

## Industry 4.0 Awareness Seminars Reports Template

MS Word File, Font Arial 12 , space 1.5

1.	Date of the Seminar	07 <sup>th</sup> August 2019
2.	Organizers	CII
3.	Title of the seminar	DHI-CII Awareness Workshop on Industry 4.0 <i>The Indian Perspective</i>
4.	Programme	Attached
5.	Report: suggested contents (1) Main takeaway / good suggestions (2) Clusters covered – <b>Faridabad</b> (3) Nos attended - <b>70</b> (4) Success stories that need to be compiled / shared – <b>Case study: Sandhar Smart Manufacturing</b>	<b>(1) Main takeaway / good suggestions:</b> <ul style="list-style-type: none"> <li>• Overview of Industry 4.0 concepts and benefits of adoption</li> <li>• Human-Robot collaboration for evolving factory of the future</li> <li>• Safety standards for applications of Industrial Robots</li> <li>• Understanding of a basic framework of readiness for Industry 4.0</li> </ul>
6.	List of Speakers with contact details	Attached
7.	Photographs	Annexure 1
8.	Resource persons for providing consultancy, skilling, guidance etc.	<ul style="list-style-type: none"> <li>• <b>Mr Niraj Hans</b> Convener, CII Haryana Manufacturing Panel &amp; Chief Operating Officer (Automotive) Sandhar Technologies Ltd</li> <li>• <b>Mr Harish Sandesh</b> Manager-Applications OMRON Automation India Pvt Ltd</li> </ul>
9.	Presentations	Annexure 2
10.	Learnings from the seminar	- Industry has a basic understanding of the concepts of Industry 4.0 at a broader level (as understood from

		<p>the participants who attended the workshops). They are keen on understanding in detail about the applications of how to benefit from implementing Industry 4.0 through specific case-studies by companies who have deployed Industry 4.0.</p> <ul style="list-style-type: none"><li>- Working models and demonstrations of Industry 4.0 applications were very well received by the participants. It was also quite engaging and insightful.</li><li>- Participants attending the workshops have shown great interest on interacting with DHI officials to understand about the various initiatives taken by Government in creating an enabling eco-system for Industry 4.0 adoption.</li></ul>
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## Awareness Programme on Smart Manufacturing and Industry 4.0

### *The Indian Perspective*

Wednesday, 7 August 2019: Hotel Radisson Blu, Faridabad

#### Programme

0930 – 1000 hrs	Registration / Networking Tea	
1000 – 1030 hrs	Welcome Remarks &  Case study: Sandhar Smart Manufacturing	<b>Mr. Niraj Hans</b> Convener, CII Haryana Manufacturing Panel & Chief Operating Officer (Automotive) Sandhar Technologies Ltd
1030 – 1100 hrs	Utilizing IIoT for Quality Management to achieve Zero Defects Manufacturing	<b>Mr. Harish Sandesh</b> Manager-Applications OMRON Automation India Pvt Ltd
1100– 1115 hrs	Q & A	
1115 – 1130 hrs	Tea / Coffee Break	
1130 – 1200 hrs	Presentation By	<b>Mr. Gautam Dutta</b> Co – Convener, CII Haryana Manufacturing Panel & Senior Director Siemens Industry Software India Pvt Ltd
1200 – 1230 hrs	“e-Factory - Japanese Perspective of Smart Manufacturing”	<b>Mr. Milind Gokhale</b> Senior Manager – e-Factory Solution, Automotive Business Development, Factory Automation & Industrial Division Mitsubishi Electric India Pvt Ltd
1230 – 1300 hrs	Comprehensive Industry 4.0 solution for machining industries	<b>Mr. Hardik Mistry</b> DGM – Sales & Industry Solution CERATIZIT Bengaluru Pvt Ltd
1300 – 1315 hrs	Q & A	
1315 - 1330 hrs	Summing Up	
1330 hrs	Networking Lunch / Close	

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## List of Speakers

S. No.	Name	Designation	Company	Contact No	Email
1	Mr Niraj Hans	Chief Operating Officer (Automotive)	Sandhar Technologies Ltd	9810498853	niraj.hans@sandhar.in
2	Mr Harish Sandesh	Manager-Applications	OMRON Automation India Pvt Ltd		harish.sandesh@omron.com
3	Mr Gautam Dutta	Senior Director	Siemens Industry Software India Pvt Ltd	9958660071	gautam.dutta@siemens.com
4	Mr Milind Gokhale	Senior Manager – e-Factory Solution, Automotive Business Development, Factory Automation & Industrial Division	Mitsubishi Electric India Pvt Ltd	8669689332	Milind.Gokhale@asia.meap.com
5	Mr Hardik Mistry	DGM – Sales & Industry Solution	CERATIZIT Bengaluru Pvt Ltd	9980571968	hardik.mistry@ceratizit.com

Photo gallery













**Presentations**

# Sandhar Smart Manufacturing



By. SSM Team Sandhar

## What is Industry 4.0?

**A collective term** for technologies and concepts of value chain organization.

Based on the technological concepts of

- Cyber-physical systems.
- **Internet of Things** and the Internet of Services,
- It facilitates the vision of the **Smart Factory**.
- Builds on the **Digital revolution**
- Smaller & powerful sensors
- **Machine Learning**
- Ubiquitous internet
- **Artificial Intelligence (AI)**
- Labor & Energy Cost



## Why Industry 4.0?



### Technology

- **Robotics** – Replacing humans on assembly line
- **3D Printing** – Manufacturing customized components
- **Big Data** – Collecting performance parameters
- **Analytics** – Understanding collected data



### Process

- **Constant communication** – Data exchange between components
- **Decentralized decision making** – Routine decisions
- **Standardization** – Ease of customization
- **Smart Transport System** - Automated transportation of raw material / final products



### People

- **Increased efficiency** – Reduction in labor per unit
- **Skill Development** – Up-skilling, Re-skilling, Continuous learning & Mindset change
- **Only to handle disruptions** – Monitoring and corrective actions



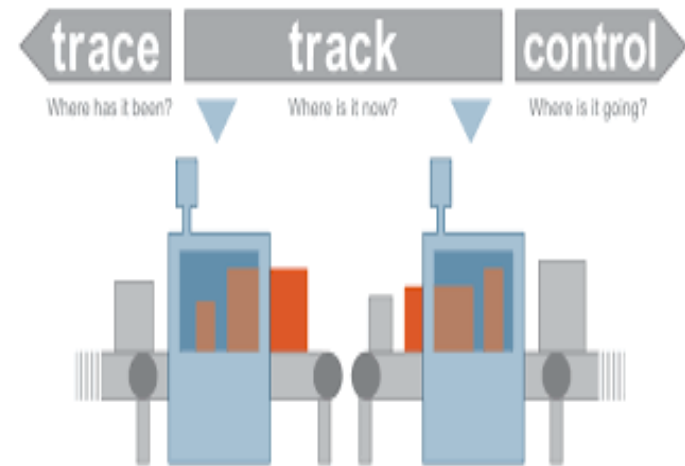
# Sandhar initiative towards Industry 4.0



## Connected Manufacturing



Assembly Automation



Material Traceability



## Connected Manufacturing

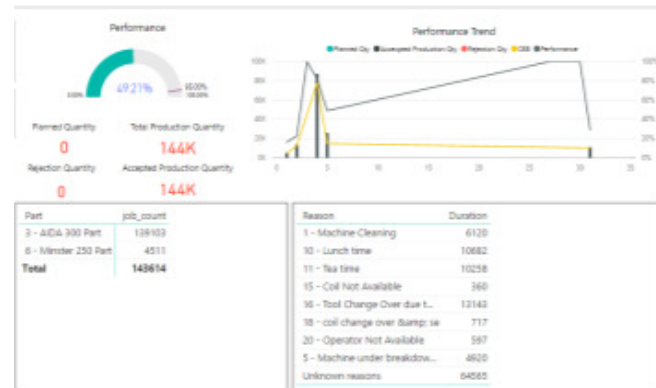
**Connected manufacturing** is a business strategy that leverages cloud computing to harness operational and business data for greater visibility, efficiency, control, and customer satisfaction. Connecting your people, processes, and supply chains gives us an end-to-end visibility and control.

**Alert , Notification, Data and Reports on real time basis.**

**Production data, Quality data, OEE, Down Time . etc,**



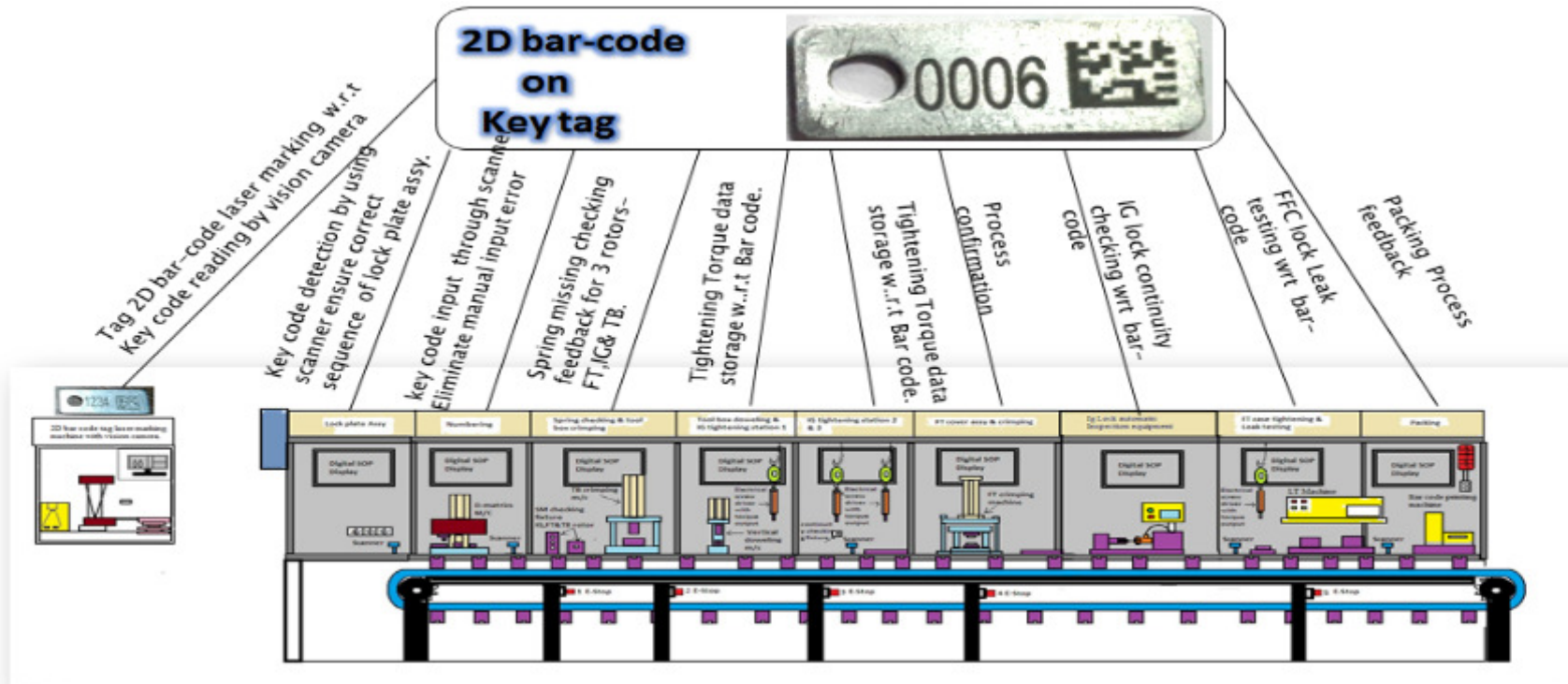
### Operator Performance analysis



### MTTR and MTBF



# Assembly Automation



## Line Features

- Testing Automation and data recording
- Rejection Part Interlocking
- Hourly out put monitoring .
- Rejection data with value .
- Poka Yoke Process Confirmation.





## Material Traceability

### Material Traceability ( Track and Trace)

- Vendor Management
- Inventory Management ( Smart Intelligent Store)
- Work in process management
- FG Management
- Warranty Tracking



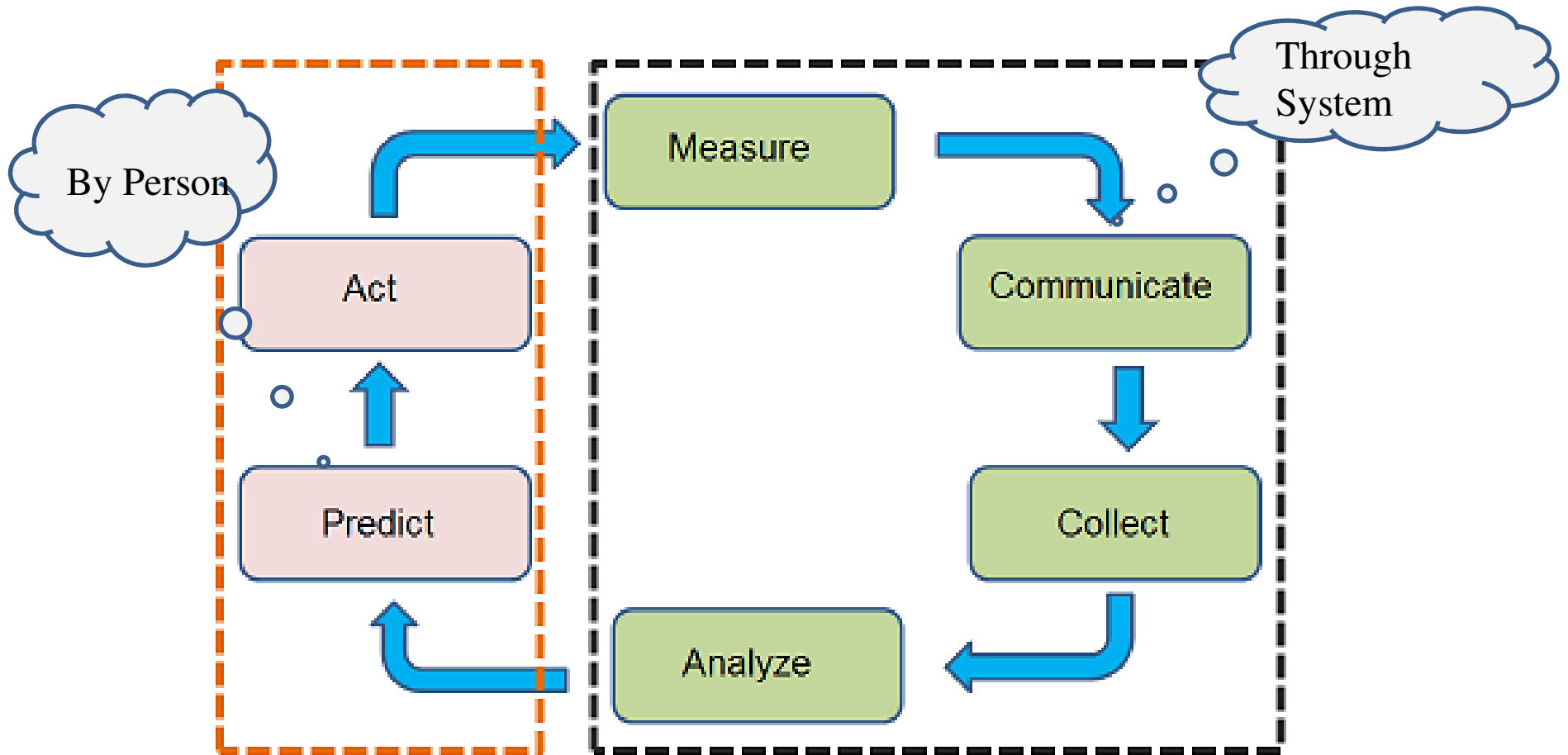
DS8178-SR

### Benefits

- Elimination of manual data entry for material receipt and Issue in all stages
- Auto up-dation of Inventory
- Auto scheduling to vendor as per material consumption
- Auto shipment note
- Minimal Difference between physical and system stock data



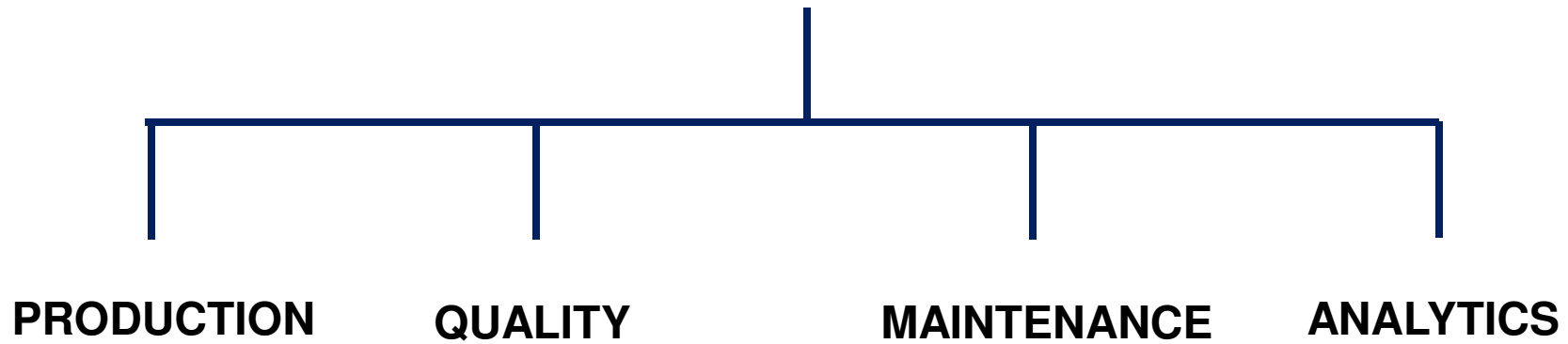
# Work Scope – Connected Manufacturing





## Scope

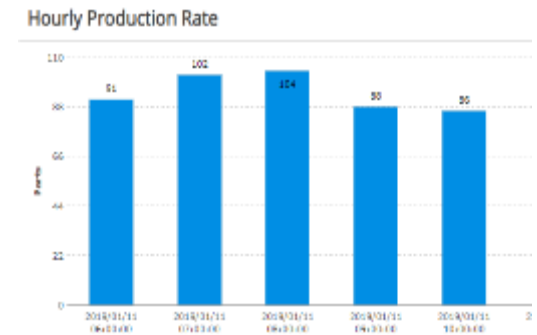
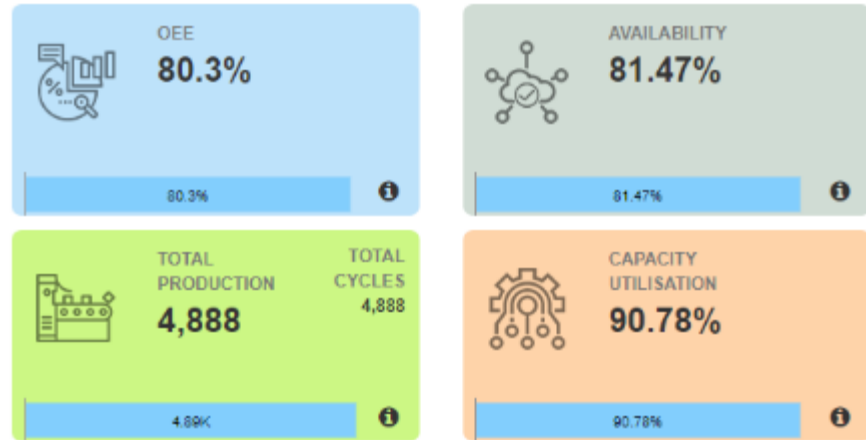
# Connected Manufacturing



- **Production monitoring**
- **Quality data recoding**
- **Maintenance alerts**
- **CBM parameter monitoring and alert**
- **Comparison of data**



## Scope - Production





## Scope - Maintenance

Electricity  
**10.11 kWh**



Hourly Electricity Consumption



### MTTR and MTBF

**Downtime in Mins by Reason**

Reason	Downtime (Mins)
4 - Machine under b...	~70
5 - Machine under b...	~30

**Number of Failures**  
**76**

**Planned Down Time**  
**6 days, 21:48:47**

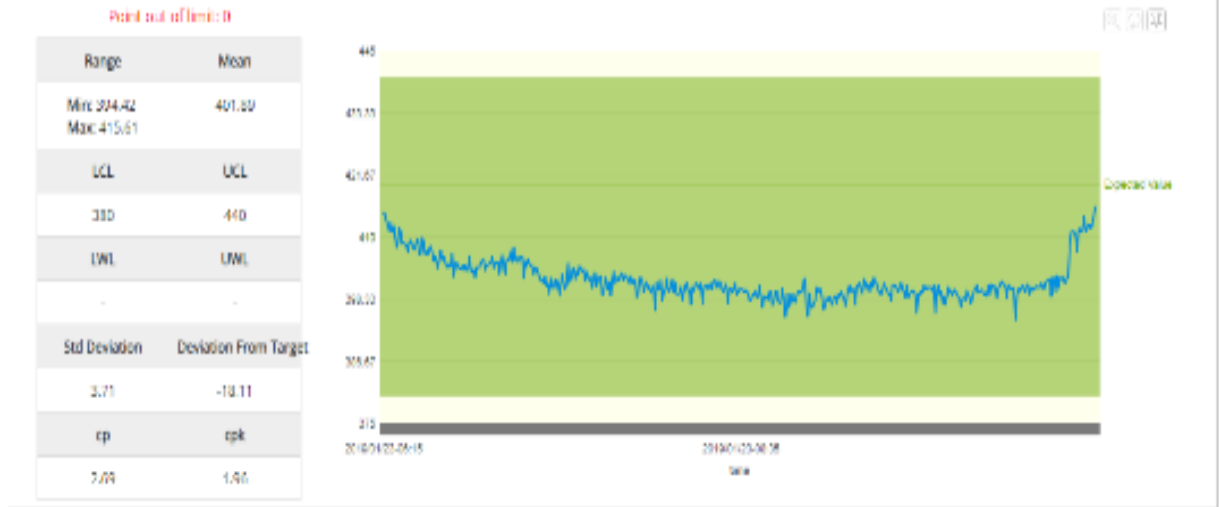
Unplanned Down Time | Operating Time

### Machine Maintenance Report

Code #	Name #	Health Remaining	Last Maint. Time	Cycles Since Last Maint.	Maint. Threshold	Likely Maint. Due Time	Actions
Anterior Diaphragm Die	Anterior Diaphragm Die	49751 cycles	2016/10/02 06:30	269	50000	2043/01/11 21:35	<a href="#">↗</a> <a href="#">🗑</a>
Gear Grinder	Gear Grinder	15409 cycles	2016/10/02 06:30	9541	25000	2017/02/14 13:39	<a href="#">↗</a> <a href="#">🗑</a>
Press Trimmer	Press Trimmer	5459 cycles	2016/10/02 06:30	9541	15000	2016/12/02 10:47	<a href="#">↗</a> <a href="#">🗑</a>
Drill bit 25mm	Drill bit 25mm	33000 cycles	2016/10/02 06:30	0	30000	NA	<a href="#">↗</a> <a href="#">🗑</a>



## Scope - Quality





## Scope - Analytics

Cell Line#  
Milling

Show 5

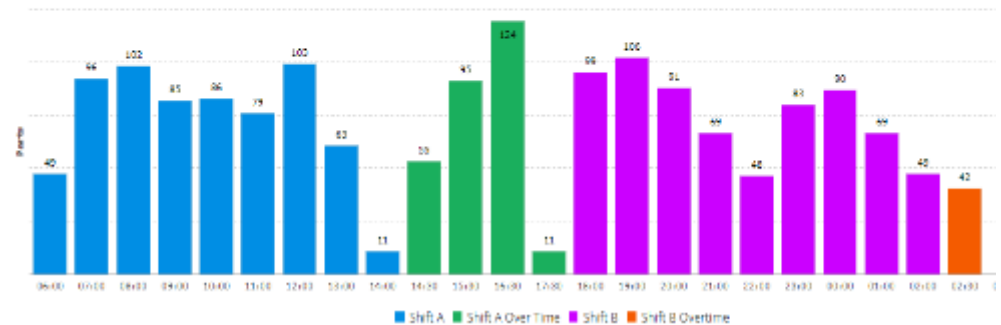
Workcenter Name #	Health Remaining %	Mant. Threshold (hours)	Last Maint. Time	Next Maint. Due Time	Actions
Milling 1	100% (100 hours)	1000	2018/07/14 23	2019/04/05 09:10	
Milling 2	100% (100 hours)	1000	2018/07/14 25	2019/07/11 07:24	
Milling 3	100%	100	NA	NA	
Milling 4	100%	100	2018/08/18 01	2019/03/02 09:47	

### Hourly P/E/C

Workcenter#  
Moulding 1

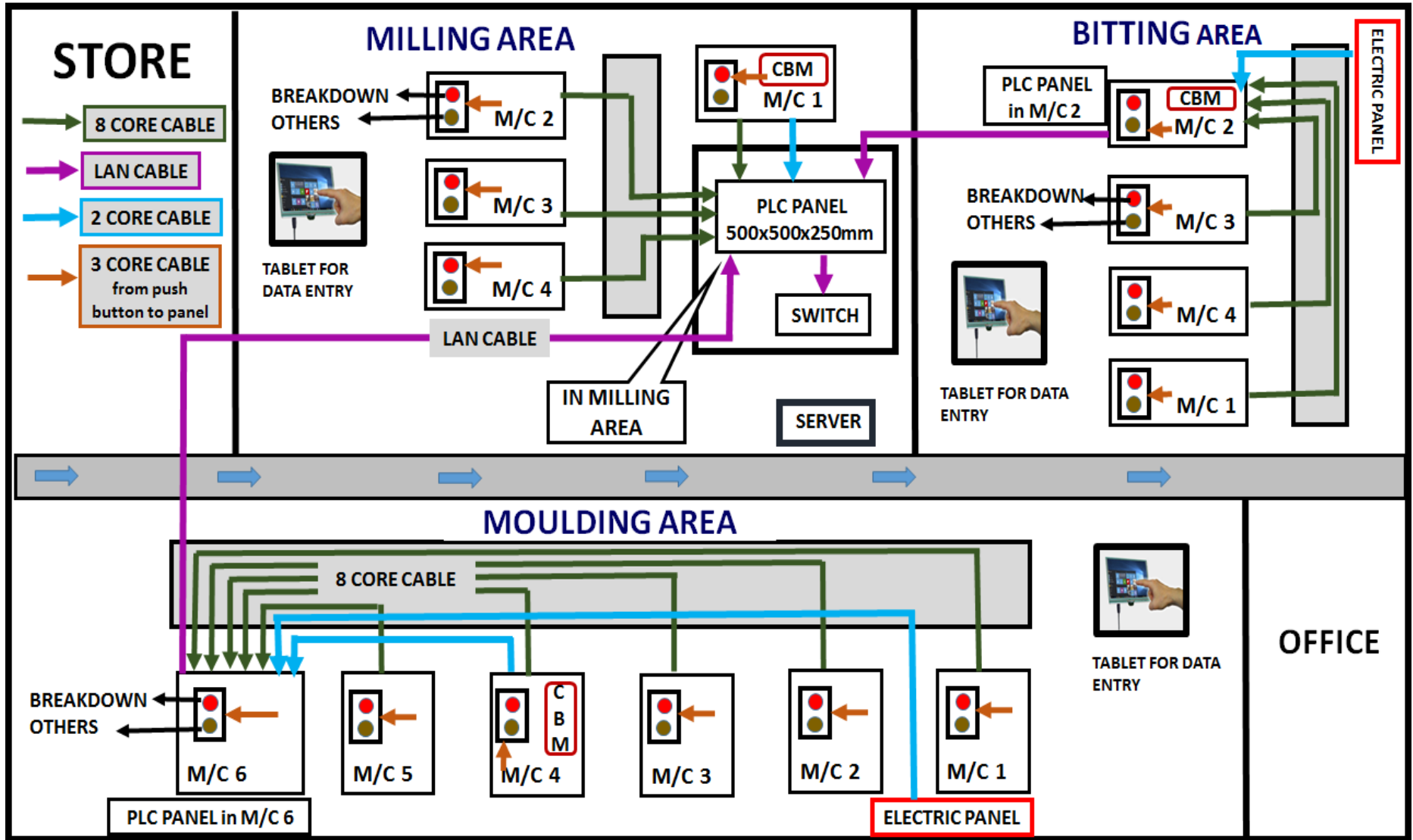
Date  
2019/01/21

### Hourly Production Rate





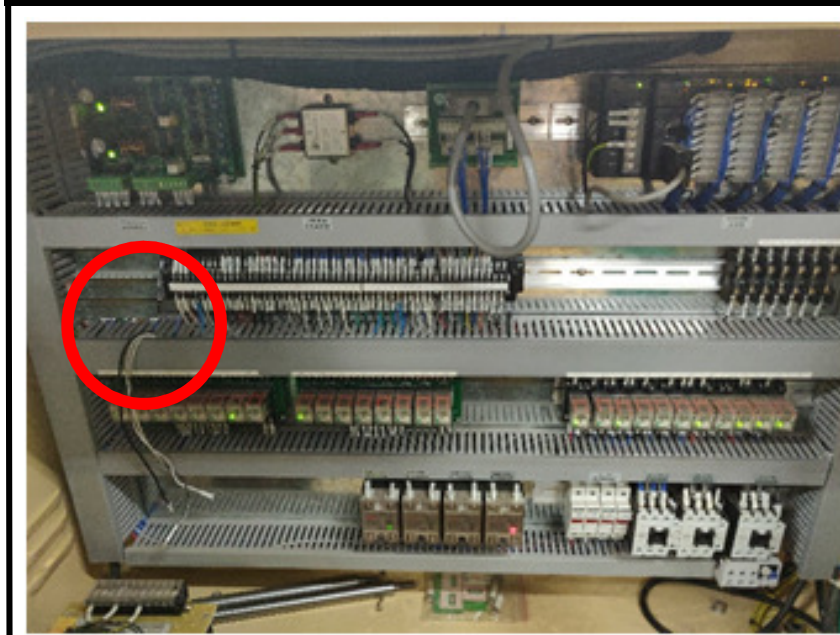
# Key Section Layout with wiring detail- After



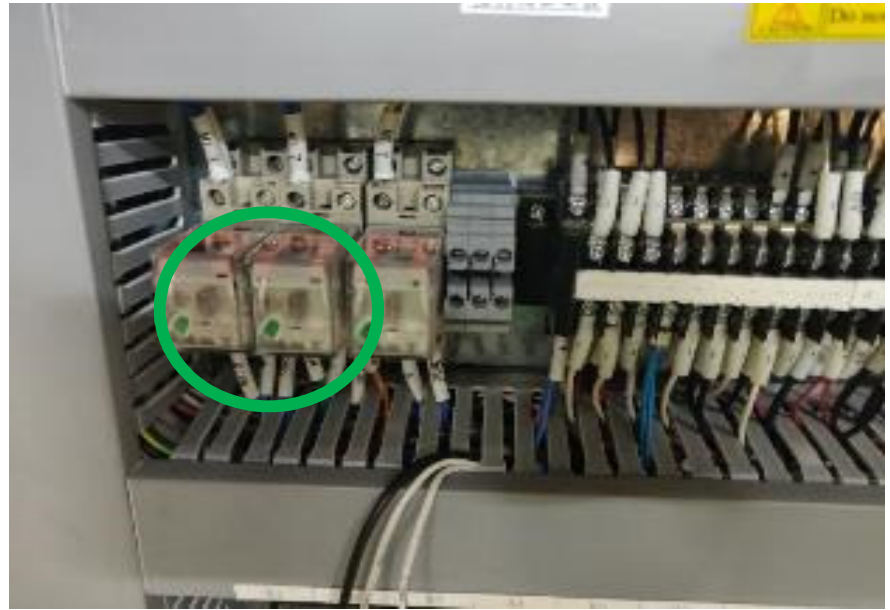




# For Production Data – All machine



**Before**



**After**

Relay added in Each machine for getting production count , up time and running detail of each machine.

## For Breakdown Data – All Machine



**Before**



**After**

- 2 Nos. Push Button added for monitoring of down time
- 1- Unplanned Down time - Breakdown Alert
- 2- Planned down time – Tool Changeover



# For Data Collection – Each Section Milling, Biting and Moulding



PLC Panel installed

## For CBM Data – Motor Working Milling Machine –1



**Before**



**After**

Current transducer and Energy Meter added for Motor working Monitoring

- 1- Cutter Motor
- 2- Slider Motor



## For CBM Data – Lubrication Oil level Milling Machine –1



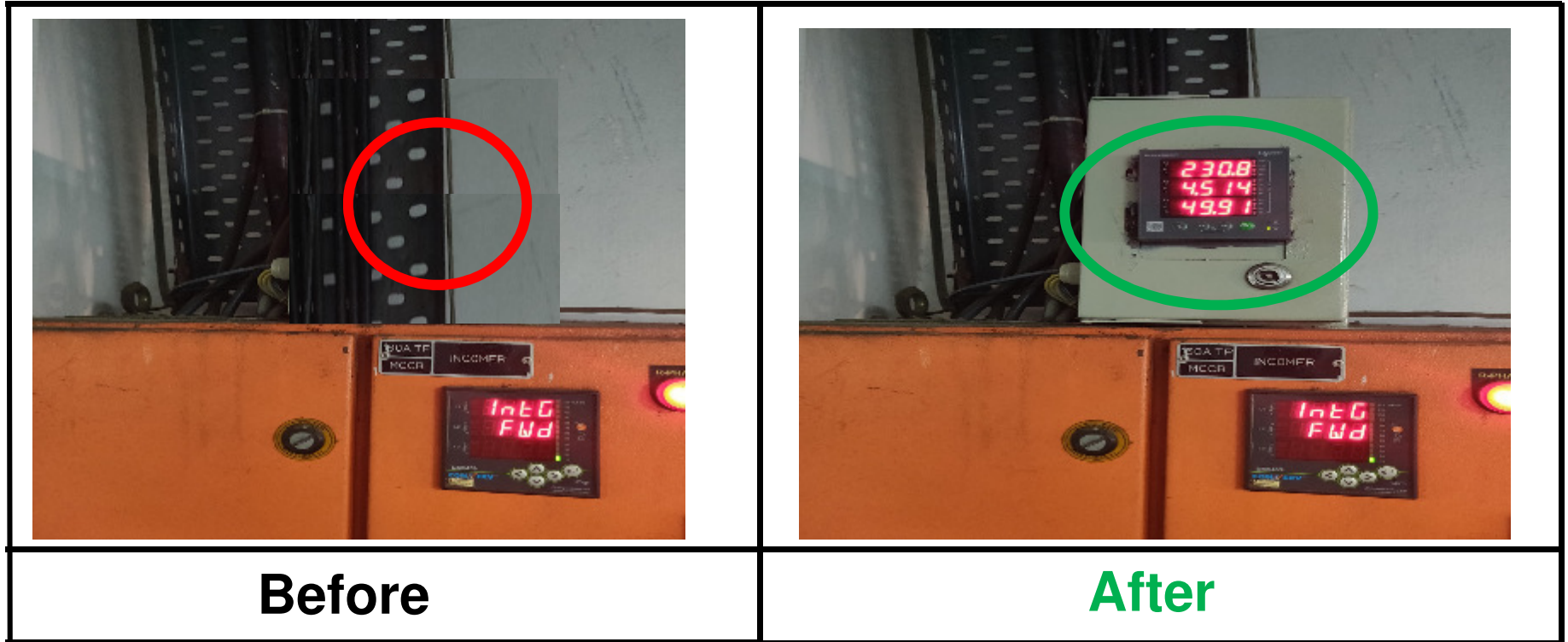
**Before**



**After**

Capacitance level sensor installed for lubrication oil level monitoring

## For CBM Data – Biting Section Voltage and Current



The electrical parameters that Energy Meter will measure are Voltage, Current and frequency



# Go live on 15<sup>th</sup> April.19





## Motivational Section Live Dashboard

**Sandhar Initiative**  
Section Dashboard



Jul 17th, 2019  
Wed, 12:27:05 IST



### Workcenters

Cell	Workcenter	Part	Prod Qty	OEE	Status	Achiever
Moulding	Moulding-1	P-16 Amba (C Type)	541	89.44%		
	Moulding-2	P-16-Hero (C Type)	497	84.74%		
	Moulding-3	KVHG (C Type)	563	91.70%		
	Moulding-4	MAHINDRA & MAHINDRA (A Type)	568	91.90%		
	Moulding-5	KZNA-Hero (A Type)	447	78.46%		
	Moulding-6	KWAG-Hero (C Type)	598	97.41%		

### Legends

Machine running with achieved OEE Target of 90%

Machine stop due to planned downtime

Machine running below OEE Target of 90%

Machine stop due to unplanned downtime





## Alerts / Notifications on real time basis

### Machine breakdown E-mail to Maintenance

**Sandhar Initiative**  
Operator name on Breakdown notification slip

Moulding-3 is Under Breakdown : Operator - Gopal - Message (HTML)



FILE

MESSAGE



Tue 09-04-2019 08:14

Datonis <datonis@altizon.com>

Moulding-3 is Under Breakdown : Operator - Gopal

To raghvendra.singh@sandhar.in; shubham.rai@sandhar.in; rashmi.tripathi1@sandhar.in

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.



A rule [Push Button 1 Pressed Alert for Breakdown](#) was triggered at 2019/04/09 08:13:41. You can access details [here](#).

#### Thing Details

<b>Thing key</b>	ec61b9d578
<b>Name</b>	Moulding-3
<b>Thing Template</b>	<a href="#">Moulding</a>
<b>Thing details</b>	<a href="https://www.datonis.io/things/ec61b9d578">https://www.datonis.io/things/ec61b9d578</a>



## Preventive Maintenance Alert

Workcenter Name	Health Remaining	Maint. Threshold (hours)	Last Maint. Time	Likely Maint. Due Time	Actions
Milling-1	386.29 hours	1650	2019/03/28 14:00	2019/08/20 10:46	
Milling-2	1427.60 hours	1650	2019/07/01 20:00	2019/10/26 07:36	
Milling-3	803.36 hours	1650	2019/05/02 08:15	2019/09/27 19:55	
Milling-4	353.57 hours	1650	2019/03/23 10:00	2019/08/18 04:52	

« < 1 > »

Showing Page 1 of 1

Show 10 ▾

Search for...

Workcenter Name	Health Remaining	Maint. Threshold (hours)	Last Maint. Time	Likely Maint. Due Time	Actions
Bitting Feeder Line	NA	NA	NA	NA	
Bitting-1	1462.31 hours	1650	2019/03/03 18:00	2022/06/09 11:23	
Bitting-2	1246.32 hours	1650	2019/06/16 17:20	2019/10/20 16:04	
Bitting-3	1297.87 hours	1650	2019/06/18 17:45	2019/10/31 16:05	
Bitting-4	1113.25 hours	1650	2019/06/09 17:35	2019/10/03 22:34	

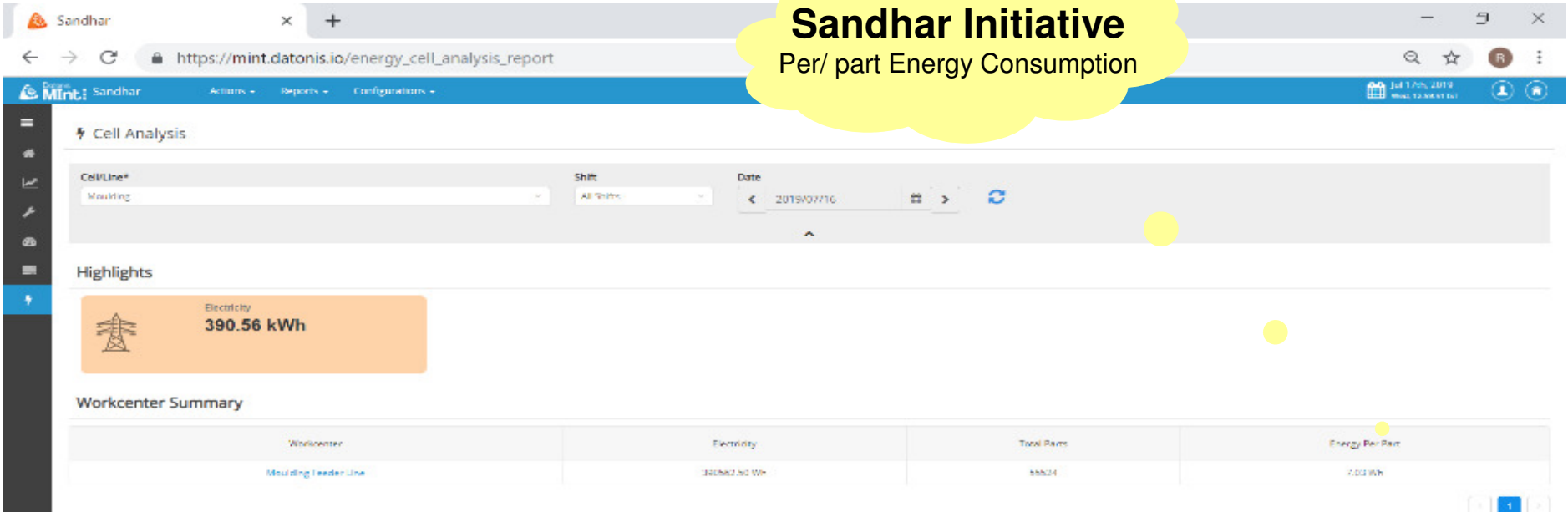
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Showing Page 1 of 1



## Daily Energy Consumption

**Sandhar Initiative**  
Per/ part Energy Consumption

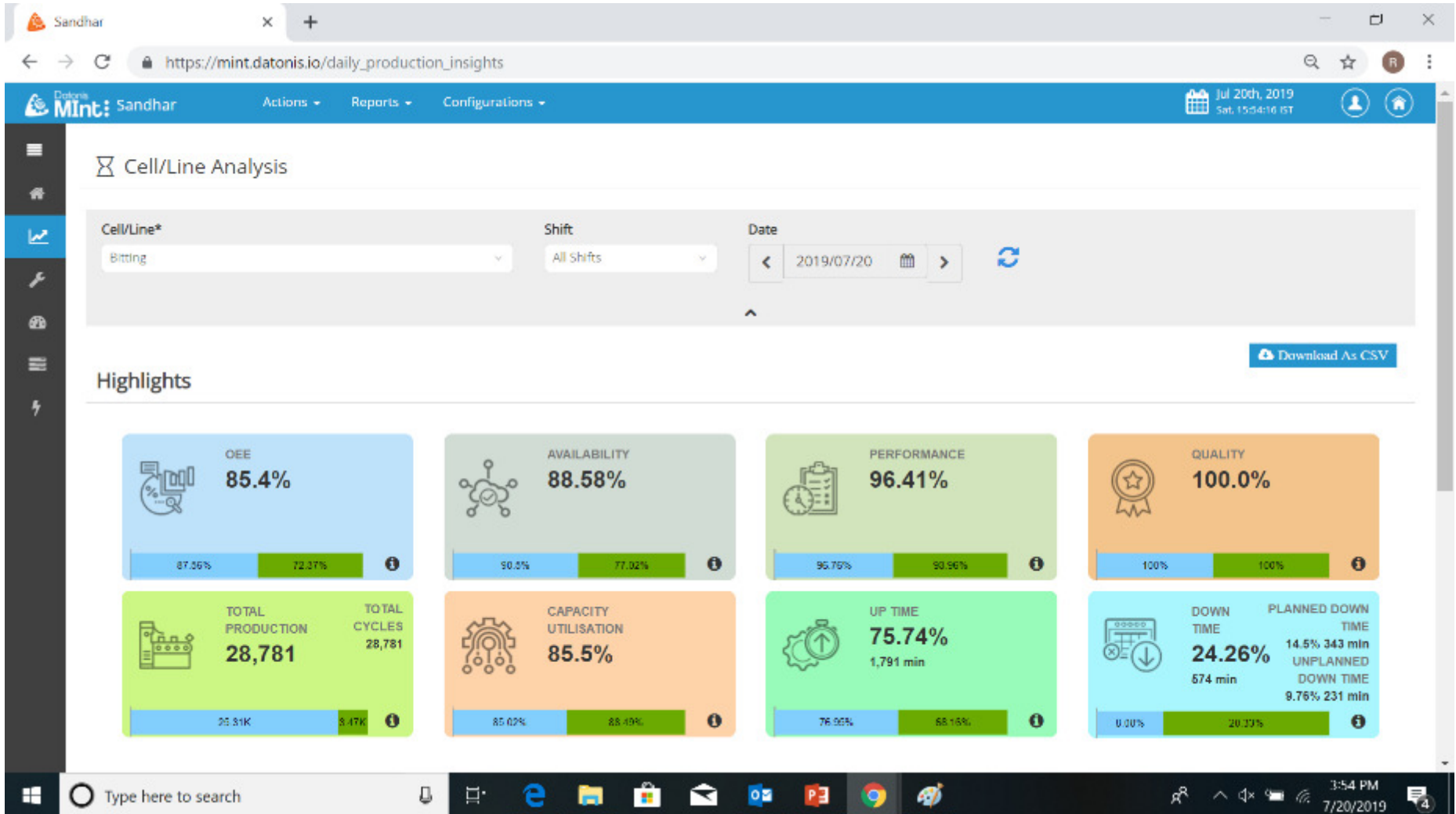


## Section wise Hourly Electricity Consumption



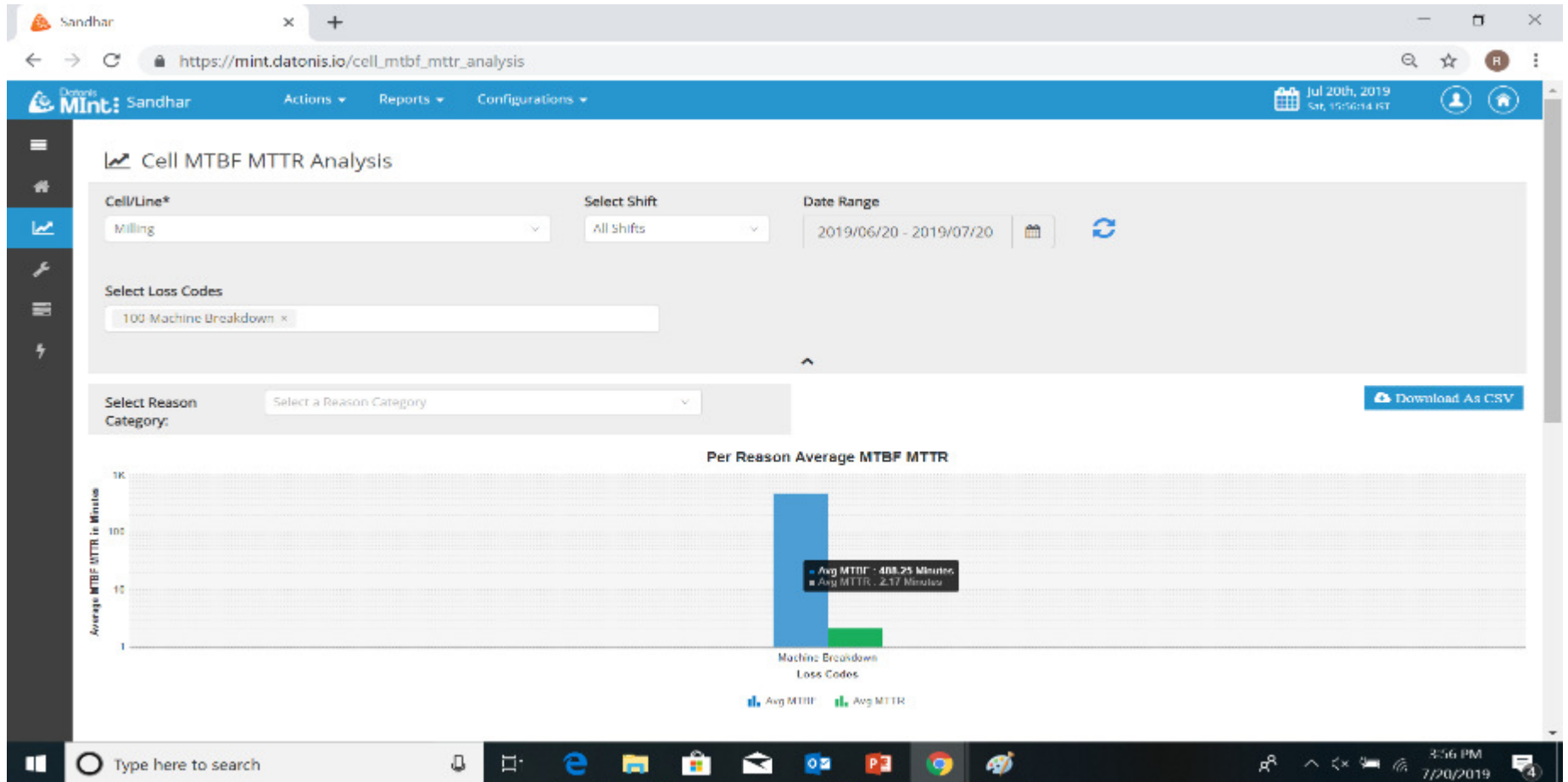


## Section Wise Report





## Section wise MTBF / MTTR report



■ MTBF

■ MTTR



## Machine Wise History Card

**Sandhar Initiative**  
Machine History Card

The screenshot shows a web browser window displaying the 'Machine History Card' page. The browser address bar shows the URL: https://mint.datonis.io/sandhar\_maintenance\_breakdown\_report. The application header includes 'Mint: Sandhar' and navigation options like 'Actions', 'Reports', and 'Configurations'. The main content area is titled 'Machine History Card' and features a filter section with 'Workcenter\*' set to 'Ritling-3' and 'Date Range' set to '2019/01/23 - 2019/01/22'. Below this is a 'Highlights' section with a table showing machine details.

Machine Name	Ritling 3	Description	ACS 2011
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The 'Maintenance History' section includes a 'Show 10' dropdown and a table with the following data:

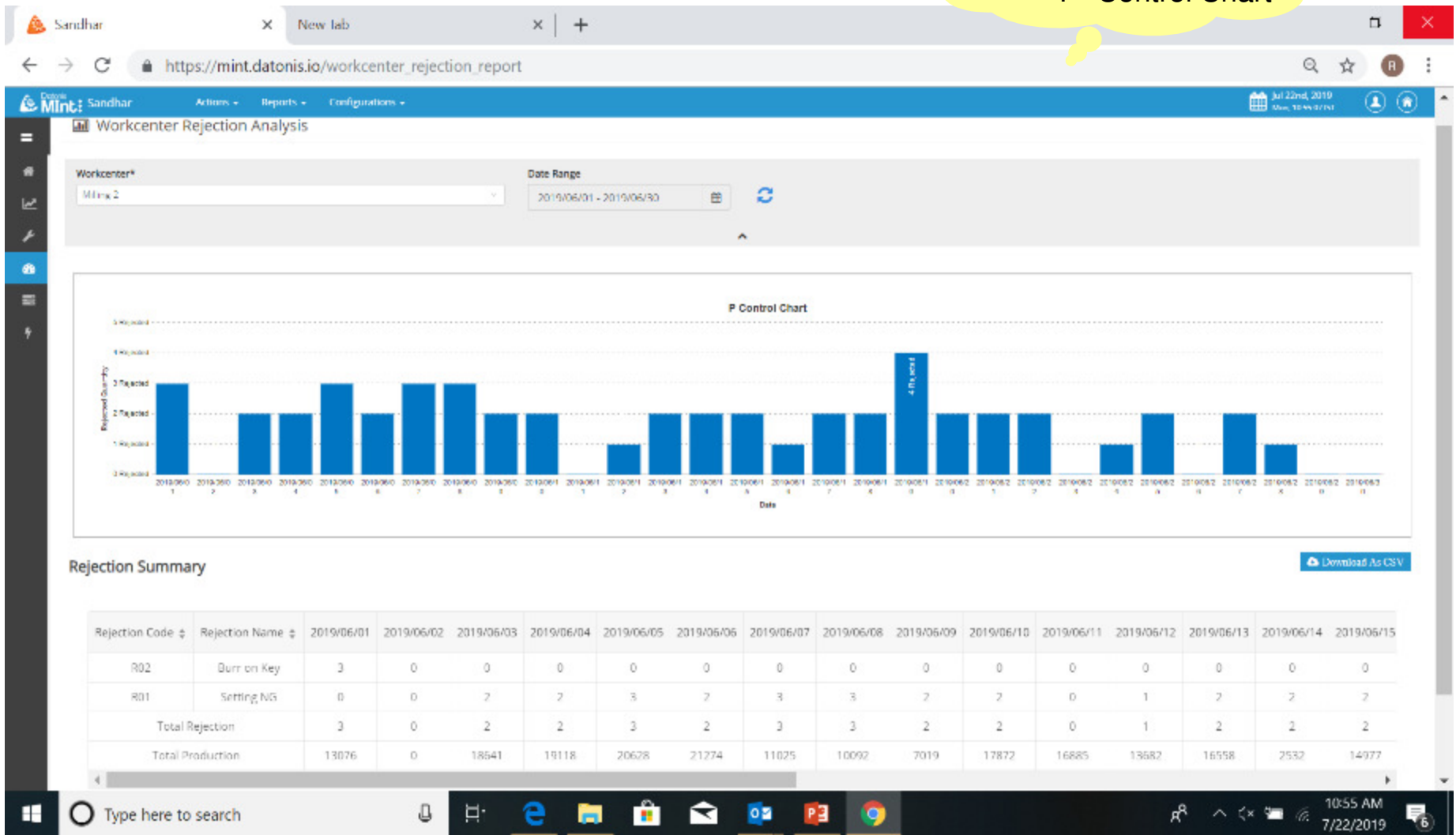
Maint. Start Time	Maint. End Time	Maint. Duration (hours)	Maint. Threshold (hours)	Maint. Details	Maint. Done By	Problem Details	Work Done	Spare Used
2019/06/18 16:40	2019/06/18 17:45	1.08	1650	Preventive Maintenance	Sukhender, Sanjeet		1- All sensors checked and tightened 2- Servo motor Checked and chuk-nut Tighten 3- FRL unit cleaned 4- Electrical panel cleaned with blower and checked 5- Marking unit checked	
2019/02/26 16:30	2019/02/26 17:20	0.83	1210	Preventive Maintenance	Dharmpal		1- Voltage and Current of Motor Checked 2- Bearing Check 3- Air Pressure Checked 4- Nut and Bolt Tightening 5- Greasing	

The interface also shows a pagination control at the bottom of the table indicating 'Showing Page 1 of 1'.



## P- Control Chart

Sandhar Initiative  
P- Control Chart





## SPC

Sandhar Initiative  
SPC

Sandhar × + https://mint.datonis.io/spc\_report

Mint: Sandhar Actions Reports Configurations Jul 22nd, 2019 May, 2019

### SPC Report

Workcenter\*:  Date Range: 2019/07/08 - 2019/07/11

Part\*:  Inspection Policy\*:  Policy Parameter\*:

#### Quality Control Limits

Part Name	Part Number	Characteristic	Specific Dimension				Instrument	UCL	LCL
			USL	LSL	UWL	LWL			
P-60 (A Type)	COSMMK0130002	Depth Dimm.	0.85	0.75		Profile Projector	0.82	0.80	

#### Process Capability

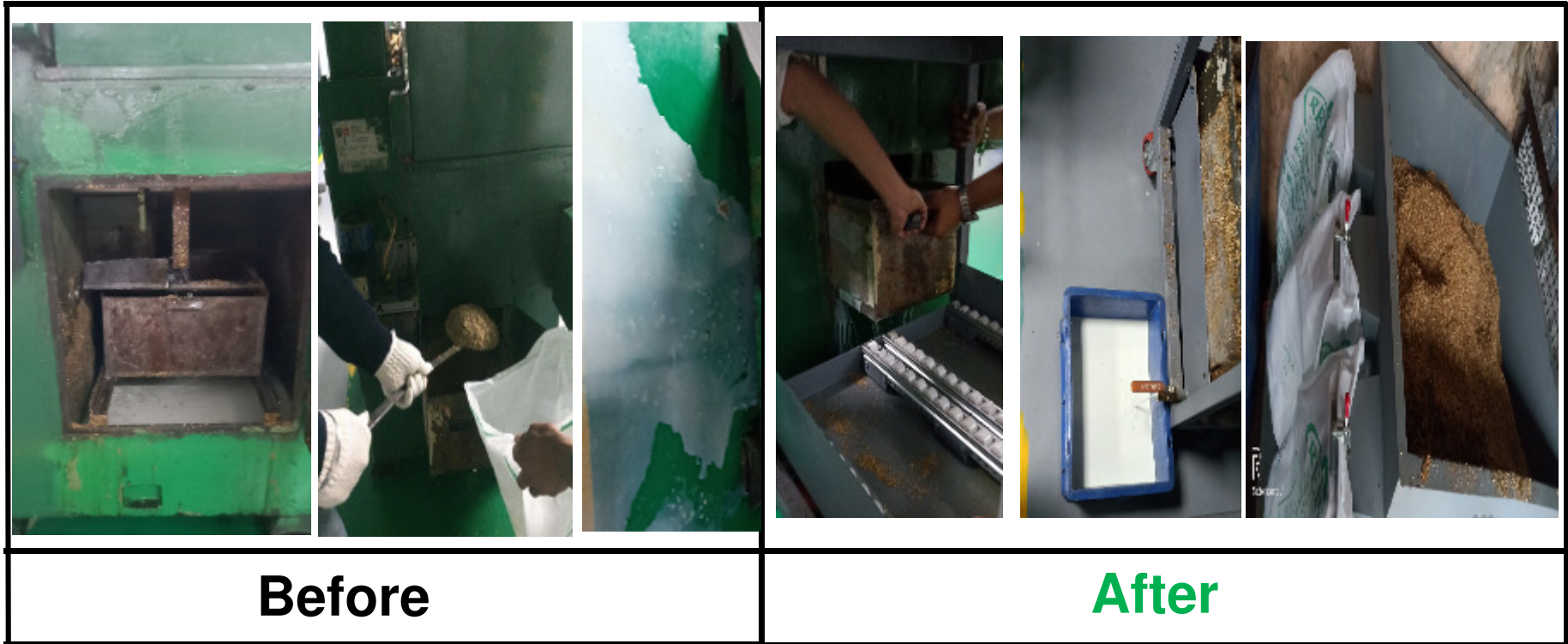
Name	Value
Cp	1.72
Cpk (Upper)	1.37
Cpk (Lower)	2.06
Cpk (Hnal)	1.37
UCLx	0.82
LCLx	0.80
UCLR	0.04564
LCLR	0

SPC norms for cpk	
Range	Status
Less than 0.05	Reject
0.50 to 0.99	Check
1.0 to 1.32	Needs Improvement
1.33 to 1.66	OK
More than 1.67	Excellent

Type here to search 4:51 PM 7/22/2019



## Milling Brass Scrap Process- Scrap removal and filling

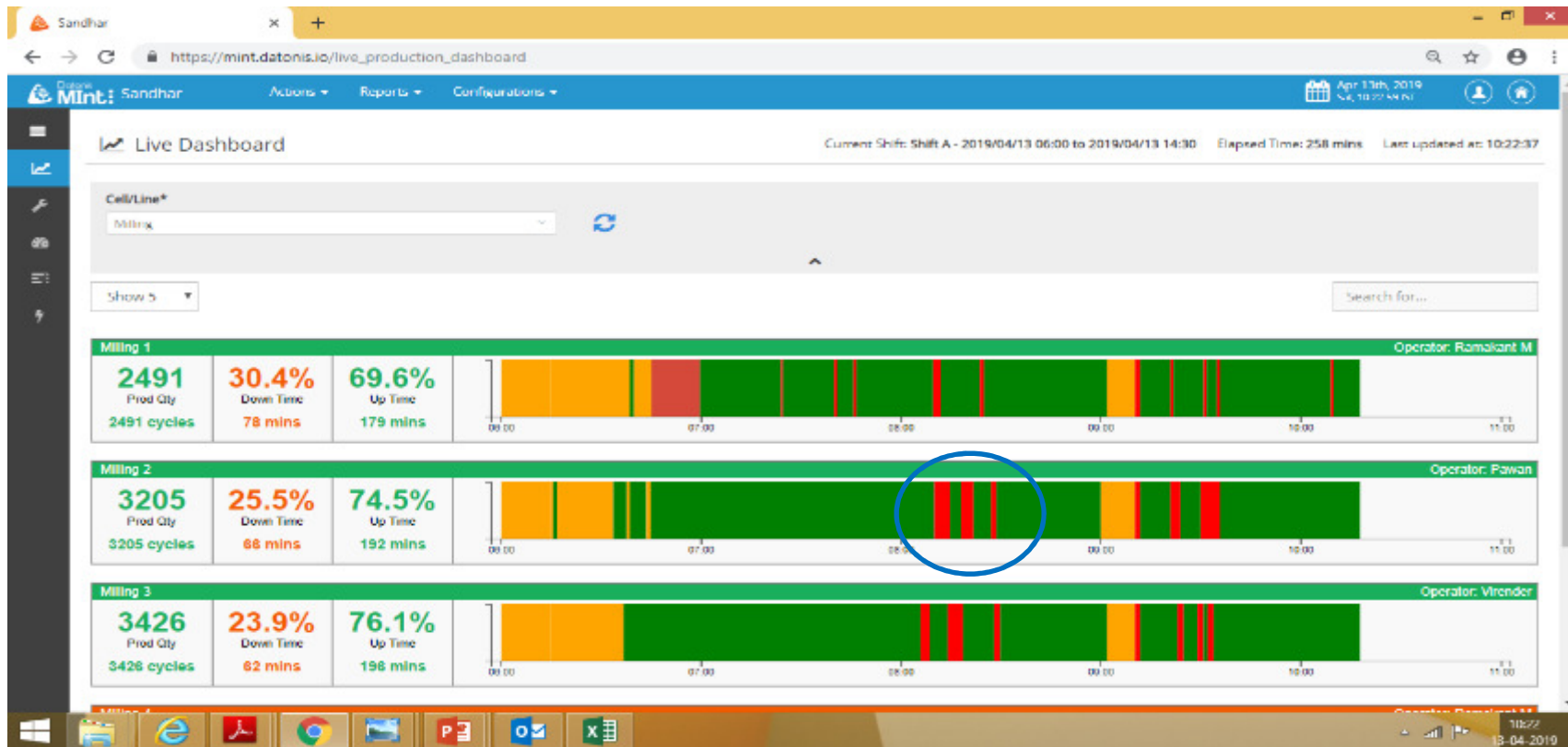


Pull the container  
 Filling of scrap on sack on machine  
 itself .  
 Coolant seepage on floor and waste  
 Machine stop

Pull the filled container on trolley.  
 Insert empty container on machine.  
 Coolant Collection from trolley  
 Filling of scrap on sack in scrap yard  
 through lifter  
 Machine not stop



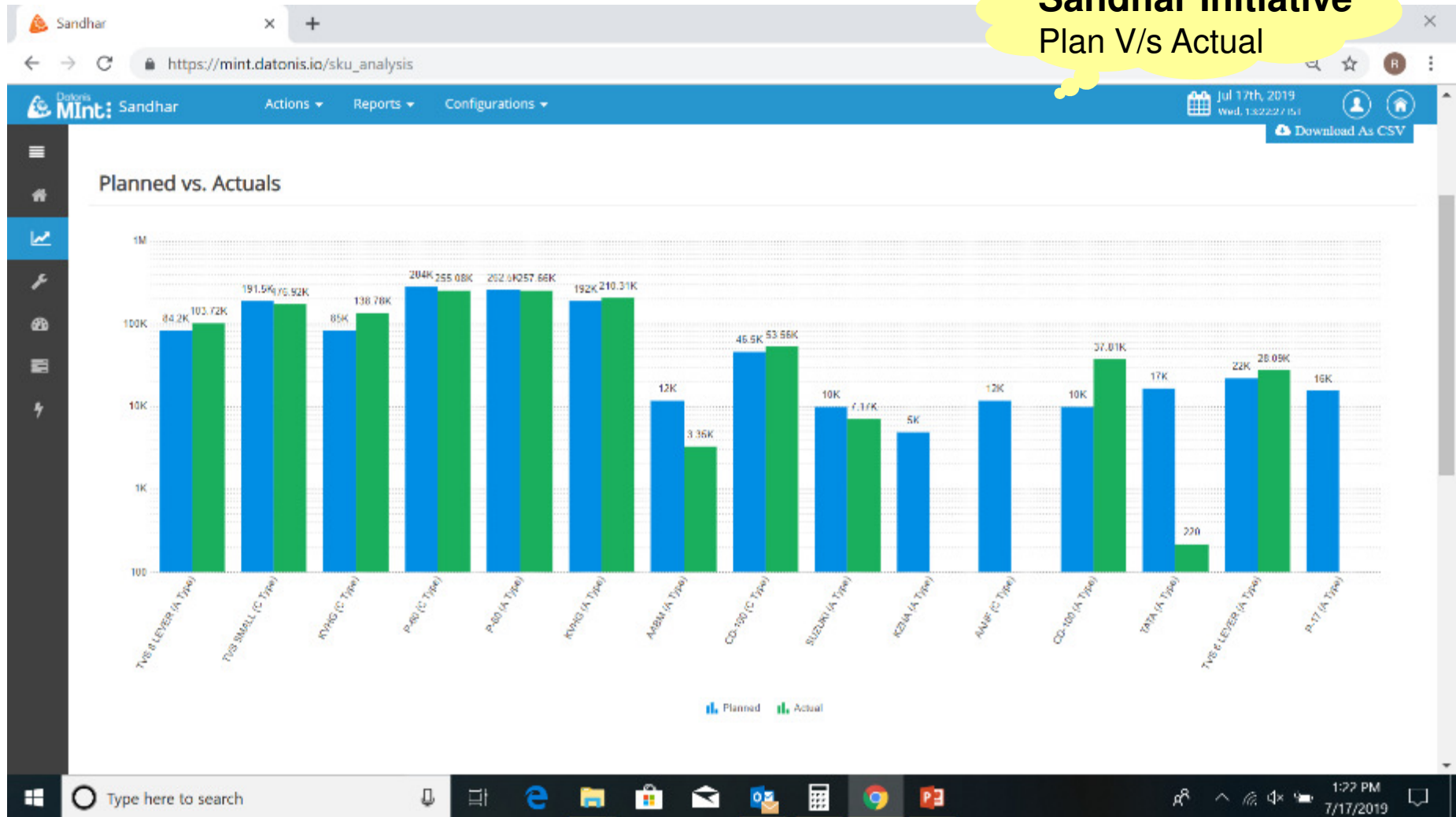
## 3-Visualization Benefit – Small time loss





## 4- Analytics Benefit – Planning Analysis

Sandhar Initiative  
Plan V/s Actual

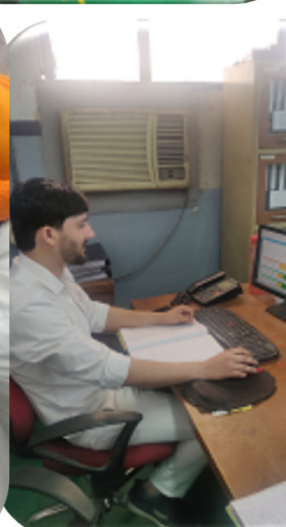
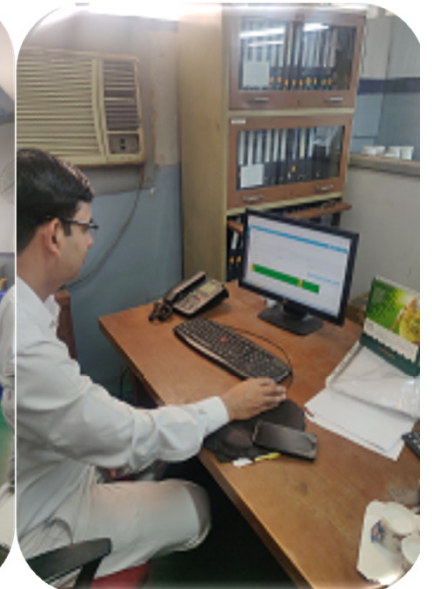


PLAN

ACTUAL



# SSM Team Working





# SSMART





- **Feedback**
- **Suggestion**
- **Query if any**

**Thank You**

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