SUSTAINABILITY

...a guide to...

Process Improvement

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in association with SMMT Industry Forum

CARDIFF UNIVERSITY

SMMT Industry Forum

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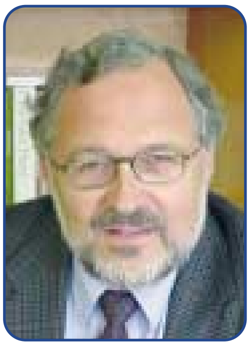

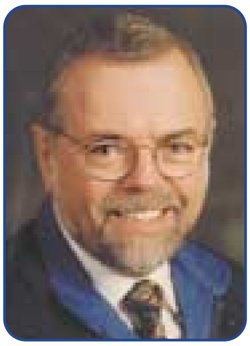

Daniel T Jones and Arthur David

A fundamental shift in thinking about production has swept the industrialised world over the last decade. Instead of focusing on optimising the use of individual assets - from pieces of equipment to departments, to whole plants - production managers began to look instead at optimising the process path followed by different product families through their plants. If they managed to make the product flow through each value-creating step from door to door with minimal interruptions, then lead times and inventories could be cut, while at the same time cutting defects and eliminating lots of costly wasted steps and human effort. Repeat this along the whole supply chain and end customers should see very significant improvements in quality, costs, delivery and responsiveness.

The trigger for this change of thinking was the arrival of Nissan in Sunderland in 1986, followed a few years later by Toyota and Honda. They quickly began to demonstrate that the process-focused approach developed in Japan could be followed in the UK with similarly striking results. Moreover they also began to teach their local suppliers how to follow their example. At the same time benchmarking studies of car assembly and component manufacturing began to reveal the scale of the performance gap and the process oriented logic that lay behind it. This approach was labelled Lean Production or Lean Manufacturing, though it clearly embraces key elements of Total Quality (the latest version of which is 6 Sigma) and Total Productive Maintenance.

The UK government became concerned to spread this thinking through the automotive supply chain as fast as possible. They encouraged and financed the establishment of the SMMT Industry Forum, a unique industry-wide collaborative venture to train a group of experts in accelerated process improvement by doing it on the shop floor under the guidance of Master Engineers lent by Nissan, Toyota, Honda, GM and VW. Industry Forum has also distilled a common approach to process improvement, which is described in this booklet. Their activities have now spread well beyond the car industry, to industries as diverse as aerospace and ceramics and other countries are looking to set up their own equivalents of Industry Forum.

Getting started down this process improvement path is not difficult - dramatic improvements can be made in individual activities within a matter of days. However spreading this across the plant and linking islands of improvement up and down the supply chain needs patience and perseverance. Changing the hearts and minds of everyone involved takes time and sustaining improvements over time is not easy. This is the key challenge if the substantial gains from accelerated process improvement are to be realised - to the benefit of customers, employees, shareholders and the country at large. This booklet summarises the results of a unique research project carried out by the Lean Enterprise Research Centre at Cardiff University Business School in collaboration with the SMMT Industry Forum, to understand what it takes to spread and sustain process improvement. Its conclusions should be of intense interest to anyone embarking on this path to improved competitiveness.

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introduction

In this booklet we provide guidelines to help you conduct sustainable Process Improvement (PI) activities. Initially, the structure of the Industry Forum MasterClass is outlined and practical advice on how to conduct PI is provided. We also outline a model of sustainability of PI activities to provide a vision for companies that are beginning improvement programmes.

The booklet is intended for companies that have taken part in Process Improvement activities and are currently conducting their own activities or plan to do so in the future. Although based on the Industry Forum MasterClass programme, the information and principles it contains can also be applied to many other improvement formats.

This booklet is based on research conducted by the Lean Enterprise Research Centre (LERC) at Cardiff University for the Society of Motor Manufacturers and Traders (SMMT) Industry Forum. The purpose of this research was to identify those enablers that are important for sustaining Process Improvement activities such as MasterClass.

This booklet translates the findings of the research into guidelines for use by Change Agents and Champions in companies, and outlines practices that are likely to sustain Process Improvement activities.

Definition:
Change Agent: This is defined as the person who deals with improvement issues on a day to day basis and co-ordinates the improvement activities.

Change Champion: This is defined as the person usually at director level, who has initiated the improvement programme and who has ownership for the programme at the highest level.

2:00

THE MASTERCLASS PROCESS

This section describes the MasterClass process and outlines the purpose of each part of the MasterClass.

Figure 1 shows a diagram of the MasterClass process.

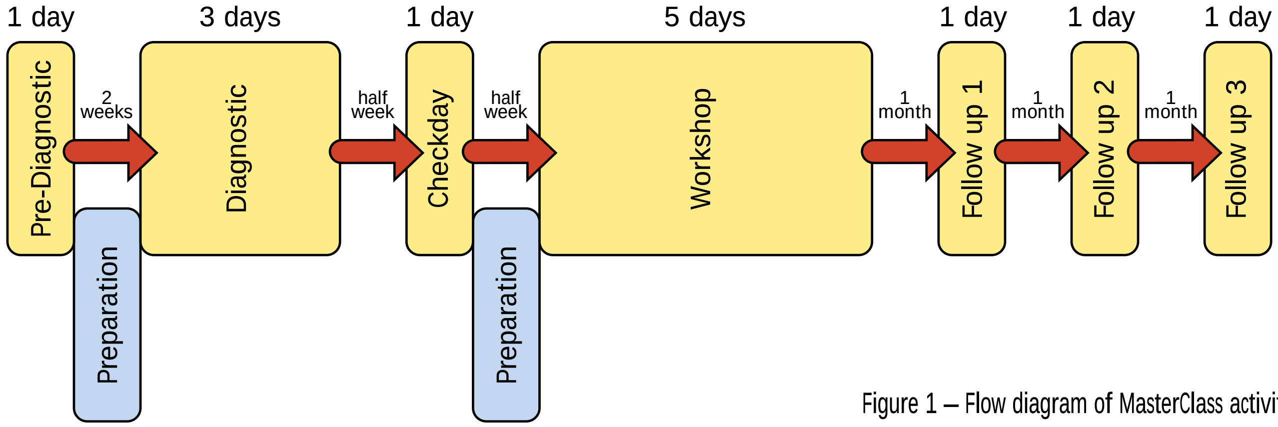


Figure 1 – Flow diagram of MasterClass activity

2.1 PRE-DIAGNOSTIC

This initial phase involves a one-day visit from an IF engineer. During the pre-diagnostic phase, the area is selected in which the improvement activity should be focused, called the ‘model area’. The IF engineer also ensures that data necessary to identify the current situation in the model area is available. If it is not, appropriate measures are put in place to gather the data.

A typical pre-diagnostic will include a factory tour of the suggested area and discussions with the most senior person on site to establish expectations and the level of support for the activity.

It is also important to establish how the personnel will be treated who, as a result of the activity, are released from their normal jobs.

2.2 DIAGNOSTIC

The MasterClass programme can only result in real and sustainable progress if companies know where they are starting from, and have an effective benchmark against which to measure improvements.

The aim of the diagnostic phase is to identify all potential areas for improvement within the model area. This is achieved by collecting and analysing data. Using this data, the team must then prioritise and select from the potential areas.

The team working on this activity will be introduced to the 7 Quality, Cost and Delivery measures (DTI 1998). These will be established from the data available. The analysis depicts the current situation and provides a benchmark from which the improvements achieved in the workshop can be measured. The QCD figures also allow comparison with existing business measures.

As part of the diagnostic phase, the team will learn techniques for data analysis, such as pie and Pareto charts, and will use them to generate data trails (Figure 2). These take a Quality, Cost or Delivery (QCD) result and trace the information down to lower levels of data to establish specific areas for improvement. They also establish the potential impact of these improvements on the original QCD measure.

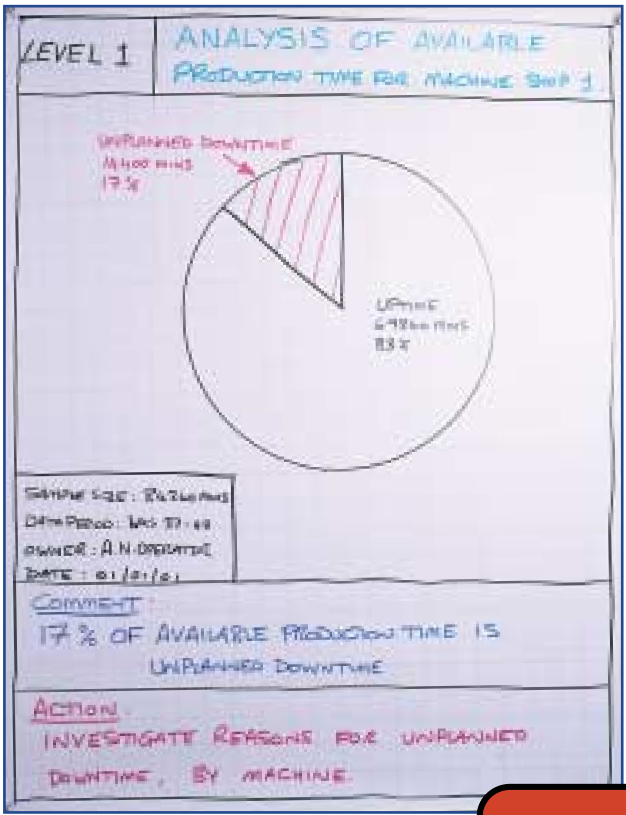
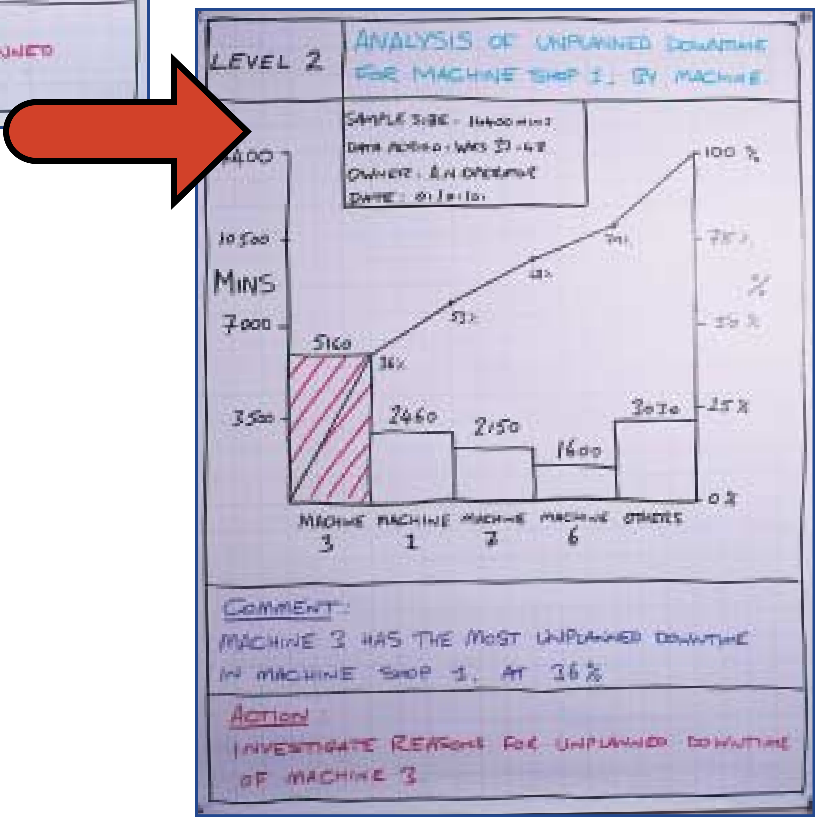


Figure 2-Data trail for machine availability



Once the potential areas for improvement have been identified, the team must decide on which area it wants to concentrate. This decision should be based not only on the size of the predicted saving, but also on the team's ability to deliver the improvement within the workshop period.

During the diagnostic phase the team will also learn about the building blocks of continuous improvement. This will give them an overview of the elements of improvement activities, as shown in Figure 3.

On the final day of the diagnostic phase, the team will make a presentation to its management team and other interested groups. This will give the team a forum in which the members can describe their intended activity and gain management support. At this stage, targets should be set for the workshop phase so that the degree of success can be checked.

2.3 CHECK DAY

The aim of the check day is to ensure that any actions needed before the workshop are being progressed and the resources necessary for the workshop are available. Preliminary data can also be evaluated for its relevance and quality, and to establish whether further data will be required before the workshop begins.

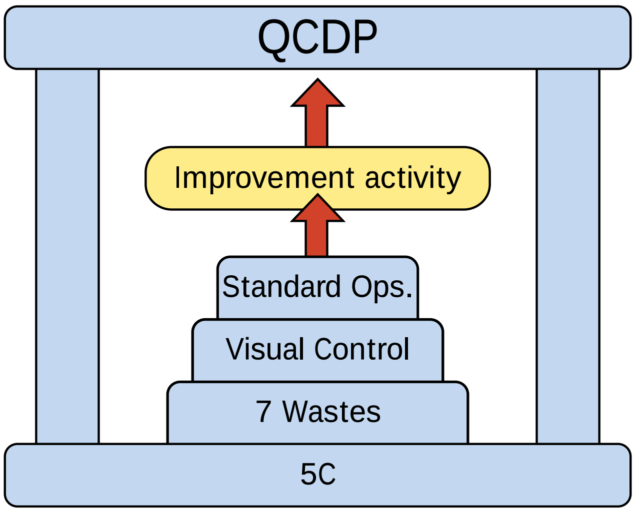


Figure 3 - Building Blocks for Continuous Improvement

2.4 WORKSHOP

Once the diagnostic phase has identified the areas where improvements can be made and targets set against the relevant measures of QCD, the MasterClass moves on to the workshop phase.

The aims of the workshop are to complete the agreed improvement activity and to achieve the targets set by the team during the diagnostic phase. During the workshop phase the team has the opportunity to apply the building blocks outlined in the diagnostic phase.

The workshop is a 'learning by doing' activity. The team will be guided by the IF engineer who will ensure a structured approach to improvement following the Plan, Do, Check, Act cycle shown in Figure 4.

During the workshop phase, the IF engineer will show the way that improvements can be made. However, it is the team's responsibility to actually make the improvements, and it is only their ideas that will be implemented. At the end of each day, the team will review its progress and learning. All outstanding tasks and further improvement concepts that have developed during the workshop will be captured and recorded as problem follow-up lists.

At the end of the week, the team will make a presentation to the management team and other interested groups. This presentation will show the improvements achieved and progress made towards the target. It will also include a roll-out plan developed by the team showing its plan for completing outstanding tasks, monitoring the improvements made during the workshop, and plans for future activities. This is the point at which the management team agrees resources to facilitate the plan.

2.5 FOLLOW-UP STAGES

Any improvement resulting from the workshop phase is only effective if it is sustained. A tailored follow-up programme, spread over several months, provides the support to ensure continuous sustained improvement.

Initially, the aim is to check that the improvements made during the workshop phase have not only been maintained but are meeting the targets set. The IF engineer will review the activity and establish the level of compliance with the roll-out plan. This is also the time to ensure that the team has retained the support of the activity's Champion.

The improvement team's level of understanding in some areas may be also reviewed and, if necessary, reinforced by further teaching by the IF engineer. The team will then establish further targets. Problems will be discussed and the IF engineer may, if necessary, discuss these with the Champion to ensure that the team continues to receive adequate support and motivation.

During the follow-up period, management of the change process transfers from the IF engineer to the improvement team.

2.6 POST FOLLOW-UP

After all the follow-up stages have been completed, the IF engineer will stay in contact with the Change Agent to offer continuing advice and support.

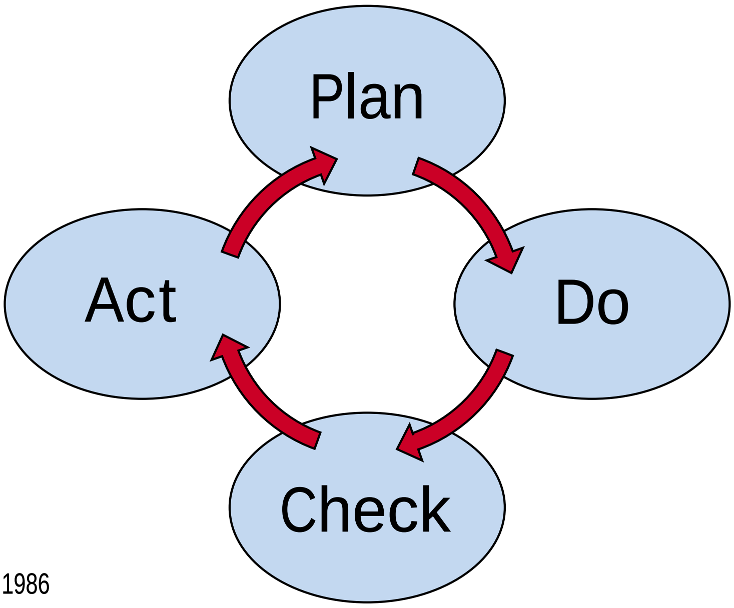


Figure 4 - PDCA cycle: Deming 1986

3:00

A VISION FOR YOUR ACTIVITIES

Improvement activities have different levels of sustainability. This section outlines a model for sustainability, identifying five classes of Process Improvement activity each reflecting a different level of sustainability. This allows Change Agents to track the success of their activities and have a vision of their potential.

3.1 A MODEL FOR SUSTAINABILITY

Figure 5 shows the sustainability model, which was developed by following the various stages of an improvement activity and considering the different outcomes in terms of sustainability at each phase.

During the workshop phase, activities consistently achieve an improvement, so all the classes of activity are shown with an increase in improvement. During the follow-up period, companies are trying to do two things:

1. Maintain the new working methods developed during the workshop.
2. Close out technical issues identified in the workshop.

Class A and B activities achieve both of these and class E activities fail to achieve either.

Class C activities maintain the new work methods but fail to close out technical issues. So only the level of improvement achieved during the workshop is maintained.

Class D activities do the opposite, failing to maintain the new methods of working but closing out technical issues. This results in an activity that shows some improvement but fails to exploit fully the potential of the improvement activity.

A summary of the definitions of the classes A to E is shown in Table 1.

During the Post Follow-up phase Class A activities continue to improve and Class B activities maintain the current situation. Continuous Improvement takes place when the team uses the tools and techniques learned during the MasterClass programme to solve new issues and to improve further the performance of the model area. The activities that achieve this are defined in the model as Class A activities

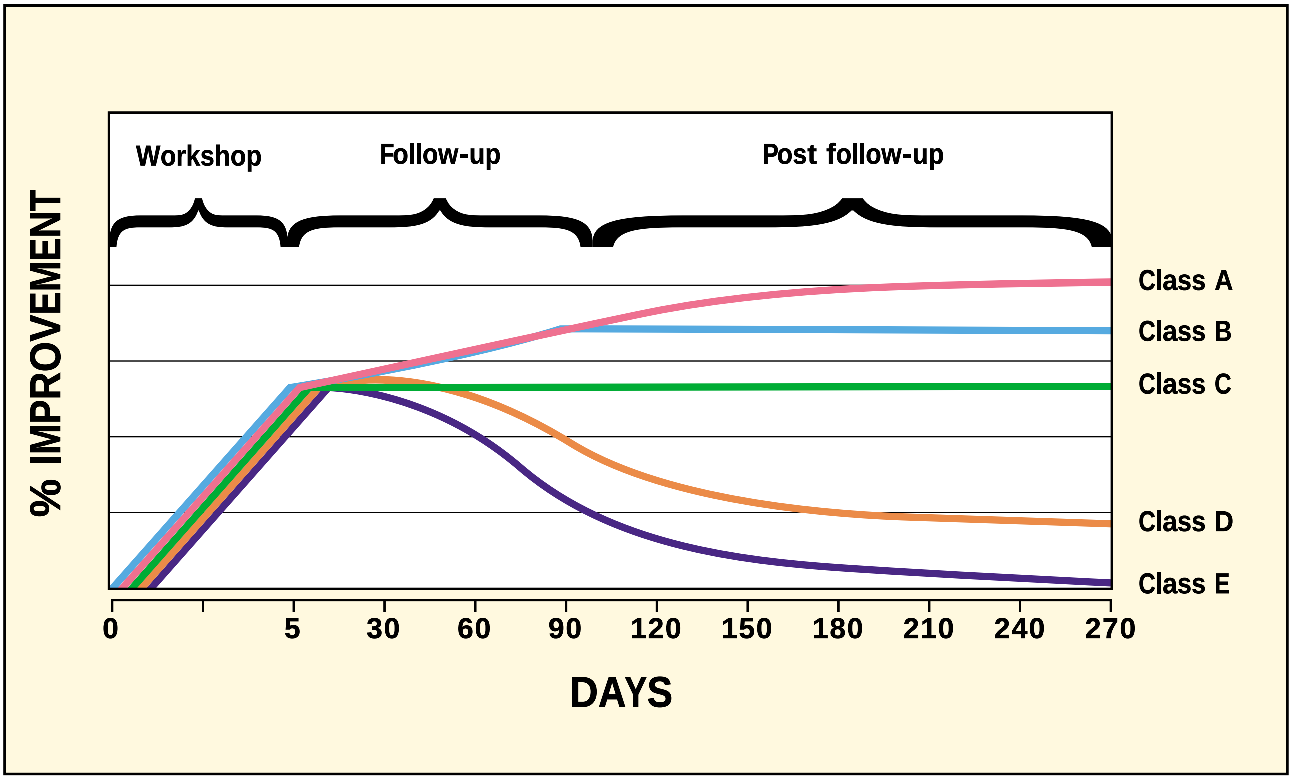


Figure 5 - Sustainability Model

Classification	Improvement in workshop?	Maintain new procedure?	Close out technical issues?	Continuous Improvement?
Class ‘A’	✔	✔	✔	✔
Class ‘B’	✔	✔	✔	✘
Class ‘C’	✔	✔	✘	✘
Class ‘D’	✔	✘	✔	✘
Class ‘E’	✔	✘	✘	✘

Table 1 - Summary of sustainability classes.

4:00

CONDUCTING PROCESS IMPROVEMENT ACTIVITIES

Outlined in this section is practical advice for conducting successful Process Improvement activities. It is aimed at Change Agents who plan to run their own improvement activities.

4.1 THE NEED TO IMPROVE

It is essential for Change Agents to understand and interpret the need for the improvement activity in the day-to-day language of each individual involved. For example, if a company needs to improve its flexibility and speed of response for certain product lines, it may mean shorter changeover times and less work in progress. The greater the sense of urgency throughout the organisation to meet this need, the faster will be the implementation of change. The Change Agent must ensure that the improvement team fully understands and appreciates the need.

- Make the need to improve a tangible requirement.
- Instill a sense of urgency.

4.2 PLANNING AND RESOURCES

The Change Agent must make a thorough plan of the overall resources required to conduct an improvement activity, including people, time, machinery or shop floor equipment and a meeting room. It will need to include planning for the loss of production and removing key operators, maintenance personnel, team leaders and other support function staff for the entire period of the improvement activity. The plan should not involve these individuals being expected to make up the time spent on the activity. That will only cause resentment. It should, however, detail machinery or cell downtime periods for practical activities and time for the team's feedback to managers.

It is important to communicate this plan to the management team and clarify its support and commitment at the outset - at the pre-diagnostic stage, for example. Also, seek evidence of the managers' commitment in establishing contingency plans for production output and attendance at the presentations. In addition, identify at least one senior manager who will maintain a close link to the progress of the activity by attending some of the informal end-of-day reviews, for instance. This will help the change process within the management team. This person will also understand and assist with any wider implications to the company.

- Plan the activity in conjunction with the senior management team.
- Get proactive management support during the activity.

4.3 TEAM STRUCTURE

The make-up of the improvement team should reflect the resources within the model area and those that support it. With between six and ten members, the team should, therefore, comprise operators, support staff and maintenance personnel, with the emphasis on employees directly concerned with the model area.

- Form a cross-functional team.
- Include key shop floor personnel from the model area.

4.4 ACTIVITY DIRECTION AND PACE

Once the activity is under way, it is important for the Change Agent to maintain a clear understanding of the ideal goal and direction for the activity. Although it is not important for the team to trace the ideal direction precisely, the Change Agent must recognise when the team needs to be brought back on course. This means introducing and applying the relevant tools and techniques at the right time so that the team can relate the theory to the appropriate practice.

The Change Agent must balance the needs and desires of the team with the expectations of the management team to maintain enthusiasm while retaining accountability and credibility during the activity. The effective use of the cross-functional team will help to identify any artificial barriers that may already exist. These can then be exploited to draw the team together. This is a good time to reaffirm that it is the shop floor that generates the revenue and the operators who are the real experts.

Although the Change Agent should be in overall control of the pace and direction of the activity, care must be taken not to stifle creativity, to move on too quickly nor to force solutions on to the team. Instead, the Change Agent should encourage the team to look at things from many different viewpoints, develop problems and explore their implications. In effect, the facilitator should help the team to sell both their problems and their improvements to their colleagues and supervisors.

- Paint the ideal picture.
- Make the journey simple and fun.

4.5 MOVING FORWARD

Once the workshop stage is complete, some items that have not been resolved, or further ideas for building on the improvements already made, must be logged formally. This can be done using problem follow-up sheets and the progress of each item tracked according to its priority. Complete a roll-out plan and seek approval at the management presentations for the resources needed to complete the actions.

- Log all unresolved issues.
- Manage the ongoing plan.

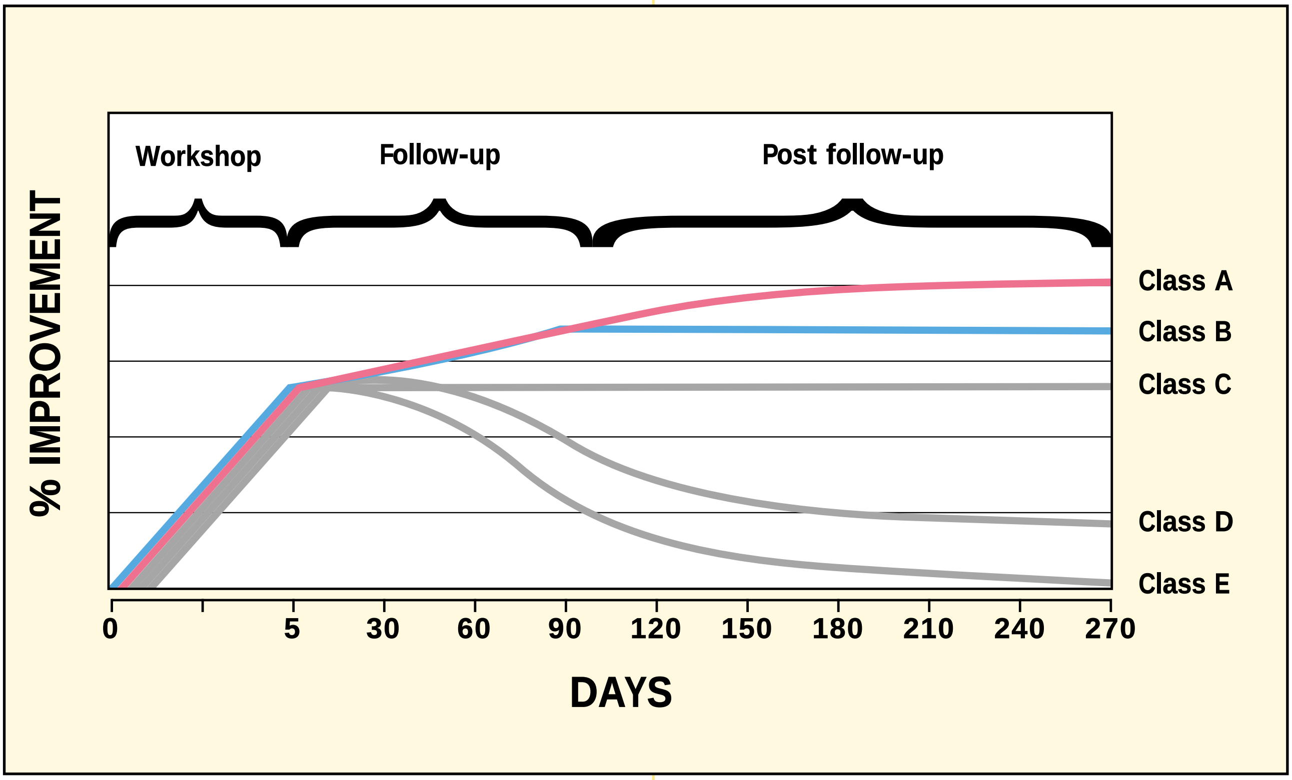
5:00

ENABLERS FOR SUSTAINABILITY OF PROCESS IMPROVEMENT ACTIVITIES

This section outlines the enablers for sustaining your Process Improvement activities. Divided into two sections, the first identifies five enablers for getting the most out of your activities. These enablers are associated with achieving at least a Class B activity. The second section examines five enablers to assist the improvement team in moving on to Continuous Improvement once the initial Process Improvement activity is complete. This is defined as a Class A activity in the sustainability model.

To help with implementing each of these enablers, an engineer from Industry Forum has added comments.

The enablers in this section were derived from research into forty improvement activities. As part of the research process, the enablers associated with Class A and Class B activities were identified.



ENABLERS FOR CLASS B ACTIVITIES

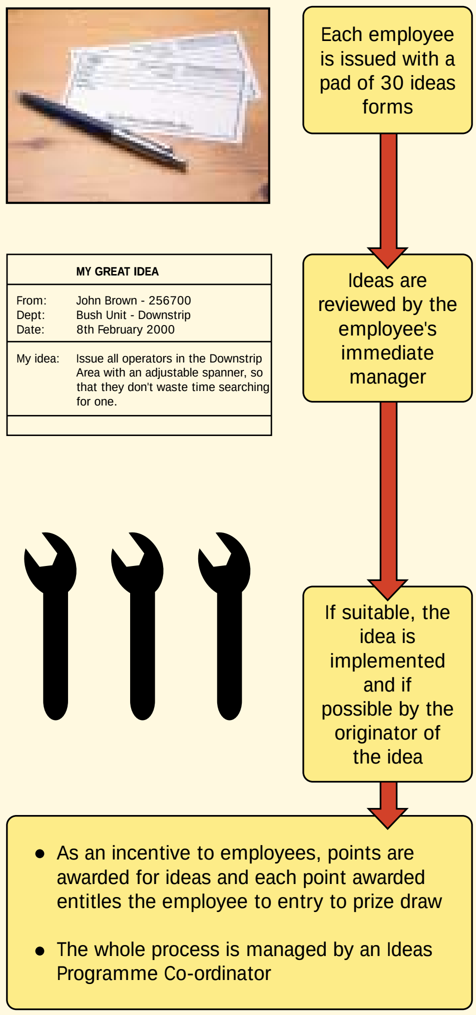
“Getting the most out of your Process Improvement activities”

There are two areas covered by the five enablers described in this section:

1. Contribution and buy-in by the improvement team.
2. Maintenance and focus on the improvement activity.

5.1.1 CONTRIBUTION AND BUY-IN FOR IMPROVEMENT TEAMS

This section is concerned with making sure that the people who work in the focus area can contribute to the way in which their area is operated. This allows the team members to contribute their skills and knowledge and to have ownership of decisions. The implementation of these two enablers takes place after the workshop, during the follow-up and post follow-up period.



Enabler 1

- There should be a formal way of documenting ideas from the shop floor.

The important aspect of this enabler is that documenting ideas should be done using a *formal* process. This is important because an informal process such as such ‘telling my supervisor’ is not robust. If, for example, the supervisor or team leader is distracted by other events or is replaced by another supervisor who is, perhaps, not so receptive, the process of noting operators’ ideas can break down.

ENGINEERS COMMENT

A formal process should not be too onerous. Examples include using a flip chart where operators can note their ideas. The flip chart is then reviewed by the team leader or supervisor.

Another example is from a company that has developed specially printed note pads, which are issued to employees. Employees use the note pads to jot down their ideas and these are then reviewed by managers. This process is shown in Figure 6.

The review element of the process is crucial as it forms the check part of the Plan, Do, Check, Act cycle.

The next stage is to prioritise and implement appropriate ideas.

- *Devise an easy way for collecting ideas.*
- *Review these ideas, take action on them and feed back the results.*

Figure 3 - Building Blocks for Continuous Improvement

Enabler 2

- Ensure that operators can make decisions in a team about the way they work.

For this enabler the importance of working in teams is highlighted. The companies that had lower levels of sustainability either had operators who were not allowed to make any decisions or operators who all made decisions independently, resulting in a chaotic situation. Instead, decisions should be made with contributions from all the people who work in the area. This allows knowledge to be pooled and lets everyone working in the area understand what is being implemented and why.

ENGINEERS COMMENT

Standardised Operations is an area where it is often difficult to get operators to make group decisions. The example described below outlines the action of a company which encountered these problems.

The model area comprised a number of complex assembly operations and required a great deal of operator skill and dexterity. The managers noticed that some assemblers were more able to hit targets than others on the most difficult stages. Some operators were, therefore, identified as specialists, and managers used them wherever possible at that assembly stage.

However, this created several problems:

- *Some operators were seen to be getting preferential treatment.*
- *Absenteeism was very difficult to cope with.*
- *Output was dependent on who was in rather than the number of people in.*
- *They risked failing a QS audit, as their standard operation became less and less accurate.*
- *Training was inconsistent.*

In conjunction with a MasterClass activity, the decision was taken to rewrite the standard operations and to reinvent the way they were generated.

One assembler, who was chosen for her open-mindedness, was taken from the area and asked, with the assistance of a Quality Inspector and the Process Engineer for the area, to write a rough draft of what the standard operation should be. At first the assembler was very nervous about writing down a method which she believed might be imposed upon her peers. It was necessary to talk her through the whole process to gain her confidence.

Having created this first draft, a meeting was set up for the whole assembly team and the operations director. The Change Agent chaired the meeting and gave a speech which recognised the operators as the experts in their area. He explained the difficulties that non-standard working had caused them, and how the operator had been asked to generate a first draft of the new standard operation. A heated discussion followed, centred on everyone having his or her own best methods and how they could not be changed.

The Change Agent used his skill to redirect this passion into distinct problems with the detail of the proposed standard operation. The standard operation was updated during the meeting.

At the end of the meeting, the Operations Director thanked everyone for their expert input. He requested, in strong terms, that they all adhere to the updated draft for two days and that they make a note of anything that was wrong with it. He also told them that any slight fall off in production would no doubt be due to the new standard operation. Another meeting was set for two days time.

At the second meeting the Operations Director was not present. The tone of the operators was very much 'I told you so', but the Change Agent used this momentum to update the document again. Some items had two or more operators suggesting their method was easier. This was dealt with on a simple show of hands to decide which method to try first.

At the next meeting the tone was much more pleasant as:

- *Some of the new methods had made the job easier.*
- *The team members felt that they were being listened to.*
- *They knew that the meeting would not be used to blame people.*
- *They knew that if they did not like the methods proposed they could change them again, after a fair trial.*

The meetings were held monthly and became progressively shorter. The aim was to attend the meeting having discovered a new easier, safer, quicker method to share with the team. Standard Work Combination Tables (Figure 7) were introduced with the blessing of the operators as a way of reviewing which ideas had saved time and effort, and which had not.

The standard operations are now adhered to and reflect the current best practice. The operators own the standard operation and use it to generate continuous improvements.

- Involve operators and use their expertise.
- Encourage ideas to be trialed.

Standard Operation Procedure

Standardised Work Combination Table

Figure 7 - Standard operations Documentation

5.1.2 MAINTENANCE AND FOCUS

These enablers are based on maintaining the improvement level achieved in the workshop and ensuring that the team members and their managers remain focused on the improvement activity.

Enabler 3

- Make sure that there is time dedicated to maintaining the 5C standard every day.

The nature of 5C as the foundation of Process Improvement means that it is important for the 5C standard to be maintained. The 5C condition should, therefore, be checked each day or shift and brought up to standard if necessary. This should be done as part of a formal process and time should be allowed to ensure that it happens. Typically, this could be at the start or end of a shift, or within the process cycle if there is operator idle time.

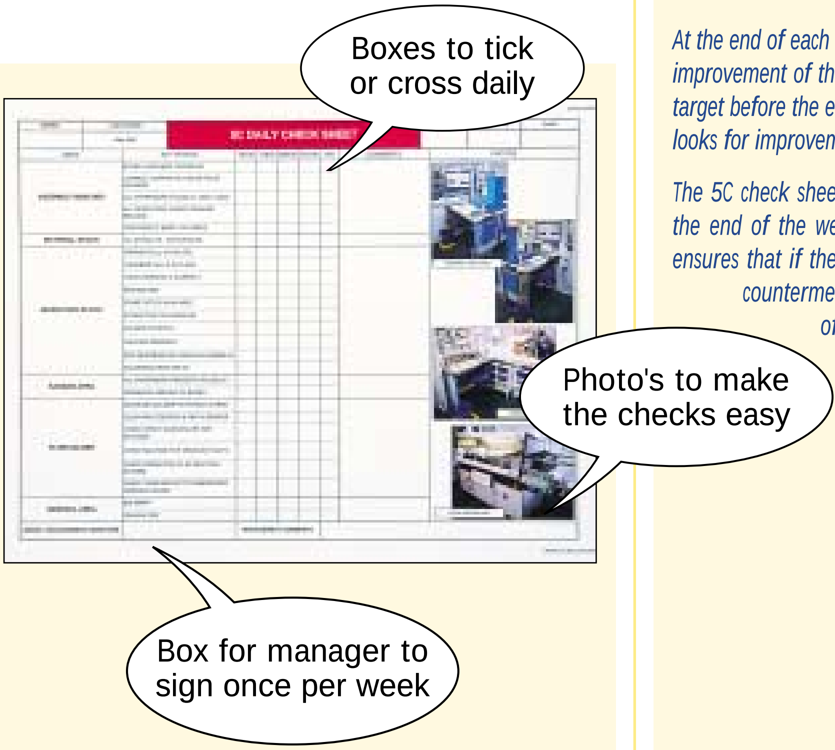


Figure 8 - 5C checklist

ENGINEERS COMMENT

In this example a set of 5C check sheets for the model was created.

These check sheets were developed by the operators. They reflect not only where items should be configured and the cosmetic condition of those items, but also include many issues that the operators raise with their team leader or maintenance (Figure 8). This includes many niggles, such as vacuum cleaner availability and repair, and room temperature acceptability. By including the types of item that concern operators, 'buy in' is more likely.

The operator checks the 5C condition at the start of each day using the check sheet. Any unacceptable conditions (crosses) are highlighted to the team leader before work begins. The team leader must decide whether work can begin or that the condition warrants immediate attention. Whatever the decision, the problem should be eliminated before the next shift.

At the end of each day, ten minutes is allocated for maintenance and improvement of the 5C condition. If the team reaches its production target before the end of the day, 5C work begins early and the team looks for improvement activities within its area.

The 5C check sheet that the team designed lasts for one week. At the end of the week it has to be signed off by a manager. This ensures that if the team is constantly reporting a problem and no countermeasures are apparent, the manager will be aware of it. This removes blame from the operators in the area and puts the pressure back on to the team leader to resolve the problems or action someone else to resolve them.

- Make 5C benefit everyone.
- Designate time for 5C.

Enabler 4

- Ensure there are measures to monitor the improvements made - at an appropriate level.

This means monitoring the specific improvements made during the workshop and the measure it is intended to improve. So if, for example, the workshop was focused on reducing set-up time, the set-up time during normal production should be monitored.

ENGINEERS COMMENT

In the example shown in figure 9, the company wished to make improvements in OEE.

This was achieved during the workshop by reducing set-up time to 20 minutes. It was then monitored until the team was confident that the target could be achieved - a period of about two months. The effects of this set-up reduction were also monitored by calculating machine availability and OEE.

- *After the workshop, directly monitor the improvements made.*
- *Make data visual, real time, and close to its source.*

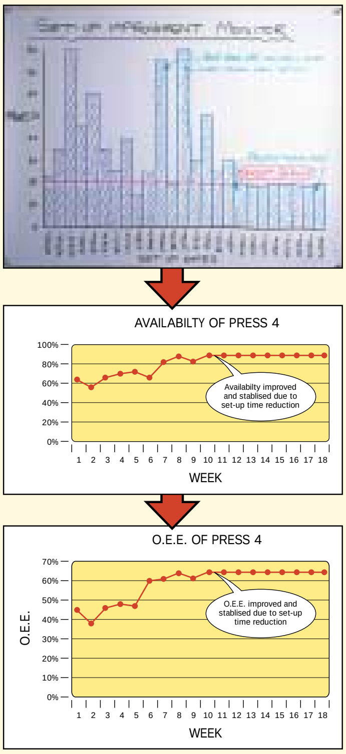


Figure 9 - Data monitoring set-up time and its effect on OEE.

Enabler 5

- Managers (cell leader and his or her manager) should stay focused on PI activity.

This supports the previous enablers. It means reviewing the performance monitors and, if the expected improvement is not achieved, investigating why. It also means reviewing operator suggestions and dealing with any issues or problems that arise because of the new way of working.

ENGINEERS COMMENT

This is best achieved by giving the cell leaders responsibility for achieving targets. Process Improvement then becomes their method of achieving their goal. In order to use the correct PI tool, they will require data and operator feedback. Lack of ownership of the improvement process by the operators, team leaders or managers, will promote acceptance of the status quo. As the 5th Spirit of continuous improvement states (see Figure 10) 'Improvement is infinite. Better is not good enough'.

- *Set improvement targets.*
- *Make people responsible for reaching targets*

Process Improvement Spirits

Challenge all fixed ideas!
Do it now, no excuses!
Use your wisdom, not your money!
Get to root cause by asking why five times.
Improvement is infinite, better is not good enough!

Figure 10 - Process Improvement Spirits.

5:20

ENABLERS FOR CLASS A ACTIVITIES

"Moving on to Continuous Improvement"

This section deals with the enablers associated with Continuous Improvement. That is, after the follow-up stage in a MasterClass, going on to use the tools and techniques associated with Process Improvement on an on-going basis. There are three areas covered by this section:

1. Consistency and buy-in.
2. Strategic Direction.
3. Factory Level Support and Focus.

5.2.1 CONSISTENCY AND BUY-IN

Enabler 1

- Changes to operating methods of the cell should be formally introduced to all cell members.

This is required because not all people who work in an area can usually take part in an improvement activity. There should, therefore, be a formal training session for all the people who work in the focus area to ensure that they are fully aware of the new ways of working. This training could consist of new standard operations, what is required to fulfil the 5C standard, and so on. It can be achieved by a short presentation or hands-on training by the operators who were involved in the improvement activity.

ENGINEERS COMMENT

There are two levels of training that cell members must be taken through when they need to change their operating methods. The first is general training in the theory and benefits of, for example,5C or standard operations. This ensures that everyone gains a common understanding of the techniques, rather than this knowledge remaining with the enlightened few on the improvement team. This training should be followed up by the introduction to the cell of the initial issue of a 5C check sheet or standard operating procedure.

The second is a more specific level of training required when there is an up-date of the 5C check sheet or standard operating procedure. This level of training is a more regular event and occurs whenever specific instructions are changed.

It is important that all cell members go through level one training first. In both cases, however, it is important to keep records, such as updated skills matrices, to ensure that all cell members have received training in the latest methods and can demonstrate that they are working to them.

- *Ensure cell members understand the reasons for the change.*
- *Update training records based on evidence that cell members are working to the new standard.*

5.2.2 STRATEGIC DIRECTION

Enabler 2

- The cell should have a strategy.

As part of the Continuous Improvement process, the team will solve issues and problems associated with the area. Initially the members will tend to deal with issues that already have high visibility. For example, issues raised during the diagnostic phase but due to time constraints were not dealt with during the workshop phase, or issues that suddenly become a problem, such as an incoming material quality problem.

After this initial resolution of imminent issues, the team will need direction on which issues should be tackled next. This is where a strategy for the cell can be helpful. It should provide direction for the Continuous Improvement team so that it can focus on issues that support the cell.

ENGINEERS COMMENT

An example of this enabler comes from the use of a customer's ramp-up plan to drive the goals and targets for the improvement activity. Although the activity began with the outstanding problems and issues surrounding the existing operations, the long-term strategy for the cell was to double the output over a three-month period. This could be managed in the short term by working overtime and increasing the labour availability. However, in the longer term the strategy was to incorporate this new demand into the normal running of the cell.

The operators' improvement activities supported two needs:

1. *To solve the day-to-day running problems faced by the operators.*
2. *To double the output of the cell.*

The improvements therefore met the needs of the operators and the strategy of the management team. This resulted in the operational issues being resolved and given full support by the senior managers which, in turn, motivated the operators to achieve the longer-term strategic goal of doubling output.

- *Obtain long-term goals for the cell from senior management.*
- *Update the goals annually.*

5.2.3 FACTORY LEVEL SUPPORT AND FOCUS

There are three enablers associated with this area. All of them provide more infra-structural support for Process Improvement activities.

Enabler 3

- There should be a person co-ordinating PI activities across the factory.

The co-ordination role is defined as requiring at least 30% of a co-ordinator's time. In larger companies a full time PI co-ordinator is required. This person, called the Change Agent, should not be executing the improvements but facilitating and aiding cell leaders and improvement teams.

ENGINEERS COMMENT

The Change Agent is often appointed as the improvement co-ordinator for the whole factory. This proves most effective when the role is a dedicated one and he or she reports to the management team. The role of the Change Agent is to plan and facilitate the long-term roll-out of improvement activities. The plan involves identifying model areas, teams and time schedules for improvement activities, and agreeing these with the management team, with the planning horizon extending 6-12 months in advance. Facilitating involves providing the improvement team with direction, training and resources, including the removal of barriers to change. The Change Agent must also identify other potential trainers who can support the facilitating role.

- *Appoint an improvement co-ordinator with factory-wide objectives.*
- *Ensure the co-ordinator is fully supported by senior management*

Enabler 4

- Senior Managers should be involved in improvement activities.

In addition to the improvement team, senior managers such as the Operations and Managing Directors should be involved in PI activities. This can be achieved by attending the presentations that are part of improvement activity and by looking at how Process Improvement and Lean principles can be integrated into the organisation of the company. It is not proposed that senior managers attend all activities, but taking part in at least one activity will greatly improve their understanding and give a message of commitment.

ENGINEERS COMMENT

The senior management team should be:

- *Formally involved in the activity at the initial meeting to agree the model area and possible focus activity.*
- *Attend feedback presentations following the diagnostic and implementation stages.*
- *Attend key milestones of the follow-up programme.*

There should also be an informal senior management presence during the activity to keep abreast of progress and the overall direction of the team, attending some of the evening reviews for example. This helps with the implementation of changes and the wider implications of the improvement ideas beyond the shop floor.

A visible sign of senior management commitment would include being present during the application of some improvement tools. During a problem-solving brainstorming session, for example, or as a supplementary team member at a 5C activity.

- *Set up a rota for senior managers to participate in improvement activities.*
- *Ensure senior managers attend key presentations.*

Enabler 5

- Senior managers should stay focused on PI activities.

Maintaining focus should be achieved by reviewing the progress of the shop floor as a whole, not by imposing unnecessary additional initiatives and, as far as possible, protecting improvement activities from external interference. Focus can also be maintained by having some aspects of improvement activities as part of the performance measures for the factory.

ENGINEERS COMMENT

Companies that go on to sustain class A activities do so with very strong, consistent commitment to the programme from the senior management team. This means that reviewing PI activities becomes part of the monthly management review agenda, with the results of individual activities reported alongside their original objectives. During the meeting, resources for future activities will be agreed and lessons learned from the performance of past activities. This ensures that there is an overall PDCA cycle for the PI activities.

- *Ensure improvement activities are always on the management review agenda.*
- *Quote targets for improvement activities and report results at review meetings.*

6:00

CONDUCTING YOUR OWN ACTIVITIES

Conducting your own activities is the best way to develop your Process Improvement capabilities. Many companies, having completed one or more MasterClasses, go on to conduct their own activities. Of the companies that took part in the research, 85% went on to do so.

Adapting the Industry Forum approach to your own company needs, and taking note of the guidelines outlined in section 4 is a good starting point for PI. The enablers outlined in section 5 should increase the chance of sustaining your activities. Along with the methodology of the IF MasterClass, this should give a robust approach to Process Improvement.

7:00

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8:00 REFERENCES AND FURTHER READING

8.1 REFERENCES

Deming, (1986): *Out of the Crisis* MIT Cambridge Mass.
ISBN 0 911379 01 1

Dti (1998): *Quality Cost Delivery. Seven measures for improved competitiveness in manufacturing industry.* Department of Trade and Industry March 1998 URN 98/629

8.2 FURTHER READING

For a good background into Lean Operations:
Womack, J. and Jones, D. (1996): *Lean Thinking.* Simon & Schuster New York. ISBN 0-684-81035-2

For reference books on the tools and techniques;

Bicheno, J (1998): *"The Quality 60"* Picsie Books Buckingham
ISBN 0 95 138297 7

Bicheno, J (1998): *"Lean Toolbox "* Picsie Books Buckingham ISBN 0 95 138299 3. Available at http://www.axiom.co.uk/picsie

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