

Problem Solving

Identify and solve the root causes of problems using CI tools



Course Objectives



- Enhance your ability to see and understand problems
- Learn steps and tools to help you identify and solve root causes of problems
- Incorporate problem solving into your daily work

Tools and Concepts We Will Cover



- A3 Problem Solving Tool
- Voice of the customer (VOC)
- Program and process measures
- Brainstorming
- Affinity Diagram
- Root cause analysis tools
 - 5 Whys
 - Fishbone (Cause and Effect) Diagram
 - Relations Diagram
- Impact/Cost Matrix
- Action Plan
- Performance Measures Table

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Problem solving – Why do it?



- Increase customer value and satisfaction
- Make work better for staff
- Save resources
- Grow a high performing work culture



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Problem Solving Example





Why are the floors of the Jefferson Memorial disintegrating?

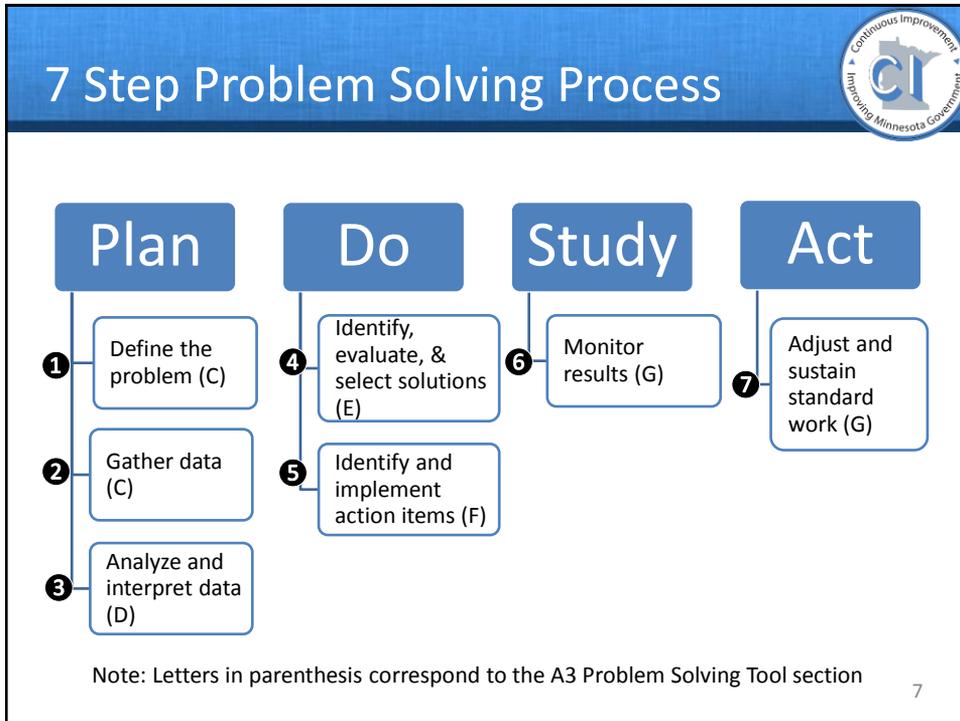
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A3 Problem Solving Tool

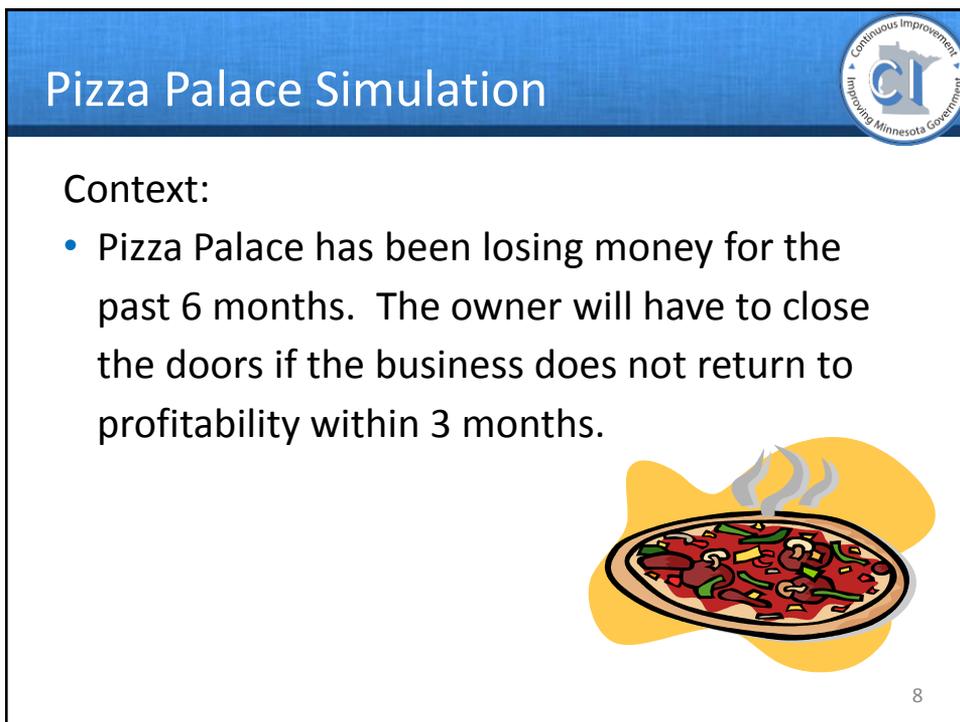


A3 PROBLEM SOLVING TOOL: <Title>		Contact: <Name>		Date: .date.																					
BACKGROUND / BUSINESS CASE <div style="text-align: center; font-size: 2em; font-weight: bold;">A</div>			SOLUTIONS <div style="text-align: center; font-size: 2em; font-weight: bold;">E</div>																						
STAKEHOLDERS • Customers: • Team Members:																									
CURRENT CONDITION <div style="text-align: center; font-size: 2em; font-weight: bold;">C</div>			ACTION ITEMS <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 60%;">Action</th> <th style="width: 15%;">Owner</th> <th style="width: 12.5%;">Proposed Date</th> <th style="width: 12.5%;">Actual Date</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>			Action	Owner	Proposed Date	Actual Date																
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ANALYSIS / ROOT CAUSES <div style="text-align: center; font-size: 2em; font-weight: bold;">D</div>			<div style="text-align: center; font-size: 2em; font-weight: bold;">F</div>																						
			METRICS/FOLLOW-UP <div style="text-align: center; font-size: 2em; font-weight: bold;">G</div>																						

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Pizza Palace Simulation



Context:

- Pizza Palace has been losing money for the past 6 months. The owner will have to close the doors if the business does not return to profitability within 3 months.



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Background/Business Case (5 min)



BACKGROUND / BUSINESS CASE	SOLUTIONS
<p>A</p>	
STAKEHOLDERS • Customers: • Team Members:	
CURRENT CONDITION	al
ANALYSIS / ROOT CAUSES	METRICS/FOLLOW-UP
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- What issue or problem do you wish to solve?
- Why is this issue important to solve now?
- What benefits do you anticipate from solving the problem (e.g., quality, timeliness, cost, customer/employee satisfaction)?

Stakeholders (5 minutes)



BACKGROUND / BUSINESS CASE	SOLUTIONS
<p>B</p>	
STAKEHOLDERS • Customers: • Team Members:	ACTION ITEMS
CURRENT CONDITION	tual ite
ANALYSIS / ROOT CAU	METRICS/FOLLOW-UP
	10

- Who are internal and external customers?
- Who's perspectives do you need to complete the A3 Problem Solving Tool (e.g., subject matter experts, customers, outside set of eyes)?

Current Condition (15 min.)



<p>BACKGROUND / BUSINESS</p>	<ul style="list-style-type: none"> • What do you know? <ul style="list-style-type: none"> • <i>What</i> errors are occurring? • <i>Where</i> are the errors occurring? • <i>When</i> are the errors occurring? • <i>Who</i> is making the errors? • <i>How</i> are the errors occurring? 						
<p>STAKEHOLDERS</p> <ul style="list-style-type: none"> • Customers: • Team Members: 							
<p>CURRENT CONDITION</p>	<ul style="list-style-type: none"> • What don't you know and need to find out? <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr style="background-color: #c00000; color: white;"> <th style="padding: 5px;">What</th> <th style="padding: 5px;">Who</th> <th style="padding: 5px;">When</th> </tr> </thead> <tbody> <tr style="background-color: #f0d0d0;"> <td style="height: 20px;"></td> <td></td> <td></td> </tr> </tbody> </table>	What	Who	When			
What	Who	When					
<p>ANALYSIS / ROOT CAUSE</p>	<ul style="list-style-type: none"> • What specific performance measure needs to improve? <ul style="list-style-type: none"> ➢ Problem Statement: Reduce/Increase the number/percent of <?> from <current level> to <desired level> by <date>. 						

C

➤ **Problem Statement:** Reduce/Increase the number/percent of <?> from <current level> to <desired level> by <date>.

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1. Define the problem




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Problem Definition Tools



Brainstorming

Affinity diagram

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Brainstorming



Brainstorming is a team-based strategy for quickly capturing diverse information, ideas, and perspectives.

Brainstorming Rules*:

- Think of as many ideas as you can
- Postpone judgment
- Clarify, combine, and build on ideas

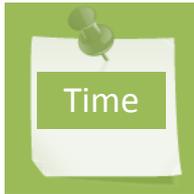


*When brainstorming solutions include:

- Be creative – there is no such thing as a “wild” or “bad” idea

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Brainstorming Potential Problems



- Waiting: hand-off delays
- Inefficient or illogical work flow
- Unreliable equipment or limited equipment capacity
- Process complexity
- Motion

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Brainstorming Potential Problems



- Numerous sign offs
- Over-processing (exceed customer specs)
- Overproductions
- Too much inventory or documentation
- Bottlenecks/backlog
- Transportation

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Brainstorming Potential Problems



- Errors
- Rework
- Defects
- Unclear roles & responsibilities
- Vague customer requirements

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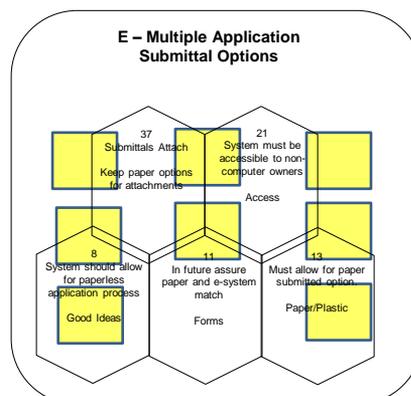
Grouping and Theming Ideas



Random Ideas



Affinity Diagram



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2. Gather data



What?

Who?

When?

How?

Why?

Where?

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Voice of the Customer




WHO
are our customers?

Who are our **KEY** customers?

What do they want/need?

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Program and Process Data

Types of data:

- Quantity: How much did we do?
- Efficiency: Cost per unit; Process time
- Quality: How well did we do it?
- Effect: Is the customer better off? Did the customer achieve desired results?

The photograph shows a person's hands sorting through a large stack of colorful folders or documents, illustrating the handling of program and process data.

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Brainstorm Problems (5 min.)



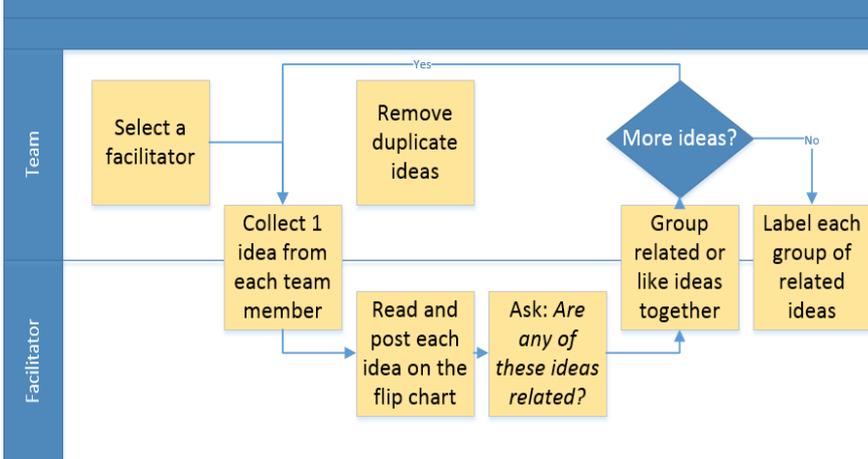
- Brainstorm possible causes and contributors to the problem:
- Individually brainstorm possible causes and contributors to why Pizza Palace is losing money
- Record one idea per post-it.
- Be creative – we will build upon your work throughout the course!

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Affinity Diagram (15 minutes)



Affinity Diagram Process



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3. Analyze & interpret data



BACKGROUND / BUSINESS CASE	SOLUTIONS
STAKEHOLDERS • Customers: • Team Members:	<ul style="list-style-type: none"> • Why are the errors occurring? <ul style="list-style-type: none"> ○ Use the simplest tool to show cause-and-effect down to root cause(s) ○ Root cause analysis tools: <ul style="list-style-type: none"> ➢ 5 Whys ➢ Fishbone diagram and 5 Whys ➢ Affinity and Relations diagrams • Does our data verify the root causes? <ul style="list-style-type: none"> ○ If not, a team may need to collect additional data to verify the root cause(s)
CURRENT CONDITION	
ANALYSIS / ROOT CAUSES <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="border: 2px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">D</div> </div>	

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Symptom or Root Cause?



Symptom
You see it;
people talk about it

Root cause
Often hidden;
you need to find it



Defining the “wrong” problem wastes time. You end up looking for a solution in the wrong place.

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Benefits of Root Cause Analysis Tools



Solve the problem once and for all

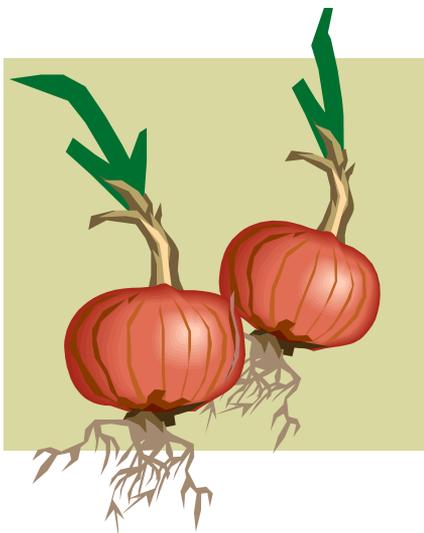
Identify and focus on the root cause with the greatest impact on productivity

Improves productivity: less headaches for staff → happier staff!

Save resources: solution may cost less than addressing symptoms

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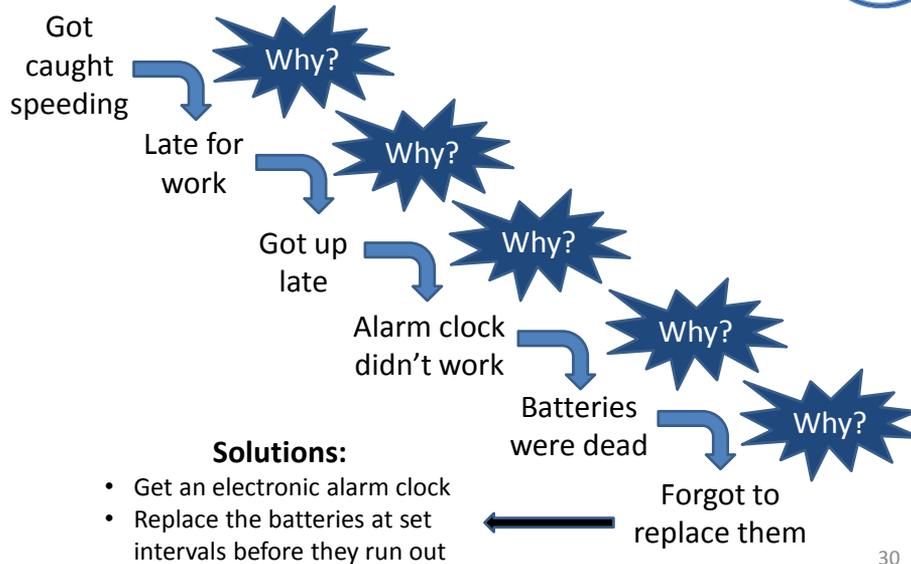
5 Whys



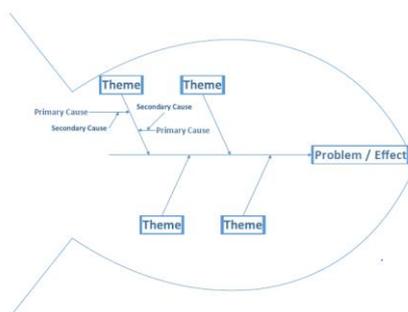
- A simple, quick method for getting from symptoms to the root cause of a problem by repeatedly asking *Why?* (logic chain)
- Use with fishbone diagram

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5 Whys Example

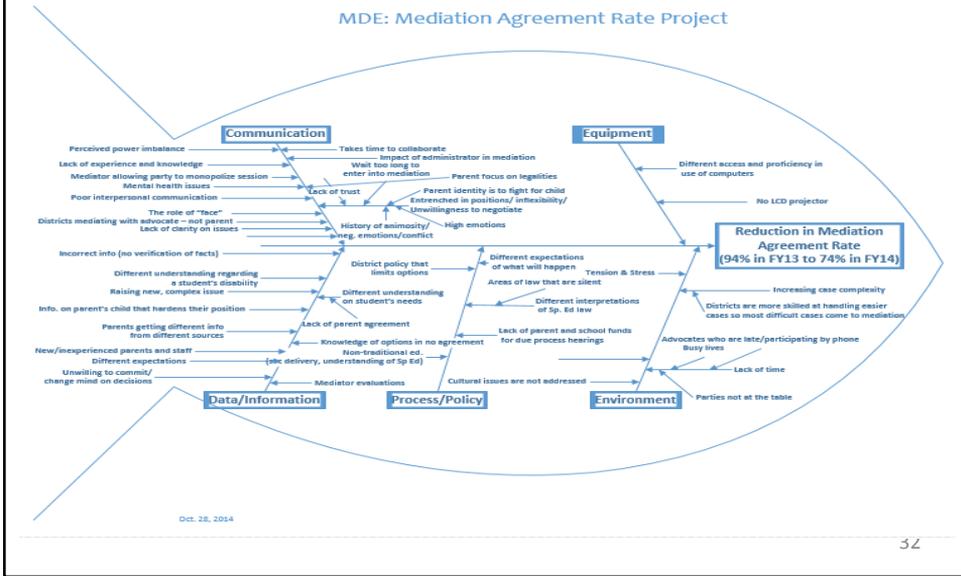


Fishbone (Cause & Effect) Diagram

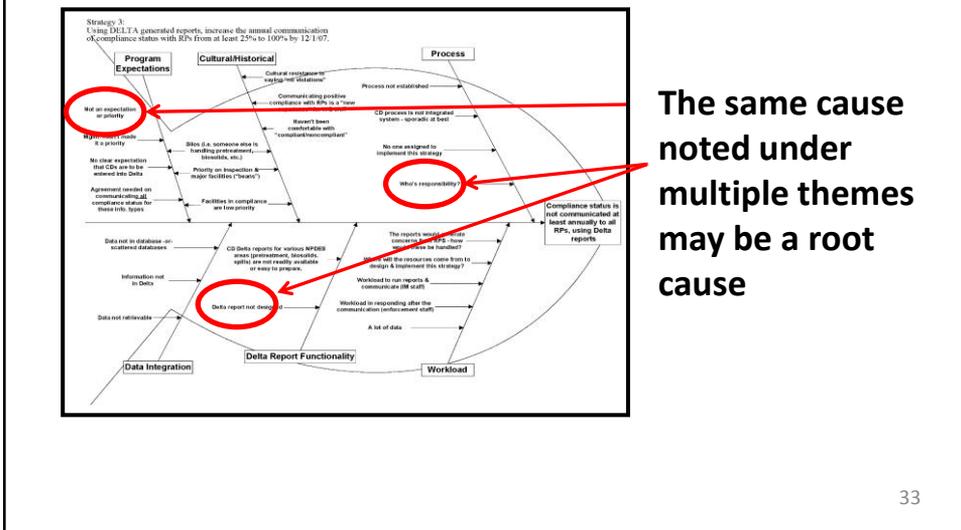


- A team-based tool for visually showing possible root causes of a problem
- Cause categories:
 - People (roles, trng.)
 - Equipment/Tools
 - Process/Policy
 - Materials
 - Environment
 - Technology

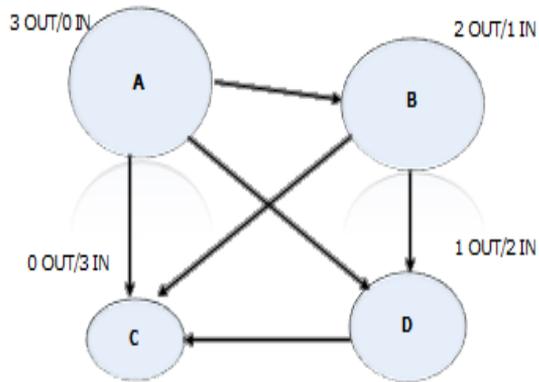
Fishbone Diagram Example



Fishbone Diagram



Relations Diagram



- A team-based tool for identify key drivers or contributors to a problem
- A cause category (theme) with many outward arrows may be a root cause

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Why use a Relations Diagram?



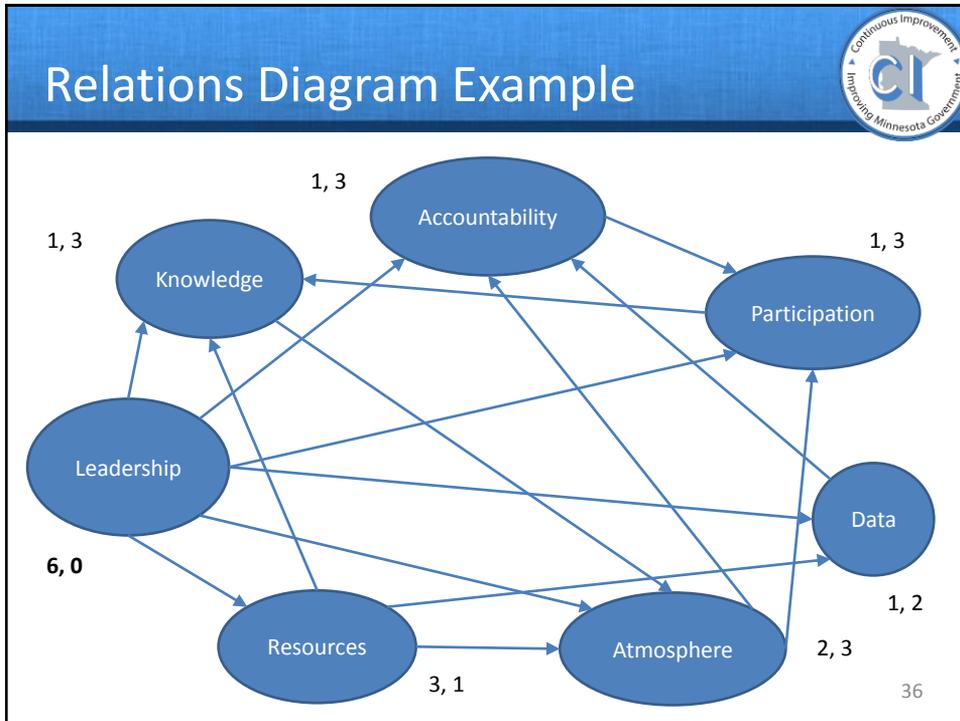
Helps us see possible root causes as a system

Tests whether a cause really impacts the effect

Helps identify **and rank** causes that may have the greatest impact



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Relations Diagram (20 min.)



1. For each theme, draw an arrow showing which theme has the greatest influence
 - No two-way arrows!
 - Some themes may have no relationship
2. Record the number of “out” and “in” arrows for each category (# out, # in)
3. Team reports - identify top drivers

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4. Identify, evaluate & select solutions



BACKGROUND / BUSINESS CASE	SOLUTIONS																
STA • C • T CU AN	<div style="text-align: center; font-size: 2em; font-weight: bold; border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; margin: 0 auto; display: inline-block; line-height: 30px;">E</div> <ul style="list-style-type: none"> • What solutions will solve the root cause(s)? <ul style="list-style-type: none"> ➢ Brainstorming • What solutions are best? <ul style="list-style-type: none"> ➢ Impact/Difficulty Matrix; Criteria Decision Matrix • What impacts (positive and negative) may result from implementing the solutions? <ul style="list-style-type: none"> ➢ Impact Wheel; FMEA <table border="1" style="float: right; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Proposed Date</th> <th style="width: 50%;">Actual Date</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> </tbody> </table> METRICS/FOLLOW-UP	Proposed Date	Actual Date														
Proposed Date	Actual Date																

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Brainstorm Solutions (5 min.)



Brainstorm solutions to root causes:

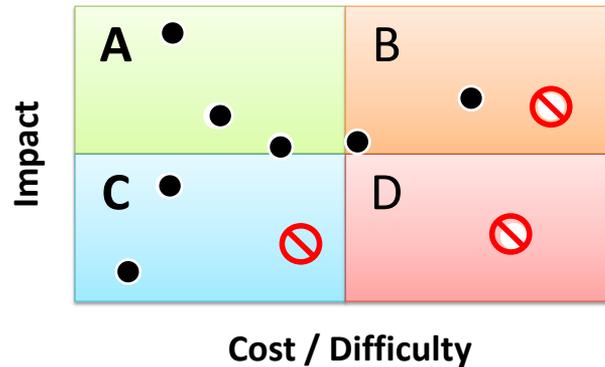
- Individually brainstorm possible solutions to root causes on why Pizza Palace is losing money
- Record one idea per post-it.

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Impact/Difficulty Matrix



- A tool for prioritizing solutions

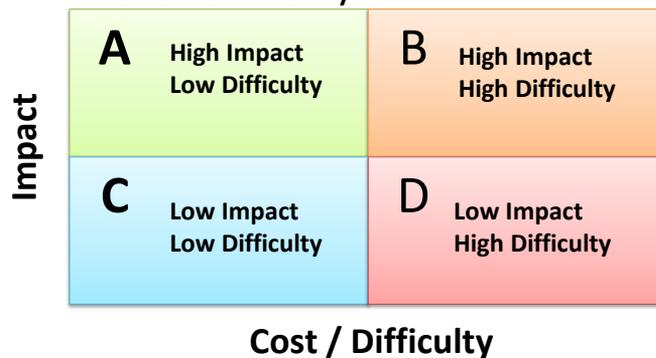


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Impact/Difficulty Matrix (10 Min)



- Place each idea in the most appropriate area of the Impact/Difficulty Matrix
- Record the solution you select in the A3



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5. Identify & implement action items



BACKGROUND / BUSINESS CASE	SOLUTIONS																				
<ul style="list-style-type: none"> What tasks do you need to complete? Include tasks to: <ul style="list-style-type: none"> Mitigate risks Identify and solve issues Measure progress & results Communicate changes, project status & results Train managers and staff Who will be responsible for each task? When will the task be done? What resources are needed for each task? 	<p>ACTION ITEMS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Action</th> <th>Owner</th> <th>Proposed Date</th> <th>Actual Date</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">F</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>ANALYSIS / ROOT CAUSES</p> <p>Metrics/Follow-up</p>	Action	Owner	Proposed Date	Actual Date	F															
Action	Owner	Proposed Date	Actual Date																		
F																					

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6. Monitor results



BACKGROUND / BUSINESS CASE	SOLUTIONS																				
<p>STAKEHOLDERS</p> <ul style="list-style-type: none"> Customers: Team Members: <p>CURRENT CONDITION</p>	<p>ACTION ITEMS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Action</th> <th>Owner</th> <th>Proposed Date</th> <th>Actual Date</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>ANALYSIS / ROOT CAUSES</p> <p>Metrics/Follow-up</p>	Action	Owner	Proposed Date	Actual Date																
Action	Owner	Proposed Date	Actual Date																		

- What metrics will you use to track progress and performance (validate results)?
- What data do you need?
- Who will you communicate results to?
- How will you communicate results?

Follow up is critical!

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Performance Measures Table



Term	Description
Title	Clear, easy to understand, relevant title
Operational Definition	Scope of the measure. What are we talking about?
Purpose	Why are we monitoring this? Does it relate to the problem/issue? Who is the audience? How will results be used?
Target	Do we have mandates/standards we are not meeting? What is our performance goal?
Formula	Is there a formula/calculation for this measure?
Frequency	How frequently will the measure be collected and reported?
Source	Where will the data come from? How will it be collected?
Responsibility	Who will be responsible for collecting the data? Analyzing? Reporting? Communicating?

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7. Adjust & sustain standard work



BACKGROUND / BUSINESS CASE	SOLUTIONS																		
STAKEHOLDERS • Customers: • Team Members:	<ul style="list-style-type: none"> • How and when will you check progress and performance (e.g., daily, weekly, 30, 60, 90-days)? • How will you sustain new process standards? • How will you communicate results and share what you learn with others? 																		
CURRENT CONDITION																			
ANALYSIS / ROOT CAUSES	<table border="1"> <thead> <tr> <th>er</th> <th>Proposed Date</th> <th>Actual Date</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	er	Proposed Date	Actual Date															
er	Proposed Date	Actual Date																	
	METRICS/FOLLOW-UP <div style="text-align: center;">  </div>																		

Follow-up is critical!

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How can you incorporate problem solving into your daily work?



1. Pause before jumping to solutions
2. First, ask questions to understand your situation
 - What? When? Where? Who? How? Why?
3. Collect data
4. Ask Why 5 times to get to root cause
5. Engage other people in the process
6. Implement solutions that have the biggest impact and address root causes
7. Validate results
8. Learn from successes and failures
9. Celebrate improvement and learning

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Plus/Delta



Plus	Delta
What worked well?	What was difficult?
What did you like?	What would you like to change?

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We're a Resource for You!



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