



PAPER AIRPLANE LEAN SIMULATION

INTRODUCTION

- You are going to partake in a simulation that will demonstrate the basic principles of Lean – by building paper airplanes.
- The simulation will run for approximately 60 – 90 minutes
- There are 3 rounds with improvements between each round.



ROLES

Role	Responsibility	Detail
Facilitator (TXM)	Facilitate the process	Allocate roles Set the standards Encourage the result
Factory Manager	Support and Manage the details	Expedite product through the business. Respond to customer complaints. Maximise production
Customer	Set & Display the customer expectations	Communicate satisfaction Detailed quality check
Folder (5)	Fold the planes as per the standard	
Material Handler	Move the planes	In correct lot size
Timer	Time the process	Overall run time and lead time

MATERIALS

- One packet of white A4 copy paper
- 10 sheets coloured paper – e.g. Blue
- 10 sheets coloured paper – e.g. Yellow
- 2 stopwatches (you can use smart phones)
- 1 calculator
- Flip chart
- Two contrasting color markers
- Whiteboard – recording results and doing line balance chart.



OPERATOR 1 – PRACTICE YOUR FOLDS

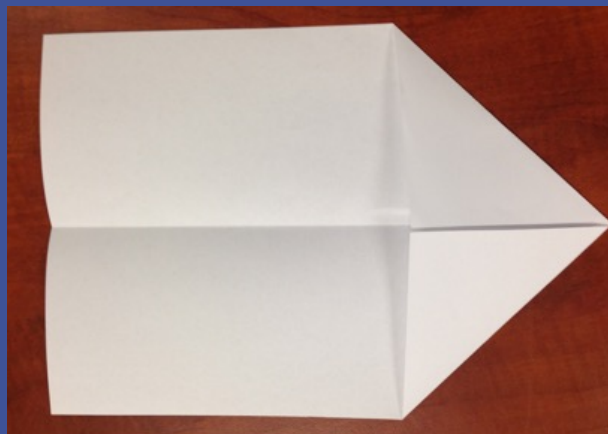


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OPERATOR 2 – PRACTICE YOUR FOLDS



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OPERATOR 3 – PRACTICE YOUR FOLDS



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OPERATOR 4 - PRACTICE YOUR FOLDS

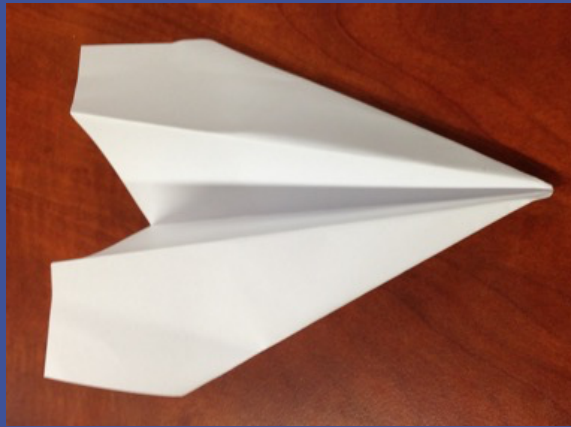


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OPERATOR 5 – PRACTICE YOUR FOLDS



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METRICS – DRAW ON FLIP CHART OR WHITE BOARD.

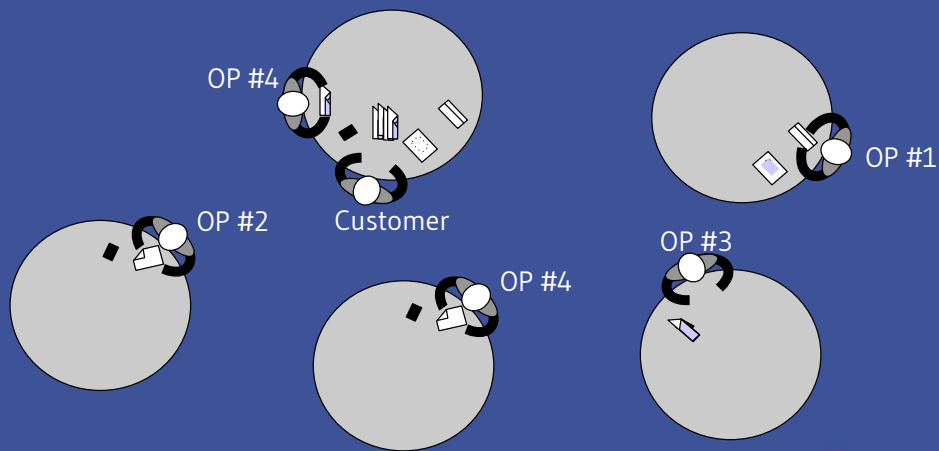
	R1	R2	R3
Lot Size			
WIP			
Lead Time			
Total Run Time			
Deliveries (to customer)			
# of people			
Space			
Productivity <small>(Units / Person / Minute)</small>			
Quality			

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SIMULATION LAYOUT EXAMPLE



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START ROUND 1 – KEY POINTS

- Batch size = 3
- All operators must go as fast as they can and not stop until told to stop.
- Material handler is the only person allowed to move materials.
- Material handler only moves **three** planes at a time – no more, no less.
- Once process is stable then timer inserts coloured sheet at process 1 and records time.
- Operators must treat coloured sheet like a normal sheet (some expediting is OK once round one gets beyond 10 minutes)
- Stop production as soon as the timer says stop.

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TIME TO REFLECT ON ROUND 1 - LEADER

- Fill in the Metrics
- What were the key problems?
- How did it feel at each operator station?
- What was the material handler's experience?
- What was the customer experience?
- How can you make it better?
 - Note that you can not make all the improvements at once so follow the instructions for Round 2

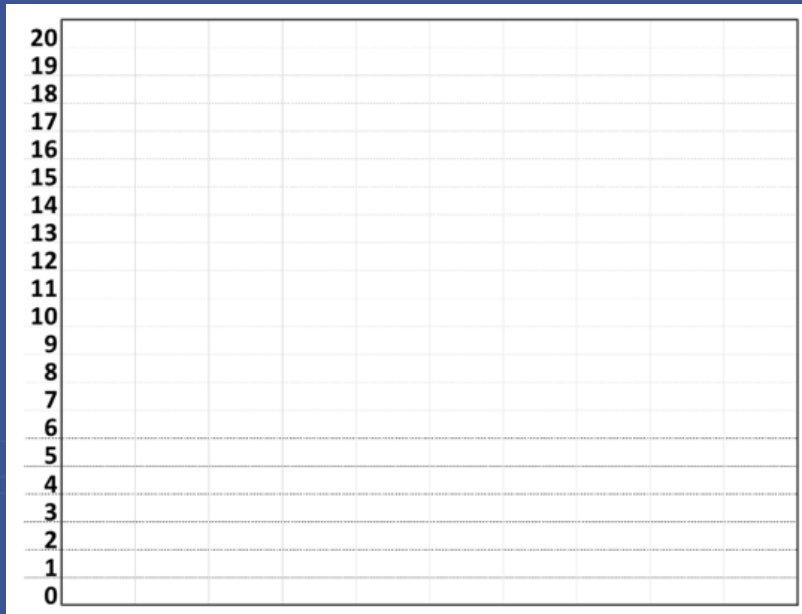


ROUND 2 – KEY CHANGES

- Customer to take one plane every 15 seconds.
- Operators are to be seated side by side.
- Planes to be built in batches of 1.
- Do not start to fold your next plane until the Kanban square between you and the next operator is empty.
- Only fold one plane at a time (including Operator 1)
- Don't stop simulation until Timer #2 has recorded times for all the operators.
- Ensure each fold has a standard time that is to be recorded on the chart as shown on the next slide.



LEVEL LOAD CHART – DRAW UP ON WHITEBOARD



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TIME TO REFLECT ON ROUND 2 - LEADER

- Fill in the metrics
- What worked better this time and why?
- How did it feel?
- What improvements can you make next round?
- How will you divide up the work between operators to balance the process?
- Can you reduce the number of operators again?

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ROUND 3

- You now have around 10 minutes to do a “mini Kaizen” to work out how to reallocate the folds (there are 10 folds) between the stations.
- Things to consider: Process balance, visual management, Kanban, etc.
- Trial the new method to see if you can meet the 15 second takt time.



TIME TO REFLECT ON THE SIMULATION

- What did you learn?
- How much improvement did your team make?
- Why was there so much improvement?
- Can you see how this might be relevant to your business?

