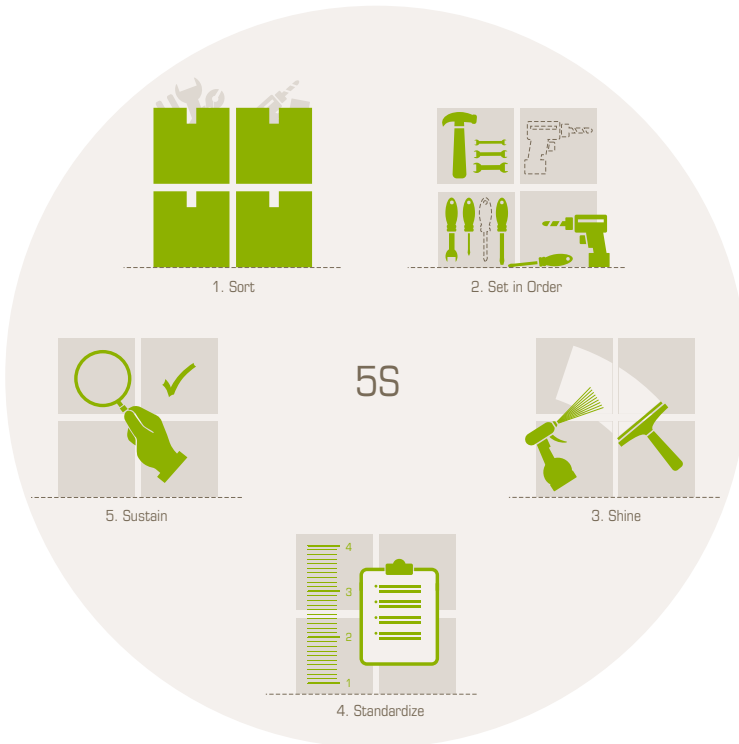
Compare that to the average DIY enthusiast's toolbox. With things strewn everywhere, you have to look hard to find them. Who gets the job done quickest and with the least stress—and who would you hire? Good housekeeping is the backbone of any well-organized and efficient site and, combined with good visual management, makes a huge difference. Applied diligently, 5S is an excellent tool to ensure that your “house” is always in top condition. From that, all of the benefits Lean promises will follow.

People like a tidy and clean place to work, and the advantages are indisputable. With some systems or techniques it may be necessary to argue the case for change against the old ways of doing things. However, it's very hard for the dissenters to marshal a convincing argument for an untidy, dirty or unsafe workplace. A well-kept site will convey the fact that everything is under control, which makes a very good impression also on customers, visitors and regulatory inspectors.

Britta continues that, in her experience, the plant will also see a reduction in working days lost due to accidents. She also thinks an increase in morale, and consequently productivity, is likely—as it is clear that employees appreciate the improvements made to their work environment.

In 5S, the real challenge will be the final “S”—Sustain—and hence that needs to be the key issue for management focus.

 Concepts Illustrated: 5S



 Toolkit—Remembering 5S

- Sort:** Identify and remove all unneeded or unclaimed items from the workplace.
- Set in order:** Organize the items, tools, materials that are needed.
- Shine:** Thoroughly clean the work area.
- Standardize:** Develop visual standards, procedures, cleaning schedules and an audit system.
- Sustain:** Audit, monitor, correct ... and if required, go back to the first “S.”



Top Tip—Sustaining Housekeeping

How to Achieve the Fifth “S”: Sustain

You need to focus on three issues:

- Embedding the culture
- Leading by example
- And audit—just in case

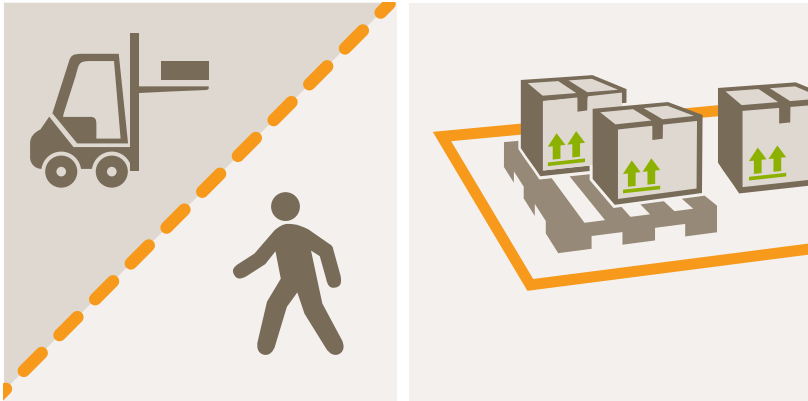


Top Tip—Macro 5S

Many see 5S primarily as a workplace organization tool—a system for creating and maintaining high standards of housekeeping, cleanliness, etc., at site (or micro) level. But you can also “5S the organization” at macro level—from boardroom to executive office. For example, at the micro/factory level, the second “S” (set in order) could mean creating allocated areas for tools and equipment by using tool racks, floor markings, shadow boards and such. On a macro level, set in order could involve restructuring the company’s plant and equipment footprint, simplifying a process or creating a new organizational structure, for example. At this stage, you are trying to achieve the same aim (whether micro or macro level) to establish a steady state or platform that you believe works and is safe, efficient and effective. From this steady state, you then progress to shine, standardize and sustain.

Visual Management

Britta goes on to describe to Gary and Alejandro two other Lean tools that go hand in hand with 5S, often used to help implement the set, shine and standardize components in particular, namely visual management and standard work.



The first of these tools is **visual management**, which is the employment of visual indicators, displays and controls to improve and simplify the communication of key information. Examples include signage, labeling, status lights, notice boards, etc., making the rules, standards and status they illustrate immediately clear to everyone, thereby helping with workplace organization and fighting various types of waste.

Floor markings are another very simple and effective use of visual management to designate issues such as the correct location for equipment or the correct route for movement of people and machinery. You will need to make effective choices to balance the need for good information against the pitfall of sign pollution.

Visual management also includes more detailed forms of posted information, Britta adds. These can take the form of boards, charts, forms and so on to provide quick reference material that helps organize the workplace. Examples include charts showing who works in which area and when, productivity data, production schedules, maintenance records, photographs of first-aid responders—useful info that benefits those working on the floor by being close at hand.

Besides helping to make work go more smoothly, this kind of approach does more than manage visually—when well done, it

also contributes to making a positive visual impression. This not only benefits those who work there, but also makes a strong and important first impression on visitors to the facility—from customers to regulatory inspectors.

Standard Work

The other common Lean tool that Britta mentions is standard work, another essential part of the Lean backbone (think of the fourth “S,” standardize), at its most effective when supported by clear visual management systems. Standard Work defines what we should do, how we should do it, where we put things, what equipment we should use and what safety procedures we need to adopt, etc.

For a production process, for instance, the term refers to a system of providing instructions by clearly documenting procedures that fully specify the correct method of doing a job and that records agreed best practice in the form of a Standard Operating Procedure (SOP).



Top Tip—Make it Visual

Use visual management clues. In real life, these are all around you. Think zebra crossings, IKEA step-by-step instructions, parking spots, pictograms at airports, road signs and more.

The more visual you can make something, the more first-time-right anyone not used to the process will be able to complete it. To further enhance visual management, the next step is color coding or physically differentiating different elements, giving every operation a unique design or color—for example, marking levers and switches for “power on” in green and “power off” in red, and painting the floor to differentiate between production and pedestrian areas, etc.



Toolkit—Essentials of Good Visual Management

Have a visual management strategy for elements such as signs, labels and floor markings.

- Signs should be clear and easily visible and legible.
- Where possible, use symbols and diagrams, rather than words.
- Tag machines, equipment and tools with ID names and numbers.
- Label storage locations with a location code, the item name and the quantity stored.
- Position storage locations labels so that they are easy to see, take out and return.
- Use floor lines to separate aisles and work areas and indicate the position of storage, equipment, tables and storage positions for mobile equipment. Only use straight floor lines; use cross hatching where caution is required.
- Make sure that you also apply 5S routines to your visual management—if signs and notices are out of date or shabby, remove or replace them; if a storage location changes, then update the label; if equipment is moved, re-lay the floor markings.
- Be consistent with color coding and signage and do not overcomplicate it.
- Avoid visual management pollution.
- Everything you do must look professional.
- Follow normal corporate rules.

It is best practice for SOP documents to be drawn up together with those who best know how to execute a task and therefore take on board their knowledge. The finished SOP will help new workers quickly learn how to carry out these jobs effectively. It also provides a standard that can be checked and audited to ensure that the agreed best practice is being sustained.

Writing an SOP

To produce an SOP, the operation is examined and broken down into steps. These steps are then recorded, using a combination of illustrations, photographs and text, to ensure that there is a helpful visual aspect to the instruction. These manuals, often in the form of boards, are then placed at every workstation where the task is performed, illustrating the way that staff have been trained to do the job. Like all things Lean, standard operating procedures should be open to scrutiny and further improvement.

An SOP demonstrates the accepted best way of doing a task, be that changing a spare part on a bagging machine or inputting a sales order. The more visual the SOP, the better.



Top Tip—Standard Operating Procedures

Ensure that standard operating procedures are compiled by those who know the task best, covering the following:

- Visual—using pictures, diagrams and clear simple text
- Located where the appropriate task is carried out
- “Living” documents that are ready to be changed and updated
- Audited—SOPs are best practice, but also a baseline for further improvement
- To further enhance SOPs, consider adding the time the operation in question will take and put an audit regime in place to monitor against this














Toolkit—Combining Techniques—the Single Point Lesson

A great way to get people familiar with SOPs and their requirements is to include them in training routines. This you can do through the single point lesson (SPL).

The SPL aims to standardize best practice by delivering successful task training in 15 minutes or less. Some benefits that SPLs bring are that they are highly visual, explain the why as well as the how, and include a demonstration on a single sheet. The emphasis is on showing, rather than telling, with illustrations that are intuitive and self-explanatory and contain an absolute minimum of text.

SPLs have become an essential tool for training and communication for operators, maintenance, managers and support functions.

Whereas SOPs and SPLs are simple visual guides to a task, the single point lesson is specifically designed for training. Think of them like this: the SPL is the quick-start guide, the SOP is the manual. Plant personnel use SPLs in exactly the same way as car or computer users—to get up to speed themselves or even to advise others. On the other hand, the manual is a valuable reference when needed, but is read less often. It is important to note that SOPs need to be accompanied by an audit regime to ensure that the task taking place is completed in line with the SOP.

UCo Operations			
Single Point Lesson			
SPL N° YEL-MAN-031 Version N° 01 Date: 05/06/2014		Air pump blockage removal	Risk Assessment N° YP-RA-PRD-031
Step	Activity	Key Points	
1.	Remove inlet section.	Unscrew the four bolts on the top of the pump and remove the inlet section.	
2.	Inspect pump.	Check both sections of pump for any blockages.	
3.	Inspect inlet balls.	Remove the steel washer and seal to inspect the balls and replace when complete.	
4.	Replace inlet section.	Put inlet section back into place and screw onto the pump.	
5.	Remove outlet section.	Repeat key point one to remove outlet section.	
6.	Inspect pumps.	Check both sections of pump for any blockages.	
7.	Inspect outlet balls.	Remove the steel washer and seal to inspect the balls and replace when complete.	
8.	Replace outlet section.	Put outlet section back into place and screw onto the pump.	
		Be sure you have turned the air off to any pumps before carrying out any work.	P.P.E. Requirements
			   

Process Mapping

Britta moves on to introduce the technique of process mapping, which she explains is fundamental to understanding the basic Lean principles upon which UCoPS is founded. She reminds the team that the objective is to understand what actually creates value within our operation and to make sure that these value-adding activities flow. But of equal importance is the elimination of the non-value-adding activities: the seven wastes.

So what does process mapping do? It helps us to identify the individual process steps by creating a picture (or map) of our operation depicting the sequence of activities, the flow of product and materials and even the flow of data and information.

Britta explains that every time our customers place an order this triggers a sequence of events and processes that go toward creating, producing and delivering the product or service to the customer. She says “think of it as a journey that our product has to go through from receipts of raw materials right through to delivery to the customer. During this journey it will go through a number of steps, some of which add value and others that do not.”

Britta gives a memorable example of process mapping in action: “I was leading a Lean implementation at a site. The staff had really taken their training to heart and were making good progress through the 5S stages at the factory. The time had come to explore further the concept of value and waste so that we could identify improvements and then standardize these improved practices.”

“We decided to use the team’s new Lean skills to create SOPs by mapping, documenting and analyzing the various steps and specific tasks within a process. Involving the operators was absolutely crucial to the success of this, as they had the relevant knowledge and experience, which the team was able to pick up on, broadening their own understanding along the way.”

Britta recounted the experience and explained that the team was mapping a relatively simple batch production process that involved the following activities:

1. The various component raw materials were collected from the warehouse and collated into batches.
2. Each batch of materials was manually placed onto a single pallet. There could be as many as fifteen different raw materials contained within a single batch.
3. The pallets containing these batches were then moved by forklift truck (FLT) to a lay-down area on the floor.
4. These pallets were then transported again from the lay-down area by FLT to the main production area—to another lay-down area.
5. After a brief waiting period these pallets were individually transported again by FLT to a high-level work platform where an operator manually ripped and tipped each bag into a hopper. The materials then automatically dropped from the hopper into a large plastic mixing drum.
6. The mixing drum was then moved by FLT and loaded into another machine that rotated the mixing drum for twenty minutes to mix all of the components together to create a blend.
7. The finished blend contained in the mixing drum was then transported again by FLT to a packing line where it was filled into individual bags.
8. These bags were then put onto pallets so that they could be transported to the finished goods warehouse ready for dispatch.

Britta explained, “The teams of Lean trainees took to their task with cameras and clipboards, gathering and recording information. Back in the training room they began to build a visual map and, armed with

a large roll of wallpaper, photographs, Post-it notes and pens, started producing a sort of storyboard of the way this batch blending and packing was done.”

“Each step of the process was mapped and given a photo to illustrate it, and notes were produced from the animated discussion of those involved, as they added advice about what types of safety precautions needed to be taken, protective equipment that should be worn, quality checks that were required and so on. They were so engrossed in creating their process map that they completely forgot their trainers were even in the room!”

“And there was much more than just the systematic recording of the process—their enthusiasm spilled over into real scrutiny of how the job was done. I remember hearing them question things like the distant placement of a control button, and arranging to have maintenance move it to save time, and an idea to paint new floor markings to show when a waste bag had grown long enough to need changing.”

“But,” Britta said, “I did have to reign in some of this enthusiasm by reminding the team that there was an even more fundamental purpose in producing our process map! The purpose of the exercise is for us to be able to see the journey that our product takes and the various steps that are involved in this journey. We can then go back to the process map and for each and every activity ask the following three questions:

1. Is this activity directly value adding to your product and something that the customer wants and is willing to pay for? If yes, then **these activities should flow** seamlessly.
2. Is this activity business value adding, whereby the task may not add value directly but is something that protects value or is legally required to ensure compliance with regulations (safety, quality, financial, corporate, etc.)? **These activities should be optimized** so that they are as efficient as possible.

3. Is this activity non-value adding? These are things that the customer is not willing to pay for and are not required to protect value elsewhere in the process. Clearly **these activities are waste and should be eliminated.**

Britta recalled that she had asked the team to look again at the process map they had produced and to reflect on the different types of activities. She said “I asked them to look at every single process step with a view to whether it was adding value, protecting value or simply a waste.”

She went on: “The result of this was that the teams were very quickly able to identify waste such as waiting time, inventory, transportation and movement. But most important was the realization of just how few of the activities within the process actually create value directly!”

Britta concluded by sharing with the team a simple message. “When you look at your own process map ask the following questions for every single step—If the customer knew that we did this step, would they have paid more for the product, and if we stopped doing this, would the customers notice, and would they be dissatisfied?”



Toolkit—Hands-On Process Mapping

When undertaking process mapping, fancy software or elaborate forms can be used, but the common tools of checklists, cameras and Post-it notes are as effective, and readily available. Try this:

- Walk a process from end to end, note all activities carried out along the way, not just those directly involved with the procedure.
- Discuss the process with all who use it and ask what their biggest problems are.

- Chart the process with a series of Post-it notes to have a fully flexible map and include problem issues.
- Identify where improvements might be made and how these should be achieved.
- Now go back and observe the process in action—consider it carefully, using a waste walk sheet and taking photographs to note opportunities for improvements.
- Take the material from the walk and add it to the process map for further discussion.

Process mapping is particularly effective in engaging staff, as it actively uses their experience, knowledge and feedback. Britta says that watching this exercise in action often allows you to sense the point at which Lean thinking has been adopted by the team. As everyone involved in a chain of activities comes forward with their opinions, they become part of the process, and both insight and criticism of how things are done are fully shared and heard, perhaps for the first time. This exercise can create and reveal true enthusiasm for Lean implementation.

Process mapping really embodies the fundamental principles of the Lean approach and enables everyone to truly visualize value and waste within a process, and what can be achieved and improved when you apply its principles. By engaging staff in this way, buy-in improves and, as they identify and log possible bottlenecks themselves, their understanding of continuous improvement is deepened.

Effective process mapping will identify which parts of a process add real value and where there is waste. Here are six key components that should be revealed by the process map:

- Sequence of process steps
- Waiting times
- Capacities

- Throughput rates and cycle times
- Crew sizes
- Batch sizes

Armed with all of the information and insights that process mapping delivers, your business will then be in a prime position to single out and secure improvements right across the operation.

Overall Equipment Effectiveness (OEE)

The next core Lean tool that Britta brings into the equation is OEE –Overall Equipment Effectiveness. She explains that OEE is a productivity measure that shows the combined effect of equipment availability, equipment performance and product quality and is essentially used to establish whether an asset is doing what it is supposed to do. The goal is to identify and eliminate the six main losses in every production process:

1. Breakdowns and unscheduled repairs and modifications
2. Changeovers, setup, adjustments
3. Work organization—breaks, cleaning, staff problems
4. Raw-material supply failure
5. Minor stoppages, slow running
6. Quality losses and defects

For example, within a factory OEE will measure how efficiently your machines are running, measuring and exposing all areas of waste within your production processes. At the same time, it enables corrective actions and resources to be targeted appropriately, to deliver the maximum productivity.

How is OEE calculated? With a formula that multiplies operating time, output and product quality, where these are given as percentages of their ideal rates.

OEE = Availability × Performance × Quality.

Where:

Availability = the net operating time as a percentage of the total scheduled/planned time

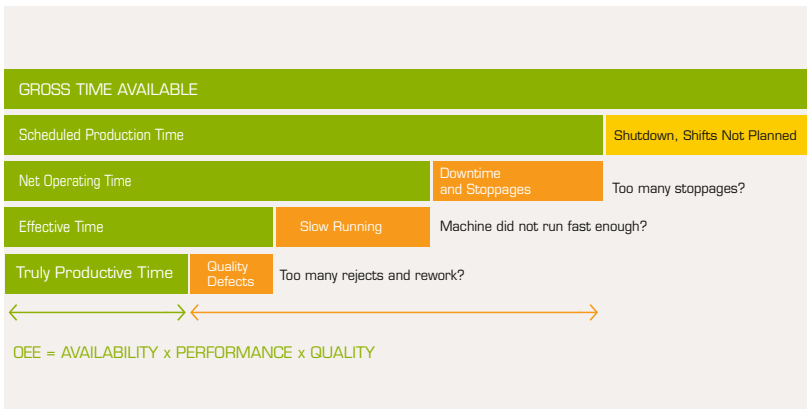
Performance = the actual output as a percentage of the maximum demonstrated rate (during the net operating time)

Quality = the amount of production that was right first time as a percentage of total production

OEE aims to show how effective the process is by identifying the impact of downtime, slow running and quality issues. Even though this might at first look like a complicated or technical approach, it monitors productivity and pursues the system goal of providing a continuous improvement tool (with continuous elimination of waste), and so is among the first tools that should be adopted, Britta advises.

What makes OEE such a powerful route to continuous improvement is the way in which it provides a total measure is by focusing on the relationship between availability, performance and quality. Most importantly, OEE pinpoints where such losses are occurring, allowing

.....
 Concepts Illustrated: OEE



you to identify where improvements are needed, so that you can focus on the most appropriate areas.

Britta points to how OEE helps to quantify and communicate all forms of losses on the production line and compares production to the potential 100% target. Besides scrutinizing equipment, OEE also spotlights other potential bottlenecks, such as staffing, material supply, planning and changeovers. All in all, OEE provides a variety of data to improve planning, costing and efficiency.



Top Tip—Accurately Record All Lost Time

OEE is a fantastic tool for identifying lost production time and so additional output potential. However, to get the best out of OEE it is essential to accurately record the lost time/minutes. Scheduled stoppages, such as shutdowns, shifts without planned work, major plant overhauls and so on, are not used in the calculation of OEE. Also, remember that this tool is geared up to examine efficiency, in order to discover ways of doing things better—a performance indicator or metric, rather than performance tool as such. Don't use OEE to compare two sites unless they are truly identical. OEE is not for you versus others but to measure yourself. It is a tool used to help give you lasting productivity improvements.

Bear in mind that OEE is all about data. The better you record and analyze the losses, the more appropriate the actions you will take, and the more you will benefit.



Top Tip—Wider Overall Equipment Effectiveness

Although an excellent tool for measuring equipment effectiveness, OEE in isolation may not give a true reflection of wider site efficiency. You may, for example, decide to “throw labor” at a bagging line to increase bagging rate and hence performance in the OEE calculation, but this might simply create an inefficient bagging line with high OEE. Ensure that you have other metrics, in addition to OEE, for the measurement of wider site performance

– most typically, cost per unit produced.

Concepts Illustrated: OEE Example

Example OEE exercise:

A 50 kg bagging line is planned to operate a single shift on Monday, 11 April, from 09.00 to 18.00, with a one-hour lunch break.

The “maximum demonstrated production rate” for the line is 1,000 bags per hour (8,000 bags for a nine-hour shift—you cannot produce over lunch). Total actual output on 11 April was 6,300 bags, of which 100 bags had to be reprocessed, due to poor stitching.

There were the following incidents:

- Production started late, at 09.10
- 15 minutes lost, due to no empty bags
- 20 minutes lost, due to empty hopper/payloader problem
- 15 minutes lost, due to repair to sewing machine.

So, in total, one hour was lost.

What was the OEE?

Availability = Seven hours' operating time, out of a total eight hours' scheduled time = 87.5%

Performance = 6,300 bags produced over seven hours, compared to a target of 7,000 bags over seven hours = 90%

Quality: As 100 units out of the 6,300 required re-work = $6,200/6,300 = 98.4\%$

So the OEE = $87.5\% \times 90\% \times 98.4\% = 77.5\%$

In the above example, you would probably focus first on why the availability was relatively low, compared to performance and quality. While compiling the data for OEE is important, the real benefit comes from analyzing that data to understand which of the six losses have been incurred, so that actions can be taken to improve OEE performance.

Asset Care/Planned Preventive Maintenance

Asset care, and preventive maintenance in particular, is another critical component of a successful productivity system and something in which Britta believes wholeheartedly. Asset care is also vital for safety performance. At a basic level, Britta explains that asset care is all about keeping a close eye on the state of your plant and ensuring that equipment is always in an appropriate condition—while meeting the required standards of safety, regulatory compliance, quality and efficiency. In other words, if you look after your assets, they will look after you.

Because, as Britta stresses, it doesn't really matter how good your Lean system and processes are if you do not look after the assets within your area of responsibility. Her advice is to always be aware

of natural wear and deterioration, as well as the premature and accelerated degrading of equipment, due to neglect, contamination or incorrect operation.

Asset-care activities include:

- **Inspect**—with the aim of preventing deterioration. Apart from cleaning, adjustment and minor repairs, keeping a log of these activities creates a record of helpful data.
- **Measure** deterioration—by monitoring the state of equipment, you get information that allows for diagnostic prediction so that maintenance can be planned.
- **Repair**—correct the cause of bottlenecks or breakdowns and perform preventive maintenance to keep larger problems from developing.

The basics of all planned maintenance (PM) systems are essentially the same, namely that you:

- Identify and record the assets on site
- Identify the maintenance tasks and frequency of task for each asset
- Record that tasks have been completed
- Record all unscheduled maintenance tasks that have completed
- Adjust the planned maintenance tasks accordingly in the PM system on an ongoing basis

UCo also encourages the implementation of “first-line maintenance”, which involves training operatives to develop greater understanding and knowledge of equipment. They will then be able to undertake basic routine maintenance activities in a safe and competent manner, stepping in to perform immediate checks and simple repairs. In effect, first-line maintenance entails tasks being delegated to the line by maintenance following appropriate training. The ability to do this can be linked to core Lean tools, such as standard work. These skills also improve operator ownership of the plant and their buy-in to the

productivity system, while actually increasing productivity—because there is no need to wait for a maintenance crew.



Top Tip—Asset Care

Consider nominating individuals as the custodians of specific plant equipment. However, be aware that the challenge of ownership increases with shift work where more than one person will use the equipment. Asset care thrives with personal ownership.

Planned Preventive Maintenance

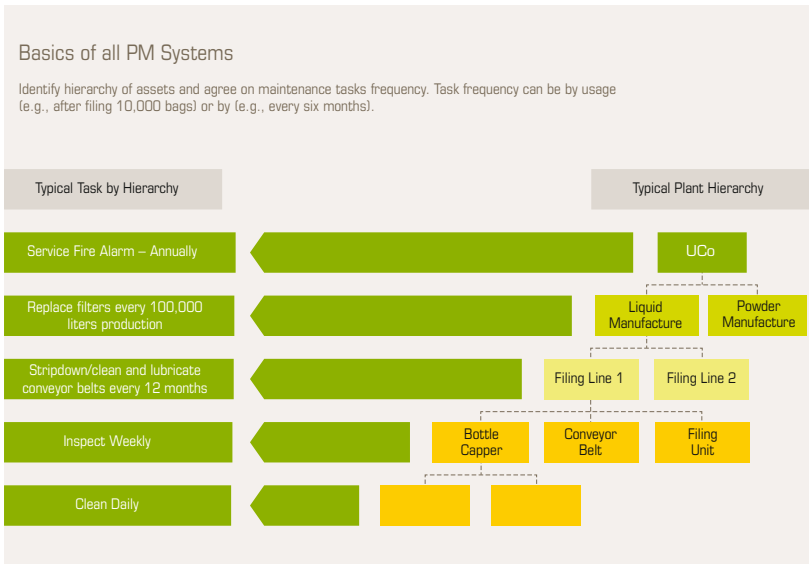
Gary included the requirement for all UCo sites to have an appropriate Planned Preventive Maintenance System (PPM) in his steering document. Britta defines PPM as the systematic, proactive approach to managing the maintenance of plants (e.g., bagging line), equipment (forklift truck, power tools, etc.) and facilities (buildings, for example). It is the opposite of reactive, or so-called firefighting maintenance, which is typically carried out when the plant, equipment or facility structure breaks down.

Britta is fully aware that asset care, including first-line maintenance by operatives, is a fundamental building block in PPM. By taking responsibility for basic maintenance routines and understanding their machines well enough to detect the early signs of deterioration, operators provide important information to help formulate effective preventive strategies. It is an old, but true, observation that no one understands equipment performance like the person who uses it every day. Although primarily a productivity tool, PPM also directly impacts safety as reliable equipment is normally inherently safe. Accidents are more likely to occur when equipment is poorly performing or during maintenance.



Toolkit—Preventive Maintenance System

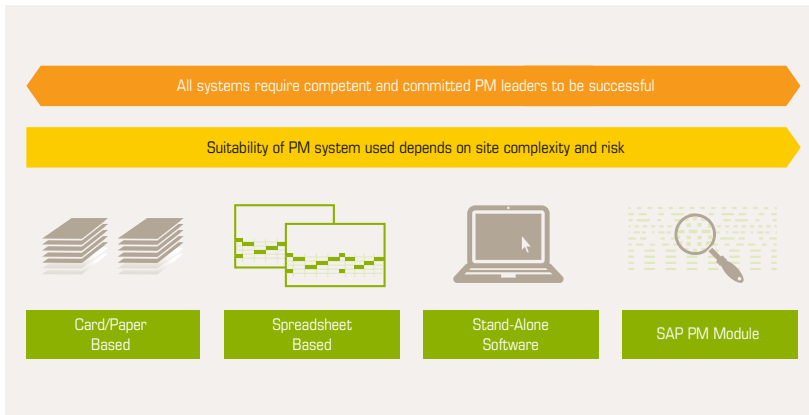
Asset care, and in particular preventive maintenance, is an essential tool for operational sites to help ensure safety and productivity performance. The basics of all preventive maintenance systems are shown below.



More advanced PM systems will also:

- Record the labor and cost by task (to allow better budgeting/reporting)
- Initiate the reorder of spare parts consumed
- Issue job sheets, help with permits, issue e-mail reminders, etc.

Concepts Illustrated: Typical Preventive Maintenance Systems



Top Tip—Systematic Maintenance

When undertaking systematic maintenance, rank the type of maintenance according to criticality of the equipment for the total process. As an example, a palletizer typically is unique and will require preventive maintenance to avoid a breakdown. A mobile conveyor might not be critical if you have more of them. In this case you can save time and money not by doing preventive maintenance but by letting the operator check routinely to detect and report when a repair is needed. Should the equipment break down, production can continue.

Continuous Improvement/Kaizen

Japanese for “improvement” or “change for the better,” kaizen embodies a central part of the Lean philosophy. Continuous improvement is at the heart of our goal to eliminate waste.

Kaizen is a daily process that also aims to put staff participation—all staff—at the heart of improvement. Kaizen boards are the most common medium in the UCoPS, in the jargon-free form of continuous improvement boards.

In some ways, these boards are similar to a suggestion box, but there are also profound differences. The key one is that they are open, so that everyone can see and share ideas, and it is equally visible to all if those ideas are being ignored, rather than dealt with.

The continuous improvement board should be reviewed at regular meetings, Britta suggests. All of the new ideas that have been posted since the previous meeting are handled in an open discussion and she recommends everyone who makes a suggestion on a kaizen board **MUST** receive feedback on their ideas. This should happen quickly, so set a firm deadline, she says. There should be a small designated group that verifies which ideas get what kind of action, and they should tell the people who proposed each idea the reasons for their decisions.

While Britta is keen on introducing further Lean tools, she feels that what has been outlined above are the key essentials to bring lasting productivity improvements to UCo from a practical implementation of Lean. Britta's priority is to ensure that the successful introduction of these tools, with additional Lean development only to be considered when an appropriate level of excellence has been reached over a prolonged period of time. Britta's final comment is to ensure you sustain what you have gained before you move on.



Top Tip—Go to the Gemba!

The gemba is where the actual work takes place. Taiichi Ohno (considered to be the father of the Toyota Production System) advised his managers to go to the gemba, ask why and always show respect for people. When managers walk around the site

and talk to people, it helps to break down any barriers that may have grown between them and the workforce. Also, it is a great opportunity to observe what is really happening on the shop floor and how best practice is being applied—or not. These walks will often reveal any gaps that exist between what management *thought* they were communicating and how those messages have actually been interpreted. It is here, on the frontline, that any misunderstandings can be put right.



Top Tip—Continuous Improvement/Kaizen Boards

Make your kaizen boards with magnetic or erasable sticky strips to avoid having to rewrite as issued are cleared. Make sure that they are categorized according to the seven wastes and that the kaizen board is not used for complaints!

UCo – Factory Kaizen Board

Continuous Improvement Actions	Seven Wastes' Category							Site Improvement					
	Transportation	Inventory	Motion	Waiting	Overprocessing	Overproduction	Defects	Safety	Environmental	Space	Energy	Date Suggested	Actioned?
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
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Just in Time/Kanban

A few months have passed and Alejandro and his team are proud of their achievements. It has not been an easy ride, but they are seeing real gains from the productivity tools they have implemented. Alejandro and Britta have toured the plant and gone through a range of issues that have surfaced. They agree that the site has been able to sustain good performance and work well with the Lean tools as implemented and is now ready to explore further, more advanced Lean tools. One of the major issues the site is facing is the ordering of raw material. Britta therefore decides to kick off by explaining the concept of kanban.

Kanban is another Japanese term, signifying “just in time” production, with Toyota arguably its greatest ever exponent. Kanban is based on the principle of producing according to “pull”—i.e., *what* is needed, *how much* is needed and *when* it is needed—rather than “push,” where you produce to stock.

In essence, kanban is a system of order that provides a visual or physical indicator that some form of action is needed. A real-world example of kanban in action might be where a token is inserted between items in stock to indicate that it is time to order more; or the red area on a fuel gauge that serves as a reminder that the tank needs to be filled up soon.

The Principles of Kanban

Britta explains that the underlying rules to kanban are very clear. You visualize the workflow, prioritize and “pull” work from column to column. The kanban board provides an excellent overview of your current work situation. Visualizing work in a team environment simplifies communication and leads to improved effectiveness. Like all Lean processes, kanban also lends itself to constant adaptation, so that it evolves with the business, while the call to action that underpins it will be triggered automatically by the production process. Get that right and kanban will help you to deliver the best outcomes.

Takt Time and Line Balancing

Alejandro and his team quickly find many issues on the continuous improvement boards where kanban can be useful. Britta tells them she will introduce the team to the rest of the productivity tools she has in mind for UCoPS, so that they may find where to apply the tools themselves.

She starts with, takt time, which is the beat or pace of production—normally measured as seconds per unit/piece. Why would you measure this? To help align the pace of production with customer demand, because, if it isn't, inherently you have waste, e.g., equipment running idle and waiting time.

Example Takt Time and Line Balancing

Takt time is calculated as:

scheduled production time per day (seconds) ÷ average daily customer demand (units)

A calculation of takt time would be:

Scheduled production time = 24 hours = 86,400 seconds

Average customer demand = 3,600 tons per day

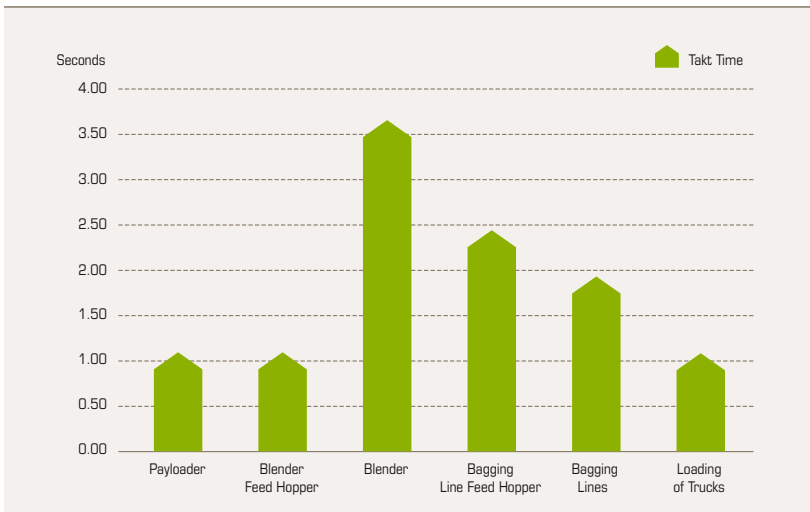
Takt time = $86,400 \div 3600 = 24$ seconds per ton

To meet demand, the operation must produce one ton every 24 seconds.

Most operations or production lines comprise several sequential or parallel processes. Here, the measurement of individual process takt times can show whether the line is balanced. This can best be carried out in conjunction with process mapping, and help to expose capacity constraints and bottlenecks.

The example below shows individual process takt times for a production line. Measured as seconds per bag. The final loading operation has a takt time of only 1.1 seconds. The bagging operation that precedes loading has a takt time of 1.8 seconds, while the blender has a much higher takt time of 3.6 seconds and is clearly a capacity constraint. By measuring process takt times, we can, in this instance, see that the production line is not balanced.

Line Balancing – Processing Takt Times



A simple illustration of the waste involved in line imbalance.

SMED—Single Minute Exchange of Die

With the introduction of UCoPS and thanks to the structured implementation of OEE monitoring, it has become much easier to see where productivity is being hampered.

At the site in Argentina, the OEE data shows that while the bagging lines are running at the correct performance and the correct speed, the availability is low due to a high-level of downtime. Further investigation confirms that this is mainly due to the number of changeovers that are made to the bagging lines. Britta knows that short production runs are entirely necessary to meet the customer demand on a make-to-order basis. From their training with Britta, the site team also now understands the concept of waste, so they too understand that larger batch sizes and more inventory is not the answer.

She explains that changeovers are a natural consequence of being able to deliver on time and to meet changing market demands. The challenge now is to reduce the time it takes to complete those changeovers. The benefits of doing this are quite easy to see from the OEE data.

Faster changeover times obviously increase availability. With increased availability we increase our productivity. Higher productivity consumes fewer resources for the same output so this has a direct effect of lowering our manufacturing costs.

But there are still more benefits—if our changeovers are faster we can then produce smaller batch sizes. This in turn means that our planning and order scheduling can be much more flexible and better able to respond directly to customer demands. Britta concludes, “So we can then produce only what is required, or ‘pulled’ by the customer!”

Britta introduces the team to a technique known as ‘Single Minute Exchange of Die’, most often referred to by its acronym, SMED. She briefly describes that the reference to exchanging ‘dies’ comes from the automotive industry where this technique was first developed. But, she

explains, “SMED can be applied directly to our operation, just as it can to a whole range of different environments. The guiding principle of SMED is that we take a methodical approach by looking at each and every aspect of a changeover. By breaking the changeover down into smaller task elements we can analyse each one systematically; following a step by step approach to firstly eliminate anything that is wasteful and then to optimise those tasks that remain.”

SMED

The SMED technique consists of the following steps:

1. Observe and record the changeover process being carried out. Video is ideal for this as it makes it much easier to carry out the next step.
2. Analyze the whole process by breaking it down into the individual activities (or elements).
3. Record the actual time taken for each element.
4. Identify waste activities: those elements that are non-value adding. Eliminate these. Examples of waste within a changeover include:
 - Waiting for instruction
 - Looking for items
 - Waiting for people
5. Identify external activities—these are elements that could be done in advance of the changeover, while the plant is still running. The objective here is to make it possible to complete as many tasks as possible before the line stops. These then become external activities. For example:
 - Pre-assemble any change parts in advance of the changeover and do it off-line.

- Make sure that all required tools and equipment are close to the line and ready to use.
 - Ensure that all the packaging materials, labels, etc. are delivered to the line before it stops.
 - Ask: can we perform any of the quality checks before the machine is stopped?
 - Ask: can any cleaning tasks be performed safely while the line is still running?
6. Identify internal activities: these are elements that must happen in sequence as part of the changeover process so cannot be moved. These tasks can only be performed when the line is actually stopped, so the aim here is to improve the efficiency of these tasks.

Some examples of where we can streamline these tasks:

- Close location of tooling and equipment to reduce motion.
- Color coding of change parts for quick and easy identification.
- Visual ruler guides to assist placement and adjustment.
- Locating pins or stops so that change parts or tooling can be adjusted to a definite set point.
- Reduce errors by having one-way fitment—so parts can only be fitted correctly.
- Standardize fixings (bolts, screws, etc.) to reduce number of tools required.
- Replace fixings with hand-adjusted ones (levers, knobs, etc.) to eliminate the need for tools completely.
- Make these fixings quick release to reduce unnecessary motion.
- Perform parallel tasks—i.e., multiple activities on the same machine at the same time.

Once the SMED process is complete, bring in Lean techniques we have seen before—visual management—to create clear, illustrated work instructions to document standard work best practice, and audit and review these standards frequently to strive for continuous improvement.

SMED Changeover Analysis—Example:

SMED – Changeover Analysis							
Machine/Equipment:		Change from:		Date:		Sheet #	
Process Name:		Change to:		Name of Observer:		Proposed	
No.	Description of Task	Clock Time	Task Time	Internal	External	New Internal Time	New External Time
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							



Top Tip—SMED

As with many Lean tools, make sure that you implement SMED in the right way. Be careful not to focus on it too strongly and so add other inefficiencies. In a factory environment, rather than just focusing on changeover time, be mindful of the resources that are being employed to reduce changeover times. Formula 1 changeovers, for example, may be fast, but they would not be economical in a factory setting. With SMED, like all Lean tools, focus on the simple or most obvious and you will see benefits. Avoid extremes. The law of diminishing returns applies to Lean efforts also.

Problem-Solving and Root-Cause Analysis

Britta has now introduced various Lean tools and methods but also a fundamentally different way of seeing things through visual management and process mapping. She's also underlined the importance of good asset care and the role that planned, preventive maintenance plays in influencing the efficiency of the plant through the overall equipment effectiveness.

Clearly, many issues are now being highlighted as opportunities for improvement, but also as problems! So, Britta's next step is to introduce a structured approach to problem-solving that can be applied not only to solve the immediate problem but also to identify and eliminate the root cause of the problem. To make her point, Britta reminds everyone of what was learned when applying 5S, "Before we are able to standardize and sustain good housekeeping, we first have to identify and eliminate the causes, the root causes, of poor housekeeping during the sort phase."

Britta continues, "Solving problems is no different. We can only truly solve a problem and sustain the improvement if we fully understand the root causes of that problem."

She reminds everyone of the "plan, do, check, act" (PDCA) improvement cycle and explains that this should guide us during problem solving. "By following this we can be sure that we are not only solving the *right* problem, but also that we check to see if what we did is actually working. Plus, we can do this on a single sheet of paper!"

A3 Problem-Solving

Britta introduces the team to A3 problem-solving, so called because the stages of problem-solving can be recorded on a single sheet of A3 paper, as shown on the next page.

Britta explains that we can use this technique for solving virtually any type of problem, such as a maintenance issue, a quality problem,

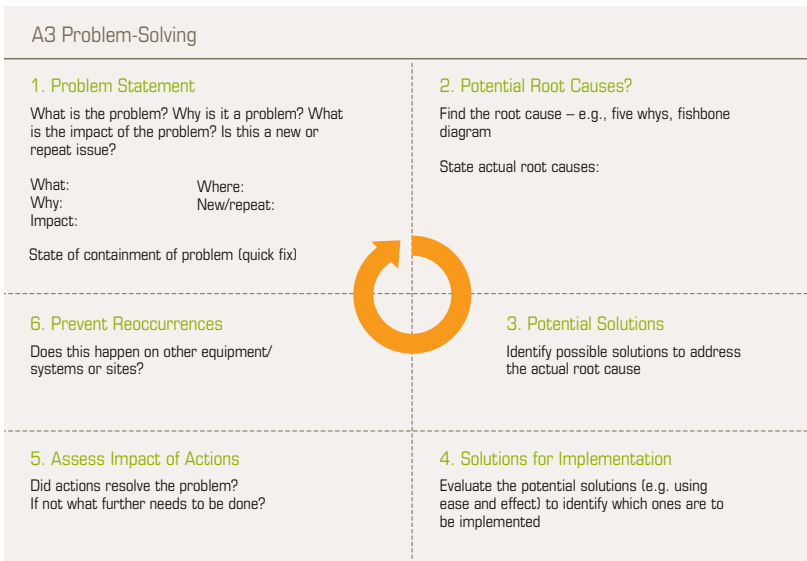
an efficiency loss, etc. She also emphasizes that problem-solving is most effective when done as a team. Therefore we ensure that those affected by the problem are fully engaged in solving it. Britta warns that sometimes this process can reveal that those affected by the problem may also be contributing to the causes of it. An open mind and a good facilitator can at times be essential!

She takes them through the A3 template and explains the six steps that are involved.

Step 1: Problem Statement

Before we dive into solving a problem we must first understand what the problem is by asking some simple questions:

- What is the problem?
- Why is it a problem?
- What's the impact of the problem?
- Where is the problem?
- Is it a new problem or a repeat problem?



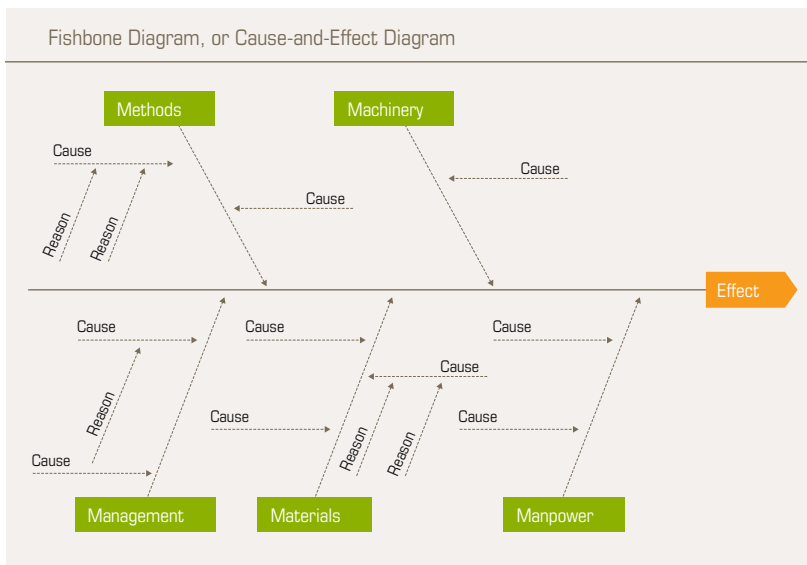
Britta emphasizes that while this stage may sound obvious, many attempts to solve problems (and their root causes) fall down at the first stage, simply because the problem is not fully understood.

Step 2: Potential Root Causes

Now that we have defined the problem we can look at the detail behind it. Cause and effect are directly linked, so we should now look at the causes that are directly contributing to the effect (the problem).

Sometimes it is possible to very quickly get to the root cause by simply asking the question why five times (a technique actually known as the five whys). By repeatedly questioning the answer to the previous question, we may rapidly arrive at the underlying cause.

But sometimes problems are more complex (or may appear that way) and require more detailed analysis. To help us do this and to guide our thinking we can use what is known as a cause-and-effect diagram or, more commonly, the fishbone or Ishikawa diagram (named after its creator, Kaoru Ishikawa).



The fishbone diagram helps us by providing structure and a framework that captures the thoughts of everyone involved in the problem-solving process. Most underlying causes of a problem will be within one or more of the following areas:

1. The methods we use and the way we work
2. The machinery and equipment that we use to do the work
3. The management systems and procedures we employ
4. The materials available to us
5. The people doing the work

These are shown on the “bones” of the diagram as the various causes. So we now start to reveal causes in a structured way, and most likely we will find that there are sub-causes (the reason for these causes). We are now truly exposing the real root causes to the problem at hand.






Step 3: Potential Solutions

Once the root causes have been identified, we should then start to identify potential solutions. Britta stresses that the potential solutions should be focused not on the problem itself (the effect), but on tackling and eliminating the actual root causes that we identified above. She advises that a good way to capture these potential solutions and to ensure that everyone’s voice is heard is to write each solution down (on a Post-it note, card or similar). With the many solutions provided, the A3 team should have a good number of ideas that can be used to solve the problem.

Step 4: Solutions to Implement

With so many ideas and potential solutions we, need a way to evaluate these and decide which ones to implement, and when. Britta explains that one of the most efficient and transparent ways to do this is to rank each idea on the basis of two questions, (1) how effective will it be in eliminating the root cause? and (2) how easy will it be to implement? Britta introduces the ease-and-effect matrix, where individual ideas can be assigned in their relevant place on the resulting grid.

By doing this, everyone’s contribution is heard, discussed and evaluated on the same criteria. No ideas are dismissed outright—we simply

Ease and Effect Matrix			
	Difficult To Do	Moderate To Do	Easy To Do
High Effect			
Medium Effect			
Low Effect			

choose not to implement them at this time on the basis that they have a lesser positive effect than others, or are more difficult to do than others (or both).

Any potential solutions that fall into the upper right corner of the matrix are clearly the quick wins, as they are easy to do and have a high effect.

With this evaluation completed, an action plan with clear responsibilities and time scales can now be developed.

Step 5/6: Assess Impact of Actions and Prevent Reoccurrences

Britta now explains the last two stages of the A3 problem-solving process. At the outset, she had reminded the team of the importance of “plan, do, check, act” and also the similarity with founding principles of 5S. She explains the importance of checking the impact of the actions to ensure not only that they worked, but also that the actions are now standardized and sustained—thereby truly eliminating the root causes of the problem. This not only prevents reoccurrences, but also ensures that best practice is standardized across the site (or indeed the organization) to ensure that this same problem does not appear elsewhere.



Top Tip—Why only Five Whys?

Although the number 5 is part of the generally accepted name of this technique, there really is no fixed amount. The point of the exercise is to keep questioning responses until you finally get to the bottom of the problem at hand. Think like an old-fashioned crusading journalist determined not to let a dubious interviewee get away with any distracting or empty answers. You are bent on getting the truth! You have succeeded when a solution emerges that solves the problems revealed by the chain of evidence.

An Example of Five Whys Questioning:

Understanding Root Cause

1. Why did the bagging line stop?—Printer was not working correctly.
2. Why was the printer not working correctly?—The printed image was unclear.
3. Why was the printed image unclear?—The ink was too thin.
4. Why was the ink too thin?—The printer had become blocked and solvent was added to clear the blockage.
5. Why was there a blockage?—There was a buildup of ink, because there is no standard for cleaning the printer end of each run.

Solution: Introduce routine printer-cleaning regime. Determine necessary tools/equipment, and agree on frequency and cleaning standard.



Top Tip—Root-Cause Analyses

Root-cause analyses such as the five whys and SCAT perform well for many cases. They are, however, simplified methodologies that might not be appropriate for complex cases. A deep root-cause analysis is based on three principles:

- The data collection shall be done as soon as possible, only be based on facts and evidence and be done by going on site and talking with all relevant stakeholders.
- The root-cause tree shall be drawn up using only the collected facts and start with the event itself with these initial questions:
 - What was necessary for this event to occur?
 - Was this in itself enough for this event to occur? (If not, you look for an additional cause.)
- The actions identified should be as close to the source of the root cause as possible and, ideally, distributed as much as possible through the Ishikawa diagram with an assigned person responsible for each action and a due date for its completion.

After the actions have been taken, you would follow the normal PDCA cycle to prevent the issue from reoccurring.

With these additional tools, Britta feels that the site has got the Lean understanding it needs to reach excellence. It will take a long time for the site to properly deploy and sustain all the tools she has outlined. Further Lean productivity tools exist; however, she feels that most of the benefit can flow from the tools she has outlined and that more effort is better spent elsewhere than to broaden the toolset in Argentina.

3.

Managing Implementation

CHANGE DOES NOT COME EASY

Gary, UCo's operations director, is determined to address the safety and productivity challenges evident in the company's global network of logistics terminals and manufacturing sites. He has decided to introduce a global productivity system and appointed a lean navigator, Britta, to ensure implementation of appropriate Lean manufacturing procedures.

An initial implementation at a site in Argentina is in progress. However, it is becoming clear that the shop-floor workers need more coaching if the targeted Lean tools are to become properly established and produce timely benefits.

Buying into Change

Although Britta does not intend to replicate a full Toyota Production System in Argentina, her experience from the pilot site indicates that successful Lean implementation will depend on a profound and lasting change of work culture.

In Britta's view, Lean builds on sound operations, rather than creating them. A good productivity system requires the people on the ground to grasp the initiative, adopting a constructive problem-solving mindset and assuming leadership in delivering and sustaining improvements. The Argentina site exhibits a classic challenge: a top-heavy management structure. This has been allowed to develop unchecked over time, creating a culture of disaffection where shop-floor workers are told what to do, rather than having clear lines of responsibility delegated to them and their successes properly rewarded.

Britta cannot stay at the site for the length of time it would take to become an insider. The initial approach was that she would spend one week there each month. However, this is not delivering the required speed of implementation and results. A greater commitment is needed in order to gain the trust and buy-in at shop-floor level that will enable UCo to drive through the change process it is seeking.



Top Tip—Implementation from Bottom and Top

When you are embarking on Lean, be sure you know where you need to start. Should it be top down or bottom up? To be really effective, implementation should come from both directions, with the primary goal to achieve some degree of critical mass and, once that is established, a virtuous cycle where all levels involved drive improvement forward.

The most likely implementation bottleneck will lie in the middle—supervisors and team leaders—rather than the shop floor or senior management levels. Consider doing Lean site implementation with a bottom-up emphasis, where the operators are the first to get Lean training and are incentivized to take responsibility for analyzing, designing and implementing the changes. This provides a sense of empowerment and autonomy on the shop floor. When this is combined with Lean knowledge from upper management (an influential figure supporting top-down Lean buy-in), it helps middle/first-line managers to see that the productivity drive involves both developing a permanent new mindset and the continued application of new tools.

Remember, though, that Lean implementation is never without risk, as acceptance always depends on the existing site culture. It's wise to identify the employees who are willing to learn and so put effort into training and engaging them. Similarly, you are wise to identify those not willing to change and to agree on the most effective means of dealing with this, for all parties concerned.



Toolkit—Line Management Role

As a line manager you have a particular responsibility in the productivity system and during its introduction.

- Know the territory you manage—the people, the processes, the stakeholders, the problems.
- Understand the numbers and what the different tools tell you.
- Be a coach, help the front-line to do their best.
- Give recognition to those who deserve, it but have the guts to deal with those who don't. Be accountable and take responsibility/blame.

- Establish clear and simple visual management standards and controls.
- Have clear targets for measuring performance and progress against potential.
- Use information boards so that everyone knows what's required, understands the status and the tempo—from 15 meters and in 15 seconds.
- Be present, be visible and employ hourly management of the process: to trap problems early, to reinforce standards and to follow up and prevent recurrence.

Transforming site culture and ways of working takes time and Britta has committed to moving on to another site to continue the UCoPS rollout elsewhere within the company. She knows, however, that buy-in from the site manager is absolutely crucial for successful implementation. So Britta has carefully introduced Lean to Alejandro as a way of formalizing and structuring operational common sense to increase productivity. Alejandro has some concerns that this will increase the managerial demands being made on him, but Britta assures him that Lean takes no more time: it is just a different way of working that focuses on continuous daily improvement, not one-off projects. Her painstaking efforts help Alejandro to understand the benefits of Lean for himself and his colleagues. He is delighted and proud that Argentina has been chosen as the first pilot site and committed to making it a success. He has grown into a supportive and keen Lean advocate, a major reassurance for Britta, as she and Gary have agreed that the whole program will depend on the existence of sound operational managers like Alejandro.

Lean Management

While Lean makes its way into daily work at the shop-floor level, it must also be owned and understood at management level to create the communication and cooperation needed to drive implementation forward and get UCo firmly on the road to continuous and sustainable improvement. Britta outlines more of the specific concerns that Gary and Alejandro need to keep in mind when using Lean to kick-start the productivity system.

The role of management is very much about using their knowledge of the territory for planning, targets and methods that enable the business to meet its goals. Day-to-day hands-on involvement with the Lean and productivity system process is a must—coaching the front-line and giving recognition for the advances that are made.

As Britta points out, management has to do more than simply talk a good story. Lean should come across as both practical and transparent—and that means you cannot preach Lean if you are wasteful yourself. Likewise, you won't be able to implement 5S successfully or persuade others to follow your mantra if your own office is a mess. Lean is very much a matter of “do as I do.” It's often said that safety is contagious. In many ways, productivity is no different.

At the same time, managers need to treat the implementation as continuous learning for themselves. They will not know everything before they start, so they should be prepared to listen and adapt, as that may well improve their ability to deliver the best outcomes, whatever the circumstances or challenges.

Show that you are as involved as the shop floor in the Lean implementation and not afraid to measure your own performance—and also be open to constructive criticism.

This is something to which Britta is totally committed. She finds it hard to imagine any organization where communication does

not come under criticism at some point. She explains that there are a number of practices that can help ensure the right levels of information flow between factory floor and management. The kind of dialogue she seeks to establish within UCo should be an engine of positive change, rather than a channel for complaints.

One useful approach is regular—daily and weekly—meetings. A daily session is a fundamental part of improving communication and driving performance. Ideally, it should take place on the line, in front of the performance board, so that hard information is at hand and shared with the whole workforce, so they know exactly how the business and Lean implementation are progressing. Such inclusion is vital, if the buy-in process is to work. Continuous communication keeps everyone in the picture. There should also be weekly meetings where the group reviews safety performance, examines OEE and discusses planning and resource issues. Different tasks can be adopted by staff members, some perhaps in rotation, so that there is real ownership of the meeting as well, says Britta. Also, just by walking around the site and talking to people, being visible and engaged with what is happening, management can have a significant influence on the shop floor.



Top Tip—Buy-In

Any improvement program is more successful when it has the buy-in and involvement of those affected. It is important to keep in mind that Lean, in essence, is simply the elimination of waste. Successful implementation of these principles is more easily achieved if it is kept simple and the use of technical jargon avoided.

Management must come across as absolutely committed believers in what is implemented within the organization. As soon as managers appear in any way skeptical themselves as to what is being introduced, the whole system will begin to fail. To be committed

and to lead by example, you also really need an acceptable level of knowledge and understanding.

Managers must also be pragmatic individuals flexible enough to adapt to good input from the line. To make UCoPS work, managers will sometimes have to make tough decisions to keep progress on track. Removing non-believers, once all other reasonable avenues have been pursued, will perhaps be one of the hardest issues to deal with.



Top Tip—It Requires Communication

Make sure that you have outstanding levels of communication at all times. This is arguably the most critical success criterion in managing change. In the UCoPS process, communication plays a key role. It is not unusual to discover disconnects between the factory floor and the rest of the business, and there are a number of actions that can help to get communication flowing more freely.

Set up daily meetings (or toolbox talks/morning meetings) as another fundamental way of improving communication and driving performance, ideally taking place on the shop floor. They provide an opportunity to review the previous day's performance and suggest improvements, as well as to discuss any safety incidents or shared learning. A daily meeting typically need not take more than five minutes. Short and focused is the goal.

The Lean Multiplier

The initial approach undertaken by UCo to introduce Lean in Argentina was for Britta to visit the site for one week a month. It was soon clear, though, that such an approach would not provide the impetus required. A more permanent and dedicated on-site resource would be required if implementation were to be successful and results seen quickly.

Britta therefore suggests to Gary that each site in the UCoPS should nominate a lean multiplier to help ensure the successful rollout of the Lean program, as developed by Britta. Gary is supportive, and they agree that her role should be to support the training of all the lean multipliers, who will then each be responsible for implementing and, in particular, sustaining Lean on their own sites.

UCo decides to operate a train-the-trainer or lean navigator approach to implementing UCoPS where Britta will train a key site worker as a lean multiplier, who then, in turn, trains the other site employees and becomes responsible for sustaining the change process. On hearing this, Alejandro volunteers to take on the role himself. Although slightly taken aback, Britta describes how the multiplication effect is best when the drive for change comes from a less senior employee with a more immediate connection to the shop floor. Alejandro immediately proposes Rodrigo, a champion of the system and a young, talented and energetic engineer, for the lean multiplier role at the Argentina site. Rodrigo has already helped Britta by mapping site tasks and processes and specifying the skills needed to perform them. With his help, Britta has reorganized tasks to improve flow and flexibility, using standard work methodology to capture correct methods and agree on best practices. She has supported the development by introducing visual management tools and single point lessons.

Alejandro and Britta meet Rodrigo to explain the role of lean multiplier and to ask him to step up to the role. Rodrigo seems surprised to be asked, but responds with enthusiasm. Alejandro confirms his full support and Britta gains a dedicated shop-floor ally to boost her efforts in implementing the productivity system.



Top Tip—On-Site Buy-In

In any turnaround-type change process, engaging the employees should receive as much effort as the implementation itself. Buy-in is everything, especially from the site leadership. If he/she does not buy in, then the day the lean navigator moves on to the next site will also be the day that everything already implemented will effectively be lost. Lean implementation should leave a lasting legacy. This only occurs if the plant manager and employees believe in it. Forcing Lean onto a non-believing plant manager will not work. A good strategy can be to identify an on-site believer, often an eager shop-floor worker, to train first. Then ensure that their supervisor is 100% supportive.



Toolkit—How to Identify and Select a Lean Multiplier

To succeed in changing and aligning the way a large organization works, you need to create a learning ripple effect. On-site trainers are the multipliers of the ripple effect, acting as sparring partners for management and employees involved in the shop-floor implementation. These lean multipliers are critical for sharing knowledge and best practices and also have the process overview needed to develop local goals, solutions and implementation plans.

To find your lean multipliers, look for employees with a broad range of knowledge and a willingness to take on an implementation role. Responsible for providing on-site guidance to production operatives, warehouse staff and other shop-floor workers, as well as management, these early adopters need to be analytical, methodical and socially adept. They will be your enthusiastic converts who spread the message.

Typical tasks undertaken by a lean multiplier:

- Help develop and implement a Lean-based productivity program and related change management tasks.
- Review current facilities and workflows.
- Benchmark against other internal and external sites.
- Run/support Lean continuous improvement (kaizen) events and other improvement activities.
- Help develop a self-sustaining Lean culture.
- Rollout operational best practices as standardized processes.
- Coordinate with relevant department heads to drive improvements in quality, safety and efficiency.
- Help sustain the standards and levels of improvement attained and ensure continual improvement, and that improvements are measured and recorded.

In his Multiplier role, Rodrigo is now providing constant coaching to the workforce, which is a significant help in changing isolated working practices. But it does not seem to be enough to fundamentally change group behavior at the site.

Britta and Rodrigo realize that they have not paid enough attention to getting two long-serving employees on board. These two, viewed as the site's firefighters, are incredibly useful in a crisis, often stepping in to resolve problems when things go wrong. However, Rodrigo has heard both men voicing deep concerns about the change process and even expressing doubts about the rapid improvements that the program has begun to deliver in some areas. This may be prompted in part by a recognition early on of how their roles will change as productivity improves and firefighting incidents reduce.

Britta meets with them and seeks their advice and opinions on how to make the implementation go smoother. One, a supervisor called Raoul, is openly negative and states plainly that Lean cannot teach

them anything worthwhile and that any improvement so far is really down to hounding the employees. He says there is nothing to discuss and returns to work. By contrast, his colleague, Joachim likes some of the Lean tools, but has worked in several sites previously and seen change processes that have not given lasting results. Once the external people moved on, the sites simply returned to their old ways. Britta thanks him for this insight, saying that she, too, has seen similar instances of this happening. She asks him what he feels needs to be done to avoid this happening now. Joachim points out what he sees as one stumbling block—that, because Rodrigo is young and relatively inexperienced, he doesn't really have the status to push changes through. As they talk, Britta realizes that Joachim is potential Multiplier material. As a first step, and to test his longer-term suitability, she asks him to consider working alongside Rodrigo as a mentor. This could pay benefits in the move to get the workforce fully behind the process.

Britta seizes the opportunity to carry out some critical succession planning. She wants Rodrigo to follow her to the next site to see if he can help to train another trainer and perhaps become a regional Lean resource in his own right. Joachim can then take the role of Multiplier in Argentina. Rodrigo responds positively to this proposal, while Alejandro backs the idea, at the same time deciding he will start looking for replacements for both Rodrigo and Raoul. One possible hitch is that Joachim is senior to Rodrigo and, as such, may not be keen on just taking over his role. Alejandro decides to make Joachim the site's new Continuous Improvement Manager and to communicate the position as a more senior permanent position. After some reflection, Joachim accepts the job, while agreeing in the meantime to mentor Rodrigo until he leaves for the regional role. For his part, Joachim is looking forward to being able to use his experience and judgment alongside the Lean tools to take the initiative and create best practices, rather than having to consult management and work according to the rules.



Top Tip—Performance Longevity

How do you ensure that your Lean implementation does not simply fade away when the Lean champion(s) move on to pastures new? Think through and implement your succession planning. Also, ensure that Lean is embedded in the site's way of working and not seen as just another project, which Lean most definitely is not! Make sure that first-line/supervisor-level leaders are true Lean believers and champions.

Remember to get the senior firefighters on board. These are the most experienced employees whom everyone goes to when there is something wrong and it's not easy to fix. Their greater experience means that they are considered the experts and enjoy high status, all of which makes them valuable employees in the current setup. However, their status and value derives partly from the site not having a good structure. Once you improve things, they will be needed less and, instead of being unconditionally praised, the sense of reliance and dependence on them will start to disappear. The key is to involve them in the changes taking place. Make them part of driving that process, so that they retain their expertise and enthusiasm, delivering these as part of a team. If you can bring about that change, great! If you can't, you need to consider whether they and you are best served by them staying on.



4.

Human Resources (HR) Essentials for Productivity

DEVELOPING PEOPLE

“As important as having the right tools and procedures in place is that the people working at the site have the right knowledge and competence”, Britta says. Alejandro agrees and refers to the PowerPoint that all new employees and contractors go through while on site introducing them to site practicalities, the location of the canteen, emergency exits and so on.

While the PowerPoint is a decent introduction to the site, now that they are introducing employees also to the productivity system they agree that more training is needed and HR must play its part in ensuring productivity. There are six key aspects to this:

- Site-specific training/on-boarding
- Site skills matrix
- Development plan
- Succession planning
- Attendance management
- Performance management

Site-Specific Training

When a new person, employee or contractor comes to a site there is certain information that he/she needs. The obvious is to explain the basic site rules and the practicalities. It is equally important, however, to introduce the person to the way of working at the site, the productivity system and the culture. Thus, the training is not only functional but also covers what is expected of the new person in terms of behaviors and attitudes.

“We want to introduce the productivity system from the start so that everyone is aware of its importance and how they are expected to contribute to it,” Britta says. She introduces Alejandro to the mandatory site-specific training that she feels is essential to any productivity system. Employees, contractors and temporary staff will be provided with appropriate level induction training, covering issues such as safety, quality and Lean. In addition, the site should have an annual communication session to help ensure that the work force is aligned. In addition, where appropriate, literacy and numeracy training and English language tutoring should be provided.

Alejandro is keen to keep the training program simple and tailored to the site itself and its employees; Britta agrees.



Toolkit—Good On-Boarding

Good on-boarding is essential for new employees and contractors to be as productive as possible from day one. In UCo on-boarding covers not only the HR essentials such as pay, holiday and health-care, but also a sound introduction to the importance of safety and the UCoPS way of working.

HR essentials

- Basic site rules, routines and procedures
- Welfare facilities

- Safety and emergency procedures
- Organization and who's who

Quality

- Standard work (including measurable quality parameters)
- Quality management procedures
- Quality awareness (be aware, make others aware, take action)

Relevant Lean tools

- Seven wastes/waste walks
- 5S workplace organization
- Visual management systems
- PDCA (plan, do, check, act)/A3 problem-solving
- Process mapping
- Standard work



Top Tip—Make Training Relevant to the Site and Individual

Ensure that your site-specific training is flexible enough to allow and encourage local induction training to be done at the right level. There are two main considerations here:

- What topics do you need to train in and how complex or simple does the training need to be? (Entirely site-dependent.)
- What level does the training need to be carried out at? (Depends on the employee's needs.)

New basic-level employees may just need enough to buy into the site's ways of working, unlike higher-level employees who need to lead processes. Temporary workers and contractors also need an introduction to safety and standard procedures that is pertinent to their tasks.

A good example of site-specific training is language skills: any change process driven from corporate level can face problems if site managers are not fluent in the company's official language. Likewise, site workers without basic literacy in their local language will face an extra burden in a Lean implementation process, e.g., where visual management charts must be clearly understood.

And don't forget to measure the quality of your training. This can be done through metrics, and by encouraging feedback and improvement proposals from employees.

Site Skills Matrix

Britta tells Rodrigo and Joachim that employee flexibility is also a key contributor to a Lean production concept. A versatile team with each member trained appropriately in the various skills required will help improve productivity. She introduces them to the skills matrix: a visual management tool for showing who has the skills to do what, as well as for guiding skills development and ensuring that the site has sufficient labor flexibility. "An important thing here is to make the skills matrix a living tool, not a one-off exercise," Britta says.

Alejandro sets off together with Rodrigo to turn their knowledge and overview of site tasks, and skills needed to perform them, into a site skills matrix for the Argentinian site.

One important outcome from this is that Alejandro plans to incorporate the resulting skills overview into the job descriptions he has almost completed and then formulate individual goals for training and upgrading skills for all site employees. However, the completed skills matrix shows that the plant skills distribution is skewed, both in terms of the number of people with key skills and the number of skills per head. Alejandro decides to use the matrix as a basis for developing wider skill sets and backups for critical skills. He introduces annual skills development targets for all employees, reflecting the gaps revealed by the skills matrix, and skills development becomes a key

performance indicator (KPI) for everyone at the site. Managers can be targeted to increase by a certain percent the number of skills, on average, operators can perform.

Alejandro likes the idea of the skills matrix. It will allow him, as site manager, to see skills gaps, plan skills development and improve his staff recruiting.

Gary explains to Alejandro how skills matrices should be linked to the annual performance review, which is part of UCo’s PMP (performance management process). Apart from dealing with performance, the review should also cover training needs for individual employees, as defined by the training and retraining database which, to a large extent, is based on the gaps in the skills matrix.

Skills Matrix								
Operative	On Boarding	Tanker Offload	Liquid Manufacture	Liquid Filling	HSFL	Drum Filling	Powder Manufacture	Warehouse
Daniel A.	✓	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Martin B.	✓	■ ■	■ ■ ■ ■	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■
Karen C.	✓	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■ ■ ■
Frank D.	✓	■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■	■ ■
Joseph D.	✓	■ ■	■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■
Chris D.	✓	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Julian E.	✓	■ ■	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■	■ ■
John F.	✓	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Tom M.	✓	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■
Allan N.	✓	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■
Tim S.	✓	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■ ■ ■
Nigel S.	✓	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Paul T.	✓	■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■	■ ■
Amir T.	✓	■ ■	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■	■ ■
Andy W.	✓	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■	■ ■

Induction completed
 Trained to level one

 Trained to level two

 Trained to level three and able to train others

Training and Retraining Database

All sites have to have an up-to-date training and retraining database that records the training undertaken by each employee and the date when retraining is required, Gary informs Alejandro.

HR-related tools, such as the site skills matrix, training and retraining databases and performance review all form part of the UCo productivity system. Productivity comes from much more than Lean implementation alone. For sites that do not have them, these HR productivity tools need to be rolled out as part of the UCoPS execution.



Toolkit—Skills Matrix

A skills matrix is a simple visual management tool that lists the skills needed for specific tasks—as well as defining the levels of a given skill—and maps these against site employees. To create such a matrix, first you need to decide on some basic elements:

1. The specific task or process to which the skills matrix will be applied, e.g., bagging line, warehouse loading, maintenance
2. How many levels of skill you should have
3. A description or definition of each level, e.g., can do the task supervised, can do the task unsupervised, can train others
4. The general criteria for each level, e.g., qualified by level-4 instructor
5. A color code or symbol to indicate the skill level

Next step is to plot these into a table, then repeat this for each key task.

When you combine your tables and map them against the site workforce, you get a site skills matrix that reveals who has the skills to do what, who needs training and who is best placed and suited to train them.



Top Tip—Skills Management

Think in threes—every task or function should be able to be covered by three employees (per shift, if appropriate). This allows job rotation, so that each part of a site gets a set of new eyes every now and then—something that supports continuous improvement.

To be most useful, skills management should be an ongoing process, where individual employees periodically assess and update their recorded skill sets. These updates should occur at least as frequently as employees' regular line-manager reviews and certainly when their skill sets change.

To constantly develop employees' skills is a goal in itself. It increases site flexibility, builds employee morale and shows that you value your workforce enough to invest in it.

Development Plan

Having identified the skills and skills gaps at his site, Alejandro realizes he has got to fill several gaps. “A nice structured way of doing this is to make a development plan,” Britta says.

Alejandro is very much a supporter of the development-plan concept. He recognizes the ways in which it can give him a structured approach to developing individual and collective skills at the site, and quickly gets to work implementing it. He is glad that he can adopt a company-wide framework that is adaptable to his specific needs.



Top Tip—Creating a Feedback and Coaching Culture

How do you develop an efficient production system—and ensure that it remains so? Most of all, this demands a culture of coaching and feedback—both for suggesting improved working procedures and ways of working together. It is a requirement of UCoPS that all employees have a “mini-review” (a performance dialogue). But don’t forget that it is equally important to get upward feedback.

However, creating a culture of feedback and coaching is no simple matter. Giving and receiving feedback can often be challenging and it takes time for people to get used to this. Sometimes, the initial reaction to feedback is to become defensive, hurt or angry and to try to rationalize away any development opportunities. To help prevent this, avoid inappropriately negative feedback and criticism: always be constructive. A feedback dialogue is about what has been done well and what can be done better—and discussing what the employee should do to improve his or her performance. You can reinforce development of a feedback culture by informally celebrating and rewarding your employees’ successes.

If the manager is doing his or her job, feedback dialogue provides heartfelt and useful input for the employee. Feedback should be seen as a gift—someone is spending time and effort to help you move forward.

Managing Absenteeism in the Workplace

Poor employee attendance directly impacts productivity. Two tools can help HR ensure that leaders are able to effectively manage absenteeism. The first is a formal attendance management policy and the second a system to ensure that absenteeism is monitored and action taken at individual and department/site level.

The attendance management policy should be fair yet establish clear rules that tell employees that the organization takes absenteeism seriously.

The first focus is the overall absence levels, usually recorded as a percentage of total working time. However, as always with data, monitoring alone will solve nothing. You need to analyze the underlying causes and target improvements, exploring also the link to any site safety issues. A safe and healthy work environment will help encourage high levels of attendance.

A good working culture will help achieve low levels of absenteeism. A trusting and open culture where employees approach leaders with their problems rather than calling in sick is beneficial to attendance and hence productivity. Including some private life-friendly opportunities in attendance-management policy is typically beneficial. As always, leaders need to lead by example when it comes to attendance.

If the site has an absenteeism problem, then look for positive ways to encourage attendance—perhaps, for example, including it in the site performance-related pay scheme. It may sound harsh, but what you want from employees is that they turn up and be productive.

As a leader, if you ignore absenteeism it will often start to grow. Absenteeism needs to be managed like any other key productivity measure.



Top Tip—Bradford Sickness Index/Bradford Formula

In UCo the key tool used to monitor and manage absenteeism is the Bradford Sickness Index. This index indicates whether absenteeism is reasonable or excessive.

What is the Bradford factor?

A quantitative method of measuring and scoring absenteeism, based on the premise that frequent short absences are more disruptive than occasional longer-term absences.

Where did it come from?

Believed to have been devised in the 1980s by Bradford University's School of Management.

Who uses it?

Widely used across private- and public-sector employers.

How does it work?

Absence is scored by the number of absences over a fixed period (normally 6–12 months) and the duration of those absences.

What is the method of calculation?

The Bradford Factor is calculated as follows:

$S \times S \times D = \text{Bradford points score}$

Where:

S = number of occasions of absence over fixed period

D = total number of days' absence over fixed period

For example:

One absence of 14 days is 14 points ($1 \times 1 \times 14$)

Seven absences of two days each is 686 points ($7 \times 7 \times 14$)

Fourteen absences of one day each is 2,744 points ($14 \times 14 \times 14$)

Trigger points

There are no set trigger points and these can vary widely across employers.

Typically the process starts at 150 points (over 12 months) where the employee is invited to a formal absence-review meeting or disciplinary hearing in line with the absenteeism policy.

Caveats

The formula depends on accurate absence recording and should not be used in isolation. The index is a useful indicator but requires common sense and good management to be effective!



5.

Business Planning

TIME TO INVEST

UniversalCo's global operation director, Gary, is working alongside the newly appointed lean navigator, Britta, to introduce a global productivity system into the company's network of terminals and production sites. A site implementation in Argentina is underway, which is being led by Britta and supported by a locally employed lean multiplier, Rodrigo. Training the site team is ongoing and the team has started working according to the new productivity methodology.

Although early efficiency improvements look promising, further progress is apparently being blocked by the old equipment on the bagging lines, which demands a great deal of manual handling.

The only way to speed up production using these machines is to add more labor, which is both expensive and potentially unsafe. Site manager Alejandro suggests investing in new automatic lines to continue the productivity progress.

Further scrutiny, however, shows that there are other potential solutions that might yield the same, or an even better, result. By talking to the commercial team, Britta discovers that, although the plant has traditionally delivered in 25 kg bags, they actually feel customers would have no objections to being supplied in 40 kg bags. In fact, in some cases it would cut customers' own warehouse workload. Yet this simple change would almost double site bagging capacity, at little extra cost.

Britta relays the idea to Alejandro, who says that he has heard this idea before. However, the palletizer cannot handle 40 kg bags, nor can it be modified. Furthermore, the cost of a new palletizer is far too high, so they should instead look at improving how they work the bagging shifts. After analyzing the return on investment (ROI) for the palletizer, Britta discovers that Alejandro's cost analysis only looked at the short-term benefits of the new palletizer and did not take into account the performance improvement the asset brings as the business develops. This is poor business planning. She knows that the benefits of increased productivity will rise as business expands, which, with a major bottleneck cleared, is likely.

After being taken through the analysis, Alejandro can see that Britta is right. He is somewhat embarrassed to admit that this oversight is a result of never getting enough time to focus on the business case for site investments. He is constantly bogged down with short-term capacity planning and the day-to-day challenge of maintaining productivity. Alejandro admits that this is a situation that should improve as UCoPS becomes more established at the site.

Annual Business Plan

After discussions with Britta, Gary sees an opportunity to improve site efficiency by formally linking issues, such as investments, maintenance scheduling and commercial planning and labor requirement, into a simple site business plan, focused solely on the year ahead. Aksel is also impressed and decides that a key requirement in the UCoPS will be that sites must complete a standard-format site business plan. Alejandro is specifically asked to compile this for the Argentina site.



Toolkit—Annual Business Plan

All UCo sites are required to complete a site-specific business plan, based on a standard template. The template also allows for monthly reporting in standard format across all sites, as well as peer-group monthly performance monitoring. When setting up such a plan, it is important not to start worrying should historical data not be available for all the fields you propose to include. Instead, focus on the future.

Best practice is for the site operational managers to drive the completion of this exercise, rather than the financial manager, as it provides a stronger sense of ownership. The business plan is more than a financial budget. It targets safety, quality, volume, productivity, capital spending and HR issues. Clearly, any site business plan needs to be consistent in key fields, such as capital spending, with higher-level financial budgets within the UCo organization.

Alejandro has never made a comprehensive business plan for the site, so Gary puts him on track by listing the elements that he wants to see covered:

- Sales/production volumes aligned with commercial
- Safety, efficiency, working capital and quality targets
- Key Lean initiatives/commitments
- Employee-development issues/initiatives
- Capital spending
- An appropriate financial measurement for the site, such as:
 - EBIT (Earnings Before Interest and Taxes)
 - ROCE (Return on Capital Employed)
- Performance-related pay (bonus) scheme for the site.

UCo Sites – Business Plan 2014 Template

Site: Argentina

KPI		2014	BP2015	EST2015	BP2016
World-Class HESQ Performance	Safety/Health/Environment TRI Rate LTI Rate (level 1 and 2 injury) Attendance %				
	Quality Right First Time Quality % Customer Service (On Time In Full)				
World-Class Asset Productivity	Production Volumes				
	Total Fixed Costs				
	Productivity Cost per Unit of production Output/Operational Labor Hour				
Investments	Safety Productivity				
	Total				
Manning	Permanent Employees Temporary Operator Labor Hours				
	Total				

A main earnings contributor to UCo through operational excellence

A key reason why Gary is keen on each site having a formal annual business plan is to allow the agreed key targets to be cascaded easily and into Alejandro’s personal KPIs (key performance indicators) and the site’s PRP (performance-related pay) scheme for the rest of the

site employees. It is also useful for other processes, such as managing investments and performance management, by benchmarking between sites.

With support from Rodrigo and Britta, Alejandro puts the site business plan together. He presents it in a video conference with Gary, describing how it gives him a much clearer picture of exactly what the site needs to deliver. Gary is clear that, while the template needs to be standard, the backing slides or supporting documentation need to reflect the importance and complexity of the individual sites; the less complex, the shorter the documentation. He also points out that the business plan must act as the approval process for investment proposal screening.

Demand and Capacity Planning

Shortly after the business plan is completed, it becomes clear to Britta that Alejandro is struggling to reach the targeted objectives. When this is put to him, Alejandro owns up to one of his key challenges: demand and capacity planning. He faces issues with raw material stocks that increase because of long lead times for ordering and daily demand that varies greatly.

At times, even the large stocks and soaring labor costs through overtime are not enough to ensure that the site delivers on time. And on every occasion where it fails to meet its promises, it disappoints customers and jeopardizes repeat sales. Alejandro is busy firefighting and responding to short-term changes, rather than following a structured long-term plan. Looking into the detail, it doesn't take Alejandro and Britta long to discover that the forecasts provided by the sales force are unreliable. They change completely from week to week and fail to match actual orders more than half the time. If he is to meet customer demand and maintain budgeted labor costs, Alejandro knows that he urgently needs greater accuracy in the sales forecasts compared to what he is provided with today.



Top Tip—Create an Agreed Way of Working

An agreed Way of Working (WoW) that documents best practices for how the sales function, production and supply chain should work together is valuable in any productivity system. This needs to strike a balance in its degree of complexity: enough to be useful to operations, without being an administrative burden for commercial. It should detail issues like opening hours, minimum order sizes, lead times, cut-off times, complaints procedures, etc.

It is operations' commitment to commercial and commercial's commitment to operations to run an efficient and organized business.

Where possible, involve customers in this process. Typically, they understand and accept that working according to certain rules is normal and customers are often easier to convince than internal sales people, whose expectations of service requirements often exceed what the customer expects or considers to be reasonable.

A WoW between commercial and operations should also detail an associated service-level agreement (SLA), as well as metrics for both SLA and WoW performance, such as % on-time delivery, complaint rates, etc.

There must also be a mechanism for receiving and handling customer feedback (both positive and negative), together with appropriate close-out and feedback.

A true benefit of a WoW document is that it clearly identifies who is responsible for what. If the document states orders must be received by 12 AM for delivery the following day, then that is clear. Commercial must ensure timely orders. Operations must ensure timely dispatch. Get the agreement between commercial and operations down on paper and productivity will follow.

Britta again refers to the principles of Lean manufacturing and the practical aspects of honing a system that is built around meeting customer demand. Even though the UCoPS is set up to concentrate on an agile response, thanks to a flexible and flowing system, this does not mean that there is less need for planning. In fact, she points out, good planning and good order management are a key part of creating good flow.

A Lean system is pull-based, meaning that you produce to order, Britta explains. However, unless improving how you receive orders is a part of that system, you will not be able to have production that can adjust efficiently to fluctuations in demand. Getting this right is critical.

Lean may have originated with Toyota, but car manufacturing is a specific type of industry where pull is very pure, where things can be truly made to order. Many consumers are happy to wait for weeks or months to get a car made to their specifications. They are not necessarily as patient when it comes to other goods—like smartphones, milk or Christmas trees!

One simple example of the types of difference can be seen by comparing meal production, Britta suggests. These businesses have many of the same basic considerations to keep in mind—ordering quantities, shelf life of ingredients or products and optimizing their production setup and techniques.

A fast-food restaurant would be geared toward larger-scale production and staggering their employee numbers or shifts, whereas a traditional sit-down establishment would have a much more complex planning process to predict accurately the parameters of their busy periods. Finally, a catering company would have pure pull knowing exactly with what, how much and when their customers wanted their orders filled.

In markets like the one in which UCo operates, which needs to be highly reactive to customers' expectations and where you produce to fill orders, requirements are different than for an automobile factory, Britta explains. "For us, the priority is agility," she says. "Therefore,

we need to devise and implement an effective planning system to predict what the customer wants and when.”

The ideal system would plan perfectly, predicting in advance exactly what will be needed—so scheduling, raw material purchases, shipping, etc. can be done to allow an efficient flow. However, as no system is ideal, the target is to have a planning system that allows for sufficient plotting of production targets, based on market pull. In a way, planning becomes the pull. That part of the equation is for Aksel and his marketing people in management, she tells Alejandro: “The better they do their jobs, the easier it will be for you and your team to optimize production.”



Top Tip—The Importance of Planning

A good planning system allows production personnel to better serve customers’ real needs, and to keep costs down and quality up. Lean does not start at the factory gates, but with the sales team giving accurate estimates of what is needed and when. Efficient production schedules allow you to optimize production runs and changeovers, capital employed (avoid stock, both in the plant and in the market), raw materials (avoid stock outs and obsolescence), logistics (the more last minute, the more expensive), and utilization of human and capital resources in the site, such as planning shifts and maintenance. Good scheduling extends beyond the factory gates, with efficient procurement, shipping, packaging, call-off of raw materials, etc. Planning really is the start of productivity. If you do not plan you will not be productive. The commonly referred to 5 P’s “Proper Planning Prevents Poor Performance” is always true. It is equally true in the context of this book when written, “Proper Planning Prevents Poor Productivity.”

Britta and Gary come to Alejandro’s aid. They call the commercial team responsible for Argentina, and its production and logistics

managers, into a workshop to develop an improved way of working for forecasting demand, scheduling production and other rules for how commercial and operations should work together. The objective is to formalize this in a procedural model that will ensure that everyone is working in an agreed-upon way to the same standard and using the same basis for their assumptions when making their forecasts. This will then be documented in a WoW protocol to maintain the quality and integrity of the process.

The groups involved in the meeting have differing perspectives, but all consider flexibility a challenge:

- The sales team describes every market segment as unique and claims that customers will go to the competition if they are asked to accept more delivery flexibility. In their view, unpredictable factors such as weather, politics and the competition will always make forecasts inaccurate.
- The production people see product flexibility as a burden and think that sales should focus on selling what is easiest to produce and gives the highest utilization of the factory.
- Logistics highlights the savings that can come from take-or-pay commitments and long-term contracts that are feasible, if few changes are allowed.

Britta acknowledges their challenges and underlines how important commercial forecasts are in any efficient productivity system. She also indicates that the new Lean processes mean that the production side is well on its way to improving its flexibility to respond to changes. An accurate forecast essentially creates a Lean operation by avoiding waste issues, such as stockpiles, overproduction and idle labor, Britta adds. Similarly, flexible production methods allow efficient resource planning and reduce stressful order spikes.

When Gary sees that the three groups are being won over, he maps out the opportunity: “We want you to help us create WoW models to manage the relationship between commercial and operations. It

will be based on the best practices for making clear commitments from production to sales and vice versa. They will also take into account the impact of key logistics issues, such as transport capacity or loading times. It will give everyone a more predictable way of working and clarify who is responsible for what. This will lower costs and frustrations and increase reliability and earnings. Together, we can set the bar for all UCo sites worldwide.”

Britta commits to helping the production people agree on what can be promised to their commercial colleagues. It will cover issues such as opening hours, response time, order cut-off times, minimum order sizes and agreed-upon performance targets for issues such as on-time-in-full delivery. Rodrigo is tasked with helping reorganize the front office to facilitate a Lean workflow. They establish a monthly forum—the Operational Commercial meeting, or OpCom—where commercial and operations meet to agree on the forecasts and other issues of importance for the month ahead. Everyone agrees that, once a forecast has been approved, it is the responsibility of production to supply it and, of course, for the commercial line to sell it.



Top Tip—Sales Forecasting

The simpler the forecasting system is for the sales staff, the better. Linear programming models and other “black boxes” using automated rules for predicting demand are not usually able to outperform sales people, who have a good market understanding and reasonable knowledge of history and are committed to seeing the business succeed. The planning tool must be easy to use, simple to navigate—and extract information from—and standardized. Remember also that often your customers can forecast better than your sales force. So use them to do the work for you. Sales-forecast accuracy is a good KPI for any commercial team.



Toolkit—Way of Working

A well-structured way of working between operations and commercial is a prerequisite for achieving Lean business success. It should establish procedures for forecasting (monthly, seasonal and annual), order intake, cut-off dates and dispatch deadlines, as well as for the rules operating when theoretical factory capacity is reached. It should also be constantly fine-tuned by measuring, analyzing, incentivizing and adjusting forecasting accuracy (in line with plan, do, check, act).

Forecasting Accuracy

Gary commits to providing a good forecasting tool for the company. The challenge is for it to be business useful and not administratively burdensome for the sales force.

To help with the implementation of the way of working and make sure that the salespeople take it seriously, Aksel will ensure that they are benchmarked on forecasting accuracy. Meanwhile, operational units will be measured on their ability to meet the agreed-upon forecast through measures such as on-time-in-full, order lead times, etc. Gary also indicates to the sales force that the company will accept that customers who cannot adapt to a reasonable way of working will need to pay appropriate surcharges to compensate for the complexity they are causing or be replaced, even if this causes some short-term loss of revenues. Most likely, this approach will lead to higher earnings by being paid for flexibility that was previously given for free. Gary is confident that customers will not turn down a reasonable way of working. Experience suggests that your own sales force tends to worry unnecessarily, whereas customers are often early adopters and understand what you are trying to achieve.

A trial period ensues. The sales team begins forecasting the current month, plus the subsequent three months, where the first month is expected to be 90% accurate, while the following three months is expected to be 75+% accurate. The forecasts are then reviewed by the operations team and Alejandro, who then confirm an agreed-upon sales target and dispatch plan for the four-month period.

The idea of allowing the sales force some short-term earnings loss makes them less cautious—and they soon discover customers do not mind having to provide some measure of commitment and advance warning or pay a fee for the flexibility of ordering or amending orders. In fact, they respect UCo for asking and appreciate its efforts to increase the service level.

To encourage the sales reps to adapt to the new way of working, forecasting accuracy is made one of the elements of the sales-bonus structure.

Formalizing the Way of Working

In the previous workshop, a new way of working that sets limits for the operational flexibility required of the site was agreed upon. Alejandro and Britta can now explore how to improve capacity planning; in essence, this is the resource needed to meet the forecast from labor to raw materials to transport.

It soon becomes evident that many factors that previously required constant attention and adaptation, such as shift patterns and raw material and logistics purchasing, have become more predictable.

After a trial using the new way of working, the sales staff discover that customers are receptive to the new procedures, particularly once they see how they also benefit through high levels of service reliability.

The operational teams discover that good forecasting and planning mean that they are better able to handle complexity than they anticipated. Alejandro is satisfied to see productivity rise, stocks fall and costs per unit tumble.

The best practices established for demand forecasting and way of working between commercial and operational teams, as well as a fee structure for extra flexibility, are accepted as templates for company-wide use—while accepting that, where appropriate, local units will need to make local adaptations.



Top tip—Productive Surcharges

Charging customers for flexibility, or surcharging, should be considered part of your productivity portfolio. Well-structured and communicated surcharges incentivize customers to play their part in ensuring that productivity is maximized. Likewise, it ensures that if a customer is happy to pay for poor productivity, then we are happy to let them pay for it.

Gary will ensure that the way of working is formally reviewed between the operations and commercial teams annually, so as to ensure sustainability and promote continuous improvement. Performance measures, such as OTIF (On-Time-in-Full) and sales-forecast accuracy, become accepted and established in UCo, at the same time allowing proper benchmarking across UCo.



Toolkit—Capacity Planning

To be truly Lean, an operation needs a quality capacity-planning tool that allows you to carry out resource planning and budgeting, etc. It can often be a simple spreadsheet that plugs forecasted numbers by pack or unit, where appropriate, into a calculation model incorporating assumptions such as:

- Available shifts/work hours
- Production rates/OEE assumptions
- Labor availability/crew sizes
- Pay rates
- Attendance percentages (to predict resource requirements)
- Planned shutdowns
- Training time

It should indicate capacity utilization by site unit and forecast temporary labor requirements, head-count variations, shift pay, etc. The same model can be used to produce “what if” or growth scenarios—for example, developing a five-year road map showing when recruitment is required, where capacity bottlenecks arise, etc.

What is critical is that the capacity plan must demonstrate what resources, labor, raw materials, etc. are required to meet the forecast.

Capacity Planning

Volume Vs. Capacity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
	4.4	4	4.2	4	4	4.2	4.6	4	4.4	4.6	4	3.6	50
Production Line 1													
Forecast Volume	1 353 980	1 478 140	1 456 020	1 546 640	1 179 080	650 770	988 570	1 669 860	853 000	1 045 080	1 179 880	934 650	14 235 670
Maximum Theoretical Capacity	1 595 188	1 450 171	1 522 679	1 450 171	1 450 171	1 522 679	1 667 696	1 450 171	1 595 188	1 667 696	1 450 171	1 305 154	18 127 134
Forecast as %age of Capacity	84.9%	101.9%	95.6%	106.7%	81.3%	42.7%	59.3%	115.1%	53.5%	62.7%	81.4%	71.6%	79.1%
Production Line 2													
Forecast Volume	203 295	306 495	291 515	303 090	292 235	65 700	138 690	103 055	149 875	240 410	248 775	170 670	2 573 805
Maximum Theoretical Capacity	605 516	550 469	577 952	550 469	550 469	577 952	633 039	550 469	605 516	633 039	550 469	495 422	6 080 960
Forecast as %age of Capacity	33.6%	55.7%	50.4%	55.1%	53.1%	11.4%	21.9%	18.7%	24.8%	38.0%	45.2%	34.4%	36.5%
Production Line 3													
Forecast Volume	389 330	545 130	550 060	766 040	773 730	686 960	850 900	880 980	1 014 650	757 570	579 822	406 354	8 201 526
Maximum Theoretical Capacity	1 778 171	1 616 519	1 697 345	1 616 519	1 616 519	1 697 345	1 858 997	1 616 519	1 778 171	1 858 997	1 616 519	1 454 867	20 206 484
Forecast as %age of Capacity	21.9%	33.7%	32.4%	47.4%	47.9%	40.5%	45.8%	54.5%	57.7%	40.8%	35.3%	27.9%	40.6%
Production Line 4													
Forecast Volume	76 480	143 220	96 700	225 300	127 220	51 860	91 610	76 260	128 638	116 970	115 620	303 990	1 554 268
Maximum Theoretical Capacity	310 332	282 120	296 226	282 120	282 120	296 226	324 438	282 120	310 332	324 438	282 120	253 908	3 536 488
Forecast as %age of Capacity	24.6%	50.8%	32.6%	79.9%	45.1%	17.5%	28.3%	27.0%	41.5%	36.1%	41.0%	119.7%	44.1%
Production Line 5													
Forecast Volume	64 880	70 800	35 904	42 240	6 540	38 680	5 000	46 240	26 176	31 680	21 120	0	389 280
Maximum Theoretical Capacity	252 908	229 824	241 315	229 824	229 824	241 315	264 298	229 824	252 908	264 298	229 824	206 842	2 872 900
Forecast as %age of Capacity	25.7%	30.8%	14.9%	18.4%	2.8%	16.0%	1.9%	20.1%	10.4%	12.0%	9.2%	0.0%	13.5%
Production Line 6													
Forecast Volume	1 898 972	2 077 476	2 212 218	2 373 646	2 042 629	1 285 975	1 651 383	2 379 296	1 917 097	1 846 110	1 746 809	1 268 032	22 699 644
Maximum Theoretical Capacity	2 189 448	1 990 407	2 089 928	1 990 407	1 990 407	2 089 928	2 288 968	1 990 407	2 189 448	2 288 968	1 990 407	1 791 366	24 880 090
Forecast as %age of Capacity	86.7%	104.4%	105.9%	119.3%	102.6%	61.5%	72.1%	119.5%	87.5%	80.7%	87.8%	70.8%	91.2%
Total Volume (units)	3 986 838	4 621 261	4 642 417	5 256 956	4 421 434	2 779 945	3 726 353	5 155 691	4 089 636	4 037 620	3 892 026	3 083 696	49 694 173



Toolkit—An Agile Labor Model

Most operations experience peaks and troughs in demand. For any plant with fluctuations in demand to reach its true productivity potential, labor must be appropriately agile, with the key components of such a model being:

- A core team of multiskilled, well-trained operative staff
- Permanent head count balanced to the lowest month of activity
- A shift system best able to respond quickly to sudden increases in production demand
- A belief that overtime is the enemy to be avoided at all costs
- An operation that can quickly flex down, if demand drops
- Use of temporary workers in peak season
- A close partnership with temporary labor suppliers to ensure that they understand the requirements of safety, quality and efficiency when assigning temporary staff.



Top Tip—Reducing Complexity

As planning and optimization become organized and under control, you often discover that business processes are overly complex. One regular culprit is the number of stock keeping units (SKU). Without rules, sales people are tempted to design special products for specific customers or to accept requests for products “no matter how small.” In addition to issues related to forecast and order intake procedures, the way of working should also include agreed-upon rules relating to items such as a standard for new SKU introductions and annual processes for reducing SKUs, raw-material limitations, etc. Any complexity caused by the interface of the factory and sales or supply should be addressed in the way of working and preferably an annual housekeeping process, combined with procedures for preventing unproductive future complexity (as opposed to profitable, and therefore welcome, variation).

6.

Incentivizing Improvement

MOSTLY CARROT BUT ALSO STICK

A number of initiatives have been set in motion at the Argentina site, where the employees are already motivated by the improvements introduced. However, in a few areas, Gary and Britta feel that focus and effort could be stronger. Britta can see that the rapid improvement in sales-forecasting accuracy has been boosted by including this as a component in the sales-force bonus scheme. The site already has a system where performance-specific metrics influence bonus pay, however, Gary's feeling is that these could be better aligned with what UCo is trying to achieve.

After careful reflection, Britta is convinced that there needs to be a strong link between UCoPS implementation and the company's bonus schemes to help drive and sustain the improvements being gained. She talks to Gary about formally linking employee incentives to the UCoPS implementation.

Together with HR they review all the incentive schemes and identify where they could be aligned better with the new strategy. Incentive schemes in UCo are similar to many other multinational companies and fall into two key areas. A site-performance-led scheme for more operational or non-managerial staff and individual performance plans for the more senior management roles.

Gary discusses this with Aksel and they agree that UCo will seek HR approval to implement a standard-format performance-management scheme for the operational employees on all

UCo sites. HR agrees to this but also makes it clear that they will take the lead when it comes to the individual performance plans. It is agreed that all UCo sites will have a standard-format performance-related-pay (PRP) scheme, with payout directly tied to various operational and financial performance measures.

To make certain that the incentives support the identified business goals and productivity targets and to ensure consistency, they decide that the measures influencing payout must reflect the targets as set out in the site business plan.

Britta and Alejandro develop a performance-management framework for the site that sets KPIs for the three core areas of performance: health and safety, quality and service, and productivity and cost efficiency. They add workplace organization as an area underpinning the other three and decide that an audited 5S score will be the workplace organization target included in the scheme. The KPIs chosen are accident rate and near-miss reporting targets for health and safety; first-time pass rate and on-time delivery (for quality and service); and OEE, waste disposal and attendance (for productivity and cost efficiency). Do not be afraid to include an issue of the moment in such schemes. If poor-packaging complaints have been a real issue, then include that as a specific target in the PMP scheme.

The targets and potential bonus are communicated and explained to the workforce in a formal town-hall meeting session.

Monthly KPIs / Balanced Scorecard

The next step is for Gary to approve the targets and ensure that the performance payout criteria, KPIs and business plan are fully aligned, and for Britta and Alejandro to put in place a structured means of measuring progress.

Gary is also keen to avoid a situation where *not* meeting a single KPI would take away all incentives or that one single incident could ruin a KPI for the rest of the year, undermining the incentive effect. He recognizes that the full-year KPI for the number of serious accidents should be zero, but also wants to avoid a situation where an accident in January, for example, would then impact employee motivation for the rest of the year. After some deliberation, Alejandro decides to link KPIs to quarterly performance, so that each quarter of good performance earns 20% of the KPI bonus pot and where a full year of good performance adds a further 20% on top. In this way, poor performance in one quarter does not remove all incentives for the remainder of the year.

After seeing Alejandro's draft, Britta points out that, although the site's business plan should be cascaded to employees, it doesn't seem right to give everyone the same KPIs. Each employee has different skill sets, behaviors and personal development needs. Good KPIs allow measuring the team, but also some tailoring to the individual. Alejandro comes up with the idea of linking individual worker's KPIs to both their behavior and development goals, according to the site skill matrix, thus ensuring that personal KPIs support site needs. Britta is in full agreement with this idea.



Top Tip—Short-Term Incentives

Not everything can or should be captured in a structured annual performance-related pay or bonus system. At times, you may want to focus on a specific issue of the moment. Achieve short

bursts of effort to reach a particular goal. Keep short-term incentives simple, such as a certificate of recognition posted up on site, or a takeaway pizza lunch if the team achieves a short-term production or delivery target.

Weekly Performance Reporting

Monthly KPIs to monitor performance are soon in place; however, it becomes evident that control based on monthly reporting of KPIs is fine for Gary, but Alejandro needs a more current report, in order to respond more quickly to developments that need his attention.

Together with Britta, Joachim develops a one-page version of the monthly report, focusing on the most operational KPIs. This allows Alejandro to track developments on a weekly basis. The report makes overall site performance transparent for everyone to see and is well received by both employees and management.

However, during its second week of use, Alejandro spots that 5S standards are slipping and decides to investigate. He doesn't get far before the whole process grinds to a halt. There are several teams at work during each shift and multiple teams on the shop floor over the course of the working week. Yet there is no distinction made between each team's performance on the weekly report. Consequently, Alejandro can't see which team is falling short of the expected standard.

With Joachim, he sets out to develop a scorecard that can be used by each team. Joachim works with his shift and team managers to apply the KPIs in a lucid form where each team can see its precise performance per day and per shift.

Even though the resulting reports are kept very simple, the shift managers tell Joachim that they have two main drawbacks. The first is that the work required to fill in these reports takes focus away from production; the other is that the report provides a daily status, but is not current enough to enable team leaders to fix issues as they happen.

The managers want a way to track performance in real time, instead of waiting until day's end.

Joachim discusses this with Britta and they agree that the simpler the reporting, the easier it generally is to implement. Together, they define a real-time report for the two most critical areas, OEE and first-time pass quality, that team leaders can update and monitor throughout the day. This is made easier by putting the reports on notice boards next to the workstation in question. Simply noting every 15 minutes what has happened during that time takes only a few seconds and provides effective real-time tracking. For shift reports and daily reports, they just add the daily tracking information and simple statistics, such as total products produced and number of incidents. This creates a nice cascade from the yearly business plan through monthly performance monitoring to weekly reports, daily reports, shift reports and real-time monitoring, where the business plan is a more detailed document, and the subsequent reports are increasingly simple and easy to monitor.



Toolkit—Factory Scorecard/KPIs

The factory scorecard is exactly that—a monthly update that shows the current score against KPIs.

Accessible, clear and highly visual, the scorecard shows at a glance the current performance status.

Targeted at the workforce, the factory scorecard is an essential component to communicate performance and incentivize improvement.

Explaining what you are measuring is key. Therefore, good practice is to also clearly define for the workforce what you are measuring and why. In UCo this is done in the format of a factory scorecard definitions table.

UCo Operations Factory Scorecard – Definitions

Key Performance Indicator	Target	Definition
Health and Safety Performance		
Lost Time Incidents	ZERO	A work-related incident resulting in injury, where the person is unable to attend work on their next planned work day or shift
Attendance	>96 %	Attendance = total hours actually worked as a % of total hours that should have been worked
Bradford Index Score	<86	A calculated score based on the number of absences and the duration of those absences. Frequent short-term absences result in a higher score than a single long-term absence of the same duration
Quality Performance		
First Time Pass Rate	99.2 %	A measure of our internal quality performance – the % of output that was right first time and did not require reprocessing, addition, repacking, relabeling, etc.
On Time in Full Dispatch (OTIF)	98.0 %	% of units that were dispatched on time (within 8 days of the agreed-upon date)
Productivity Performance		
OEE – Liquid Filling Lines	74.0 %	Overall Equipment Effectiveness (OEE) = Availability% x Performance% x Quality%
OEE – Drum Filling	100.0 %	Availability: Productive time as a % of scheduled time
OEE – Powder Filling	45.0 %	Performance: Actual output as % of target output (during the productive time)
OEE – Box Filling	66.5 %	Quality: the % of output that was right first time
Total Factory – OEE	74.0 %	The weighted average OEE for all lines that were measured during the period
Overall Labor Efficiency (Units per Hour)	260	Total number of units produced divided by the direct operational hours worked (this includes agency temp hours, overtime hours worked and any authorized absence hours)
Waste Management Performance		
Cost of Waste per Unit of Production (Dollar per unit)	0.34 DPU	The total cost of all waste disposal (skips, waste tanks, powder waste, etc.) divided by the total number of USD/unit produced or similar
Workspace Organization – 5S Performance		
5S Audit Score – Factory Average	85.0 %	Sort, set, shine, standardize, sustain: All 5S areas are audited monthly and the average score is measured cumulatively throughout the year

UCo Factory Scorecard – July 2014

Key Performance Indicator	Target	July	Year To Date
Health and Safety Performance			
Lost Time Incidents	ZERO	ZERO	ZERO
Attendance	>96 %	95.8 %	
Bradford Index Score	<86	41	
Quality Performance			
First Time Pass Rate	99.2 %	98.0 %	99.4 %
On Time in Full Dispatch (OTIF)	98.0 %	99.8 %	
Productivity Performance			
OEE – Liquid Filling Lines	74.0 %	66.6 %	72.3 %
OEE – Drum Filling	100.0 %	105.6 %	97.0 %
OEE – Powder Filling	45.0 %	34.4 %	38.0 %
OEE – Box Filling	66.5 %	70.1 %	54.9 %
Total Factory – OEE	74.0 %	76.0 %	71.6 %
Overall Labor Efficiency (Units per Hour)	260	269	254
Waste Management Performance			
Cost of Waste per Unit of Production (Dollar per unit)	0.34 DPU	0.41	
Workspace Organization – 5S Performance			
5S Audit Score – Factory Average	85.0 %	89.5 %	



Top Tip—KPIs

Performance monitoring also needs to be continuous, but it is important to adapt your measure to the time period under consideration. Cost per unit produced might be relevant as a monthly or annual performance target, but OEE or output per hour might be much more meaningful for a shorter timeframe. Adapt KPIs to the time period under consideration.

Metrics or key performance indicators (KPIs) need to be in place to measure and communicate the performance of all aspects of site operation.

KPIs should be fully aligned with the site's business plan and, where relevant, longer-term road-map objectives, and also address key HR issues, such as the skills gaps revealed in the site skills matrix mentioned earlier.



Top Tip—Performance Reporting

Keep weekly reports alive by altering some of the items measured, say quarterly, so that you focus on certain issues that are short-term priorities. Modify the measures as appropriate to target a specific issue that needs a short-term boost.

7.

Long-Term Planning

LOOKING BEYOND NEXT YEAR

Gary reviews the site business plan that Alejandro has made. Among other things, it indicates that another warehouse will be needed shortly, as business grows beyond the current capacity and logistics flow intensifies. However, Gary knows that the Brazilian organization plans to build a new factory in three years' time that will take significant volumes from the Argentinian site. Consequently, although the business plan is correct to assume that a new warehouse is needed when taking only the next year into consideration, it would have been clear, had Alejandro been able to see the wider picture, that the proposed warehouse would not be necessary. Gary therefore decides that looking three to five years ahead is more relevant for larger investments and therefore that a road map with that timescale is also needed, in addition to a shorter-term annual business plan.

Site Road Maps

The road map's focus is long-term performance targets and key site capital spending requirements. It is, in many ways, a three- to five-year site-development plan.



Toolkit—Road Map

A site road map is essentially a scaled-up version of the site business plan, with a horizon of up to five years, rather than six to twelve months. It should be a site line responsibility to complete and forms the basis for subsequent business plans. It is, to all intents and purposes, an approved site-development plan.

The simpler the site, the simpler the road map; for the least complex sites, this map could be a single page, as long as it is appropriate for the complexity of the site. If the site is to close over time, then the road map will reflect this, although distribution may then be limited or the document redacted.

What does the road-map document actually define? This will be the mid- to long-term purpose and ambition for the site, and should include:

- Commercial assumptions on volumes
- Long-term KPI targets (safety, efficiency, quality)
- Envisaged capital spending
- Key contract dates (leases, stevedore agreements, etc.)
- Key HR issues (succession, recruitment, development, etc.)
- A site-appropriate financial target (ideally EBIT—i.e., earnings before interest and taxes)

The road map should be reviewed every three years, unless fundamental changes have occurred. That review should cover:

- Forecast assumptions: volumes, productivity, shift patterns
- Capacity: bottlenecks/capacity constraints
- Capex: spending needed, head counts, customer development
- Other key issues: HESQ, buildings/infrastructure, regulations

The road map should also cover issues relating to regulatory or permit issues, such as when do permits expire, etc. Many organizations focus primarily on short-term, immediate issues. A truly productive organization will spend appropriate effort on the longer-term issues to help ensure long-term profitability. It doesn't harm the sales force and production people to sit down once every year to focus solely on the future.

Capital Spending

Once the Argentinian site has created its road map and business plan, Gary compares it with the investment proposals he has received from other sites and finds a confusing assortment of PowerPoint documents and Excel sheets containing a wide and often unrelated variety of information. To have a clear oversight of all the sites' projected capital expenditure and to coordinate spending, all of this data will need to be brought together into one central repository. In his role as operations director, Gary is also responsible for ensuring that new investments are undertaken so that they are on time, to budget, operate to design and are completed without safety incidents.

He is frustrated that capital spending is often unplanned and adamant that it should never be a surprise. Gary therefore imposes strict rules relating to any such spending that is not included in the business plans.

He develops guidelines for capital spending to ensure that all new investments are verified at an appropriate level, so that they both support the productivity system and are truly needed. Appropriate capital spending delegation limits are put in place to avoid essential, but small, items being held up unnecessarily in an approval hierarchy. Clearly, Gary cannot be flooded with requests for buying a single

fork-lift truck or similar. There needs to be some kind of threshold for what equipment the site can buy without his involvement. To start with, Aksel and Gary together decide any spending above USD 100,000 that's needed for operational purposes is an appropriate level for which approval needs to be given.



Top Tip—Capital Spend Database

There are multiple benefits from having a capital spend database. It ensures visibility, making it easy to spot what has been approved and by whom, and identifying who may be holding up the process. It also reduces e-mail traffic, enables an easy audit trail and ensures compliance and cross-site best-practice sharing. The downside is that it requires a stand-alone system, increasing IT complexity and cost, and a possible double-keying of information, as you would not typically integrate such a system with your enterprise resource planning.

Beyond Argentina

The Argentinian pilot implementation has been underway for six months now and has yielded good results. Procedures and standards were written during the first three months and made available to the other company sites.

Since Britta couldn't visit all of these at once, a Lean-Lite training package was developed and shared with all the UCo business units. Britta has now moved on from Argentina and is overseeing training at the next sites.

To manage performance across all of UCo's 100 sites globally, Aksel has asked Gary to rollout site business plans and road maps, in addition to the Lean-Lite operational improvement program. Gary went to UCo's finance/controllers department, eagerly suggesting a separate operational reporting process. Disappointment was waiting

for him: it quickly became clear that the business units were not going to welcome what they saw as an additional burden and yet another centrally mandated process.

Gary confers with finance/controlling and they decide that the best way to manage sites, with business plans, KPIs, etc. is through the existing business planning and follow-up process. Subsequently, the units were asked to complete the plans and road maps, as per Aksel's request, as part of their normal business process.

Significant progress on implementing UCoPS and changing the site culture was achieved during the first few months of the Argentinian pilot. Gary's experience with other business units is that progress is slower than he had hoped for. While Argentina has seen a lot of progress, most other sites have not yet started site business planning, nor introduced the Lean tools and workplace organization defined by Britta. Despite being impressed by the pilot project, they have been busy with growth projects, monthly sales and other immediate concerns, and have not spent any time on the system.

Gary appeals to Aksel, who agrees that the productivity system should be a mandatory part of any business unit's operations and of UCo's steering system. He makes it the responsibility of the line to achieve the results he wants to see in this area, thereby shifting responsibility from the small central team and tapping the force of the line to bring about the desired outcome.



8.

Safety Management and the Link to Productivity

SAFETY—ALWAYS THE HIGHEST PRIORITY

Just as Gary and Britta are launching the productivity system across the company, news of a serious accident spreads across all sites. An operator in France has tried to make up lost time by removing the safety guard on a machine. He has been dragged into the moving parts of the machinery and it seems likely that he will lose the use of his arm. It is a shock to everyone. The CEO and board of UCo get involved and they are more determined than ever to do everything in their power to prevent anything like this happening again. They mandate zero tolerance for serious accidents across the organization underlining that safety is UCo's license to operate and that there can be no excuses for not focusing on this. UCo knows that they need to improve their safety performance and a debate about safety ensues within the organization.

The serious accident has also brought focus on UCo's productivity system itself. The board is pleased with the UCoPS implementation and progress to date, but the accident has made them ask some pointed questions of Aksel about the potential implications for safety. Aksel is insistent that the UCoPS introduction should not result in less emphasis on safety and that the increased focus on productivity must never lead to safety shortcuts. The board's comments, however, have made Aksel slightly concerned that maybe Gary's productivity focus is not helping to reach the company's safety targets.

Aligning Safety and Productivity

To check that there is no negative impact on safety performance with UCoPS implementation, Aksel invites UCo's safety director, Kristine, to present to himself and Gary a complete analysis of UCo's safety incidents since the UCoPS program started.

For Kristine, the report is easy to compile as UCo's accident data is readily available. What is immediately reassuring to Aksel is that safety performance has actually improved at sites where UCoPS has been implemented. When asked, Kristine says she is not surprised, stating that this will probably be because of the strong housekeeping focus which definitely reduces safety risks on a site.

In further reviewing the report together it becomes apparent that in UCo some causes of injury really are much more prevalent and their consequences are more serious than others. Kristine explains that the data highlights four key areas where the frequency and exposure to risk is high. These are:

1. Working at heights.
2. Working with hazardous substances.
3. Working with safety-protected equipment.
4. Working on electrical equipment.

To improve safety performance in UCo, they know they are going to have to give increased focus to improve in these four key areas. After some discussion, and helped by Kristine's knowledge of how other companies are tackling such issues, the three decide that the best way to proceed is to propose to the board that UCo will apply a simple but clear, set of non-negotiable "golden rules" applicable to all employees and contractors relating to the four risk areas to help ensure that incidents are reduced.

The golden rules address these four key risks by stipulating what precautions and control measures should be applied. To secure immediate and full compliance, they also make clear that anyone found breaching the rules faces automatic disciplinary action and,

depending on the severity, can even be dismissed on the spot.

The board react very favorably to the golden rules proposal and ask Aksel and Kristine to ensure prompt implementation following the appropriate employee consultation. The golden rules become fully established and accepted in UCo in a matter of months and bring about an immediate positive impact on safety performance in these four key risk areas.



Top Tip—Golden Rules

In UCo the golden rules have been introduced to ensure absolute focus on four issues of critical safety importance.

The following activities and related safety rules have been targeted to prevent recurrence of serious accidents. These are the golden rules:

1. Working at heights
→ A safety harness shall be used
2. Working with hazardous substances
→ Personal protective equipment shall be used
3. Working with safety-protected equipment
→ Safety guards shall not be removed without written permission
4. Working on electrical equipment
→ The power source shall be de-energized and locked out

Breach of a golden rule shall automatically trigger a disciplinary response in all UCo sites.

Implementing such rules companywide in a format that is non-negotiable and easy to understand for employees ensures success. Depending on how critical the issue is, golden rules can also be considered for issues away from safety, including productivity. For example, a golden rule could be introduced to help solve the issue if a company is facing a disastrous rate of related customer complaints.

With productivity always on his mind, Gary immediately starts to think that if safety can achieve such quick gains from the introduction of golden rules, then something similar should be applied to productivity. Gary starts to compile four initial targets to discuss with Aksel.

1. All sites to ensure good housekeeping with an appropriate audit regime.
2. All sites to have up-to-date performance measurements for key equipment.
3. All sites to have an up-to-date continuous-improvement board.
4. All sites to have an up-to-date site skills matrix.

Aksel is immediately supportive but, at the same time, somewhat hesitant. He wants nothing to distract from reducing safety incidents in the golden rules risk areas and therefore suggests to Gary that nothing is actioned immediately. He goes on to say that he is very open to considering a similar rules-based approach to tackle specific productivity shortcomings in the future.

Aksel also starts to realize that that productivity in UCoPS can maybe learn more from the safety-management routines used in the company. He asks Gary to consider this further and to report back on what else he feels UCoPS could learn from UCo's safety procedures.

Gary, admitting that his knowledge of safety management is not at the same level as productivity, suggests that he should spend some more

time with Kristine to truly understand safety management in UCo better, including perhaps a site visit together, before reverting.

The Link Between Safety Management and Productivity Management

Kristine explains to Gary that in UCo the key safety requirements for operational sites are summarized in a document titled “UCo—Our Essential Safety Management Tools.” Together they use this document to review how UCo manages safety.



Toolkit—UCo, Our Essential Safety Management Tools

1. All sites shall have a high standard of housekeeping.
2. All sites shall establish annual safety targets with action plans.
3. All sites shall have a safety committee reflecting all levels of the organization.
4. All jobs shall be risk assessed with respect to safety.
5. The use of personal protective equipment shall be specified for employees, contractors and visitors.
6. A preventive maintenance system shall be in place.
7. Modifications of process systems and process equipment shall be approved based on systematic change-management review.
8. UCo’s work-permit system shall be used.
9. Contractors shall be formally approved before being hired.
10. All accidents and near misses shall be reported and investigated and the subsequent corrective actions implemented quickly.
11. An emergency-response plan shall be in place and tested at least once every year.
12. All managers shall carry out safety walks and any resulting tasks shall be completed appropriately.
13. The total commitment of line management shall be in place to ensure the above.

In reviewing the document, Gary discovers that safety and productivity build on many of the same principles and require similar improvements at the sites. It is clear, for example, that safety walks and waste walks are compatible. Likewise, as Kristine has already highlighted, good housekeeping is fundamental to both safety and productivity.

To get more insight on how to ensure safety and productivity really do go hand in hand, Gary asks Britta to travel with him to Canada to visit the UCo site that currently enjoys the best recent safety record. The site has not been touched by UCoPS yet, so it should reflect “pure safety.”

When they meet the manager, Daniel, it becomes evident why the record is so good. He is clearly an expert on safety, with a passionate commitment to maintaining the highest standards. He is the man to help them understand and harmonize the safety and productivity issues across the business.

Gary, Kristine and Britta, having spent the plane journey discussing the safety essentials, decide to walk around the site to see how these interact with operational issues. As they set out, they can see that the place is orderly and clean, with obvious good housekeeping. When Daniel is asked how they manage to maintain safety performance, he explains that they follow up on any issues after every safety walk. They also focus strongly on having annual safety targets and action plans. Plus, there is a vibrant safety committee that meets regularly. While many other matters are also in the plans and meetings, Daniel believes that, by getting the fundamentals right, the rest is more likely to fall into place.

Later, as Gary, Daniel, Britta and Kristine walk along a raised platform inside the warehouse to get an overview, Britta drops a bottle of water out of her pocket. It narrowly misses a person working on the floor seven meters below.

Fortunately, no one has been injured, but Daniel explains to Gary and Britta that what just occurred was a near miss and will be reported.

From one of the nearby work stations he picks up a pad and explains that these are “near miss” forms that are located all around the plant.

“Incidents must be reported” so that they can be properly followed up and action taken, he says. “This is not only mandatory but is also essential in developing a strong safety culture.” He goes on to explain that the accepted wisdom on site is that, while there can be an excuse for an action that leads to an incident, there is no excuse for a failure to report it.

Even though the incident with the falling bottle of water did not result in an actual accident it could have caused harm, therefore Daniel explains that issues like this are reported as near misses so that “we can learn from them and revise our procedures if appropriate.” This reinforces the strong line management support that Britta, Kristine and Gary have witnessed across the site: a hallmark of any good, safe and productive operation.

Over dinner, the team discuss what needs to happen for safety to improve further in UCo. They quickly decide that the first common practice needed is self-evident: every site must be compliant with either the internal safety guidelines or local regulations, whichever is more stringent. Kristine and Britta agree that another critical factor for implementing an improved safety culture and more robust measures is for everyone to understand and know about hazardous conditions and near misses.

A hazardous condition is something that has the potential to cause an accident or incident. The difference between a near miss and an accident is luck, Kristine notes. You would expect near misses to be much more frequent than minor incidents, and similarly that minor incidents are more frequent than serious incidents. Therefore you would expect reporting of safety issues to resemble a pyramid.

When looking at the UCo sites, however, they have seen more of a pillar shape, where the numbers of different types of reported incidents are roughly the same. The exception tends to be at the

sites where safety performance is at its highest and Kristine puts this down to better reporting of incidents in general at these sites but in particular from the shop-floor workers. Gary replies that it is the same with productivity. At UCo's most productive sites, the kaizen board will be thriving with input from the shop floor. Again it highlights how safety and productivity are compatible.

Gary, Daniel, Kristine and Britta carry on the discussions, and confirm to each other how they now really appreciate the link between safety and productivity. They are even able to match a productivity-management tool to each of the safety-management essentials.



Top Tip—Manage Productivity Like You Manage Safety

A review of UCo's safety-management tools will show you just how compatible safety and productivity management are.

1. All sites shall have a high standard of housekeeping.

Perhaps the most direct link between safety and productivity. Put simply, an untidy, messy, disorganized site will never be safe. It also will never be productive. It is with good housekeeping in place that high levels of safety and productivity performance both start.

2. All sites shall establish annual safety targets with action plans (what, who, where).

UCo uses the annual business plan and performance-management tools discussed earlier to ensure that all the key objectives for a site are brought together and appropriately coordinated. Targeting a safe site through establishing annual safety targets and action plans is obvious good practice—and no different from targeting a more productive site through setting efficiency improvement targets and actions. The process and methodology are exactly the same: high-level objectives and targets, supported by an action plan to help achieve the desired results.

3. All sites shall have a safety committee reflecting all levels of the organization.

Ensuring that site safety committees are in place is a key UCo safety requirement and, again, good safety-management practice. Best practice is for the committee not to be a management forum but a representation from all levels of the organization to ensure cross-site buy-in. It is the forum for ensuring that safety issues are properly organized, reviewed and implemented. This is again directly compatible with any Lean implementation, where the formation of an effective meeting hierarchy and structure helps ensure that key Lean or productivity issues are identified, organized, reviewed and implemented. As with all committees, both will need to be well structured and efficiently run, but the link between safety and productivity management is again very visible.

4. All jobs shall be risk-assessed with respect to safety.

Requiring that that all tasks are evaluated with respect to safety prior to being undertaken is again good safety-management practice. With a risk assessment, you are assessing a task to see how it is best undertaken from a safety viewpoint. Process mapping can be viewed similarly in how it relates to productivity. You are undertaking a structured assessment of a task to see if it can be undertaken more productively. They are both structured improvement tools.

5. The use of personal protective equipment shall be specified for employees, contractors and visitors.

Clearly, employees need the right personal protective equipment to work safely. Likewise, employees need to be provided with the right tools and equipment to be productive. The equipment needs to be of the right scale and type, and fit for purpose. Give an office employee a bad desk or poor light and they will be less productive. It is the same in an operational environment.

6. A preventive maintenance system shall be in place.

Effective plant maintenance is essential for safety and likewise for productivity. Appropriately maintained equipment will be both safe and productive.

7. Modifications of process systems and process equipment shall be approved based on systematic change management review.

Before you make a change to plant or equipment, it is good safety practice to assess to the best of your ability if it is safe to make the change. This is the same with productivity: before you change a process or introduce something new to improve productivity, take the time to assess whether it will achieve what you are after. In both cases, you are aiming to reduce the chance of failure. Think “plan, do, check, act,” as this is always applicable. Changes or modifications to plant, equipment or processes can have an adverse impact on safety if not fully reviewed and assessed. Similarly, changes and modifications can impact workflow, line balance and takt times. Put simply, you need to assess that what you are changing, improving or modifying will not have a negative impact elsewhere with regard to safety and productivity.

8. UCo’s work-permit system shall be used.

A work-permit system, or “permit to work” (PTW), is just that: a requirement for written permission for a potentially hazardous or non-routine task to be carried out. The PTW specifies how the job will be performed and the steps involved (the method statement), an evaluation of the risks involved (risk assessment/safe job analysis), and any controls, precautions, safety and protective equipment, as well as isolations, required to complete the job safely. Only with these in place can the work be permitted. Although PTW systems can often be very complex, there is a clear parallel with the fundamental Lean principle of standard work—where best practice is identified, documented, implemented and checked/audited to ensure that the task is performed consistently, safely and efficiently.

9. Contractors shall be formally approved before being hired.

Any contractor carrying out on-site work presents a potential safety risk that needs to be appropriately managed. Typically, contractors are twice as likely to be involved in an accident as regular employees, largely due to their unfamiliarity with the site. Therefore, a formal system for contractor assessment and approval should be in place that checks key issues: Are they legally compliant? Do they have a good track record in this area of work? Do they have references and up-to-date insurance? Do they have a safety policy, and good evidence of qualifications and competency? It is also important that the scope of work is well defined and fees are clearly agreed upon. The same process should be employed before you appoint any contractor—be they consultants or external training providers to help with your Lean initiative. Do the same checks as you would when employing a construction company to replace the factory roof.

10. All accidents and near misses shall be reported and investigated and the subsequent corrective actions implemented quickly.

UCo has a formalized system for reporting accidents and near misses. Employees are also targeted to ensure near-miss reporting thrives at each site and is supported by making such reporting part of the bonus structure. How you manage a near-miss reporting system should really be no different to how you manage the kaizen board or continuous-improvement system. That means promoting the system, ensuring there is full management buy-in, encouraging employees to report incidents as a matter of course and ensuring the right levels of follow-up, action and closure are enforced. An accident is an accident. Not reporting an accident, however, is not an accident. It's deliberate. Apply zero tolerance if staff fail to report incidents. But exercise the right degree of leniency if accident rates increase through better reporting. The unequivocal rule is that ALL accidents and near misses should be reported. Remember: lessons learned from near miss incidents are

free (i.e., incur no losses). Likewise, employees should shoulder the same responsibility to shout out about quality or productivity issues as they do to report safety issues. No one should ever walk past a hazardous condition without dealing with it or reporting it. Likewise, they should never walk past an obvious productivity or quality wrong without reporting it.

11. An emergency-response plans shall be in place and tested at least once every year.

The site should have a plan in place to deal with emergency situations, such as fires, major accidents, spillages, environmental pollution, etc. Everyone who has a role to play in this plan should be suitably trained.

In many ways, this is no different to normal operational contingency planning. Well-managed operational sites will also have good contingency plans in place, should there be a non-safety, related emergency, such as a major plant failure. Likewise productive sites will have contingency plans for issues such as unique/bespoke plant, stockholding of critical spares, lead times for parts, and alternative suppliers for components, raw materials, packaging and freight.

12. All managers shall carry out safety walks and actions closed appropriately.

Again a clear link with productivity. A safety walk is an inspection of the workplace for safety issues, with issues identified appropriately logged and closed in a timely manner. A waste walk clearly deals with waste issues but in a very compatible manner to a safety walk. In UCo, when a manager visits a site, he or she is not expected to solely focus on safety. While safety always will have the highest priority, productivity must come second. Leaders must be competent to undertake both safety and waste walks and ensure the closure of identified issues similarly.

13. The total commitment of line management shall be in place to ensure the above.

Safety only works if the line management leads by example. Productivity is no different. You must believe in what is being introduced; if not, the implementation will fail. Getting line management to become role models is a vital step in achieving safety and quality performance. We cannot ask our employees to change if we do not demonstrate the right commitment and exemplary behavior ourselves. Leadership and visibility are key elements in the chemistry between the “hardware” (tools and practices) and the “software” (employee behavior). This is the same with Lean and productivity. Management must show the way. If a director or senior manager walks past litter, so will the operational worker. Behavior is always contagious in relation to safety. The same is true with productivity.

Upon returning from Canada, Gary, Britta and Kristine meet with Aksel to discuss their findings highlighting that the comparisons of the two areas, safety and productivity, and findings from site visits, quickly revealed how HESQ and productivity goals and tools overlap. “A safe site must be clean and orderly,” says Kristine. “A productive site must be safe and free from hazardous conditions,” adds Britta. All agree that there can be no trade-off between safety and productivity. The message is clear: a productive site is safe and a safe site is productive. By the same token, an unproductive site is often inherently unsafe.

9.

Ensure Continuous Improvement

NOW YOU'VE GAINED IT, SUSTAIN IT

Twelve months later, UCo's companywide rollout of the productivity system to its business units is nearing completion. Gary and Britta get together to discuss how to sustain the performance, productivity gains and knowledge required to deliver an even higher return on investment. Gary says that, to take things one step further, the fundamental need is still to ensure that they have the right people and expertise, and that they institutionalize knowledge in a way that is not overly complex. Aksel also takes steps to support continued development of the productivity system. First, he mandates it as part of UCo's program for assessing and integrating acquired sites. Secondly, he aligns it with the company's Performance and Development Process (PDP) for cultivating workforce expertise and leadership.

Integrating Acquisitions

Aksel is clear that the productivity system will be an essential tool in assessing new sites and then helping them play their part in UCo's overall business strategy. Gary has been given the job of explaining the approach to the M&A team, some of whom doubt its value for them. He launches into it energetically:

“As you all know, any acquisition can be thought of as having three phases: scouting, due diligence and deal negotiation, and integration. Having an operational system, such as the UCoPS, as a reference point is a bonus in all three phases. To make an acquisition, you need to know two things: first, how well does the site operate today? And, secondly, how much better can you operate it, i.e., what value can you create by buying and integrating it?”

One of the team responds: “That’s difficult without a benchmark to measure against. How well the target operates compared to what? And you can’t know how much better it can be operated, unless you know what will create improvement or what improvement potential a site has.”

“Exactly!” replies Gary. “Our operational system gives you a benchmark of good operations, as well as a methodology for improvements. Armed with this, you can look at key numbers for competitors in the scouting phase or visit locations to get an idea of whether the target performs well or poorly, whether the assets are in a good or poor condition and if they are fit for purpose or not, and, as a consequence, whether high or low reinvestment is needed.”

Warming to the discussion, someone else chips in: “That makes sense. When we are negotiating a deal, it’ll be easier to do a due diligence with something to measure against.”

“You’ve got it!” confirms Gary. “With the knowledge we are building, you will be able to find out that, for example, loading 600 tons per hour is a good level, while 300 ton is not. You will know

what housekeeping looks like, what good safety standards are and so on. You will also know how advanced a site is in its operations, and therefore the effort and investment needed to bring it up to our standard. As an added benefit, you will often be able to assess whether the site is well managed (even if there is no operational system) and therefore how easy it will be to improve performance, from a cultural and management perspective.”

Another member of the M&A team observes, “Sometimes we see poor sites that are well managed. Maybe there has been no investment for years, or perhaps poor demand planning is creating chaos in the plant, but the underlying culture and managers are good. If I get you correctly, our productivity system will also help us to detect all of this.”

“Correct!” confirms Gary. “And once you make an acquisition, you will have a standard procedure for integrating it and thereby creating value from it. You will know the steps to take—which investments are needed ASAP and which can wait or are not needed at all. You will also be pretty certain that you are able to capture the value.”

“I like the sound of this,” the leader of the team replies. “However, we know that there’s generally a two-month window of opportunity after an acquisition in which the employees expect and are receptive to changes. After that, they return to their old ways. Our managers are often challenged by new people from the acquisition resisting change and citing all sorts of reasons for why change isn’t possible. Will this be easier to deal with, going forward?”

“Armed with an operational system, a standard way of working and skilled employees, we will be able to identify blockers quickly and remove them,” Gary reassures her. “We will also bring in a few of our navigators to help everyone fast-track to the new way of working. In this sense, the two-month window works in our favor, because it is a period when employees expect changes and will accept the system introduction better than they otherwise might!”

Continuous Improvement Teams

Looking back on the documentation she has developed during the implementation, Britta notices that both the sites and the system itself, require continuous improvement. As the implementation has rolled on, she has discovered new best practices. Moreover, she is eager to apply new management techniques that have been developed in the industry.

To make sure that continuous operational improvements can be supported at UCo, and to sustain the knowledge base needed to do it, Britta and Gary decide to appoint a full-time team around Britta. The team will be tasked to continuously improve the productivity system itself, drive further site implementation, spread best practices and support the UCo organization with expertise, when needed, and help to integrate new assets. As agreed with Gary, Britta recruits a small team to support her in developing the system and drive the implementation forward.

Britta begins to adapt her initial operating-system documents with her findings from the implementation process. As she works, she realizes the system that is evolving, now officially called the UniversalCo Productivity System, or UCoPS, is unlike anything she has seen before. From a basic model, UCoPS is developing into a unique system adapted to UCo's operations, culture and competitive landscape.

Gary drops in for a presentation of the update Britta has put together. Afterward, he says he's delighted he appointed Britta to focus 100% on UCoPS. "It is clear that we needed someone whose sole job was to coach, question, support, motivate and institutionalize. All this would never have been achieved if you had also had a day-to-day operational role." They discuss the size of the team Britta will hire. Although there are many sites to get through and many additional processes the team could focus on, they end up with four people. While a larger team would have put more force behind the effort, Gary is worried about building too large a cost base. Equally importantly, Britta wants most of the change to happen bottom up and is mindful of the time this requires.



Top Tip—Continuous Improvement Teams

Lean must remain lean. The payoff from additional improvement efforts decreases as performance increases. Continuous improvements should be a part of every site's daily routines. However, special interventions will reach a point where the payoff doesn't merit the efforts. As the team approaches this point of diminishing returns, you will typically find that applying the same methodology and rigor to related processes, such as engineering, logistics and the wider supply chain can yield substantially higher benefits than further site operational interventions.

Employee Rotation and Shared Learning of Best Practice

Britta reflects on the great results she saw in Argentina where Rodrigo became part of her team for a while before rotating back into the line to implement UCoPS at another site. During the implementation, she has been in contact with several talented and motivated operational staff who she feels could excel, if only she had the time to train them. She asks Gary whether she would be allowed to hire these employees into her unit. Gary is positive, but cannot mandate this on his own, so he involves Aksel in the discussion.

Although sympathetic to Britta's idea, Aksel sees too many hurdles to overcome. First, it's difficult to move staff on permanent expatriate contracts with their families and then replace them in their home country. This might also lead to conflicts when the staff return and their old job is occupied. Also, Britta would have to offer an attractive incentive package to persuade staff to move and to retain them (safeguarding the training investment) when they return, since any highly skilled operator could become a recruitment target for competitors.

Aksel asks Britta how much time a person needs to work full-time with UCoPS to become an expert. “With the proper understanding, you could be well on the way in a year or two,” Britta responds. Aksel therefore proposes to introduce a rotational program where skilled operators are asked to join Britta’s team for up to two years, after which they return to their site. This has multiple benefits for UCo: employees are only abroad temporarily; the UCoPS is spread more efficiently; and every six months or so, the central team gets a new pair of eyes to focus on improving the system.

At the same time, Aksel wants these skilled employees to have an extra incentive to stay with UCo. So he proposes to introduce a certification for everyone who completes a rotation. “They would become first in line for promotion when returning home. In time, we can mandate that the managers of our largest sites must have had completed a rotation before becoming a manager,” he suggests. Gary and Britta are satisfied with the solution and Britta confidently goes off to recruit her team.

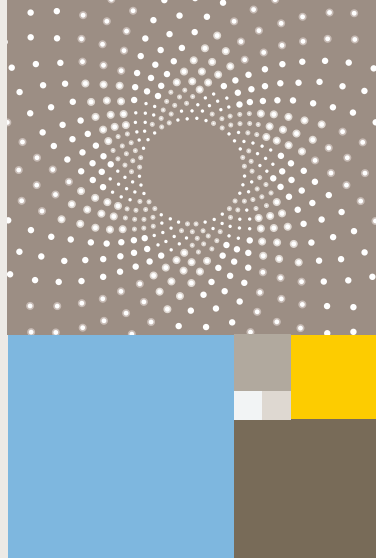


Top Tip—Employee Rotation

Depending on the complexity of your sites, you may want to mandate that some site managers have certified knowledge of UCoPS. The larger and more complex the site, the more important this is. By mandating the rotation of certain managerial levels into the productivity system for a few years, you not only get talented employees in your operating system, but also ensure that senior managers on the sites are true system experts who can assure its long-term development. In our experience, a carrot is necessary to get the best employees into the central productivity unit. If they only see two years of frequent traveling, at the end of which they find their old job has been taken and their peers have been promoted ahead of them, the chances of holding on to these talented individuals are not great.

10.

The Most
Important
Theme of all
—Culture



BEHAVIOR RUNS DEEP

Throughout this book, there are themes worthy of their own chapters, but we have chosen to treat them as an implicit part of the production system. However, one of these themes—culture—underpins the rest.

Cultural change is just as important as the physical changes taking place. Successful cultural change is what distinguishes sustainable transformations from short-term fixes that have no lasting impact.

Although all of the critical factors for achieving cultural change—such as understanding and support from the top, adaptation to local needs and alignment with incentive structures—are mentioned elsewhere, it is worth digging a little deeper into how to help your organization make this transition.

The ultimate aim when you establish a productivity system is to develop a culture where decisions are taken as close to the factory floor as possible and where these decisions ensure continuous improvement.

From Knowers to Learners

You may have employees in a state of being uninformed/unaware, in which they bring up problems, make complaints and criticize without suggesting solutions—the problem is someone else's. The goal of a productivity system is to help employees evolve from being knowers—who tend to see problems as someone else's responsibility, who lack interest in new ways of working, or who, when they do engage in solving problems, simply offer opinions or solutions to the problem at hand instead of fixing the underlying issues—into learners. Learners are what every site really needs. They are curious, pose questions to understand the root causes, actively seek new ways of solving problems and own both the problems and their solution.

You want to see them transform from victims of what is happening into masters of their own work situations. As it is much more satisfying to be a master than a victim, employee morale typically rises when this transition happens.

It is not uncommon to blame the market, the raw materials, the management, the investors, the unions—in principle, everyone but yourself—for any lack of performance. The new learning culture requires something else: that employees accept full responsibility for the cost and quality of the products that they deliver to customers, becoming deeply engaged with the efforts to bring about improvement. It also requires that employees share full responsibility for ensuring that the productivity system is safe.

Why Now? and Why Here?

As a manager, you need to identify the employees' understanding of the situation. Do they recognize the need for change? Have you explained the Why now and Why here behind the change? For example, a first-time pass rate of 98% may not appear that bad. However, over a year and multiple sites, this can add up to millions in lost margins. With productivity you have to understand your numbers.

Even the most profitable industry will be forced to change due to competitive pressure at some stage. It is then management's job to motivate the employees to accept change instead of fighting it. To succeed in this, managers have to truly believe in and demonstrate the change themselves, and to repeatedly communicate its rationale and benefits.

To make a system like the UniversalCo productivity system succeed demands clear leadership all the way from the top. If a senior manager visits a site, he or she should always take care to role-model the change. This could involve doing a waste walk or a safety walk or engaging with the system and people in another meaningful way, such as a review of the factory scorecard, attending a morning meeting or joining a 5S audit. Even picking up litter. In many companies, visiting execs are expected to show a clear interest and demonstrate leadership when it comes to safety. However, demonstrating the same interest in productivity is also vitally important from a cultural view point. Companies undoubtedly need safe factories, but what they should truly desire is safe and productive units. Senior executives' interest and attention need to cross both issues.

Factory management should be accessible and visible on the floor every day and engage with the new way of working. Ideally, you should keep organizational layers to a minimum and create as flat a structure as possible. Regardless of how big the plant is, there should never need to be more than four levels—from the most junior to the most senior.

Through the UCoPS, the aim is to empower employees to make good decisions, both by teaching them the methods required to solve problems and allowing them the autonomy to do so. When you engage with employees to solve problems, ask for how they applied the productivity methodology, not for the solution to the problem at hand. Rather than just focusing on quick solutions, aim to have the employees use the new system and methodology to find sustainable solutions for problems. But do try to create quick wins that show the system works.

Cultural Markers

Pay particular attention to the cultural markers—the signals that indicate if the employees' thinking is aligned with the new culture. For instance, a healthy level of safety reporting, e.g., reporting of near misses by all employees, indicates a positive safety culture and buy-in. Likewise, a healthy, up-to-date kaizen board indicates buy-in to the productivity system.

A system such as the UCoPS is built on the understanding that the axis from customer to supplier is more important than the axis from management to employees. This must flow through your business and be demonstrated by cultural markers: Who has the best parking at your site—surely the customer and not management? Is it unacceptable for any faulty product to be dispatched, no matter how insignificant the fault (unless agreed with the customer)? Any and all accidents are unacceptable, but is reporting near misses and incidents encouraged, no matter the behavior of the persons involved? Who is promoted in the organization—surely the best-performing employee and not the person most visible to the boss? And who is the hero? Is it the methodical person who consistently delivers on-time-in-full and not the firefighter who occasionally makes a big effort to save the day? If you are a team, do you work open plan instead of sitting alone in cell-offices? Is the site manager located at the heart of the activity, or in some separate office block away from where everything is happening? These are all important cultural markers.

Finally: Don't Give Up!

Last of all, never give up. Changing an entire way of working takes time. Don't expect improvements to show up in financials immediately. Often many points along the value chain have to be improved before the bottom-line impact becomes visible.

Always bear in mind that a productivity system comprises more than just Lean; it includes all of the seven areas covered in this book:

1. Safety
2. Employee development
3. Business planning
4. Capital spending
5. Performance management
6. Quality
7. Lean

The productivity system must be anchored at a high-level first. It subsequently needs to be introduced into the organization's business plans and road maps to ensure proper focus and resourcing. The actual tools and practices you implement next should be aligned with the above seven key elements that should encompass any productivity system.

Get this right and you will be well on your way to achieving the goals to which any ambitious business aspires.

11.

Lessons Learned, Case Studies from UCoPS

Case Study: UCoPS Application at a Laboratory

“We’re a laboratory situated alongside a factory, and when the plant received Lean training, we followed suit. It just seemed like the natural thing to do at the time, even though we are not the typical setting. And even though a lab is very different, the introduction of UCoPS and Lean to our routines largely felt like adding a bit of formal framework around the way we were used to thinking and working,” says lab manager Chris.

The analysis of samples performed at the lab needs to be carried out quickly to allow clients to carry out proactive rather than remedial action to get optimum nutrition to their crops. Getting increasingly efficient performance out of an operation that grew faster than its physical premises created a tradition of constant vigilance for improvement, which made the application of UCoPS easier.

“Using ‘Lean’ or ‘UCoPS’ still seems a little odd, as these are things that have always been done. Only now that we are giving labels to them,” the lab technician, Roger, says. “To process ever-increasing numbers of samples with the same amount of resources, we needed smarter ways of working.”

He gives a very simple, but typical, example of the kind of improvement-seeking attitude at the lab. To prepare a sample for analysis, a volume of soil and a volume of extracting solution are placed in a jar, shaken in a shaker, then filtered.

“This process has been improved by placing all customer samples in drawers—a drawer containing ten plastic pots set into polystyrene blocks instead of jars. Instead of getting ten jars, and moving them one at a time to where they need to be, now we simply move one polystyrene block which contains all ten pots. This is the same for

labeling. Rather than label ten individual jars, we can just label one block,” Roger explains.

“When we come to filter the solution, again, rather than filter ten jars one at a time, we can filter ten samples in one go. This process is then carried through to washing. With specially designed ten-headed taps, we can wash the polystyrene blocks in one simple movement.”

This whole procedure has saved a lot of time and space, and these savings become highly significant when such procedures are carried out many thousands of times over a year.

With the advent of a formal productivity system, improved communications make the appearance of such ideas more likely. The lab has also actively adopted a kaizen board, where everyone can submit ideas for improvements. This has spurred a number of success stories, and it also guarantees that all ideas are both documented and discussed.

One success story came about from a suggestion from an alert technician, who noted that the cycle time on a carbon/nitrogen/sulfur analyzer was 30 seconds longer than on an identical partner machine by its side. First the technician adjusted them to have the same time, but after quality tests, determined that the time could be shortened without having a negative impact on results.

“Saving 30 seconds a sample for that particular piece of equipment roughly equated to saving 150–200 machine hours per year. Plus, of course, sample turnaround time improved,” Roger notes.

A similar example of success, thanks to a mindset open to simple but effective innovation, came from questioning a manufacturer’s default equipment—in this case, tubing in a spectrometer’s auto-sampler.

By locating the auto-sampler slightly closer to the instrument and then looking at the length of tubing that was actually needed to move the liquid from the tube to the instrument, it became clear that the tube was perhaps 20 inches longer than it needed to be.

“By reducing the length of the uptake tube, the time taken for the liquid to get to the instrument was also reduced, meaning a saving of perhaps 10 seconds a sample,” Roger says. “These instruments will analyze at least once, potentially several times (depending on the tests required) the hundreds of thousands of samples that the laboratory receives. So the time saving soon adds up. Through freeing up machine time, more samples can be analyzed per day, which means more results go out to the customer, faster.”

Daily routines have also been subtly influenced by the adoption of UCoPS and Lean techniques.

“Now at the lab, everything is shared—we create standard operating procedures (SOPs) for all tasks. This means that jobs do not become dependent on one person. The lab can still function even when numerous members of key staff are absent as there are systems in place to allow others to competently complete the work,” Roger says.

The regular 5S meetings held in the days of Lean implementation evolved into weekly team discussions, a forum where developments are shared and any topic can be aired. An offshoot of this communication is a system of weekly reports where a few key target—for example, sample turnaround, lab safety and quality—are measured so that data exists to chart improvement.

“This is a simple concept, but it has had quite a significant effect,” Roger adds. Just like the meetings, by doing this regularly and openly, knowledge is shared—no one feels excluded and the whole team takes part in all aspects.

“In some ways using Lean or UCoPS seemed a bit odd, as it felt like giving labels to things that we had always done. But the effect of having a system did make tasks around the lab clearer and more efficient,” he says.

“In very unobtrusive ways, UCoPS has helped eradicate the old ‘knowledge is power’ attitude,” Roger continues. “Various members of the laboratory team have been given responsibilities for organizing

aspects of our operation—for instance, we have a health and safety, quality-control and 5S coordinator. 5S is a continuing process. This gives a sense of ownership to the team, which in turn creates enthusiasm for such tasks, and greater care in carrying them out.”

“I wouldn’t say we were alone, but I would say that we were feeling left out,” operations director Mehdi admits. Since the majority of the activity at his site was not linked to production, it was not originally a prioritized location for getting UCoPS.

Case Study: UCoPS at a Production Site

“In one sense, we had a pretty good idea of what our challenges were. We had productivity bottlenecks, we had safety issues, and most of these issues were linked to constraints we had due to limited space and the physical layout of the facility,” he explains. “We tried to work around these problems, and we did a good job but what we didn’t know was the ‘formula’—how the techniques from a productivity system could help us more.”

With regular seasonal rushes on product, the site had to stockpile at a buffer warehouse to cope with the constraints, which appeared to be due to a mismatch between production and bagging capacity.

“Maintaining this warehouse buffer meant double handling of product, moving it into and out of storage instead of delivery. This was clearly pure waste in Lean terms, and was another symptom that needed to be addressed,” he adds.

Things began to turn around fast once the site got UCoPS assessment and training in order to address efficiency levels within their blending operation. While in many respects this African operation largely handled logistical and sales matters, it also had blending and packaging facilities that UCoPS could typically target.

“For us, the big change was that we learned how to measure key data and how to improve. We started to record downtime meticulously, log all the many, various reasons these stoppages happened, and then analyze the data. The main tool for us was OEE, and takt time analysis,” Mehdi recalls.

Delays could come in many forms; a payloader could be down, time could be lost with the arrival or positioning of trucks, there could be slow shift changeovers or mechanical problems. Systematic records

and reports brought clarity and indicated what could be solved by preventive maintenance, and what needed to be changed.

“The level of detail, and the knowledge that could be shared by the productivity experts who visited us, was invaluable—and impressive,” he adds. “Just one example—a visiting engineer spotted that the supporting feet on our blender were steel surfaced instead of plastic. Fixing this increased the lifespan of equipment parts, and we could quickly be told where to source the needed coating—even though this was on the other side of the world!”

“All of this knowledge allowed us to hone operations and put hard figures on the factors that we had previously suspected were causing the problems. Our theories turned out to have been good, but UCoPS provided the ‘scientific evidence’ that confirmed this, and indicated solutions.”

Detailed analysis identified the blender as the fundamental and insurmountable bottleneck—there was no way to operate at more than 50% capacity, as it required an interval of waiting and refilling equal to the length of its operating burst.

“We couldn’t just add a machine, due to space constraints. To solve the space problems, a bigger site was being planned for completion in about two years’ time, so we also had to make sure that the investment needed to clear the current productivity bottleneck, also fitted into our longer-term site changes. So this was quite a complicated set of variables, and it was quite an investigation, examining so many possibilities and wrestling to find the optimal answer.”

The UCoPS action plan for the site put a high priority on safety issues. Because of the site’s layout, vehicles would regularly enter into areas where staff on foot would be working or waiting. The UCoPS process identified additional safety precautions that needed implementation, and HESQ issues became a regular part of discussions during shift changes. If only temporary safety improvements were possible due to the demands of the current space, then permanent solutions were earmarked for the setup of the new, roomier site in the future.

“To me, safety and productivity go hand in hand,” Mehdi emphasizes. “Staff safety is always our first priority in any case, and it is easy to see that when conditions are not optimal—because of the logistical limitations of an aging facility—then the extra vigilance needed gets in the way of quick and efficient operation. This has meant that site design has become an important, and somewhat unusual, part of our UCoPS process.”

“We turned out to be quite a ‘Lean’ operation even before we adopted UCoPS, because we had clear challenges to cope with, and we had decided pragmatically that we had to focus on improving what we could control. But the arrival of UCoPS was very, very positive.”

“We received expert advice, and our staff gained added skills and perspective about their jobs. It makes what we do more scientific. We definitely feel that our work has become more exciting, and it allows the local team to bring more to the table.”



Glossary and Abbreviations

Term	Definition
5S Workplace Organization	5S: sort, set in order, shine, standardize and sustain. A method of creating a clean and orderly workplace that exposes waste and errors.
A3 Problem Solving	A problem-solving methodology that can be recorded on a single sheet of A3 paper. The categories and flow of discussion are problem statement, potential root causes, potential solutions, solutions for implementation, assess impact of actions, how to prevent reoccurrences.
Agile	The ability of an organization to sense change in the market environment and to respond efficiently and effectively to that change.
Just in Time (JIT)	Production strategy that aims to improve return on investment by producing only what is required, when it is required, thereby reducing inventory and work in progress.
Kaizen Board	A way of visually capturing the improvement suggestions by encouraging people to write these on a continuous improvement board. Often more successful than suggestion boxes due to the more visual nature.

Term	Definition
Kaizen	Japanese for “improvement” or “change for the better,” and is normally expressed simply as “continuous improvement.” Its aim is to involve people at all levels to proactively seek incremental improvements through the continued elimination of waste.
Kanban	Japanese term for “signboard,” refers to a scheduling system for Lean and Just in time (JIT) production that helps determine what to produce, when to produce it and how much to produce. Helps to eliminate the wastes of inventory and overproduction by regulating the flow of products and raw materials throughout the process.
Lean	<p>Often referred to as “lean manufacturing” and while many definitions exist, it can be described simply as the systematic and continued elimination of waste in all forms.</p> <p>It is an operating system that is focused on adding value and eliminating waste through the structured use of improvement tools and techniques.</p> <p>By eliminating waste, quality is improved and production time and cost are reduced.</p>

Term	Definition
Lean Lite	A “lite” approach to Lean manufacturing, with Lean principles at its core but with the ability to selectively deploy specific tools and techniques so that you can reach a good standard swiftly and move toward perfection later.
Line Balancing	A production strategy that seeks to remove the imbalances from one process step to another by ensuring that each machine is operating at the same rate of production. The workload is leveled across all processes to remove bottlenecks, excess capacity and unnecessary inventory.
Process Mapping	The creation of a visual representation of the process as a picture or map that shows the sequence of activities, the flow of product, the flow of materials and the flow of information allowing subsequent analysis and improvement potentials to be identified and actioned.
Root-Cause Analysis (5 Whys)	A question-asking technique used to explore the cause-and-effect relationships underlying a particular problem. The primary goal of the technique is to determine the root cause of a defect or problem.

Term	Definition
Seven Wastes	The seven wastes are at the root of all unprofitable activity within an organization, but also the key to uncovering value and eliminating unnecessary work. The seven wastes are transportation, inventory, motion, waiting, overproduction, overprocessing and defects, forming the acronym TIM WOOD.
Skills Matrix	A visual management tool for showing who has the skills to do what (by task or work area). A skills matrix would ideally provide a quick visual indication of each individual's level of training, so it is an effective tool for guiding skills development.
Standard Work	Standard work defines and documents best practice (the most efficient methods) for producing products using available equipment, people and material. It depicts key process points, operator procedures, production sequences, safety issues and quality checks, and forms the baseline for continuous improvement. Often documented as standard operating procedures (SOPs).
SteerSys Document	A steering document at a high-level that describes requirements for management, organization and work performance for activities that are common to the entire organization. Describes what must and should be in place and who is responsible for it.

Term	Definition
Takt Time	Often referred to as the rhythm and heartbeat of the process. The desired time between units of production output, synchronized to customer demand. Measured to determine and align the pace of production with that of customer demand.
Visual Management	Visual management tools show the current status of a process and provide directions, reminders and instructions to employees. Visual management tools include things like color coding, pictures, graphics, labeling, area information boards, control boards and checklists. They allow employees to complete their tasks safely, efficiently and in a standardized way.
Waste Walk	A team or individual walks through the work area identifying the wastes they observe, with a checklist as a reminder of the seven wastes. Also serves as a valuable training tool, as it enables waste to be more easily explained and visualized in a true work context.

ABBREVIATIONS

EBIT **Earnings Before Interest and Tax(es)** An indicator of a company’s profitability, calculated as revenue minus expenses, excluding tax and interest.

EBIT is also referred to as “operating earnings.”

HESQ Health, Environment, Safety and Quality.

KPI **Key Performance Indicator**
Financial and non-financial metrics used to quantify objectives to reflect strategic performance of an organization.

MDR **Maximum Demonstrated Rate**
The maximum production rate over a set period of time, typically seven days, achieved by an asset. Often higher than the nameplate or design capacity. The performance measure against which output is typically measured.

OEE **Overall Equipment Effectiveness**
A performance metric compiled from three data sources of the machine (or process) being measured: availability, performance and quality.

OPCOM **Operations and Commercial**
A forum (usually monthly) where the operations and commercial functions come together to review sales forecasts, demand patterns and capacity issues.

ABBREVIATIONS

PDCA **Plan, Do, Check, Act**
Plan: develop a plan with expected results. **Do:** implement. **Check:** what was achieved versus what was expected. **Act:** review, refine and do it again.

PDP **Performance and Development Process**
The system for monitoring and managing individual performance and for identifying training and development needs.

PPM **Planned Preventive Maintenance**
System for scheduled maintenance that ensures equipment is operating correctly and therefore avoids any unscheduled breakdown and downtime.

PRP **Performance-Related Pay**
Bonus program tied to performance.

ROCE **Return on Capital Employed**
Indicator of profitability of the firm's capital investments. Determined by dividing earnings before interest and taxes by capital employed.

ABBREVIATIONS

SKU	Stock-keeping Unit Warehousing item that is unique because of some characteristic (such as brand, size, color, model) and must be stored and accounted for separate from other items.
SLA	Service-Level Agreement A contract between the provider and the user that specifies the level of service expected during its term.
SMED	Single Minute Exchange of Die Practice for reducing the time it takes to change a structured process for reducing changeover and setup times between different products.
SOP	Standard Operating Procedure A documented best practice for the completion of a task.
SPL	Single Point Lesson Aims to standardize best practice by delivering successful task training in 15 minutes or less. SPLs are highly visual, explain why as well as how, and include a demonstration. The emphasis is on illustration and an absolute minimum of text.

ABBREVIATIONS

UCoPS

UniversalCo Productivity System

A holistic operating system/framework that is adaptable to the specific characteristics and requirements of individual sites.

UCoPS helps to operationalize strategy by integrating road maps, business plans, capital spending, performance management, employee development safety, quality and agile business/Lean thinking.

WoW

Way of Working

A documented best practice between two groups (typically commercial and operations) detailing clearly the obligations of both parties to ensure smooth operations in line with customer expectations.



Appendix:

Self-Assessment Checklist

How does your site compare to a fully functioning UCo site?

The following is a self-assessment where you can score your site vs. the UCo operating system on a scale from 1 to 3, where 1 is missing and 3 is fully in place.

UCoPS Focus Area	Score	Comments	Agreed Actions
Safety Management			
Is the site management fully aware of UCo's Safety Management Principles for Production sites?			
All sites shall have a high standard of housekeeping.			
All sites shall have a Safety Committee comprising the site manager and members reflecting all levels of the organization.			
All employees shall participate in safety meetings on a regular basis.			
All sites shall establish annual safety targets with action plans (what, who, when).			
All jobs shall be evaluated with respect to safety, and a job-safety analysis shall be carried out for those jobs that are considered critical. Critical jobs shall be described in job procedures, including the prescription of the use of any special personal protective equipment. Employees shall be trained accordingly.			
The use of personal protective equipment shall be specified for employees, contractors and visitors.			
A preventive maintenance system shall be in place.			
Modifications of process systems and process equipment shall be approved based on a systematic review.			
A work-permit system shall be in place.			
An approval system for contractors shall be in place.			
All accidents and near misses shall be reported and investigated, with the subsequent implementation of corrective actions.			
An emergency response plan shall be in place and tested at least once every year.			
All managers shall carry out safety walks (walk-observe-talk).			
For the above principles to be successfully implemented, total commitment of support from the line management is required.			
Have the golden rules been communicated to all employees?			
Does the site know which UCo steering system documents are applicable to its activities?			
Is an up-to-date safety performance board clearly visible on entry to the site?			
Are the site boundaries clearly marked and security fencing appropriate for the site?			

SELF-ASSESSMENT CHECKLIST

UCoPS Focus Area	Score	Comments	Agreed Actions
Does the site have competence in English to allow UCo instructions related to safety to be easily cascaded?			
Is safety included in site management's annual performance review?			
Is near-miss reporting actively targeted and are all near misses appropriately reviewed/addressed?			
Is the rate of absenteeism on site actively monitored?			
Does the site have a safety-information notice board for employees?			
Business Planning and Performance Monitoring			
Does the site have a five-year road map?			
Is there a site business plan?			
Is there a weekly report focusing on short-term operational issues?			
Is there at least one communication session held for all employees each year?			
Does the site have a factory score card visible to all employees updated monthly?			
Does the site have a site-specific PRP scheme strongly related to the business plan?			
Is the site leaders' individual performance plan fully aligned with the business plan?			
Do all key assets, such as bagging lines, cranes, loading facilities, have performance targets that are measured daily?			
Lean and Workplace Organization			
Are the site leaders appropriately trained in Lean manufacturing?			
Likewise, have the plant operators been trained in Lean manufacturing issues to an appropriate level?			
Does the site employ a standard methodology, such as 5S, to maintain housekeeping standards?			
Is standard work actively targeted and implemented?			
Does the site operate with a high-level of visual management systems?			
Have key process flows relating to the site been mapped and improvements identified?			

SELF-ASSESSMENT CHECKLIST

UCoPS Focus Area	Score	Comments	Agreed Actions
Does the site employ methodology for problem-solving, such as A3?			
Does the site use OEE methodology (or similar) to measure key asset performance?			
Is first line maintenance in place and actively targeted?			
Does the site have a procedure/forum for continuous improvement ideas to be channeled from and responded to by from all employees?			
Employee Development			
Do all employees have a mini appraisal/performance review each year that is recorded?			
Does the mini performance review cover training needs for the year ahead?			
Are all key positions appropriately covered in case of long-term sickness or employee leaving?			
Is there an up-to-date site skills matrix?			
Does the site have high levels of labor flexibility across the various skills required on site?			
Does the site have a training and retraining database (manual or computerized)?			
Do all employees receive company induction training?			
Can the site manager understand communication in English?			
Is numeracy and literacy training offered to employees who cannot read or write?			
Capital Spending			
Does the road map contain a five-year capital spending plan for the site?			
Does the site's business plan for 2016 include capital spending proposals?			
Is the company capital spend database used for capital spending > \$100 K?			
Is all capital spending > \$10 K "tendered" to at least two suppliers?			
Are capital spend proposals raised with operations director as verifier if > \$100 K?			
Is all capital spending > \$50K following up with a post-project report?			

SELF-ASSESSMENT CHECKLIST

UCoPS Focus Area	Score	Comments	Agreed Actions
Are the commercial assumptions put forward in capital spending proposals followed up as a matter of routine?			
Does the site have at least one capital spending proposal for 2016 related to efficiency and not HESQ?			
Quality			
Does the site have appropriate quality-control procedures?			
Is a complaints procedure in place that details issues such as investigation and resolution process?			
Does the site have formal quality targets that are reported appropriately?			
Are all employees trained in the importance of quality?			



Appendix:

Steering Document

UCo – Steering System Document 4:O1

Universal Co Productivity System

Scope

This document is valid for UCo.

It provides standard operating procedures for all operational units to improve productivity and safety performance.

Statutory regulations shall always be complied with. In case of a difference between the statutory requirements and the UCo standard, the more stringent shall apply.

Responsibility

The site management is responsible for compliance with the standard.

Operating in non-compliance with this standard requires the approval of UCo operations director.

Definitions

Shall: Denotes that the requirement is mandatory.

Should: Denotes the preferred action, but is not mandatory (unless made mandatory by statutory requirements).

Requirements

Each UCo site shall operate as detailed below in seven key areas of operation:

1. Safety
2. Employee development
3. Business planning
4. Capital spending
5. Performance management
6. Quality
7. Lean

1. Safety

All UCo sites shall:

- Ensure full regulatory compliance with national regulations
- Ensure UCo's safety golden rules are implemented and actively managed on site
- Likewise ensure that UCo's 12 identified Essential Safety Management Tools are implemented on site
- Have a clear understanding of the UCo steering system and understand which are the key UCo SteerSys documents and requirements that apply to the site
- Ensure that all HESQ incidents are reported and actioned appropriately
- Have leadership who can communicate UCo safety issues from English to employees in their mother tongue
- Have visible clear and concise safety performance boards on entry to site
- Have annual safety targets as integral part of both business plans and performance-related pay schemes
- Ensure that absenteeism is monitored and appropriately followed up

2. Employee Development

All sites shall have:

- A leader with formal agreed-upon annual performance plan
- A site skills matrix that targets employee task flexibility
- A training and retraining database to ensure that training records for the site's employees are up to date and that retraining needs are easily identified and scheduled
- An appropriate training schedule for the year ahead to ensure that the site and its employees can comply with the requirements of this document in areas such as safety and Lean

All employees shall as a minimum have:

- An outline job description
- An annual personal development review that includes identifying training needs
- Appropriate induction, safety, quality and Lean training
- Literacy and numeracy development if appropriate
- An annual communication session

3. Business Planning

Each site within the UCoPS shall have an agreed five-year road map and an annual business plan.

The road-map document shall define the mid- to long-term purpose and ambition for the site and will include:

- Commercial assumptions on volumes
- Long-term KPI targets (safety, efficiency, quality, etc.)
- Proposed capital spending
- Key contract dates (leases, logistics agreements, permits and authorizations, etc.)
- Key HR issues (succession, recruitment, development, etc.)
- A site-appropriate financial target

The road map should be reviewed every three years unless fundamental changes have occurred and should form the basis for subsequent business plans. The simpler the site, the simpler the road map.

The road map must be compiled with the appropriate commercial team and approved by UCo operations director.

The annual business plan will be compiled in Q4 each year. The document will target specific objectives and actions across the following areas:

- Safety
- Production volume
- Productivity
- Capital spending
- Working capital
- Quality
- Key Lean initiatives/commitments
- Key employee development issues/initiatives

The document will also include appropriate financial measures for site (such as EBIT or free cash flow).

The business plan shall, once approved, be cascaded into:

- Individual performance-plan KPIs for site leaders
- Site-specific PRP scheme for those employees without individual performance plans

As with the road map, the simpler the site, the simpler the business plan. All business plans must be formally approved by the UCo operations director.

4. Spending and Commitment Management

Sites within UCoPS shall:

- Ensure that UCo's capital spending procedures are followed
- Have the UCo operations director act as verifier for all spending > USD 100K
- Ensure that all capital spending projects > \$25K are concluded with an end-of-project report review
- Measure any commercial assumptions used to obtain

capital approval over the appropriate time period

- Ensure that capital spending proposals form an integral part of both road map and business plan

5. Performance Management

Every day, each site shall:

- Monitor performance of key machinery that has a significant impact on efficiency, quality and flow (e.g., bagging and mixing units)
- Use OEE as a tool in the systematic productivity improvement process

Every week, each site shall:

- Report on performance issues of relevance for productivity
- Discuss improvements with the cross-functional teams and follow up on the action plans

Every month, each site shall:

- Update the business plan KPIs and provide brief explanations for deviations
- Focus on safety, productivity and quality
- Make the KPI update visible for all employees on a productivity performance board in the agreed-upon UCo Factory Scorecard format

Every quarter, each site shall:

- Monitor progress to the site-specific PRP scheme and update employees

6. Lean

Sites within UCo shall be committed to continuous improvement and eliminating the seven wastes. The use of appropriate Lean manufacturing tools shall be in place across the UCo sites.

As a first-phase introduction to Lean, all sites shall:

- Conduct waste walks as a means of identifying opportunities for improvement
- Use 5S methodology for workplace organization to ensure high standards of housekeeping
- Employ visual management systems (performance boards, signage, floor markings, etc.)
- Implement standard work principles and deploy standard operating procedures for all key tasks
- Use process mapping to target and eliminate the Seven Wastes
- Use Overall Equipment Effectiveness (OEE) as a tool to measure asset performance

Use of other Lean tools will be encouraged but on a site-specific basis. These could include systematic asset care, focused kaizen, kanban, takt time and line balancing, SMED and A3 problem-solving and root-cause analysis.

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