

DATE: 04/28/2023

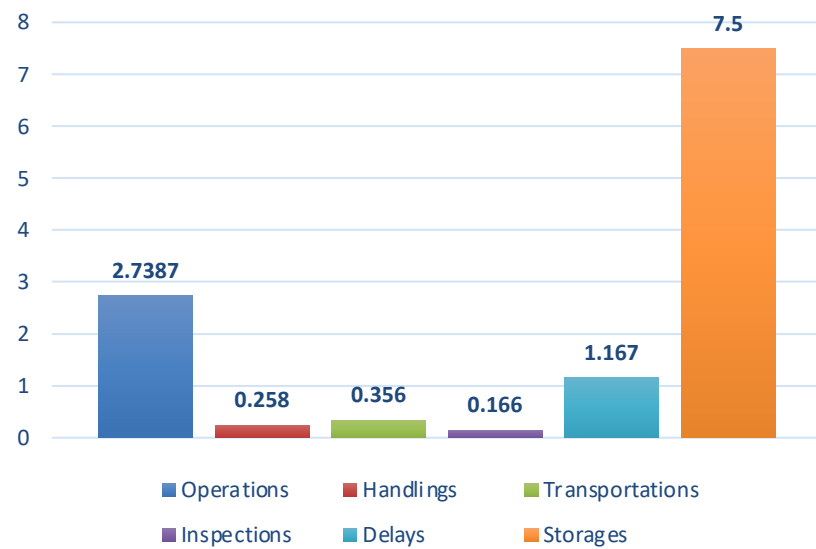
Value Stream Mapping (Plastic Injection Molding)

Sakthikumar Sivakumar

FLOW PROCESS CHART

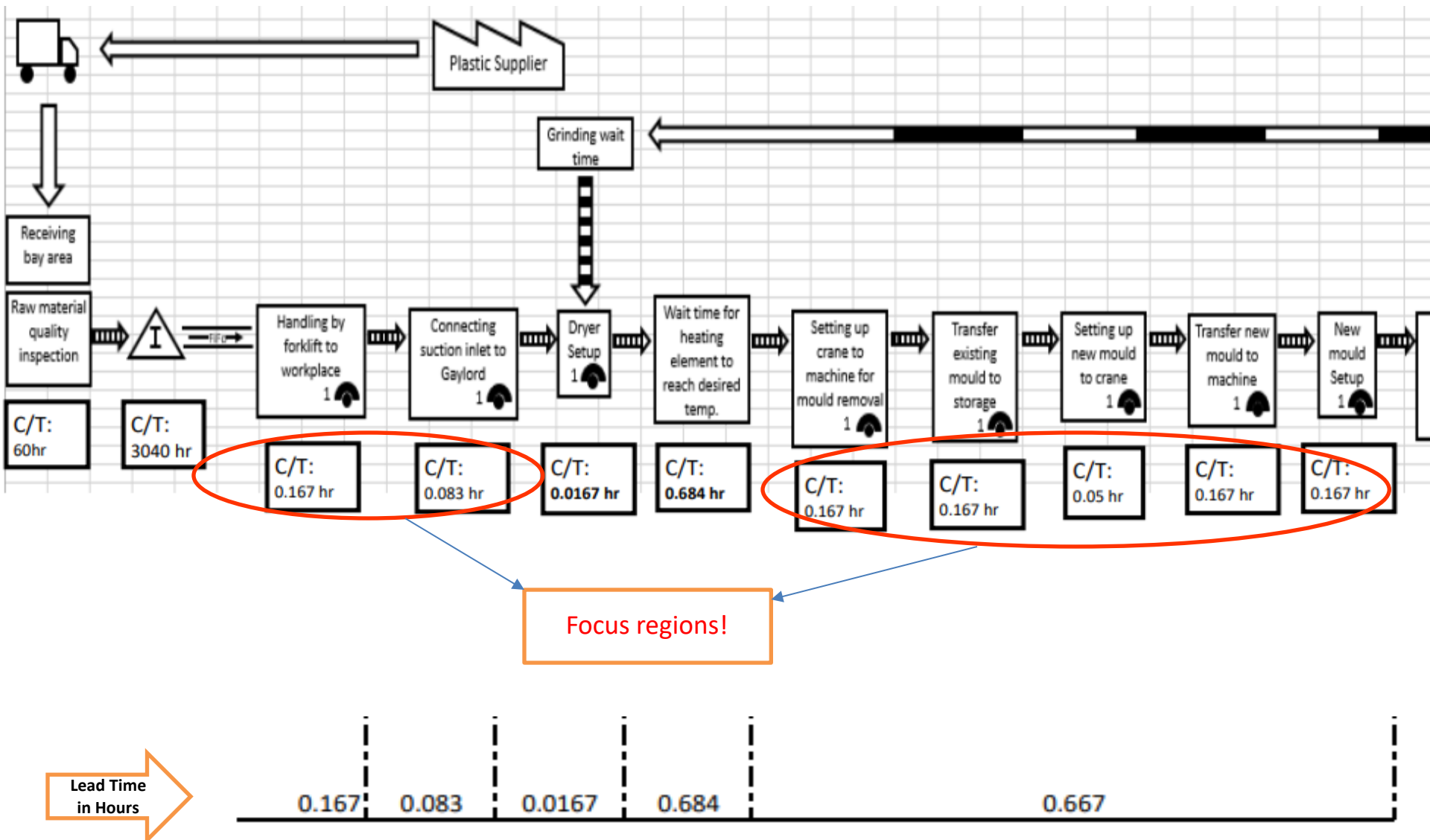
Summary		Present	
		No.	Time
○	Operations	11	2.7387
◇	Handlings	3	0.258
➡	Transportations	6	0.356
□	Inspections	2	0.166
⌒	Delays	3	1.167
▽	Storages	2	7.5

(Time in Hours)

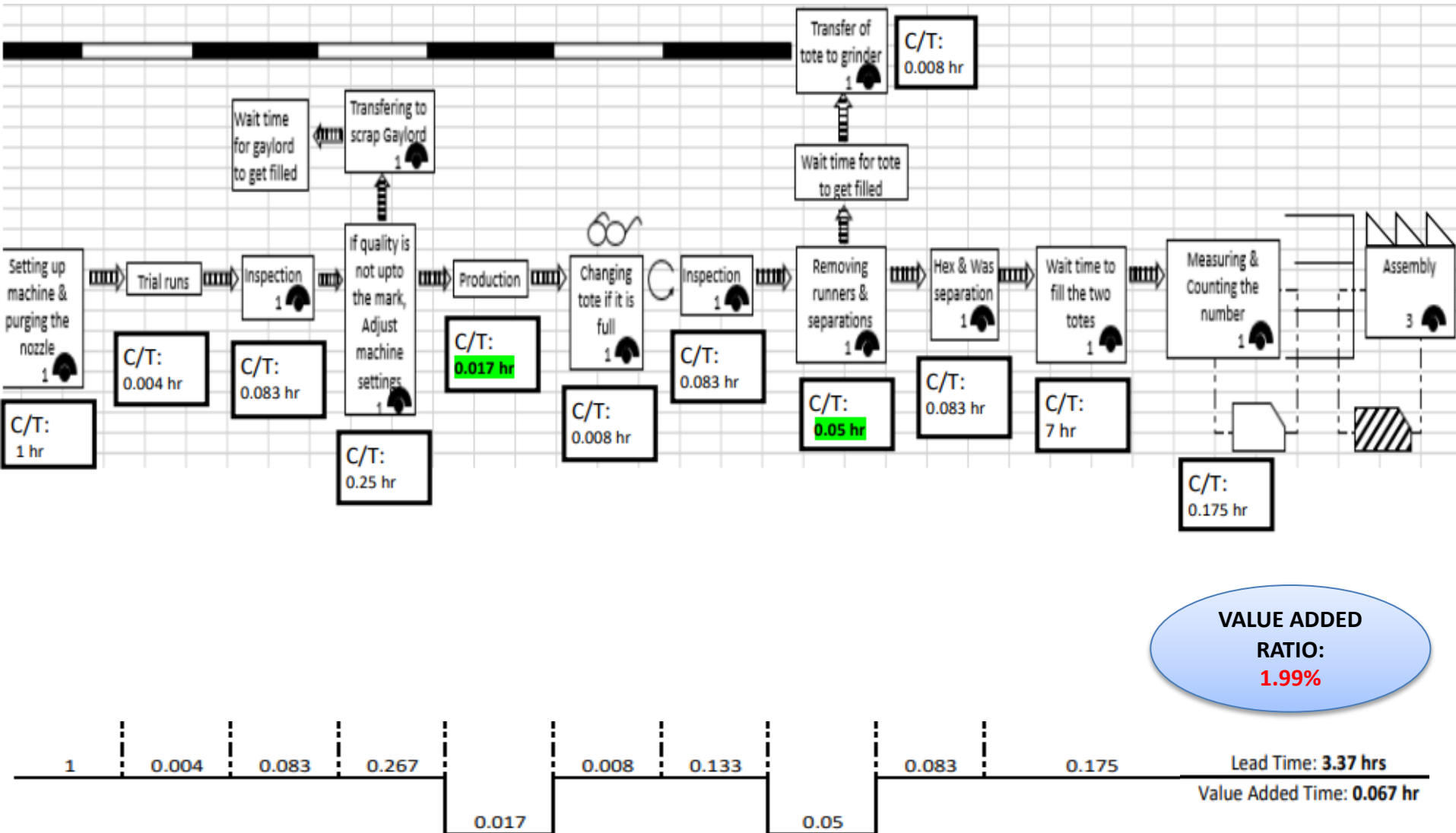


Details of Method		Operation	Handling	Transport	Inspection	Delay	Storage	Time (Hours)	VA / NVA
1.	Wait time for forklift	○	○	➡	□	⌒	▽	0.25	NVA
2.	handlings by forklift to workplace	○	●	➡	□	⌒	▽	0.167	NVA
3.	Connecting suction inlet to gaylord box	●	○	➡	□	⌒	▽	0.083	NVA
4.	Dryer setup and operation	●	○	➡	□	⌒	▽	0.0167	NVA
5.	setting up heating element	●	○	➡	□	⌒	▽	0.017	NVA
6.	Heating element to reach desired temp	○	○	➡	□	⌒	▽	0.667	NVA
7.	setting up crane to machine for removing existing mould	●	○	➡	□	⌒	▽	0.667	NVA
8.	Transfer existing mould to mould storage area	○	○	➡	□	⌒	▽	0.167	NVA
9.	removing existing mould and setting up new mould to overhead crane	●	○	➡	□	⌒	▽	0.05	NVA
10.	Transfer new mould to machine	○	○	➡	□	⌒	▽	0.167	NVA
11.	setting up new mould	●	○	➡	□	⌒	▽	0.667	NVA
12.	Setting up machine and purging the nozzle	●	○	➡	□	⌒	▽	1	NVA
13.	Triall runs	●	○	➡	□	⌒	▽	0.004	NVA
14.	Inspections for first set of samples	○	○	➡	■	⌒	▽	0.083	NVA
15.	If quality is not upto the mark. Adjust machine settings	○	○	➡	□	⌒	▽	0.25	NVA
16.	Transferring waste samples to scrap gaylord	○	○	➡	□	⌒	▽	0.003	NVA
17.	Production after machine setting adjustment	●	○	➡	□	⌒	▽	0.017	VA
18.	Storage of product falling from the IM machine	○	○	➡	□	⌒	▽	0.5	NVA
19.	Changing tote	○	●	➡	□	⌒	▽	0.008	NVA
20.	Inspecting	○	○	➡	■	⌒	▽	0.083	NVA
21.	Removing runners and separations	●	○	➡	□	⌒	▽	0.05	VA
22.	Storage of runners	○	○	➡	□	⌒	▽	7	NVA
23.	transferring tote to grinder	○	○	➡	□	⌒	▽	0.008	NVA
24.	seperating Hex and Was parts	○	●	➡	□	⌒	▽	0.083	NVA
25.	Transferring material to weigh machine	○	○	➡	□	⌒	▽	0.003	NVA
26.	Measuring & counting the number	●	○	➡	□	⌒	▽	0.167	NVA
27.	Transferring finished product to Kanban Tray	○	○	➡	□	⌒	▽	0.008	NVA

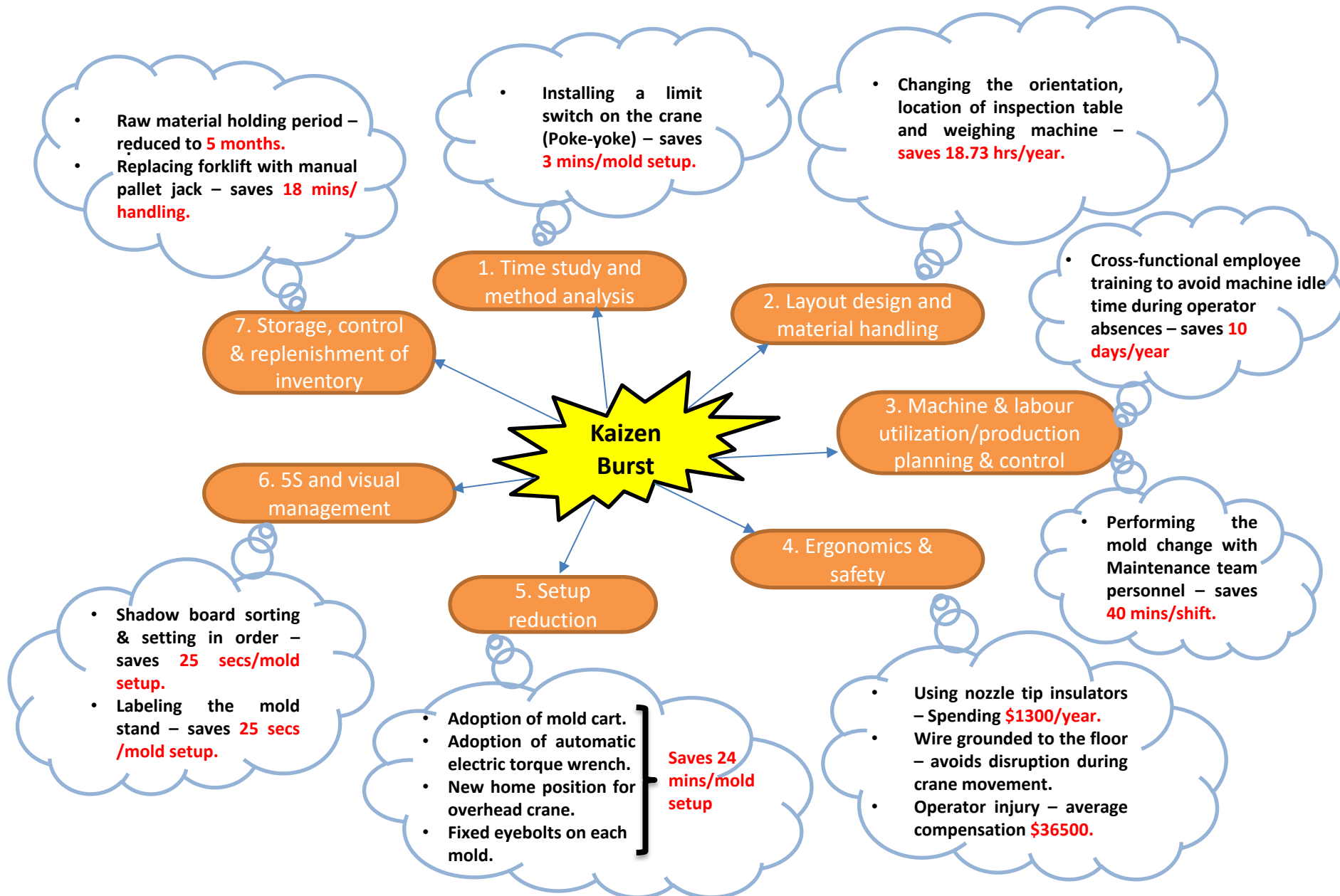
CURRENT STATE VALUE STREAM MAPING



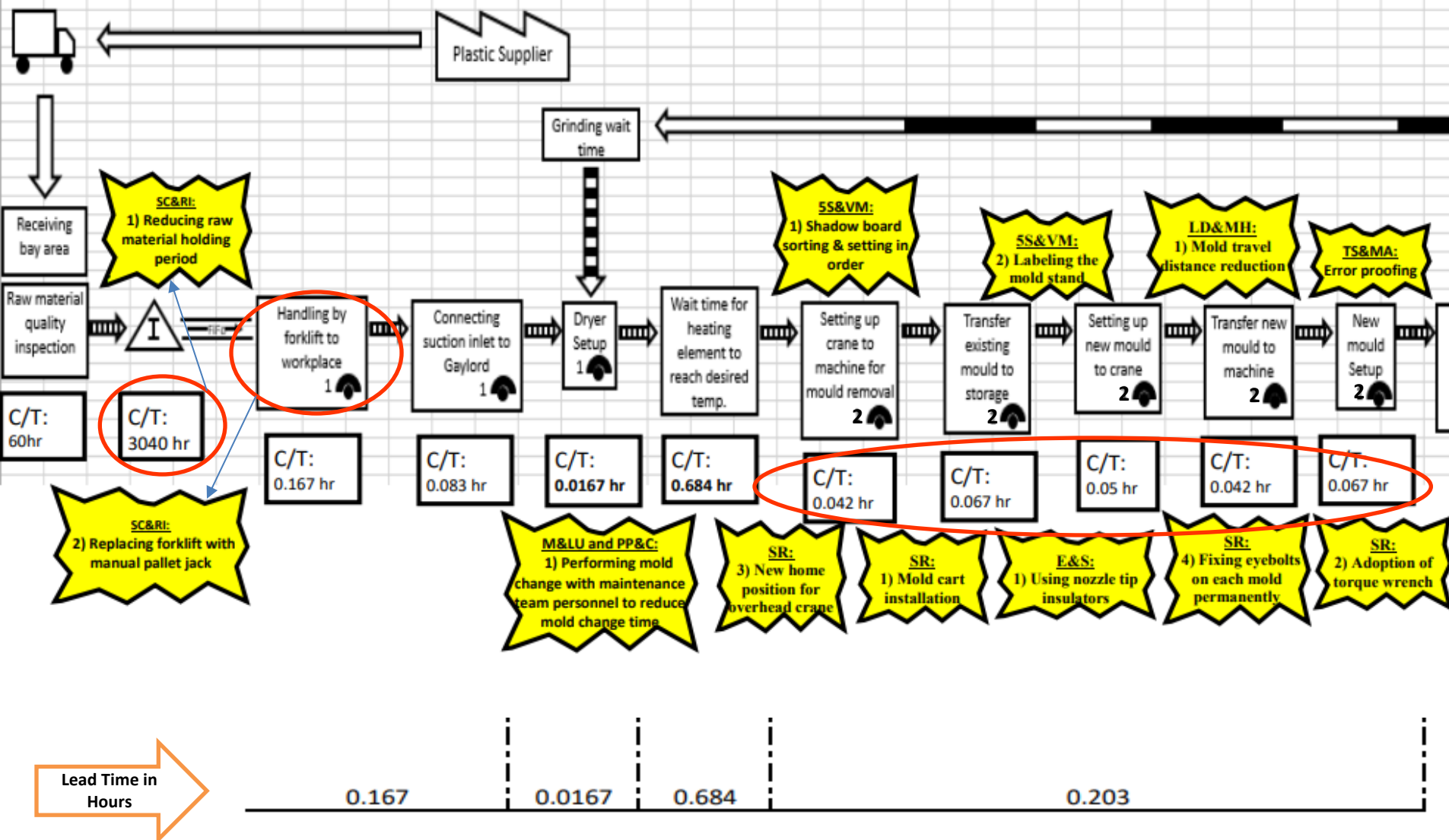
CURRENT STATE VALUE STREAM MAPING



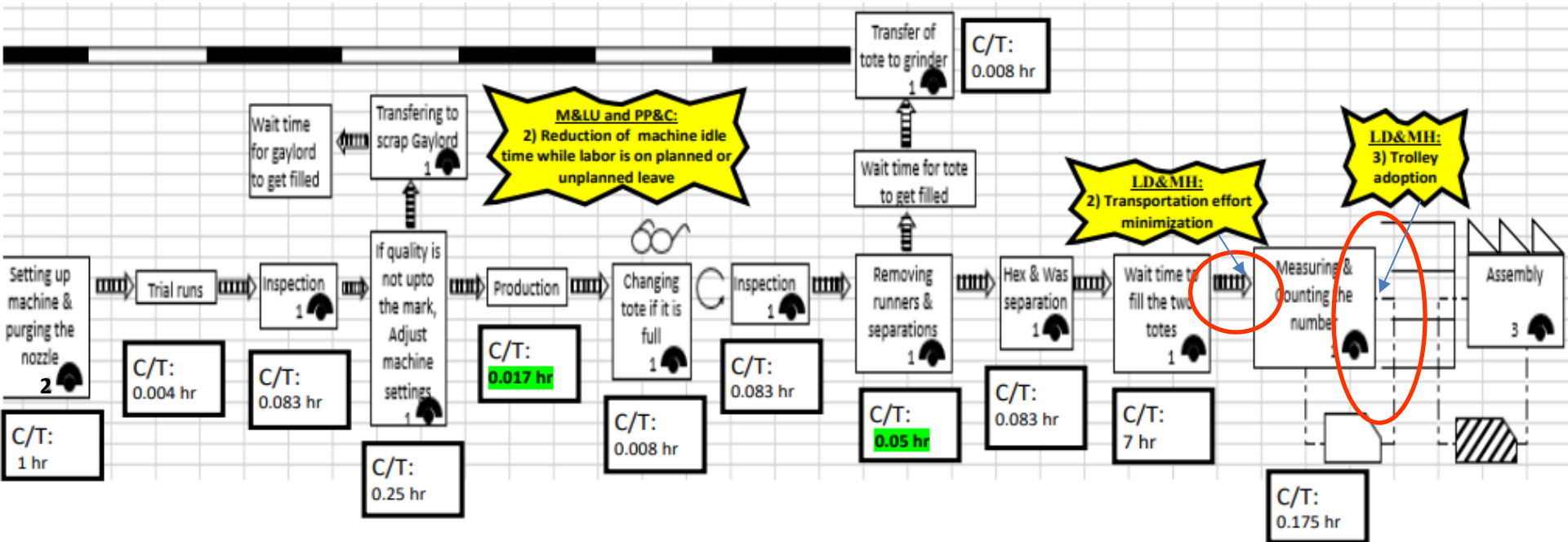
Idea(s) to Solve the Problem



FUTURE STATE VALUE STREAM MAP



FUTURE STATE VALUE STREAM MAP



0.333 0.004 0.083 0.267

0.008 0.133

0.083

0.1

Lead Time: 2.082 hrs

Value Added Time: 0.067 hr

0.017

0.05

**VALUE ADDED
RATIO:
3.22%**

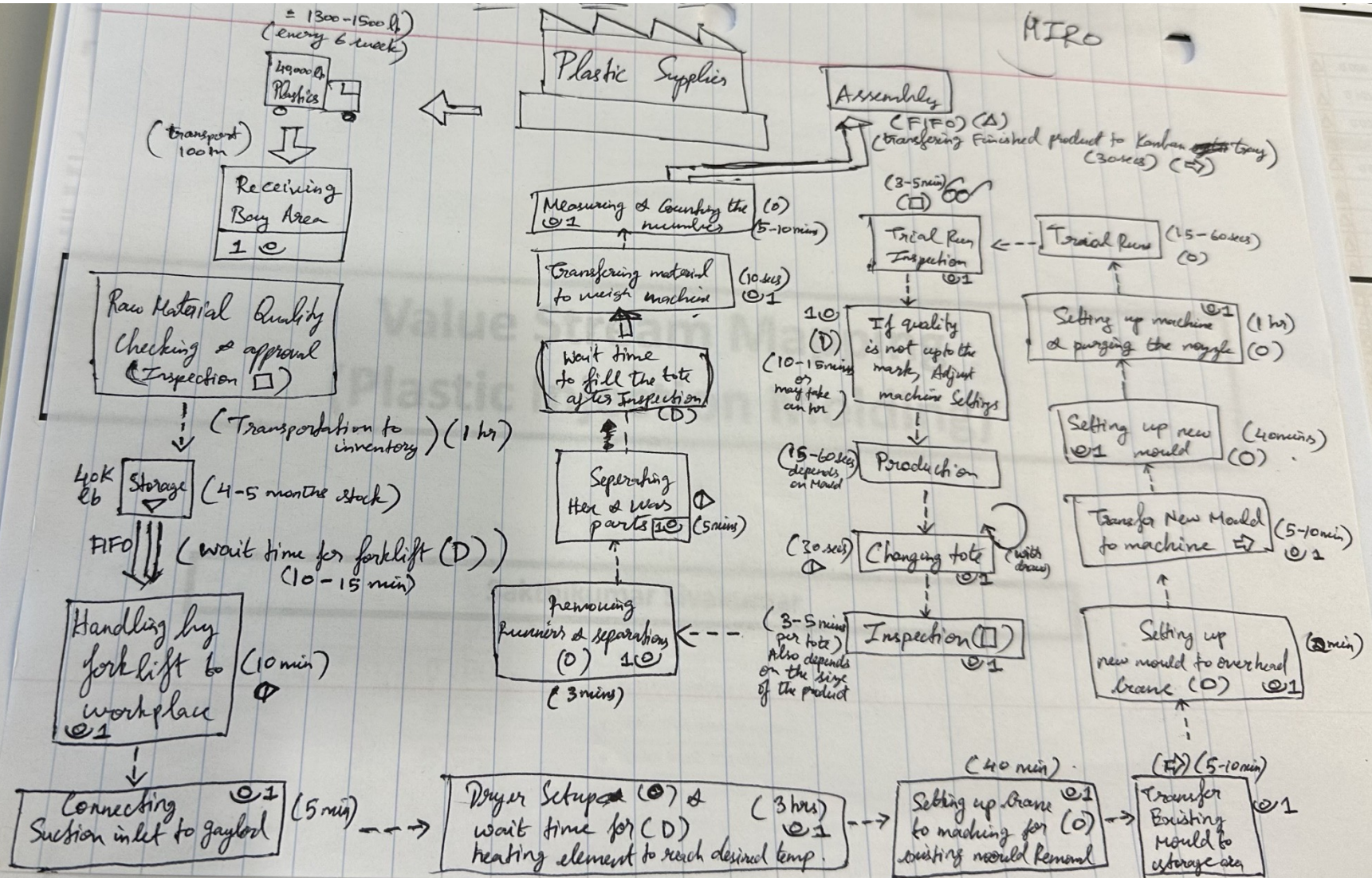
SUMMARY

PROJECTS	KAIZEN BURSTS	BENEFITS
TIME STUDIES AND METHOD ANALYSIS	<ul style="list-style-type: none"> Installing a limit switch on the crane (Poke-yoke). 	<ul style="list-style-type: none"> Saves 3 mins/mold setup.
LAYOUT DESIGN AND MATERIAL HANDLING	<ul style="list-style-type: none"> Changing the orientation, location of inspection table and weight machine. 	<ul style="list-style-type: none"> Saves 18.73 hrs/year.
MACHINE & LABOUR UTILIZATION	<ul style="list-style-type: none"> Performing the mold change with maintenance team personnel. 	<ul style="list-style-type: none"> Saves 40 mins/shift.
ERGONOMICS & SAFETY	<ul style="list-style-type: none"> Usage of nozzle tip insulators. Wire grounded to the floor. Compensation for operator injury. 	
SETUP REDUCTION	<ul style="list-style-type: none"> Adoption of mold cart. Adoption of automatic electric torque wrench. New home position for overhead crane. Fixed eyebolts on each mold. 	<ul style="list-style-type: none"> Saves 24 mins/mold setup.
5S AND VISUAL MANAGEMENT	<ul style="list-style-type: none"> Shadow board sorting & setting in order. Labeling the mold stand & setting in order. 	<ul style="list-style-type: none"> Saves 50 secs/mold setup.
STORAGE, CONTROL & REPLENISHMENT OF INVENTORY	<ul style="list-style-type: none"> Raw material holding period reduced to 5 months. Replacing forklift with manual pallet jack. 	<ul style="list-style-type: none"> Saves 18 mins/handling.
PRODUCTION PLANNING & CONTROL	<ul style="list-style-type: none"> Cross-functional employee training to avoid machine idle time during operator absences. 	<ul style="list-style-type: none"> Saves 10 days/year.

➤ **Increase in Value Added Ratio: 1.23%**

SCRATCH WORK

AIRO



REFERENCES

- [1] Rother M, Shook J. Learning to See: Value Stream Mapping to Add Value and Eliminate Muda (Lean Enterprise Institute). Lean Enterp Inst Brookline 2003:!
- [2] Singh B, Garg SK, Sharma SK. Value stream mapping: Literature review and implications for Indian industry. Int J Adv Manuf Technol 2011;53:799–809. <https://doi.org/10.1007/s00170-010-2860-7>.
- [3] VSM-Symbols n.d. <https://www.allaboutlean.com/vsm-symbols/vsm-symbols-2/>