

Cleaner Production Clubs Surabaya

MADRIWARU CLUB

Final Report



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**Improving the living and working conditions of people in and around
industrial clusters and zones**

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INTRODUCTION

Lasting improvements of living and working conditions of people in and around industrial clusters and zones is achieved only if all stakeholders are involved. It will be not sufficient to focus on only individual enterprises and local governments; it requires the integration the estates' management as well.

One of the three pillar concept are the Cleaner Production activities on the level of the enterprises. The environmental impacts are reduced by carrying out cleaner production pilot measures in selected industries. The driving force for companies participating in the project will mainly be economical benefits such as reduced resources consumption (energy, raw materials, water), improved product quality, reduced waste streams, and reduced waste treatment costs (if any)..

METHODOLOGY

The form of a self-organized club tackles issues of Cleaner Production by the club members namely the participating enterprises. The CPCs focus on the principles of Cleaner Production and club members are supposed to execute internal assessments, cause analysis, develop case studies, implement selected improvements, and sharing the experience with other club members.

RECRUITMENT

Earlier, the establishment of club was planned to be done through recruitment system which involved government institutions such as the department of trade and industry, businessman associations, etc. However this system did not work well because direct involvements from those institutions were very limited. According to industrial data obtained from the department of trade and industry in each area/region and also from the network of CBIS (Center for Business and Industry Study) from the University of Surabaya, the approach should be done from industrial forum existing in each area. By making appointments with and under permission from the forum committee, informative meetings could be done during regular meetings of the industrial forum (in average 1-2 times/month). Some of the industrial forums which have given us the chance to conduct informative meetings are industrial forums in Driyorejo, Karang Pilang, Ngoro, Manyar Gresik, Mojokerto and SIER (Surabaya Industrial Estate Rungkut). On the other hand, these forums' meetings could not be the only way for the recruitment process, because the time interval between the forums' meetings are quite long and in some cases the meetings were also cancelled. In addition, almost all attendants of these meetings are industrial representatives (staffs) who do not have the power to make a decision by themselves. Thus the confirmation whether an industry will join the club or not could take such a long time. Therefore, the recruitment method was changed into the "door to door" system, that is conducting informative meeting in each industry, but this method has a consequence in that it took a lot more time and efforts to spend. In spite of that, the effectiveness of this approach is much higher, because by having a more 'personal' approach, the top management would be easier to reach and to get involved.

List of industries who have joined the MADRIWARU club can be seen in the table below:

No.	Industry	Company Profile
1.	PT. JINDAL STAINLESS STEEL	PT Jindal Stainless Indonesia is subsidiary of Jindal Stainless, India. Jindal Stainless has established its foothold in the South East Asian market with its acquisition of a stainless steel cold rolling plant in Indonesia from Maspion Stainless Steel. The plant

		has a capacity of 60,000 metric tons per annum and located in Maspion Industrial Estate, Manyar Gresik. Its strategic location has enabled Jindal Stainless to serve the South East Asian and the Oceania markets. With its strong team and modern facilities to produce quality product, P.T. Jindal Stainless Indonesia is leaving its mark in the markets. This plant produces all grades of stainless steel including 200, 300, and 400 series and is well prepared to serve customized requirements.
2.	PT. INDAL	P.T Indal Aluminum Industry is Group of Maspion on Building Construction Material Sector. This company is located on Ds. Sukomulyo Jl. Manyar Maspion Industrial Estate, Gresik. The productare gypsum as building material and gypsum board. Process production is divided into 2 shifts, with total 24 work hours per day. The main raw material for all product variants is natural rock gypsum that imported from Thailand.
3.	PT. FURUKAWA	Furukawa is a joint venture company between Japan (Furukawa) with 60% share and Indonesia (Indal Groups) with 40% share. The factory located in Maspion Industrial Estate, Manyar Gresik with total employee 330 workers. The product is aluminum plat for automobile's air conditioner which mostly absorbed by japan's companies (Toyota, Honda, etc).
4.	PT. PETROCENTRAL	Petro Central is a factory which produces STPP (Sodium Tri Poly Phosphate) which is located in Romo village, Manyar, Gresik on 2.6 hectare land. It is a National Investment Plant, which is founded in Indonesia based on Notary Act of Soeleman Ardjasmita SH No.4 on 3 March 1986". The shareholder of the company is: PT Unggul Indah Corporation, PT Petrokimia Gresik, PT Kodel, PT Fosfindo, PT Supra Veritas and PT Salim Chemical Corpora with Rp. 50 billion investment at the beginning. The capacity of the plant is 50.000 tons/year. There are 268 employees in the company. The product is an intermediate product used for detergent builder and also used for ceramics. The plant is working 24 hours, based on continuous process.
5.	PT. UBM	Established in 1976, PT. United Biscuit Manufactory (UBM) is a biscuit factory producing many kinds of biscuits from several biscuit categories: marie, square puff, cream crackers, assorted, malkist, cocoa puff, sandwich and others. Overall there are more than 40 varieties of biscuit products to meet the demand of both the domestic and international market. The company is located in a 2 hectare area on Jalan Raya Waru 29, Waru, Sidoarjo. Their production capacity is approximately 1500 ton/month (non-water) and 53 ton/month (water). They also have HALAL certification and HACCP certification (LTIB-SHACCP-002-2004) which give customer increased confidence in the quality of biscuits occupational health and safety which are integral aspects of the management system. The number of employees is 750 people (permanent workers). Today they have two manufacturing plants located near Jakarta and Surabaya.
6.	PT.CAMPINA	PT Campina Ice Cream Industry was founded in 1970 in Surabaya and now has become a well-known ice cream company in Indonesia. The factory is located on jalan Rungkut Industri II/15-17 in the Surabaya Industrial Estate Area Rungkut (SIER) and has an area of 8.900 m2 with a distribution network all across Indonesia. Total number of employees working in the Surabaya plant is around 450 workers.
7.	PT. ADIPRIMA SURAPRINTA	PT. Adiprima Suraprinta is paper making manufactory, focus on newsprint paper. This company is belong to Jawa Pos group (national newsletter) and located at Wringinanom, Gresik. In 1995 this company started production, which was mainly to supply paper for Jawa Pos. Today, the paper mill is not only fulfilling the needs of Jawa Pos Group but also exports its product to several countries. The company has 500 employees with total product

		capacity 120,000 T per annum.
8.	PT. PRIMA ELECTRIC POWER	PT. PRIMA ELECTRIC POWER is a power plant company. This company was built on August 2002, with purpose to supply electrical power to Jawa Pos group companies, mainly to PT. Adiprima Suraprinta. Located in Wringinanom, Gresik, this plant has 4 Ha areas with total 175 employees. Production capacity is 25 MW.
9.	PT. MIWON	MIWON is a joint venture company between South Korea and Indonesia which produces glutamic acid (GGA) and mono sodium glutamate (MSG). It was established in 1973 and run the first commercial process in 1978. The plant is located at Driyorejo, Gresik, with total area 336,200 m ² . Recently the production process is run continually, 24 hours with total employee 800 workers.
10.	PT. INKTECH INDAH MULYA	PT Inktech Indahmulya (ITI) is located in jalan Tambak Rejo 34 Surabaya. It was established in 1989. ITI produces gravure and flexographic printing ink for the flexible and food packaging industries. It is a branch of Toyo Ink Pte. Ltd which is a specialist company located in Singapore producing the same products. At the moment, ITI produces: PMG Ink, OPP/PP Ink, PP Ink, GNC Ink, CCST Ink, FLEXOPAK Ink, FLEXO T Ink, FLEXO AQUA Ink, and OFFSET Ink
11.	PT. JAYA GARMENT	PT Jaya Garment Sukses Makmur (in short: Jaya Garment) is located in kelurahan Cangkring Malang kecamatan Beji, Pasuruan, East Java. It was established in 1988. Jaya Garment produces T-shirts, polo shirts, casual shirts and jeans. The production capacities are 1600 pieces/day for T shirts and polo shirts, casual shirts 960 pieces/day, and jeans 560 pieces/day. Total number of employees is 300 persons; with 150 of them are permanent workers and 150 contracted workers.

Note:

- Several other industries have also joined the club, but then (some of them even before attending the training/workshop) they resigned from the club, with or without a reason. The reasons were because the industry is only a service company, not a manufacturing one (for example: PT. Siam Maspion Terminal); another because of lacking support from the top management (for example: PT. TPC Indoplastics). Some other industries have resigned without giving any reason, for example PT Weilburger Coating and PT Petrokayaku.

TRANSFER OF KNOWLEDGE

Transfer of knowledge was done through workshop/training followed by networking meeting. Materials given in the workshop is an application of Cleaner Production concept, consisting of problem identification (inefficiency sources), cause analysis, option generation, selection, and implementation and monitoring. Workshops given to club members were accompanied by setting up action plan to guide each industry to apply the materials they got from the workshop in their own industry. In the network meetings, progress achieved by each industry was presented in front of all club members and then discussed if there are any barriers during implementation. In this meeting the club members can share with each other so that everyone can give/receive feedbacks from experiences in each industry to handle or minimize barriers faced during the implementation.

Run down activities (workshop & network meeting) that have been conducted for MADRIWARU club is given as follow :

1. Preliminary Meeting (27 September 2007)

This first meeting was delivered by UBAYA. The contents of meeting were:

- Refreshment on the information of the program (by UBAYA Team)
- Simple Tools To Find Inefficiency Sources (by UBAYA Team)

At the end of meeting, sharing forum was held to share the condition at each industry. This meeting was end up with an agreement to set an action plan and to apply the tools given to look for inefficiency sources in each industry

2. Network Meeting (25 October 2007)

This meeting was conducted during the visit of IVAM. At first session, each industry shared their implementation progress on finding the inefficiency points. After that, IVAM delivered presentation of:

- Introduction/basic principle of Cleaner Production
- Production Efficiency Club – Rule of the Game

3. Workshop 1 (15-16 February 2008)

This workshop was delivered by BPPT Team within 2 days. The content of workshop were:

- Concept of Non Product Output (NPO) , including exercise (group work) : Identify NPO from an process industry (Old Fritz)
- Set up Process Diagram (flow chart) and NPO flow
- Calculation of NPO, including exercise (group work) : Ink TECH
- Set up Process Diagram and NPO flow for each industry, followed by presentation and discussion
- Introduction of green house gas emissions calculation
- Active Learning Set (ALS)

At the end of workshop, every company set up their action plan to make NPO Diagram and the Calculation. These will be discussed on next workshop.

4. Networking Meeting & Workshop 2 (6 – 7 June 2008)

The second network meeting and workshop were conducted at the end of May 2008, one day (6 June) for network meeting and one day (7 June) for a workshop lead by BPPT.

In the network meeting, each club member presented their progress in NPO calculation done in their company. Most of inefficiencies sources in the industries come from raw material handling, operation processes, usage of excessive packaging material, and cleaning/washing activities. Discussions were done in groups, where each industry representative shared the problems they have encountered during the process of NPO data gathering and calculation. Inputs or feedbacks from peer industries were gathered and further analyze as alternative options/solutions.

The subject explained and worked out in the second workshop was “Cause Analysis”. This topic was directed to help industries to find the main causes from inefficiencies sources identified during the process of NPO calculation. Cause analysis was done with the help of “mind mapping technique”. Then the identified causes were clustered according to whether they are related to:

- human resources capacity → working habits, work procedures, etc
- new/additional investment needed → new equipment purchase, machine modification, process modification

- environmental improvement efforts

Option generation then based on the cause analysis, the appropriate options are selected based on priority which can be differed from one to another.

5. Network Meeting

On 12 September 2008, network meeting has been held. A general review progress has been presented by facilitators, followed by detail progress sharing by each club member. Efforts to find root cause of inefficiency, through mind mapping technique, have been implemented by most of club members. Based on the cause analysis, several options have been developed and implemented.

Summary of Industry Participation on CPC Events

No.	Industry	Pre-Meeting	Network Meeting 1	Workshop 1	Network Meeting 2	Workshop 2	Network Meeting 3
1.	PT. JINDAL	√	√	√	√	√	
2.	PT. INDAL	√	√	√			
3.	PT. FURUKAWA	√	√	√	√	√	√
4.	PT. Petrocentral	√	√	√	√	√	√
5.	PT. UBM	√	√	√	√	√	√
6.	PT. CAMPINA	√	√	√	√	√	√
7.	PT. Adiprima	√	√	√	√	√	√
8.	PT. Prima Electric			√	√	√	√
9.	PT. MIWON			√	√	√	√
10.	PT. Inktech Indahmulya			√		√	√
11.	PT. Jaya Garment			√			

COMPANY VISITS

Company visit was performed after club member industries gave feedbacks to the facilitators. The idea is that industry wants to have more facilitation during the implementation of the cleaner production concept they have obtained from the workshop in their own workplace. In this regard, the facilitator does not act as a problem solver, but more as a brainstorming/discussion partner. Efforts to implement the learned concept are completely the responsibility of the efficiency team established in each industry.

Company visit has given very positive impacts, because each industry received new experiences in conducting their efficiency program. This also influences the network meeting held periodically during the project, where industries can share their experiences in doing the efficiency program in their environment. This is very beneficial because each industry's experience could be a solution to other industry that might have problems in that area.

All of MADRIWARU Club members have been visited by facilitator; some of them were visited more than once. Active discussion and field inspection have done in the area of inefficiency, which are already identified through NPO calculation and mind mapping analysis.

RESULTS

The Non Product Output (NPO) concept and mind mapping technique is felt as very useful by most of the industries who are actively involved in the program. For those industries who have not known the concept of cleaner production/production efficiency, this tool is

still a new thing for them. But for those who are relatively advance (MIWON and Adiprima), this tool can still be merged/integrated with the existing program.

After running for about 16 months (several industries are about 10 months, e.g. PT. Prima Electric Power, PT. Inktech Indahmulya, PT. MIWON and PT. Jaya Garment) the progress of each club member industry can be categorized into:

- Industries who have implement selected programs/action plans to improve efficiency level
 - Industries who have obtained quantified results (financial saving)
 - Industries who are still under monitoring process to obtain real data from the impacts of selected program/action plan implementation
- Industries who have finished calculating their non-product output (NPO) but still have not or still doing their program/action plan
- Industries who have not finished their NPO calculation

OPTIONS IDENTIFIED AND IMPLEMENTED

From the obtained results, non-product outputs (NPO) which become priorities of the industries to be taken care of are not only waste, but also energy (electricity and water) as well as raw material. Thus, the developed action plans consist also efforts to minimize waste or reject product, energy and raw material. Identified and implemented action plans can be seen from this table below:

INDUSTRY	OPTIONS IDENTIFIED	OPTIONS IMPLEMENTED
Furukawa	<ol style="list-style-type: none"> 1. Introduce new standard for washing parameter (Al in acid solution) (N) 2. Introduce SOP for washing activity (N) 3. Buy Analytical tool (Instrument) (H) 4. Process modification on multi hole tube process to reduce time break (L) 5. Equipment improvement on conveyor belt system by installing speed controller (L) 6. Training for operators (N) 7. Introduce SOP for solid waste handling (N) 	<ol style="list-style-type: none"> 1. Introduce new standard for washing parameter (Al in acid solution) (N) 2. Introduce SOP for washing activity (N) 3. Buy Analytical tool (Instrument) (H) 4. Process modification on multi hole tube process to reduce time break (L) 5. Equipment improvement on conveyor belt system by installing speed controller (L) 6. Training for operators (N) 7. Introduce SOP for solid waste handling (N)
Petrocentral	<ol style="list-style-type: none"> 1. Process modification : to increase rate of calciner (L) 2. Process modification : to increase low bulk density (L) 3. Install new dust collector (M) 4. Process modification : to improve filling equipment setting (L) 5. Material substitution, from soda ash to caustic soda (L) 6. Introduce new SOP for modified process (N) 7. Training for operators (N) 	<ol style="list-style-type: none"> 1. Process modification : to increase rate of calciner (L) 2. Install new dust collector (M) 3. Process modification : to improve filling equipment setting (L) 4. Material substitution, from soda ash to caustic soda (L) 5. Introduce new SOP for modified process (N) 6. Training for operators (N)

UBM Biscuit	<ol style="list-style-type: none"> 1. Introduce SOP on material loading on the conveyor belt (N) 2. Equipment improvement : substitution of wood chain into inverter in the conveyor (L) 3. Substitution of diesel fuel into gas (LNG) (H) 4. Install new packaging machine (H) 5. Training for operator (N) 	<ol style="list-style-type: none"> 1. Introduce SOP on material loading on the conveyor belt (N) 2. Equipment improvement : substitution of wood chain into inverter in the conveyor (L) 3. Substitution of diesel fuel into gas (LNG) (H) 4. Training for operator (N)
Campina	<ol style="list-style-type: none"> 1. Install flow meter for water consumption monitoring (L) 2. Process modification : change regeneration system in cooling tower (N) 3. Material substitution : change exchanger resin (M) 4. Introduce SOP on “cleaning in process” during production process (N) 5. Process modification on Process production to reduce “cleaning in process” (L) 6. Equipment improvement : replace leaking pipes (M) 7. Training for operators (N) 8. Equipment improvement : install capacitor (M) 9. Equipment improvement : renew cooling plats (H) 10. Introduce SOP in instruments/machines maintenance (N) 	<ol style="list-style-type: none"> 1. Install flow meter for water consumption monitoring (L) 2. Process modification : change regeneration system in cooling tower (N) 3. Training (N) 4. Introduce SOP on “cleaning in process” during production process (N) 5. Introduce SOP in instruments/machines maintenance (N)
Adiprima Suraprinta	<ol style="list-style-type: none"> 1. Install rotary drum filter to recover fiber (H) 2. Process modification : raw material/waste paper selection before Deinking unit (L) 3. Introduce SOP in Deinking unit, in feeding raw material to the reactor (N) 4. Equipment improvement : replace the leaking pipes (for water and steam) (H) 5. Equipment improvement : replace old pump with low performance (M) 6. Training for operator (N) 7. Reuse effluent water from rotary drum filter to deinking tank (M) 	<ol style="list-style-type: none"> 1. Install rotary drum filter to recover fiber (H) 2. Training for operator (N) 3. Process modification : raw material/waste paper selection before Deinking unit (L) 4. Introduce SOP in Deinking unit, in feeding raw material to the reactor (N) 5. Reuse effluent water from rotary drum filter to deinking tank (M)
Prima Electric Power	<ol style="list-style-type: none"> 1. Introduce new SOP for material loading (N) 2. Process modification : isolate fly ash and bottom ash area to minimize particle emission (L) 3. Equipment improvement : check motor engine in the process to reduce electrical consumption (M) 	<ol style="list-style-type: none"> 1. Process modification : isolate fly ash and bottom ash area to minimize particle emission (L)

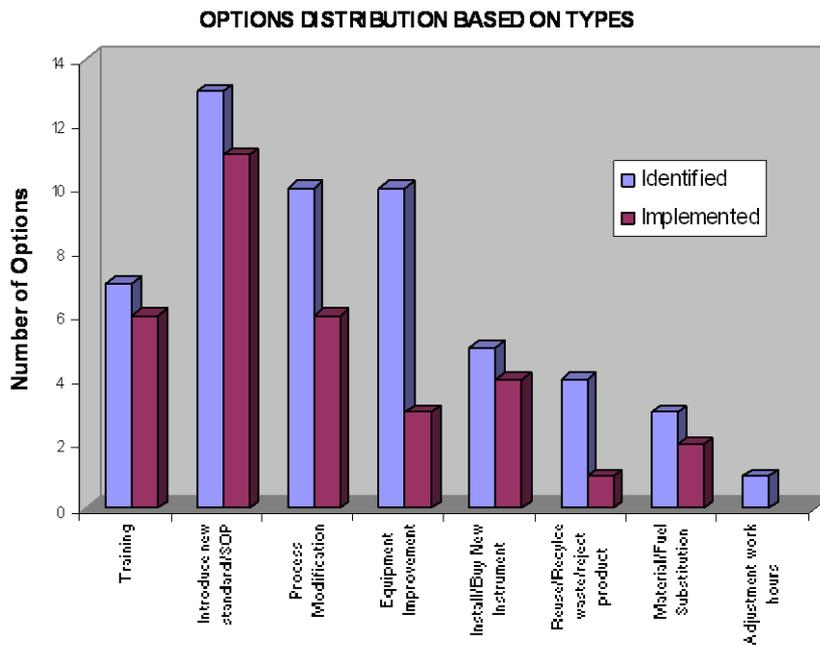
Inktech Indahmulya	<ol style="list-style-type: none"> 1. Use recycle water (N) 2. Reutilized used ink (N) 3. Process modification : use plastic cover to seal off open drum in order to reduce the evaporation of ink or solvent (L) 4. Process modification : To limit the storage time of ink in open drum maximum in 3 days before packaging into can or closed drum (N) 5. Readjust work hours (N) 6. Introduce SOP for Storage of raw material (N) 7. Introduce SOP for mixing process (N) 8. Training for operators (N) 	<ol style="list-style-type: none"> 1. Introduce SOP for Storage of raw material (N)
MIWON	<ol style="list-style-type: none"> 1. Equipment improvement : adding "baffle" in mixing tank to improve homogeneity coefficient (H) 2. Introduce SOP for shifting process in mixing plant (N) 3. Introduce SOP for solid waste minimization (N) 4. Equipment improvement : replace old vessel jacket to optimize energy utilization (H) 5. Training (N) 6. Reuse treated wastewater for cleaning process (M) 	<ol style="list-style-type: none"> 1. Equipment improvement : adding "baffle" in mixing tank to improve homogeneity coefficient (H) 2. Introduce SOP for shifting process in mixing plant (N) 3. Introduce SOP for solid waste minimization (N) 4. Training (N)
TOTAL	53	33

CATEGORIZATION OF OPTIONS

Identified and implemented action plans can be categorized as below:

1. According to types of action plans

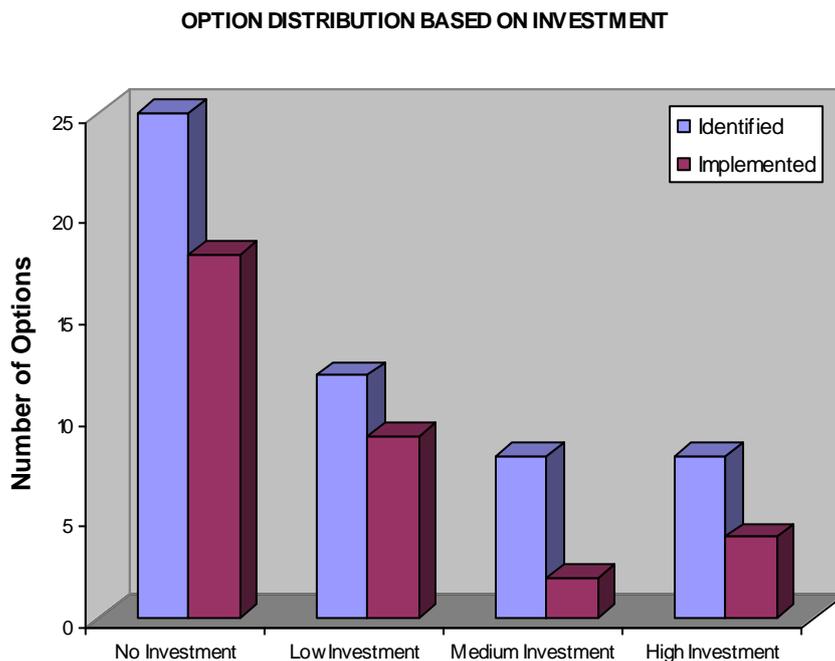
No.	Action Plans	Identified	Implemented
1.	Training	7	6
2.	Introduce new standard/SOP	13	11
3.	Process Modification	10	6
4.	Equipment Improvement	10	3
5.	Install/Procure New Machine/Instrument	5	4
6.	Reuse/Recycle waste/reject product	4	1
7.	Material/Fuel Substitution	3	2
8.	Others (adjustment work hours)	1	
TOTAL		53	33



2. According to amount of investment::

1. No Investment (N)
2. Low Investment (below IDR 15,000,000.00) (L)
3. Medium Investment (IDR 15,000,000.00 – IDR 75,000,000.00) (M)
4. High Investment (more than IDR 75,000,000.00) (H)

No.	Investment	Identified	Implemented
1.	No Investment	25	18
2.	Low Investment	12	9
3.	Medium Investment	8	2
4.	High Investment	8	4
TOTAL		53	33

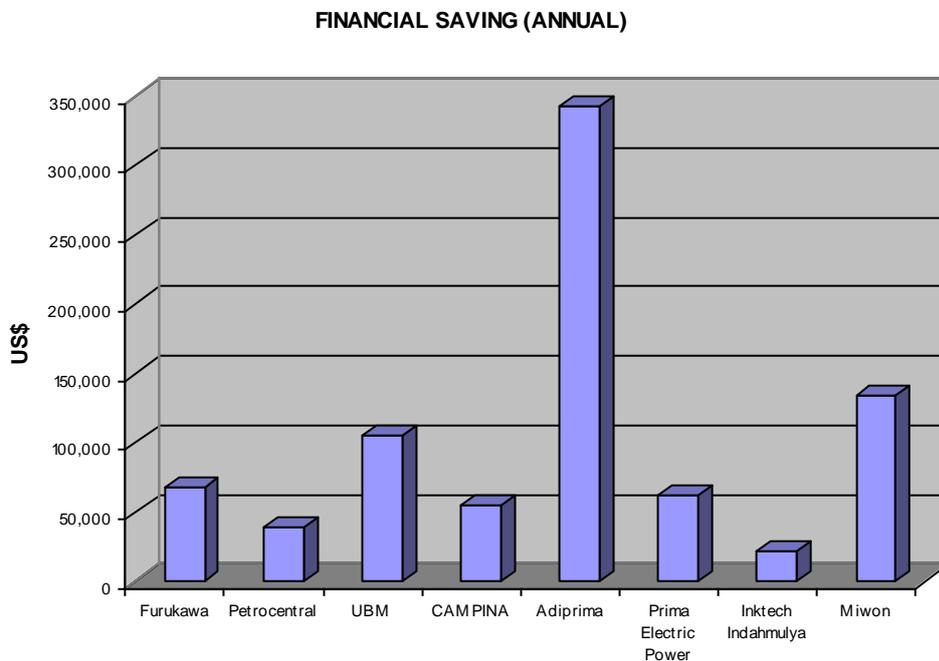


FINANCIAL SAVING

Some industries who have implemented options to increase their efficiency level have also felt benefits which can be converted into financial saving, while some others are still in their preliminary stage of option implementation or option implementation monitoring stage.

Majority of options implemented are no or low investment options. High investment option has been selected by PT Furukawa (analytical instrument to measure aluminum and sulfuric acid content), PT. Adiprima Suraprinta (installment of Rotary Drum Filter for the fiber recovery process), PT. UBM Biscuit (modification on burner system as a consequence of fuel substitution), and PT. MIWON (adding baffle in mixing tank).

The saving value reported is based on monthly monitoring result and then it is projected into uniform time period (annual). Some industries who have calculated their financial saving are:



ENVIRONMENTAL SAVING

Efforts to implement options in order to reduce inefficiency level have also influenced the environmental protection program. Environmental saving obtained could be grouped into direct saving and indirect saving.

Identified environmental direct saving are among others:

- PT. Furukawa : reduction of wastewater quantity (as much as 0.574 m³/day) and wastewater load (caustic soda, reduced 125 Kg/day and H₂SO₄, 98%, reduced 53 liter/day)
- PT. Petrocentral : reduction on emission rate, from 2 tones/hour to about 0.8 tones/hour
- PT. UBM : waste minimization of dried rest dough, about 2 sacks/day
- PT. CAMPINA : reduction of wastewater quantity, as much as 1000 m³/month, from modification of regeneration system in cooling tower

- PT. Adiprima Suraprinta : reduction of wastewater load in, because around 50% (which is equivalent to 900 tones fiber/year) of the wastewater is recycled back to recover the fiber.

Some environmental impacts still can not be measured, mainly because of no proper monitoring instruments (e.g. potential reduction of exhaust gas emission from the fuel substitution effort in PT. UBM, potential reduction of particle emission from the isolation of fly ash and bottom ash area)

Environmental indirect saving includes minimization effort of raw material such as implemented by some industries (e.g. fiber consumption by PT.Adiprima). By reducing raw material consumption, there is an indirect saving in natural resources consumption. In addition, energy saving efforts (electricity saving, heat optimization, etc.) are also indirect efforts which can give benefit to the environment.

BARRIERS & SUCCESS FACTORS

From interview with the club members, barriers faced during the implementation of the Cleaner Production Club program can be grouped as follows:

1. Lack of commitment from top management
This is revealed by either not allowing the efficiency team in his/her company to implement/complete the sequence of CPC program or not giving full support. Some top management prefers to stay in the “old paradigm” by focusing only in production operational. It is difficult to change the mindset of the top management that production efficiency is very important for a company. There is also a case that the top management is ‘afraid’ that implementation of this PEC program in their company will uncover their mistakes and losses/inefficiencies which (they think) would give negative impacts to their future career.
2. Old paradigm/work habits/mindset of the workers
To change existing culture/mindset, especially from low level workers (operators) is also quite a big problem. They are so used to the ‘old’ ways of handling and doing their works. The people have thought that the old system is the best & tested one, and a change means additional workload. Several industries faced this problem.
3. Lack of inter-departmental coordination
Some industries have problem in accessing data from other departments (e.g. purchasing, utility, etc) in their company. Therefore, to identify the exact number of non product output and/or to express the implementation result in a quantitative way is difficult. In fact, this is also due to low involvement of top management.
4. Not enough member in production efficiency team
In some cases, the number of efficiency team members could be an issue. Team members have other responsibilities, so that sometimes it is very difficult to spend special time and concentrated effort to think of ways to eliminate inefficiencies between the routine work loads, especially when there are lots of orders to finish. Progress in some industries could be faster if they have enough team members.
5. Financial Barrier
Some options, especially with high investment, could not be implemented because of financial reason. This is also influenced by the global financial crisis.

Meanwhile, some success factors which aid to the success of CPC program implementation are as follows:

- a. Commitment and support from top management
- b. Commitment and high engagement from staffs, especially those who are engaged in the production efficiency team (solid team)
- c. High motivation and focus on the program
- d. A strong cooperation from all related divisions to support the implementation of efficiency programs

FEEDBACK FROM COMPANIES

Most industries found that CPC program is very useful especially in terms of new knowledge gained. CPC's components (NPO concept and Mind Mapping – Cause Analysis) are very helpful to identify the root causes of inefficiencies. The delivery methods are very easy to follow and company visit give them chances to discuss the existing problems in the field from many viewpoints (not only based on field experience). The idea of a club is still relatively new for them. The companies could learn many new things including success or failure stories from other members vice versa by mutually sharing opinions or ideas. By following this program, they are able to get financial saving, environmental saving and experiences in a learning organization.

In the future, the companies hope to continue the club which will bring all the industries together in solving not only technical problem, but also in the insight of business perspective.

PROJECT CONCLUSIONS

8 out of 11 of the MADRIWARU club members have been actively involved in the program and as the results there are significant financial and environmental benefits, as well as organizational learning which could be obtained by those club members. Of course in the process not all industries could be in the same level of implementation (progress) because of various barriers in the field. In spite of that, developed options - which most of them have been implemented – are still efforts/results that should be highly appreciated. By going through series of learning processes, the industries can acquire additional knowledge, such as how to identify inefficiency sources and how to develop action plan to minimize the inefficiencies. This knowledge is proved to be a very valuable and useful matter for the industries.

Ideas about 'club' are also responded enthusiastically by most of the industries that have joined. They felt that through this sharing forum, their knowledge and experiences are much broadened. Majority of the industries have agreed that this media is very effective to find solution of problems faced by industries. In the end, MADRIWARU club members have agreed to maintain the sustainability of this club independently, even though funding from the European Union APE project has ended.

RECOMMENDATIONS

According to experiences from the implementation of CPC program in Surabaya, the facilitation function could not be separated from efforts to give technical guidance. Principally, developed options to minimize inefficiency level are not only managerial approach, but also technical approach. For industries, especially those who do not have

the technical capacity in technical field, certain guidance is required. It is realized that giving technical guidance does not mean closing the learning opportunity of the respective industry. Guidance can be in the form of brainstorming together, so that the team from the respective industry could have a chance to learn and develop.

Related to the club, ideally each member should have equivalent experiences (positive or negative), so that there is a balance between giving and taking experiences to and from fellow members of the club. Facilitators should have the capacity, both in terms of management and technical aspect (not only facilitation function to lead/moderate the meeting), in a way that help the member industries to have experiences which could eventually be shared.