



Adroit
Technologies



Adroit Enterprise OEE

Product Description

Adroit

MITSUBISHI
ELECTRIC
FACTORY AUTOMATION

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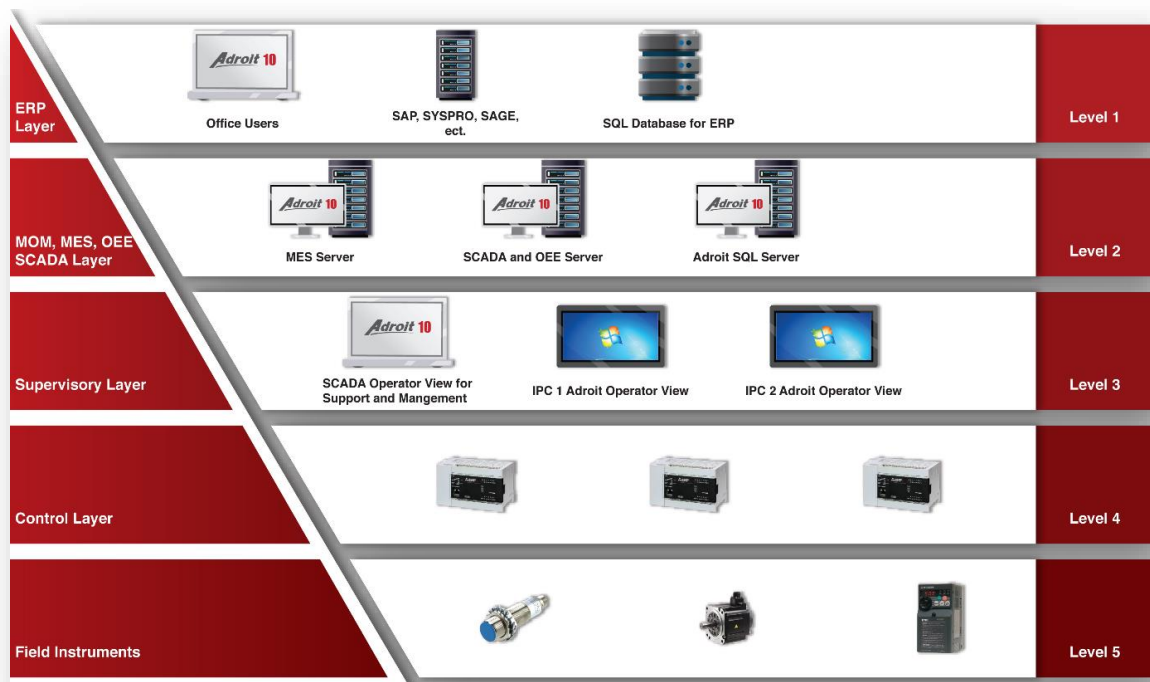
1 Introduction

1.1. Now you can measure your performance

The Enterprise OEE is a vertical product that seamlessly integrate with an existing SCADA system or can be implemented as a Stand-alone product. If implemented with the existing SCADA it however requires its own licences and is not price with the tag configuration as the SCADA although it do add additional Scan points to the system.



The Enterprise OEE takes Raw inputs from a front end devices like a Programmable Logic Controller (PLC) and store the information in a structured way in the SQL database from where it can be analysed through reports to provide clear and accurate data on the customers process performance.



The process performance can be broken down into the performance of a group of factories, a factory, a division, a zone, a group, a cluster of machines, an individual Machine and as low as the performance of the individual operator. The performance of the setters, maintenance and quality also can be analysed with the Enterprise OEE.

2 OEE Principles

The adroit OEE Enterprise is built on the 3 pillars of OEE which are:

- Quality,
- Performance and
- Availability

and we do measure all 3 these conditions to obtain the overall OEE of the factory, zone, machine, or operator.

The operator is forced through its interface to load a works order which is captured in the system by the ERP or the production Planner.

After loading the works order the operator will start the Machine if there are no fault conditions on the machine that he must log.



OEE can be used on one machine or single equipment as well as on multiple equipment lines as well as the entire factory with multiple equipment.

It is suitable for all types of manufacturing processes including discrete, continuous or batch.

Adroit Enterprise OEE has built-in management and real-time performance reporting and early detection of problems means less downtime and production losses.

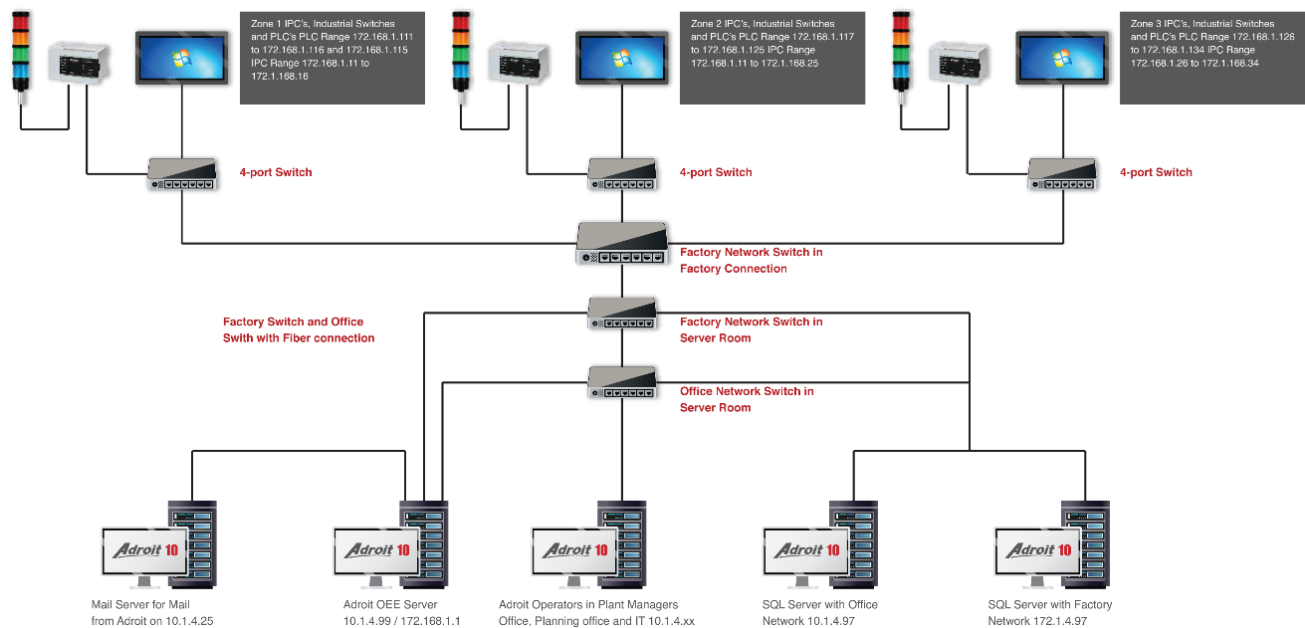
With Adroit Enterprise OEE, companies can anticipate events that represent efficiency and savings – allowing focus on preventative maintenance, machine failure root cause etc.

Live data provided by the Adroit Enterprise OEE solutions can provide insights and knowledge to reduce unplanned downtime, increase throughput speed and quality whilst identifying unplanned stoppages that ultimately lead to greater profitability.

3 Hardware Requirements

The system consists of 2 servers connected to the Factory network and on the factory side it consists of a Mitsubishi PLC, an IPC, and a small switch per line or machine.

The factory side also need a dedicated switch to distribute between the different machines. Below is a typical network diagram of the Enterprise OEE as well as the automation layers in which the product is deployed.



4 Software Requirements

The following software packages are required:-

- Mitsubishi GX Works 3 (PLC Programming)
- Adroit 10 SCADA
- Windows 10 for all IPC's
- Windows Server Operating Systems for both the SQL and Adroit Servers
- MS Office 32 Bit with Outlook for Adroit Server (Emailing reports etc)
- Microsoft SQL Server 2017 (Standard or Enterprise)
- SSMS SQL server Management Studio (FREE)
- SSRS SQL Server Reporting Services (FREE)
 - SQL Server Information Tools (FREE)
 - Visual Studio Community Version (FREE)
 - Microsoft Server Data Tools (FREE)

5 System Overview

The system does cater for 3 deferent scenarios of when to log the active delays on the system.

First scenario

is the operator can book whenever he do have time and there is no interlocking of the machine,

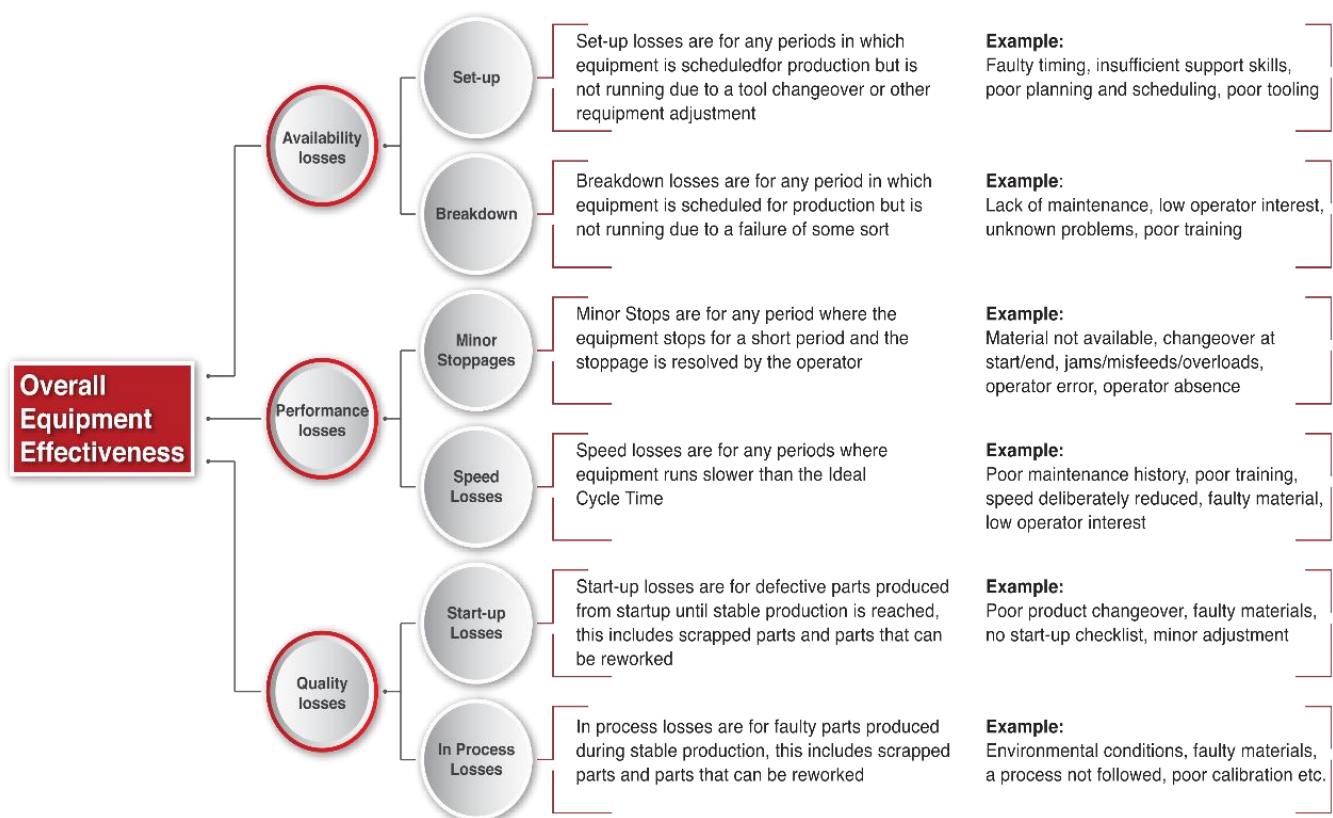
Second scenario;

he must log all his delays before he can start a new works order and the machine will be interlocked till all is booked of the previous order and

Third scenario

the operator must book the delays immediately before he can continue with the works order and will not be able to start the enterprise OEE before the order is booked.

We also install stack light at each machine for quick reference by management if they walk through the factory to be able to see the state of the working machine instantly.



The performance of each machine is showed for the present order the operator is busy producing by 4 dials on the operator view The operator can also see info on the operator view of the current order the stoppages or delays the next orders in the system and its projected target if he continue with his current speed

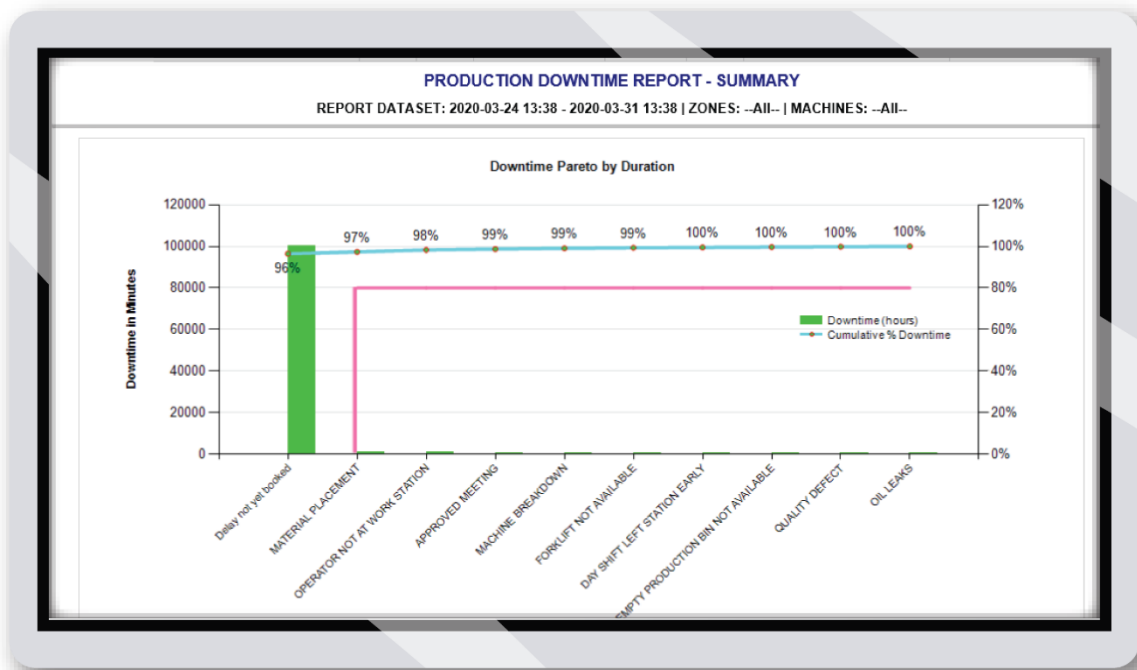


The other info will be the state of the OEE and the production figures. There is also info on the system health as well as the buttons for the support departments when they do log on to do maintenance and quality checks.

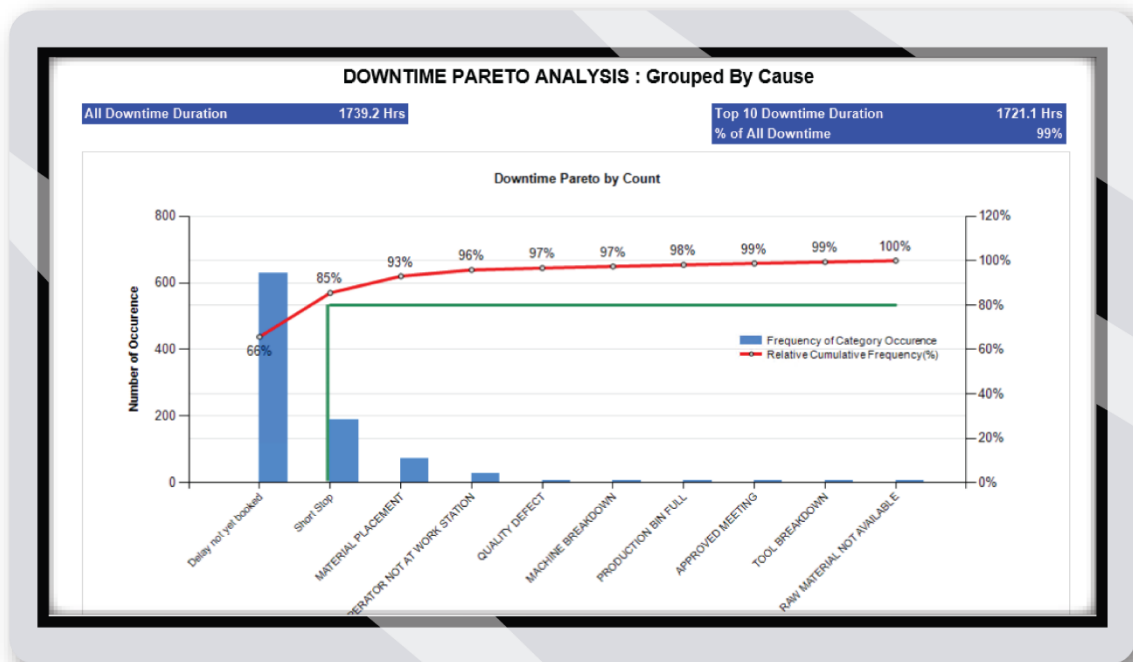
Implementation of the product is done with the assistance of Object model to minimise engineering cost and the product is launched as an install containing the object model.

6 Reporting

The SQL reporting is done in SSRS and we ship some custom reports with the enterprise OEE. Reports is setup that the users can select its own time frame and parameters for the information to be returned only of which he is interested in.



The OEE will clearly show orders in the system, Orders done, time frames in which the orders were completed, the overall OEE, Performance, Quality and availability of the areas selected. It will also show the stoppages with the reasons entered by the operator for the stoppages.



We can now analyse the data and see what the 5 biggest stoppages reasons for a period per machine was, per zone, per department or per factory and centralise the effort to eliminate these stoppage, irrespective if they were caused by maintenance, quality or operators.

Code Number	System Name	Downtime (Minutes)	% Time	% Cumulative Time	Number of Breakdowns	MTTR	Frequency	MTTR	Action Plan	Who	When
1	Delay not yet booked	100,028.5	96.43%	96.43%	628	159.28	Chronic	Acute			
2	MATERIAL PLACEMENT	949.1	0.92%	97.35%	72	13.18	Under Control	Under Control			
3	OPERATOR NOT AT WORK STATION	935.4	0.90%	98.25%	27	34.65	Under Control	Under Control			
4	APPROVED MEETING	460.3	0.44%	98.69%	6	76.71	Under Control	Under Control			
5	MACHINE BREAKDOWN	371.5	0.36%	99.05%	7	53.07	Under Control	Under Control			
6	FORKLIFT NOT AVAILABLE	278.4	0.27%	99.32%	3	92.81	Under Control	Under Control			
7	DAY SHIFT LEFT STATION EARLY	197.6	0.19%	99.51%	4	49.40	Under Control	Under Control			
8	EMPTY PRODUCTION BIN NOT AVAILABLE	177.6	0.17%	99.68%	2	88.78	Under Control	Under Control			
9	QUALITY DEFECT	177.3	0.17%	99.85%	8	22.16	Under Control	Under Control			
10	OIL LEAKS	151.8	0.15%	100.00%	2	75.92	Under Control	Under Control			

March 31, 2020

The data is clearly showing the problem areas in the manufacturing environment and will lead to better efficiency, better maintained equipment, better quality as well as more productive personnel as every aspect of the process is now monitored.

Zone 1	Zone 2	Zone 3
Press01 A: 0% P: 0.7% Q: 0% OEE: 0.7%	***Press02*** A: 0% P: 0% Q: 0% OEE: 0%	***Press03*** A: 0% P: 0% Q: 0% OEE: 0%
Press04 A: 0% P: 0% Q: 0% OEE: 0%	Press05 A: 0% P: 0% Q: 0% OEE: 0%	Press06 A: 0% P: 0% Q: 0% OEE: 0%
Press15 A: 96% P: 1.8% Q: 0% OEE: 1.7%		
Press14 A: 0% P: 0% Q: 0% OEE: 0%	Press13 A: 0% P: 0% Q: 0% OEE: 0%	Press12 A: 0% P: 0% Q: 0% OEE: 0%
Press11 A: 0% P: 0% Q: 0% OEE: 0%	Press10 A: 0% P: 0% Q: 0% OEE: 0%	Press09 A: 0% P: 0% Q: 0% OEE: 0%
Press08 A: 0% P: 0% Q: 0% OEE: 0%		
Press16 A: 0% P: 0% Q: 0% OEE: 0%	Press17 A: 0% P: 0% Q: 0% OEE: 0%	Press18 A: 0% P: 0% Q: 0% OEE: 0%
Press19 A: 0% P: 0% Q: 0% OEE: 0%	Press20 A: 0% P: 0% Q: 0% OEE: 0%	Press21 A: 0% P: 0% Q: 0% OEE: 0%
Press22 A: 0% P: 0% Q: 0% OEE: 0%		

Machine is ready to run. The operator needs to start the machine.

Machine is in a long stop and needs to be booked for a delay.

Machine is running normal.

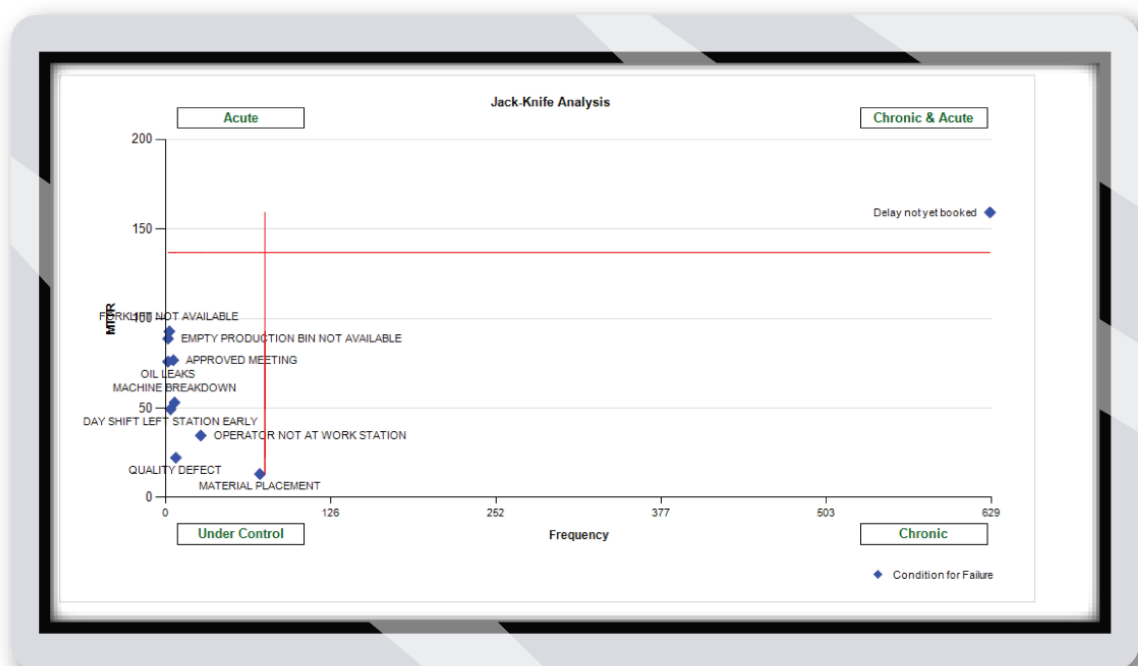
Machine is in maintenance mode.

Machine is running slow below target.

Machine is in tool setup mode.

Overall a more efficient factory environment through the accurate measurement of data which cannot be manipulated. Underneath some examples of the reports generated by the system.

PRODUCTION REPORT SUMMARY - Grouped By Zone							
REPORT DATASET: 2020-03-10 13:46 - 2020-03-31 13:46 ZONE: --All-- MACHINES: --All--							
End Time	Target	Total Good	Total Bad	Availability	Performance	Quality	OEE
20/03/25 05:23	65581	42087	15	54.34%	69.39%	99.93%	37.68%
20/03/26 10:51	53643	29180	58	41.68%	84.97%	99.60%	35.28%
20/03/24 08:17	110701	61179	38	51.55%	75.46%	99.88%	38.85%
	229925	132446	111	49.19%	76.61%	99.80%	37.27%



7 Adroit Enterprise OEE Documentation

The following related documentation is also available on the Adroit website:-

<https://adroittech.co.za/downloads-tree-view/>

