11/12/2020

Draft Team Report

Production Inefficiency

Project 3

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To:
Nick Kourtesis
CDL Management
Conestoga Design Ltd.
299 Doon Valley Drive
Kitchener, ON
N2P 1TP

Draft Report

Dear Sir,

We team of Junior Busines Analysts of Team Strikers have developed this report which is the draft version of project “Production Inefficiency” for Product TrackR application. This document consists of all the relevant information regarding project and its solution.

Please find the below mentioned topics covered in this document:

- Future State
- Implementation
- Client Project Plan

We look forward to hearing from you about the ideas and methodologies that we have included. Thank you for your time and consideration.

Sincerely,
Team Strikers

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Statement of Confidentiality

The data and information derived from the cooperation are confidential, only intended to be retrieved by team Strikers. The information and data are strictly confidential that do not authorize non-project unaccredited access of the information and may not be altered, transferred or reproduced without CDL prior written consent.

If you are not the deliberated viewer to the company, you may not disclose or use the data/information in the documentation in any manner.

Any violation of the agreement would lead to legal action against the unintended participant.

DISCLOSING PARTY	**RECEIVING PARTY**
Name:_____	Name: _____
Signature:_____	Signature: _____
Date:_____	Date: _____

Document History

Sr.	Document	Date created	Date Revised	Description	Version	Author
1	Cover Letter	11/12/2020	N/A	Cover letter created	1.0	Aditya, Anuj
2	Document History Chart	08/12/2020	11/12/2020	Document history chart created	1.1	Sarthak, Anuj
3	Statement of confidentiality	08/12/2020	N/A	Statement of confidentiality created	1.0	Sarthak, Prabhjot, Karanvir
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9	Measuring Success	11/12/2020	N/A	Success determination for each implementation.	1.0	Aditya, Anuj, Prabhjot,

Executive Summary

CDL started its business trip by providing nearby medical clinics with three specially equipped medical imaging scanners. CDL has long been the market leader in supplying medical imaging equipment. The first non-commercial TrackR device, a wearable technology for home users, was also published by CDL. It was a major success and attained the highest sales volume. Owing to poor management by the CDL personnel, the company was on the verge of bankruptcy. CDL is addressing this situation with the Market Analysts support team. They also proposed suggestions and alternatives to the problems that have plagued CDL's effectiveness.

Currently, TrackR's output inefficiency and related issues are faced by CDL. The cost of production exceeds revenue in the assembly area and the number of failure rates is rising. CDL needs advice on the application of the theory and methods of Six Sigma to reduce the rate of loss and increase the output quality. CDL's production and assembly of TrackR is done manually and the procurement of Siplace automation machines is taken into account.

The current production staff of the CDL and their management team will be impacted by this reform. Employee pay scales are changed by the CDL. Right planning and education are also recommended.

History of CDL

Conestoga Design Ltd. is an industrial medical supply company that provides local medical facilities with medical imaging machinery. For more than two decades, CDL has been a stable, successful manufacturer and seller of medical imaging equipment. The Onsite manufacturing department of CDL is tested as a preferred and risky approach because it awards the marketplace the leading operation.

The first proposed focus of the CDL was on manufacturing and heavy medical imaging equipment. Later, contemporary improvements have resulted in the heavy loss of TrackR fitness band output within the assembly technique. With this the capacity to assemble was reduced and the expense expanded. They guide renewal of the manufacturing offices after 3rd party investigation to match TrackR's structure requirements.

Stakeholder Register

This document mentions all the stakeholders for the dashboard creation project

Roles	Internal/External	Description
Project Manager	Internal	Organizing all task and dividing roles and responsibilities among team of junior BA’s
Associate Project Manager	Internal	Work closely with the other team members and is responsible to give updates to the project manager
Program Manager	Internal	Creating and Managing Long term goals for Junior BA team
Scribe	Internal	Responsible for documentation creation

Business Analyst	Internal	The senior business analyst is responsible for coping directly with their concerns with CDL management and transmitting them to the junior business analyst. Junior business analysts are responsible for analyzing and presenting solutions to CDL problems
Senior BA	Internal	Guide and convey Important requirements of client to team of junior BA's
Website Developers	Internal	Work closely with the team of business analysts to come up with and implement executive dashboard
Billy Bob	Internal	Billy Bob is CDL 's CEO. He is responsible for directing and controlling CDL in multiple scenarios and ensuring that the enterprise operates properly in all circumstances. He is also responsible for directing and reviewing the success of staff employed under him
TrackR Upgrade Team	Internal	The TrackR Software Update Team is now responsible for supplying concept suggestions for the creation of the new ecommerce platform for all the processes involved with the newest CDL product TrackR
Medical Imaging Team	Internal	It is also responsible for supplying ideas for the new website to the Medical Imaging team responsible for the medical imaging machines sold by CDL, and it will then be a forum for the sales of medical imaging machines
Social Media Manager	Internal	Responsible for planning, implementing, and monitoring the company's Social Media strategy to increase awareness for revised Application
TrackR Senior Executives	Internal	Responsible for allocating budget for the project and also responsible for product acceptance
End Users/Customers	External	The client (agency / agent) is one that buys CDL goods and sells them to end customers. Those that use the goods that are marketed by CDL are the end users. They are the clients who will get input on the items that CDL offers
Competitors	External	Companies who are trying to sell product or services to the same people

Problem Description

The manufacturing process of TrackR is divided in several steps, throughout which workers needs to move from location to another in order to get assembly parts. During the assembly process the worker who is not assembling TrackR needs to retrieve parts located to the shelve at other end of the area. Three tables are using by the workers and one shelve is using for testing unit.

This whole process takes a lot of time and somehow impacting negatively on the company's overall device production. This also include extra manual work and assembly team as this process needs extra one person to pick components from the other end.

It includes deviation such as waste, Unevenness and Overburden, to overcome these deviations company required lean process and Six Sigma implementation that would help the organization to improve time management, boost employee motivation and provide higher revenue at lower cost.

Implementation of Six Sigma would also enhance assembly process and provide sustain quality improvement to the company by reducing production cost.

Key Metrics of CDL

Producing Quality Products

Better quality aids in offering a better product on the market. A strong production system should be established that delivers high-quality products.

Maintaining Production Cost

Right now, the main challenge facing CDL is that the business spends a lot more money on development activities than it earns. Therefore, a cost-effective development process should be planned to solve this problem.

Increasing Volume of Production

As the production process is not effective, the speed at which the products are produced is poor. In order to raise net income, CDL will also focus on improving the amount of the products produced.

Maintaining Accuracy and Timelines

Company is facing timelines issue as well, because of deviation in assembly line and storage, assemblers required to move a lot that increases the completion time for each unit assembly. As currently manual assembly line for TrackR development is in operation, Production timeframe is bit higher compare to automated development.

Assumptions

Assumptions for Six Sigma

- As per the current scenario, the production cost is higher comparatively to profit margins.
- Company would be able to provide required training equipment and material to train employees as per six sigma training suggestions.
- Implementation of Six Sigma could reduce production inefficiencies.
- Re-arranging assembly area and proceeding with spaghetti analysis would be a easy determination in order to full fill current requirements.

Assumptions for Component Picking

- CDL has enough budget to implement our possible solution within the timeframe
- CDL will hire required employee to accommodate the suggested solution
- CDL will provide us with floorplan and blueprints of their production unit
- CDL will provide basic knowledge for their manufacturing unit
- CDL will provide all the information about the type of material they are currently using

Assumptions for Assembly Change

- CDL has enough financial plan to execute our conceivable arrangement inside the time span
- CDL will recruit expected worker to oblige the recommended arrangement
- CDL will furnish us with floorplan and plans of their creation unit
- CDL will give fundamental information to their assembling unit
- CDL will give all the data about the kind of material they are right now utilizing

Assumptions for Staffing

- Although CDL is in a position to hire more staff on the basis of RFI's response, it is advised that the layoff be carried out on a temporary basis as CDL is on the verge of bankruptcy.
- The company is prepared to address the health and safety demands of its workers.
- Employees are able to indulge in the outsourcing of various computer manual operations.
- CDL has given all the information needed to successfully complete this specific project.
- The proposed solution applies only to factory employees; indirect workers are excluded from this circumstance.

Assumptions for Automation

- CDL has enough financial plan to actualize the solution inside the time period
- CDL will recruit the employee to make the recommended suggestions
- It will furnish the floor plans of their creation unit
- It will give fundamental information to their different sections within the project

Future States

Future State for Six Sigma

Created by Sarthak Tyagi

Known Client Requirements

Suggestions
The company wanted a recommendation by which to reorganise the production process by using the least financial breakeven.

Current State
In order to get to the future state, the organisation needs a thorough AS-IS flow of the production process. In order to achieve the necessary calculations to enforce Six Sigma, it also requires spaghetti analysis in the metre.

Future State
The company requires a comprehensive TO-BE flow of the production process, including all the detailed collected measurement process of reorganisation. In an enhanced aspect, that could show a relative difference between the present and future state.

Six Sigma Implementation
The organisation has gathered many points of weakness that influence current production and requires guidance and methodology to incorporate six sigma principles and techniques in order to profile them.

Coaching Suggestion
In order to fulfil current criteria that could be altered after the introduction of a new manufacturing process that includes six sigma concepts, the organisation requires educational suggestions.

Suggestion Overview

Standardize the Methodology
Company needed to introduce automated tracking ID on each component required for TrackR assembly, which could boost overall efficiency, as it could easily do the necessary identification of any component.

Reduced Cycle Time

- In order to complete the overall assembly of the product, organizing storage parts near the assembly shelves may further enhance the timeline and entail less operation.
- If storage arrangements cannot be enforced in the field, it might make a good difference by adding small storage boxes near the assembly shelves needed for weekly production.

Benchmarking
Depending on the state of the organisation, Lean Six Sigma consists of seven forms of waste (DOTWIMP) with their own priorities, which must analyse the correct mitigation to overcome it.

Determine Waste, Unevenness and Overburden
Depending on the state of the organisation, Lean Six Sigma consists of seven forms of waste (DOTWIMP) with their own priorities, which must analyse the correct mitigation to overcome it.

Types of wastes

- Defects
- Overproduction
- Transport
- Waiting
- Inventory
- Motion
- Processing

We need to keep concentrating on motion, waiting, defects and processing in the current scenario. As even a single additional move taken by employees to lead TrackR further increases the inefficient timings, inventory and also gives no value to the output.

Analyse Value
Each employee needs to decide their single phase during the TrackR assembly as to whether or not it adds value to the overall system. Over and expensive development in an inefficient timeframe could lead to the system's overall failure.

Rationale about how this Suggestion will Reduce Loss / Improve Profitability

Failure Point 1
AS IS
The current failure rate while testing for component cracking during assembly of TrackR is 2%, that make the overall process time consuming and costly. Further, regularly getting higher failure rate in component could be harmful in overall production process.
TO BE
Failure rate of cracking inspection can be reduced to half if company uses ISO certified component, that can be helpful in making the overall production process easy and reliable. It also reduces time required to assemble final product.

Failure Point 2
AS IS
Currently while performing the TUG test the failure rate is 5.2%, resulting into costly and time-consuming process.
TO BE
TUG test failure rate can be reduced to 3%, if proper coaching and regular training provided to workers performing component insertion and depression to perform this test. This can make the overall assembly process easy and inexpensive.

Failure Point 3
AS IS
Currently company gets around 2% failure rate while performing visual inspection after soldering components. This failure point leads to major cause to the overall assembly process.
TO BE
Visual inspection failure point can be reduced to 1% if company uses industry standard soldering equipment and if only experience workers performs this step. Right guidance and quality training can make this step reliable.

Failure Point 4
AS IS
In the second TUG test, the company is facing high failure rate of 7.5%. This place a negative impact in assembly process of TrackR as failure at this point requires multiple process to perform again.
TO BE
TUG test failure rate can be reduced to 4%, if proper coaching and regular training provided to workers performing component insertion and depression to perform this test. This can make the overall assembly process easy and inexpensive.

Failure Point 5
AS IS
While taping the component company is getting 3% failure rate because of failure issues of not placing adhesive tape properly. During TrackR assembly if worker gets this failure then they need to rearrange component back and again perform same step.
TO BE

Taping failure rate can be reduced to 2% if workers are experience and work under guidance. Company needs to provide taping implement coaching separately to workers. This could place good impact on assembly procedure.
Failure Point 6
AS IS
It is the second last inspecting in TrackR assembly process and leads to overall process aborting if this occurs. Company is getting high failure rate around 9.5% this time that is hugely impacting production process.
TO BE
Heat test can be reduced to 4% If proper crystal-clear layout of internal circuit provided to workers while performing this step. Also, having certified and advanced equipment to perform heat test makes this step reliable and easy to perform.

HVAC System
AS IS
Currently company is facing issues in winter while assembling TrackR, as the Duct is open in warehouse that is impacting the required temperature inside. Same duct provides heat to shipping and receiving area.
TO BE
Combing and attaching new duct to the HVAC system could resolve temperature issues during winter.

Detailed Excel model of the To-Be TrackR production process, including failure rates and points

Process Model to Analyze Failure

Employee Salary	$25.00	Per Hour
	0.0069	Per Second

TrackR Production Process Flow

Task	Activities	Duration (Seconds)	Total time to Complete Task	Value nedeed to Labour	Total Labour cost	Components	Component Cost	Total = Labour + Component	Failure Percentage	Activity	Time Taken	Labour Cost	Component Cost	Total time taken with 1 Fail and Good Repeat (Seconds)	All Total to Task	Reliability for Single Acitivity	Total Overall Reliability
1	Go to the Shelves	15	15	$ 0.10	$ 0.10			$ 0.10						15	$ 0.10	100.0%	100.0%
2	Collect all required components	25	40	$ 0.17	$ 0.28	All		$ 0.28						40	$ 0.28	100.0%	100.0%
3	Go to the assembly area	15	55	$ 0.10	$ 0.38			$ 0.38						55	$ 0.38	100.0%	100.0%
4	Unpack with precaution	10	65	$ 0.07	$ 0.45	A	$ 6.61	$ 7.06						65	$ 7.06	100.0%	100.0%
5	Cracking Inspection	3	68	$ 0.02	$ 0.47			$ 7.08	1%	Failure 1	13	$ 0.19	$ 6.61	81	$ 13.88	99.0%	99.0%
6	Component B needs to be place on Table	1	69	$ 0.01	$ 0.48	B	$ 0.08	$ 7.17						82	$ 13.97	100.0%	99.0%
7	Component B needs to be connected with C	2	71	$ 0.01	$ 0.49	C	$ 3.00	$ 10.18						84	$ 16.98	100.0%	99.0%
8	Component C needs to be connected with A	7	78	$ 0.05	$ 0.54			$ 10.23						91	$ 17.03	100.0%	99.0%
9	TUG Test needs to be performed	5	83	$ 0.03	$ 0.58			$ 10.27	3%	Failure 2	12	$ 0.19	$ 3.00	108	$ 20.25	97.0%	96.0%
10	Get D component	1	84	$ 0.01	$ 0.58	D	$ 4.00	$ 14.27						109	$ 24.26	100.0%	96.0%
11	Component D needs to be placed on E	5.5	89.5	$ 0.04	$ 0.62	E	$ 14.99	$ 29.30						114.5	$ 39.29	100.0%	96.0%
12	Procese component soldering	15	104.5	$ 0.10	$ 0.73			$ 29.41						129.5	$ 39.39	100.0%	96.0%
13	Visual Inspection	20	124.5	$ 0.14	$ 0.86			$ 29.54	1%	Failure 3	11	$ 0.08	$ 6.69	160.5	$ 46.29	99.0%	95.1%
14	Task 8 needs to be hold for fasten the process	24	148.5	$ 0.17	$ 1.03			$ 29.71						184.5	$ 46.46	100.0%	95.1%
15	Get Component F & G	2	150.5	$ 0.01	$ 1.05	F	$ 0.57	$ 30.30						186.5	$ 47.04	100.0%	95.1%
16	Soldering with H	10	160.5	$ 0.07	$ 1.11	H	$ 4.15	$ 34.51						196.5	$ 51.26	100.0%	95.1%
17	TUG Test needs to be performed	6	166.5	$ 0.04	$ 1.16			$ 34.56	4%	Failure 4	22	$ 0.15	$ 32.06	224.5	$ 83.51	96.0%	91.3%
18	In port of E component, Slide Component I	1	167.5	$ 0.01	$ 1.16	I	$ 2.00	$ 36.56						225.5	$ 85.52	100.0%	91.3%
19	Place Component J onto component E	1	168.5	$ 0.01	$ 1.17	J	$ 1.88	$ 38.45						226.5	$ 87.41	100.0%	91.3%
20	Component K needs to be taping	10	178.5	$ 0.07	$ 1.24	K	$ 17.42	$ 55.94	2%	Failure 5	6	$ 0.04	$ 0.06	242.5	$ 105.00	98.0%	89.4%
21	Component L needs to be Install inside component A	8	186.5	$ 0.06	$ 1.30	L	$ 38.15	$ 94.15						250.5	$ 143.20	100.0%	89.4%
22	TrackR end product need to be unclamped	13.3	199.8	$ 0.09	$ 1.39			$ 94.24						263.8	$ 143.30	100.0%	89.4%
23	Dtermine welding and heat test	10	209.8	$ 0.07	$ 1.46			$ 94.31	4%	Failure 6				273.8	$ 143.37	96.0%	85.9%
24	Perform radioacative testing	30	239.8	$ 0.21	$ 1.67			$ 94.52						303.8	$ 143.57	100.0%	85.9%
								$ 94.52							$ 143.57		95.5%

Activity 1 - Process 1

Task		Duration (Seconds)	Total Time to Task	Labour Task Value	Labour Total to Task	Component	Component Cost	Total = Labour + Component
1	Walk	4	4	$ 0.03	$ 0.03			$ 0.03
2	Failed Component need to be Dropped	2	6	$ 0.01	$ 0.04	A	$ 6.61	$ 6.65
3	Walk	4	5	$ 0.03	$ 0.07			$ 6.68
4	Replacement Component need to be pickedup	3	2	$ 0.02	$ 0.09	A		$ 6.70
5	Walk	4	4	$ 0.03	$ 0.12			$ 6.73
6	Perform Unpacking	5	8	$ 0.03	$ 0.15	A		$ 6.76
7	Perform Inspection	5	13	$ 0.03	$ 0.19	A		$ 6.80

Activity 2 - Process 2

Task		Duration (Seconds)	Total Time to Task	Labour Task Value	Labour Total to Task	Component	Component Cost	Total = Labour + Component
1	Walk	4	4	$ 0.03	$ 0.03			$ 0.03
2	Failed Component need to be Dropped	2	6	$ 0.01	$ 0.04	C		$ 0.04
3	Walk	4	5	$ 0.03	$ 0.07			$ 0.07
4	Replacement Component need to be pickedup	3	2	$ 0.02	$ 0.09	C		$ 0.09
5	Walk	4	4	$ 0.03	$ 0.12			$ 0.12
6	Perform Unpacking	5	7	$ 0.03	$ 0.15	C	$ 3.00	$ 3.15
7	Perform Inspection	5	12	$ 0.03	$ 0.19			$ 0.19

Activity 3 - Process 3

Task		Duration (Seconds)	Total Time to Task	Labour Task Value	Labour Total to Task	Component	Component Cost	Total = Labour + Component
1	Perform PCB cleaning	4	4	$ 0.03	$ 0.03			$ 0.03
2	Perform Solder Again	7	11	$ 0.05	$ 0.08	A	$ 6.61	$ 6.69

Activity 4 - Process 4

Task		Duration (Seconds)	Total Time to Task	Labour Task Value	Labour Total to Task	Component	Component Cost	Total = Labour + Component
1	Product Disposing	7	7	$ 0.05	$ 0.05	ALL		
2	clean the PCB area	7	14	$ 0.05	$ 0.10			
3	Record Loss	8	22	$ 0.06	$ 0.15		$ 32.00	$ 32.06

Activity 5 - Process 5

Task		Duration (Seconds)	Total Time to Task	Labour Task Value	Labour Total to Task	Component	Component Cost	Total = Labour + Component
1	Remove Tape	4	4	$ 0.03	$ 0.03			$ 0.03
2	Perfrom Joining process again	2	6	$ 0.01	$ 0.04	M	$ 0.02	$ 0.06

Activity 6 - Abort process

Task		Duration (Seconds)	Total Time to Task	Labour Task Value	Labour Total to Task	Component	Component Cost	Total = Labour + Component
1	Walk	4	4	$ 0.03	$ 0.03	ALL		
2	Failed Component need to be Dropped	2	6	$ 0.01	$ 0.04			
3	Walk	4	10	$ 0.03	$ 0.07		$ 30.00	$ 30.03

Detailed Excel model of the To-Be financial performance of the TrackR Production Unit

TrackR Financial Model

Making Tra	4.5	Minutes
to pick Cor	6.5	Minutes
	45	Minutes per hr working time
	8	hrs assembly per shift
	6%	TrackR failure rate
	75	Quality TrackR assembled Per Shift Per Table
	$ 150.00	TrackR whole sale price
	$11,280.00	Gross Income per Table per shift
	$ 93.18	Component Cost produced by per TrackR
	$ 20.00	Marketing Cost produced by per TrackR
	$ 2,768.86	Net Income Per Shift Per Table
	3	Tables Per Shift
	2	Shifts
	$ 16,613.18	Net Income Per Day of Plant
	451	Good Trackers Per Day
	$ 25.00	per hr Pay
	21%	Burden (Taxes on Payroll)
	70	Per hr for 24 Hrs Facility Cost
	4	Manufacturing Employee (1 Tester+3 Assembly)
	8	Management Employee (3 QC Staff, 3 Shift Managers, 3 Human Resource, 2 Designers, 2 Reciever/Shipper, 2 Purchasing Agent, 1 Plant Manager)
	10	Hours
	$ 9,908.00	Total Labour and Facility Cost / Working Day
	$ 6,705.18	**Total Profit/Day**

Workers	
6	**Teams**
3	**Assembly Workers**
1	**Tester**
24	**Total Production workers**
16	**Management / Support**

Detailed Excel model of the To-Be TrackR production process.

including failure rates and points, with the ability to change the failure percentage at any failure point and see the immediate effect on profitability.

Given Cost of Components		
Component Name	Component	Cost per Each
MPC432119	A	$ 6.61
MPC44422	B	$ 0.08
LS1121	C	$ 3.00
SDMALBB30	D	$ 4.00
FnOFI-GN12	E	$ 14.99
HG213123-2	F	$ 0.57
STMA11233	G	$ 0.31
BD2098733A	H	$ 4.15
BLE112	I	$ 2.00
BD20911131	J	$ 1.88
SFLV25	K	$ 17.42
SS98AAIS	L	$ 38.15
Adhesive Tap	M	$ 0.02
	Total Cost	**$ 93.18**

Process Model to Analyze Failure

Employee Salary	$25.00	Per Hour
	0.0069	Per Second

TrackR Production Process Flow

Task	Activities	Duration (Seconds)	Total time to Complete Task	Value nedeed to Labour	Total Labour cost	Components	Component Cost	Total = Labour + Component	Failure Percentage%	Activity	Time Taken	Labour Cost	Component Cost	Total time taken with 1 Fail and Good Repeat (Seconds)	All Total to Task	Reliability for Single Activity	Total Overall Reliability
1	Go to the Shelves	15	15	$ 0.10	$ 0.10			$ 0.10						15	$ 0.10	100.0%	100.0%
2	Collect all required components	25	40	$ 0.17	$ 0.28	All		$ 0.28						40	$ 0.28	100.0%	100.0%
3	Go to the assembly area	15	55	$ 0.10	$ 0.38			$ 0.38						55	$ 0.38	100.0%	100.0%
4	Unpack with precaution	10	65	$ 0.07	$ 0.45	A	$ 6.61	$ 7.06						65	$ 7.06	100.0%	100.0%
5	Cracking Inspection	3	68	$ 0.02	$ 0.47			$ 7.08	1%	Failure 1	13	$ 0.19	$ 6.61	81	$ 13.88	99.0%	99.0%
6	Component B needs to be place on Table	1	69	$ 0.01	$ 0.48	B	$ 0.08	$ 7.17						82	$ 13.97	100.0%	99.0%
7	Component B needs to be connected with C	2	71	$ 0.01	$ 0.49	C	$ 3.00	$ 10.18						84	$ 16.98	100.0%	99.0%
8	Component C needs to be connected with A	7	78	$ 0.05	$ 0.54			$ 10.23						91	$ 17.03	100.0%	99.0%
9	TUG Test needs to be performed	5	83	$ 0.03	$ 0.58			$ 10.27	3%	Failure 2	12	$ 0.19	$ 3.00	108	$ 20.25	97.0%	96.0%
10	Get D component	1	84	$ 0.01	$ 0.58	D	$ 4.00	$ 14.27						109	$ 24.26	100.0%	96.0%
11	Component D needs to be placed on E	5.5	89.5	$ 0.04	$ 0.62	E	$ 14.99	$ 29.30						114.5	$ 39.29	100.0%	96.0%
12	Procese component soldering	15	104.5	$ 0.10	$ 0.73			$ 29.41						129.5	$ 39.39	100.0%	96.0%
13	Visual Inspection	20	124.5	$ 0.14	$ 0.86			$ 29.54	1%	Failure 3	11	$ 0.08	$ 6.69	160.5	$ 46.29	99.0%	95.1%
14	Task 8 needs to be hold for fasten the process	24	148.5	$ 0.17	$ 1.03			$ 29.71						184.5	$ 46.46	100.0%	95.1%
15	Get Component F & G	2	150.5	$ 0.01	$ 1.05	F	$ 0.57	$ 30.30						186.5	$ 47.04	100.0%	95.1%
16	Soldering with H	10	160.5	$ 0.07	$ 1.11	H	$ 4.15	$ 34.51						196.5	$ 51.26	100.0%	95.1%
17	TUG Test needs to be performed	6	166.5	$ 0.04	$ 1.16			$ 34.56	4%	Failure 4	22	$ 0.15	$ 32.06	224.5	$ 83.51	96.0%	91.3%
18	In port of E component, Slide Component I	1	167.5	$ 0.01	$ 1.16	I	$ 2.00	$ 36.56						225.5	$ 85.52	100.0%	91.3%
19	Place Component J onto component E	1	168.5	$ 0.01	$ 1.17	J	$ 1.88	$ 38.45						226.5	$ 87.41	100.0%	91.3%
20	Component K needs to be taping	10	178.5	$ 0.07	$ 1.24	K	$ 17.42	$ 55.94	2%	Failure 5	6	$ 0.04	$ 0.06	242.5	$ 105.00	98.0%	89.4%
21	Component L needs to be Install inside component A	8	186.5	$ 0.06	$ 1.30	L	$ 38.15	$ 94.15						250.5	$ 143.20	100.0%	89.4%
22	TrackR end product need to be unclamped	13.3	199.8	$ 0.09	$ 1.39			$ 94.24						263.8	$ 143.30	100.0%	89.4%
23	Dtermine welding and heat test	10	209.8	$ 0.07	$ 1.46			$ 94.31	4%	Failure 6				273.8	$ 143.37	96.0%	85.9%
24	Perform radioacative testing	30	239.8	$ 0.21	$ 1.67			$ 94.52						303.8	$ 143.57	100.0%	85.9%
								$ 94.52							**$ 143.57**		**95.5%**

Future State for Component Picking

Created by Anuj Patel

Known Client Requirements

- Refer to **Appendix A**.

Deliverables Given by Senior Business Analyst

- Refer to **Appendix A**.

- Initiating Phase
  - Creating team
  - Project Kick-off meeting
  - Team contract
  - Style guide
  - Project charter
- Planning Phase
  - Scope Statement
  - Project management Plan
  - Teamwork breakdown
- Executing Phase
  - Six Sigma Analysis of Production
- Monitoring and Executing Phase
  - RACI documentation
  - Gantt Chart (Timeline)
- Closing Phase
- Final Presentation

Solution Related Deliverables

- Requirement Definition
  - The requirements for TrackR app upgradation will be collected with help of RFI document submitted to CDL. and will also get an idea that what are the expectations of clients.
- Finding Solution Software
- Based on the requirements of the company, TrackR app will be developed and to save company from bankruptcy.

Tools and Techniques

Products Placement

Manufacturer	Part Number	Description	Comment	Cost
Mitchell's Plastics	MPC432119-2	Vulcanized Rubber casing	10C	6.61
Mitchell's Plastics	MPC44422	Rigid plastic pins	10E	0.08
American Vanadium	SFLV25	Slimflex Lithium-Vanadium printed battery	2A	17.42
Foxconn	FnOFI-GN1212	Main printed circuit board (PCB)	4D	14.99

Qualcomm	BD2098733AAB	Secure housing for orientation equipment	5E	4.15
Qualcomm	BD20911131BB	Micro-transmitter for LTE communication	6B	1.88
ST Microelectronics	HG213123-221	3-axis digital gyroscope	7B	0.57
ST Microelectronics	STMA11233	2-axis analogue accelerometer	8E	0.31
Samsung	SS98AAIS	18mm x 29mm OLED screen	7E	26.43
Sandisk	SDMALBB3033G	2GB FLASH NAND	3C	4
BlueGiga	BLE112	Bluetooth 4.0 low energy chipset	1A	2
Banda Bracelets (HK) Ltd.	LS1121	Plastic wrist strap	14A	3

Cost Model AS-IS

The excel sheet will help in determining the current cost of the production facility.
Please refer to the document –
F20-Patel,Anuj (Team Strikers)-INFO8440-Production Inefficiency-Cost Model

Spaghetti Diagram and Calculation (AS-IS)

I have created the Spaghetti diagram manufacturing plant. The calculation of Spaghetti diagram will be found in the above cost model sheet under **spaghetti distances tab.**

Please refer to the document –
F20-Patel,Anuj (Team Strikers)-INFO8440-Production Inefficiency-Spaghetti Diagram

Process Flow

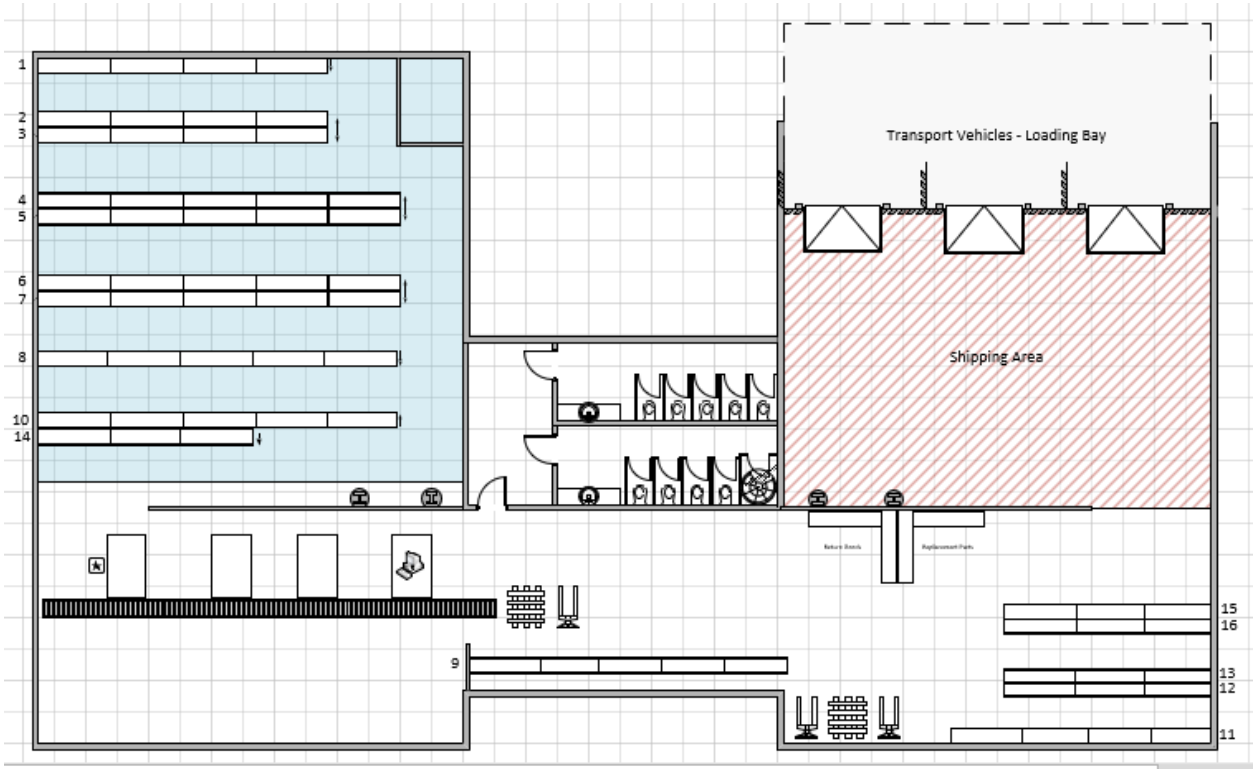
I have created the AS-IS process flow of the current manufacturing production.

Please refer to the document –
F20-Patel,Anuj (Team Strikers)-INFO8440-Production Inefficiency-AS-IS Process Flow

Future State for Staffing

Created by Aditya Shah

Diagram of the To-Be Factory Layout



Rationale about how this Suggestion will Reduce Loss / Improve Profitability (TO-BE Analysis)

From the AS-IS study, it was noted that out of 8 hours in a shift, the active hours were found to be 6.4 hours and the break time or standby time was 1.6 hours. Each employee had at least a 10-minute break. It is believed that there are two shifts in one day.
This project suggests three solutions, one of which would be the optimum solution in terms of efficiency and costs involved in the development of TrackR.

Detailed Explanation of the To-Be Staffing and Utilization of Labor

Solution 1: Reduced Team Member

In this case, the number of workers per table was limited. Any of the workers would have had breaks every hour, but they were uneven, and employees are forced to work on other tables to accommodate breaks. Here we removed one employee from Table 3 and asked the employee from Table 1 and Table 2 to work when they are on Standby at their respective tables.
This Solution made sure that every member of every team got 10 minutes break every hour and is available at all the tables to replace whenever needed.

Total Productive Time	Total Time Count	Minutes
	576	3564

Total Break Time per Shift	Total Time Count	Minutes
	224	672

Procuctive Time for 1 Employee for 1 Shift	Hours
	6.6

Break Time for 1 Employee for 1 Shift	Hours
	1.4

As shown in the above table, we were able to increase Productive Time count to 3564 minutes from 3456 minutes. Also, it helped in reduction of the break time. The break time dipped from 1.6 hours to 1.4 hours on an average for every employee.
This solution has also impacted the overall cost and has gained overall profit by around $1,200 per day.

Type and Cost of Employees Working				
Employees	Number of Employees	Pay per Hour	Cost per Shift	Cost per Day (2 shifts)
TrackR Team Lead	6	26	$ 1,248.00	$ 2,496.00
TrackR Team Member	11	22	$ 1,936.00	$ 3,872.00
TrackR Team Maintenance	6	26	$ 1,248.00	$ 2,496.00
TrackR Shift / Maintenance Manager	2	30	$ 480.00	$ 960.00
TrackR Quality Control Tech	2	26	$ 416.00	$ 832.00
		Total Costs	$ 5,328.00	$ 10,656.00

Solution 2: Reduced Labor

In this approach, the number of employees per table remained the same but the rates of pay for TrackR Team Lead, Team Member, Team Maintenance, Maintenance Manager and Quality Control Tech were lowered. However, the manufacturing time required, and the break/standby time remain the same, but the direct labor costs have been lowered from $11,904 to $10,080 for 1 day.

Type and Cost of Employees Working				
Employees	Number of Employees	Pay per Hour	Cost per Shift	Cost per Day (2 shifts)
TrackR Team Lead	6	22	$ 1,056.00	$ 2,112.00
TrackR Team Member	12	18	$ 1,728.00	$ 3,456.00
TrackR Team Maintenance	6	22	$ 1,056.00	$ 2,112.00
TrackR Shift / Maintenance Manager	3	28	$ 672.00	$ 1,344.00
TrackR Quality Control Tech	3	22	$ 528.00	$ 1,056.00
		Total Costs	$ 5,040.00	$ 10,080.00

Solution 3: Removed Needless Staff

After removing 1 Team Member from Table 3 we saved some time and money in Solution 1. Going further needless employees were also removed in order to make more profit while still maintain the efficiency of the work.

Type and Cost of Employees Working				
Employees	Number of Employees	Pay per Hour	Cost per Shift	Cost per Day (2 shifts)
TrackR Team Lead	5	26	$ 1,040.00	$ 2,080.00
TrackR Team Member	11	22	$ 1,936.00	$ 3,872.00
TrackR Team Maintenance	5	26	$ 1,040.00	$ 2,080.00
TrackR Shift / Maintenance Manager	2	30	$ 480.00	$ 960.00
TrackR Quality Control Tech	2	26	$ 416.00	$ 832.00
		Total Costs	$ 4,912.00	$ 9,824.00

According to the above table we Removed 1 Team Lead, 1 Team Maintenance, 1 Maintenance Manager and 1 Quality Check as they we only required if needed. This reduced the cost to $9,824 from $11,904 for 1 day making profit of around $2,000.

Detailed Excel model of the To-Be TrackR production process

All the above-mentioned solutions are described in the excel file submitted.

Detailed Excel model of the To-Be financial performance of the TrackR Production Unit

Below mentioned are the changes made to reduce cost and increase financial performance of TrackR Production Unit

1. Reduced Maximum Component Cost/TrackR in Rainy Day
2. Reduced Minimum Component Cost/TrackR in Sunny Day
3. Reduced Minimum Direct Labor Cost/Hour in Rainy Day
4. Reduced Maximum Direct Labor Cost/Hour in Sunny Day
5. Reduced Actual Minimum Direct Labor Cost in Rainy Day
6. Reduced Actual Maximum Direct Labor Cost in Sunny Day
7. Reduced Minimum Indirect Labor Cost in Rainy Day
8. Reduced Maximum Indirect Labor Cost in Sunny Day

Below is the result image taken from Excel that shows the improved number by implementing the above-mentioned changes.

Profit & Loss Table				
Rainy Day			**Sunny Day**	
Gross Profit / Shift / Table	$797		**Gross Profit / Shift / Table**	$2,834
Profit / Shift / Table	$274		**Profit / Shift / Table**	$2,195
Profit per Shift for 3 Tables	$823		**Profit per Shift for 3 Tables**	$6,585
Total Profit	$1,646		**Total Profit**	$13,170
Final Profit	-$1,762		**Final Profit**	$9,143
Final Profit after Expenses	-$2,842		**Final Profit after Expenses**	$8,063

Conclusion

Out of the three alternatives, the final solution – Removal of Needless Staff is defined as the most suitable approach to this staffing scheduling problem.

Solutions	Labor Cost for 1 day (2 shifts)
Current Situation	$11,904
Solution 1: Reduced Team Member	$10,656
Solution 2: Reduced Labor	$10,080
Solution 3: Removed Needless Staff	$9,824

Future State for Assembly Change

Created by Prabhjot Toor

Key Metrics of CDL

Producing Quality Products

Better Quality helps in a better product sell in the market. A strong structure of production delivering high quality goods should be developed.

Maintaining Production Cost

The biggest challenge facing CDL right now is that the company loses a lot of money on manufacturing activities than it receives. A cost-effective development mechanism should therefore be designed to solve this problem.

Increasing Volume of Production
Since the manufacturing mechanism is not efficient, the pace at which the goods are manufactured is low.
CDL would also concentrate on improving the volume of the goods produced to increase net profits.

Future State for Automation

Created by Karanvir Singh

Key Metrics of CDL

Creating best Products
Best Quality products helps the organization to sell the product in the market. A solid structure of creation conveying great merchandise should be developed.

Scheduling Production Cost
The biggest roadblocks facing by the organization loses a ton of cash on assembling activities than it receives. A cost-effective development prototype should develop to solve this problem.

Expand the production volume
CDL would also focus on improving the quantity of the goods produced to increase net profits.

Solution

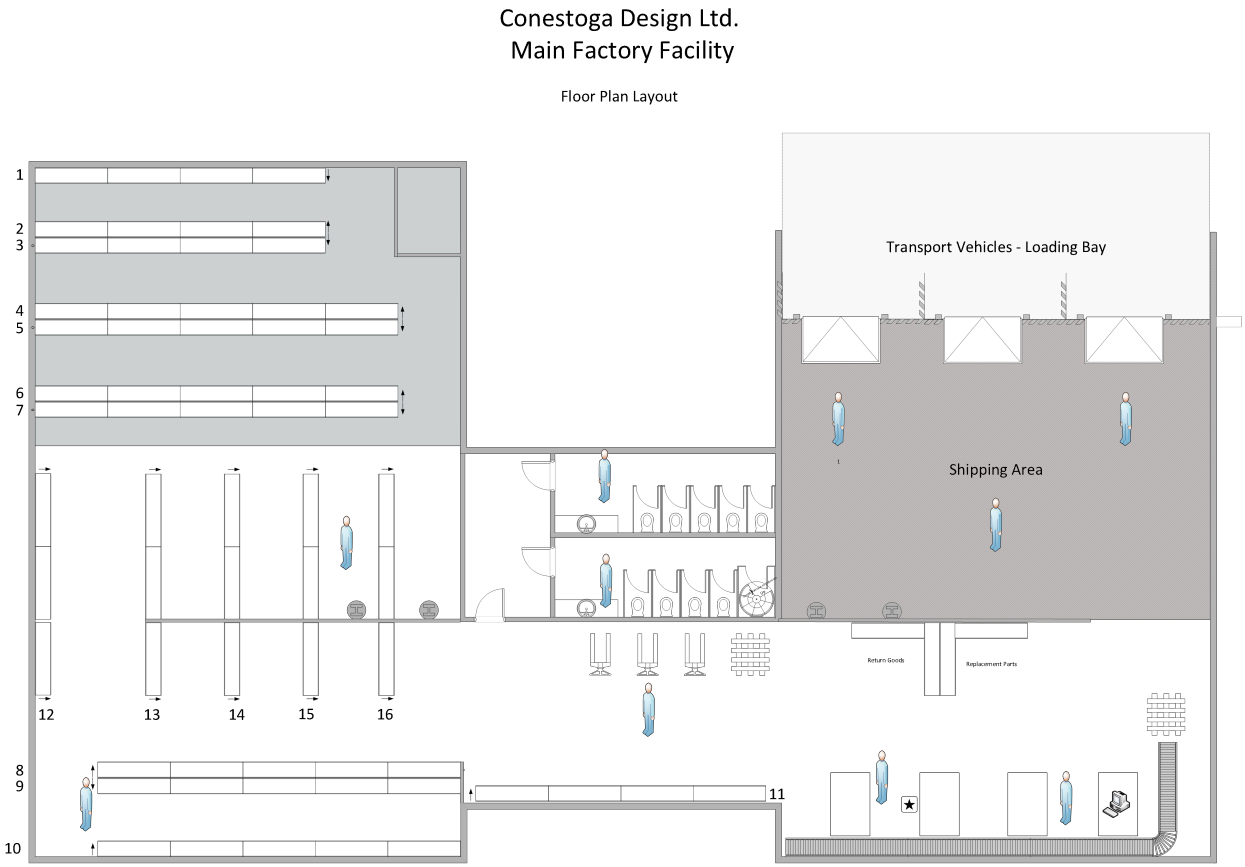
To meet the business needs of the CDL company, we have chosen the “Automation solution,” which helps the CDL company to increase the speed of the production of the TrackR to meet the goal. Moreover, it also increases customer retention and makes the higher productivity of the employees. App of the machines would become automated and also increase the net profit of the company.
Pros

- Increase the production efficiency
- Surge in the net profit
- Decrease in failure rate

Cons

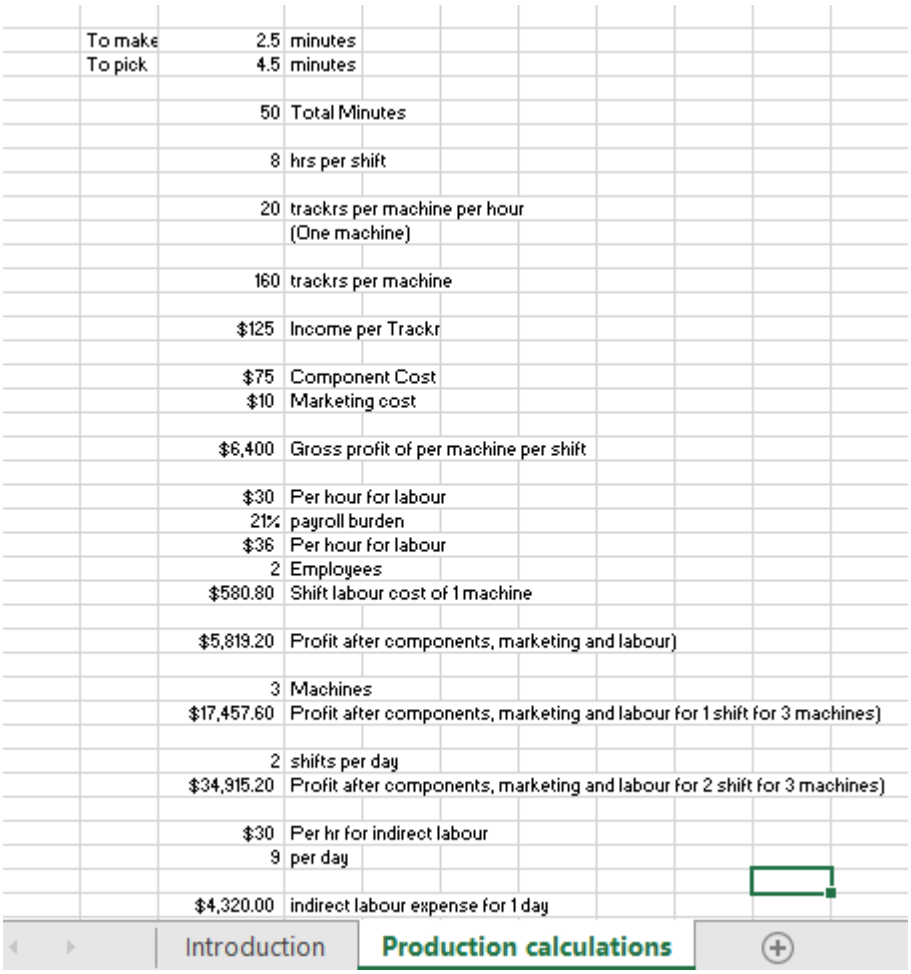
- Improper functioning
- Increase of failure in testing

Detailed Explanation of To-Be Staffing and Utilization of Labor



So, 3 employees in the shipping area and all of them will look at the different loading gates while shipping the TrackR apps.
Two employees will be work at the conveying belt area where they will inspect the trackr application on the computers.

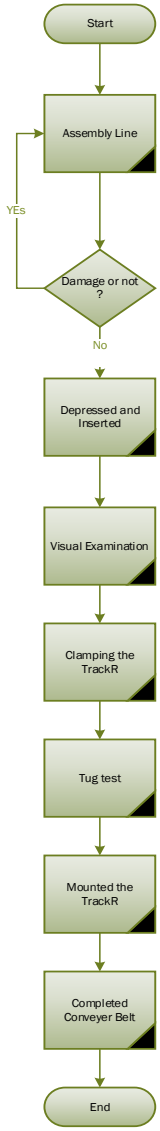
To-Be Calculation of Profit/Loss



To make	2.5	minutes
To pick	4.5	minutes
	50	Total Minutes
	8	hrs per shift
	20	trackrs per machine per hour
		(One machine)
	160	trackrs per machine
	$125	Income per Trackr
	$75	Component Cost
	$10	Marketing cost
	$6,400	Gross profit of per machine per shift
	$30	Per hour for labour
	21%	payroll burden
	$36	Per hour for labour
	2	Employees
	$580.80	Shift labour cost of 1 machine
	$5,819.20	Profit after components, marketing and labour)
	3	Machines
	$17,457.60	Profit after components, marketing and labour for 1 shift for 3 machines)
	2	shifts per day
	$34,915.20	Profit after components, marketing and labour for 2 shift for 3 machines)
	$30	Per hr for indirect labour
	9	per day
	$4,320.00	indirect labour expense for 1 day

Introduction | Production calculations

Process Flow Diagram



Implementations

Implementation for Six Sigma

Created by Sarthak Tyagi

Suggestions on Training

A Reasonable Learning Timeline

In order to get the necessary result, the implementation of Six Sigma required much attention, since Six Sigma consist of many certifications depend on the level. Here the CDL only needed the basic six sigma awareness that can be accomplished through several training sessions, these strategies and learning are at the level of White Belt Six Sigma.

Determine the Requirements

Multiple learning style and level methodology may take some more time to evaluate the level and learning methodology of each employee they are training, but it will be beneficial to the overall success of the long-term business.

Additional Multi Model Approach

Multiple learning style and level approach could take some more time to evaluate the level and learning methodology of of employee they are training, but it will be helpful for the overall success of the long-term business.

Cost and Timeline

Six Sigma training sessions will range from 3 hours to 10 days, depending on the level and specifications, white and yellow belts may be enough to gather the basic knowledge of concepts and techniques in the TrackR production process.

Depending on the sessions and level they take, the cost of the training will vary from $350 to $600 per person,

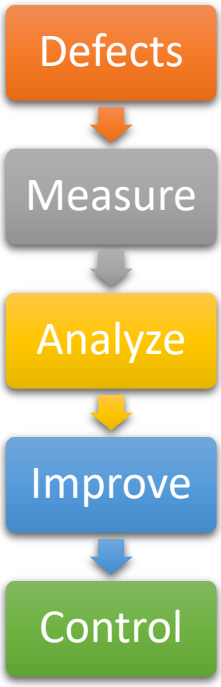
General Overview of Six Sigma Principles and Applications

Six Sigma is the organization's collection of strategies and theory for process optimization, the approach that provides methods and techniques to strengthen their ability to execute tasks. It was introduced by Bill Smith while he worked at Motorola in the mid-1980s. The main purpose of the six sigma methods is to recognise and quantify defects in the process in order to provide effective recommendations to eliminate and enhance the process based on statistical structure.

The level of Six Sigma defines and indicates the occurrence of defects in the process, the higher value of Sigma indicates low defect occurrence, and these defects can be identified as any result that affects the company's final product and consumer expectations in any way. With lower costs and timetable, higher sigma levels suggest greater customer satisfaction.

Six Sigma works on the paradigm of **DMAIC** and **DMADV**, which focuses on a procedural element to achieve some outcome. By reducing waste (**DOTWIMP**), unevenness and overburden, the structural flow of this process could improve process efficiency.

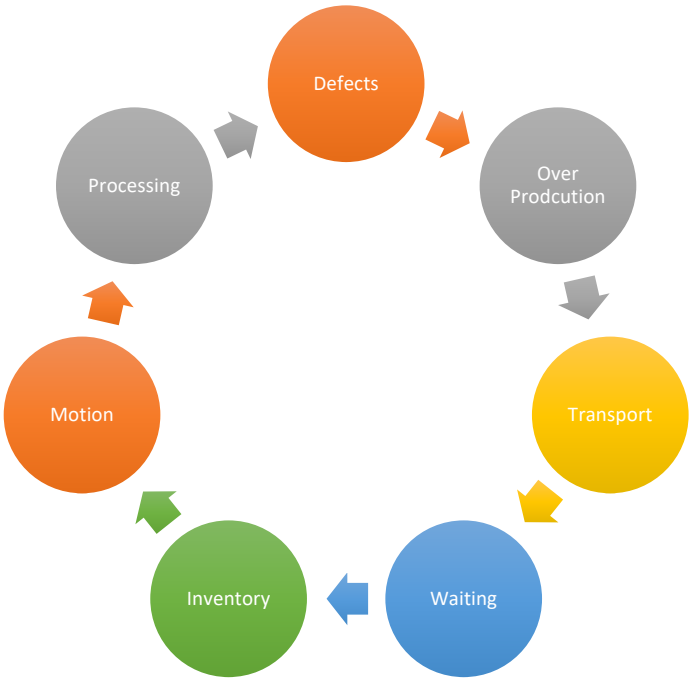
Six Sigma Phases and Principle



- Always keep focus on the customers
- Determine how the process really happens by Mapping out the value stream
- Identify the actual root cause of problem
- Reduce waste by using Lean in order to create flow
- Increase process standardization by removing inefficient variation
- Work in proper team collaboration
- Create a systematic flexible environment

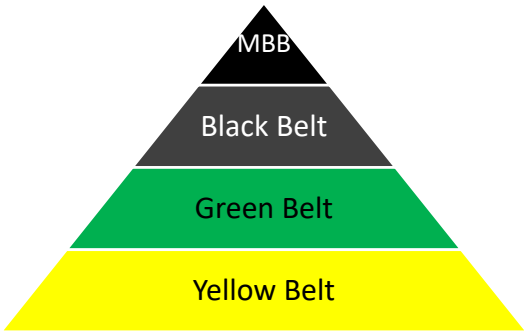
Depending on the requirements, in order to minimise waste and inefficiencies, some of the concepts and methods may be used, these wastes are somehow related to each one, improving some of them will directly influence others by which the overall process can be enhanced.

Seven types of wastes



These levels are calculated in terms of belts, based on many levels of implementation and awareness that the person has Six Sigma certification can be given. The higher the degree determines better management, effective implementation plan and greater problem-solving skills, the skills needed to execute a reliable reorganisation structure in any company in order to achieve efficiency of the procedure.

Six Sigma Belts Levels



White Belt

Six Sigma Applications

Applying Six Sigma to management will increase the overall productivity of the project by managing, calculating and evaluating various systems. The key goal of the organization's implementation of Six Sigma is to create a consistent reach, time, cost and quality. A well-organized working climate could be made possible by enhancing these key elements.

Calculations and a Summary of the Sunny and Rainy-Day Production Capacity

Day	Cost Per Trac
Sunny Day	$ 94.52
Rainy Day	$ 143.57

Implementation for Staffing

Created by Aditya Shah

Sunny Day and Rainy-Day situations in the TO-BE Financial Model versus the AS-IS Financial Model, the decreased daily losses in the TO-BE Model result in overall gains for the firm, which means that changing the labor cost of the Direct and Indirect Cost will prove useful to the company. Also, changing of the floor plan helps to reduce step and save time.

Below is the Data Table of Rainy Day and Sunny Day

Data Table				
Rainy Day			Sunny Day	
Assembling Time (Minutes)	8		Assembling Time (Minutes)	4
Picking Time (Minutes)	15		Picking Time (Minutes)	15
Hrs per shift	8		Hrs per shift	8
Tracker per hr per table	6		Tracker per hr per table	7
Total Tables	3		Total Tables	3
Trackers per shift per Table	48		Trackers per shift per Table	56
Total TrackRs / Day	288		Total TrackRs / Day	336
Direct Staff Members / Table	3		Direct Staff Members / Table	3
Indirect Staff Members	16		Indirect Staff Members	16
Total Shifts / Day	2		Total Shifts / Day	2
Total hrs / Shift	8		Total hrs / Shift	8
Plant Expense Hrs / Day	24		Plant Expense Hrs / Day	24

Below is the Income Table for TrackR units assembled at 3 different tables.

Income Table				
TrackR	TrackR A	TrackR B	TrackR C	Total
Shipped TrackRs per 3 month	3667	2977	2217	
Wholesale Price	$145	$120	$165	
Monthly TrackRs	1222	992	739	
Daily TrackRs	56	45	34	134
TrackRs per shift	28	23	17	67
Shipment %	41%	34%	25%	
Good TackRs per Shift	20	16	12	48
Gross Income	2880	1935	1982	6797
Wholesale Price per TrackR				$142

Below is the Revised Expense Table of Rainy Day and Sunny Day. On modifying this table, we get big difference in the profit of both tables.

Expense Table				
Rainy Day			**Sunny Day**	
Max Component Cost / TrackR	$125		Min Component Cost / TrackR	$91
Marketing Cost / TrackR			Marketing Cost / TrackR	
Min Direct Labour Cost / Hr	$18		Max Direct Labour Cost / Hr	$22
Payroll Burden	21%		Payroll Burden	21%
Actual Min Direct labour Cost	$22		Actual Max Direct labour Cost	$27
Min Direct Labour Cost / Shift	$523		Max Direct Labour Cost / Shift	$639
Min Indirect Labour Cost	$22		Max Indirect Labour Cost	$26
Actual Min Indirect Labour cost / Hr	$27		Actual Max Indirect Labour cost / Hr	$31
Min Indirect Labour Cost / Shift	$3,407		Max Indirect Labour Cost / Shift	$4,027
Plant Expenses / Hr	$45		Plant Expenses / Hr	$45
Total Plant Expenses/ Day	$1,080		Total Plant Expenses/ Day	$1,080
Min Direct Labour Cost / Day	$1,045		Max Direct Labour Cost / Day	$1,278
Min Indirect Labour Cost / Day	$3,407		Max Indirect Labour Cost / Day	$4,027
Max Total Labour Cost / Day	$4,453		Min Total Labour Cost / Day	$5,305

Client Project Plans

Client Project Plan for Six Sigma

Created by Sarthak Tyagi

Background

By supplying local medical clinics with three specially equipped medical imaging scanners, CDL began its business. In providing medical imaging equipment, CDL has long been the industry leader. CDL has also launched the first non-commercial TrackR system, a wearable technology for home-users. It was a big success and achieved the highest volume of sales.

The cost of production exceeds revenue in the assembly area and the number of failure rates is rising. The CDL needs clarification on the implementation of Six Sigma's theory. To decrease the rate of loss and improve the efficiency of production. The development and assembly of TrackR by CDL is done manually and needs benchmarking in order to boost these inefficiencies.

In order to procure assembly parts, the manufacturing phase of TrackR is divided into several phases, during which employees need to travel from place to place. This entire process takes a lot of time and somehow adversely affects the overall performance of the company's devices.

Vision

TrackR's current manufacturing method consists of deviations such as waste, Unevenness and Overburden, requiring lean process and Six Sigma implementation to resolve these deviations company that will help the organization enhance time management, raise employee morale and provide higher revenue at lower cost. Implementation of Six Sigma will also boost the method of assembly and provide the business with continuous quality enhancement by reducing manufacturing costs.

Needs

- The organization wanted a recommendation by which to reorganize the development process by using the least financial breakeven.
- Development phase that may display a relative difference in an enhanced aspect between the current and future state.
- In order to obtain the future state, the current comprehensive development process of TrackR. It also requires analyzing spaghetti.
- In order to incorporate six sigma principles and strategies, company requires direction and methodology.
- Reorganization of the overall phase of production to minimize costs, a timeline that further improve production quality.

Actions

- Determine the existing development method in order to analyse imperfections in TrackR's assembly process.
- Perform and incorporate the principles and methods of Lean Six Sigma in order to improve inefficiency and waste in production.
- Analyze the total disparity and show the enhancement of both processes of development.
- Provide instruction and coaching plans to teach staff about Six Sigma values and methods for implementation.

Deliverables

- Mathematical model on Excel to evaluate financial performance.
- Model to analyze and define failure point in production procedure.
- Define and evaluate future TO-BE production model.
- Provide long term suggestions and coaching plans to staff for Six Sigma Implementation and overall production efficiencies.
- Provide general overview of Six Sigma implementation with waste, unevenness analysis and define current failure points.

Suggestions of possible future analysis and development activities

Implementation of New Process
In order to comply with the principles of Sig Sigma, if any new structure is planned or applied to the production process, the organisation must adopt the DMAIC process.

Conduct Performance Reviews
Often conduct a performance analysis by evaluating and assessing employee output and production efficiency after implementing the new process in the production system.

Determine Customer Satisfaction and Expectation
Prior to the redesign of the production process, it is important to evaluate its effect on the finished product in order to assess if it meets all the company's needs.

Waste Management
Educate all employees and provide them with updated sessions to provide them with specified recommendations for mitigating the specifics of current waste and challenges faced by the organisation.

Benchmarking

One of the building blocks in the integration of Six Sigma is benchmarking, which is used to measure and evaluate the success and achievement of two companies operating in the same market.

Measure Financial Performance
In order to assess the company's long-term financial performance, it is important to track and demonstrate the current financial benefits and crises on a regular basis with the previous one, and also to use future predictions to achieve a long-term financial structure.

Client Project Plan for Component Picking

Created by Anuj Patel

Background
CDL began its business journey with supplying three specially designed medical imaging scanners to nearby medical clinics. CDL is the industry leader in the production of medical imaging equipment for a long time. CDL also released the first non-commercial TrackR product, a wearable technology for home users. It was a big success and achieved the highest volume of sales.

The organization was on the brink of bankruptcy due to bad handling by the CDL staff. With the support team of Business Analysts, CDL is resolving this crisis. They also suggested ideas and solutions to the challenges that have affected the efficiency of CDL.

Currently, the production inefficiency of TrackR and related problems are faced by CDL. The manufacturing expense exceeds the assembly region sales and there is a rise in the amount of failure rates. CDL requires advice on the implementation of the Six Sigma theory and methods to reduce the rate of loss and improve the quality of production. The development and assembly of TrackR by CDL is performed manually and the procurement of Siplace automation machines is considered. This reform will impact the existing manufacturing staff of the CDL and their Management team. The wage rates for employees are changed by CDL. Also, proper preparation and education are proposed.
The goal of this project is to recognize and collect CDL criteria for addressing production inefficiency by taking CDL's existing market challenges into consideration.

Vision
To enhance the business capabilities, our team has proposed certain solutions for the application, website, and developed a fully functional dashboard in the previous projects. Apart from this, I am proposing CDL to update their current order picking cycle to pull out the waste from the current order picking cycle.

Needs
My need is to analyze the whole AS-IS process of the order picking system and the actions the workers of CDL were performing into the system, so that we can propose the future process as a solution. Also, we need a strong risk mitigation plan to avoid the interference of risk into our desired work process.

Action

- Performing SWOT analysis on the current process to find and kick out the flaws in it.
- Creation of TO-BE process based on the result of SWOT analysis.

- Implementation of “Kaizen” foe the future state.

Deliverable

- AS-IS & TO-BE process flows
- Risk Mitigation plan
- Work Breakdown Structure
- Current cost model
- Spaghetti diagram for the current order picking process

Suggestion Overview

- “Kaizen’ methodology is one of the suggestions given from my side which will improve the utilization of staffing for manufacturing TrackR in CDL production facility.

Why Kaizen?

Kaizen methodology is used mainly for staffing improvement in business which leads to substantial long- term results. Main aim of Kaizen is to eliminate risk by identifying problems and making corrections to it.

Advantages of Kaizen

- Encourages teamwork
- Task efficiency
- Employee satisfaction

Rationale About Kaizen

- Not able to find it whether it help in increasing profit or through this CDL is making loss.

Implementation of Kaizen

- Currently in CDL TrackR production facility there 3 production line running on which 3 employees are working and 1 person is working as a maintenance person. Currently order picker use to pick all the component of TrackR and brings at the assembly line, inspect and then if part is damage, he goes to replacement area replaces the part and then assembles TrackR.
- With implementation of kaizen two person will work on assembly line and one person will pick all the parts for the assembly line workers and they will assemble if parts are not damage.
- There is total 3 assembly lines with 4 people working on each, so in total 12 people are working which includes 3 maintenance workers. So, we will use only 2 instead of 3 for all three assembly lines and will focus on the time management to manage the breaks and substitution of the workers.
- So, initially we will use the maintenance workers on any one of the assembly lines so that they can also produce some Trackr’s. During the break time of assembler, one of the maintenance workers will cover the work of assembler till he comes back from break and the order picking guy will continue with his work.

- And if 2 person wants to go on break at the same time, in that case we will use both the maintenance worker on the assembly line.
- For example, at the starting of the shift the 3 people will work on each assembly line and the remaining 2 maintenance worker will work on the assembly line 1, but when the assemblers of line 2 and 3 wants to go on break the maintenance worker will stop working on the line one and each one of them will cover the work of two assemblers and this will continue till everyone get their break. After getting break, again those 2 maintenance workers will start working on the line 1. And this whole cycle will be performed till the end of the shift. And in this way, we will use the 2 maintenance workers for the extra production of the Trackr's.
- After successful implementation of this part, we will move forward to the role of other maintenance worker.

Detailed Graphical Analysis of the To-Be TrackR Component Picking process

Diagram(s) of the To-Be Factory Layout

- To-be for component picking process diagram is same AS-IS

Process Diagram of To-be production process

- To-be for production process is same as AS-IS

Detailed Explanation of the To-Be Staffing and Utilization of Labor

- Currently in CDL TrackR production facility there 3 production line running on which 3 employees are working and 1 person is working as a maintenance person. Currently order picker use to pick all the component of TrackR and brings at the assembly line, inspect and then if part is damage, he goes to replacement area replaces the part and then assembles TrackR.
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- After successful implementation of this part, we will move forward to the role of other maintenance worker.

Client Project Plan for Staffing

Created by Aditya Shah

Vision Statement

In order to increase the staffing plan, this will minimize losses and boost the profitability of CDL TrackR production.

Needs

Need #	Need Name	Need Description
1	Suggestion Overview	Suggestions on how to mitigate losses/improve profitability for the output of CDL TrackR
2	Client Project Plan	Provide Excel with the detailed project schedule and contents (vision, actions, and deliverables)
3	AS-IS Staffing Schedule	Provide Excel for AS-IS Staffing Plan for Assembly Tables, and uses 1 manufacturing lead side, 2 Assemblers, and 1 repair per table
4	TO-BE Staffing Schedule	Provide Excel for TO-BE staffing plan for assembly tables using less than 1 development lead hand, 2 assemblies and 1 repair per table
5	TO-BE Labor Utilization	Provide Excel with a thorough study of the expense and profit of the TO-BE Labor Utilization

Action Plan

Based on the findings of the RFI document and the details given, the following steps will be taken to achieve the necessary deliverables.

Sr. No	Action Plan
1	Analysis of the current situation relevant to the staffing timetable.
2	Prepare a scenario-related AS-IS chart.
3	The productivity research included.
4	Estimate the benefit, loss, revenue, and investment of the business concerned in the present scenario.
5	Prepare a TO-BE review paper and suggest a plan for a revised staff calendar.

Suggestion Overview (AS-IS Analysis)

The TrackR production field consists of 12 employees working as a team of four in three different tables. The fourth table, consisting of a computer, is used for research purposes. Each table has its own production lead, and the other two are assemblers. The fourth worker is maintenance worker.

The current working style is as follow:

- The Assembly works on 2 different shifts. Each shift of 8 hours.
- One employee, who is not assembler, selects TrackR components from the shelves of the production room.
- When the parts are chosen, they are taken to the assembly table and assembled. This is the trend adopted or used to render medical imaging equipment as well.
- The third person is going to take a rest, snack or use a washroom.
- When assembled, it will be taken to the fourth table and checked on a computer.
- The product is packed and kept on Pallet.
- Each worker is given a break of 10 minutes every hour.

Client Project Plan for Automation

Created by Karanvir Singh

Background	CDL starts its industry with three special medical imaging scanners for the medical outlets. It also developed the non-commercial product, which is TrackR app, wearable product for the sports person and also used for home person
Vision	All the machines become automated and all of work is done automatically without any error. All of the staff members will get the proper education and training of the machines.
Needs	CDL needs a mathematical model of the current processes and then a detailed To-Be diagram of the production and financial changes that would come from purchase and installation of the automation.
Actions	All of the staff members will get the proper education of the automated machines before implementing in the assembly so they can easily work on these machines without getting any error
Deliverables	Executive summary History chart Assumptions To-Be diagrams of production and financial Process flow diagrams Calculations and suggestion on the sunny day and rainy day

Suggestions of possible future analysis and development activities

- Automation will get new jobs and responsibilities such as data analysts and the workers who are experts in machine learning
- There will be more shifts regarding the machines learning and other artificial products
- Automation will be more complex and cost-effective, but it reduces the time of the process
- Automation also increases the mass production
- It also reduces the extra expenses of the company

Measuring Success

Measuring Success for Staffing

Created by Aditya Shah

Below mentioned are the Project's success criteria:

- Schedule: The project to be completed within deadline
- Business Case Performance: The current performance of the CDL's working assembly
- Quality of Work: The quality of the work that was provided to CDL for To-Be Analysis
- Customer Satisfaction: This includes if the customer is satisfied with the services and solution provided to them
- Time Management: The amount of time taken to provide the solution and implement it
- Complete Use of working Employees: All the employees are given equal productive time and break as required
- Working Scope: This includes all the resources required to complete the project

Risks

There are some risks identified for this scenario. Below mentioned are some identified risks:

- Working Stress: As employees are working consistently for assembly production
- Workplace Hazards: Hazards such as Physical, Chemical, Biological or Chemical may occur unknowingly
- Safety Issues: Employees may not follow safety rules will be asked to return home and ultimately losing workers for that shift
- Falls and Slips: It may happen that employee may fall or slip while moving from one place to another place
- Lay-Off of Workers: This is a scenario when company cuts the number of working employees. Also, converting full-time to part-time
- Maternity Leaves: There are chance that working employee can apply for maternity leave for a long-term rest and other employee has to be trained in order to cover their work
- Emergency Sick calls: There are chance where employee can call in at last moment and eventually the shift may have one less worker

Measuring Success for Assembly and Component Picking

Created by Prabhjot Toor & Anuj Patel

Sr No	Risk:	Description	impact	probability	Risk score	Response
1	Financial risk	Reorganizing the track R assembly process for efficiency may increase the company's overall operational cost.	4(high)	4(high)	6	Financial planning should be done after analyzing every cost factor to avoid unnecessary cost raise.
2	Automation risk	Implementing new technology (Siplace machine) in the workspace may decrease work efficiency of employees because of being unfamiliar with new technology.	3(high)	3(high)	5	Formal employee training program should be planned to train workers about the Siplace machine and work environment changes.
3	Procedural Risk	Workers efficiency and production may get disturbed due to change in the assembly procedure which eventually will increase production error rate.	2(medium)	3(high)	4	Employee training should be done to teach them about changed procedures to avoid any procedural errors.
4	Technology failure risk	Installing old Siplace machine has risk of sudden machine breakdown which may interrupt the continuous production and effect the business.	3(high)	2(medium)	6	Solution for such risk is to keep backup plan for such situation and have employees trained to handle the production manually without machine automation.

Deliverable Acceptance Criteria

Setting Communication:

Before the design process, all pre-defined specifications and questions should be addressed with the customer on a required basis, any queries and details can be collected in a synchronization aspect.

Streamlining Acceptance Testing:

After every modification and history should be listed, all deliverables should need to be checked individually to decide the simple pass.

Management Involvement and Care:

Management will take care of the costs incurred by training and the introduction of new plans and management and staff will embrace the current process flow and area division.

Defining and Understanding New System:

Employees are prepared to obtain instruction in new methods and six sigma system.

Feature Estimation:

The automation should specify the clear functionality of each element according to precise specifications during the working process.

Deliverable Standards

- **Scope Validation:** The right target and scope are specified by each element; individually
- **There are no sources in the current document.** checks should be conducted before the work is combined.

- **Categorize Standards:** Any aspect of the project management documents should be categorized as external deliverable if it affects the customer requirement, internal as team management, according to its scope.

- **Reference and Collaboration:** Each document should provide its referred author with proper instructions and the role of each team member should be clearly described in the history of the document.

Project Success Criteria

- All the project deliverables are delivered before deadlines.
- Cost variance in the planned and actual cost.
- Mathematical model provided will help CDL to get higher ROI.
- Employee satisfaction score after project completion.

Reference:

Six Sigma

Strikers. (2020). *Project Management Document for TrackR Production.*
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Component Picking

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Assembly

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Automation
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