PROJECT PORTFOLIO

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MENG: INDUSTRIAL ENGINEER
KZD SOLUTIONS
(2023/671157/07)

Company	Tot. projects	Financial Impacts	Industry	Duration
DUYS	12	>R945,000.00/yr	Automotive	6 months
ZA Gear	10	>R100,000.00/yr	Textile	6 months
Oh Two Printing	20	>1,500,000.00/yr	Printing	24 months

Skillset

Project Planning

Gemba walk (visual observations for improvement)

Method, Time Study techniques and Takt time

AutoCAD Designs (2D layout revisions)

Solid Works Design (Design Modifications) “Beginner”

Lean Six-Sigma Methodologies

Designing work instructions/Standard Operating Procedures

MS Visio, Excel

Process Mapping including value Stream Mapping

Mentoring and training

Quality Improvement Systems

Data collection and Analysis

The projects below entail a summary of what the Industrial Engineering (IE) consultant has produced throughout his career. More details about the project are available upon discussion.

Contents

5’ s and Kanban Implementation

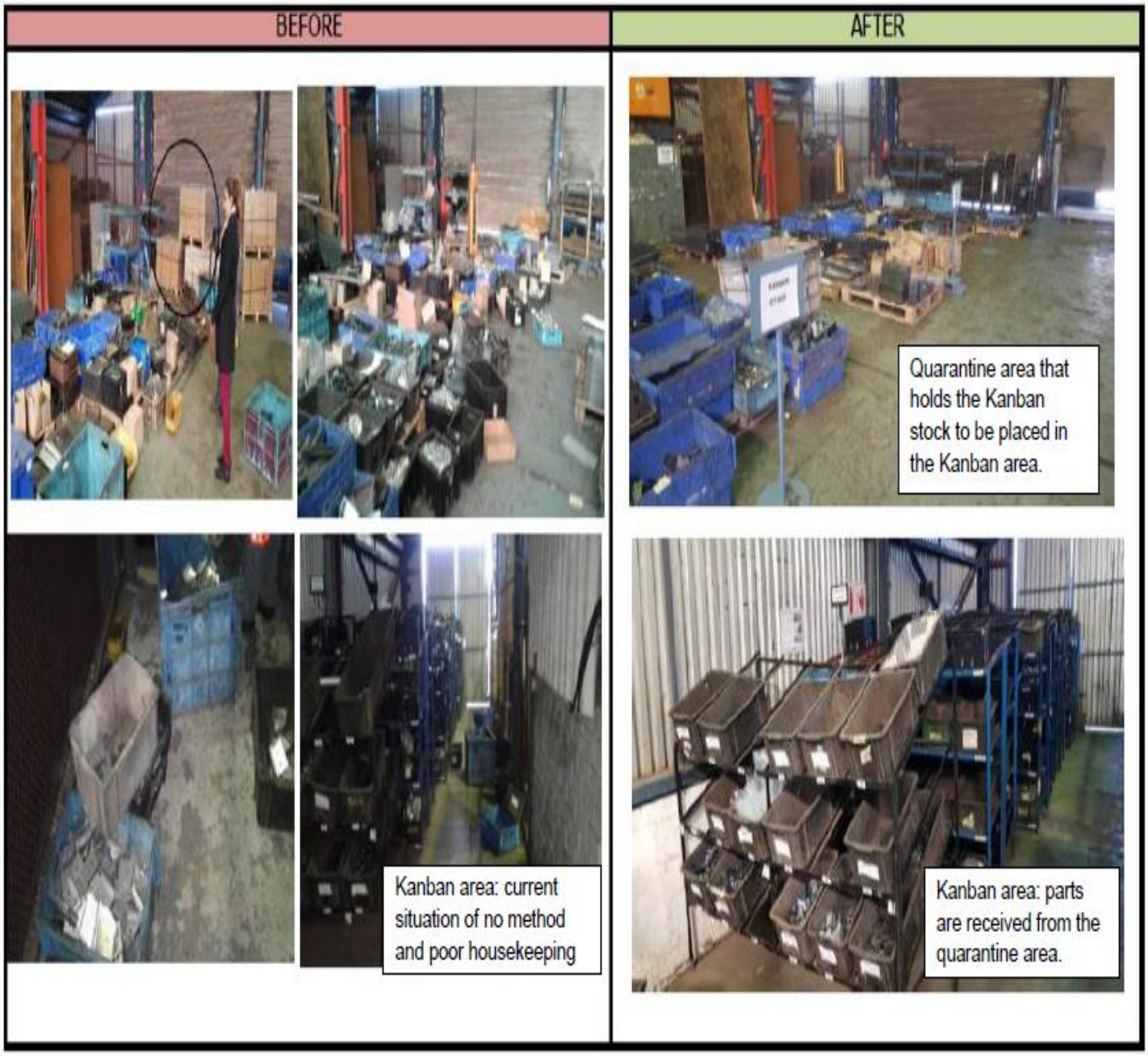
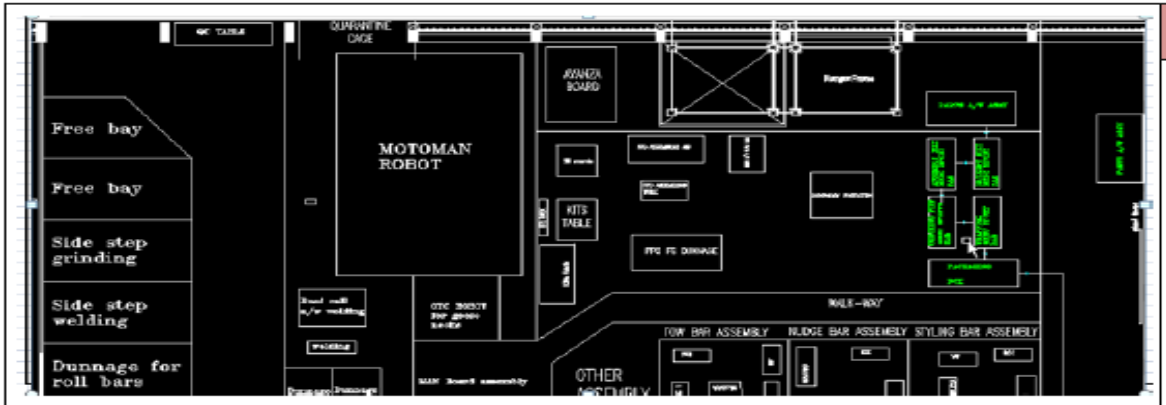


Figure 1: 5's and Kanban implementation

Facility revised layout designs



Before

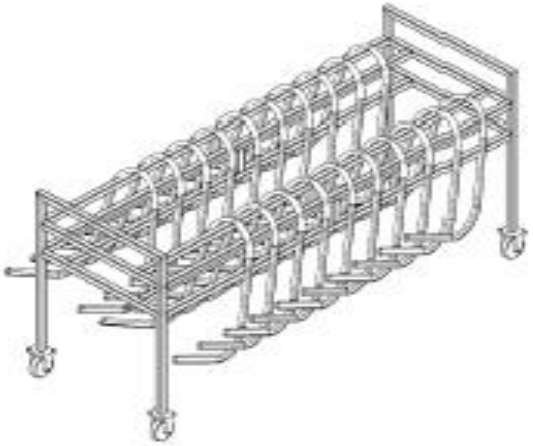
- Motoman occupying the current space and taking majority of the area.
- Obsolete products occupying the area
- Halos production process done in mild steel but then wrapped and packaged in MPD

After

- Reduced distance from production process to wrapping and packaging.
- Area is more spacious, dispatch area placed closer to walkway.
- Zero obsolete products/production process in the area
- Walkway created to dispatch finished goods.

Figure 2: Layout design

Tool and Rack design



Kaizen key Points:

1. Will require no need of modifications
2. Made specifically for bent pipes
3. Reduces risks of injures
4. Easy to push
5. Will increase productivity
6. estimated to carry 100 bent trolleys
7. help reduce over production
8. will not damage the material

1. This card will help operators know that this dunnage is specifically made for trolleys.
2. Capacity stated to avoid overloading. However, they will write the quantity the dunnage is carrying to avoid over production and keep track of how much pipes they are bending.

Figure 3: tool and rack designs

Kaizen Report

KAIZEN REPORT

DUYS

Project Name: Trolley Dunnage Modification

Department: R&D

before	after
	

PROBLEM	KAIZEN KEY POINTS	COUNTERMEASURES
1. while pushing the dunnage the trolley fell 2. the dunnage was a safety hazard, almost fell on the operator 3. the dunnage was overloaded with trolleys 4. operators were not aware of capacity dunnage can hold 5. the stand was bent due to lack of support 6. major issue is the stand needs support, incase operators overload the dunnage 7. cylinder tubes were not strong enough	1. the stand is stronger 2. supports were added unto the stand 3. stand will not bend if the dunnage would be overloaded 4. can hold 112 trolleys 5. should it exceed the holding capacity, it will not fall nor bend but it will be heavy to push around 6. eliminate future dangers of dunnage falling again 7. reduces risks of injuries 8. square tubes used to strengthen holding capacity	- make operators aware of dangers overloading the dunnages - operators should be aware of the capacity it can hold - should future issues occur modifications can be done

Team Members
Steven Kazadi (IE intern)
Jason Kista (industrial Engineer)
Africa Zulu (R&D supervisor)

Figure 4: Kaizen report (rack design)

Process Engineering

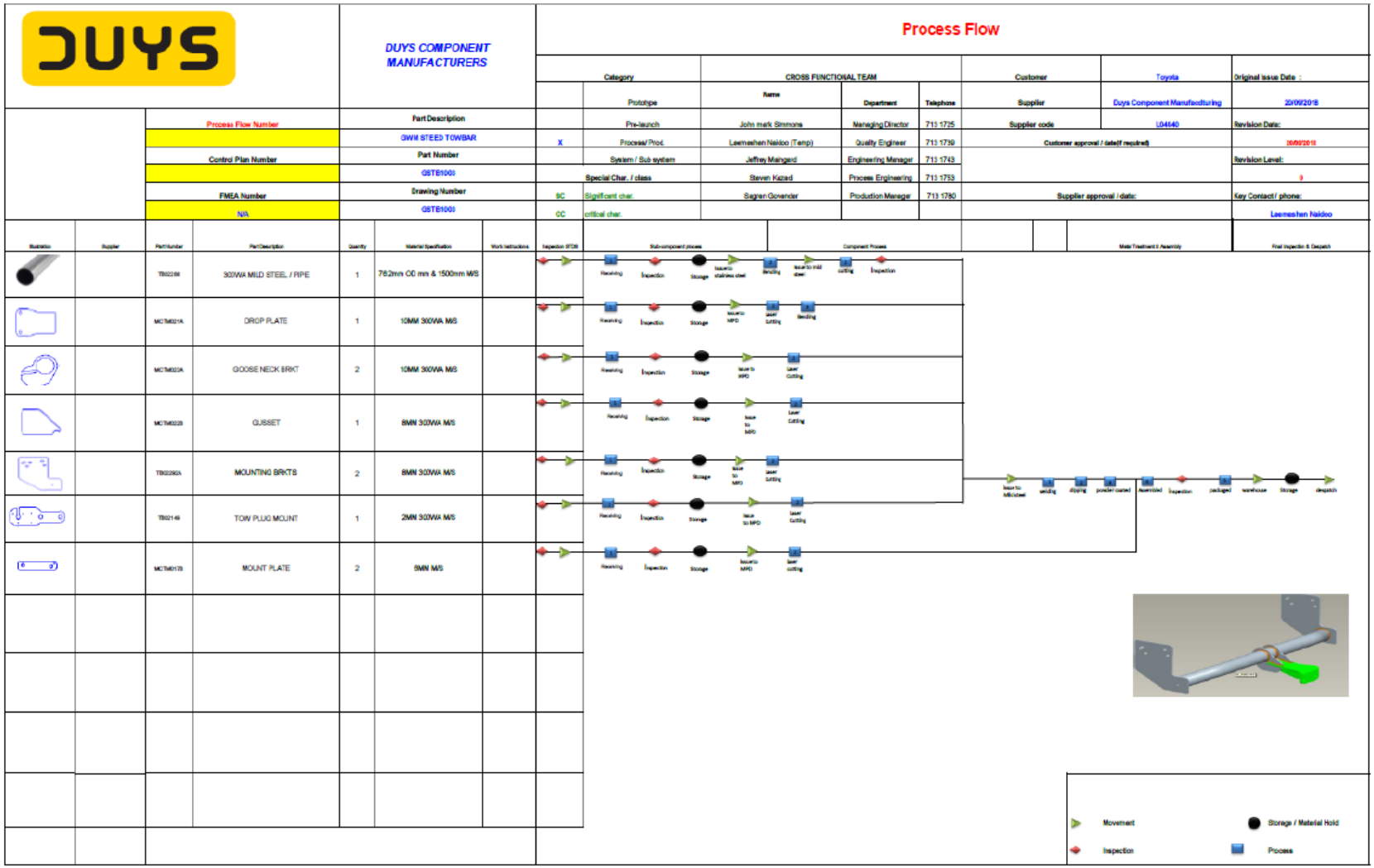


Figure 5: Process Engineering

Quality Improvement System (Utilizing OPMS)

After we have implemented most of the quality systems to improve poor quality because it was affecting the CMT production line efficiency. We then asses the improvements to see if the new method of improving quality works for the company. The OPMS systems developed by the BMA analysts formerly known as B&M analysts communicates with the management to see for any improvements.

Figure 6: Quality Improvement Rates results

From appointment of the production engineer in January and application of quality and lean-six sigma methodologies there has been a steady improvement on overall performance of the production. However, communication, leadership and teamwork does play a role to achieve significant improvement in a short space of time.

Conclusion

Table 1: Summary of improvement rates

Before		**After**	
cost loss:	R 13,563.00	cost loss:	R 3,195.00
Shortages:	R 25,494.00	shortages:	R 1,200.00
rework rate:	44%	rework rate:	7%
scrap rate:	0.54%	scrap rate:	2%
FTT:	40%	FTT:	170%

Production planning and control

Time study and takt time techniques were used to identify and eliminate or reduce bottlenecks that was cause late deliveries and not meeting daily targets which ultimately will affect the companies' profits negatively. The approach taken was a predictive analysis approach of conducting a time study from the sample stage to determine whether its profitable doing the garment and how many operators needed and the adjustments required to meet the demand in the shortest lead time as possible.

Summary

The table below represents the result of production line optimization through predictive approaches of utilizing time study, takt time and poka-yoke techniques.

Table 2: Summary of optimization results

Category	Before	After
Total Idle time:	2.38	1.08
Workstation time:	31.39	30.11
Balance delay:	8%	4%
Efficiency:	92%	94%

Time Study

Production Engineer trains the time study officer to conduct time study during sample stage and the engineer collects the data and begins to conduct analysis.

TIME STUDY SHEET									
Department: Sample Department		**Document Owner: Industrial Engineer** (steven kazadi)							
Order No. : 31929		**DATE:** 21/02/2019							
APPROVED:		**Time study personnel:** Rose Jila							
Ops no.	**Operations**	**Cycle times**				**Rating**	**NT**	**A_{pfd}**	**T_{std}**
		Cycle 1	**Cycle 2**	**Cycle 3**	**Ave. time**				
1	Make belt	1.4	1.48		1.44	100%	1.44	1.15	1.66
2	Close belt	0.35	0.33		0.34	100%	0.34	1.15	0.39
3	Join shoulders	0.39	0.32		0.36	100%	0.36	1.15	0.41
4	Bind neckline	1.34	1.24		1.29	100%	1.29	1.15	1.48
5	Frenchstitch neckline	2.33	1.38		1.86	100%	1.86	1.15	2.13
6	Bind sleeves	0.15	0.18		0.17	100%	0.17	1.15	0.19
7	Fit sleeves	1.35	0.18		0.77	100%	0.77	1.15	0.88
8	Close sides (top)	1.36	1.44		1.40	100%	1.40	1.15	1.61
9	Tack sleeves opening	0.27	0.33		0.30	100%	0.30	1.15	0.35
10	Lock front overlaps	0.39	0.45		0.42	100%	0.42	1.15	0.48
11	Join fronts (bottom panels)	1.17	1.22		1.20	100%	1.20	1.15	1.37
12	Join backs (bottom panels)	0.48	0.42		0.45	100%	0.45	1.15	0.52
13	Close sides (bottom)	1.19	1.32		1.26	100%	1.26	1.15	1.44
14	Overlock bottom	0.51	0.5		0.51	100%	0.51	1.15	0.58
15	Hem bottom	2.33	2.03		2.18	100%	2.18	1.15	2.51
16	Fit top to bottom	1.24	2.11		1.68	100%	1.68	1.15	1.93
17	Tack elastic	0.16	0.19		0.18	100%	0.18	1.15	0.20
18	Attach elastic	1.42	2.28		1.85	100%	1.85	1.15	2.13
19	Overock elastic	1.23	1.15		1.19	100%	1.19	1.15	1.37
20	Make belt loops	0.18	0.23		0.21	100%	0.21	1.15	0.24
21	Attach belt loops	1.24	1.16		1.20	100%	1.20	1.15	1.38
22	Attach hanger loops	0.36	0.46		0.41	100%	0.41	1.15	0.47
23	Attach label	0.24	0.29		0.27	100%	0.27	1.15	0.30
Total time (min)		21.08	20.69	0.00	20.89		20.89		24.02

CMT Price:	R 44.00
Labor Charge:	R 36.03
Profit/loss:	R 7.97

Labor charge formular:	R1.5/min * total **Tstd**

Profit:	
Loss:	

Figure 7: Time study data sheet (Textile: CMT)

Production Capacity Alterations

Indicates when it goes to production

Order Number: 31929 **Start Date:** 25/02/2019

Avail. Time	Daily Demand	Takt time
510	796	0.64

Budgeted Value	cmt	Daily Demand	Demand/hr
35000	44	796	94

Avail. Hrs : **8.5**

Before Alterations

no.	Process	Predecessor	Takt time	C.T (min)	Idle Time	Headcount	Qty/hr	Target/person	M/C required
1	Make belt	-	0.64	1.66	0.00	3	109	36	Safety
2	Close belt	1	0.64	0.39	0.25	1	153	153	Flat
3	Join shoulders	-	0.64	0.41	0.23	1	147	147	Safety
4	Bind neckline	3	0.64	1.48	0.00	3	121	40	Flat + binder
5	Frenchstitch neckline	4	0.64	2.13	0.00	4	113	28	Flat
6	Bind sleeves	-	0.64	0.19	0.45	1	316	316	Flat + binder
7	Fit sleeves	6	0.64	0.88	0.00	2	136	68	Safety
8	Close sides (top)	7	0.64	1.61	0.00	3	112	37	Safety
9	Tack sleeves opening	8	0.64	0.55	0.09	1	109	109	Flat
10	Lock front overlaps	9	0.64	0.48	0.16	1	124	124	Flat
11	Join fronts (bottom panels)	-	0.64	1.37	0.00	3	131	44	Safety
12	Join backs (bottom panels)	-	0.64	0.52	0.12	1	116	116	Safety
13	Close sides (bottom)	11,12	0.64	1.44	0.00	3	125	42	Safety
14	Overlock bottom	13	0.64	0.58	0.06	1	103	103	Overlock
15	Hem bottom	14	0.64	2.51	0.00	4	96	24	Flat
16	Fit top to bottom	9,14	0.64	1.93	0.00	4	125	31	Flat
17	Tack elastic	-	0.64	0.20	0.44	1	298	298	Flat
18	Attach elastic	17	0.64	2.13	0.00	4	113	28	Flat
19	Overock elastic	18	0.64	1.37	0.00	3	132	44	Overlock
20	Make belt loops	-	0.64	0.24	0.40	1	255	255	Flat + binder
21	Attach belt loops	20	0.64	1.38	0.00	3	130	43	Flat
22	Attach hanger loops	21	0.64	0.47	0.17	1	127	127	Flat
23	Attach label	22	0.64	0.30	0.34	1	197	197	Flat
	Total:		14.74	24.22	2.38	49			

Determine how many people required to do the job

Determines how many each person should produce to meet demand

Figure 9: Capacity study before alterations

After Alterations

Headcount may also be adjusted depending on the output

no.	Process	Predecessors	Takt time	C.T (min)	Idle Time	Headcount	Qty/hr	Target/person	M/C required
1	Make belt	-	0.64	1.66	0.00	3	109	36	Safety
2	Close belt	1	0.64	0.39	0.25	1	153	153	Flat
3	Join shoulders	-	0.64	0.41	0.23	1	147	147	Safety
4	Bind neckline	3	0.64	1.48	0.00	3	121	40	Flat + binder
5	Frenchstitch neckline	4	0.64	2.13	0.00	4	113	28	Flat
6	Bind sleeves+ make belt loops	-	0.64	0.55	0.09	1	109	109	Flat + binder
7	Fit sleeves	6	0.64	0.88	0.00	2	136	68	Safety
8	Close sides (top)	7	0.64	1.61	0.00	3	112	37	Safety
9	Tack sleeve+ tack elastic	8	0.64	1.25	0.00	2	96	48	Flat
10	Lock front overlaps	9	0.64	0.48	0.16	1	124	124	Flat
11	Join fronts (bottom panels)	-	0.64	1.37	0.00	3	131	44	Safety
12	Join backs (bottom panels)	-	0.64	0.52	0.12	1	116	116	Safety
13	Close sides (bottom)	11,12	0.64	1.44	0.00	3	125	42	Safety
14	Overlock bottom	13	0.64	0.58	0.06	1	103	103	Overlock
15	Hem bottom	14	0.64	2.51	0.00	4	96	24	Flat
16	Fit top to bottom	9,14	0.64	1.93	0.00	3	93	31	Flat
17	Attach elastic	16	0.64	2.13	0.00	4	113	28	Flat
18	Overock elastic	17	0.64	1.37	0.00	3	132	44	Overlock
19	Attach belt loops	18	0.64	1.38	0.00	3	130	43	Flat
20	Attach hanger loops	19	0.64	0.47	0.17	1	127	127	Flat
21	Attach label	20	0.64	0.30	0.34	1	197	197	Flat
	Total:		13.45	24.85	1.08	47			

Figure 8: Capacity study after alterations

Restructuring Business Organizational Structure

Scope

The project entails by far the biggest and most complex problem of targeting quality and efficiency at the source by restructuring the organizational structure in order to build problem solving leaders to promote the culture of continuous improvements.

Result of the project

- Improved communication between departments
- More accountability
- Upskilling employees
- Creation of new departments and job opportunities
- An environment that ensures the profitability of the business
- Quicker decision making

The commonalities between two different industries

Both SMME's and the majority of the reasons of lack of communication and accountability between departments stems from no foundational organizational structure. The biggest impact upon the two is that not only lean-six sigma projects reduce costs to maximize profits but also job creation as seen in the organograms.

In the end to execute this executive level project it boils down to three main factors influence, communication and collaborations.

ZA Gear Organizational Structure

Figure 10: Before Organizational Structure (textile: CMT)

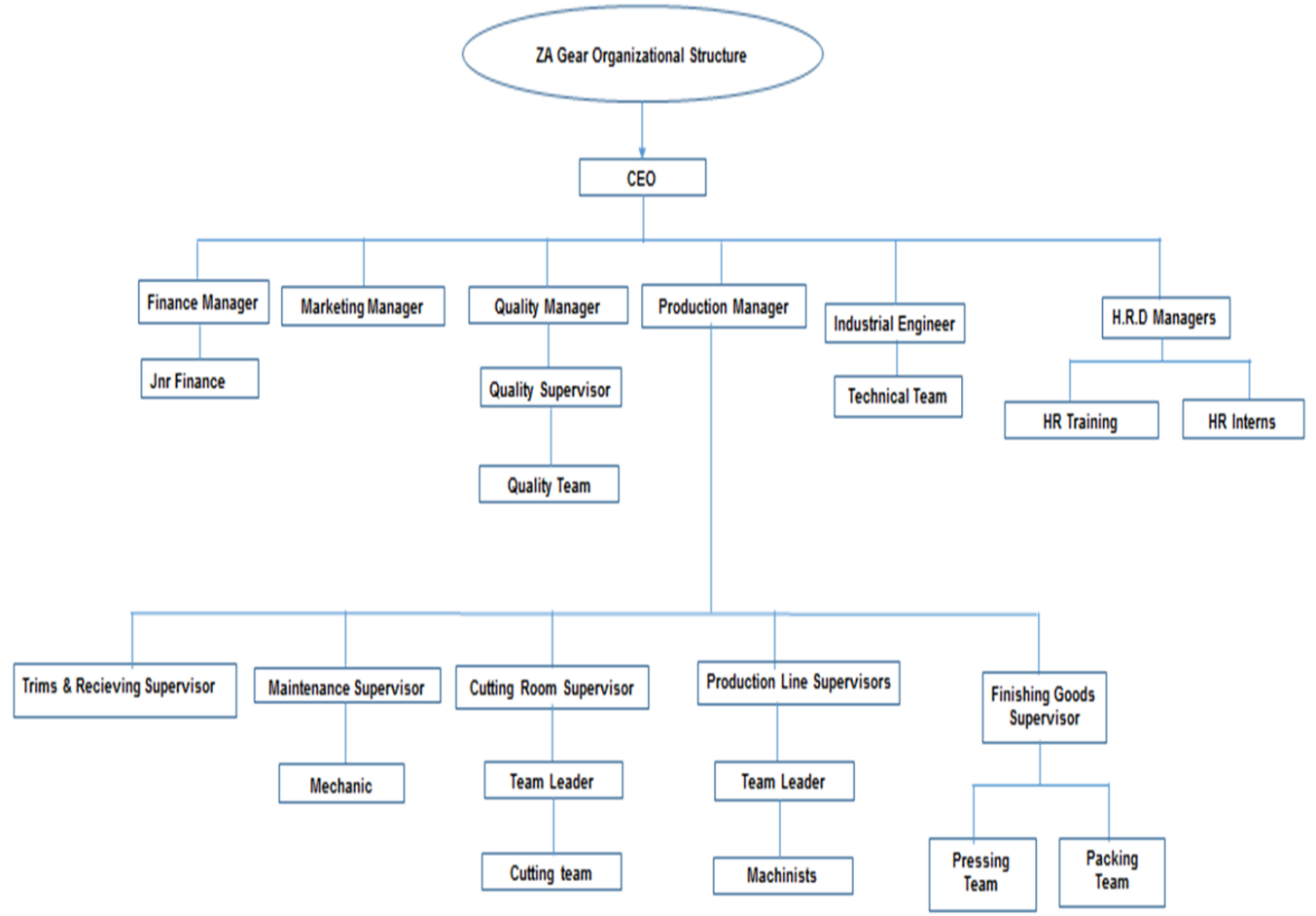


Figure 11: Revised Organizational structure (textile: CMT)

Oh Two Printing Organizational structure

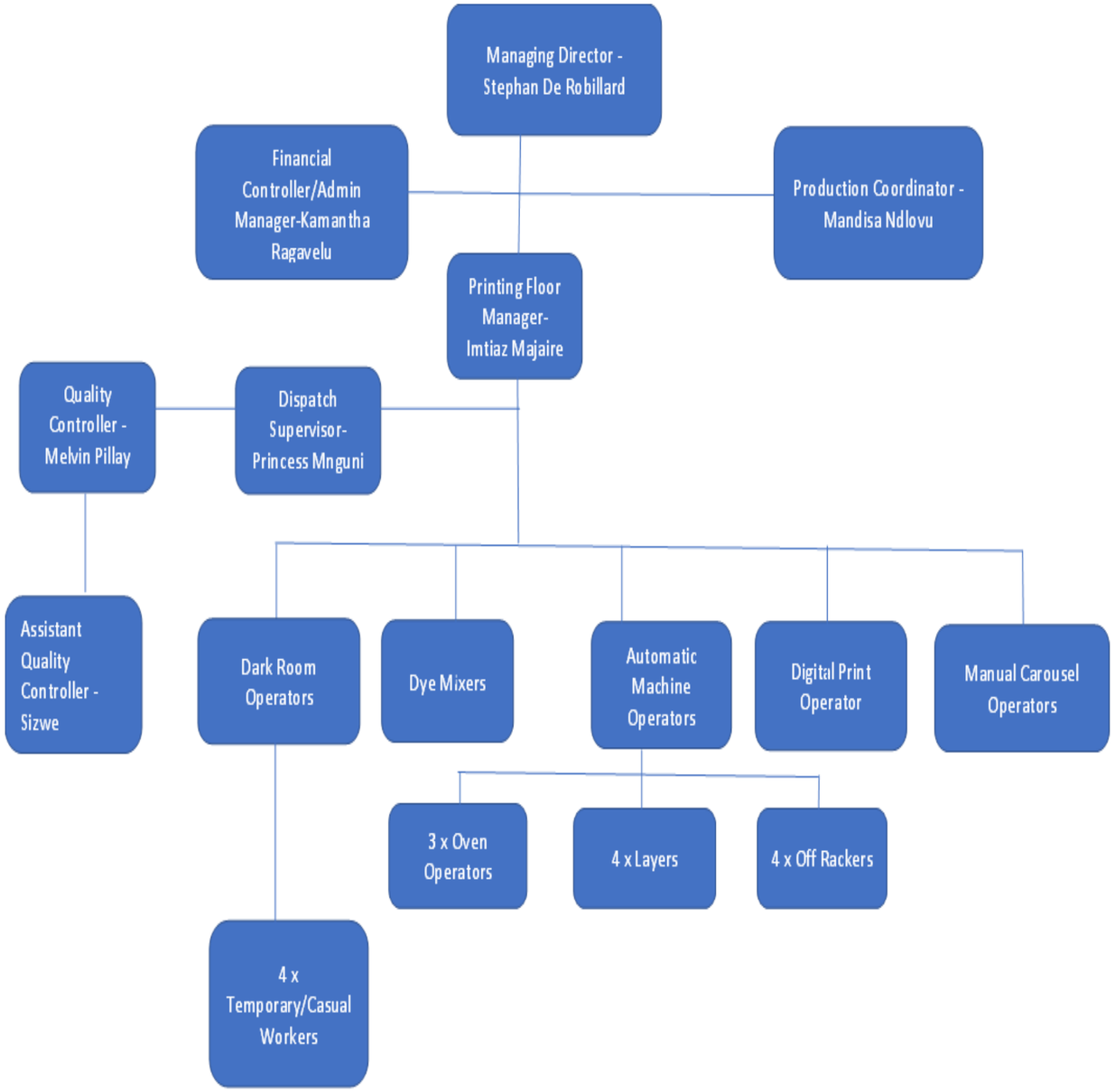


Figure 13: O2P organizational Structure (printing) Before

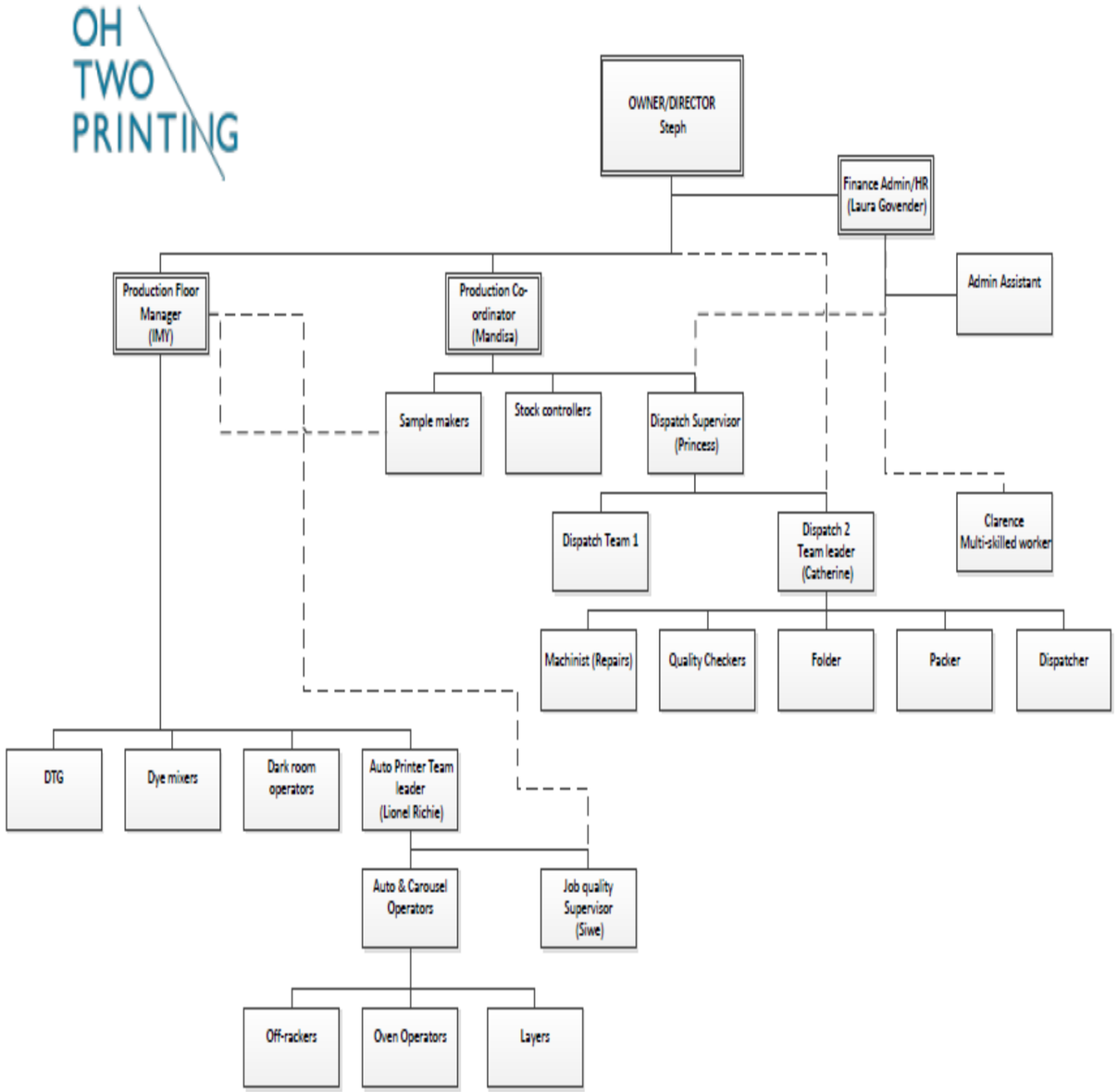


Figure 12: O2P organizational structure (revised)

Business Improvement Project

Scope

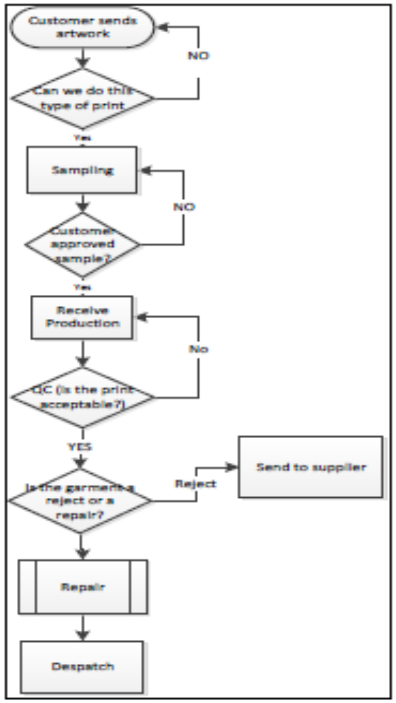
The IE consultant was tasked to improve overall operations of the printing organization by utilizing Industrial, Lean-Six Sigma approach. In which, everything began with restructuring the organizational structure, developing the SIPOC diagram and automating data collection and analyzing processes.

Results of the projects

- Increase production capacity of up to 50%
- Improved quality rate of up to 80%
- Reduced lead time of up to 50%
- >R1.5million cost savings
- On-time delivery rate raised from 60% to 100%
- Producing more for less in the shortest space of time

SIPOC Diagram

Process Oh Two Printing
Process Owner Steven Kazadi
Date Reviewed 9-Dec-21

Supplier (S) Who are the suppliers to your input?	Input (I) What things do your supplier supply to generate output	Process (P) What are your key Processes?	Output What do your processes produce?	Customers Who are your main customers? Name 1-4 main customers
Color screen	Dye (Ink) Screens, glitter, foil		Printed garments Embossed Garments Embroided garments	Ben Sherman/Palladium Ignite Detail & Design Dirose
Shaft pack / stack pack	Buff tape Plastic packets cardboard			
Overseas	Glue (embossing) Strings (Ben sherman)			
WordWoods	Embossing Plates			
Dirose	T-shirt			
Aquialib Print	Tags			
Flexo	Stickers/security stickers			
dragon design	Pozi			
Image Embroidery	Embroided garments			
Eskom	Electricity			
water	Municipality			

Benefits category:

* Prrovides a simple and high level view of the processes and elements
*Provide a starting point for process improvement or transformation
* Focal point of moving towards a pull system

SWOT or PESTEL Analysis	Lean and Six Sigma methodologies	Marketing Strategies
Identfying Internal & External factors that affects the business * keeping inventory based on customer demand and production capacity	* Identifying and increasing value to the customer by waste reduction to increase efficiency and improving qaulity to increase effectiveness * Reducing operating expenses that include rent, labor and materials * Quantifying, Measuring, Control and Improve * Matching capacity to demand, removing just-in-case habits	* Developing loyal customers * Pricing * Customers are your best advertisers * Competitive advantage
Finance, CEO	Production Management	CEO

Opportunity Project Analysis
Description
Key Role Players

Figure 14: SIPOC diagram (Printing)

A3 Problem solving approach through lean-six sigma

Project name	Productivity Analysis and improvement of Dispatch Dep.	Date	April

Team Members	
Project Leader	Steven Kazadi
Dispatch Team Lead	Catherine
Dispatch Sup.	Princess
Finance Admin	Kam

Background

Dispatch dep. Throughput capacity is poor, no system to identify root cause analysis and to identify capacity of the department. Garments are placed all over the place which would result in garments getting lost, errors bound to occur, no proper flow to justify where the garments are going. The department is constantly under pressure to push out Jobs yet the department is filled with garments all over with quality issues occuring.

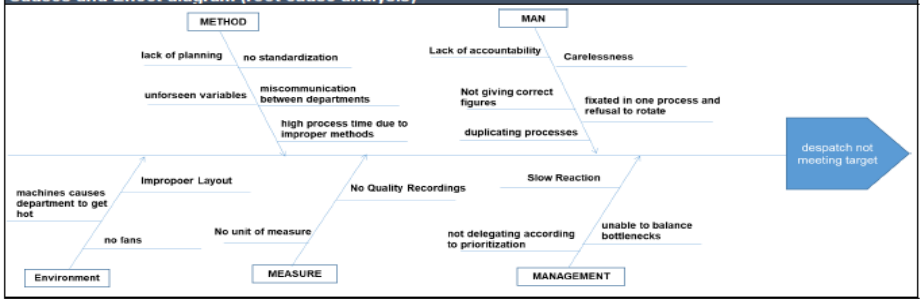
Current Situation

* Repair rate: >45% Reject rate: 3% - 10%
* High levels of work-in-progress garments
* Output capacity: Min:100 Max: 800
* overproduction of garments (extra's that accounts print rejects and fabric reject)
*Overprocessing, processes repeating itself reducing throuput capacity and increasing labor cost
* Improper layout
* Improper flow
* Late deliveries resulting on putting pressure finance admin to invoice customer
* No system to measure performance of the department therefore the question of improving is out of the question
*Lower inventory turnover

Goal

* Quality: reduce reject rate to: 1-3% repair rate to: 15%
* Delivery: increase output capacity to >900 to meet customer requirements
* Costs: reduce labor cost

Causes and Effect diagram (root cause analysis)



Improvement recommendations

Causes	countermeasure	Benefits
Method	Enforce standard operating procedures (SOP)	Better communication, less errors
	Enforce continuous improvement methods (kaizen events)	improved productivity, Quality
	Change process	quick response to errors
Man	Train workforce to applied changes	Improved employee morale, more focused on solving problems then pushing jobs out
Measurement	Develop quality Audit report	reduced repairs & rejects
	Measure productivity time study	root cause analysis will be acheved based on measurement
Environment	Enforce 5's restructure layout to suit a pull system	improved working conditions improved quality, improved productivity increased employee morale
Management	Production Planning & control	better priotization of tasks

Implementation Plan

Tasks	Responsible	Timeline	Status
SOP	All team members	april	completed
kaizen events	IE	april	on-going
training	IE	april	on-going
Quality Audit report	IE	April	completed
measuring productivity	IE	May	on-going
time study	IE	April	completed
Enforcing 5s & layout	IE	June	completed
Production planning	All team members	Nov	on-going

Follow-up

Tasks	what has been achieved?	Remarks
Kaizen events	capacity increased to >1200	case where even more than 2000 units was packed
Enforcing 5s & layout	rental spaced reduced	smaller space used but output capcity is higher
Quality Audit	repair : <10% reject rate: < 2%	achieved through audit system

Review: ensure on-going collaboration and continuous improvement

Figure 15: A3 problem-solving

Kaizen Report

KAIZEN REPORT (Quick Hit)

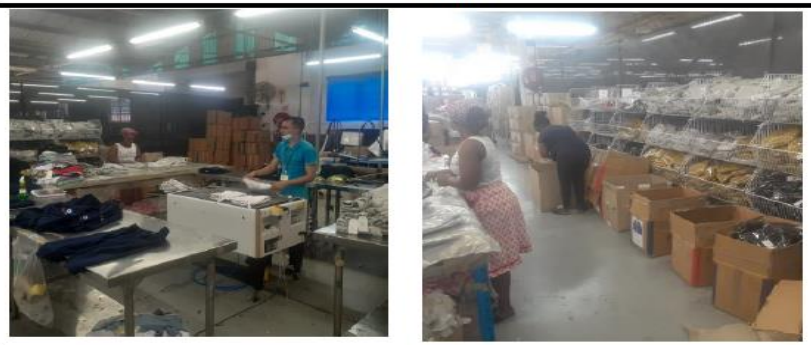
Project Name: Productivity and layout improvement

Department: Dispatch department

Date: dec

BEFORE

AFTER



Problem Statement

dispatch was faced with improper layout and system/method to flow smoothly to dispatch. quality issues was sky high resulting in workforce focusing more fixing quality issues then packing and garments lying all over which will cause errors overproducing and overproduction.

Kaizen Key Points

* layout
* method
*system
* planning

Countermeasure

* redesign layout to fit a pull system
*enforce 5s
*change process method

Team Members

Project leader	Steven Kazadi
Dispatch leader	Catherine
Prod. Manager	Imy
Exec Advisor	Paul
Directing Manager	Steph

Benefits category description

Before			After		
Description	units	costs	Description	units	costs
rental space	185.76m²	R8,173.44	Rental space	52.58m²	R2,313.52
output capacity	800	R48,000.00	output capacity	1200	R72,000.00
labor rate: R28/hr	54.83min	R1,535.24	labor rate R28/hr	29.7	R831.60
total input cost:		R9,708.68	total input cost:		R3,145.12

	Daily	weekly	Annually
input cost savings:	R6,563.56	R32,817.80	R1,575,254.40
output increase cost:	R24,000.00	R120,000	R1,440,000

Remarks: Improvement of the department resulting in creation of the stock controlling dep.

Category Descritpion			
costs	Quality	Time	Comments
●			63% profit increase and 46% cost reduction on labor cost
	●		quality improved to 87%, throughput capacity improved
		●	Reduced cycle time

Figure 16: kaizen report (Printing Industry)