

PROPOSED AUTONOMOUS MAINTENANCE OF PREFORM MANUFACTURING AT PT. COCA-COLA BOTTLING INDONESIA, BEKASI

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Abstract

In production activities, the condition of the machine need to be considered in order to remain optimal to avoid breakdown during production. The efficiency and effectiveness of a production depends on the production process as well as maintenance activities. If maintenance activities are good, it will have a positive impact on production activities. The machines are fully operational have the possibility to breakdown that takes a long time to repair itself. PT. Coca-Cola Bottling Indonesia is a food and beverage company who has a high level of demand. In production activities, PT. Coca-Cola Bottling has Preform Manufacturing which produce the preform to be used in the subsequent production phase. The value of overall equipment efficiency (OEE) on the machine HyPET 500 P 120/130 E 140 is low and it cause the machine is not in optimal condition. Maintenance & Engineering departement is responsible to maintain machines. The role of the operator is required to repair minor damage to the engine due to limitations experienced members on the maintenance section. Autonomous Maintenance is an activity designed to engage the operator with the main objective to develop a pattern of relationships between man, machine and work quality. Autonomous maintenance designed to involve the operator taking care of his own machine which is useful for increasing the effectiveness of the machine and improve satisfaction in operating the machine

Keywords: *autonomous maintenance*

1. INTRODUCTION

The efficiency and effectiveness of a production depends on the production process as well as maintenance activities. If maintenance activities are good, it will have a positive impact on production activities. Cooperation between operators and technicians should not be separated based on the context of the existing job description. If the relationship between the two departments could

undertake joint activities will improve productivity, reduction of costs of maintenance activities, as well as increased morale for employees.

Preform Manufacturing has 5 different production line based on the specifications preform and different machine specifications according to the type of bottle that will be used in the next process. A production line for production activities consisting of resin bunker machine, dryer hooper, and molding machines

The machine is fully operational due to the high level of demand so that the molding machine is the main machine for the production activities Preform Manufacturing PT. Coca-Cola Bottling Indonesia, Bekasi. Maintenance & Engineering departement is responsible to maintain machines. The role of the operator is required to repair minor damage to the engine due to limitations experienced members on the maintenance section

2. THEORITICAL FRAMEWORK

a. Maintenance System In Manufacturing

Good production process became one of the critical factors that need to be given priority attention by the way keep the condition of production facilities or machinery used can operate in good condition. When the engine gets damaged, resulting in the disruption of the production process automatically and even stop production process so that it is possible to set production targets cannot be reached and the company will lose out sales. The consequences of the inability of the company to give satisfaction to the consumer will lead to consumers to other manufacturers and no new customers.

The various entities that could be controlled in the system of maintaining such as: replacement component maintenance, maintenance control, total maintenance related reliability operator. The management system of maintenance carried out to provide a guarantee against the operation of the production facilities as well as running with good human-machine interaction in the process of the operation of a production.

b. The Definition of Maintenance

Maintenance is the conception of all activities required to keep or maintain quality facilities/machines to function properly. Maintenance activities are all activities that are conducted to maintain units on operational conditions and safe and in case of damages then it can be controlled on the operational condition of reliable and secure. The maintenance process performed not only helps the production process but the resulting products are timely delivered to customers but also maintain facilities and equipment remain in effective and efficient way in which the goal is to realize a zero damage (zero breakdown) machine.

In the production process, the facilities and the equipment is often required maintenance activities such as cleaning, inspection, lubrication (oiling), as well as availability of spare parts stock from the components contained in industry Maintenance issues have a close relationship with prevention and repair The maintenance actions can be:

- Inspection, is the action devoted to the system/machine in order to know the system is in good conditions
- Service, is actions which aim to keep a system/machine that usually has been set in the manual use of the machine
- Component replacement is the action of replacing damaged components/did not carried out the standard.
- Repair (reparement), corrective actions are carried out while minor damage
- Overhaul, massive action is usually carried out at the end of a certain period.

The complex problems of related maintenance, maintenance is often approached with a mathematical model which presented these problems. With this approach the expected decision making in maintenance issues will be able to reduce the proportion of subjective considerations

c. The Component of Total Productive Maintenance

The word "total" in the total productive maintenance has three meanings described the most important features of the TPM associated with elements of TPM, such as:

- a. The effectiveness of the total achievement of the objectives on economic efficiency or probability
- b. The total maintenance system includes maintenance prevention and maintainability improvement as well as preventive maintenance

- c. The total participation of all employees include the autonomous maintenance by the operator through small group activities.

There are two fundamental activities of maintenance, namely cleaning and inspection of the implementation of both the activity which should be based on the motto of 5S (Nakajima 1998), including:

- ✓ *Seiri* (sort)
Clearing the work area
- ✓ *Seiton* (set in order)
The setting of the layout of the equipment and supplies so that everything is ready at the time needed
- ✓ *Seiso* (shine)
Cleanliness and workplace appearance
- ✓ *Seiketsu* (standardize)
Everyone doing things the same ways
- ✓ *Shitsuke* (sustain)
Ingraining the 5S's into the culture

d. The Definition of OEE (Overall Equipment Efficiency)

OEE (Overall Equipment Efficiency) is owned by the effective value of the equipment or machinery. In calculating the OEE value consists of the availability, performance, and the rate of quality. According to Japan Institute of Plant Maintenance (JIPM) the value of OEE is calculated such as:

OEE (Overall Equipment Efficiency) = *Availability* x *Performance* x *Quality*

a. Availability

Availability is a ratio that describing the utilization of available time for the operation of machinery or equipment. Availability rate influenced by two components are equipment failure and set up and adjustment losses. *Availability is the ratio of operation time, by eliminating downtime of equipment against the loading time.* Thus, the formula that is used to measure the availability ratio is:

$$Availability = \frac{Loading\ Time - Downtime}{Loading\ Time} \times 100\%$$

b. Performance

Performance is a ratio that describing the capabilities of the equipment in producing the goods. Performance efficiency has two components that is idling and minor stoppage and reduce speed. This ratio is the result of operating speed rate and net operating rate. Operating speed rate equipment refers to the difference between the ideal speed (based on the design of the equipment) and the actual operating speed. Net operating rate measure maintenance of speed

during a certain period. In other words, it's a measure of an operation remains stable in the period for the equipment is operating at low speed. This formula ratio is:

$$\text{Performance Efficiency} = \frac{\text{Processed Amount} \times \text{Theoretical Cycle time}}{\text{Operating Time}} \times 100\%$$

c. *Quality*

Quality is a ratio that describing the capabilities of equipment in generating products that comply with the standard. Rate of Quality Product supported two components such as, defects in process and reduced yield. The formula that is used for the measurement of the value of the rate of quality product is

$$\text{Rate of Quality Product} = \frac{\text{Processed Amount} - \text{Defect Amount}}{\text{Processed Amount}} \times 100\%$$

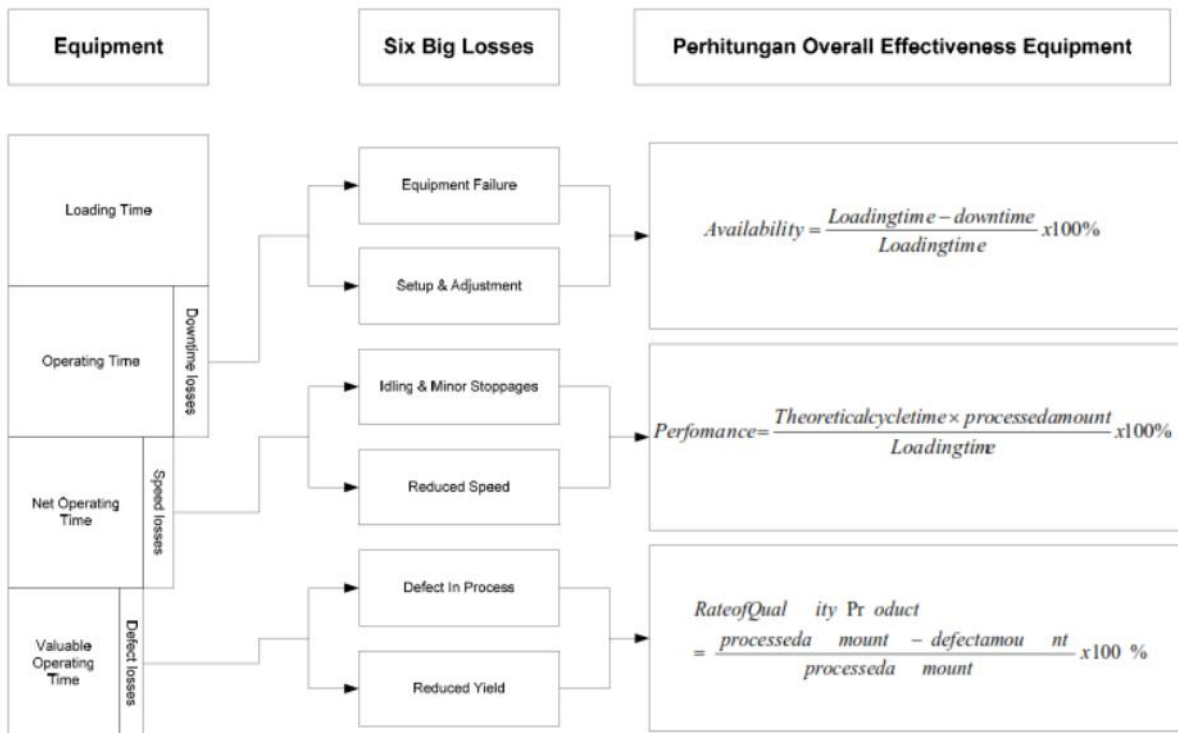
JIPM set a limit value ideal of OEE for world class companies who have implemented TPM, namely:

- *Availability* >90%
- *Performance* > 95%
- *Quality* > 99%

So that value ideal of OEE is:

$$0,90 \times 0,95 \times 0,99 \times 100\% = 85\%$$

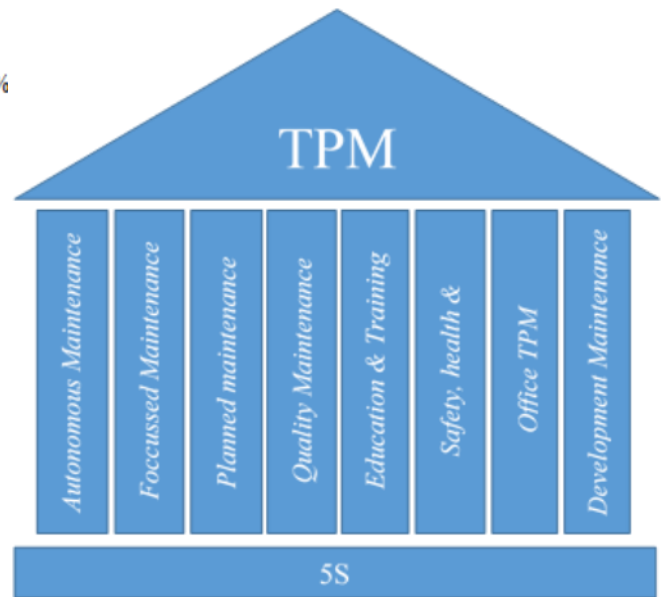
The following is a relation between the OEE calculation with six big losses in **Picture 1**.



Picture 1. Relation between OEE and Six Big Losses

e. **The Pillar of Total Productive Maintenance**

Illustration show in **Picture 2**.



Picture 2. The Eight Pillars Of TPM Implementation Approach

The activity of the TPM can effectively be grouped as follows:

1. Autonomous Maintenance

Requires proactive involvement from the operator to remove the acceleration of damage

passing through equipment cleaning, controlling, data collection, and reporting conditions as well as the issue of equipment to the maintenance staff. Moreover, operators should strive to develop an understanding of the equipment so that it will improve the skill of the operator. Autonomous maintenance which is run by an operator or a member of the team working parts manufacturing could help sustain high levels in machine reliability, low operating costs and high.

Production quality components. The information collected by the operators of the equipment could help the overall equipment effectiveness measurement.

2. Focussed Maintenance

Make improvements sustainable although the slightest improvement.

3. Planned Maintenance

Maintenance that organized and carried out with thought far ahead that concern also the issue of control and record keeping in accordance with a predetermined plan that is expected to ensure accuracy of production equipment so that the desired goals can be achieved.

4. Quality Maintenance

Intended for the planned maintenance system provides high quality and zero defects. The values obtained from the quality maintenance is able to estimate various possibilities of defect that occurs and then fix to prevent such a possibility. Targets to be achieved in the quality maintenance is reducing consumer complaints, reduce damage to the process, and reduce the cost of quality.

5. Education & Training

This component supports all the other components of the TPM by ensuring that employees have the knowledge and skill required to perform the duties related TPM. In addition, this component is intended to have employees with various skills and have high moral spirit which had to come to work and carry out all the necessary functions effectively.

6. Safety, Health & Environment

Security, health and safety is one of the components of the TPM, a target to be achieved in these elements is zero accident, zero health damage, and zero fires.

7. Office TPM

This component was implemented after running four other TPM component (autonomous maintenance, focussed maintenance, planned maintenance, quality maintenance).

8. Development Maintenance

In developing the capability of maintenance required education and training development procedures inspection consists of the preparation, the training, the general inspection to the general inspection auditing

f. Autonomous Maintenance

Maintenance of autonomy is an activity designed to engage the operator with a primary goal to develop a pattern of the relationship between man, machine and the quality of the workplace activities include cleaning, lubrication, tightening nuts/bolts, checking daily, lapse of detection and repair simple.

The purpose of this activity is to develop operator that is able to detect a variety of loss (loss). It also aims to create a workplace that is neat and clean so that any deviation from normal conditions can be detected quickly. According to Nakajima (1988) there are 7 steps the development of autonomous maintenance i.e. initial cleaning, eliminate the source of contamination and inaccessible areas, cleaning and lubrication standard, general inspection, autonomous inspection, workplace organization and housekeeping, fully implemented autonomus maintenance program

g. Activities In Management Maintenance

Kegiatan perawatan (*maintenance activities*) menurut *Japan Institute of Plan Maintenance* dan *Confederation Industrial India* dikategorikan menjadi tiga elemen:

- *Activities to prevent deterioration*, maintenance activities conducted to prevent the failure/damage to equipment when it necessary
- *Activities to measure deterioration*, maintenance activities conducted to measure the occurrence of failure/damage to equipment so obtained as a benchmark to evaluate the damage
- *Activities to restore deterioration*, maintenance activities conducted to improve restoration failure/damage equipment.

The purpose of maintenance can not be achieved if the above maintenance activity ignored.

3. DISCUSSION RESULT

a. Data Employee of Preform Manufacturin

The number of existing employees in Preform Manufacturing as many as 38 people that consists of a group of non-shift and employee contracts. Employee outsourcing contracts is derived from other companies that cooperated with PT Coca Cola Amatil Indonesia, Bekasi show in **Table 1**.

Table 1. Employee Data Preform Manufacturing

No	Name	Position	Section	Group	Status
1	Delijal	GM Preform Manufacturing	General Manager	Non Shift	Permanent
2	Satriyo HS	Maintenance & Engineering Manager	Maintenance	Non Shift	Permanent
3	Ade Irania	Admin Maintenance	Maintenance	Non Shift	Contract
4	Eko Warsito	Monitoring Planning	Planning	Non Shift	Permanent
5	M. Husni	PET Specialist	Planning	Non Shift	Permanent
6	Suparto	Supervisor	Production	Non Shift	Permanent
7	Lia Julia	Admin Production	Production	Non Shift	Contract
8	Arania Helma	Team Leader	Production	A	Permanent
9	Anjar Yoga	Operator	Production	A	Permanent
10	Agus Sumantri	Quality Control	Production	A	Contract
11	Abdul Muklis	Forklift	Production	A	Contract
12	Didi Rahmadi	Helper	Production	A	Contract
13	Tri Cahyo	Helper	Production	A	Contract
14	Rahmat Wibowo	Inspector	Production	A	Contract
15	Puji Utomo	Tager	Production	A	Contract
16	Rasim	Cleaning	Production	A	Contract
17	Ahmad Jailani	Team Leader	Production	B	Permanent
18	Sugeng	Operator	Production	B	Permanent
19	Alvian	Quality Control	Production	B	Contract
20	Agus Slamet	Forklift	Production	B	Contract
21	Nesa Andria	Helper	Production	B	Contract
22	Satria Adrian	Helper	Production	B	Contract
23	Suratno	Inspector	Production	B	Contract
24	Mustofa	Tager	Production	B	Contract
25	Abdul Halim	Cleaning	Production	B	Contract
26	Didik Adi	Team Leader	Production	C	Permanent
27	Endang Budiarto	Operator	Production	C	Permanent
28	Setyawan	Quality Control	Production	C	Permanent
29	Dede Imanudin	Forklift	Production	C	Contract
30	Darkam	Helper	Production	C	Contract
31	Agus Roi	Helper	Production	C	Contract

32	Johan	Inspector	Production	C	Contract
33	Marulih	Tager	Production	C	Contract
34	Syaidina Umar	Cleaning	Production	C	Contract
35	Much. Wahyudin	Quality Assurance Analyst 3	Quality	Non Shift	Permanent
36	Sukma Dina	Admin Quality	Quality	Non Shift	Contract
37	Roni Tabroni	Sortir Leader	Quality	Non Shift	Contract
38	Bambang	Cleaning	Planning	Non Shift	Contract

b. Specification Machines

The machines in Manufacturing Preform injection molding machine fabrication is Canada. Husky is one of the preform manufacturing company which has been around since more than 35 years with over 4000 existing systems in the field show in **Table 2.**

Table 2. Specification Machine Data Based On Production Line

No	Line	Machine Model	Serial No	Yr of Mfg.	Electrical Diagram
1	Line 5	Husky HyPET 500 HPP4.0S P120/120 EE140	5998182	Mar-13	6015192
2	Line 4	Husky HyPET 500 HPP 4.0S P155/150 EE155	5551170	Sep-11	5560141
3	Line 3	Husky HyPET 500 HPP P155/150 E155 (30:1)	5194096	Jan-10	5213542
4	Line 2	Husky HyPET 500 HPP P120/130 E140 (30:1)	4990480	Jun-10	5024223
5	Line 1	Husky HyPET 300 P100/120 E120 R565/65(25:1)	4518181	Mei-09	4538943

c. Maintenance Activities

Kind of maintenance activities performed on the Preform Maintenance is Preventive Maintenance (PM) which are routinely carried out each week. Schedule Preventive Maintenance for each different production line to ensure production schedule runs

d. Determination of Object Identification

To calculate the OEE value and know the whole production line has been automatically calculated by the Shotscope NX system that could served data based on in units of days, weeks, months even years. In the selection of objects based on the recapitulation of the OEE value is the smallest production line which is considered as a critical show in **Table 3.**

Table 3. The OEE Value Data Based On Production Line

Month/Year	OEE Line 1	OEE Line 2	OEE Line 3	OEE Line 4	OEE Line 5
Jan-14	33,39%	31,06%	44,16%	20,17%	13,18%
Feb-14	46,99%	51,17%	36,81%	37,22%	14,38%
Mar-14	42,16%	43,38%	64,32%	17,83%	61,69%
Apr-14	45,61%	40,06%	40,87%	28,57%	28,53%
Mei-14	53,82%	38,55%	48,85%	16,90%	64,08%
Jun-14	54,64%	37,22%	58,88%	30,28%	42,27%
Jul-14	54,00%	42,40%	46,66%	27,07%	32,23%
Agu-14	39,53%	51,81%	24,79%	30,43%	46,52%
Sep-14	55,44%	42,61%	47,11%	64,99%	1,62%
Okt-14	55,73%	45,63%	58,31%	36,60%	30,06%
Nov-14	75,28%	72,34%	79,14%	75,57%	64,08%
Des-14	77,71%	71,37%	89,42%	82,59%	62,05%
Jan-15	65,01%	82,59%	70,32%	82,25%	88,06%
Feb-15	71,47%	53,93%	69,83%	66,88%	71,56%
Rata-Rata	55,05%	50,29%	55,67%	44,10%	44,31%

The average value of OEE the smallest found in line 4 so the machine that is the object of the research line 4 HyPET Husky engine 500 HPP 4.0 S P155/150 EE155

e. Data Downtime of Machine

Machine downtime is the time on when the engine is not running because of an engine problem. With Shotscape NX software obtained machine downtime that occurs at line 4. The following is a recap of machine downtime data line 4 from January 2014 to February 2015 show in **Tabel 4**.

Table 4. Rekap Data Downtime Line 4

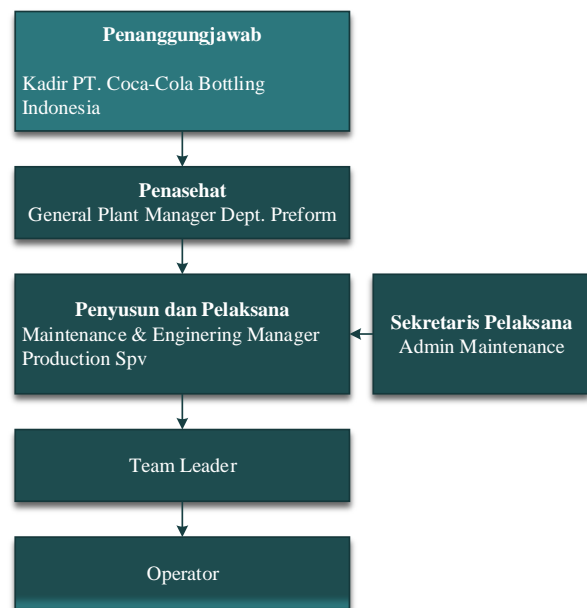
Month/Year	Subtotal Hours	Subtotal Freq
Jan-14	559,3728	516
Feb-14	253,6403	525
Mar-14	382,437	541
Apr-14	197,691	598
Mei-14	369,828	901
Jun-14	161,783	1187
Jul-14	242,493	968
Agu-14	127,66	912
Sep-14	272,981	549
Okt-14	361,4114	1506
Nov-14	108,43	1038
Des-14	104,028	1294
Jan-15	180,755	828
Feb-15	224,653	643

f. Autonomous Maintenance

The efficiency of the production depends on the cooperation between the activities of the production section with the maintenance section Both of them should be run over the activity based on the responsibility of doing the jobdesc against machine equipment

In the Preform Manufacturing, maintenance section was responsible for carrying out the maintenance of the machines in the production floor. Based on the organizational structure of that maintenance activities are carried out only by an employee while production employee was not directly involved in the activities of it cause engine maintenance engine maintenance activities require a very long time to complete. The cause of not getting involved in maintenance activities that production employee still has the paradigm of "I ran the machine and You fix it" due to production employees only have a responsibility towards the sustainability of the production activities only. Based on described above then made a proposed the concept of autonomous maintenance and implementation as well as to enhance the value of OEE continuously.

Before making the concept of autonomous maintenance it needs to be a strong commitment from top management so that its implementation is successful. Thus, the need to make proposals for the organization that serves as a facilitator in the implementation of autonomous maintenance later. The following is a proposal of the Organization in the **Picture 3** below.

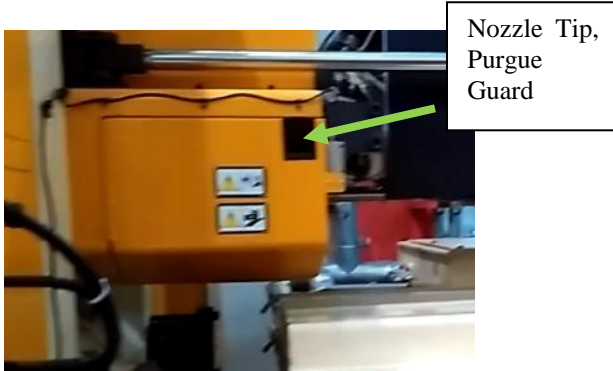


Picture 3. Structure Organizational For Proposed Autonomous Maintenance

The following is a step towards proposed autonomous maintenance line 4 HyPET Husky machines 500 HPP 4.0 S P155/150 EE155

Step 1 Initial Cleaning

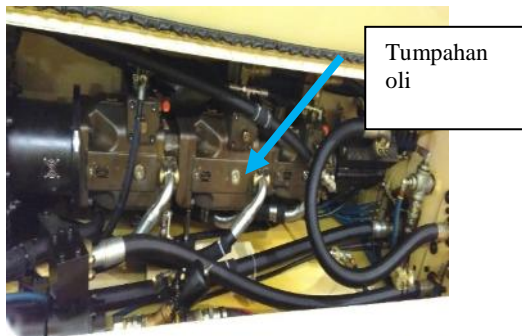
Cleaning engine parts Husky HyPET 500 HPP 4.0 S P155/150 EE155 consists of two parts, namely, HyPet machine and PET Molding. Cleaning on the machine HyPet such as nozzle tip, purge guard show in **Picture 3**.



Picture 4. Part Machines HyPet Need to Cleaning While Maintenance Is Runs.

Step 2 eliminate source of contamination and inaccessible area

At this step, a difficult to reach area to do the cleaning or maintenance of the machine that is on the inside of the machining due to limitations of space and the dimensions to human posture. In addition, this area has a high degree of risk to safety because it is directly related to the electrical machine



Picture 5. Inaccessible Area of Part HyPet Machine

Electrical components which are numerous and extremely complex does not allow to reach out to the deepest so that on the part of the machine is sometimes ignored. Contamination commonly occur that is dusting mixed with oil. How to clean it with clean by using floor cleaners to reach the narrowest gap to soak up the oil and once it is cleaned using special thick fiber tissue to remove any remains of the cleaner and dry the area the machining

Step 3 cleaning and lubrication standard

On this step carry out standardization in lubrication to carrying out basic maintenance

Step 4 general inspection

This is a step in the activity of the inspection of the step-step maintenance has done previously (step 1-step 3). At this step the operator trained according the procedure of examination of machines to observe a machine problems occur. ME Manager and Production Supervisor compile a target to determine which area has the possibility of problems on the six big losses that occurred that later can be identified by the team leader and the operator. After that, team leader recounts what problems they had identification for pulled a decision in resolving the problem of the machine's findings

Step 5 autonomous inspection

At this step is the inspection of autonomous activity that have been applied from the first step until step four. ME Manager performs evaluation of cleaning, lubrication and maintenance standards which have implemented team leader and operator

Step 6 workplace organization and housekeeping

The workplace clean and setup the right tools in place will create the comfort of the operator in the works. 5s is the basis in the activities of autonomous maintenance, namely:

- a. *Seiri* (Sort) the operator separates the necessary equipment in accordance with peruntukkan and its function show in **Picture 6**.



Picture 6. Sort In The Placement Equipment

- b. *Seiton* (Set In Order) the operator stores the working tools in place in order not difficult finding when required suddenly show in **Picture 7**.



Picture 7. Set In Order In The Placement Of The Size Small Spare Parts

- c. *Seiso* (Shine) the operator of conduct cleaning and inspection of the work environment show in **Picture 7**.



Picture 7 .*Seiso* Dalam Lingkungan Kerja

- d. *Seiketsu* (Standardize) the operator kept the condition of compliance with standardization in performing his job.
- e. *Shitsuke* (Sustain) operators are required to have the dedication and loyalty towards his job

Step 7 fully implemented autonomous

With a strong commitment from top management would motivate the entire operator. With the implementation of autonomous maintenance activity can develop skill in the maintenance of the machine and raise the morale of the operator thus creating comfortable working conditions and machine undamaged machine and eliminate the six big losses on the machines. The six big losses that occur i.e. breakdown, setup and adjustments, idling & minor stoppages, reduced speed, defects and rework, and startup and yield loss

Required additional training regarding the maintenance of the machine in order to improve the ability of the operator to handle the machine because when the operator has the ability in maintenance will give the advantage to the company

4. ANALYSIS

a. Analysis of Earlier Maintenance System

Organization on Preform Manufacturing made up by a few employees because the Plant Manager Preform Manufacturing wants a condition in organizations with few employees with consideration to the creation of a work atmosphere conducive in every section. If seen, employee production more than it is part of the maintenance. Therefore, with autonomous maintenance expected transfer process of knowledge regarding the machine from ME Manager to production operators to handle the problematic machine so that the company would get a significant increase in terms of availability, performance and product quality. Maintenance activities applied in Preform Manufacturing is a combination of activities of Preventive Maintenance and Condition Based

Maintenance. Maintenance carried out if the machine is damaged

b. Analysis A Value of OEE

A value of OEE shows how the effectiveness of the machines that consists of three elements i.e., availability, performance, and quality. If the value of the third element has increased the value of OEE a machine will be high because of the mutual effect between elements with other elements. For more details on OEE value line 4 can be seen in the following **Table 5**.

Table 5. The Value of OEE At Line 4

Month/Year	Availability	Performance	Quality	OEE
Jan-14	45,54%	69,81%	63,45%	20,17%
Feb-14	62,26%	78,97%	75,71%	37,22%
Mar-14	48,61%	63,27%	57,96%	17,83%
Apr-14	72,54%	63,27%	61,82%	28,57%
Mei-14	50,29%	69,92%	48,04%	16,90%
Jun-14	77,51%	73,47%	53,17%	30,28%
Jul-14	67,41%	75,75%	53,02%	27,07%
Agu-14	82,84%	68,90%	53,32%	30,43%
Sep-14	85,39%	79,91%	95,25%	64,99%
Okt-14	51,26%	95,60%	74,67%	36,60%
Nov-14	84,94%	97,45%	91,30%	75,57%
Des-14	86,66%	96,69%	98,57%	82,59%
Jan-15	83,58%	99,05%	99,36%	82,25%
Feb-15	72,18%	94,82%	97,71%	66,88%

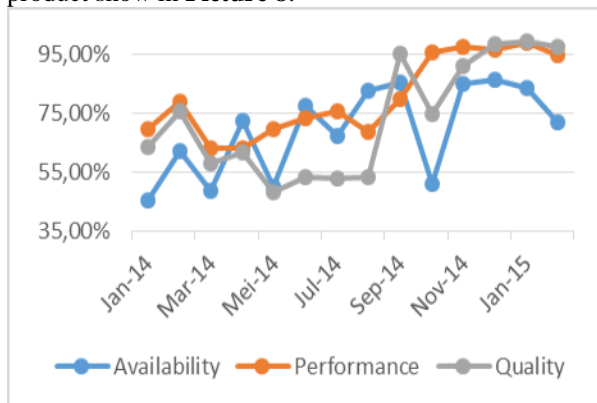
Based on table above that the value of OEE is under standard of JIPM yaitu 85%. Here are some factors considered to improve the value of OEE:

- a. **Human Resource Factors**
An increase in the ability of the operator in terms of basic maintenance knowledge. If operators understand basic maintenance then the failure of prevention can be handled
- b. **Work Method Factors**
Implementation of PM as well as minor maintenance activities should be carried out so that the need to condition the engine well and consider the production will be achieved in order not to overload
- c. **Motivation Factors**
top management should give a reward in accordance with contribution done operator to work so that in the future the operator can maximize ability in working.
Availability refers to the time machine downtime and time to setup and adjustment. How to minimize downtime i.e. operators perform

maintenance as simple as cleaning the machines, inspection machines components out, lubrication, inspection machines on the component between components that are loose, increase uptime and speed machine setup time

Performance refers to how often the machine is idle/manual, stoppages and machines operate with low speed. This makes the value of performance has not been ideal. How to increase the value of performance i.e. avoid operation of the engine when idle

Quality refers to the percentage of scrap or rework on a process. the value of low quality due to the influence of high-frequency machine downtime affects the conditions of the quality of the resulting product show in **Picture 8**.



Picture 8. Availability, Performance, Quality Curve

c. Analysis Autonomous Maintenance

In basic maintenance skills performed by the operators is the ability to run the machine correctly, clean the machine regularly, find out what kind of inspection that must be checked on the machine, able to perform lubrication in the engine, check the parts that are vulnerable to slack, and able to do the tightening of components, do start up the engine and engine shutdown properly, able to do the changeover, perform measurements against the machine , and other things which are prevention of damage to the machine show in **Table 6**.

Table 6 .Table Factors And Advantages From *Autonomous Maintenance*

No	Faktor	Keuntungan
1.	Machine	- Restoration of the machine to always on the most prime condition - Reach the level of high availability, optimum performance, and output quality is always at maximum.
2	Operator	- The study of the machine increases and the more expert in operationalize machine
3	Produksi	- Kondisi lantai produksi secara visual akan terlihat bersih
4	Maintenance	- Unplanned downtime will decrease significantly - The repair will go down

5. CONCLUSION AND SUGGESTION

a. Conclusion

Based on the analysis that has been done before it can be concluded that:

1. The value of OEE (Overall Equipment Efficiency) on line 4 that started since January 2014 to February 2015 under the JIPM standard of 85%. OEE calculations performed with Shotscape NX software in real time. the OEE value is affected by:
 - a. *Availability*
 - b. *Performance*
 - c. *Quality*

If the value of the third element above has increased, the OEE value will be increased leading to the effectiveness of a machine with zero defects.

In drawing up the strategy of Autonomous Maintenance on PT Coca-Cola Bottling Indonesia for line 4 in Preform Manufacturing consists of seven stages where each of the phases of its assessment will be conducted to ensure the skills mastered the operator and in the end the operators already have expertise in conducting maintenance in full. the company's has contributions, machines and for operators

b. Suggestion

From the conclusions above, there are some suggestions in support of the implementation of the proposed application of Autonomous Maintenance, namely:

1. Top management provides the opportunity to employees for opinions, criticisms and aspires at suggestions in the works.
2. Top management provide training regarding the maintenance of the machine gradually to the operator
3. Top management more rigorous application of the 5S incorporate as the basis of Autonomous Maintenance within the work environment

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