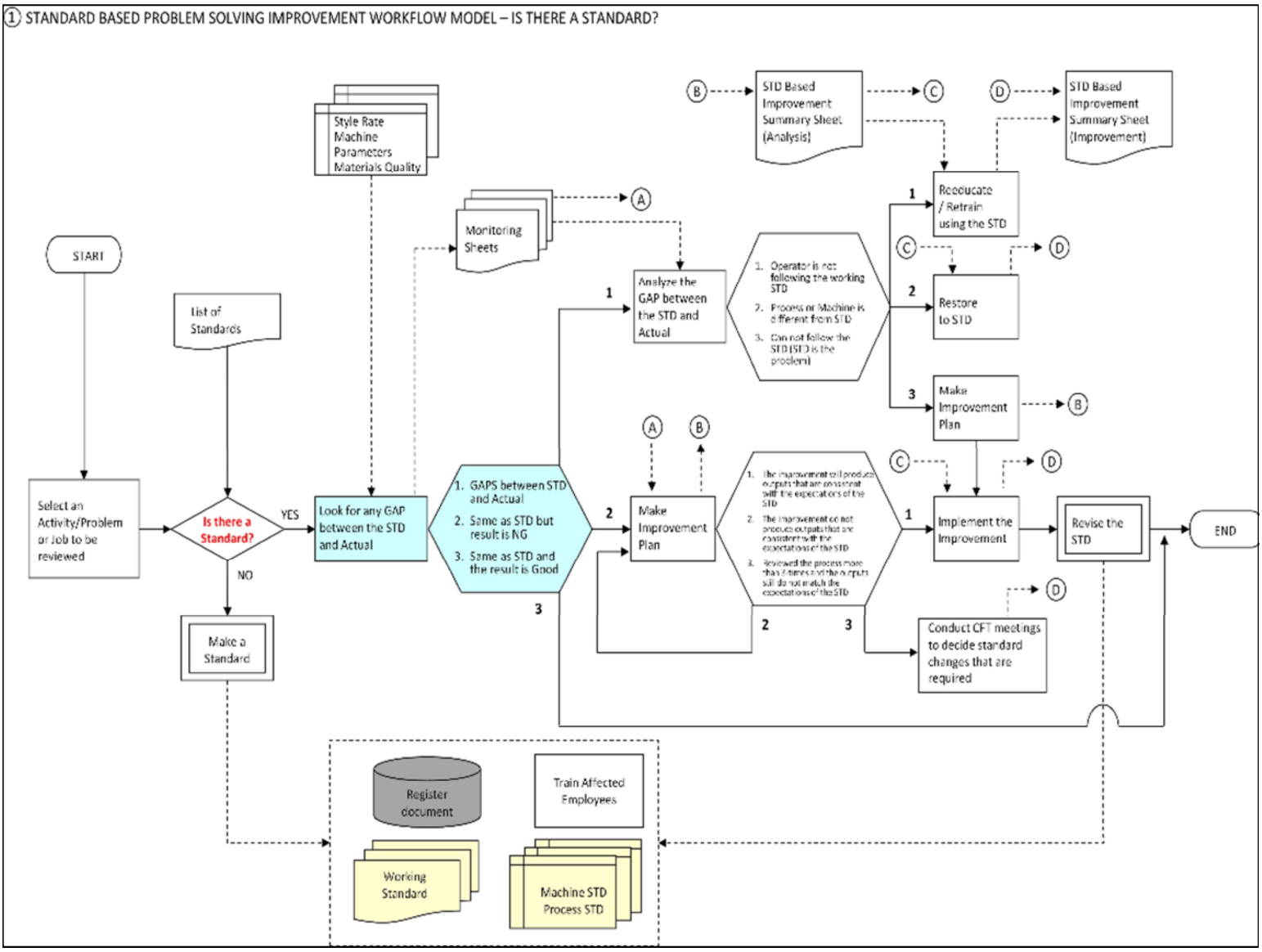
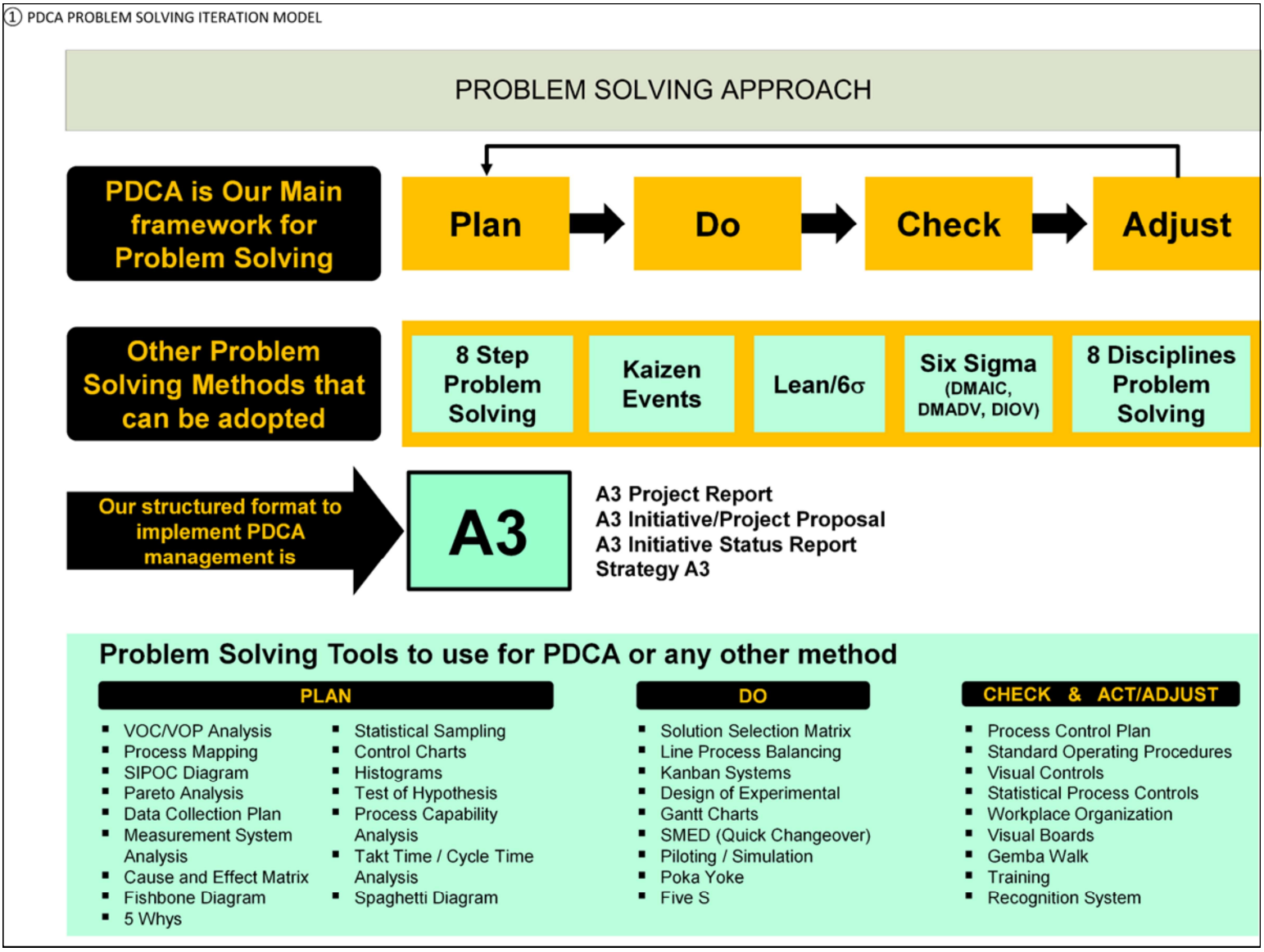


Problems! Problems! Problems! There's a school of thought that says problems are good. There was a time when I was on a quest to find a universal problem solving method, process, tool or approach and I have found that there isn't one. Good problem solving involves participation of a team of people and engagement in real time activity based problem solving workshops.

TOPS = Team Oriented Problem Solving

In this series of illustrations I created large 36" X 48" and plotter printed sheets of problem solving steps. The participants using marker pens and post-it notes activity engage with the information and data as it unfolds during the course of phases of the problem solving investigation. One of the more obvious reasons for such a manual way of using poster size paper, post-it notes and marker pens is that it appeals to the 3 learning styles of: Auditory learning, Visual learning and Kinesthetic learning.

This is the problem solving flow chart model.



Problem solving model. No matter how complex I get down into creating a problem solving plan I never forget to ask myself: “does this complete the P.D.C.A cycle? Here I am using a form of DMAIC six sigma process.

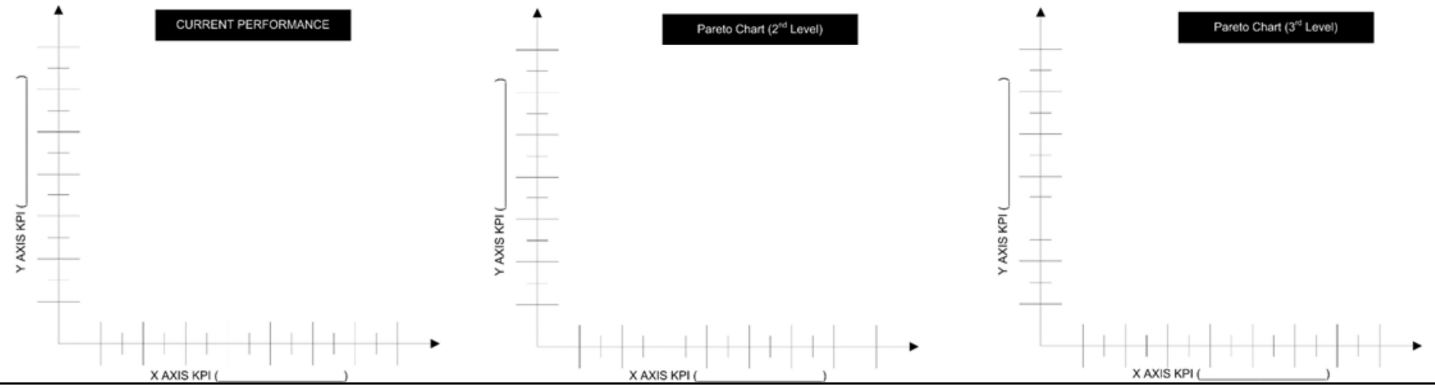
DMAIC = Define, Measure, Analyze, Improve, Control.

① - ③ - ④ PROBLEM DESCRIPTION – CURRENT CONDITION

PROBLEM STATEMENT	
CURRENT PERFORMANCE LEVEL	
DESIRED PERFORMANCE LEVEL	

① - ③ - ④ WHAT IS THE IMPACT ON THE ORGANIZATION?

✚	SAFETY	
		HOW MUCH? HOW MANY? HOW OFTEN?
Q1	QUALITY	
		HOW MUCH? HOW MANY? HOW OFTEN?
	DELIVERY	
		HOW MUCH? HOW MANY? HOW OFTEN?
$	FINANCIAL	
		HOW MUCH? HOW MANY? HOW OFTEN?
	ENVIRONMENT	
		HOW MUCH? HOW MANY? HOW OFTEN?



Here we are defining the problem statement and what impact or impacts has it has had to the organization.

② SIPOC DIAGRAM

PROCESS STATEMENT

SUPPLIERS	INPUTS	PROCESS	OUTPUTS	CUSTOMERS

Sometimes it's a good idea to capture a SIPOC of the problem. A SIPOC diagram is a tool used by a problem solving team to identify all relevant elements of a process improvement project before work begins and to see the scope.

SIPOC = Suppliers Inputs Processes Outputs Customers

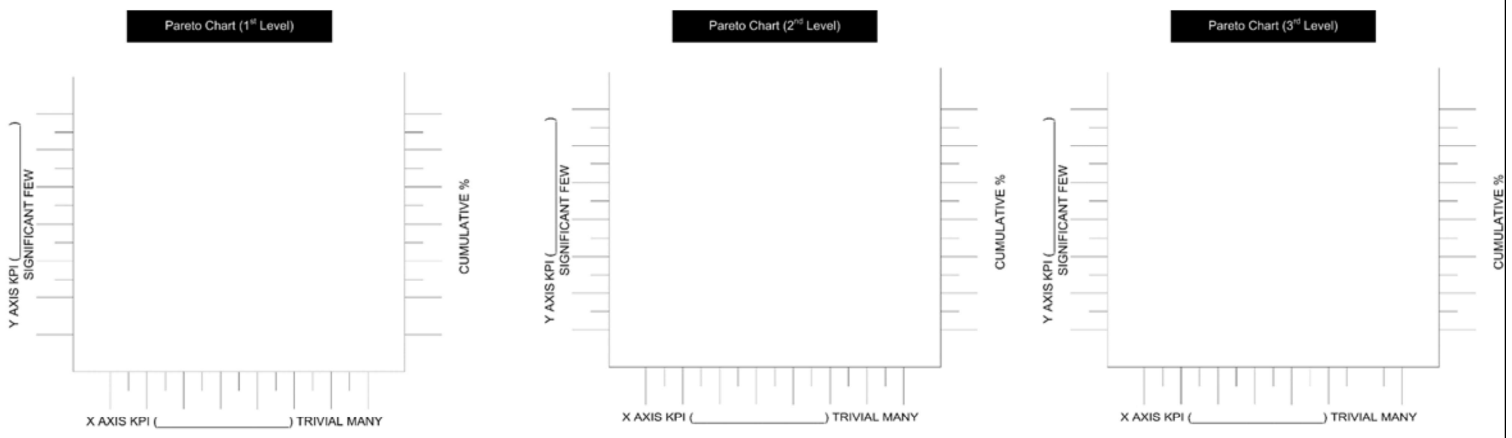
② SIPOC DIAGRAM

PROCESS STATEMENT: MILKING COWS

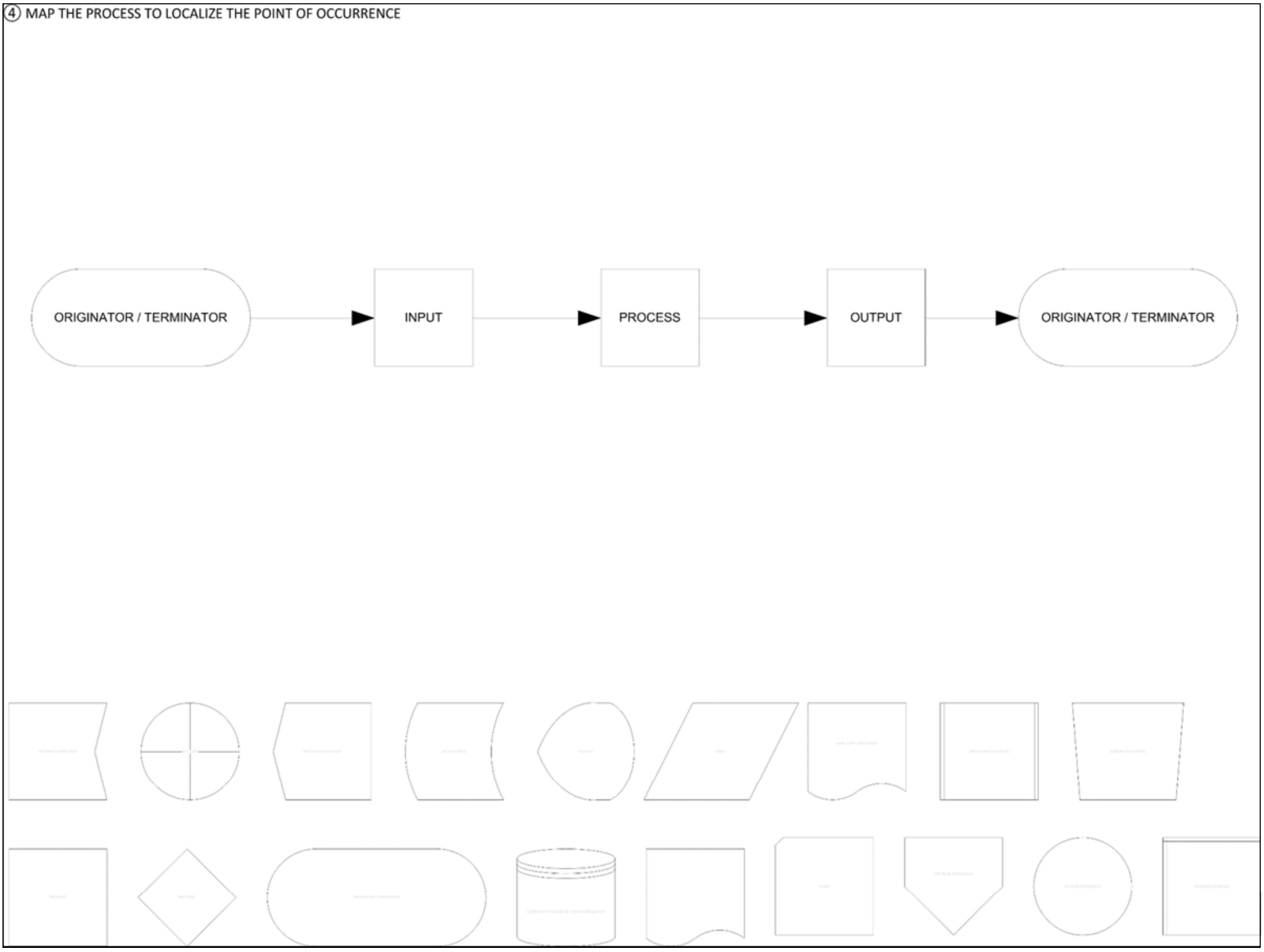
SUPPLIERS	INPUTS	PROCESS	OUTPUTS	CUSTOMERS
FARMER	GO TO STORE	PREPARE FEED TROUGHS	COWS EATS	COWS
FEED & SEED STORE	BUY HAY AND FEED	GET HAY AND FEED FROM BARN AND SILO	COWS DELIVERY MILK	DAIRY FARMER
FEED & SEED STORE	RETURN TO FARM	MEASURE HAY AND FEED IN TROUGHS	MILK TANKER PICK UP	BOTTLING PLANT
	PUT HAY AND FEED AWAY IN BARN AND SILO	SANITIZE MILKING EQUIPMENT	COWS FERTILIZES FIELDS	GROCERIES STORES
		CALL COWS IN FOR MILKING		FAMILIES' HOMES
		ATTACH MILKING TUBES TO COWS UDDERS		
		START MILKING EQUIPMENT AND MONITOR		
		REMOVE MILKING EQUIPMENT		
		PUT COWS OUT TO PASTURE		
		CLEAN MILKING EQUIPMENT AND PUT AWAY		

SIPOC example.

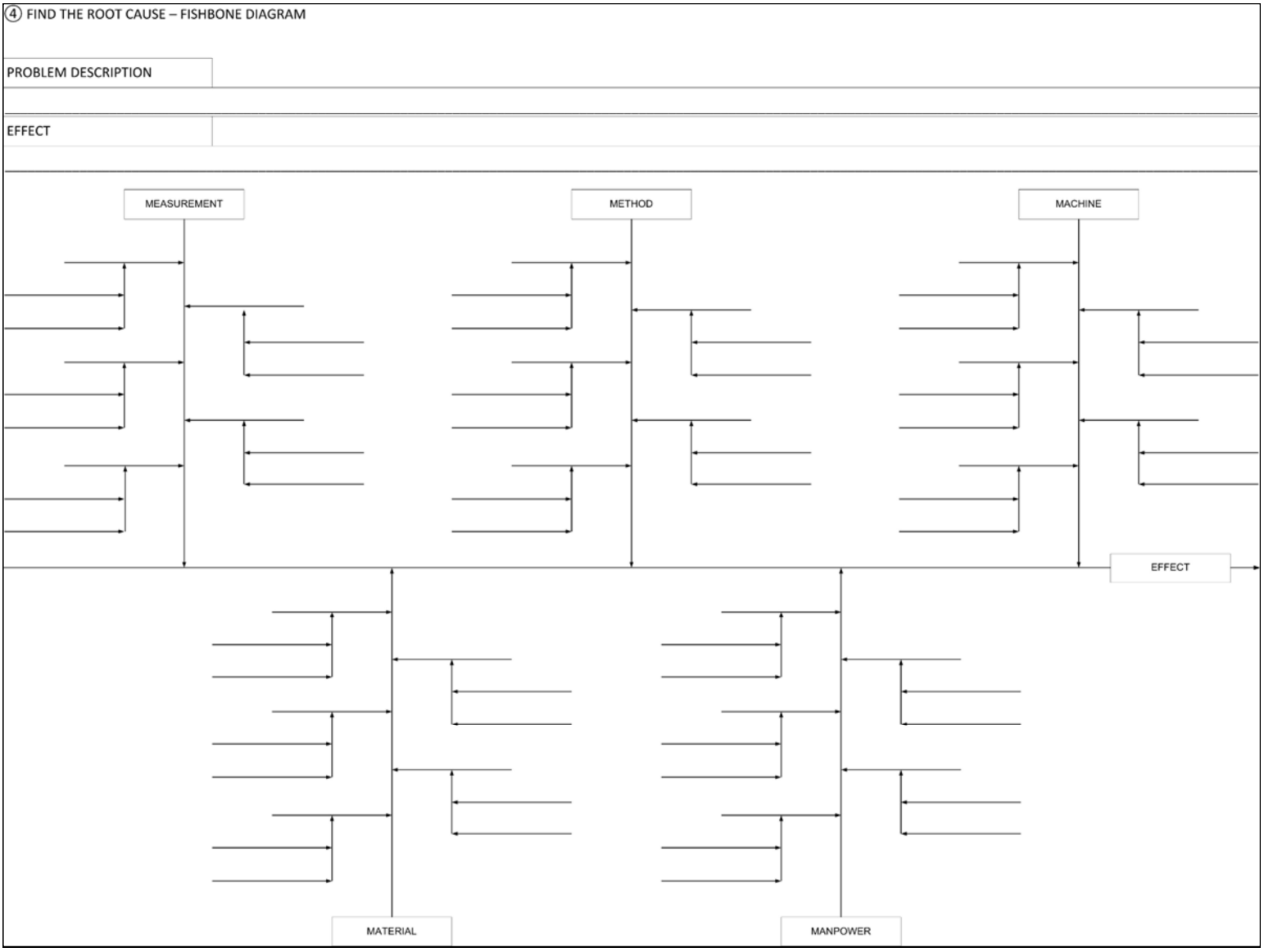
② PROBLEM BREAKDOWN



Part of the Define Analyze process is to capture information and data surrounding the problem under study.



Map the process using functional flow block diagrams



During the Analyze phase you look at factors and causal factors.

Manpower

Cause and effect logic tree using the 5 Whys method. Do the same for the other 5 Ms of **M**achine – **M**aterial – Method – **M**easurement. I designed this to scale for the 36” X 48” sheet so that the WHY and PROBLEM boxes when plotted out on the printer are the size of the 3” X 3” and 4” X 6”” post-it notes.


④ FIND THE ROOT CAUSE LOGIC TREE - MACHINE
PROBLEM
WHY?
WHY?
WHY?
WHY?
WHY?
HOW CAN THIS BE PREVENTED?
MACHINE 1
MACHINE 3
MACHINE 4
MACHINE 5

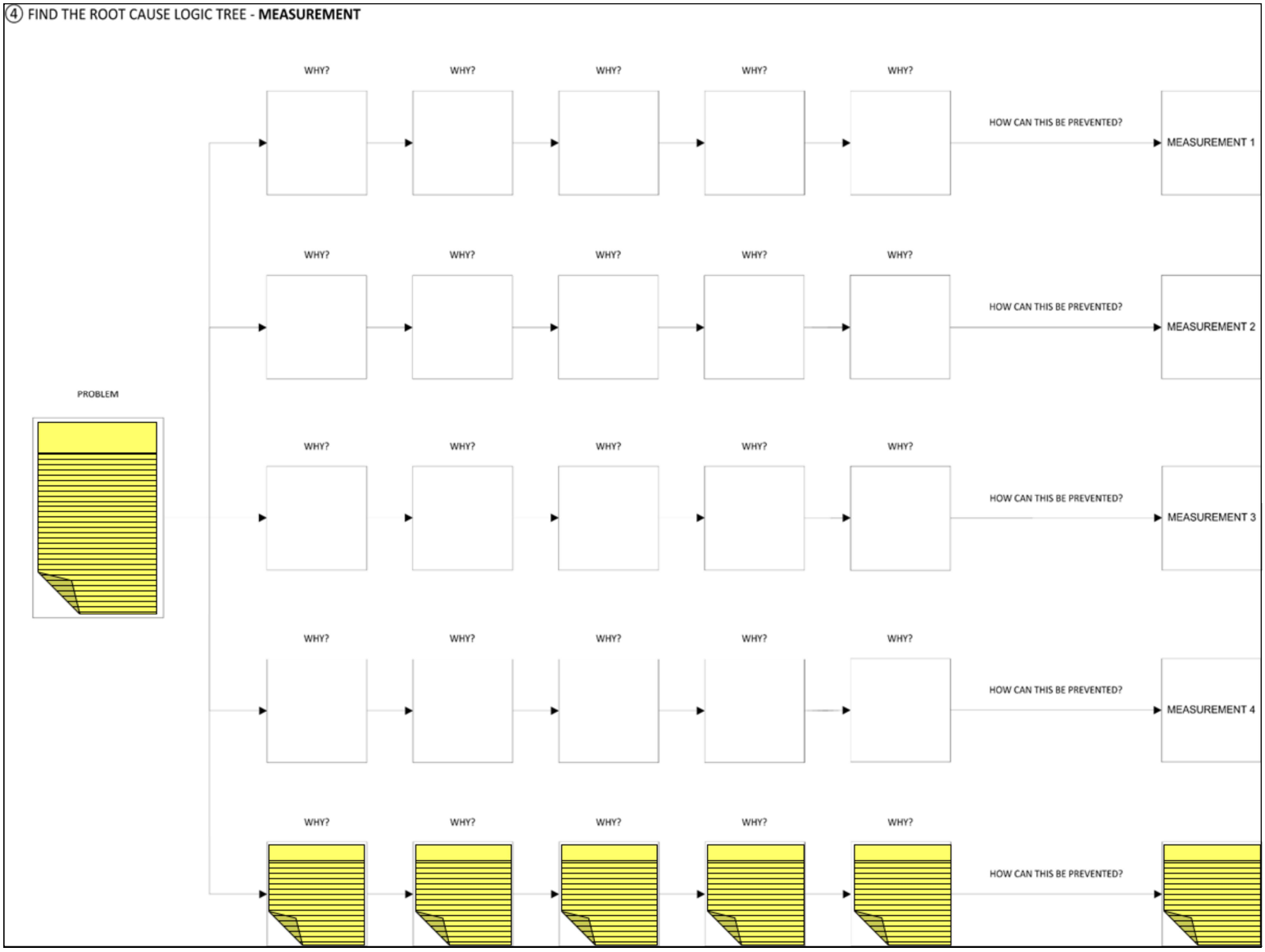
Machine


④ FIND THE ROOT CAUSE LOGIC TREE - MATERIAL
PROBLEM
WHY?
WHY?
WHY?
WHY?
WHY?
HOW CAN THIS BE PREVENTED?
MATERIAL 1
MATERIAL 2
MATERIAL 4
MATERIAL 5

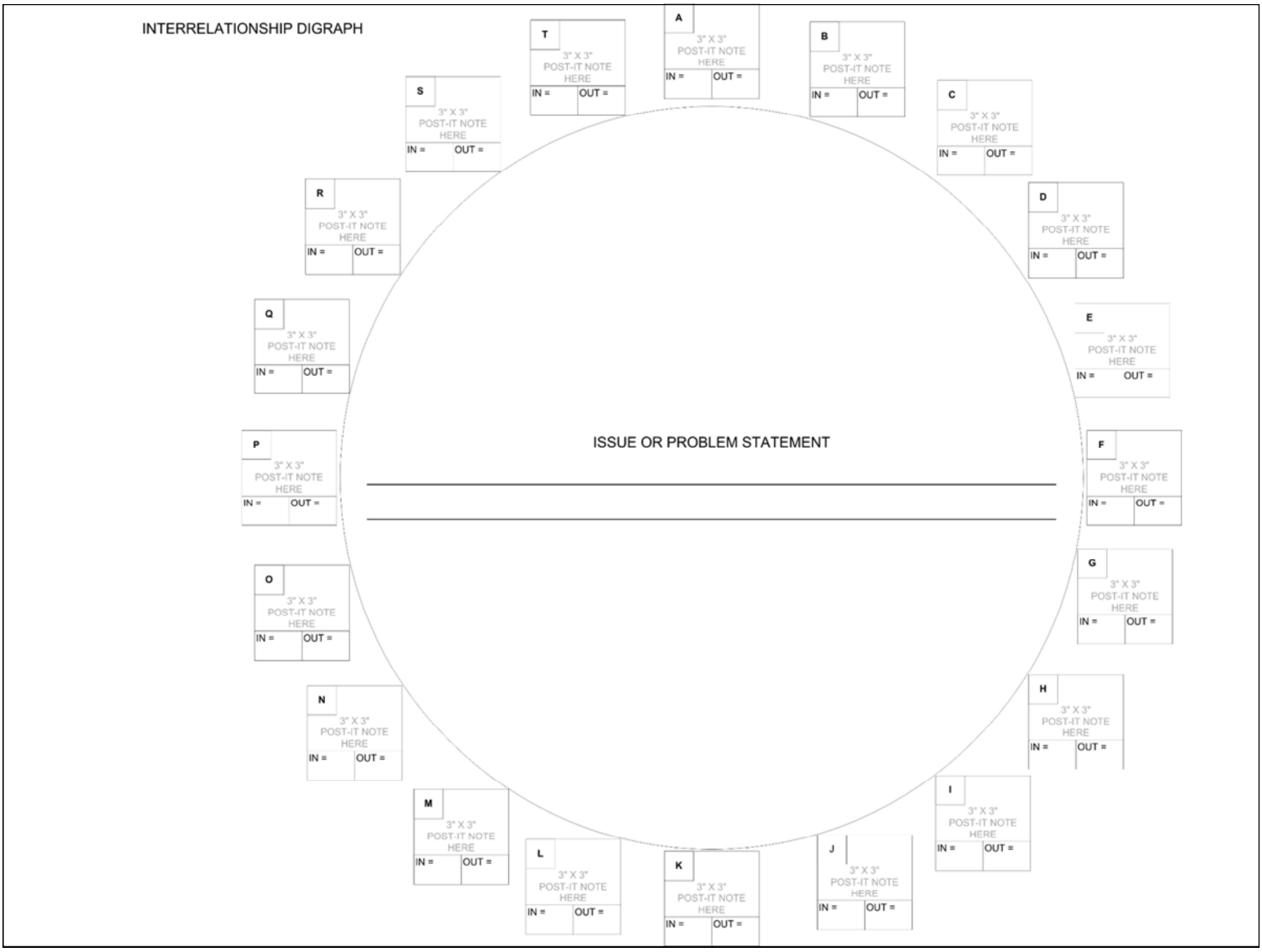
Material


④ FIND THE ROOT CAUSE LOGIC TREE - METHOD
PROBLEM
WHY?
WHY?
WHY?
WHY?
WHY?
HOW CAN THIS BE PREVENTED?
METHOD 1
METHOD 2
METHOD 3
METHOD 5

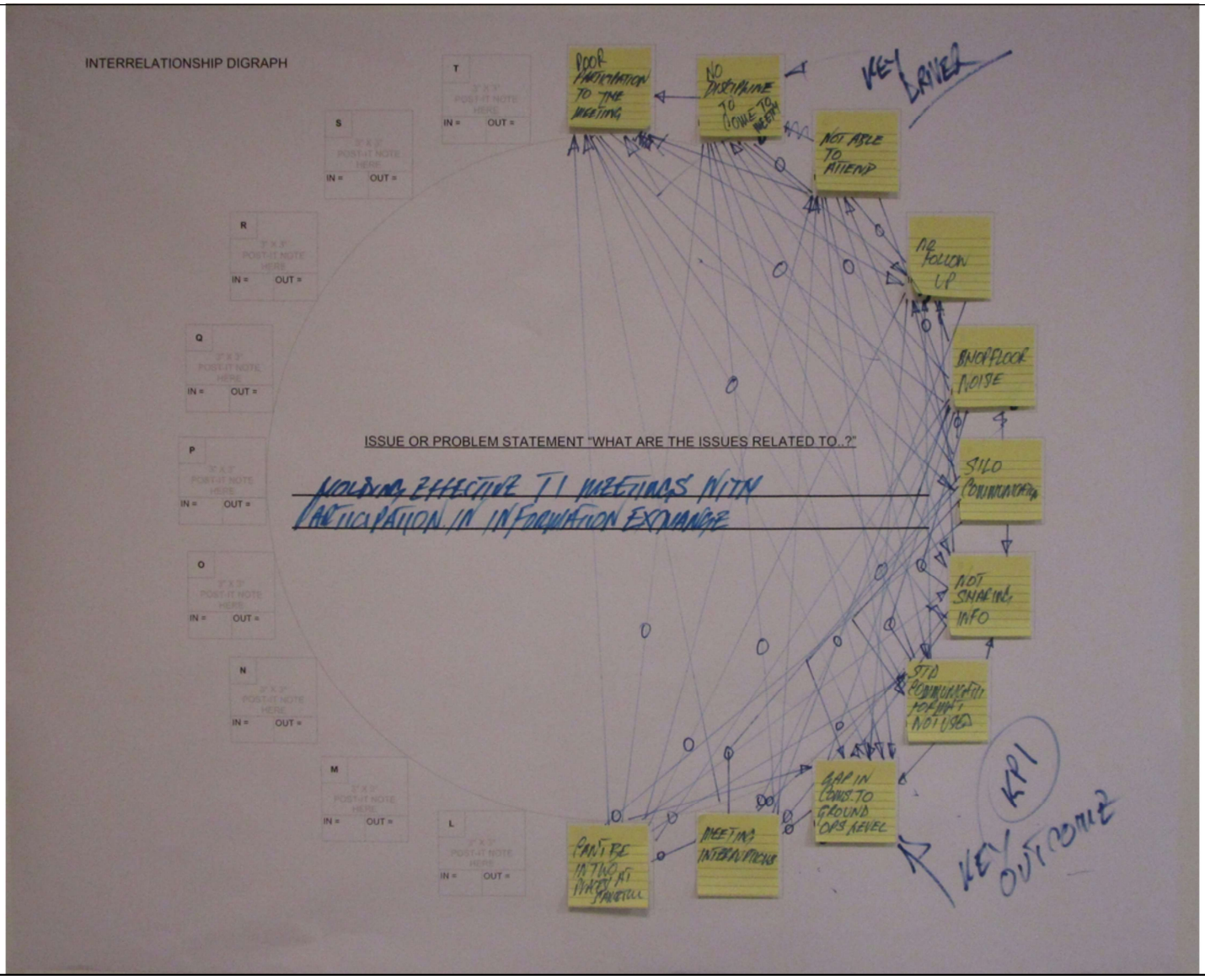
Method



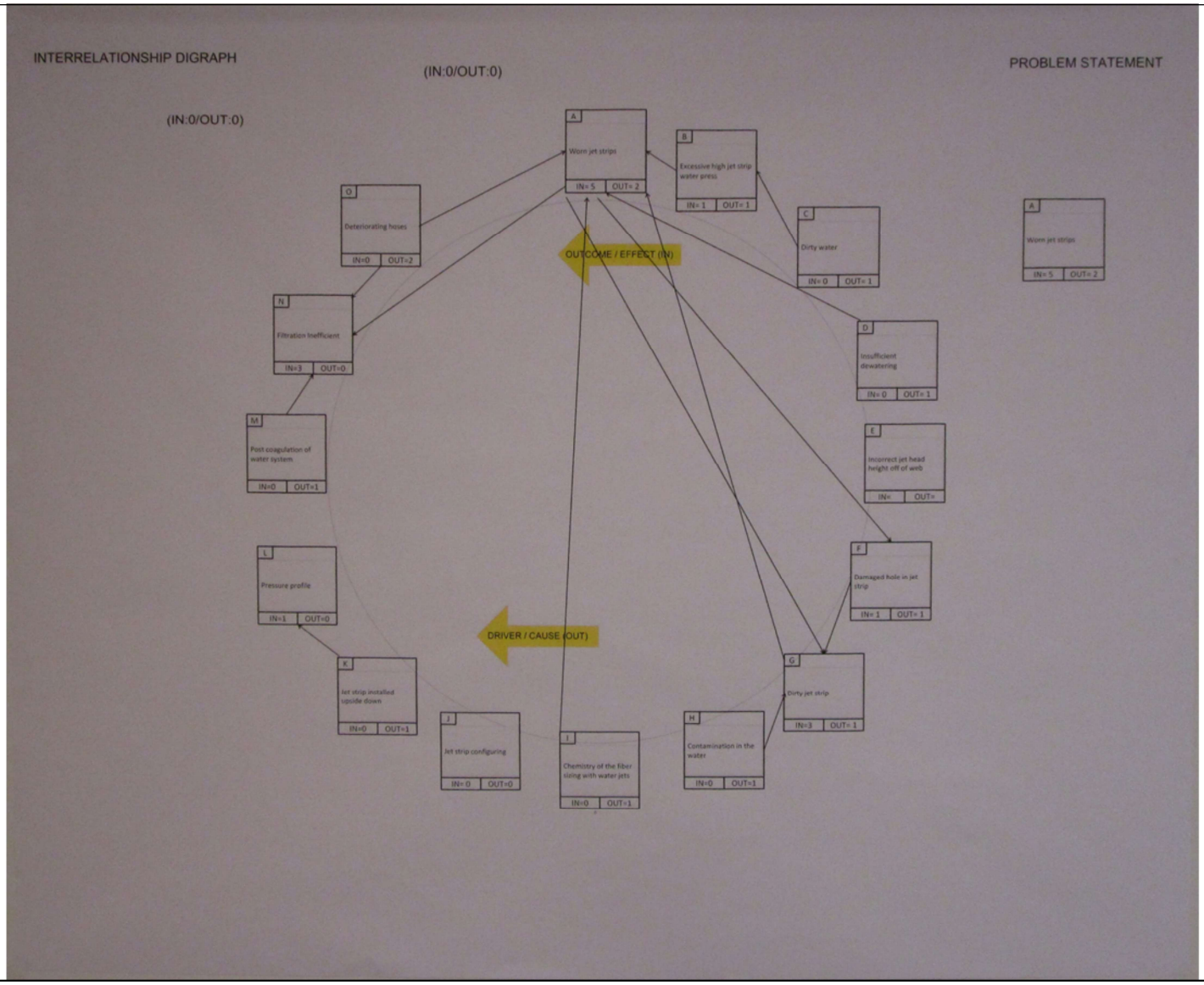
Measurement



My own plotter printer sized interrelationship digraph.



Real example of my digraph in use during allowing a team to systematically identify, analyze and classify the **Driver** and **Outcome** relationships that exist among all critical issues so that those **Key Drivers** and **Key Outcomes** can become the heart of an effective solution.



Real example of my digraph in use during allowing a team to systematically identify, analyze and classify the **Driver** and **Outcome** relationships that exist among all critical issues so that those **Key Drivers** and **Key Outcomes** can become the heart of an effective solution.

⑤ DEVELOP COUNTERMEASURES ACTIONPLAN

#	CORRESPONDING 5M FACTOR & NUMBER	IMPROVEMENT PLAN	PRIORITIZATION FACTORS (USING THE PRIORITIZATION TABLE TO EVALUATE EACH PLAN)				PRIORITIZATION SCORE
			IMPACT ON KPI	IMPACT ON SAFETY	EASE OF IMPLEMENTATION	FINANCIAL COST	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

1	LOW	3	MEDIUM	6	HIGH

Improvement plan. Again, this is all manually done with writing it by hand on the plotted sheet of paper.

⑤ IMPROVEMENT PLAN _____

#	WHAT TO CHANGE (ITEM)	ACTUAL (FROM)	FUTURE (TO)	EXPECTED RESULTS	ACTUAL RESULTS	COMMENTS
1						
2						
4						
5						
6						
7						
8						
9						
10						

This captures specifications that need to be changed. Remember P.D.C.A. If you change something test it first to make sure that it doesn't have negative affects for up or downstream processes or your customer's processes.

⑥ RECURRENCE PREVENTION CONTROL PLAN

#	CORRESPONDING 5M FACTOR & NUMBER	CONTROL PLAN – TASK – ACTIVITY	CONTROL PLAN TASK ACTIVITY TIME LINES			PROGRESS			
			ASSIGNED RESPONSIBLE PERSON	EXPECTED START DATE	EXPECTED END DATE				
1				/ /	/ /	25%	50%	75%	100%
2				/ /	/ /	25%	50%	75%	100%
3				/ /	/ /	25%	50%	75%	100%
4				/ /	/ /	25%	50%	75%	100%
5				/ /	/ /	25%	50%	75%	100%
6				/ /	/ /	25%	50%	75%	100%
7				/ /	/ /	25%	50%	75%	100%
8				/ /	/ /	25%	50%	75%	100%
9				/ /	/ /	25%	50%	75%	100%
10				/ /	/ /	25%	50%	75%	100%
11				/ /	/ /	25%	50%	75%	100%
12				/ /	/ /	25%	50%	75%	100%
13				/ /	/ /	25%	50%	75%	100%
14				/ /	/ /	25%	50%	75%	100%
15				/ /	/ /	25%	50%	75%	100%
16				/ /	/ /	25%	50%	75%	100%
17				/ /	/ /	25%	50%	75%	100%
18				/ /	/ /	25%	50%	75%	100%
19				/ /	/ /	25%	50%	75%	100%
20				/ /	/ /	25%	50%	75%	100%
21				/ /	/ /	25%	50%	75%	100%
22				/ /	/ /	25%	50%	75%	100%
23				/ /	/ /	25%	50%	75%	100%
24				/ /	/ /	25%	50%	75%	100%
25				/ /	/ /	25%	50%	75%	100%

If you change it how are you going to control it. Who is going to do what? By when? Follow up.

⑦ & ⑧ RECURRENCE PREVENTION EVALUATE RESULTS & STANDARDIZE THE IMPROVEMENT PROCESS

TRAINING NEEDS

#	REGISTRATION NUMBER	TITLE	ASSIGNED RESPONSIBLE PERSON	EXPECTED START DATE	EXPECTED END DATE
1				/ /	/ /
2				/ /	/ /
3				/ /	/ /
4				/ /	/ /
5				/ /	/ /
6				/ /	/ /
7				/ /	/ /
8				/ /	/ /
9				/ /	/ /
10				/ /	/ /
11				/ /	/ /
12				/ /	/ /

STANDARDS – SPECIFICATIONS – WORK INSTRUCTIONS – PROCEDURES – FORMS TO BE UPDATED

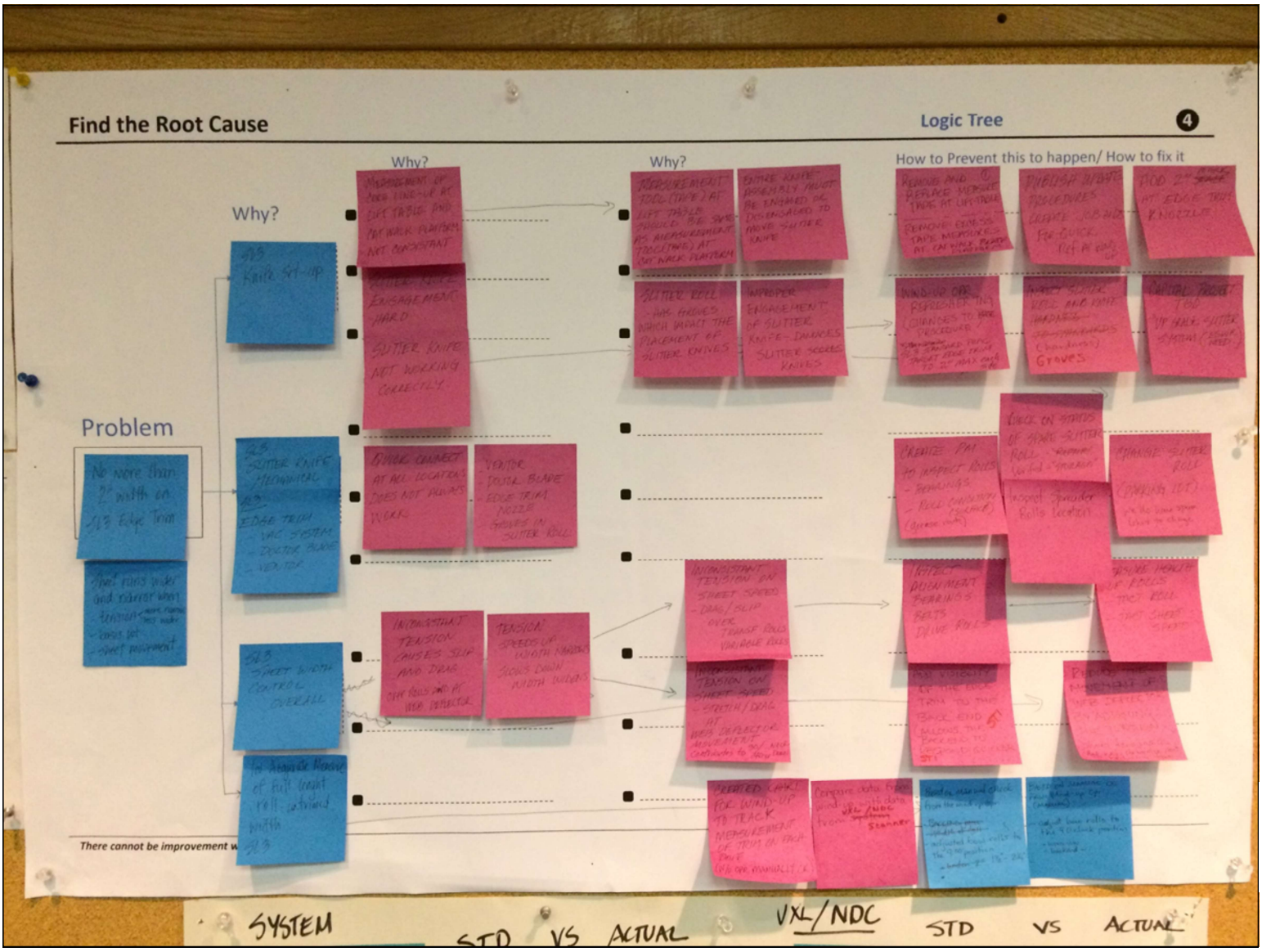
#	REGISTRATION NUMBER	TITLE	ASSIGNED RESPONSIBLE PERSON	EXPECTED START DATE	EXPECTED END DATE
1				/ /	/ /
2				/ /	/ /
3				/ /	/ /
4				/ /	/ /
5				/ /	/ /
6				/ /	/ /
7				/ /	/ /
8				/ /	/ /
9				/ /	/ /
10				/ /	/ /
11				/ /	/ /
12				/ /	/ /

Recurrence prevention. This is where you fix the system that allow the mistake, error to occur. It may be updating the PFMEA or upgrading a work instructions, updating or upgrading a control plan or improving a weakness in design to either eliminate the problem or detect it.

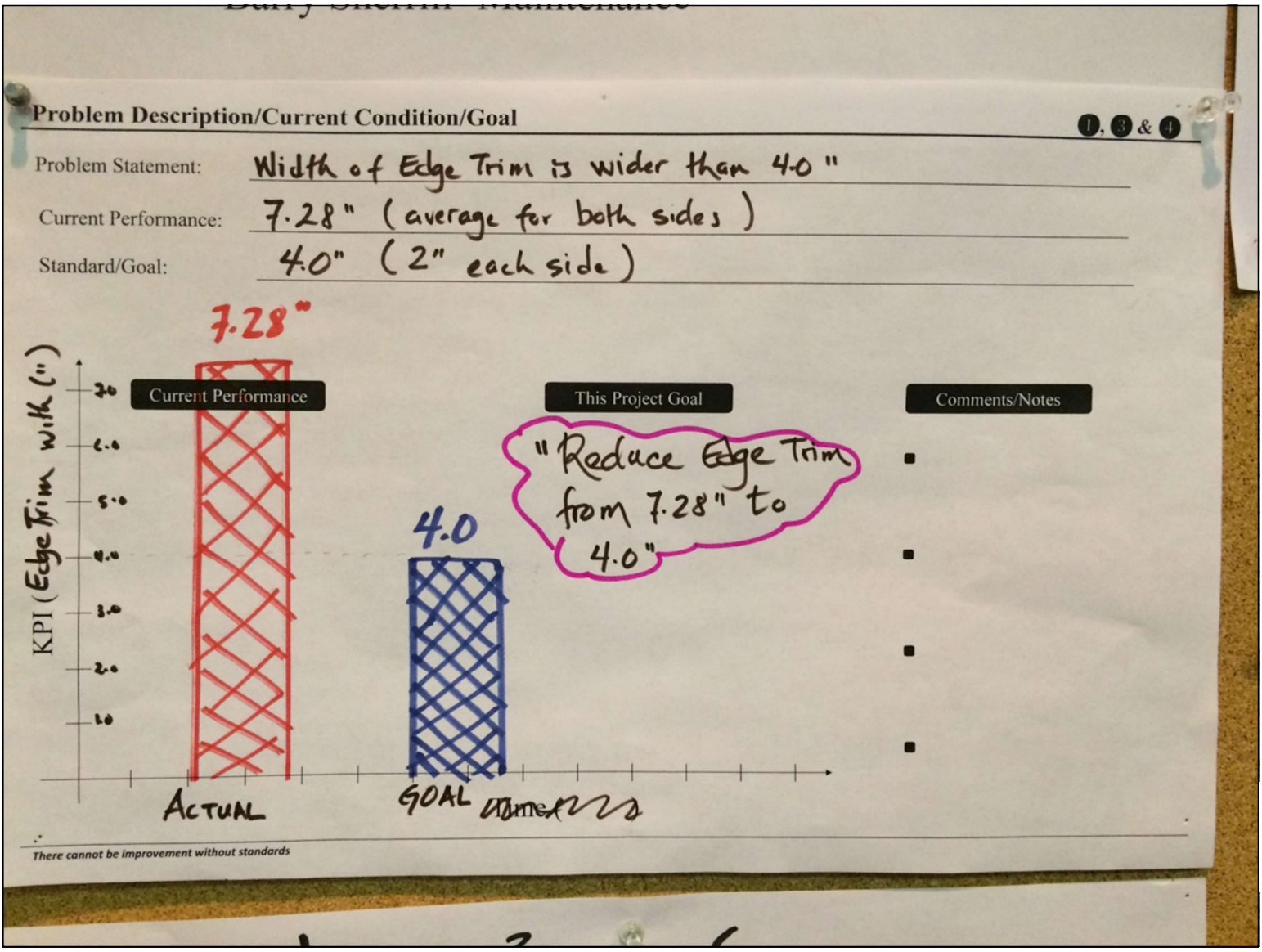
⑨ LESSONS LEARNED

1
2
3
4
5
6
7
8
9
10
11
12

Lessons learned. Document what you learned about the problem and the experiences solving it and the countermeasures used. The idea here is to get more better and faster at problem solving so that solving problems is seen as a failure in design engineering and not a burden.

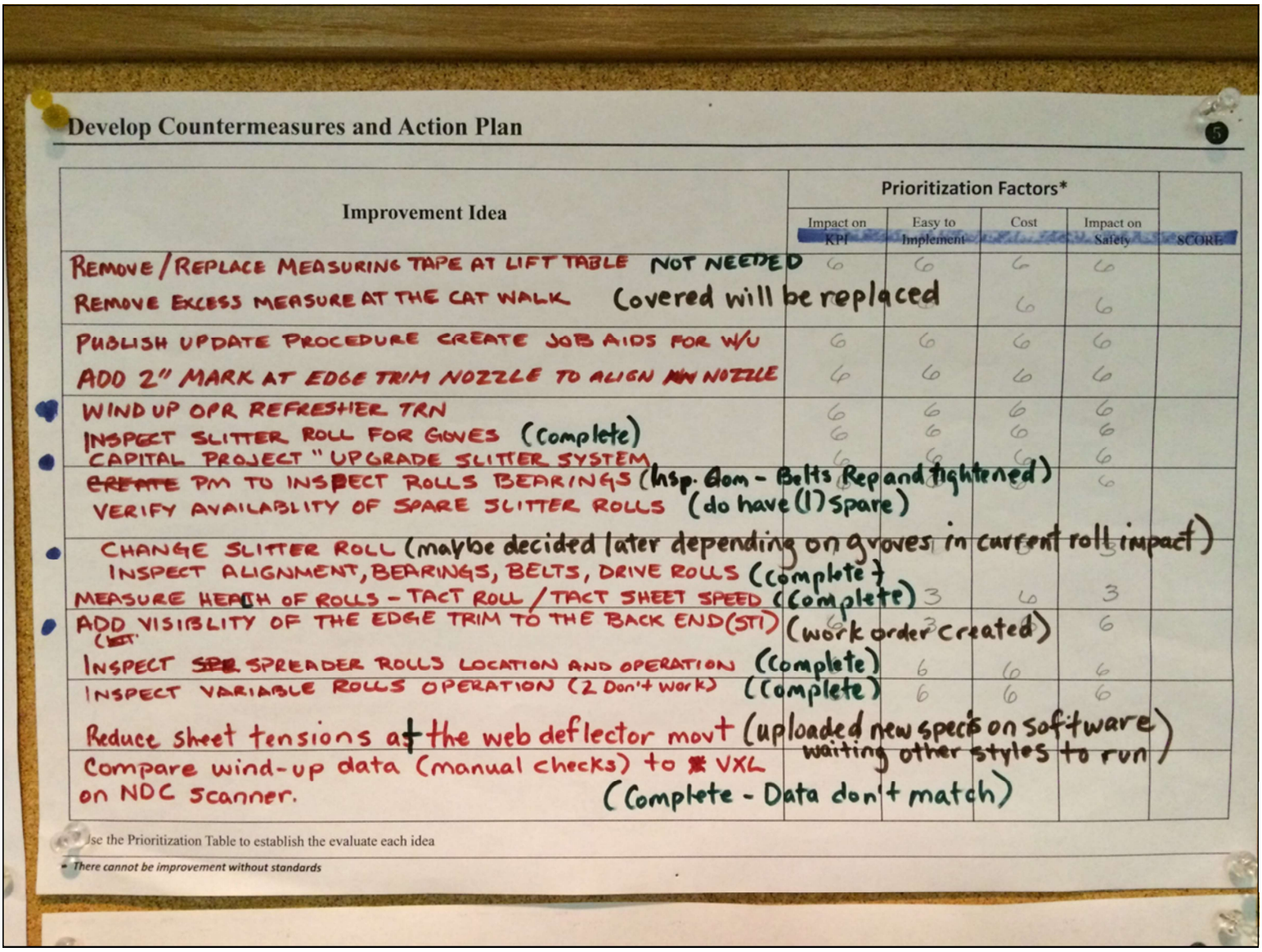


Here is a series of sample pictures of this problem solving approach in use during a processing materials edge trim waste reduction workshop. Again, very much a ‘hands-on’ marker pen to paper approach to visual problem solving.



Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a 'hands-on' marker pen to paper approach to visual problem solving.

Cont.



Develop Countermeasures and Action Plan

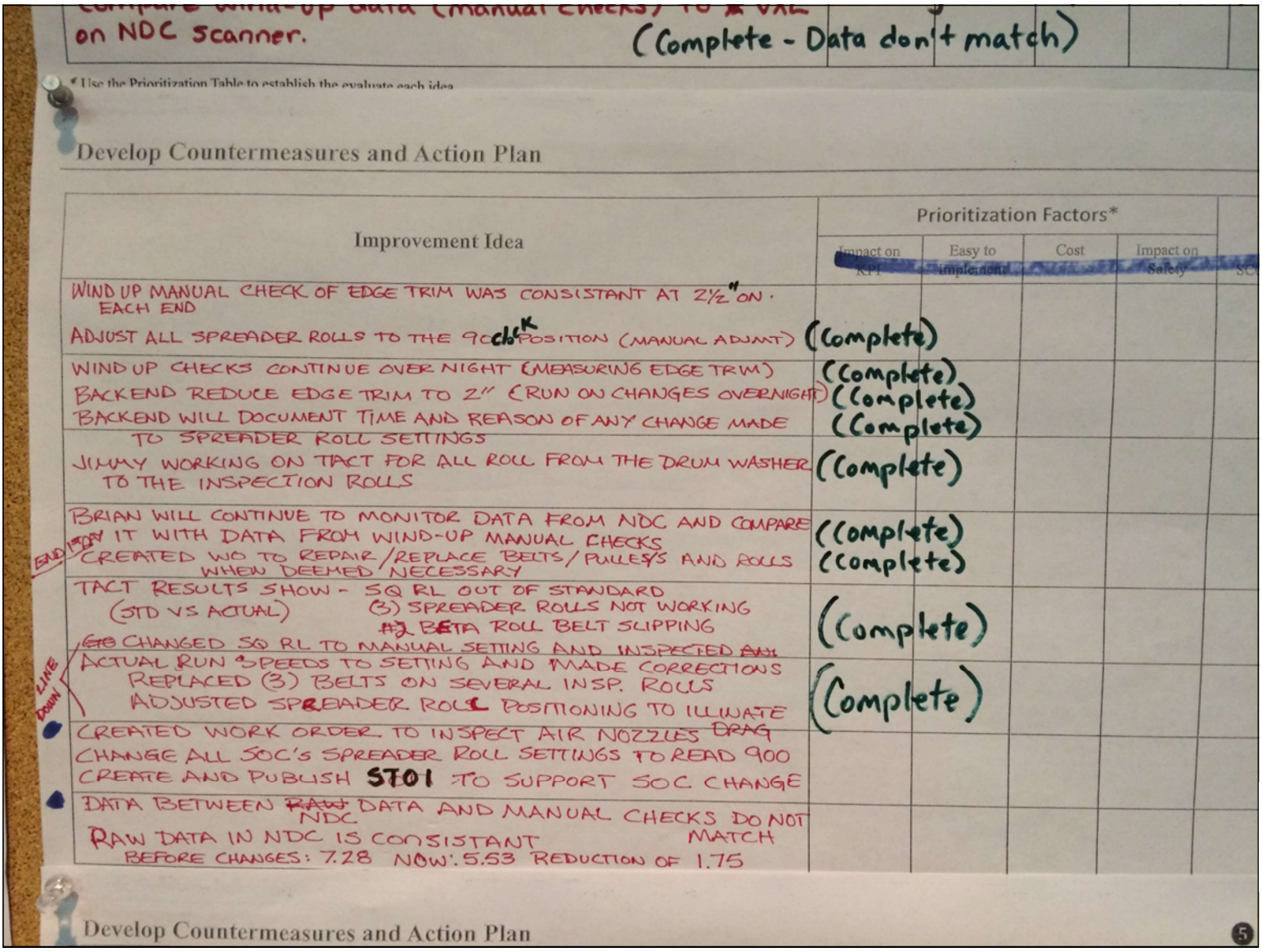
Improvement Idea	Prioritization Factors*				
	Impact on KPI	Easy to Implement	Cost	Impact on Safety	SCORE
REMOVE / REPLACE MEASURING TAPE AT LIFT TABLE NOT NEEDED	6	6	6	6	
REMOVE EXCESS MEASURE AT THE CAT WALK (covered will be replaced			6	6	
PUBLISH UPDATE PROCEDURE CREATE JOB AIDS FOR W/U	6	6	6	6	
ADD 2" MARK AT EDGE TRIM NOZZLE TO ALIGN NEW NOZZLE	6	6	6	6	
WIND UP OPR REFRESHER TRN	6	6	6	6	
INSPECT SLITTER ROLL FOR GOVES (Complete)	6	6	6	6	
CAPITAL PROJECT "UPGRADE SLITTER SYSTEM	6	6	6	6	
~~CREATE~~ PM TO INSPECT ROLLS BEARINGS (Insp. Com - Belts Rep and tightened)				6	
VERIFY AVAILABLITY OF SPARE SLITTER ROLLS (do have (1) spare)					
CHANGE SLITTER ROLL (maybe decided later depending on groves in current roll impact)					
INSPECT ALIGNMENT, BEARINGS, BELTS, DRIVE ROLLS (complete)					
MEASURE HEATH OF ROLLS - TACT ROLL / TACT SHEET SPEED (Complete)	3	6		3	
ADD VISIBLITY OF THE EDGE TRIM TO THE BACK END (STI) (work order created)	6	3	6	6	
INSPECT ~~SPR~~ SPREADER ROLLS LOCATION AND OPERATION (Complete)	6	6	6	6	
INSPECT VARIABLE ROLLS OPERATION (2 Don't work) (Complete)	6	6	6	6	
Reduce sheet tensions at the web deflector movt (uploaded new specs on software waiting other styles to run)					
Compare wind-up data (manual checks) to VXL on NDC Scanner. (Complete - Data don't match)					

Use the Prioritization Table to establish the evaluate each idea

* There cannot be improvement without standards

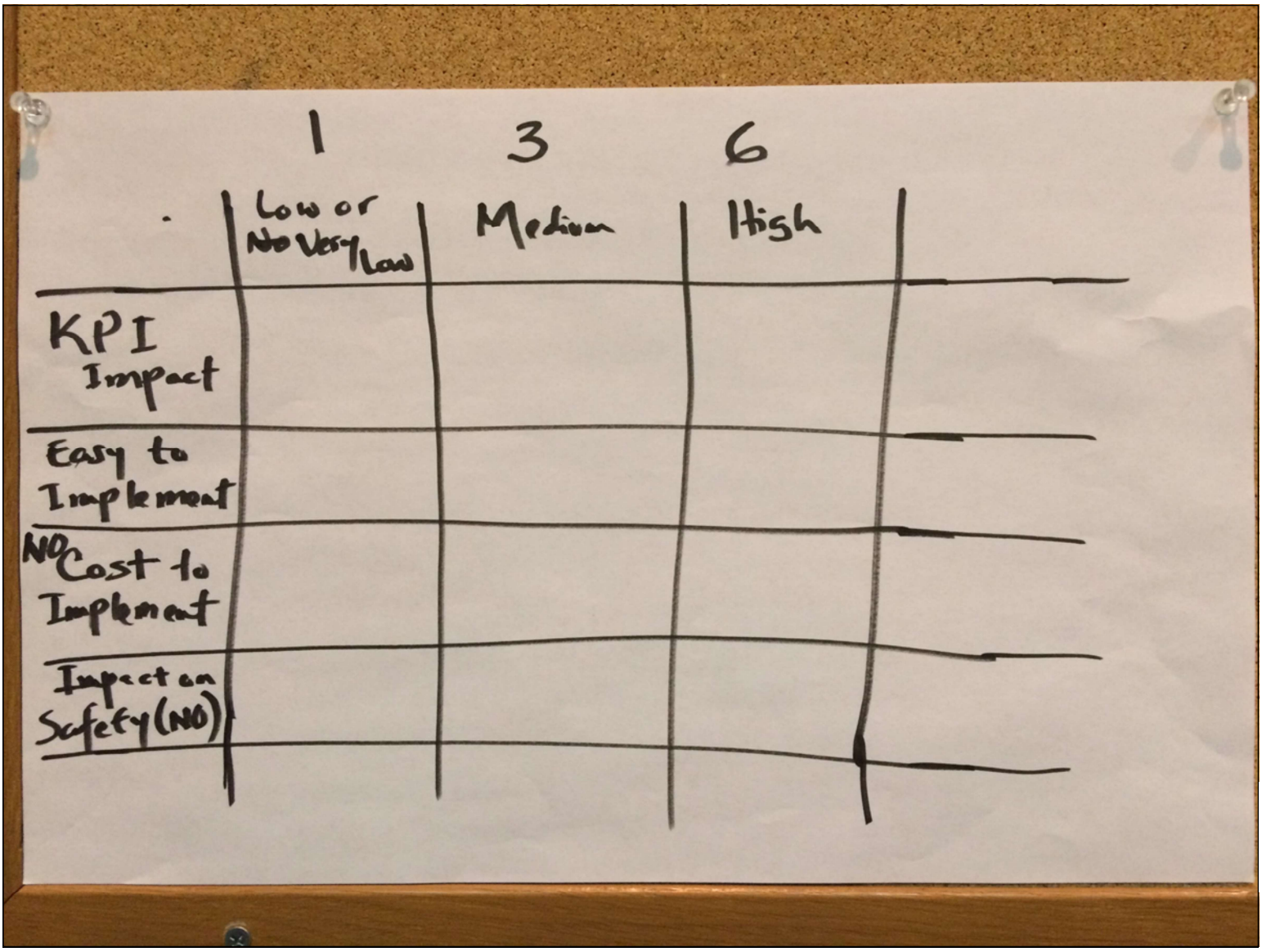
Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a 'hands-on' marker pen to paper approach to visual problem solving.

Cont.



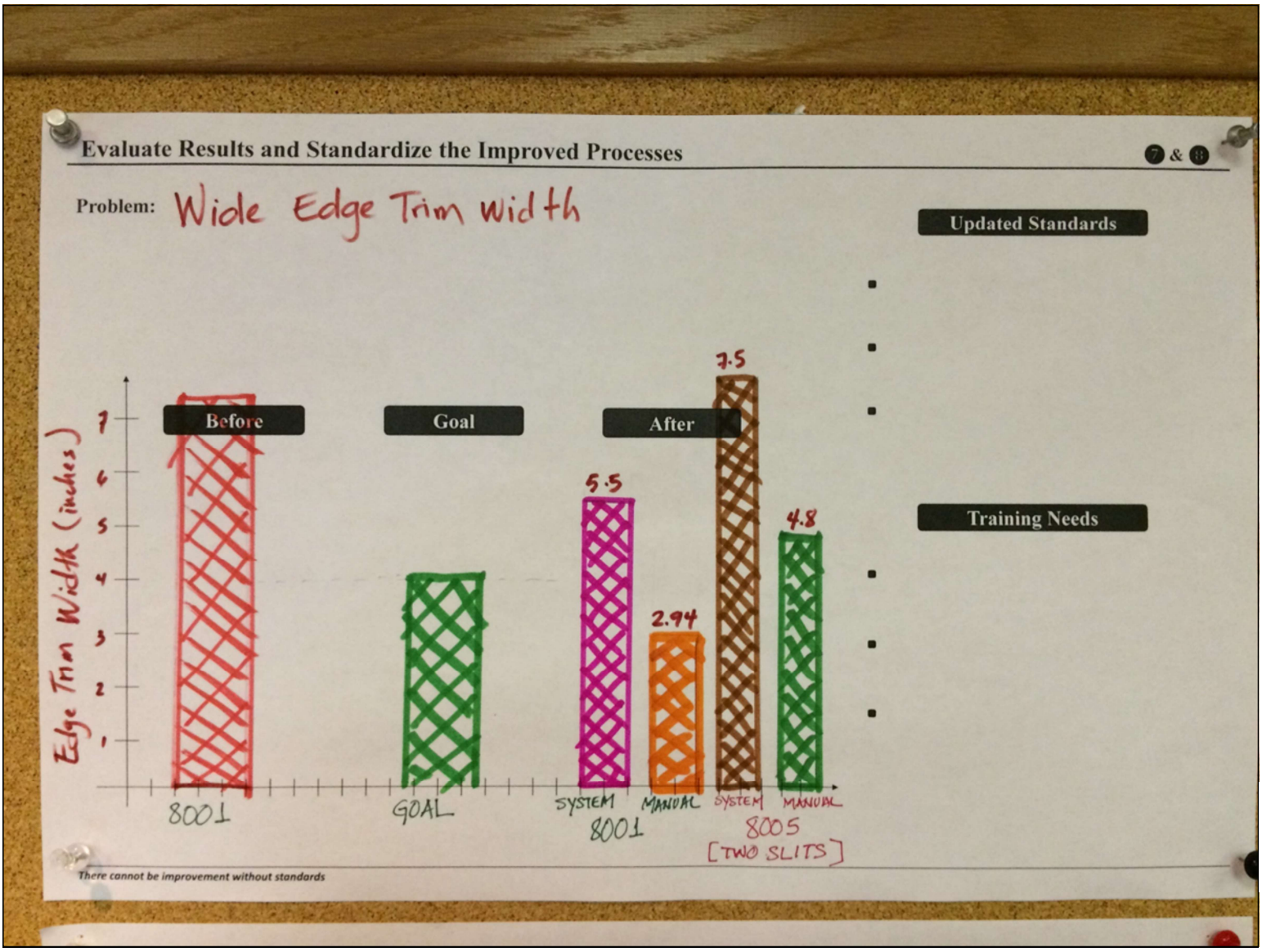
Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a 'hands-on' marker pen to paper approach to visual problem solving.

Cont.



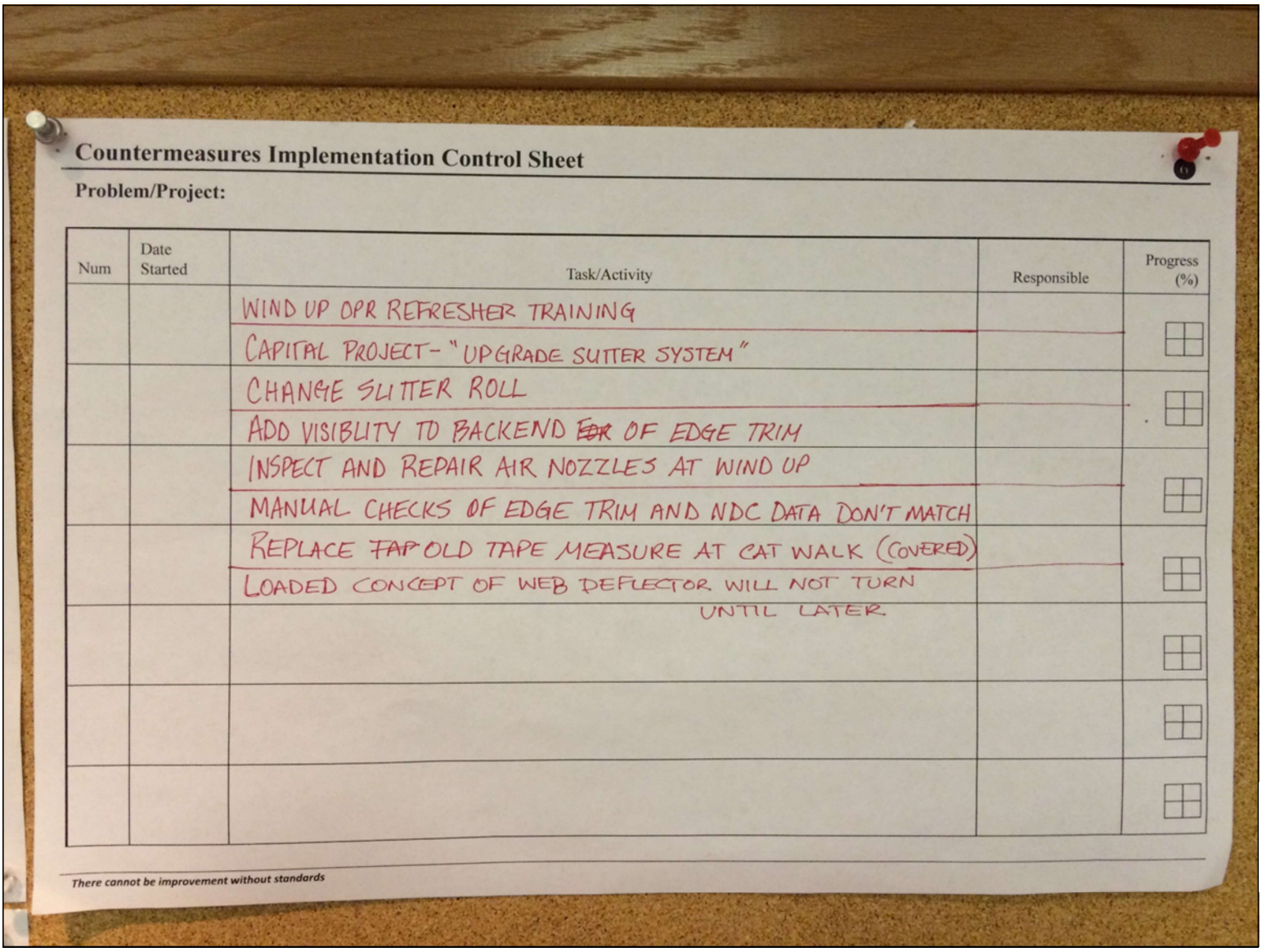
Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a ‘hands-on’ marker pen to paper approach to visual problem solving.

Cont.



Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a ‘hands-on’ marker pen to paper approach to visual problem solving.

Cont.



Countermeasures Implementation Control Sheet

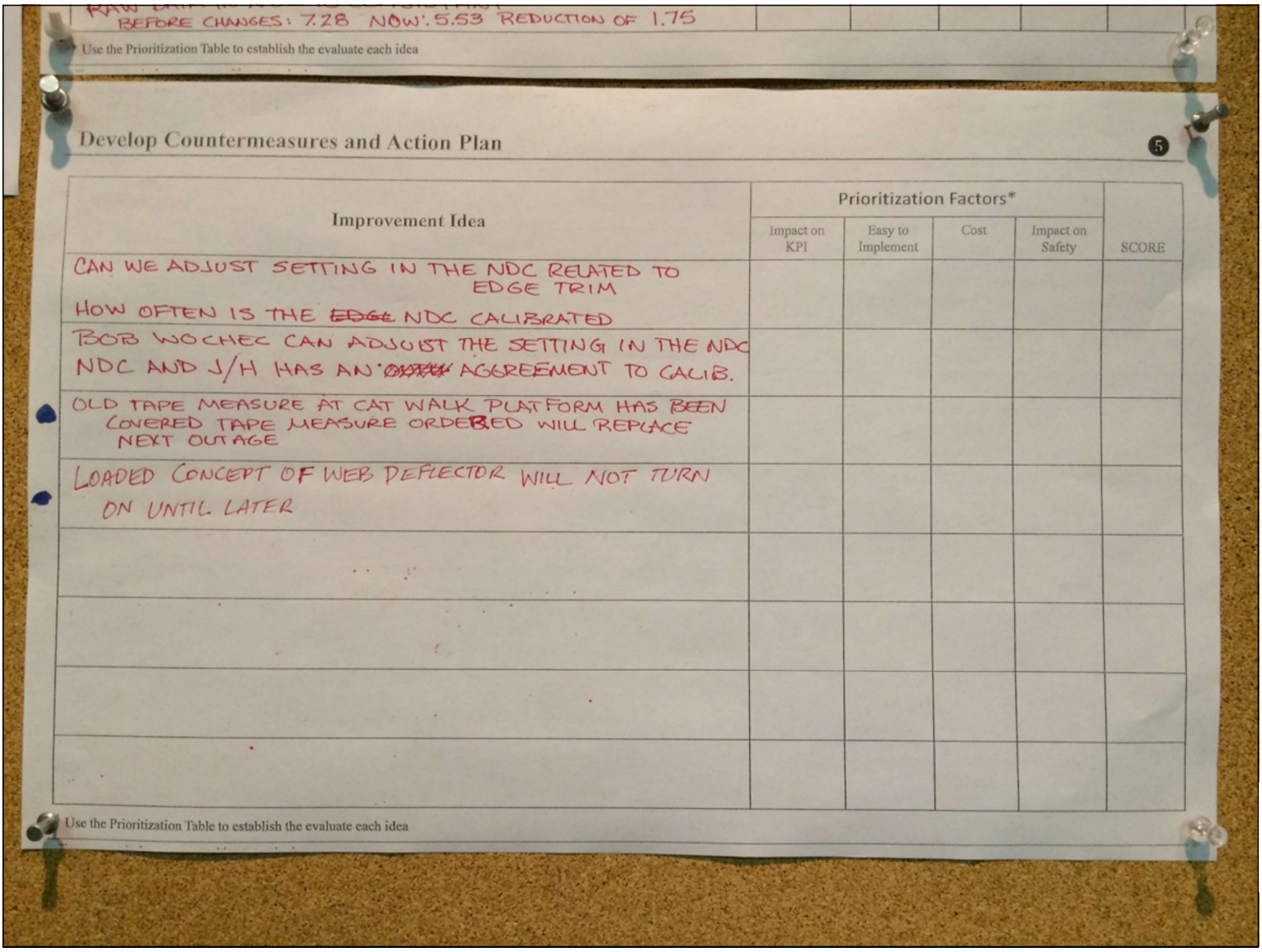
Problem/Project:

Num	Date Started	Task/Activity	Responsible	Progress (%)
		WIND UP OPR REFRESHER TRAINING		
		CAPITAL PROJECT - "UPGRADE SUTTER SYSTEM"		
		CHANGE SLITTER ROLL		
		ADD VISIBLITY TO BACKEND ~~EDR~~ OF EDGE TRIM		
		INSPECT AND REPAIR AIR NOZZLES AT WIND UP		
		MANUAL CHECKS OF EDGE TRIM AND NDC DATA DON'T MATCH		
		REPLACE ~~TAP~~ OLD TAPE MEASURE AT CAT WALK (COVERED)		
		LOADED CONCEPT OF WEB DEFLECTOR WILL NOT TURN UNTIL LATER.		

There cannot be improvement without standards

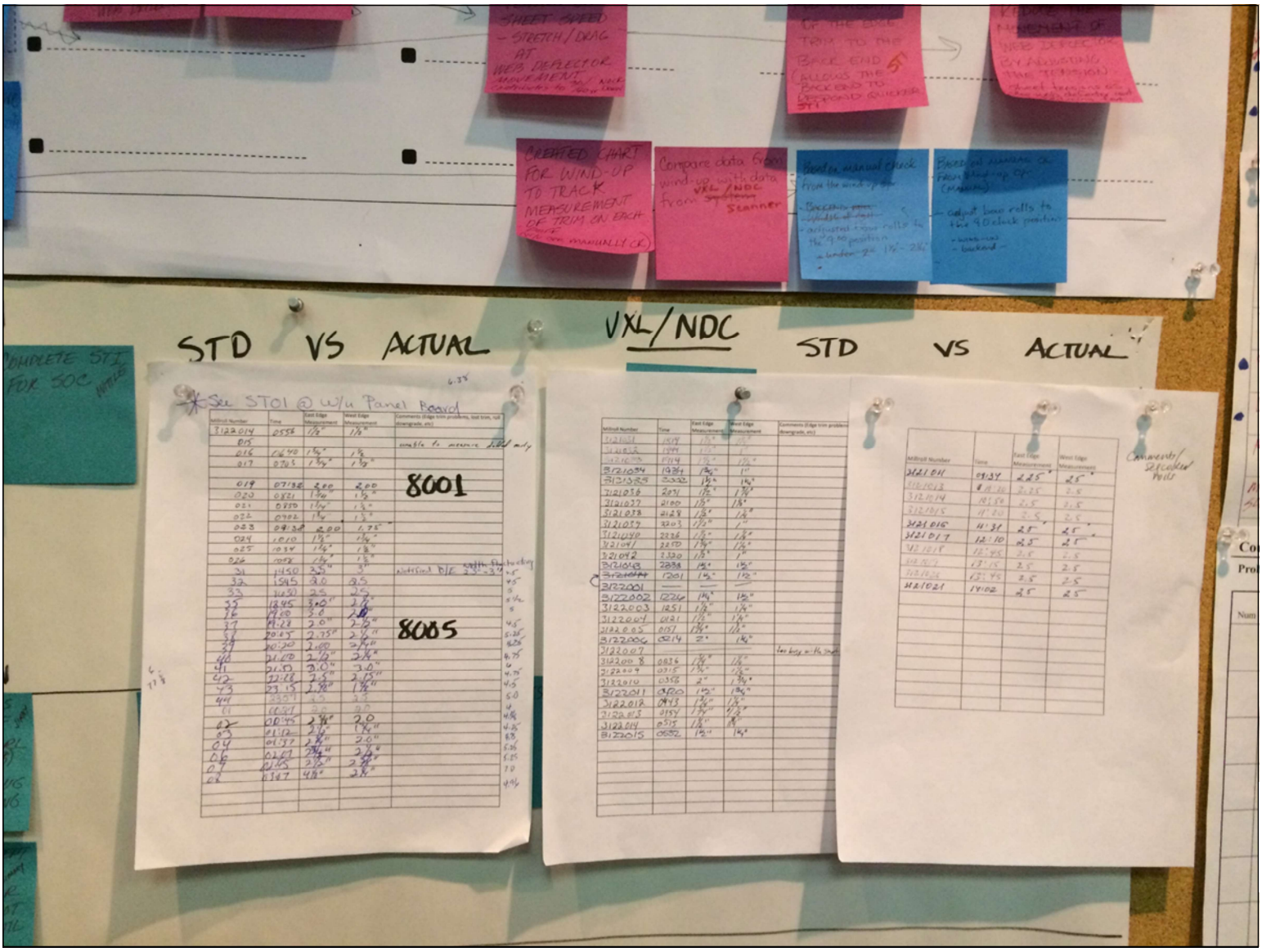
Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a 'hands-on' marker pen to paper approach to visual problem solving.

Cont.



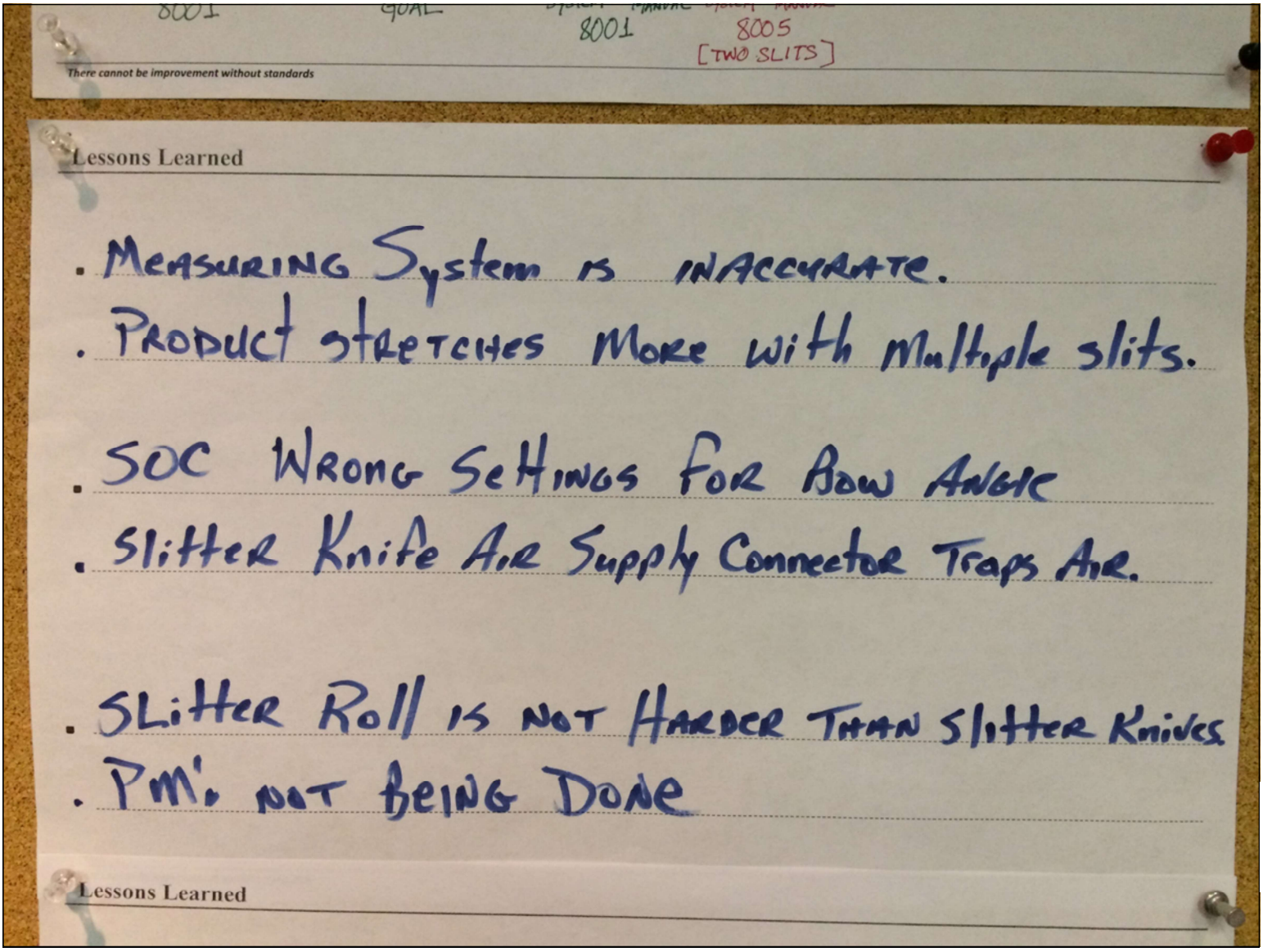
Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a ‘hands-on’ marker pen to paper approach to visual problem solving.

Cont.



Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a ‘hands-on’ marker pen to paper approach to visual problem solving.

Cont.



Here is a series of sample pictures of this problem solving approach in use during a materials waste reduction workshop. Again, very much a 'hands-on' marker pen to paper approach to visual problem solving.

Cont.