Introduction or Introduce yourself.
Breaks, snacks, get up and move around?
Informal learning atmosphere
Ask questions
Tight timetable
At Pyromation, problem solving is a key skill needed to meet our quality, cost & delivery objectives

True North – engaged team

(measure engagement => problem solving/help improve the job, giving ideas)
You face problems every day in your business.

Having problems is not unique.

From business to business the nature and complexity of problems can change base on concerns such as economic factors, regulatory requirements, workforce skill/availability, technology, etc., etc., etc.
You need to develop problem solving expertise.

Someone has to solve the problems or your business won’t survive very long.

Might as well get as much help with that as you can. The more problem solvers you have, the more problems you can solve.
Learn about Pyromation’s problem solving journey to gain insights and ideas.

“Life is a journey, not a destination.”

-Ralph Waldo Emerson

Going to talk less about how to use the specific tools (good references all over the internet and books available) but more about where we are and the path we took to get here.

Pyromation is trying to develop & grow a culture of problem solving at all levels of the organization.

Started out very differently.
Pre & early Lean, our problem solving was “expert” based.

There’s advantages and disadvantages to this approach.

Define “expert” a little more.

Engineers
Managers/Management
Consultants
Having “experts” solve your problems has some advantages.

Any ideas on why you want an “expert” to solve problems?
Going to trade shows, site visits to discover new technologies.

Benchmarking – copy what other companies have done successfully. If someone else is already doing it, why reinvent the wheel?

“Best methods” approach – internal benchmarking & standardization.

Try to standardize on what works best for your company. One size doesn’t fit all.
Problem solving can be quick & easy (and sometimes expensive).

Rely less on process data, more on experience. Didn’t build a lot of consensus. Just forged ahead and assumed improvements would be worth it.

Bias toward technology. “Visionary” leader.

Invest in technology for technology’s sake.

R&D not a bad thing if it helps you gain a competitive advantage.
Having “experts” solve your problems has several disadvantages.

Consultants (internal & external) don’t “own” the solution long term.
Focus on problems that are perceived to be currently causing the most pain.

Not focused on the “big picture” → localized solutions in areas of expertise.

Tend to find solutions that are quick hitters (easiest to implement) and more obvious. Didn’t tend to dig deep into the process.

“pet projects”
Solutions not focused on real needs of the process.

Not working on the “bottleneck” gains no added throughput/capacity.

Is the improvement dictated by the squeaky wheel?

Resistance - “It's always been done that way,”

“monuments” – welding vs. tube closure machine
Approach is usually top down, not team based.

Can be slow to implement solutions to nagging problems if the expert has no stake in solving them.

Quick to move on to the next problem without adequate stabilization/followup.

Not developing problem solvers.
As we learned about lean, our problem solving became highly “tool based.”

Wanted to change away from the expert model. Started to learn about quality tools.

What’s the next new thing?

Didn’t know what we didn’t know.
Several key learnings came from expanding our problem solving toolbox.

Sources of learning
- Sensei/consultants
- more benchmarking trips – AME
- IPFW continuing studies certificate classes
- Lean Six-Sigma classes – Scott Lasiter
- Self-learning – books, other classes (U of M)

Spent 3 or 4 years focused on learning. Mostly senior and middle management teams.

What follows is what I considers some of the key learnings.
Importance of defining the problem well.

<table>
<thead>
<tr>
<th>Key Questions</th>
</tr>
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<tbody>
<tr>
<td><strong>What:</strong></td>
</tr>
<tr>
<td>Is it specific? Does it avoid an implied solution? Does it state &quot;what&quot; not &quot;why&quot;?</td>
</tr>
<tr>
<td><strong>When:</strong></td>
</tr>
<tr>
<td>Can you quantify the pattern of occurrences? Are the dates and times specific?</td>
</tr>
<tr>
<td><strong>Where:</strong></td>
</tr>
<tr>
<td>Is it a location or a process?</td>
</tr>
<tr>
<td><strong>Who:</strong></td>
</tr>
<tr>
<td>Are you using titles or responsibilities (not names)?</td>
</tr>
<tr>
<td><strong>How Much:</strong></td>
</tr>
<tr>
<td>Avoid $'s here. Is the frequency or quantity measurable? Do you have good data?</td>
</tr>
<tr>
<td><strong>The Costs Now:</strong></td>
</tr>
<tr>
<td>Have you quantified all costs?</td>
</tr>
<tr>
<td><strong>Potential Costs:</strong></td>
</tr>
<tr>
<td>What will the cost be over the next 12 months if the problem is not fixed?</td>
</tr>
<tr>
<td><strong>Desired Outcome:</strong></td>
</tr>
<tr>
<td>Do you have a means identified to achieve the goals? Are you avoiding &quot;pie in the sky&quot;?</td>
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Scoping the problem solving activity.

Problem has to be within the team’s authority/ability to solve.
Managing to Learn – John Shook.

Outlines a thinking process as well as serves as a consensus building communication tool.

Tells the story of the improvement process.
### Key Point Sheet: Activity (RIE) A3

#### Points of Emphasis
- Aligns VSA or VSA/Mission A3
- Used in visual management – makes work visible
- Tells a Story – like a story board for a film
- Communication tool that follows a logical and standard structure
- Manage the whole cycle not just the event week.
- Quality driven – Go NoGo criteria WIP process drives event quality
- Rerun events if sustainment is not OK.
- One document!

#### Go NoGo Andon Criteria
- Box not started or in progress
- Box completed & satisfies Go/NoGo
- Box does not satisfy Go/NoGo but continue A3 flow while rework in progress
- STOP ALL ACTIVITY Act to restore flow

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#### Three Major Components
- Strategic Alignment
- Learn by Doing
- Reflections

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Format promotes strategic alignment, process learning and reflection.
“Go and See”

Trap: Solve problems by assuming we know what’s going on in the process.

Can’t sit around in a conference room and think you know the “real” process. Mapping what happens vs. what is supposed to happen.

Need to go to the “gemba” and see what’s happening. Now!
Process & Design – Failure Modes Effects Analysis

Function - Mode – Effects – Causes – Controls

Factors: Severity, Occurrence, Detection => Risk priority number

Taught us to be detail oriented.
5 Why

Ask why until you get to root cause.

How do you know you reached the root cause? Is it something the team has power/control/authority to fix? If “no” back up one level and go with it.

If you land on human/operator error as a cause (or training as a countermeasure) you probably haven’t gone deep enough.

Is there only one why/root cause that leads to a problem? Sometimes, sometimes not?
Forces you to consider the problem from a lot of different perspectives.

For each cause can also document potential countermeasures.

“shot gun” approach
Why discuss andon as part of problem solving?

You have a better chance of finding the root cause and solving a problem if you can solve it in real time (as close to when the defect occurred as possible).

Started by support staff responding to solve the problem. Now support staff monitors and coaches the team’s effort to solve the problem.
The “tool based” approach had some positive outcomes.
More focused on processes and learning more deeply about them.

The more you learn about the process, the more effective you will be at solving problems in it.

If you don’t understand the process, the harder it will be to put effective countermeasures in place.

Is there such thing as a permanent solution?
Especially from developing A3 thinking. Establishes a thinking pattern.
Team members from all areas more involved.

Extensive training to get people skilled at analyzing and solving problems.

Got better at involving team members at all levels and all functions.

Started realizing that not just managers needed people /communication/leadership skills, but all support functions did as well (engineers, quality, planners, etc.)
The “tool based” approach had some shortcomings.

Tool-based approach didn’t solve all our problems.

But was still necessary to advance our learning and discover what works for us.

Management identifies areas/processes to work on. Sponsors team. Commits resources.
If you truly know how to solve a problem, just go do it. (Kill the Snake!)

If the problem has been around for a while, or has been “fixed” one or more times before, you probably don’t really know how to solve it.

Follow the problem solving process. Make no assumptions about how to fix it.
“But our equipment/process is old / poor / cheap / not the latest thing out there and we can’t improve it unless we spend money to fix it!”

Not necessarily true - Use your creativity before you spend your capital!

**The following must be true about the process:**

Some days it performs better than others.

This performance occurs with your current equipment, supplied material, operators, etc.

There is some reason, or combination of reasons, that causes those good days to occur.
If you truly knew what those reasons are, and controlled them, you could have that “best day” every day, without purchasing new technology!

Don’t automate waste. Eliminate waste from the process first and then automate.
Shifting the problem is never a valid solution.

The focus must be on finding the causes and eliminating or controlling them.
Difficulties knowing when to use what tool.

- e.g. went through times trying to put everything in a fishbone. Don’t overcomplicate simple problems.

- Sometimes you don’t know what you don’t know but you try to force a solution anyway.

- -> problem returns
Our current approach is team based and structured around Toyota Kata.

Still using all the tools and experience but from within a consistent framework.

Started learning by going to 3 day class at U of M hosted by Mike Rother & Bill Costentino.

Realized only way to make real progress toward our goals is to enlist everyone’s help in solving problems in the organization.

Make it part of everyone’s daily work.
Toyota Kata provides a pattern for coaches and learners to develop problem solving skills and use them daily.

What is a Kata?

Kata denotes the pattern to practice. You decide what you want to practice on. Pick a cell or process and stay with it.

Works no matter what the environment.
Above: No clear path because no clear direction.

Below: You don’t have to solve all the issues you see to get the performance you need.
Management’s job to create #1

Deployed downward through the organization via Policy/strategy deployment process.

Within the PDCA cycles there’s 2 routines (kata) - for coaches and learners.
It has to be OK to fail – that’s how you learn.

Team members have to trust management for this to work.

Celebrate failures as chances to learn.
Up to the coach to assess how the learner is progressing and keeping them in the learning zone.

Has to be worthwhile or people won’t continue to use it.
Working toward daily continuous improvement has provided several benefits.

Pursuit of perfection – one of 5 lean principles in Lean Thinking (Womack & Jones).

This is the point, not perfection itself.
Dedicate time to solve problems.

Events & improvement activities – 25-40 formal/scheduled activities; usually 2-5 days; 5-9 member team

10 minutes after 1st break to discuss ideas at the cell level. Discuss problems, ideas and improve solutions – bounce ideas off other team members.

Monthly PD goals for establishing target conditions and conducting PDCA cycles.
Everyone involved in making the organization better.

Becoming part of the “culture.” – improving is part of the work (getting there, not all the way)

To get the ball rolling it helps to have people identify and discuss their problems, even if they don’t know a solution. Let the team work on it together.

“Our actions match our words.” – by solving problems and communicating in a professional way.
Let the process show you.

PDCA (It’s an experiment! Think Mythbusters) – OK to try things and not have them work the first time.

“What to we need to learn in order to make this work?”
Working toward daily continuous improvement has presented several challenges.

Hardest thing is to make improvement part of the work.

Production always beats improving, training, etc. unless you change the mindset.
It takes time for people to truly understand and apply Kata.

It takes time for people to develop new thinking patterns and behaviors. (need repetition)

It takes practice.

Process analysis takes a bit of simple math. Can be challenging to some.

Not everyone “buys in.” – One gentleman left because we were “forcing” him to give ideas.

Need strong middle management team focused on developing people.
Some people say they want the power to make changes in their work place but don’t want to “own” those changes.

The cell still needs to perform.
Develop soft skills and communication.

Lean is a balance between improving processes and people.

Need to spend as much or more effort on the people side.

Need to be intentional. (new PCB's)
Problem solving is a skill that can be developed.

Someone has to solve the problems or your business won’t survive very long. Might as well get as much help with that as you can.

The more problem solvers you have, the more problems you can solve.

The further down the organization these skills lie, the closer to the source you can tackle the source (root cause) of the problem.
You face problems every day in your business.

How you choose to go about solving them can have a huge impact on the effectiveness of your organization.

You’ve seen the stages we’ve gone through and hopefully got a feel for the benefits and challenges of the different approaches.
Pyromation continues its’ problem solving journey to drive continuous improvement.

Pyromation is trying to develop & grow a culture of problem solving at all levels of the organization.

By making problem solving part of everyone’s daily work we hope to continue to be successful in our lean journey.