

The CHAMELEONS

**New Zealand Sugar
Company
Blending Facility
Porana Road**



The Chameleons

The Team



Set-Up Time Reduction Attendance and Schedule Sheet

Team: CHAMELEON Run-off Date: 9.9.10

Attendance	Week											
Team Members (1-12)	1	2	3	4	5	6	7	8	9	10	11	12
RON CANCHER	✓	✓										
TONY CORVINO	✓	✓										
PAUL DUNNELL	✓	✓										
JOSE ROBERT	✓	✓										
TONY CORVINO	✓	✓										
JOSE ROBERT	✓	✓										
ANDY ROBINSON	✓	✓										
DAVID WYNE	✓	✓										
LINCOLN BELL	✓	✓										

Time of meeting: _____
Date of meeting: _____

Legend: ✓ = Present x = Excused absence - = Notified absence

Week 1: _____ Mid Way Presentation _____ Final Presentation _____

Schedule	Week											
Task	1	2	3	4	5	6	7	8	9	10	11	12
1. Half-day roll-off workshop												
2. Clarify Mission & Direction												
3. Plan Time & Scope Activities												
4. Assign Control Structure												
5. Identify Value of Improved Performance												
6. Identify Possible Root Causes & Solutions												
7. Prepare presentation and Present to the L.T.												
8. Plan Program Solutions, Review & Implement Successful Solutions												
9. Evaluate Results & Measure Progress												
10. Hold the L.T. & Define Future Actions												
11. Prepare presentation and Present to the L.T.												
12. Consolidate Results & Share Learning												

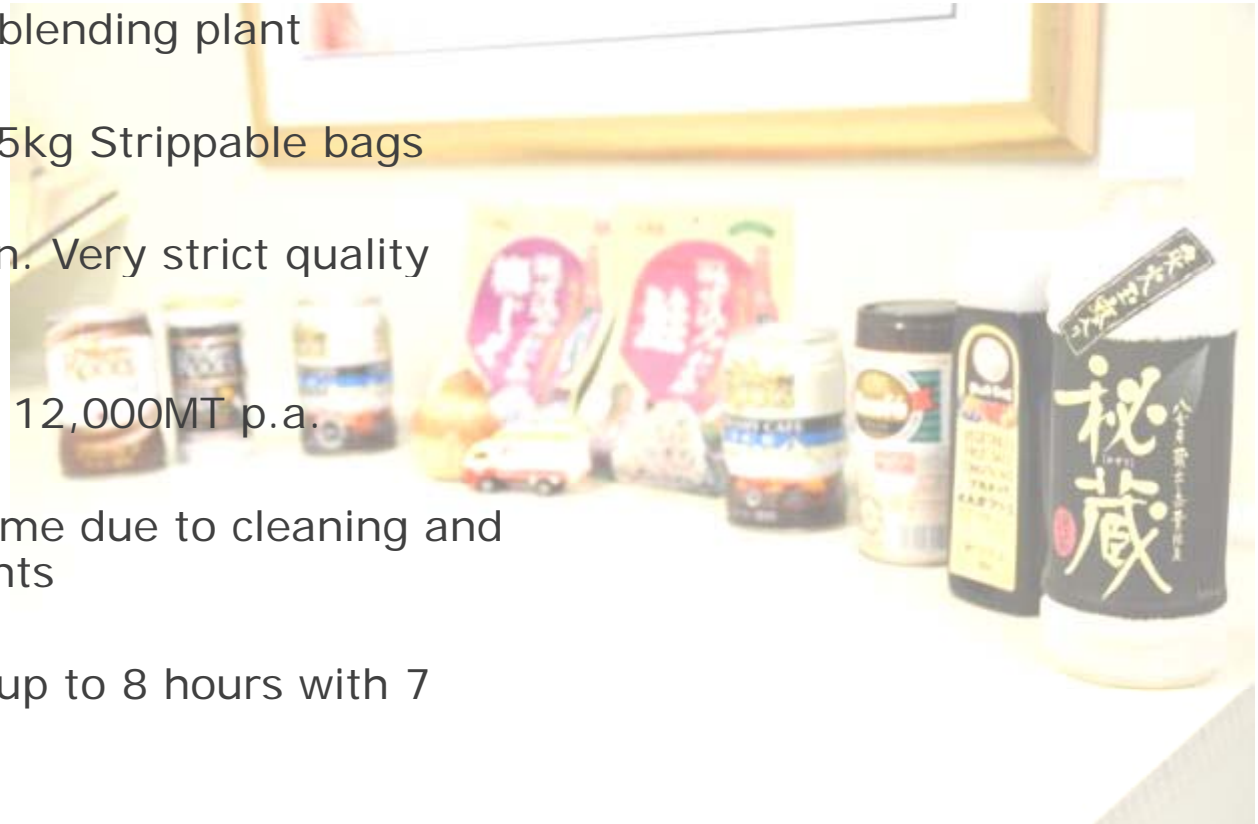
CTPM
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The Chameleons

Porana Road

- Purpose built dairy blending plant
- 15.5kg, 18.1kg & 25kg Strippable bags
- Exporting into Japan. Very strict quality requirements
- Current business of 12,000MT p.a.
- High change over time due to cleaning and washing requirements
- Change over takes up to 8 hours with 7 operators



Equal

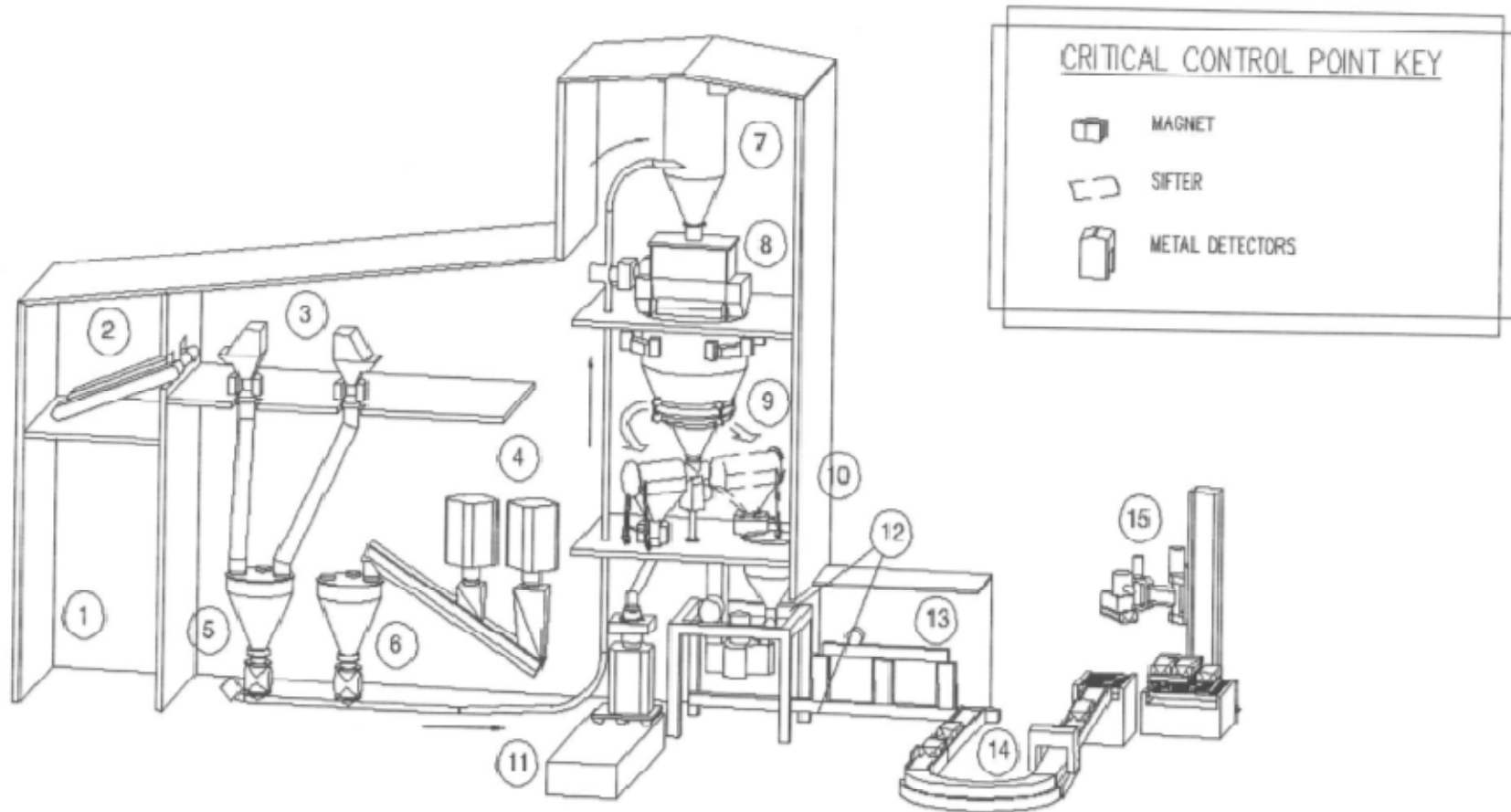


BlendSure



The Chameleons

Porana Road Plant



The Chameleons

Mandate

- Establish Baseline for current Change-over times and **improve by 25%** while also improving or maintaining the Goal Aligned Improvement Measures
- Recommend further loss related Cross-functional (Technical) and Area Based (People) improvement initiatives to the Leadership Team
- Complete within 12 weeks after kick-off.

Change-over refers to changing from one product blend to another



Approach Taken

Methodology

- Baseline Analysis
- Categorising of Change-overs
- Operator Survey
- Observations
- Set-up time reduction Charts
- Post-it Note exercise
- Change-over Checklists
- Single Minute Exchange of Dies (S.M.E.D)
- Improvement Sheets



Approach Taken

Team Involvement

- Operators / Team leader
 - Contribute to Operator Survey
 - Contribute to problem solving and improvements
 - Create Checklists
- Maintenance
 - Make improvements to equipment
 - Tools for Critical Hygiene area
- Quality / Training / Safety
 - Work on Hygiene issues
 - Liaise with Customers on Allergen testing
 - Contribute to Checklists
 - Follow up on Safety Hazards
- Production Manager/Engineering
 - Scoping for capital works
 - Facilitate requirements with Leadership team
- ALL
 - Observations (2x 4hr)
 - Improvement Sheets



Analysis

Operator Survey

Results of Operator Survey Sheet – Porana Rd

Defined Production Area: **PORANA RD**

Date **Mar 2010** — **Dec 2010** —

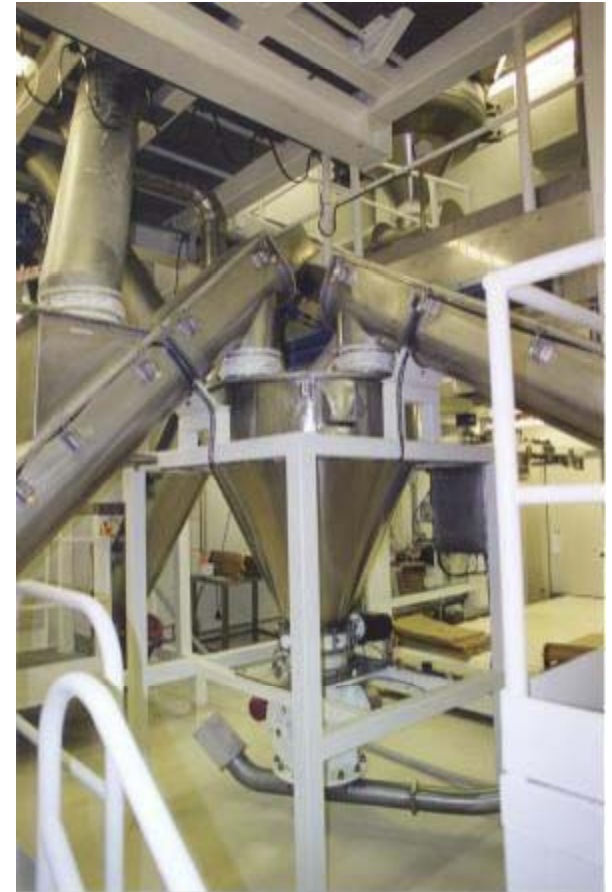
Rating	Ease of Operation	Reliability	Process Capability	Housekeeping	Safety	Environment	Remelt Performance	Maintenance Performance
Excellent	Very easy to operate	Never breaks down	Output always within tolerance	Very clean and well organised workplace	Very safe, no known safety hazards	No spills / emissions	Zero remelt or rework	Weekly maintenance servicing and inspections
	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 remelt or rework	Monthly maintenance servicing and inspections
	Fair to operate	Fairly reliable	Normally keeps within tolerance	Fair workplace	Safety hazards are a concern	Environmental spills/emissions are rare	Average remelt rate	Quarterly maintenance servicing and inspections
	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 remelt rate	Yearly maintenance servicing and inspections
Poor	Very hard to operate	Always breaking down	Cannot hold the required tolerance	Very dirty and very unorganised workplace	Serious safety hazards present	Environmental spills / emissions common	Very high remelt rate	Maintenance only comes when machine breakdowns



Analysis

Operator Survey – Main Comments

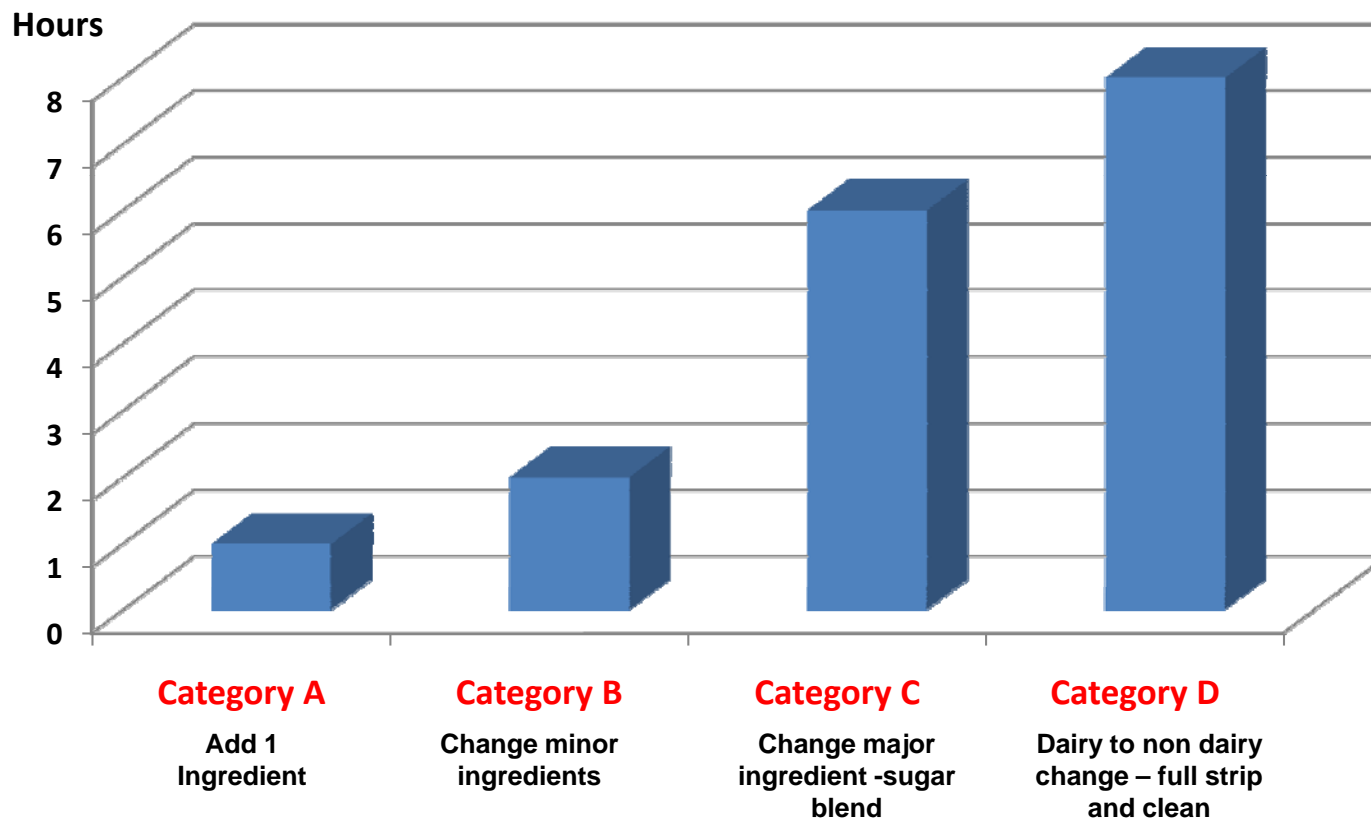
- Filters in the VRH are hard to reach
- Need extra set of product contact brushes
- Need extra manning during change-over
- Need extra product contact vacuum hoses



Analysis

Definition of Categories

Change-over time by Category

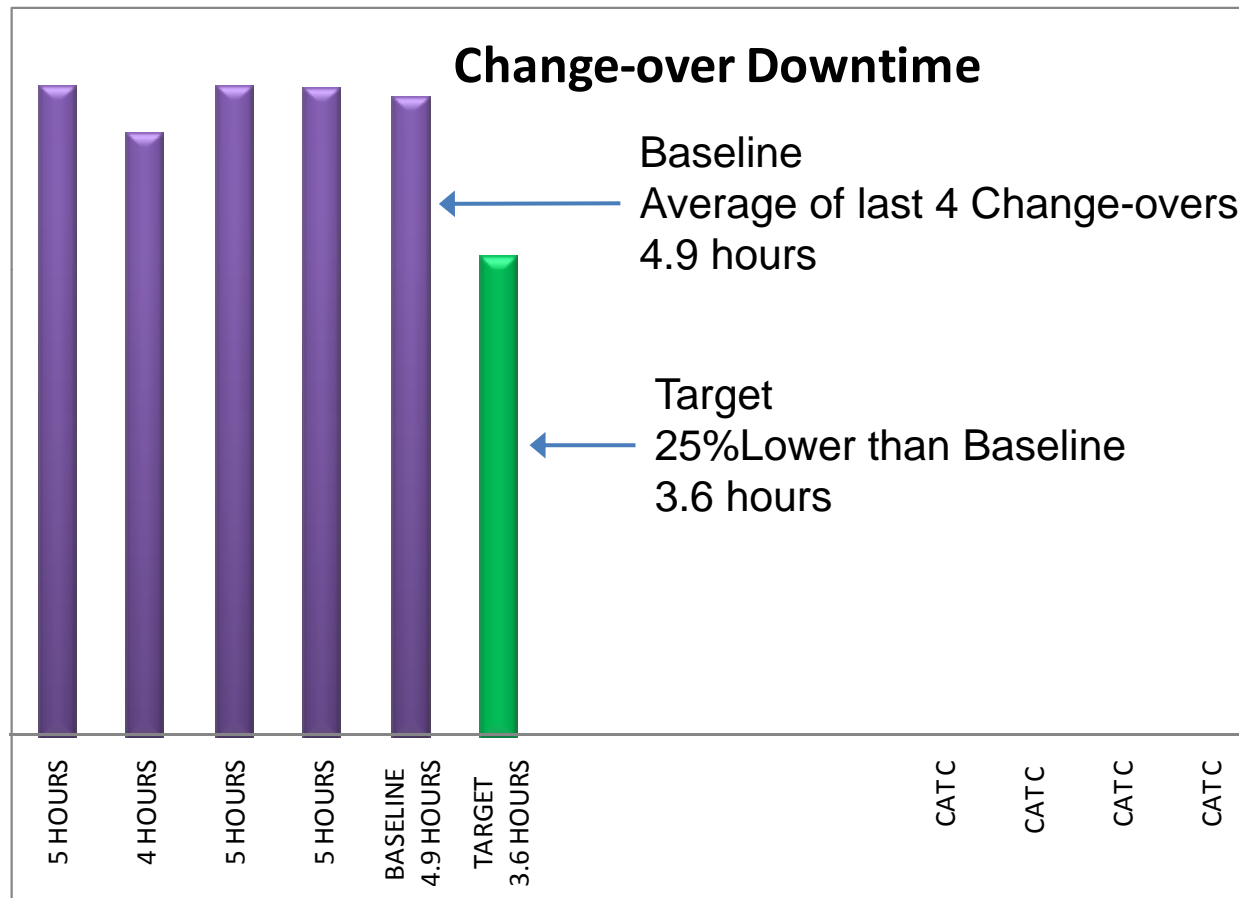


- Category refers to type of Change-over
- A and B are less complicated
- Team chose to focus on Category C & D



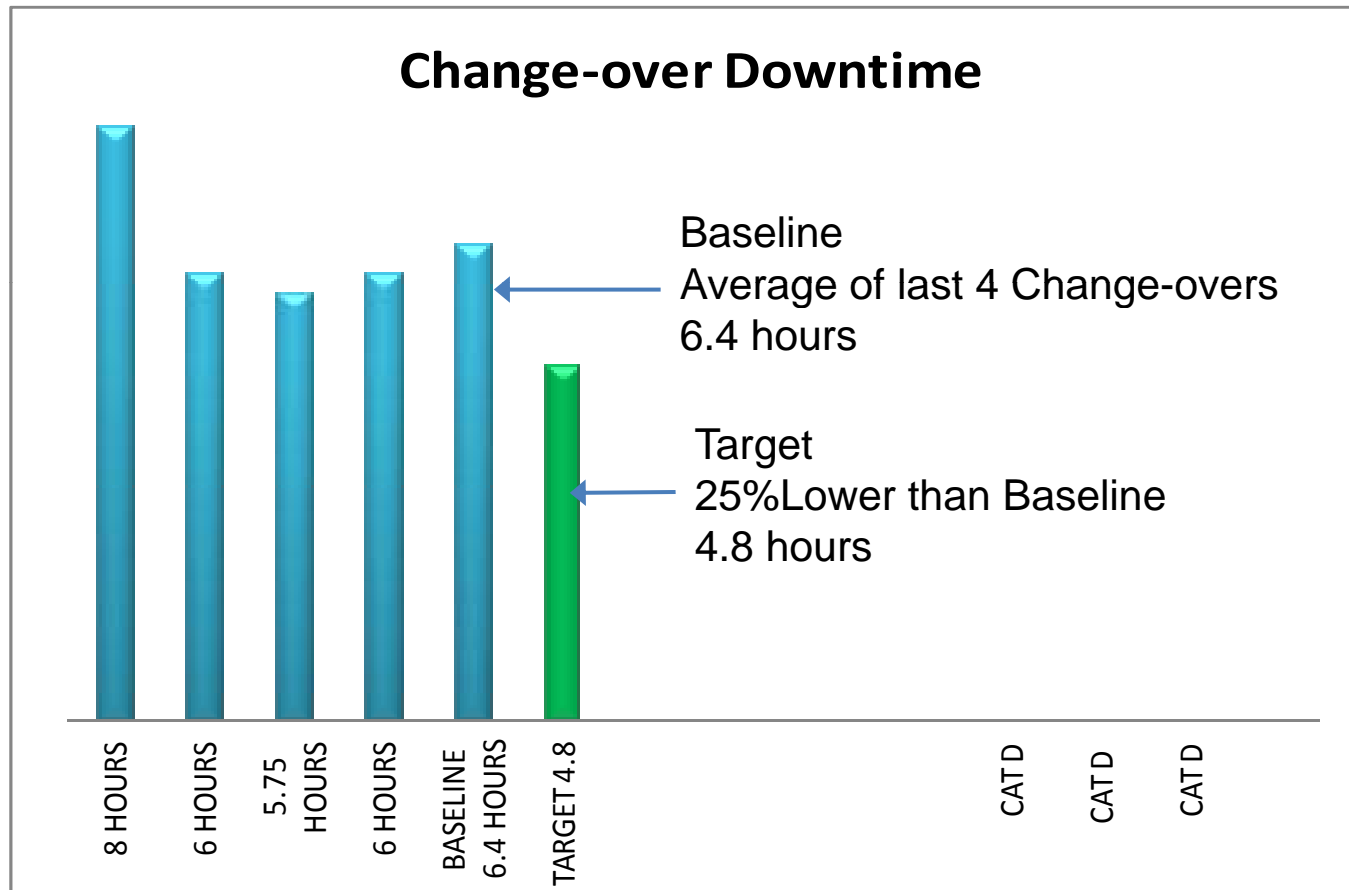
Analysis

Baseline Analysis – Category “C”



Analysis

Baseline Analysis – Category “D”



Analysis

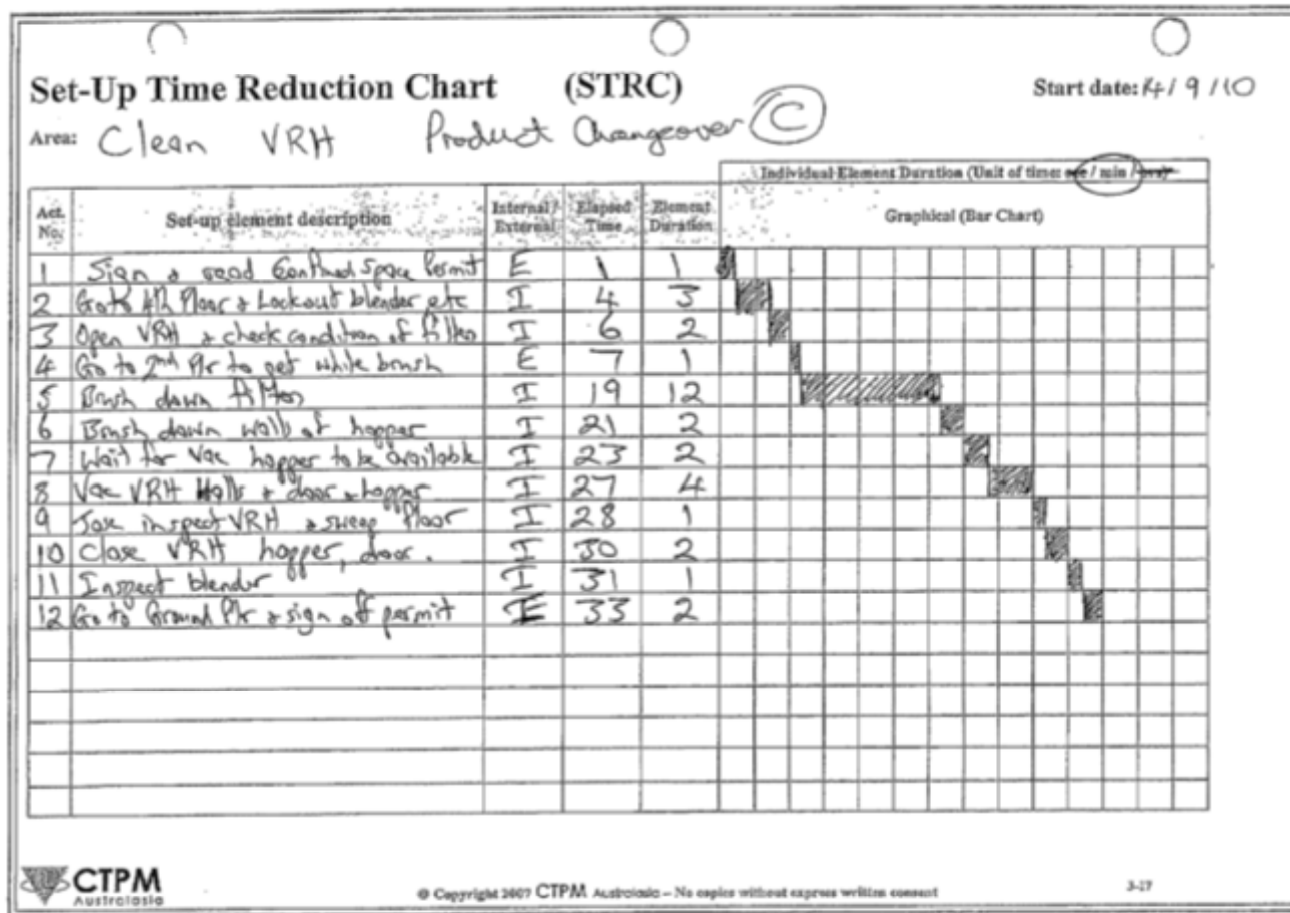
Change-over Observations

- Operators waiting for shared cleaning equipment
- Cleaning equipment transferred from one area to another
- Lack of proper place to store cleaning tools
- Timing and sequence caused unnecessary delays
- Delays waiting for equipment to be brought by the fork hoist driver
- Equipment design caused delays and safety issues



Improvement Tools

Observations – Set-up Time Reduction Chart



E = External
Tasks that can be performed while Machine is running

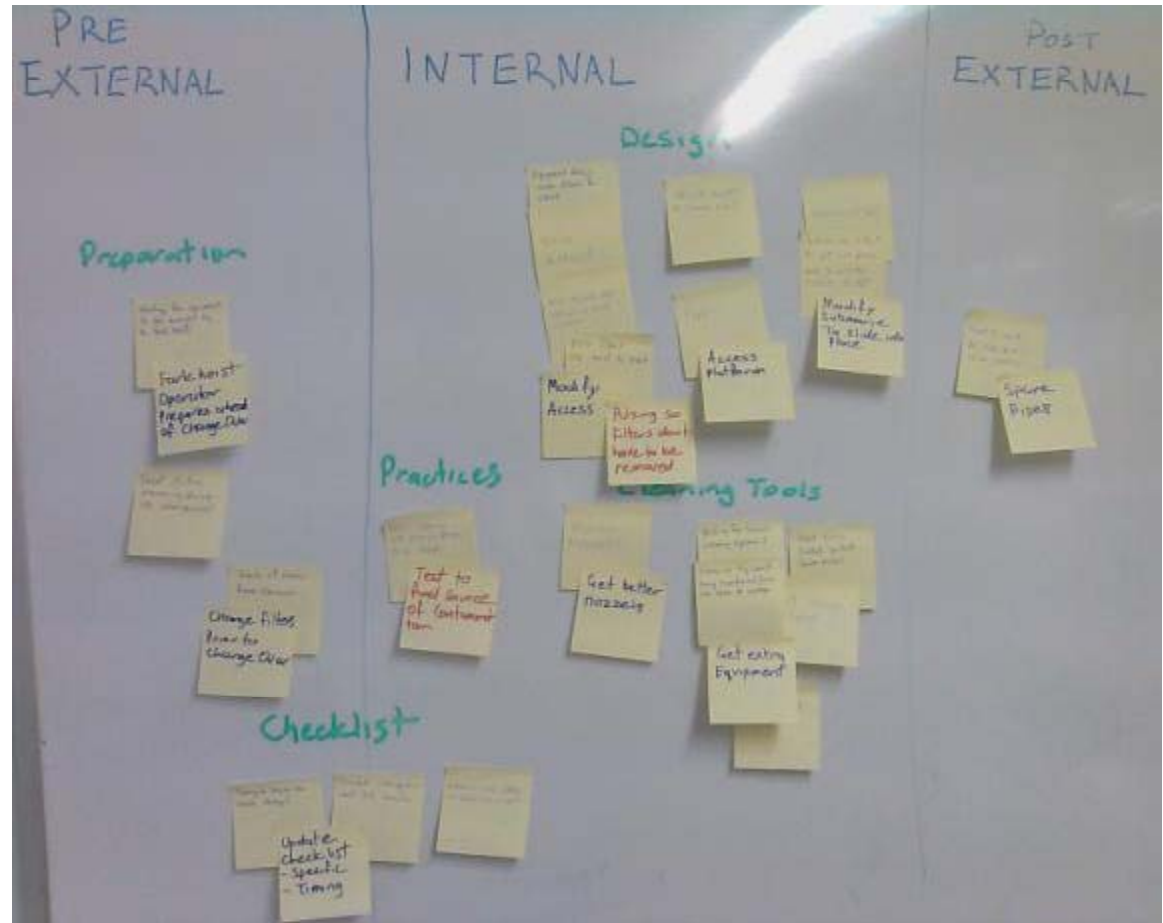
I = Internal
Tasks that must be performed while machine is down



Improvement Tools

"Post-it Note Exercise"

- Identify Problems
- Place in Internal/External
- Group "Like" problems together
- Suggest solutions
- "Out of the Box" solutions



Improvement Tools

Checklists

- Original Cleaning List
 - All categories on one sheet
 - Sign off on a separate sheet
- New Checklist
 - New checklist specific to category
 - More detail for each person
 - Improved sequence to eliminate waiting
 - Sign off and inspection

PRODUCT CHANGEOVER CLEANING LIST				
Plant	A	B	C**	D
Screw conveyors	N/R	Empty out if next product uses different sugar	Vacuum	Vacuum – clean powder off conveyor screw and wall
Sugar weigh hopper	N/R	N/R	Visual – ensure hopper is empty	Clean powder off hopper walls (vacuum/ wipe/ blow out)
Sugar hopper – rotary valve	N/R	N/R	N/R	Strip valve and dry clean
Ingredient stations A/B	N/R	Clean loose powder with screens still in place (vacuum / blow out)	Clean loose powder with screens still in place (vacuum / blow out)	Strip stations – clean powder off walls and ingredient chutes (vacuum/ wipe/ blow out)
Minor ingredient hopper	N/R	Visual – ensure hopper is empty	Visual – ensure hopper is empty	Clean powder off hopper walls (vacuum/ wipe/ blow out)
Mil hopper – rotary valve	N/R	N/R	N/R	Strip valve and dry clean
Vacuum pipe/ inlet filter	N/R	N/R	N/R	Replace vacuum inlet filter inspect vacuum pipes/ wash if required
Vacuum receiver hopper 1 – filters	N/R	N/R	Visual – ensure hopper is empty	Clean powder off hopper walls (vacuum/ wipe/ blow out)
	N/R	N/R	Brush to remove loose powder	Change filters (wash with hot water – must be dry before reuse)
Blender	Vacuum	Vacuum	Vacuum	Clean powder off blender walls (vacuum/ wipe/ blow out)
3 tonne hopper	Sweep with dedicated brush	Sweep with dedicated brush	Sweep with dedicated brush	Sweep with dedicated brush (clean powder off hopper walls)
Rotary sifter	Remove all powder from screen (for sifter overs)	Remove all powder from screen (for sifter overs)	Change screen (if sugar to milk / vacuum loose powder if necessary)	Change screen / clean powder off sifter walls (vacuum/ wipe/ blow out)
Surge hopper	Visual inspection (vacuum if necessary)	Visual inspection (vacuum if necessary)	Visual inspection – vacuum loose powder if necessary	Clean powder off hopper walls (vacuum/ wipe/ blow out)
Sapat filling machine	Flush auto-sampler	Flush auto-sampler	Flush auto-sampler	Flush auto-sampler / Remove and dry clean 2 dust extraction hoods Remove and dry clean bulk fill extraction area
	Clean loose powder from packing heads (vacuum, wipe, blowout)	Clean loose powder from packing heads (vacuum, wipe, blowout)	Clean loose powder from packing heads (vacuum, wipe, blowout)	Remove and dry clean augers
	Clean loose powder around probe housing	Clean loose powder around probe housing	Clean loose powder around probe housing	Clean all loose powder from packing heads/ clean loose powder around probe housing
Bagging line	N/R	N/R	N/R	Wipe loose powder from bagging line / floors / ledges
IBC station	TBC	TBC	TBC	TBC
Floors / walls	N/R	N/R	N/R	Vacuum loose powder /
FLUSH	1 x "1 bag blend" DSS ← → DSS10 DS → DSS	2 x "1 bag blend" DSS → DS SAS ← → DSS, DS	2 x "1 bag blend" SUGAR → MILK MILK ← → MILK** ANY → COFFEE**	2 x "1 bag blend" MILK → SUGAR COFFEE → ANY***

**NB: Equipment used for ingredients that are the same as on the next product do not require full cleaning

***NB: HWS03 to WMPFF3 – flush autosampler only (no other cleaning required)

***NB: Flush with 4 x 15 x 25kg bags of sugar – then blend flush, then send first bag for coffee odour check in Lab

Notes

1. Lockout and confined space procedures must be followed. Copy: Work Folder
2. Any wet cleaning must be completed outside of CHA – all product to be sanitised w/ ethanol prior to returning to the CHA

Doc Code: Porana 2.0

Appendix 4

Issue: 4 May 2009

Page 1 of 1

Issue No: 2



Improvement Tools

New Change-over Checklist

Product change-over check sheet – Category D

Date: _____ Blend previously produced: _____ Blend being produced next: _____ Time started: _____ Time Completed: _____

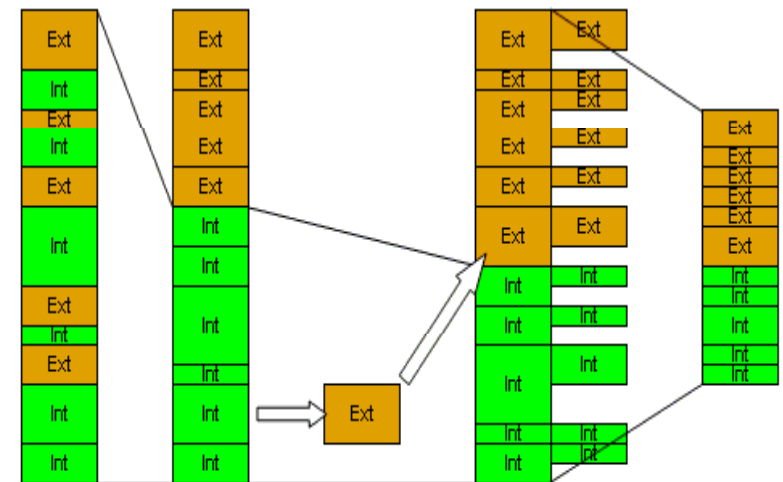
	Activities to be performed	Cleaning performed	Cleaned by	Inspected by
Blending				
Screw Conveyor 1	Vacuum – clean powder off conveyor screw			
Sugar Main Hopper (SMH)	Sweep with product contact brush then Vacuum			
Minor Ingredient station A	Strip screen and attachments and hot wash Clean powder off walls(brush, blow, vacuum)			
Minor Ingredient station B	Strip screen and attachments and hot wash Clean powder off walls(brush, blow ,vacuum)			
Ingredients Station A and B Chutes	Blow out			
Minor ingredient hopper (MIH)	Sweep with product contact brush then Vacuum			
SMH and MIH Rotary valve	Blow out			
Vacuum receival hopper (VRH)	Sweep with product contact brush then Vacuum			
VRH filters x 7	Replace filters (inspect filters walls and seals before fitting in)			
VRH inlet filter	Replace with new one			
VRH Transfer pipes x 4	Remove for hot wash			
Blender	Sweep with product contact brush then Vacuum			
3 Tonne hopper	Sweep with product contact brush then Vacuum			
Rotary sifter and Screen	Remove all powder from screen(for sifter over check) Hot wash			
Rotary sifter Screw	Empty out product trapped in shaft / Hot wash (including inside shaft)			
Surge hopper	Sweep with product contact brush then Vacuum			
All socks / breather x 4	Remove and replace (blender,3TH,sifter,MIH)			
All product contact connecting skirts(connectors)	Remove and dry clean(blow out)			



Improvement Tools

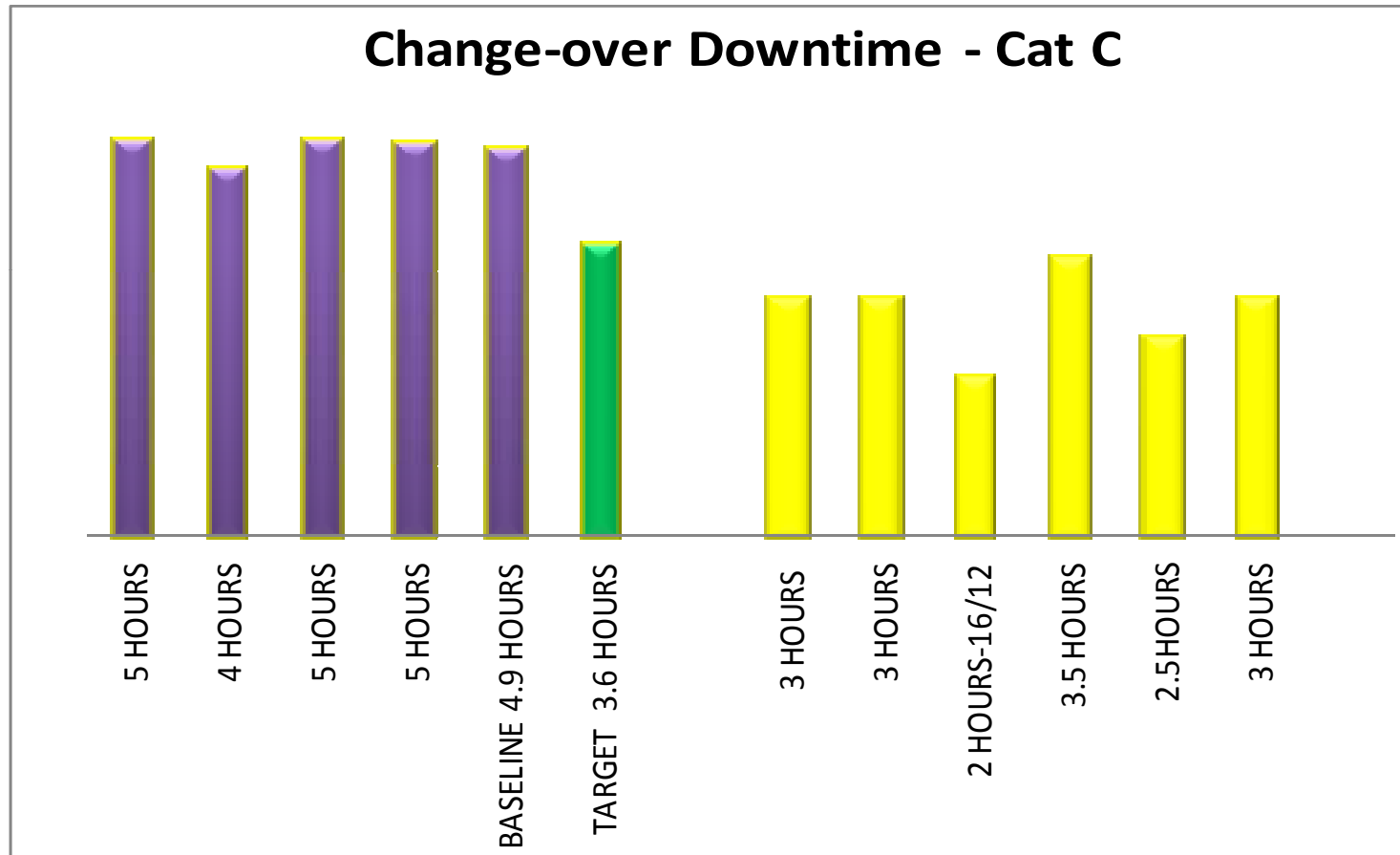
SMED (Single Minute Exchange of Dies)

- Observe
 - Observations of Category “C” and Category “D”
- Separate “Internal” and “External” elements
 - Through Set-up Time Reduction Charts and Post-it Note Exercise
- Convert where possible Internal to External
 - Transferred activities to fork hoist driver
- Streamline and Simplify
 - See improvements
- Document the Procedure
 - Use of Checklists



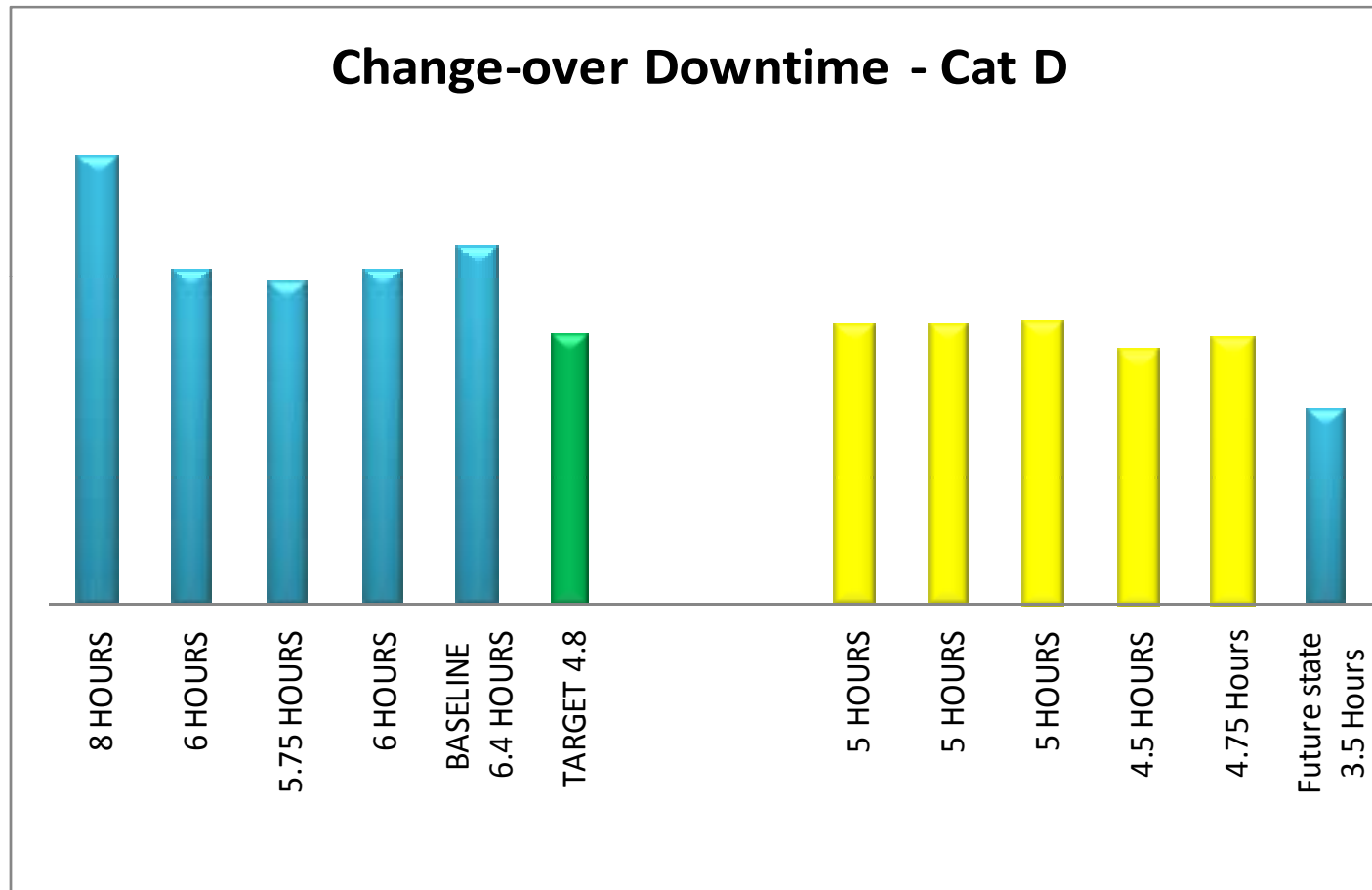
Tangible Achievements

Change-over Reduction – Category “C”



Tangible Achievements

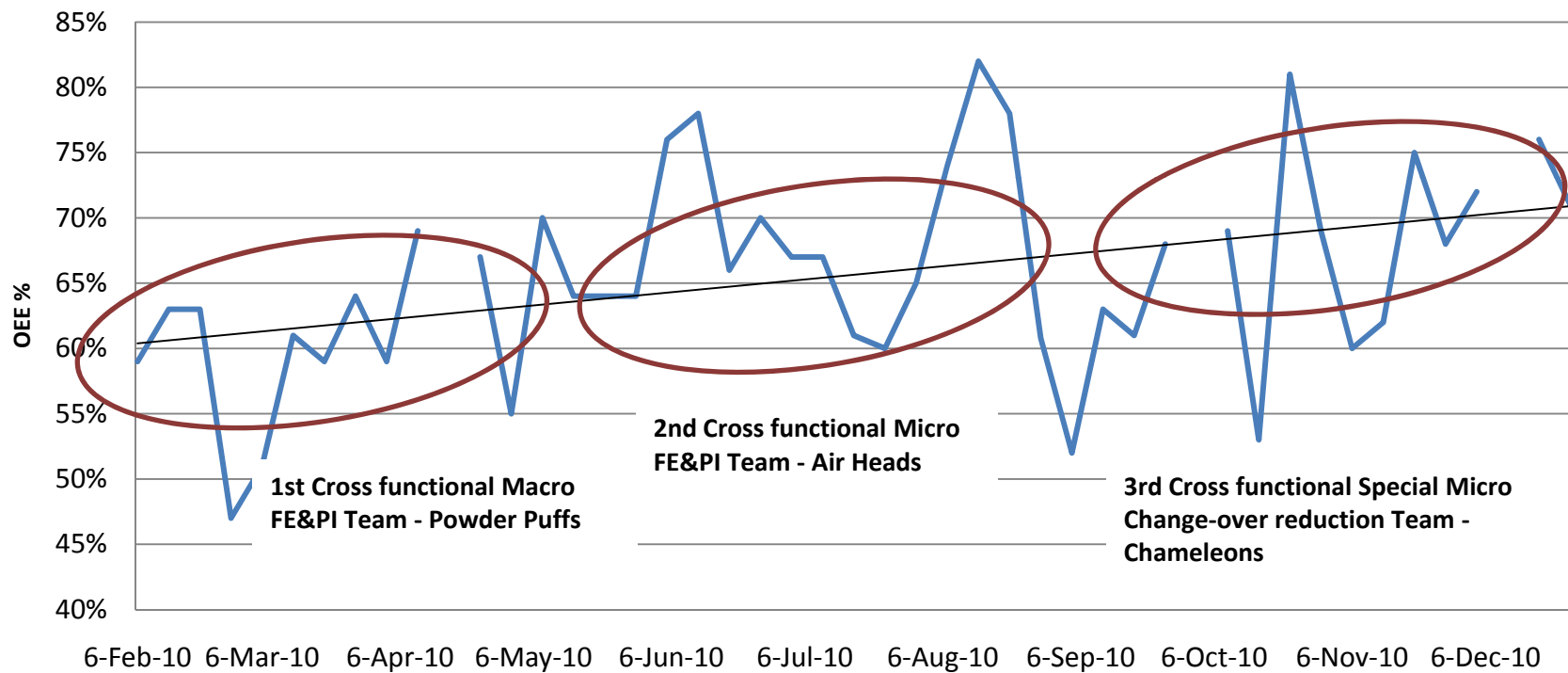
Change-over Reduction – Category “D”



Tangible Achievements



OEE Improvements

2010 - OEE by Week



Tangible Achievements



Improvements – Cleaning Attachments

Team Name:	Chameleons	Location:	Porana Rd	Initiated Date:	21/9/10
Team Type:	Changeover Reduction	Item:	Cleaning Attachment	Completed Date:	30/05/11
Initiator:	Neil Mosdel				
1. Problem (Plan)					
Cleaning attachment is old worn out and not very ergonomic.					
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)		
					
Improvement Target:	Need an attachment that is easy to use		Cost:	\$2000	Expected Saving: \$1680 pa plus Improved Hygiene and Ergonomics
4. Results: (Check)			5. Future Actions: (Act)		



Tangible Achievements



Improvements – Hose Attachments

Team Name:	Chameleons	Location:	Porana Rd		Initiated Date:	21/9/10	
Team Type:	Changeover Reduction	Item:	Hose Attachment		Completed Date:	30/05/11	
Initiator:	Robert Crow						
1. Problem (Plan)							
Lack of proper attachment causes lost time and Fiddling.							
2. Current Situation (Plan)				3. Proposed Change / Approved Improvement (Do)			
							
Improvement Target:		Hoses have correct attachment		Cost:	\$1000	Expected Saving:	\$840pa
4. Results: (Check)				5. Future Actions: (Act)			



Tangible Achievements

Improvements – Additional Hygiene Hoses

Team Name:	Chameleons	Location:	Porana Rd	Initiated Date:	21/9/10
Team Type:	Changeover Reduction	Item:	Vacuum hoses	Completed Date:	30/05/11
Initiator:	Mike Wynne				
1. Problem (Plan)					
Not enough Vacuum hoses. Operators have to borrow from each other and wait until other operator has finished. Safety issues with travelling up and down stairs with hoses. Hygiene issue with equipment being left on the floor.					
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)		
					
Improvement Target:	Purchase additional hoses and brackets	Cost:	\$2000	Expected Saving:	\$1440pa
4. Results: (Check)			5. Future Actions: (Act)		



Tangible Achievements



Other Improvements

- Relocated mezzanine operator into Hygiene Area
- Fork hoist driver given sole charge outside Hygiene Area
- Added a change over sheet for duties outside Hygiene Area – “Warehouse Change-over”
- Replacing table used when changing transfer pipes with proper working platform. Safety barrier currently in place
- Discussions with customer led to a large reduction in the amount of sugar flushed through the system after each change-over



Tangible Achievements

Improvements – Spare Vacuum Filters

Team Name:	Chameleons	Location:	Porana Rd	Initiated Date:	21/9/10
Team Type:	Changeover Reduction	Item:	Vacuum Filters	Completed Date:	19/12/10
Initiator:	Ronald Sanchez				
1. Problem (Plan)					
Vacuum unit loses power during change over then everything has to wait while filters are changed.					
2.Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)		
					
Improvement Target:	Get spare filters and replace prior to changeover		Cost:	\$600	Expected Saving: \$1600 pa
4. Results: (Check)			5. Future Actions: (Act)		



Tangible Achievements

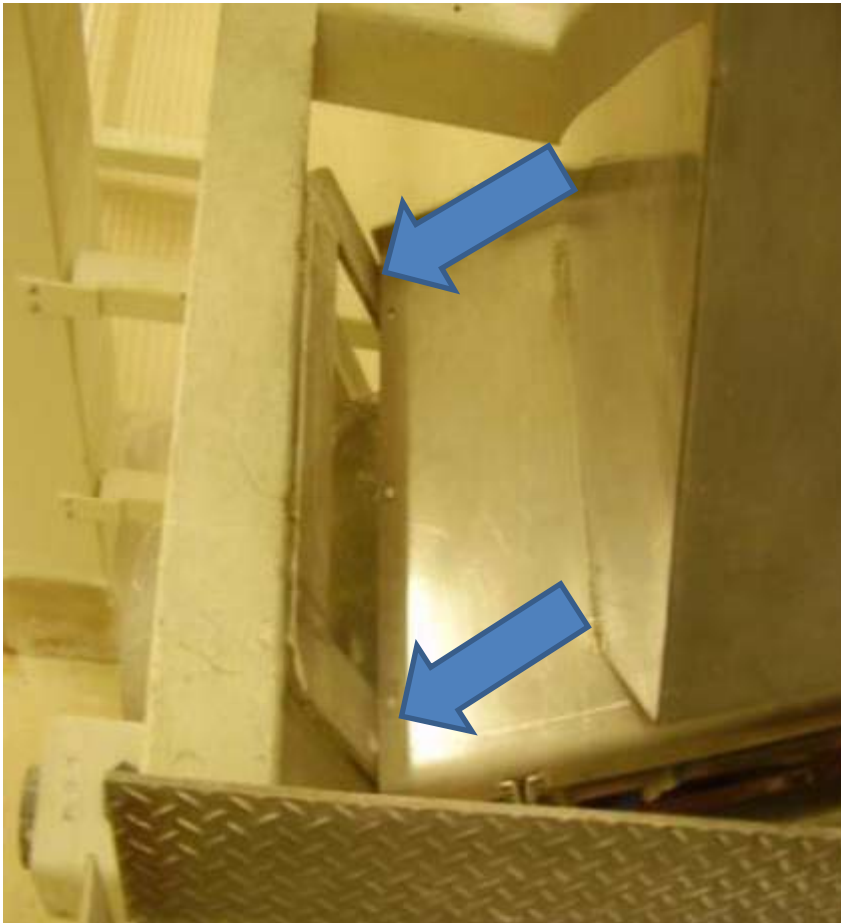
Improvements – Conveyor Hopper

- Conveyor hopper must be raised and lowered using two handed control
- Need another operator from elsewhere to help guide it and line up bolts






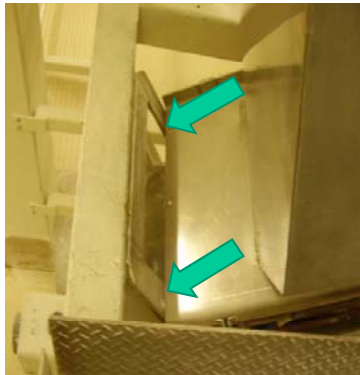
Tangible Achievements

Improvements – Conveyor Hopper



Tangible Achievements


Improvements – Conveyor Hopper

Team Name:	Chameleons	Location:	Porana Rd	Initiated Date:	21/9/10	
Team Type:	Changeover Reduction	Item:	Infeed station Submarine	Completed Date:	4/12/10	
Initiator:	David Robinson					
1. Problem (Plan)						
Safety Hazard. When operator lowers the Conveyor Hopper” into place and extra operator is needed to guide it using his hands.						
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)			
<div>SCREW 1 LATCHES</div> <div></div>			<div>WITH NEW GUIDES AND LATCHES AND STOPPER DOWN THE BOTTOM</div> <div></div>			
Improvement Target:	Fix latches and guides to make easier and safer to install submarine		Cost:	\$350	Expected Saving:	Big safety risk removed \$480 pa
4. Results: (Check)			5. Future Actions: (Act)			



Tangible Achievements


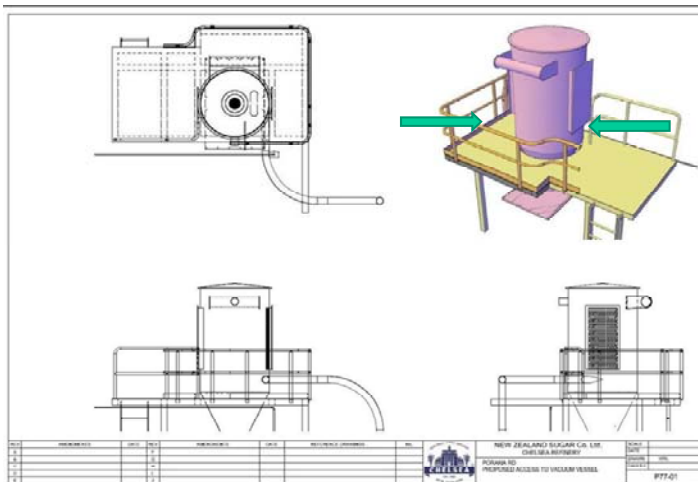
Improvements – Tools Cabinet

Team Name:	Chameleons	Location:	Porana Rd	Initiated Date:	21/9/10
Team Type:	Changeover Reduction	Item:	New tool board	Completed Date:	22/12/10
Initiator:	Lincoln Bell				
1. Problem (Plan)					
Have to bring Dirty Tools through the clothing exchange					
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)		
					
Improvement Target:	Have a dedicated place to store tools for Maintenance fitter.		Cost:	\$1100 (inc tools)	Expected Saving: \$430 pa Plus less missing tools
4. Results: (Check)			5. Future Actions: (Act)		
Cabinet can be locked by fitter but is still visual so issues with tools missing can be addressed quickly and easily			Place tools		



Tangible Achievements



Improvements – VRH Filters

Team Name:	Chameleons	Location:	Porana Rd	Initiated Date:	11/12/10
Team Type:	Changeover Reduction	Item:		Completed Date:	September 2011
Initiator:	Jose Guevara				
1. Problem (Plan)					
Unsafe practices needed when changing the VRH Filter due to access restrictions.					
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)		
<p>- CHANGING OF VRH FILTERS X 7</p> <p>SAFETY ISSUE</p>  <div>Video 1</div> <div>Video 2</div>			<p>PROPOSAL</p> 		
Improvement Target:	Ease of Access	Cost	\$65,000 inc all major safety initiatives	Expected Saving:	Major Hazards removed
4. Results: (Check)			5. Future Actions: (Act)		



Tangible Achievements

Improvements – Spare Pipes

Team Name:	Chameleons	Location:	Porana Rd	Initiated Date:	11/12/10
Team Type:	Changeover Reduction	Item:	Spare Pipes	Completed Date:	30/06/11
Initiator:	Tony Grant				
1. Problem (Plan)					
Have to remove pipes, Clean and allow to dry taking up to 2 hours					
2. Current Situation (Plan)			3. Proposed Change / Approved Improvement (Do)		
					
Improvement Target:	Spare pipes move cleaning and drying to external activities		Cost:	\$2000	Expected Saving: \$2160 pa
4. Results: (Check)			5. Future Actions: (Act)		



Tangible Achievements

Goal Aligned Measures

- 4 Major Safety Hazards identified and addressed
- Quality improvement – improved hygiene practices
- OEE % Improvement across all TPM³ Teams
- Time saving of approx 28 man hours per month
- Customer satisfaction improved with more confidence in no allergen carryover
- Shorter Change-overs make it easier to respond to customer demand



Intangible Achievements

Moral and Employee Frustrations

- Identified and reduced Operator frustration.
- Addressed some large safety concerns.
- Positive impact on Operator moral as "Something is being done"
- Food hygiene issues addressed
- Less waiting for shared tools and cleaning equipment
- Better understanding of roles through more specific checklists



Intangible Achievements

Relationships

- Greater appreciation and understanding of issues faced by Porana Road
- Cross functional nature of team led to good exchange of ideas
- Better understanding of allergen carryover issues through dialogue with customer
- Greater appreciation and understanding of Change-over Reduction process. (applied to next team at Chelsea)
- Great Management response to some large issues



Communication of Lessons Learnt

Learnings – From History Sheet

- Blockages
 - Infrequency of Change-overs for observations
 - More observations needed of VRH
- Achievements
 - Whole team involved in observations
 - Identified which categories of Change-over to focus on early on
- Lessons Leant
 - Using TPM³ principles gives good results
 - Go and See!
 - Many safety issues identified through observations
 - There is always room for improvement



Communication of Lessons Learnt

Communication

- Good participation from all team members
- Good information picked up during observations
- Regular Weekly Briefings to Porana Road team
- Used Improvement Sheets to demonstrate improvements
- Communication shared with customer
- Midway and Final Presentations made to all Porana Road operators as well as TPM³ Leadership team



Summary

Conclusions

- Achieved Mandate of 25% Change-over improvement in 12 weeks
 - This equates to a 5% OEE improvement
 - More to come
- Many good improvements. 10 Improvement sheets generated with all team members contributing
- Safety issues resolved
- Reduced frustrations
- Change overs now quicker and easier
- Improvements ongoing. Each TPM³ team building on the last (Plan Do Check Act) cycle



Thank You

Questions?

