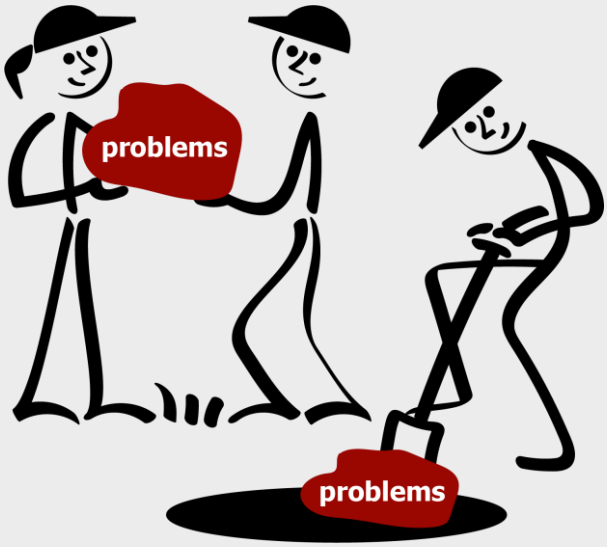
Lean Enterprise Academy

4 Step Rapid Problem Solving

Understanding: Skill Level 2



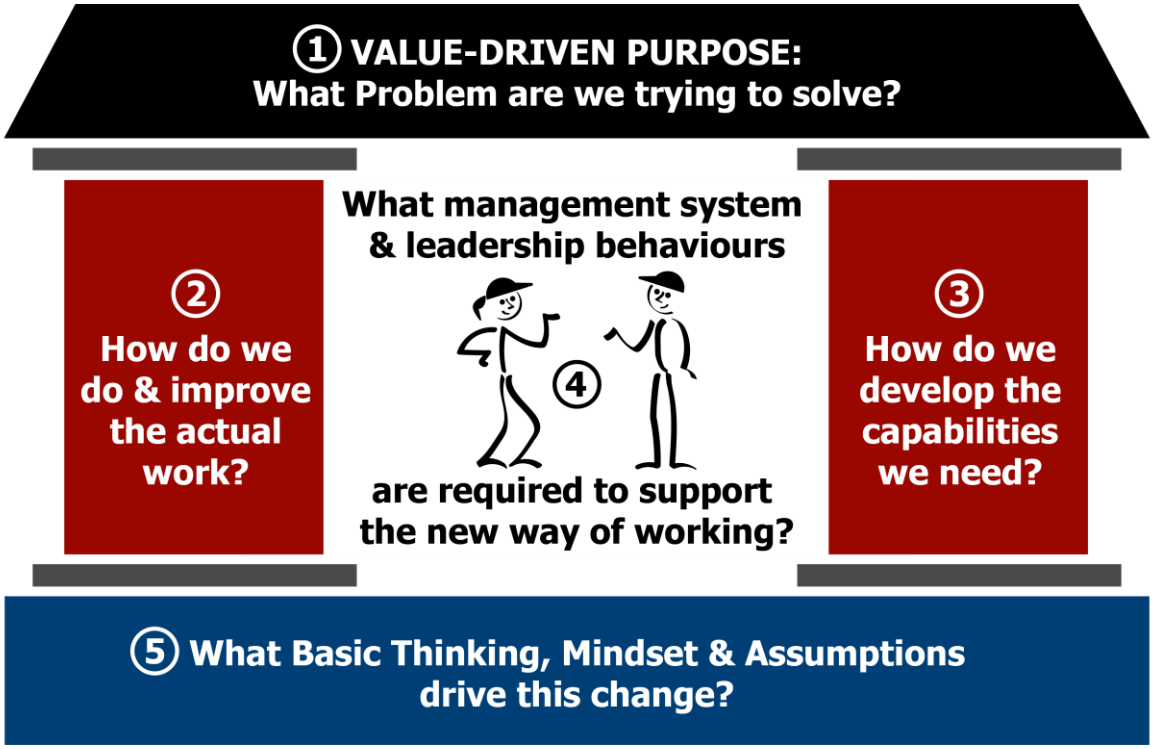
Teach Poster Facilitation Guide

LEARN | TEACH & COACH | SHARE

Ver 1

Developing your Lean Journey

The **Lean Transformation Framework (LTF)** helps determine the best lean journey for your situation. Based around five questions, it starts by asking "What problem are we trying to solve?" We use the LTF to help decide how to support your needs and progress your lean journey.



To understand how we can support you on your **Lean Learning Journey** visit our website www.leanuk.org. We have a range of products and services that you and your organisation can use to become self reliant at Lean thinking and practice.

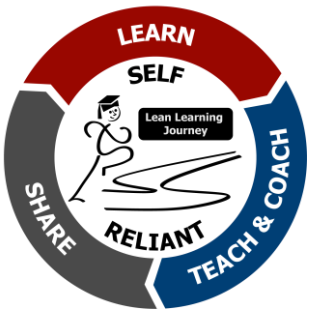
Lean Enterprise Academy®

Lean Enterprise Academy

Congratulations and thank you for purchasing and/or downloading this material from the Lean Enterprise Academy.

At the Lean Enterprise Academy we help our customers develop their capability by providing products and support using three core processes: Learn, Teach & Coach and Share. We know from practical application that skill/capability development is best described as a journey. Therefore we have developed a guided learning path called the Lean Learning Journey.

The Lean Learning Journey process is based around Four Skill Levels; Knowledge, Understanding, Capable and finally, Can Do Well and Teach & Coach Others. Our aim is for you to become self reliant on your Lean Learning Journey so that you can share your learning, develop others in your team/organisation and become effective learners for life.



To align with our customer needs we launched the Lean Learning Platform on our website in late 2020. The platform includes a selection of guided learning courses and materials available so you can develop your skills throughout your Lean Learning Journey.

Thank you for being a part of the Lean Enterprise Academy and good luck on your Lean Learning Journey!

Best wishes,

Dave Brunt
CEO, Lean Enterprise Academy

How to use this Facilitation Guide

Format

Each graphic/image from the Teach Poster has been taken and broken down in to three elements:

1. Important Steps
2. Key Points
3. Reasons

Those of you familiar with the Training Within Industry (TWI) methods will recognise these elements from Job Instruction.

The Important Steps are the logical steps required in order to advance understanding of the subject and therefore need to be explained.

The Key Points are to ensure understanding of the Important Steps. Think of them as the special pieces of information which you need to impart to your team to really get them to understand what you are tying to say.

Finally, the Reasons are an explanation of why these steps and points are necessary.

Planning for Success

When explaining the Teach Poster we recommend that it is positioned in a quiet area, printed big enough to be visible to the group and with enough space for all of them to stand around and see it. Our experience has shown that groups of no more than twelve works best. As they will be standing be mindful of the time you intend to take to explain and discuss – about 20 minutes maximum is a good target.

Engagement

The teach should not be a tell but an interactive experience for you and the team. Images have predominantly been used to stimulate thinking so use them to ask the group questions like "What do you think we are trying to show here with this image?" Eventually someone will be compelled to say something and engage in dialogue with you!

Having covered the key points another good question to ask is "Why do you think this is important?" This is a great way of checking their understanding as well.

How to use this Facilitation Guide

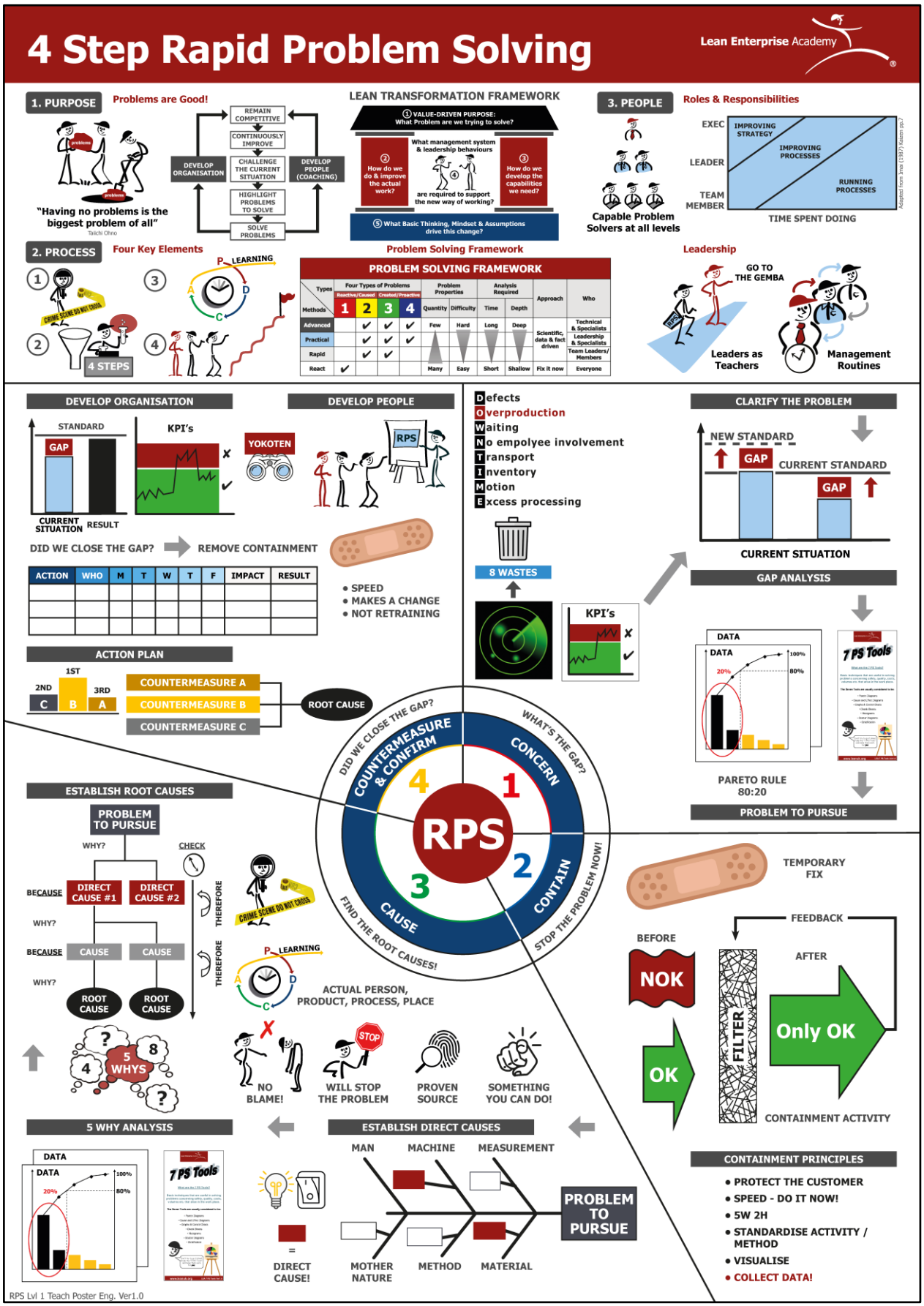
Facilitation Tips

Although not exhaustive here are few tips to consider to help provide an engaging and interactive teaching session. Of course, we are sure you have your own stories and experiences that will embellish the learning journey so please feel free to use those when appropriate.

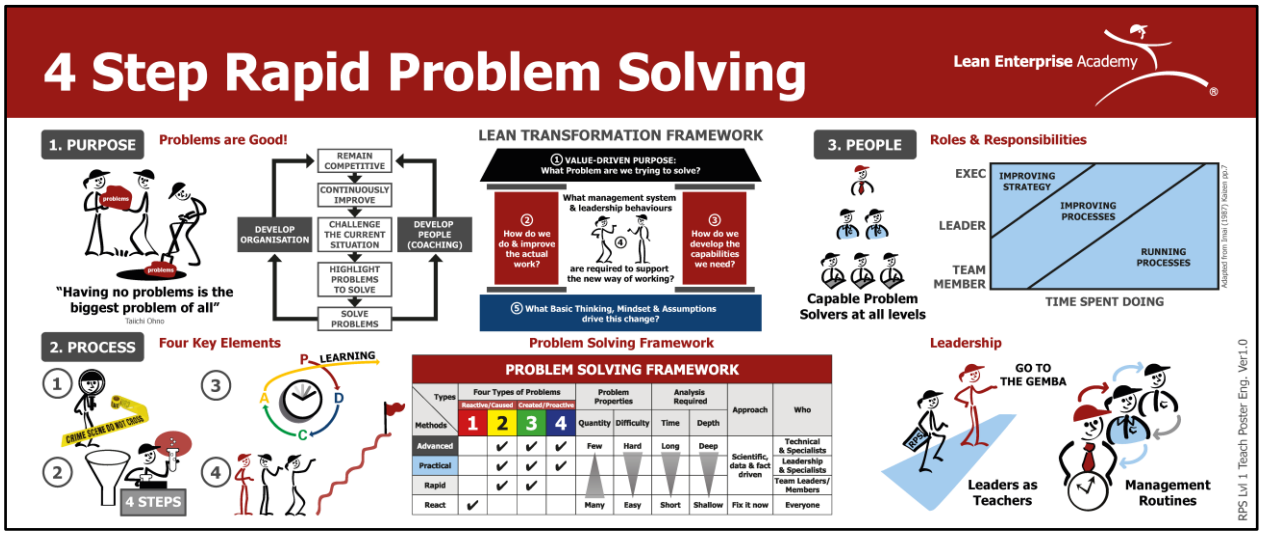
Some Facilitation Tools and Techniques:

- Use OPEN questions, one at a time.
- Waiting 10 SECONDS for questions to be answered.
- REINFORCING contributions – verbally and non-verbally.
- DEFERRING to the group – "What do you think?".
- MAINTAINING and ENHANCING self-esteem; "Good answer, thank you!".
- POLLING or voting – "Hands up who has…".
- BACKING OFF: getting the group to discuss without using the facilitator.
- ASKING the group to SUMMARISE.
- RECALL individual's points and REFER back to them.
- LINK workshop/material to business, departmental or individual topics.
- Use IMPACTORS: vivid language, link to topical/current issues etc.
- Use VARIETY of pace, tone, position, activity etc.
- Use HUMOUR and HUMILITY.

Teach Poster

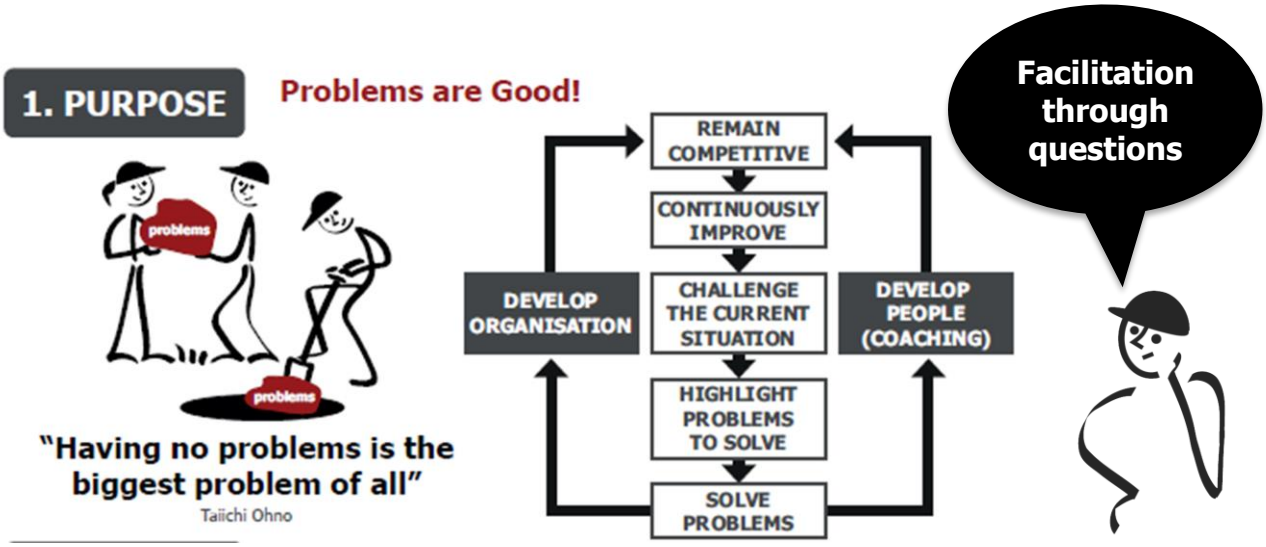


Teach Poster and the LTF



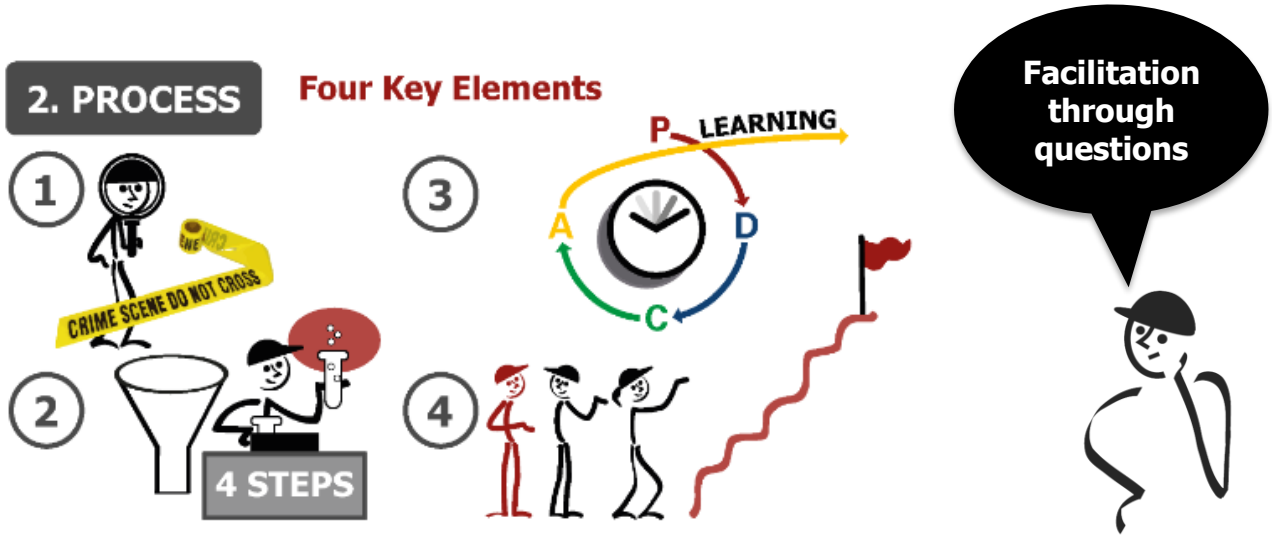
Important Steps	Key Points	Reasons
Why do we use a poster? Explain how the poster flows and works.	• It is visual, easy to read, interactive – promotes discussion. Easier to translate (ask audience for other reasons). • The upper section relates to the LTF, Purpose, Process and People with respect to the subject. • The lower section is the method to follow and is usually read from the middle outwards.	• So Leaders can use the poster to become the Teachers of others. • Poster is much simpler than a 100 page PowerPoint presentation. • Can display the poster in the workplace, keep in your folder. Not hidden on a pc somewhere.
Let's start with the Lean Transformation Framework or LTF.	• LTF defines the five dimensions for a successful Lean Transformation, which can be asked as a series of questions. • Where does RPS fit in to the Framework? Well certainly with question one, "What problem are we trying to solve?" but also it will help support answering the other questions. • We are going to look at first the Purpose of problem solving as an improvement approach, Process considerations around applying it and the People's roles and responsibilities needed to drive & sustain it. • Ask: "Why do you think Problem Solving is so important ?"	• Problem Solving is the number 1 Lean Skill as all other Lean tools are basically a result of trying to solve a problem – if you think about it e.g 5S, SW, VSM, SMED…… • Randomly applying tools is no good unless you understand the problem you are trying to solve first. • Random application of tools is not a sustainable way to improve.

1.0 Purpose



Important Steps	Key Points	Reasons
1. "Having no problems is the biggest problem of all" – Taiichi Ohno quotation.	• If you don't know you've got a problem you've got a big problem – ignorance! • Identifying problems is good – golden nuggets for the organisation! • Problems are good things!	• Once you know you have a problem you can do something about it. • Should see problems as opportunities for improvement, not hide them.
2. Remain Competitive.	• Solving problems helps us to be better which helps us to grow and will keep us competitive in our value driven purpose (Dimension 1 of the LTF).	• Problem solving is at the heart of continuous improvement. • Improvement is the key to being better than our competitors and remaining in business.
3. Develop People.	• Teaching/Coaching and using problem solving skills needs to be everyone's role not just the quality function for example. • Helping people solve problems supports employee engagement.	• Problem solving is at the heart of continuous improvement. • Improvement is the key to being better than our competitors and remaining in business.
4. Develop Organisation.	• A learning organisation will grow and deliver business results faster, better and cheaper than others.	• If organisations don't grow and remain competitive they quickly become overtaken by the competition and lose market share.

2.0 Process



Important Steps	Key Points	Reasons
1. Problem Solving has 4 key elements. First is we need to do it now while the evidence is fresh.	• "Go and See" at the workplace or Gemba in Japanese. • Will not solve problems in the office or behind the computer. • Just like CSI !	• Maximise the chance of seeing the problem and getting the best data /evidence you can.
2. We need a scientific method.	• The problem solving funnel or 4 step approach gives us a method or process to follow.	• Without a method we are just guessing.
3. We need a common thinking way.	• We follow PDCA an approach of rapid trials and tests to prove out theories and learn.	• The quicker we can do this the faster we learn and improve.
4. We strive for our vision.	• We take a step towards where we ultimately want to be. • Leaders role is to support the Team to do this.	• We need to recognise we can't always get to world class performance in one step. It takes time. • Its continuous..

2.0 Process

PROBLEM SOLVING FRAMEWORK										
Types / Methods	Four Types of Problems				Problem Properties		Analysis Required		Approach	Who
	Reactive/Caused		Created/Proactive							
	1	2	3	4	Quantity	Difficulty	Time	Depth		
Advanced		✔	✔	✔	Few	Hard	Long	Deep	Scientific, data & fact driven	Technical & Specialists
Practical		✔	✔	✔						Leadership & Specialists
Rapid		✔	✔							Team Leaders/ Members
React	✔				Many	Easy	Short	Shallow	Fix it now	Everyone

Important Steps	Key Points	Reasons
Problem Solving Framework.	• Not one size or problem solving approach fits all as there are different Types of Problems. • Art Smalley Book – Four Types of Problems: • Type 1 = Troubleshooting • Type 2 = Gap from Standard • Type 3 = Target Condition • Type 4 = Open Ended	• Need to consider the Type of Problems, their Properties, the Analysis required and Level in the organisation. • Otherwise you waste time and resource. • Sledge hammer to crack a nut analogy..
React.	• For Type 1 – Troubleshooting. • Reacting to an unexpected event. • Typically lots of them in the day, easy to fix quickly and you don't need to analyse them so much. • Like changing a flat tyre or putting out a fire, you just do it not spend time analysing the cause.	• Just Fix it Now! • Everyone can do this. • Like reacting to Andon cord pulls on a moving assembly line for example.
Rapid.	• A 4 Step approach based upon the fundamentals of: Concern, Contain, Cause, Countermeasure & Confirm to tackle one off or step change type gaps in the workplace (Type 2 & 3). • Short term Performance improvements and stabilisation. • Generally taught by functional and team leaders to natural work teams • Problem solving thinking captured on an RPS Quadrant chart.	• Fast but structured approach to problem solving. • Designed for first line leaders – not experts or after extensive training. • Simple visual tools are used to capture the thinking.

2.0 Process

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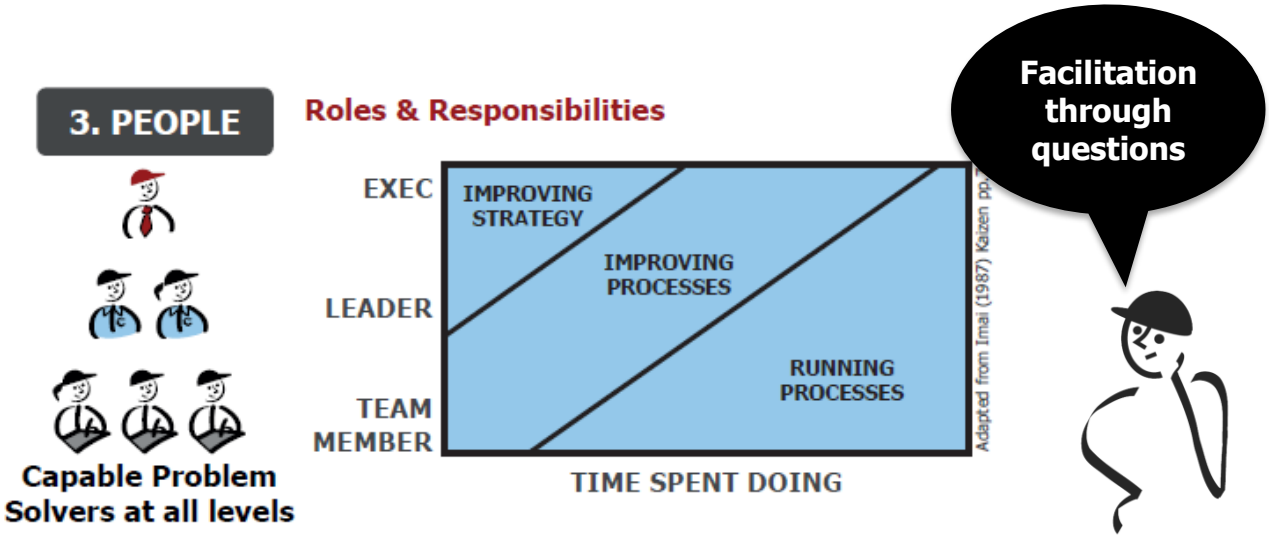
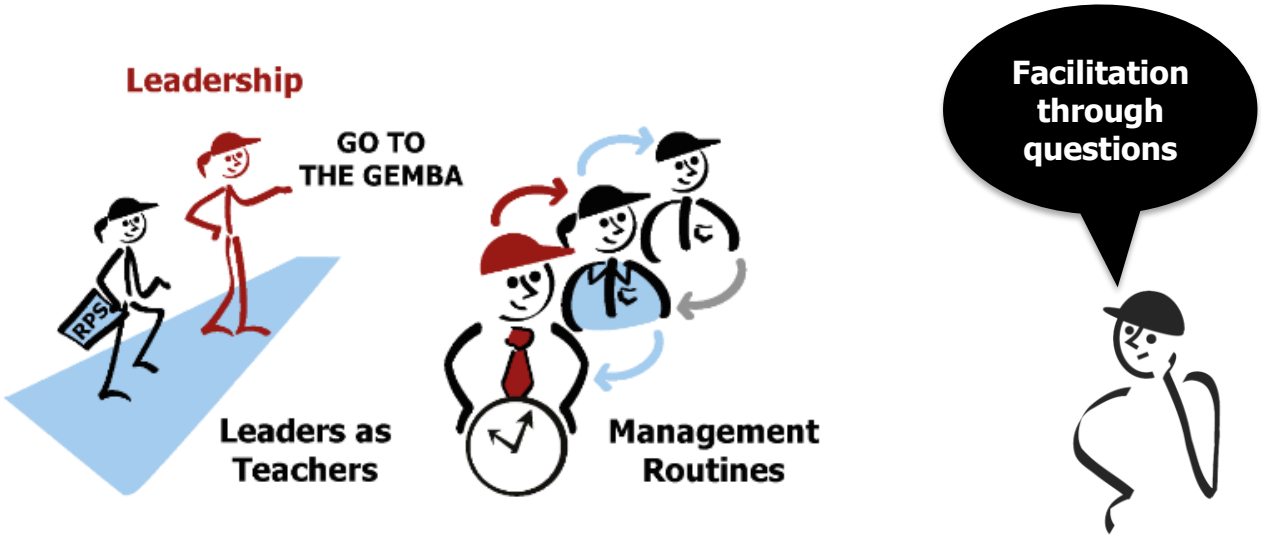
Important Steps	Key Points	Reasons
Practical.	• A3 8 step problem solving approach taking the Rapid method further. • For current and longer term business issues requiring more analysis to get to the root causes. • For Type 2 & 3 mainly although thinking way helps considerably with Type 4 or Open Ended problems. • Performed by Leaders and functional Specialists typically. • Data collected to prove thinking. • A3's used to capture the story to confirm and share learning. • If you can master PPS, you can easily teach and coach Rapid.	• Some problems need a little more time and deeper thinking in order to solve them. • The root causes and countermeasures are not that straight forward or immediately obvious as in Rapid for example. • React, Rapid and Practical can be used to tackle most problems encountered within the organisation ~ >90%.
Advanced.	• Used for innovative problem solving to seek out new solutions or proposals. • Achieves radical improvement, often a new product, process, system or value for the customer well beyond current levels. • Many different methods can be used but usually technical or specialist knowledge is required. • These are infrequent, hard problems to solve typically.	• For use on problems often with multiple drivers in play. • Experimentation may be needed to learn and understand what is happening and what is needed. • Can take some time and deep analysis but the results can be a step change in performance.

3.0 People



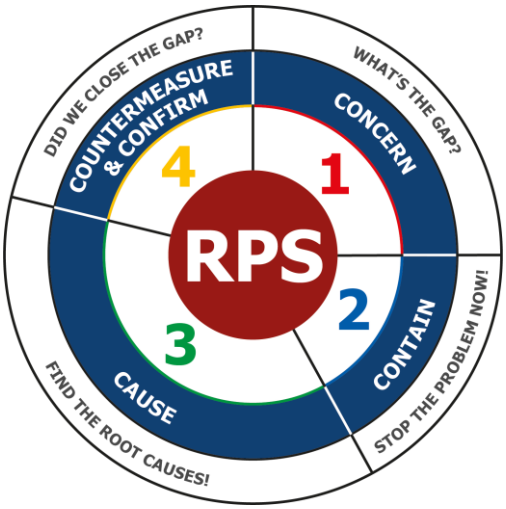
Important Steps	Key Points	Reasons
Consider the Organisation structure on the left.	• We want everyone at every level to be capable of tackling problems at their level using the Framework as a basis.	• Army of problem solvers to free up people to do what they should be doing rather than solving others problems for them.
Consider the Chart on the left.	• Typically our Team Members are running processes, Leaders are responsible for leading process improvement and at Exec level this moves more into strategic thinking. • However, we all have a responsibility to improve processes and spend time solving problems wherever you are in the organisation. • If certain individuals are stepping down, rushing around solving all the problems (firefighting) are they really doing the role they were employed for? No.	• Need to make sure the right people are spending the right amount of time doing the right things to develop themselves and the organisation – avoid getting in to firefighting mode. • Prevent this by teaching and coaching those in your Team to solve their own problems at their level. • Put your Management System in place to escalate appropriately.
Position the role of Leaders teaching and then coaching RPS.	• Leaders need to allocate time to teach and coach problem solving. • Its is part of your responsibility. • Management Routines are a way to do this. • Need to make time to do it.	• Problem solving is the Number 1 Lean skill. • Cannot be done by "Training Classes" alone. • Want to build an army of problem solvers through on the job training and development. • Make it our culture.

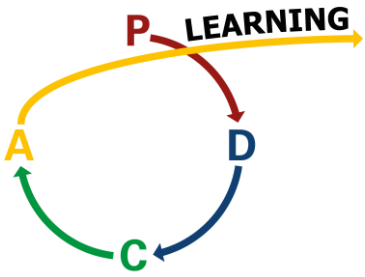
3.0 People



Important Steps	Key Points	Reasons
Leaders as Teachers.	• The role of leaders is to teach problem solving before they can coach it.	• Teaching develops the leaders knowledge of the subject but also directly shows the importance of it to delegates as it is important the leader.
RPS Thinking.	• "If you can't explain it simply enough you don't understand it well enough" – Albert Einstein quotation. • That's what an RPS does it makes you think about how to tell the story of solving your problem simply and easily. • RPS thinking can be used to systematically share knowledge in an organisation.	• We will look at the role of leaders as teachers and coaches separately. • Problem solving is not easy and needs practise. • RPS' are a key way to develop people as it makes them think deeply about what they are doing and how to summarise it simply.
Management Routines.	• Leaders at all Levels need to make time to teach and coach problem solving. • Need to establish a Management Routine or leader Standard Work to make sure that happens. • Hold themselves accountable to that routine – did I do it or not.	• To provide the opportunity for Leaders to Recognise, Teach and Coach and Feedback their team on problem solving. • Develop their people and the organisation.

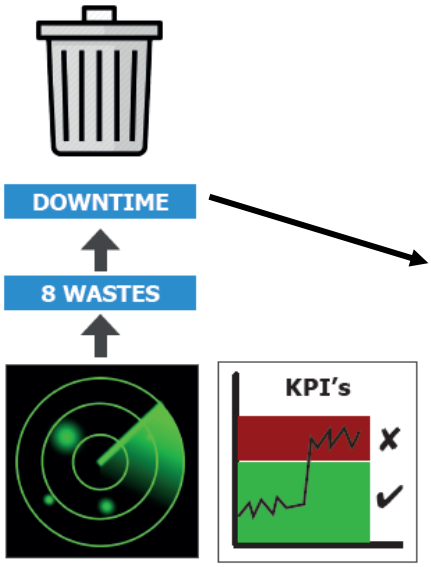
RPS Steps



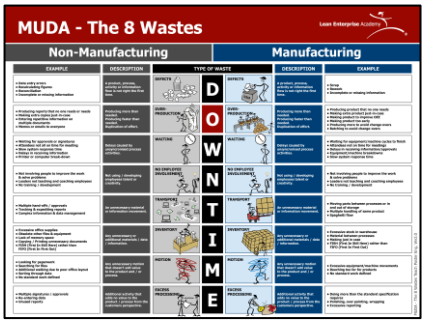


Important Steps	Key Points	Reasons
How the Poster Works	• Work out from the Centre.	• Consistent logical flow.
The colour of the 4 Step numbers (red, blue, green, yellow) Ask what these colours mean?	• Colours follow PDCA.	• Follow a logical process, don't forget to reflect at the end as ask "What did we learn?".
Size of Step 3 compared to the other Steps.	• Its is the largest portion indicating where we will spend most of our time whilst solving the problem.	• To understand the problem deeply we need to spend time to study and analyse it using data. If we don't have the data then we need to go and get it.

Step 1.0 Concern

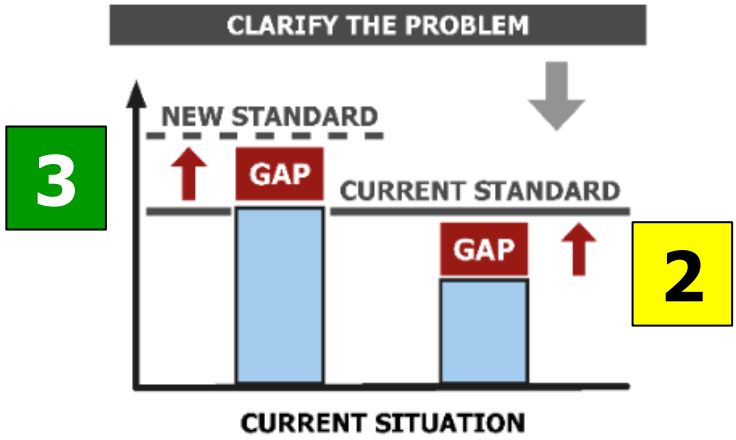


Defects
Overproduction
Waiting
No empolyee involvement
Transport
Inventory
Motion
Excess processing



Important Steps	Key Points	Reasons
Step1.0 What's the Gap!	• You are looking for a 'GAP' i.e. a difference between where you should or want to be (lets call this the Standard) and where you currently are (Current situation).	• Without a clear Gap a problem might just be perception or opinion.
Is your Waste and Problem Radar on!	• The 8 Wastes are a useful indicator that there is a problem. • Review the 8 Wastes and examples, understanding of them. • Use the MUDA – The 8 Wastes support Poster if necessary. • Sometimes you 'feel' there is a problem by seeing, hearing e.g. if team members are complaining about something or upset. • Ask why Overproduction is in red?	• Don't always initially look at measures to see opportunities. • However, eventually we need to Clarify the Problem by identifying the Gap. • Overproduction is seen as the worst Waste as it can lead or cause all of the others. • That is why we have the concept of Takt Time to prevent Overproduction and causing more Waste than is necessary.
KPIs.	• Having your Waste Radar on is a good early warning device of a problem. • However, we need to quantify the problem or the Gap. • Using KPIs are a good way to do this.	• Without a clear Gap a problem might just be perception or opinion.

Step 1.0 Concern



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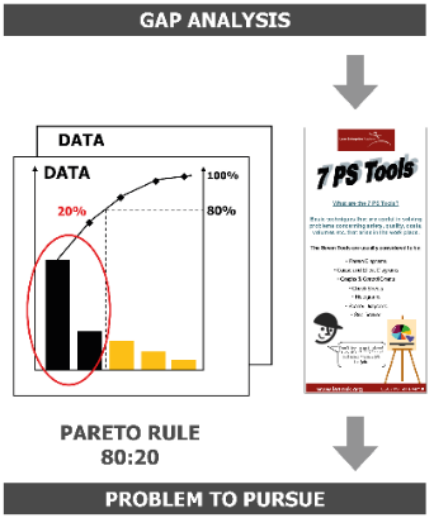
Advanced		✔	✔	✔
Practical		✔	✔	✔
Rapid		✔	✔	
React	✔			

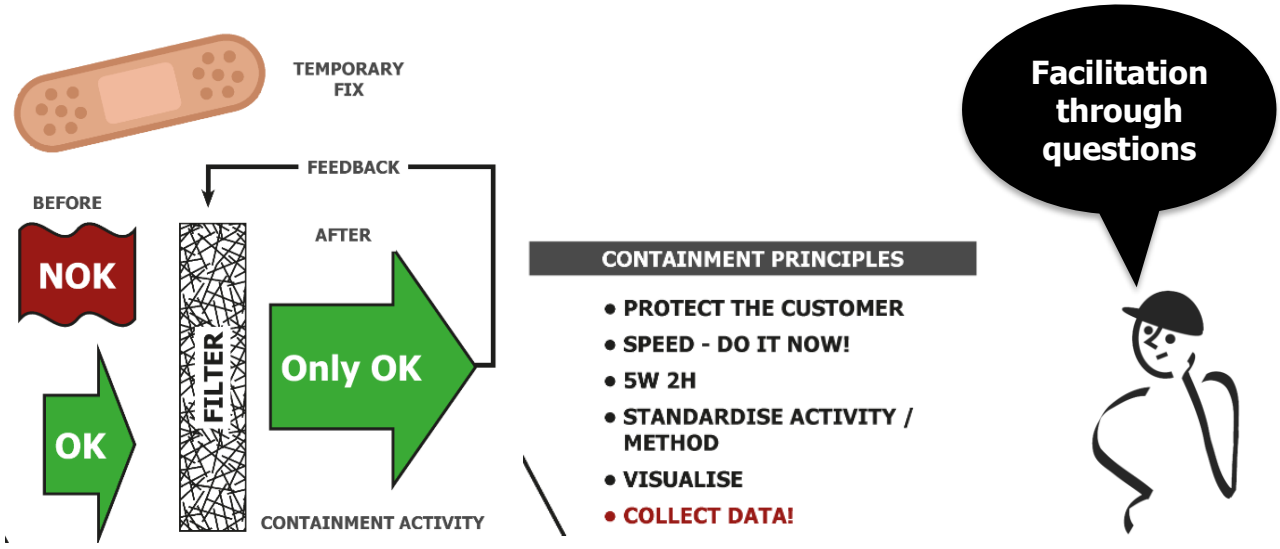
Important Steps	Key Points	Reasons
Need a method to Clarify the Problem.	• Current Situation. • New Standard. • Current Standard. • Gap – Problem Statement.	• Standard approach so everyone becomes familiar with the method.
Current Situation Where are we now? The actual situation.	• This will be obtained from KPIs and current data collection.	• To understand where we are now.
Current Standard Where should we be now? The standard/normal situation	• This will be obtained from KPIs, Budget or Continuous Improvement Planning Objectives/Goals.	• To understand where we should or are expected to be. • This is a Type 2 Problem Gap from Standard.
New Standard Where would we like to be? New Target condition.	• This will be obtained from KPIs, Budget or Continuous Improvement Planning Objectives/Goals.	• To understand where we want to be. • This is a Type 3 Problem Target Condition.
Problem Statement **GAP**	• The difference between the current situation and the current standard or new standard. • We write a statement to clarify what the problem is.	• This is problem clarified and the Gap we are trying to close. • It needs to be very clear and concise. • No verbs, just state the Gap in numeric terms.

Step 1.0 Concern



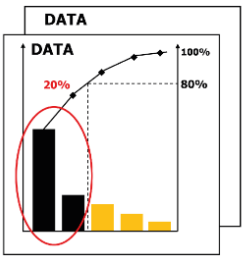
Important Steps	Key Points	Reasons
Gap Analysis.	• The Gap or Problem will no doubt be made up of many things so we need to break it down in to more manageable items. • If you can't break the Gap up then you may need to analyse the current situation to understand what's stopping you from reaching the standard.	• Prioritisation - you do not have the time and resource to do everything. Need to break it down to more manageable tasks.
Visualise using the 7 Problem Solving (PS) Tools.	• Use graphs, tables, data analysis to build up the investigation. • Use the Pareto Rule to prioritise. • Refer to the 7 Problem Solving Tools for ideas to visualise and break the problem down.	• Scientific, logical approach. • Use facts and data, not opinions.
7 Problem Solving Tools Leaflet.	• Review the leaflet and each of the 7 Problem Solving Tools. • Check for understanding some may not have seen before!	• Show delegates what tools are available to breakdown and visualise data.
Pareto Graphs and the 80:20 Rule	• Pareto Graphs are a great way to help you analyse the Gap and understand the biggest contributors to the problem. • Typically you find that 80% of the problem or gap is made up of 20% of the contributors.	• To determine the vital few and prioritise what you will pursue. • Cannot do everything, so you need to prioritise.
Problem to Pursue.	• From the gap analysis decide what you are going to prioritise and state the Problem to Pursue.	• This is Problem we are going to solve.

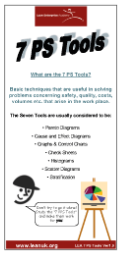
Step 2.0 Contain

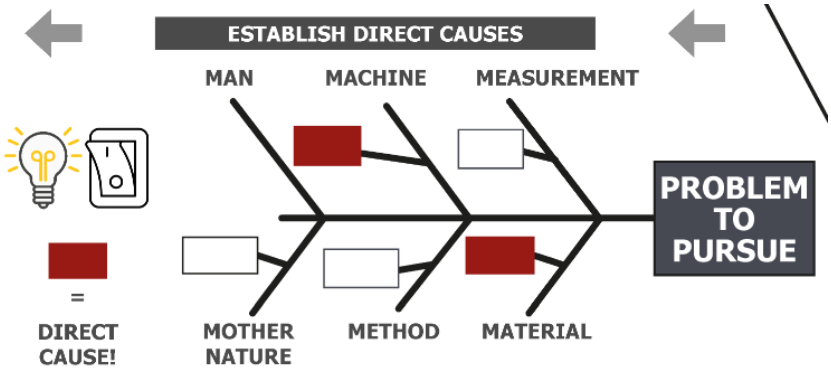


Important Steps	Key Points	Reasons
Step 2.0 Stop the Problem Now!	• Plaster is seen a Temporary Fix. • Stop the bleeding. • Buy time to solve the Problem.	• Protect the Customer. • Final Customer or the next Process step.
Temporary Fix.	• The containment will be removed once the root cause(s) are found and countermeasures confirmed.	• We add Waste into processes if the temporary fix becomes the permanent activity.
Containment Activity.	• Collect Data to understand the Problem batter and if Containment Activity is working. • Gather data to help in your Cause investigations.	• Understand the Problem and situation better.
Containment Principles.	• Speed • 5W 2H • Standardise • Visualise • Collect Data.	• Do it quickly. • Define clearly what it is. • Define the Activity clearly. • Make sure everyone can see the impact. • Understand the Problem better.
Feedback Loop.	• Check is it the Containment Activity working.	• Adjust it if necessary. • Impact on the Gap.

Step 3.0 Cause

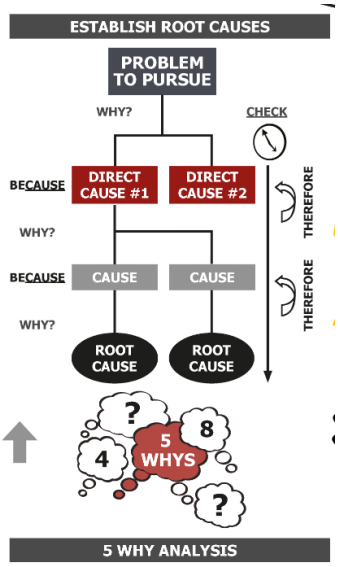






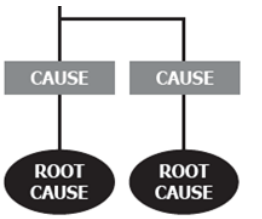
Important Steps	Key Points	Reasons
Establish the Direct Causes.	• Light switch analogy – a Direct Cause will be able to switch On and Off the problem. • The Direct Causes will be the 1st Why of your 5-Why Analysis. • Very important to establish these.	• Clear relationship of Cause and Effect. • 1st of the 5-Whys.
Fishbone Diagram.	• Also known as Ishikawa or Cause and Effect diagram. • Structured Brainstorming • Captures potential causes. • Start with Problem to Pursue at the head of the fish. • Use more or different categories than the six shown here depending upon the situation, it is not fixed.	• Common problem solving tool. • Helps to capture ideas from a group in a structured way and systematically eliminate them.
Fishbone Analysis.	• Get Data and Test each potential cause. • Identify each cause as: - OK, no Effect on the Problem. - Contributor, but not Direct Cause. - NOK, a Direct Cause.	• You need proof and evidence of the Direct Causes. • Light switch test, on-off.
7 PS Tools and Pareto Diagrams.	• To get data you may have to use Check Sheets for example to collect the information. • Pareto Diagrams are a good way to analyse the Check Sheet information and establish the Direct Causes. • You may have to run short experiments/trials to prove the Direct Causes. • If you have more than three Direct Causes, perhaps you need to narrow down you Problem to Pursue more.	• Fishbone is a good start for members to understand the Cause-Effect relationship. • More than three Direct Causes will mean you are likely to have complicated 5-Why Analysis and not get to the Root Causes.

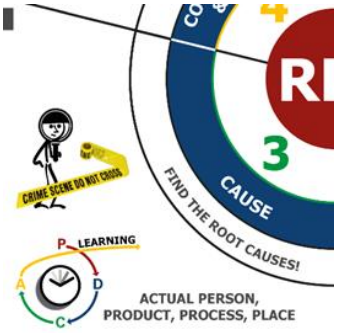
Step 3.0 Cause



Important Steps	Key Points	Reasons
Step 5.0 Use the Five Whys to find the Root Causes.	• Select a simple example e.g. Taiichi Ohno - Machine fuse blowing and the root cause is the filter being blocked starving the bearing of oil so it overheats, seizes and blows the fuse. • Show how the Problem Solving thinking works as replacing the fuse is just to Contain it and the fuse will probably blow again. • Root cause is related to finding why the circuit overloaded and so on and so forth.	• Eliminate guesswork.
5 Why – reinforce point with fuse example.	• Ask why to drill down to the Root Cause. • Each why might give multiple answers. • Capture them all. • Use data, go and see at each stage to understand pathway to the root cause.	• Pathway to get to Root Cause.
Embedded test– reinforce point with fuse example.	• The pathway to Root Cause should be in time or chronological order as you read down. • You should be able to put 'Therefore' between each level and it read correctly upwards from bottom.	• Check the thinking and logic is correct of the 5 Why Analysis.

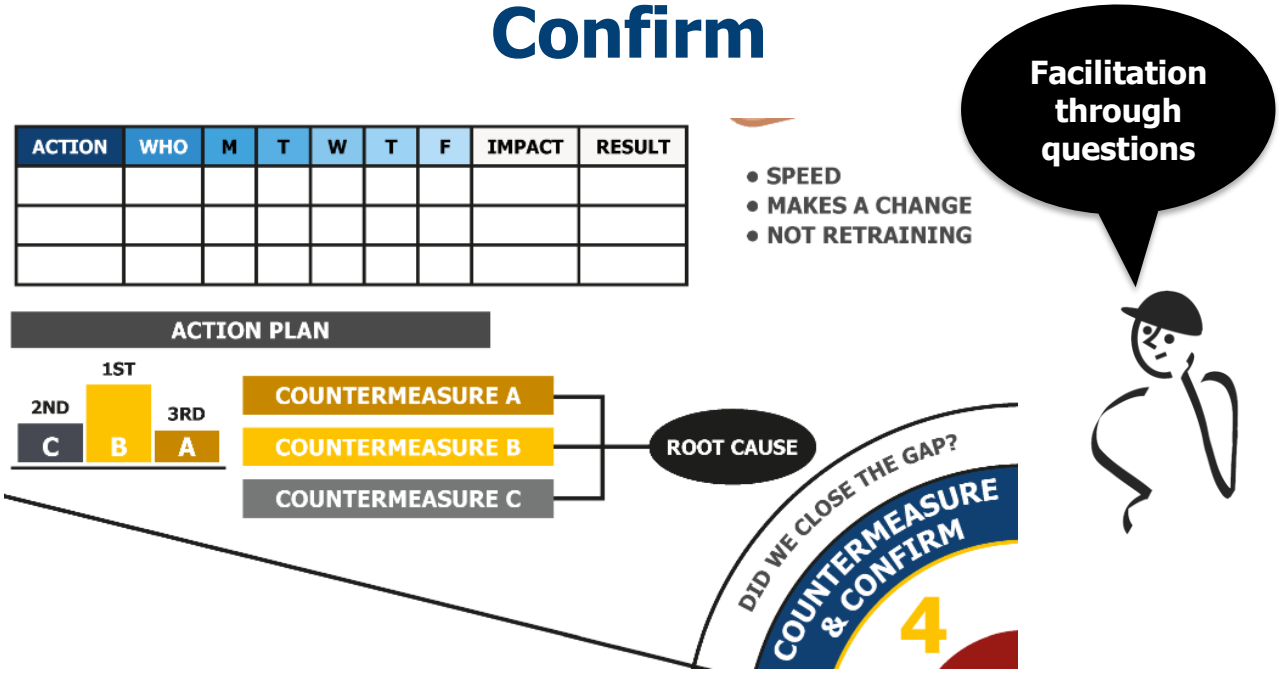
Step 3.0 Cause





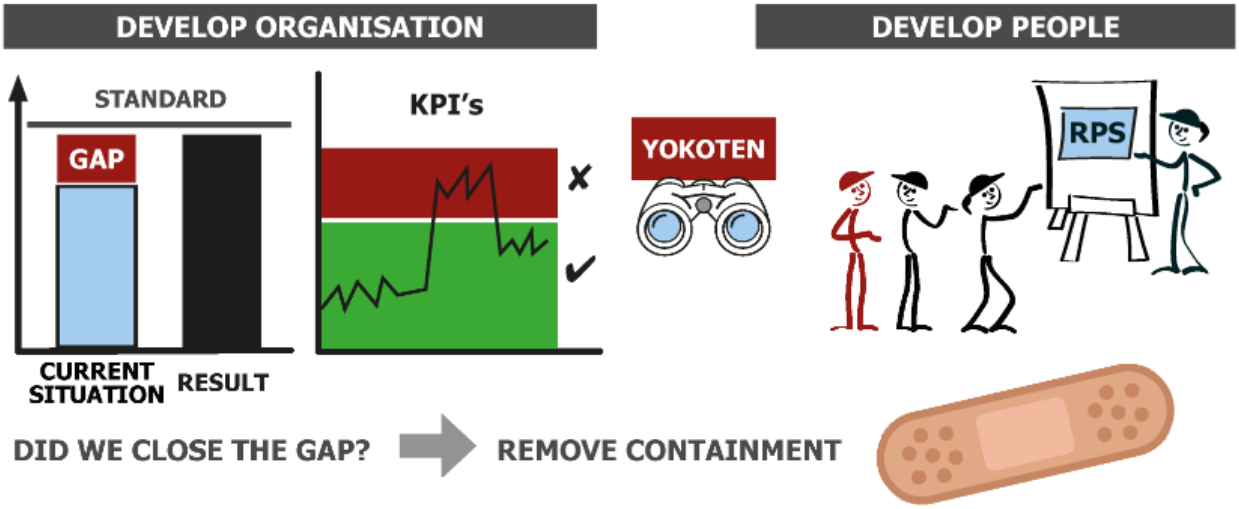
Important Steps	Key Points	Reasons
Characteristics of a Root Cause Analysis.	• It may branch off – there might be more than one Root Cause. • It does not have to be five whys it can be more or less – it is until you get to the Root Cause. • Root Causes: • Will not blame anyone e.g. operator error, someone's mistake. • Are a proven source of the problem i.e. factual, data not opinion. • It is something you can change and do something about or influence. • It will STOP the problem from happening again. • If you start on the path of another problem you need to back up.	• If it does not meet these criteria you have not found the Root Cause(s).
Root Cause Analysis.	• Using sticky notes can help to get the sequence and order of the statements in the right order.	• Easy to move around.
Go and See.	• Actual person, product, process, place. • Use PDCA and quick experiments if necessary to prove to Root causes and your thinking.	• Proven Source.
Size of this Step.	• Where most of the work is done, hence it is the largest portion on the Poster.	• It takes time.

Step 4.0 Countermeasures & Confirm



Important Steps	Key Points	Reasons
Step 4.0 Did we close the Gap?	• For each Root Cause generate a number of potential Countermeasures – challenge yourself and the Team to think out of the box.	• Need to generate more than one option so you have back up ideas.
Countermeasure Selection.	• Evaluate your Countermeasure ideas. • Impact, Cost, Leadtime are some ways to do that but think about others e.g Safety, Quality.. Depending upon your Problem. • Adopt a simple scoring method for the criteria to help prioritise. • Use the Evaluation to Prioritise the best ones. • Calculate those which will have the most Contribution to closing the Gap. • Make an Action Plan Schedule.	• Decide what are the best Countermeasures to implement.
Action Plan.	• Quick planning, days, not months to do things – speed. • Makes a change or does something different, not reapplying the same activities as before e.g. re-training.	• Quick PDCA cycles.

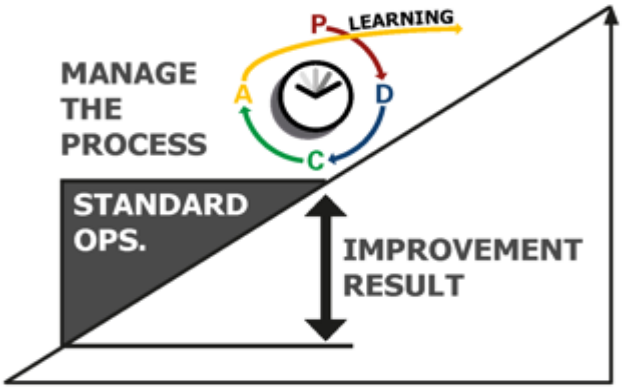
Step 4.0 Countermeasures & Confirm



Important Steps	Key Points	Reasons
Develop the Organisation.	• Make clear the contribution the RPS activity has made. • Compare the Result back to the Standard. • Summarise the Results and Impact back to the KPI for example.	• Consistency of reporting. • Easier to compare Step 1 to Step 4 using the Graphs etc. in the same format. • Clear visualisation and communication.
Remove Containment.	• If the Problem is solved then remove it.	• It is a Cost and Waste after all.
Yokoten.	• Japanese word for sharing the learning across the organisation. • Look across – binoculars. Can you adopt the same countermeasures elsewhere to prevent problems in the organisation? • Take personal responsibility to do this.	• Develop the Organisation. • Develop People.
Develop the People.	• Use the RPS Quadrant Chart to share your learning.	• Develop the People. • Develop Organisation.

Step 4.0 Countermeasures & Confirm

Draw this graphic on a Flipchart



Important Steps	Key Points	Reasons
Implementing Standard Operations.	• Implementing Standard Operations or Processes are key to sustaining the Improvement Result.	• They are like a chock or block to prevent the RPS PDCA activity result from falling back.
Manage the Process.	• The Standard Operations and Processes need to be managed and reviewed to be maintained. • A process to manage this needs to be established.	• Sustainment • Continuous Improvement.

Notes

Notes

Lean Enterprise Academy

We are a not for profit organisation, established to help customers become self-reliant on their lean journey. Through research, products and services we provide better, faster and cheaper ways to learn and improve. Our Senior Lean coaches have a combined total of over 70 years Lean experience and have worked with hundreds of companies across the globe.

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