

THERE'S SO MUCH MORE BEHIND A  DOOR

Cyclone Beaters – Aussie Cup Presentation

20th August 2014





1. Team Members Cyclone Beaters



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What are Highwind Doors and why do we make them?



[The Australian](#) February 11, 2011

GARAGE doors blown off during Cyclone Yasi are the "Achilles heel" of cyclone-proof housing, damage investigators warned yesterday.

Engineers from James Cook University's cyclone testing station have discovered the cyclone blew away garage doors that had not been braced in line with building requirements.

"Damage to roller doors is certainly significant -- they are being blown in or sucked out," centre engineer Graeme Stark said yesterday. "It does potentially put pressure on the roof.

"The design requirements for roller doors don't seem to have been met. They should be performing better . . . in areas that experienced less than the designed wind speed, there have been too many roller doors fail."

Mr Stark said garages had proven to be the "Achilles heel" in modern housing as they could let in hurricane-force winds that put pressure on walls and roofs.

Mr Stark said residents in tropical areas should place braces behind the doors to make them sturdier -- a design element that appeared to have been overlooked.

"The regulations don't need to change, but the (building) designers need to be doing the right thing," he said.

"The regulations require that the door is able to withstand a (cyclonic) wind load, but we have a problem with people complying with the regulations.

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What are Highwind Doors and why do we make them?



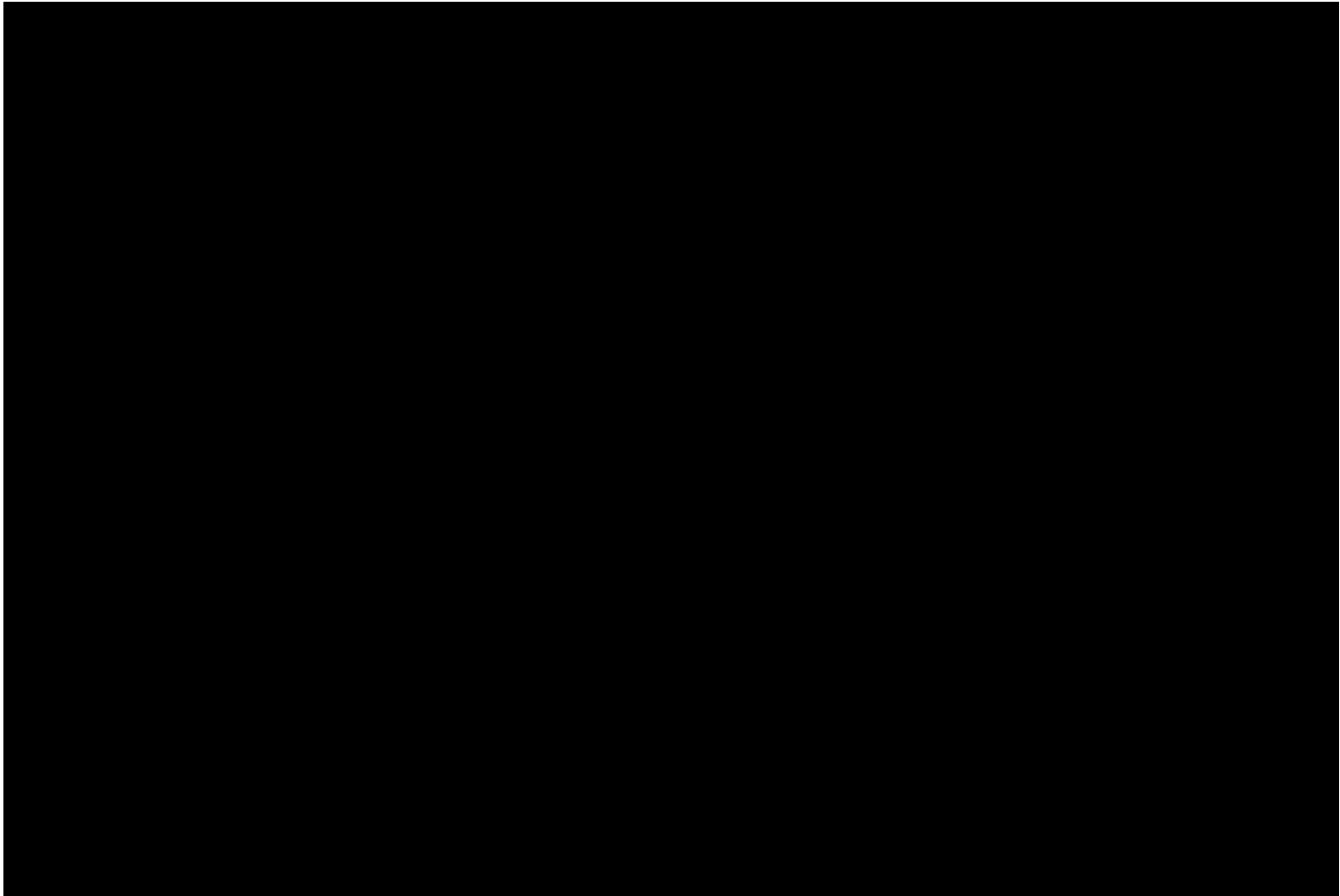
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What are Highwind Doors and why do we make them?



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What are Highwind Doors and why do we make them?



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2. Description of Area



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3. Team Mandate

- For the additional time it takes to make a high wind door, work through the 9 steps of Special Micro FE&PI (Focused Equipment & Process Improvement) and achieve an initial reduction of at least 100% while also improving or maintaining the Goal Aligned Performance Measures (especially OEE – Overall Equipment Effectiveness) of the Defined Production Area (Move from a 4:1 ratio to a 2:1 ratio)
- Recommend further actions to the Leadership Team so as to reduce the Loss by at least 90% from baseline
- Ensure means to sustain improvements are effective
- Complete within 12 weeks

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4. Team Attendance



Speed Loss Reduction Attendance & Schedule Sheet												
Team: <u>Cyclone Beaters</u>						Kick-off Date: <u>11 / 7 / 2013</u>						
Attendance	Week / Meeting											
Team Members (2-5)	1	2	3	4	5	6	7	8	9	10	11	12
Brian Stapleton	✓	✓	✓	A	✓	✓	✓	A	✓	✓	✓	A
Steve Macrosszeky	✓	✓	A	✓	✓	A	✓	✓	✓	✓	A	A
Matthew Hill	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓
Dennis Maxwell	✓	✓	✓	✓	✓	A	✓	A	✓	A	A	✓
Kevin McKay	✓	A	A	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kevin Gilbert	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time of meeting: 11.00												
Date of meeting: <u>Thursdays</u>	1/7	18/7	25/7	1/8	8/8	22/8	29/8	5/9	12/9	19/9	26/9	3/10

✓ = Attended x = Unnotified Absence A = Notified Absence

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4. Team Schedule



Week 1: 11 / 7 / 2013 Mid-Way Presentation: 30 / 8 / 2013 Final Presentation: 11 / 10 / 2013

Schedule	Week / Meeting											
Task	1	2	3	4	5	6	7	8	9	10	11	12
0. Half-day kick-off workshop												
1. Confirm Mandate & Boundaries												
2. Form Team & Scope Activities												
3. Analyse Current Situation												
4. Develop Vision of Improved Performance												
5. Identify Possible Root Causes & Solutions												
5a. Prepare presentation and Present to Leadership Team												
6. Pilot Proposed Solutions, Refine & Implement Successful Solutions												
7. Evaluate Results & Measure Progress												
8. Hold Gains & Define Future Actions												
8a. Prepare presentation and Present to Leadership Team												
9. Communicate Results & Share Learnings												



Kick-off Workshop and Presentations

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5. Future Analysis



- **Change in legislation, building code changed from 1/7/13, all roller doors installed north of Bundaberg had be cyclone rated and to pass AS4505. This is likely to increase demand for High Wind doors from 10 per week to 12 per day (now) and a budgeted 35 per day (6 months?).**
- **Decrease in demand for standard doors.**
- **Introduction of Nylofelt from South Africa.**
- **Series 2 improvement / engineering**

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5. Future Analysis



Date	H/W per month	H/W per day
March '13	41	2.05
April '13	41	2.05
May '13	41	1.86
June '13	173	7.86
July '13	307	15.2
August '13	324	14.4
September '13	349	14.8

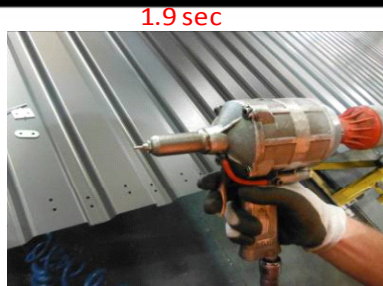
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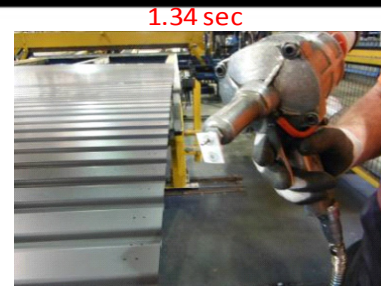
Process map for making a series one high wind door



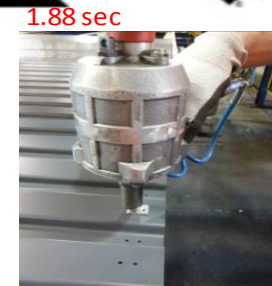
Check the door quality & select all the equipment needed



Place the rivet into the rivet gun



Place the h/w clip onto the rivet



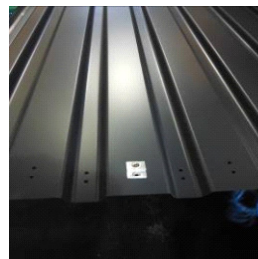
Place the rivet & h/w clip into the holes



Place the 2 hole washer under the door & onto the rivet



Align the second set of holes up & pop the rivet



Check the holes are still aligned & the rivet is in spec



Place the rivet into the gun & place the rivet into the second hole & pop the rivet



Clip completed move onto the next clip

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6. Current Method To Make A High Wind Door

**Manual Rivet
Gun.**

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7. Base Line Analysis

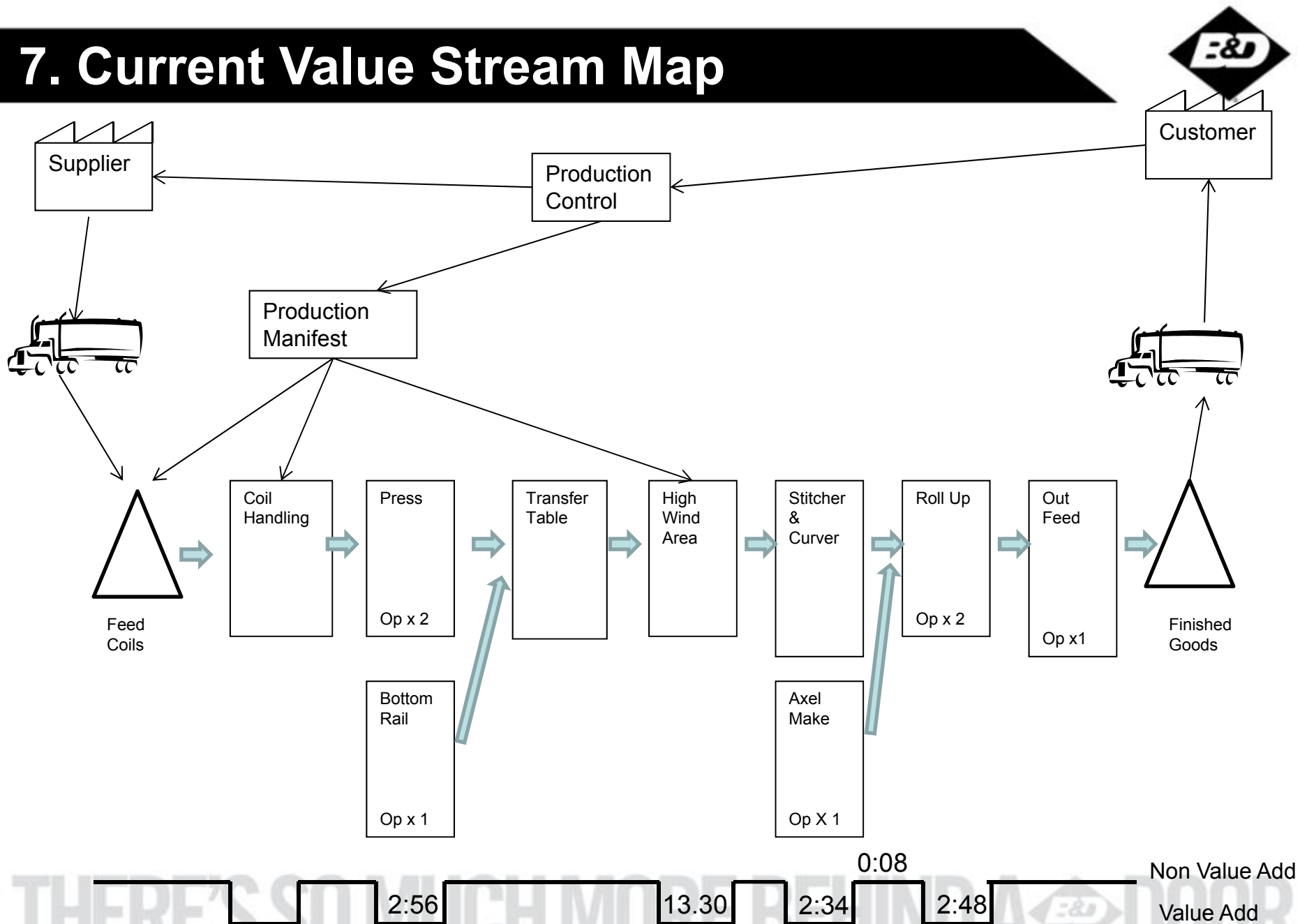


Timed from start of the press feeder
arms to end of the rollup process
All times are in Minutes

Amount of sheets	Time at end of press	Time at end of conveyor	High wind	Time at end of stitcher/ curver	Time at end of rollup
3 sheet	2.57	4.00		2.17	2.56
3 sheet	2.57	4.02		2.30	2.30
3 sheet	3.00	4.00		3.00	2.57
3 sheet	2.55	3.50	12.50	2.57	3.00
3 sheet	2.55	4.00	14.10	2.10	2.40
Average Times	2.56	3.58	13.30	2.34	2.48

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7. Current Value Stream Map





8. Operator Survey Ratings

Results of Operator Survey Sheet

Defined Production Area: Process line 1

Date: 16/2/10

Number of Respondents: 10

	Rating	Ease of Operation	Reliability	Process Capability	Housekeeping	Safety	Environment	Scrap Performance	Maintenance Practice
10	Score:	3	5	7	2	2	3	7	1
9	Excellence	Very easy to operate	Never breaks down	Output always within tolerance	Very clean and well organised workplace	Very safe, no known safety hazards	No spills / emissions	Zero scrap or rework	Weekly maintenance servicing and inspections
8									
7		Easy to operate	Reliable machine, breakdowns are rare	Few problems keeping within tolerance	Clean and organised workplace	Safe with known safety hazards	Environmentally sound	Very little scrap or rework	Monthly maintenance servicing and inspections
6									
5		Fair to operate	Fairly reliable	Normally keeps within tolerance	Fair workplace	Safety hazards are a concern	Environmental spills/emissions are rare	Average scrap rate	Quarterly maintenance servicing and inspections
4									
3		Hard to operate	Often breaks down, not very reliable	Difficult to keep within tolerance	Dirty and unorganised workplace	Safety hazards are a big concern	Environmental risks present	High scrap rate	Yearly maintenance servicing and inspections
2									
1	Innocence	Very hard to operate	Always breaking down	Cannot hold the required tolerance	Very dirty and unorganised workplace	Serious safety hazards present	Environmental spills / emissions common	Very high scrap rate	Maintenance only comes when machine breakdowns
0									

$$\text{Score} / 80 = 30 \times 1.25 = 37.5\%$$

Note: Workplace = Work Area and Plant & Equipment (Machines)



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3-12

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9. Operating Survey Rating & Comments

Comments from Operator Survey Sheet

Defined Production Area: Series 1 High Wind

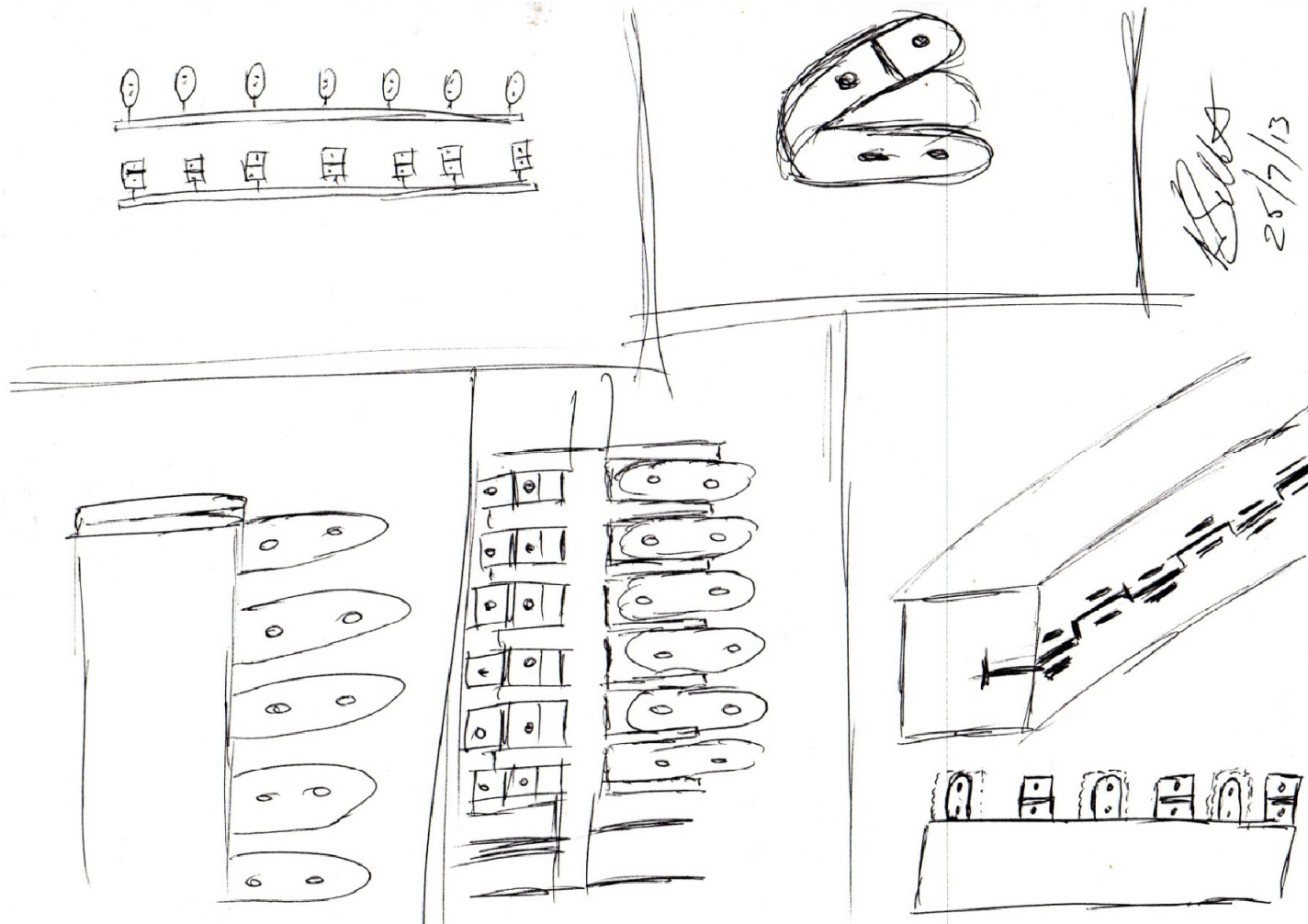
Date: 25/7/2013

Number of Respondents: 5

<p>What do you like most about operating this line/equipment/machine?</p> <ul style="list-style-type: none"> • Nothing • Break from normal routine 	<p>What do you dislike most operating this line/equipment/machine?</p> <ul style="list-style-type: none"> • Sore Back • Sore Arms • Rivet guns • Small parts • Time consuming • Lining up holes , trouble getting rivet through • Body aches on long runs 	<p>How can we improve the operation if this line/equipment/machine?</p> <ul style="list-style-type: none"> • Extra people on rivet guns • Better team work • Auto rivet guns • U- shaped clips • Clip dispenser • Better trays to organise parts • Change design • Clips attached to removable strip that snaps off after rivets are done • Take sheets off line and put back on.
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10. Brainstorming New Ideas



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10. Brainstorming New Ideas



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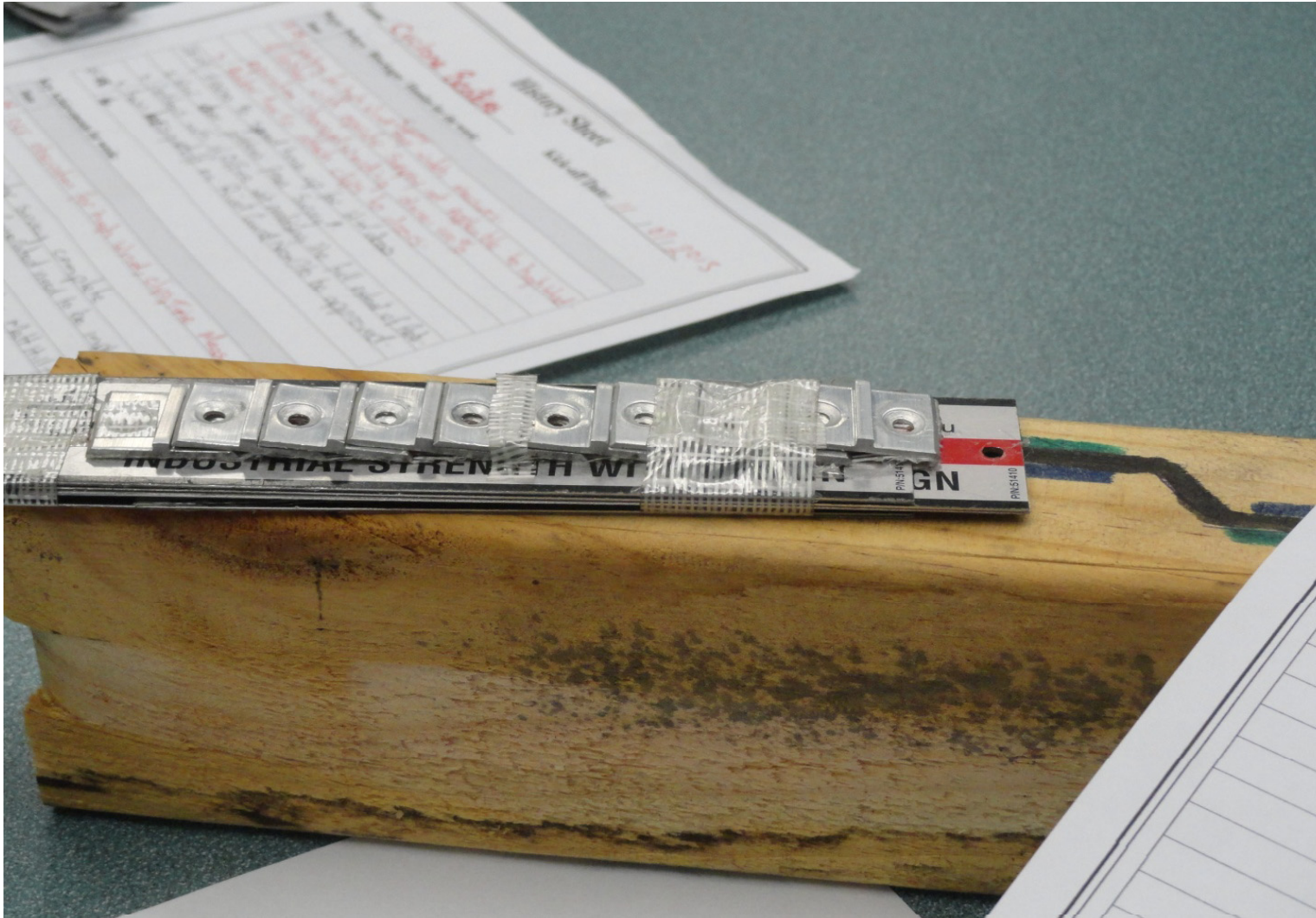
10. Brainstorming New Ideas



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10. Brainstorming New Ideas



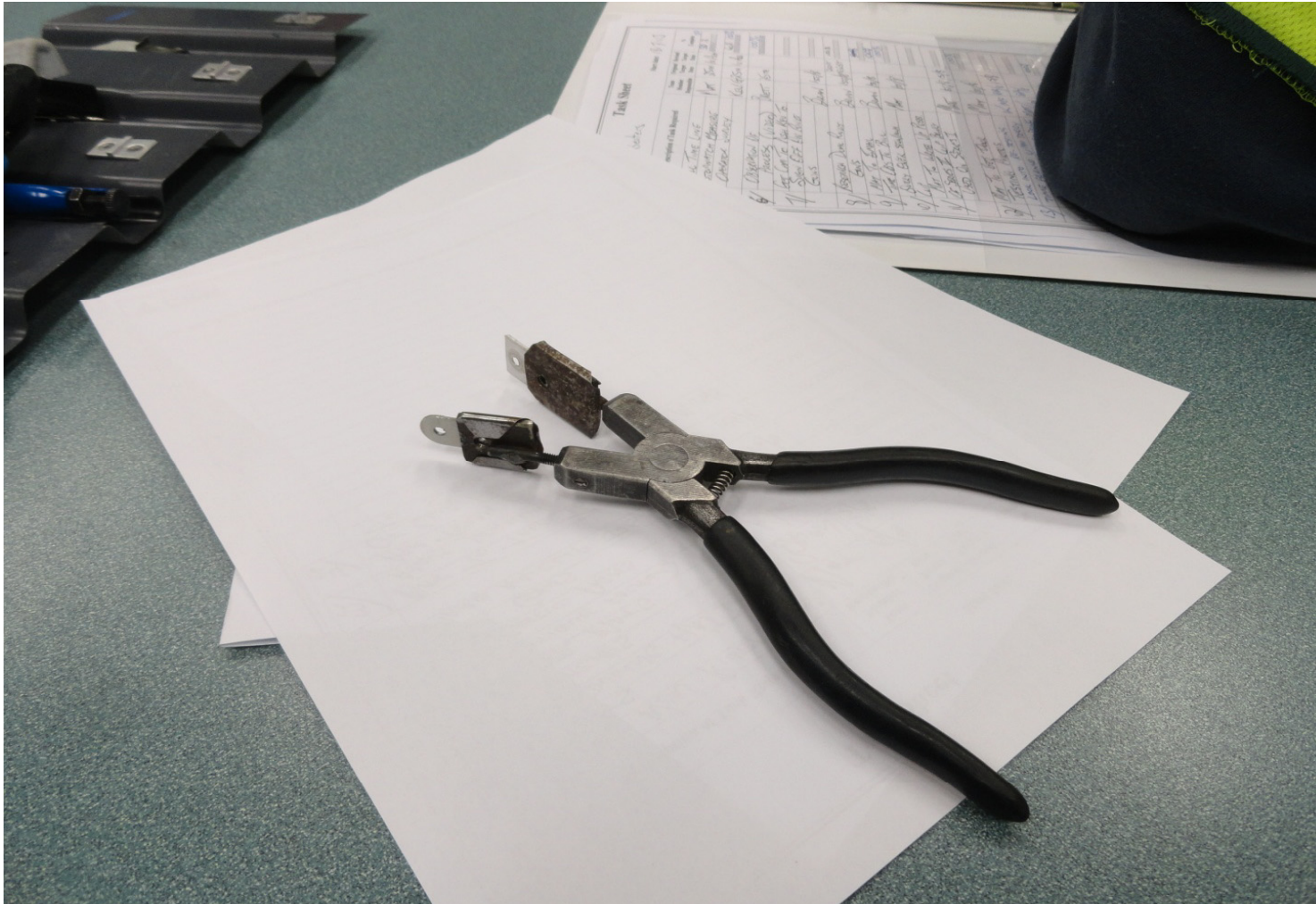
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10. Brainstorming New Ideas



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11. Idea Development



From the initial brainstorming, three areas of improvement ideas were identified -

- 1. Improve how we currently make the door using current equipment.**
- 2. Improve how we make the door by improving equipment and clips.**
- 3. Redesign the manufacture of high wind doors (Longer term – will not be completed in this cycle).**

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12. Improvements Depicted on TPM³ Improvement Sheet

Team Name:	Cyclone Beaters	Location:	Combined Line Highwind Process	Initiated Date:	08/08/2013	
Team Type:	Micro FE & PI	Item:	Concept Robotic Arm for Rivet Guns	Completed Date:		
Initiator:						
1. Problem (Plan)						
Workers are getting fatigued arms and shoulders from using the rivet guns due to the increased quantities of Highwind doors.						
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)			
						
Improvement Target:	The weight is taken away from your body, not your arms or shoulders.		Expected Cost:	Approx \$700 each.	Expected Saving:	LTi
4. Results: (Check)			5. Future Actions: (Act)			
		Actual Cost:				
		Actual Savings:				
CTPM Australasia		Approved by:	TL - Shift A	TL - Shift B	TL - Shift C	TL - Shift D
						LT Member

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12. Improvements Depicted on TPM³ Improvement Sheet

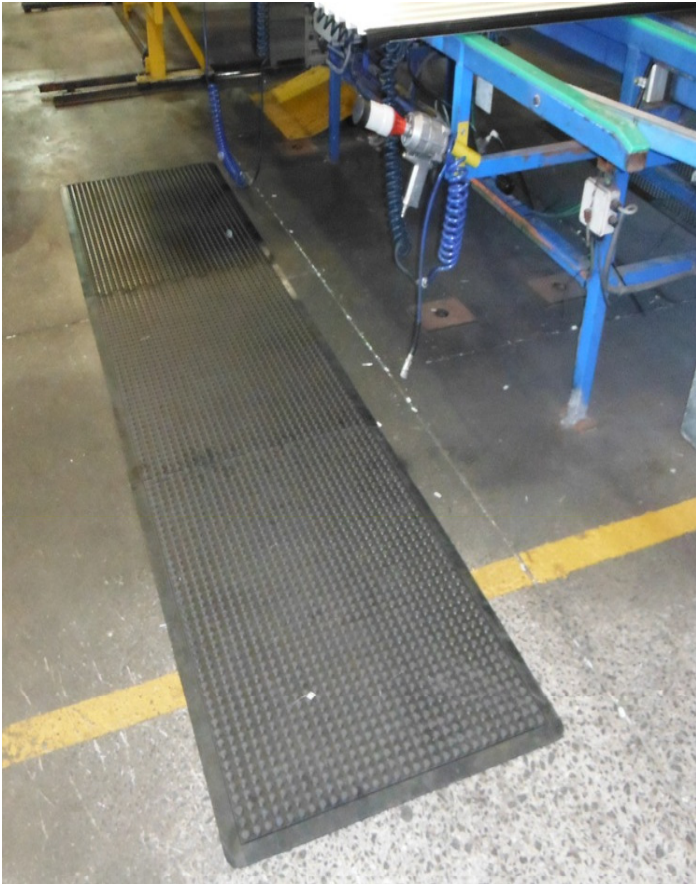
TPM³ Improvement Sheet

Team Name:	Cyclone Beaters	Location:	Combined Line Highwind Process	Initiated Date:	25/07/2013	
Team Type:	Micro FE & PI	Item:	Anti Fatigue Mats.	Completed Date:	12/12/2013	
Initiator:	The Team					
1. Problem (Plan)						
Workers standing in the same spot on concrete for extended periods.						
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)			
						
Improvement Target:	Reduce fatigue and prevent injury.		Expected Cost:	\$1000	Expected Saving:	MTI
4. Results: (Check)			5. Future Actions: (Act)			
Less fatigue and sore feet from standing directly on concrete.		Actual Cost:	\$800			
		Actual Savings:				

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Photo Of New Anti Fatigue Mats





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12. Improvements Depicted on TPM³ Improvement Sheet

TPM³ Improvement Sheet

Team Name:	Cyclone Beaters	Location:	Combined Line Highwind Process	Initiated Date:	18/07/2013
Team Type:	Micro FE & PI	Item:	Signal for Approaching Highwind Door.	Completed Date:	
Initiator:					
1. Problem (Plan)					
A Highwind door can be waiting at the Highwind table before the end of the line is aware of it, losing time and then having to get in position and alerting other team members required.					
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)		
					
Improvement Target:	All team members ready to go when the door stops at the Highwind table.		Expected Cost:		Expected Saving: Time = Productivity.
4. Results: (Check)			5. Future Actions: (Act)		
		Actual Cost:			
		Actual Savings:			
<p style="color: red;">The need for this improvement has been made obsolete by the following improvements.</p>					

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12. Improvements Depicted on TPM³ Improvement Sheet

TPM³ Improvement Sheet

Team Name:	Cyclone Beaters	Location:	Combined Line Highwind Process	Initiated Date:	08/08/2013
Team Type:	Micro FE & PI	Item:	Batch Highwind Doors Together.	Completed Date:	09/11/2013
Initiator:	The Team				

1. Problem	(Plan)
Highwind doors can appear at any time of the day and any quantity depending on colour runs. Momentum is lost and this interrupts the flow of work.	

2. Current Situation	(Plan)		
Clontarf Roller Door Daily Production Schedule			
Prod. Date: 22nd August 2013	Release Date: 21st August 2013		
Box Crates	TAPER	HIGH WIND	REVERSE COLOUR
Colour	Qty	Doors Left	KG / Coil
SM	15	81	513
MN	5	66	171
JP	2	61	68
MD	2	59	68
CN	3	57	103
CP	1	54	34
BU	3	53	103
CC	10	50	342
DO	3	40	103
PB	3	37	103
DU	2	34	68
WG	10	32	342
ZC	1	22	34
EH	3	21	103
ST	4	18	137
PE	1	14	34
SH	8	13	274
SK	5	5	171
Totals	81		

3. Proposed Change / Approved Improvement	(Do)		
Clontarf Roller Door Daily Production Schedule			
Prod. Date: 22nd August 2013	Release Date: 21st August 2013		
Box Crates	TAPER	HIGH WIND	REVERSE COLOUR
Colour	Qty	Doors Left	KG / Coil
MN	5	81	171
CN	3	76	103
CC	10	73	342
DU	2	63	68
WG	10	61	342
EH	3	51	103
SH	8	48	274
ZC	1	40	34
SK	5	39	171
PE	1	34	34
ST	4	33	137
CP	1	29	34
BU	3	28	103
DO	3	25	103
PB	3	22	103
JP	2	19	68
MD	2	17	68
SM	15	15	513
Totals	81		

Improvement Target:	Team members are fresh at the start of the shift and can get on a "roll".	Expected Cost:	\$0.00	Expected Saving:	Loss of momentum and fatigue.
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4. Results:	(Check)	5. Future Actions:	(Act)
This has given us the ability to continue making highwinds at the increased volumes.	Actual Cost:	\$0.00	
	Actual Savings:		

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12. Improvements Depicted on TPM³ Improvement Sheet

TPM³ Improvement Sheet


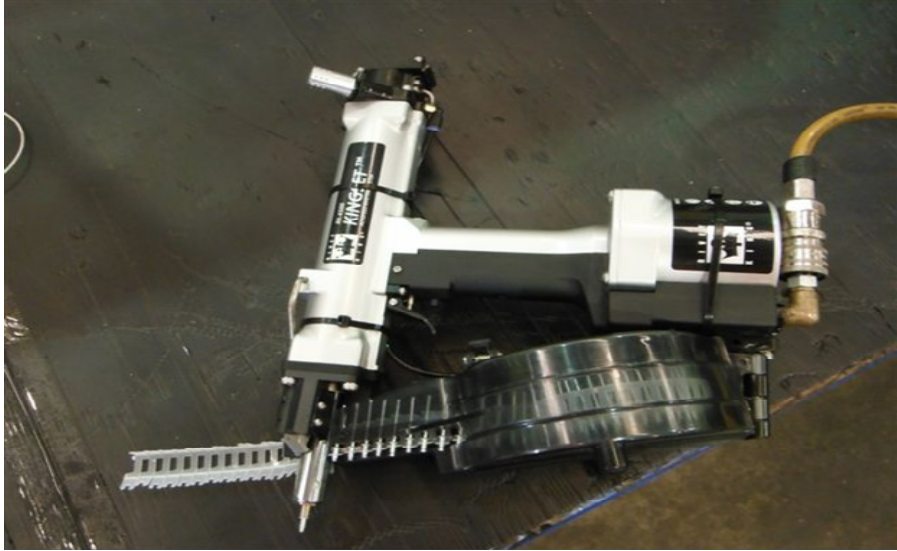
Team Name:	Cyclone Beaters	Location:	Combined Line Highwind Process	Initiated Date:	06/08/2013	
Team Type:	Micro FE & PI	Item:	Defined Operator Rotation System.	Completed Date:	09/11/2014	
Initiator:	The Team					
1. Problem (Plan)						
Same workers doing all the Highwind doors, a defined rotation system will decrease fatigue and prevent workers from sustaining injury.						
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)			
			<p>24 Highwind Doors 11 Colour Changes 9 Team Members</p>			
Improvement Target:	Share the workload between the crew to prevent injury.		Expected Cost:	\$0.00	Expected Saving:	LTI
4. Results: (Check)			5. Future Actions: (Act)			
The rotation of team members during highwind production has decreased the impact of the volume increase.		Actual Cost:	\$0.00			
		Actual Savings:				

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12. Improvements Depicted on TPM³ Improvement Sheet

TPM³ Improvement Sheet

Team Name:	Cyclone Beaters	Location:	Combined Line Highwind Process	Initiated Date:	18/07/2013
Team Type:	Micro FE & PI	Item:	New Auto Feed Rivet Guns.	Completed Date:	01/07/2014
Initiator:	The Team				
1. Problem (Plan)					
Feeding rivets into gun by hand is difficult and time consuming with gloved hands.					
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)		
					
Improvement Target:	Process will be sped up and mental and body fatigue will be minimized.		Expected Cost:	\$3000 each.	Expected Saving: Reduce process time by up to 4min.
4. Results: (Check)			5. Future Actions: (Act)		
Long term results are not available due to one month use only see video for advantages.		Actual Cost: \$10,000 for 6			
		Actual Savings:			

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Auto Feed Rivet Gun Video

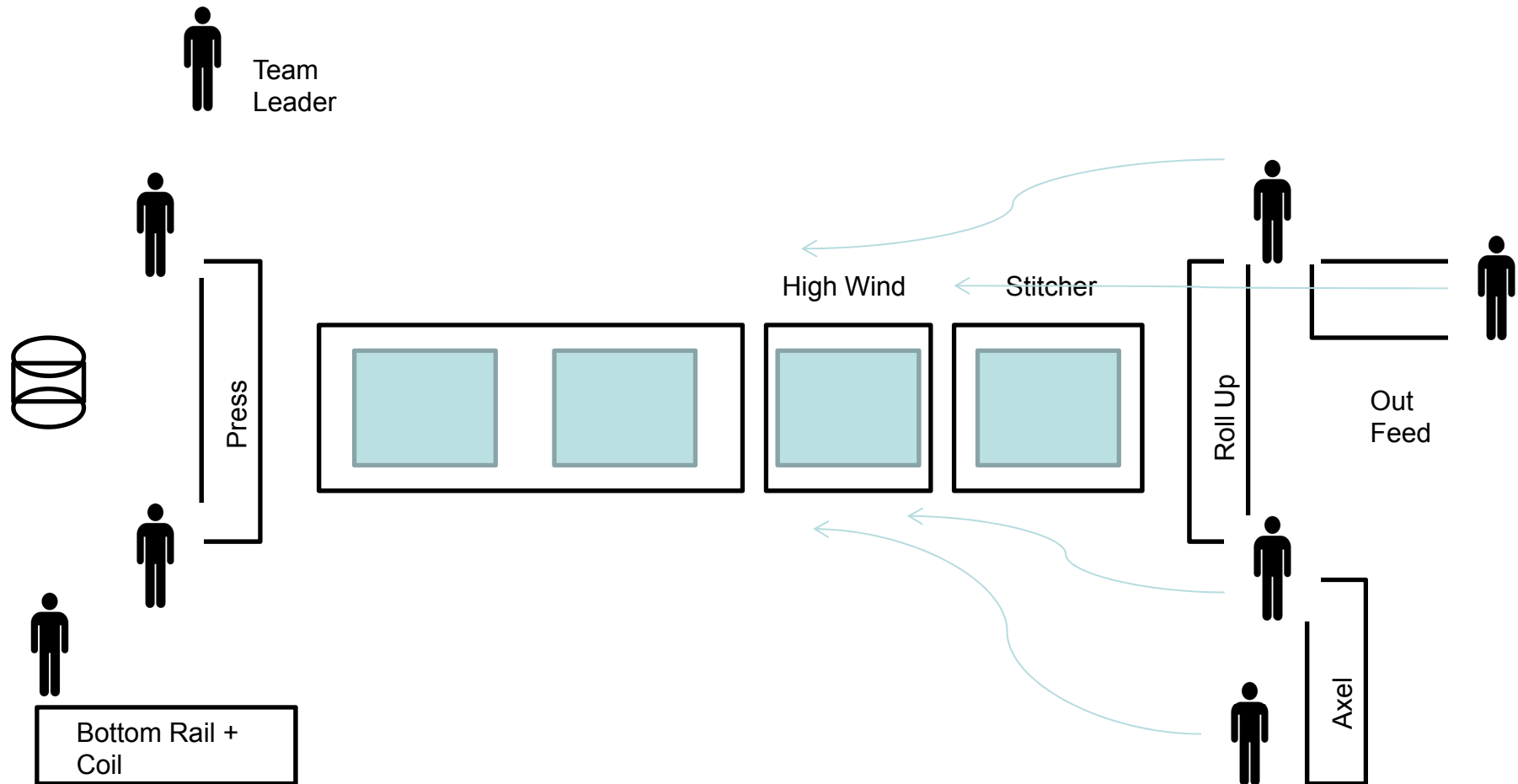


Auto Feed Rivet Gun.

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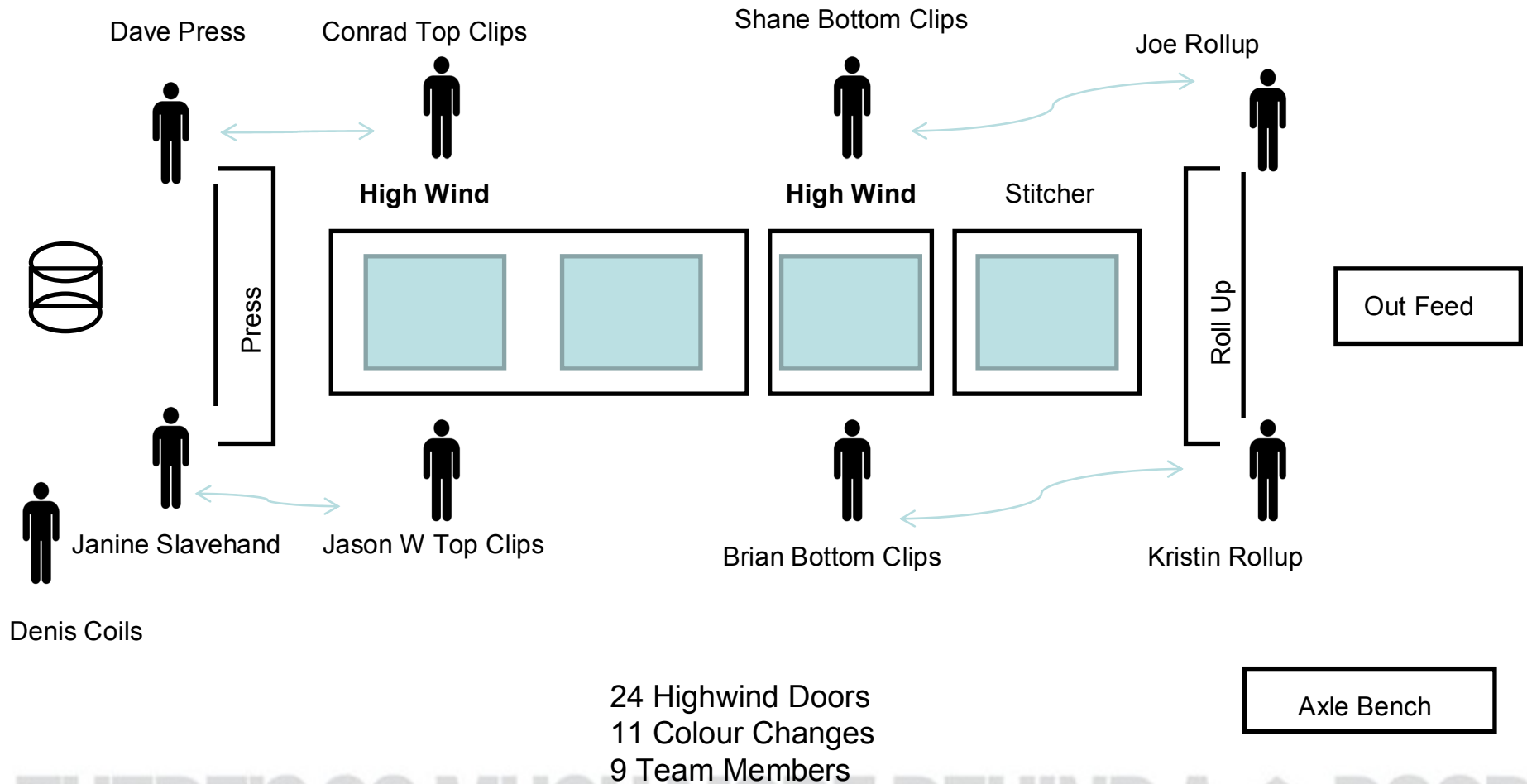


Process Map – Current State Series 1



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Highwind Trial 8:00am – 10:00am Thursday 17th



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High Wind Door Trial Video

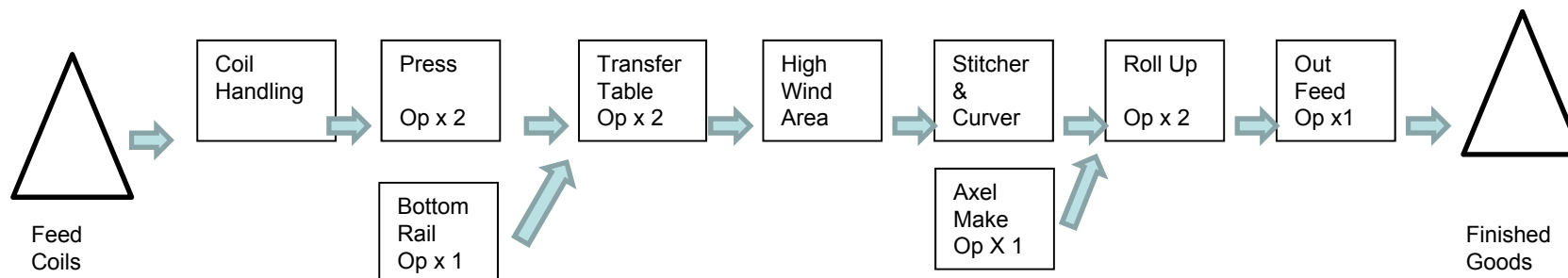


Series One Highwind Trial 17/10/2013

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13. High Wind Doors Trial Results 17th Oct 2013



Current

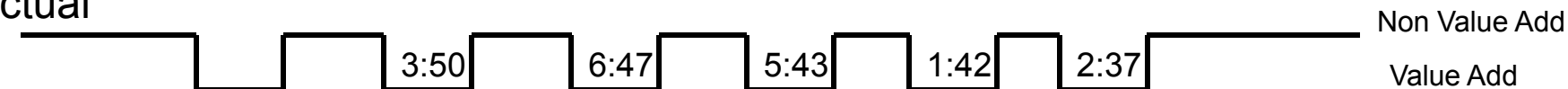


Value add time = 21:48 mm:ss
Production rate = 4.4 doors/hr

Planned



Actual



Value add time = 20:39 mm:ss
Ave time to make door = 24:54
Production rate = 8.8 doors/hr

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13. Observations from High Wind Trial



Colour changes did not impact on the production rate.

Pre-made axles and bottom rails were great, but a better system to store in correct order would be required.

Major delay to clean feed rolls (20.25 mins or 16.9% of operating time).

PM's not carried out last weekend (other improvement activities).

Improve coil covers – Brett to locate black core flute.

Pre-start checks – clean feed rolls?

Operator rotation, more often is good (comments from operators).

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13. Long term impact from Trial improvements

Figures For Day Shift Only

	September 2013	October 2013	July 2014
Shift Hours	208	194	172
Man Hours	1442	1419	1233
Total Day's worked	24	23	22
Weekend's worked	3	1	0
Day's overtime	23	16	4
Shift hours overtime	48	28	5.5
Hours at time & half	39	25	5.5
Hours at double	9	3	0
Actual Doors Made	1510	1482	1657
Per day Average	52	64	75.3
Highwind Doors	260	281	222
Per day Average	10.83	12.21	10.09
Total Equivalents	2078	2086	2110
Doors per Man hr	1.44	1.47	1.71

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13. Highwind Door volumes.

There has been a 300% increase in the volume of Highwind Doors.

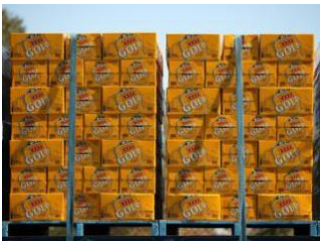
Jul-12	26
Aug-12	117
Sep-12	220
Oct-12	41
Nov-12	69
Dec-12	76
Jan-13	12
Feb-13	51
Mar-13	41
Apr-13	41
May-13	41
Jun-13	173

Total	908
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Jul-13	307
Aug-13	324
Sep-13	349
Oct-13	399
Nov-13	425
Dec-13	220
Jan-14	250
Feb-14	339
Mar-14	319
Apr-14	272
May-14	283
Jun-14	326

Total	3813
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For the visual people in our audience what does a 300% increase look like?

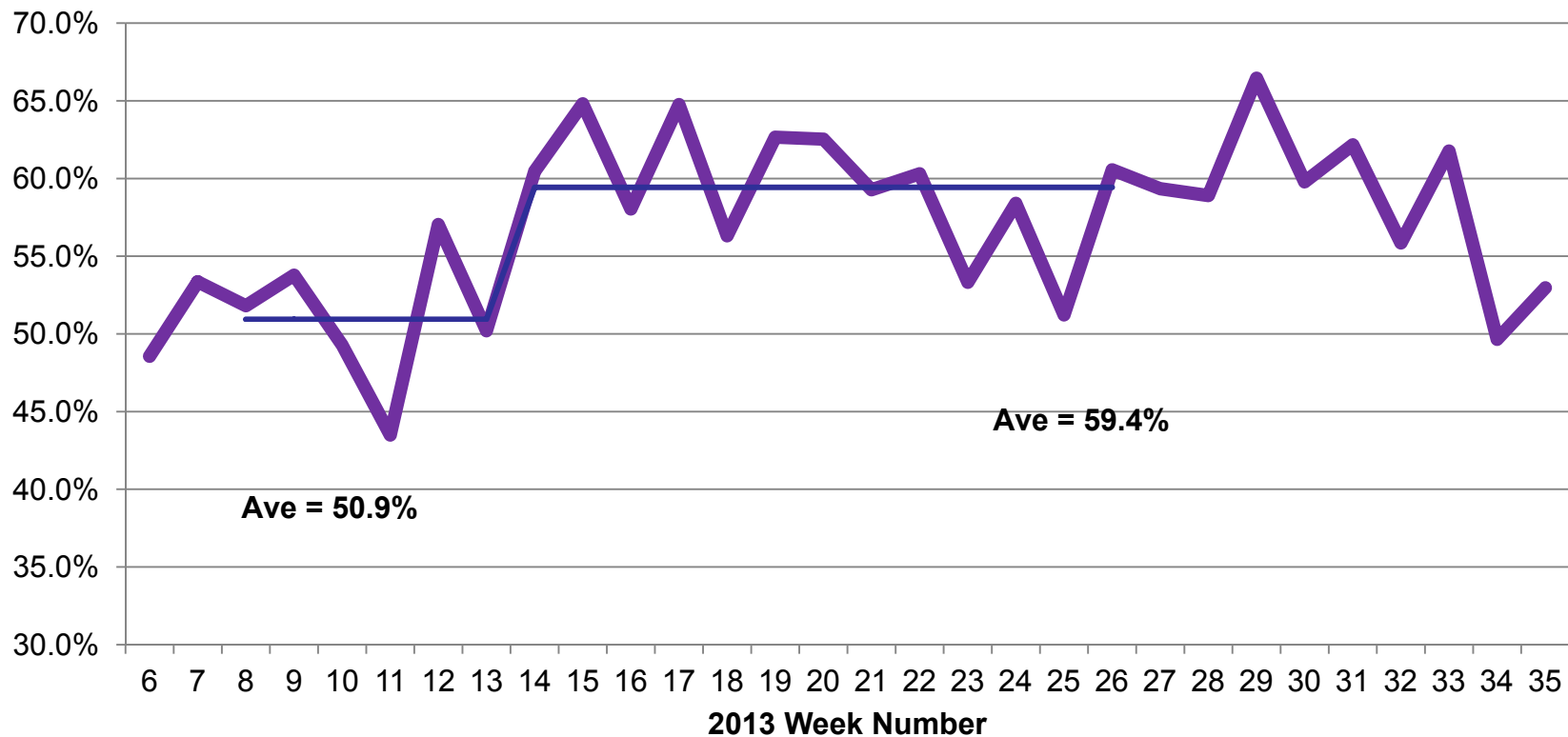


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14. Current OEE Performance



Series 1 High Level Overall Equipment Effectiveness



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15. Detailed Recommendations for Micro Teams



- **Micro NEM (New Equipment Management) – Automation of high wind door manufacture to make a high wind door in the same time as a normal door.**
- **Micro NEM (New Equipment Management) – design alternate C clips.**
- **Micro NEM (New Equipment Management) – redesign HW door to a pressed fitting.**

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16. Original Parking Lot Issues



Redesign of clip.

Redesign of clip attachment.

Redesign of sheet – different shape / press.

Automation.

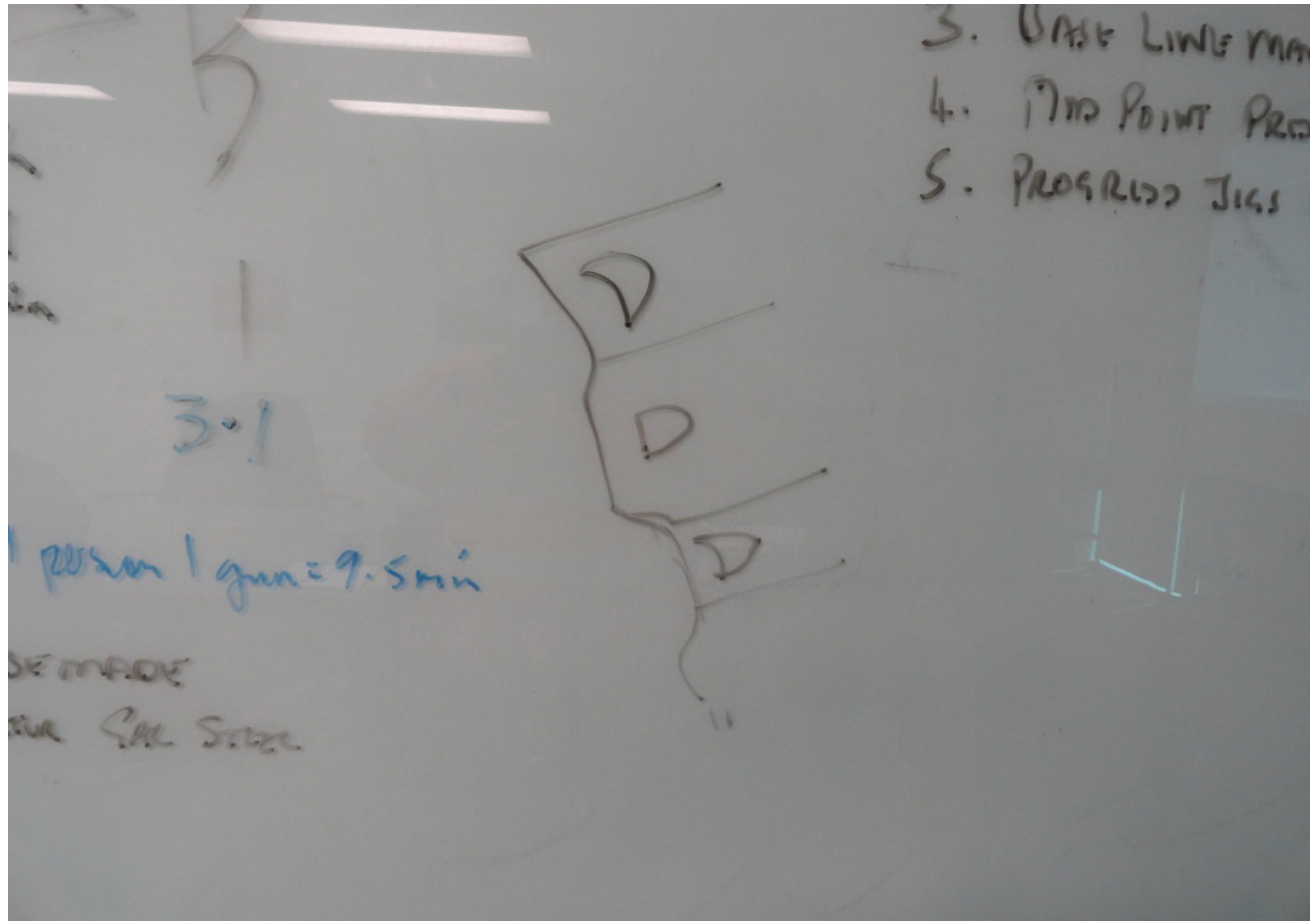
Trial doors with one clip every second corrugation, every third corrugation, every fourth corrugation.

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17. Redesign Manufacture of High Wind Doors



The idea from brainstorming session



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17. Redesign Manufacture of High Wind Doors



Prototype



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17. Redesign Manufacture of High Wind Doors



A different type of
rivet / clip?



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17. Redesign Manufacture of High Wind Doors



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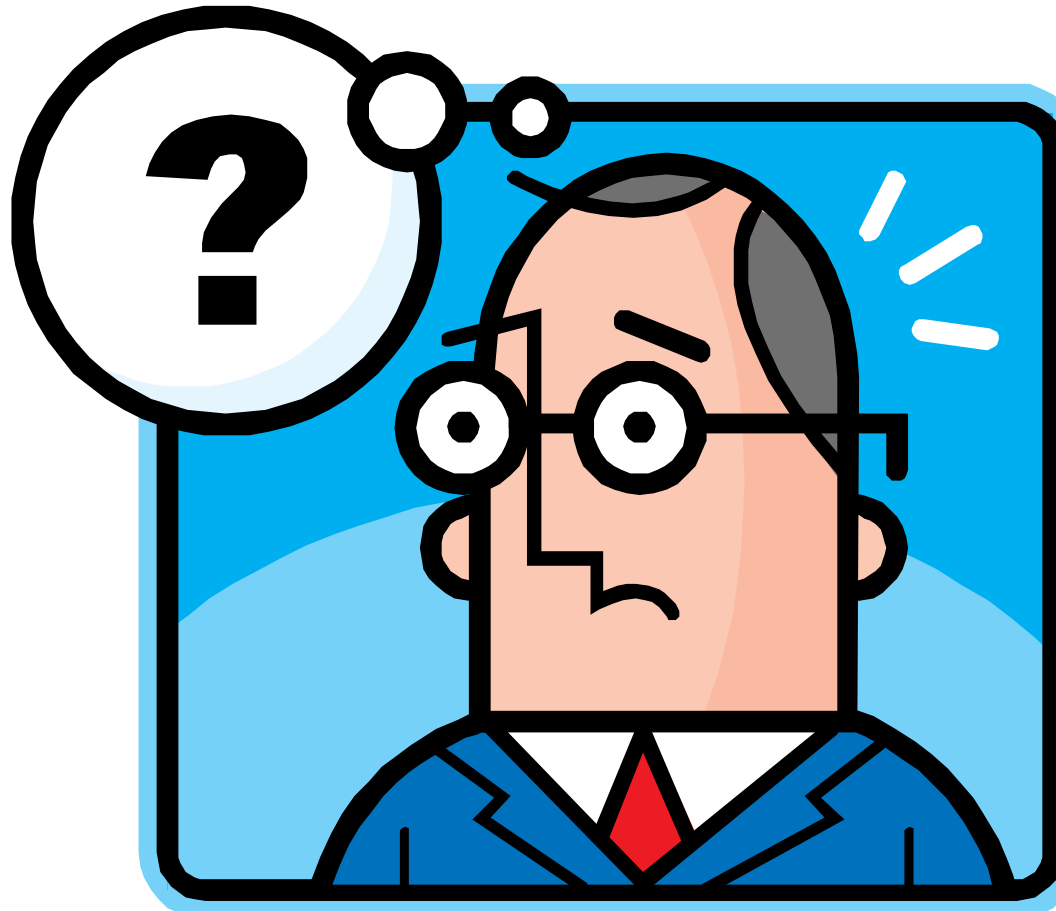
18. Lessons Learnt by Team



- **We have a creative bunch.**
- **Use of automation is the way forward.**
- **Task is physically demanding.**
- **Use of a an antiquated clip is OK when making 2 doors a day not 20!**

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Questions?



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