

Cyber Blue - Team 234

Continuous Improvement Through Root Cause & Corrective Action

"How To Learn From Your Mistakes"

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At the 2005 Championship Forums
Preparation - Chris Fultz

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- What is Continuous Improvement?
 - Learning from mistakes
 - Finding a better way
 - Avoiding "that always happens"
 - Moving your program to the "next level"

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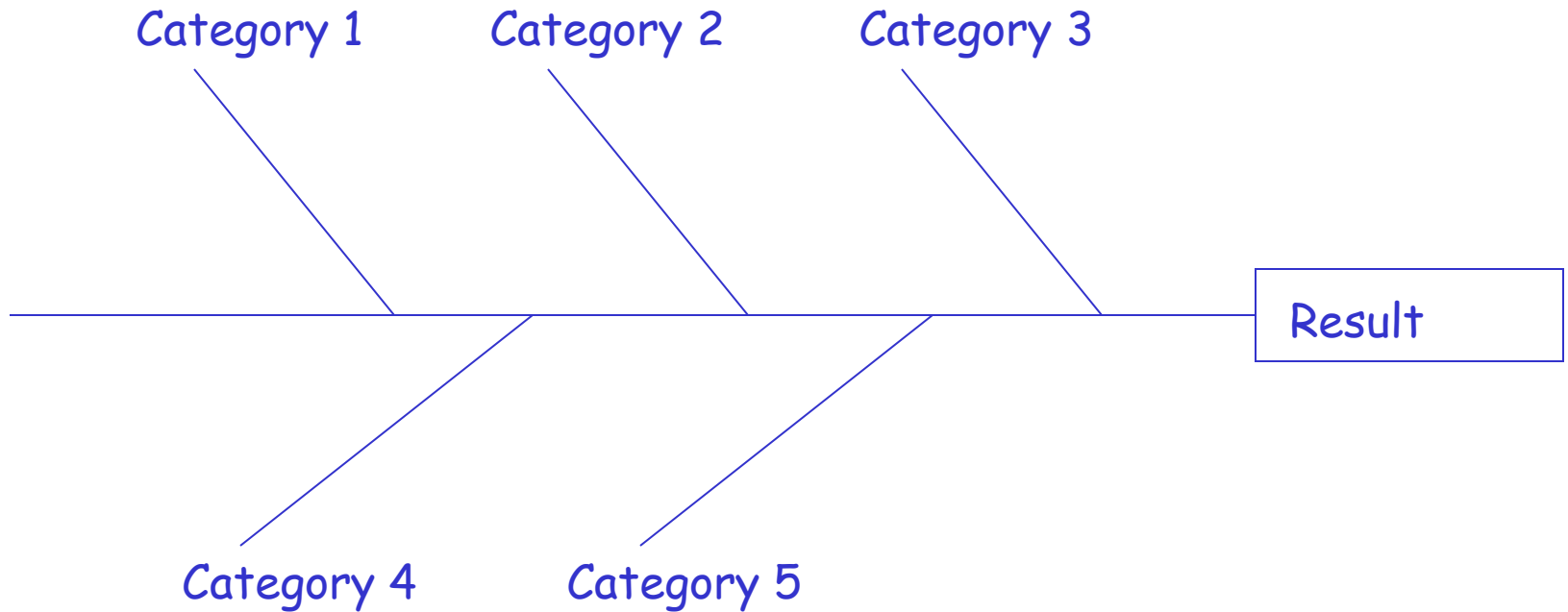
- There are several good processes for Root Cause / Corrective Action
 - Six Sigma - DMAIC
 - Define, Measure, Analyze, Implement, Control
 - 5 Why's
 - Structured Brainstorming
 - Ishikawa (Fishbone)

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- Cyber Blue implemented a Root Cause and Corrective Action process by using the "Ishikawa" or "Fishbone Diagram".
- Straight-forward, easy, well suited for groups and brainstorming activities

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- Fishbone (how it got its' name)



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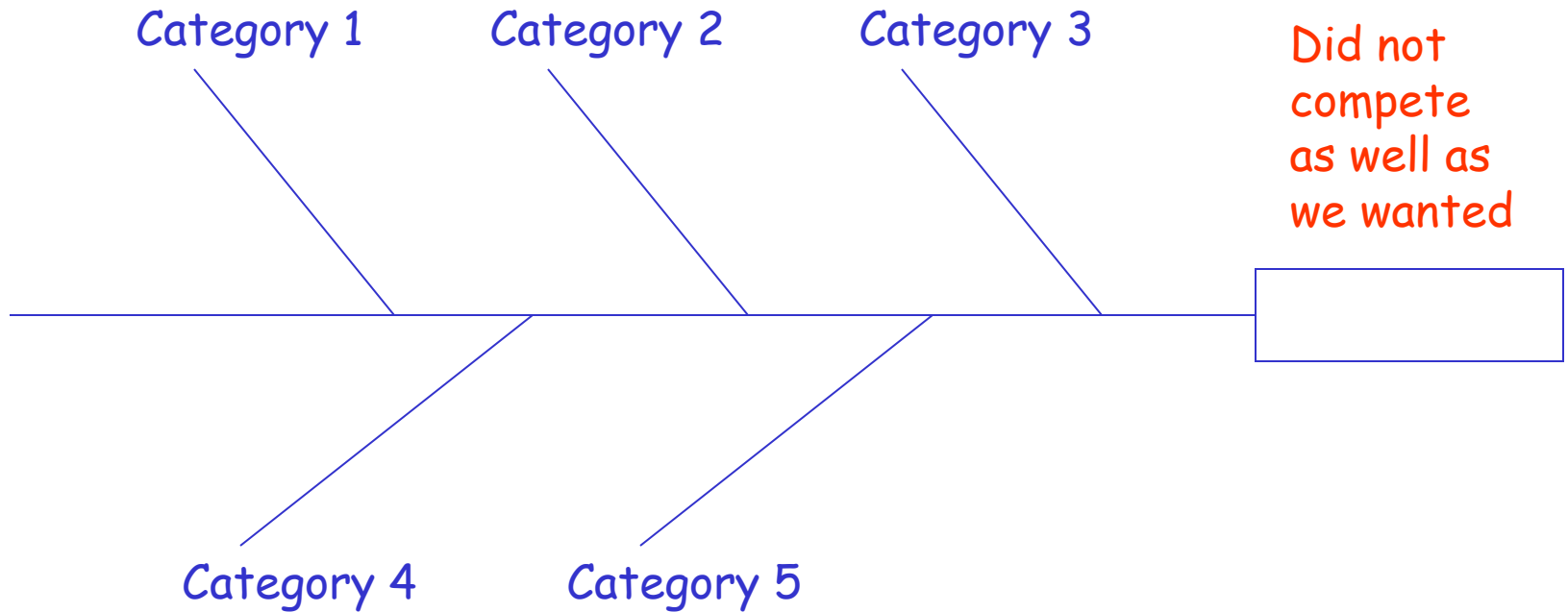
- The Process - six steps
 - 1. Agree on the 'result' to be analyzed
 - 2. Identify the bones of the fish
 - 3. Brainstorm ideas and place them
 - 4. Review and select common themes
 - 5. Identify actions and action plans
 - 6. Prioritize and Complete the actions

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- Sample Process -
 - Fictional Team
 - Good Robot, Good Team
 - Did not compete as well as they wanted
 - Want to identify what they can correct for the next season

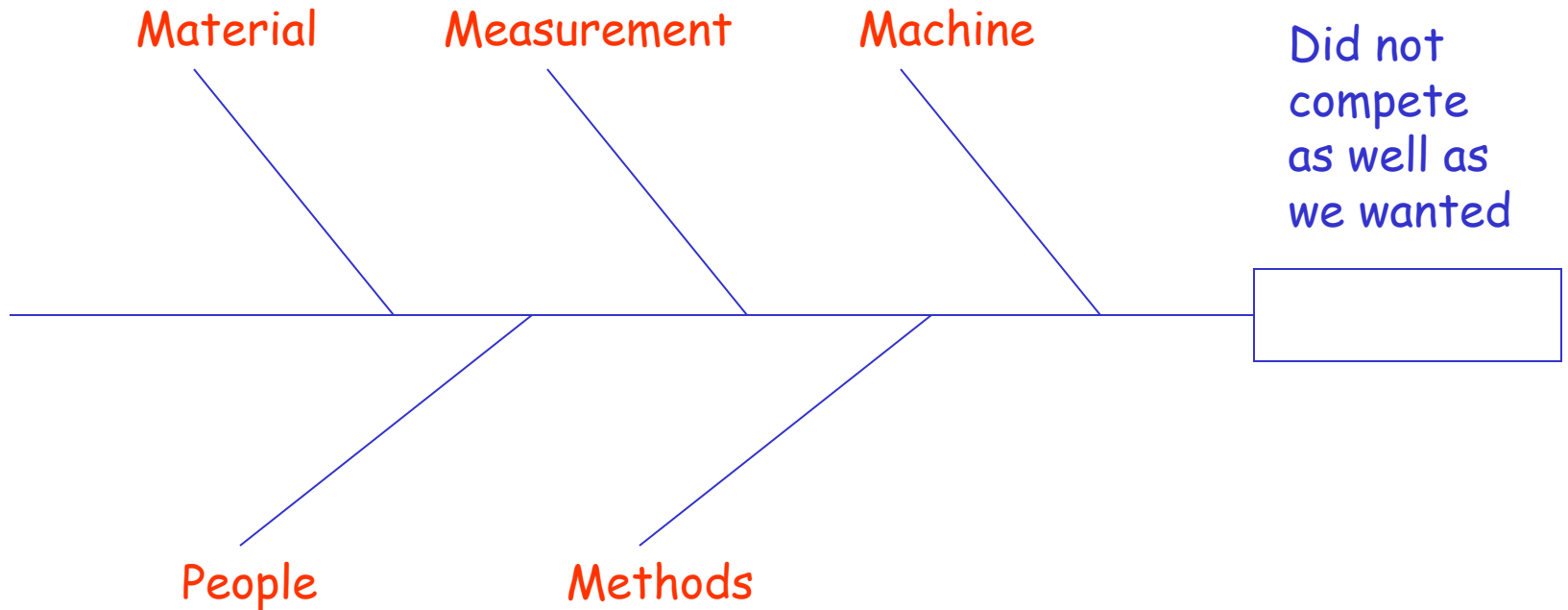
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- 1. Agree the result to be analyzed



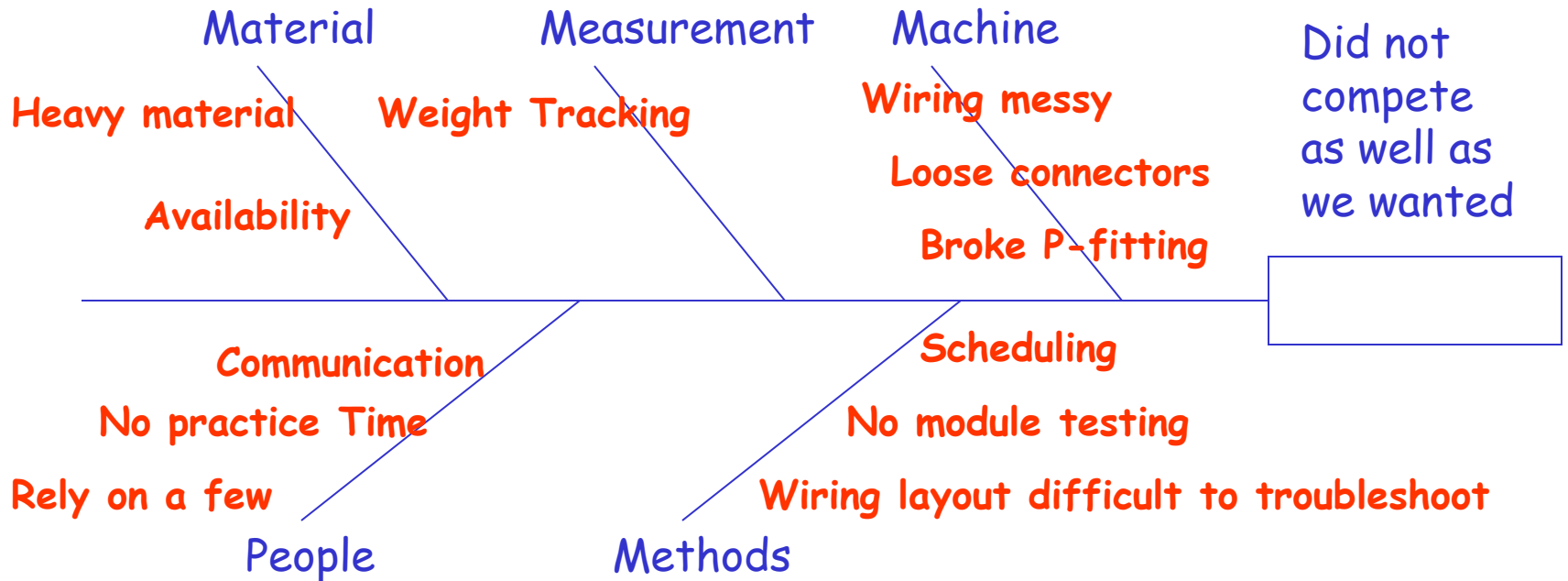
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- 2. Identify Main Bones



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- 3. Brainstorm Ideas - Classify



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- 4. Review and Group items into common themes
 - Communication
 - People
 - Controls

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- 5. Identify actions and action plans
 - Actions should be
 - Specific
 - Measurable
 - Assigned & Accepted
 - A specific person or small group
 - Tracked

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- 5. Identify actions and action plans
 - Weight Tracking
 - Make better use of Inventor (Bob)
 - Find weight of 'canned' parts (Mike)
 - Get an accurate small scale (Kelly)
 - Force a weight margin - ie 10 lbs (Mr. Jones)
 - Heavy Material
 - Find lighter, stronger materials (Mike, Jan)
 - Weld frame instead of bolts (Mr. Jones)
 - Requires a welder (tool) and welder (person)

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- 5. Identify actions and action plans
 - Availability (of materials)
 - Buy standard parts and stock them (Kyle)
 - Create a nightly shopping list (Kyle)
 - Communication
 - Force nightly discussion session (Captain)
 - Create "to-do" lists (Sub-Team Leads)
 - Use / read web-site for notices (ALL)

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- 5. Identify actions and action plans
 - No Practice Time
 - Set a build schedule and stick to it (Mr. Jones)
 - Build another chassis for controls (Fab Team)
 - Work weekends - maintain schedule (ALL)
 - Rely on a Few
 - Assign work to more people (Sub-Team Leads)
 - Assign leader roles (Mr. Jones)
 - Develop other students (Sub-Team Leads)

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- 5. Identify actions and action plans
 - Wiring layout difficult / messy / difficult to troubleshoot
 - More time to wire (schedule) (Mary)
 - Make a schematic (Luke)
 - Number / Label wires on each end (Luke)
 - Loose Connectors
 - Buy good crimpers (Kyle)
 - Train a crimper person (Mr. Jones)
 - Buy high quality connectors (Kyle & Mary)

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- 5. Identify actions and action plans
 - Broken Pneumatic Fitting
 - Add protective cover to all fittings (Mike)
 - Route fittings in protected areas (Mike)
 - Don't use pneumatics (Whole Team Decision)
 - Scheduling (Team Leaders)
 - Create a schedule and stick to it
 - Force late work / evenings to maintain schedule
 - Drop work if needed to keep schedule

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- 5. Identify actions and action plans
 - No Module Testing
 - Create mini versions (Sub-Team Leads)
 - Build modules and test them (Sub-Team Leads)
 - Use old robot for new ideas (Sub-Team Leads)

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- 6. Complete the Actions!
 - Just making the list does no good
 - Create a large action board
 - Track progress
 - Follow-up to see if the actions made a difference
- Then start all over for next year!

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- ## Summary

- FIRST teams can improve year to year by utilizing formal continuous improvement processes
- Many businesses use the same tools and there is a wealth of information available in libraries and on the internet.
- Your sponsor companies or local colleges / universities might offer a facilitator!

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- Questions?