Introduction of High Efficiency Once-through Boiler In Golf Ball Factory of PT. Sumi Rubber Indonesia

By. Akmal M Kartajaya
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COMPANY PROFILE

PT Sumi Rubber Indonesia

COMPANY	:	PT SUMI RUBBER INDONESIA
ADDRESS	:	INDOTAISEI INDUSTRIAL ESTATE, BLOK H, SECTOR 1-A 7 Q-3 CIKAMPEK - KARAWANG, WEST JAVA
AREA	:	37 Ha
BUSINESS STATUS	:	FOREIGN CAPITAL INVESTMENT
PRODUCT	:	TYRE & GOLF BALL
EMPLOYEE	:	3,615

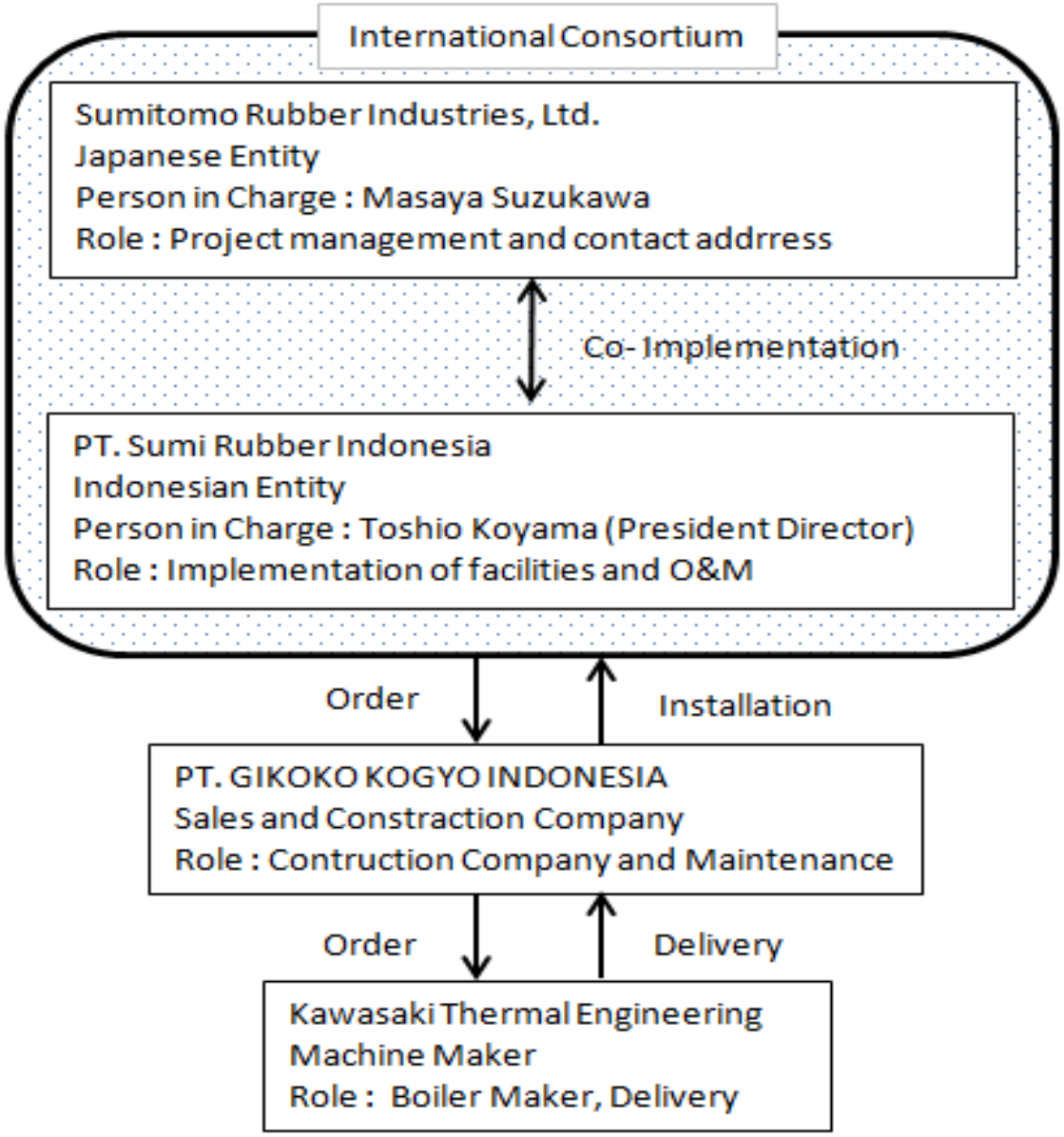
DUNLOP

1. Project Overveiw

1.1. Location of JCM Model Project

PT Sumi Rubber Indonesia
Golf Ball No.2 Factory
Indotaisei Industrial Estate, Sector 1A, Blok Q3
Cikampek, West Java

1.2. Structure and Role of JCM Model Project



1.3. Background

1.3.1. Boiler is needed for production of golf ball

Function of BOILER :
Change water become **steam** for production process

In Golf Ball Factory, mainly steam is for :

- Curing the plug rubber become core ball in Press Machines

Plug of rubber

STEAM for Heating

Core ball press machines

Core Ball

Golf ball Construction (1pcs type)

- Humidity & Temperature Control of Finishing Room

Finishing Room

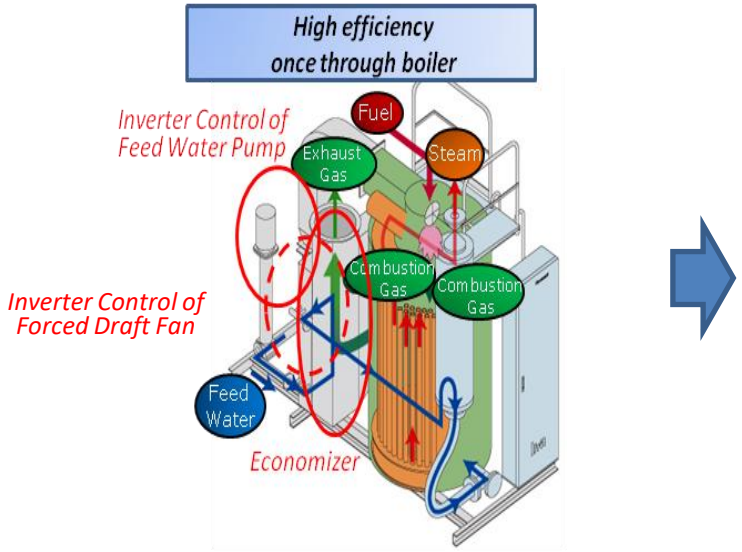
Finished Goods

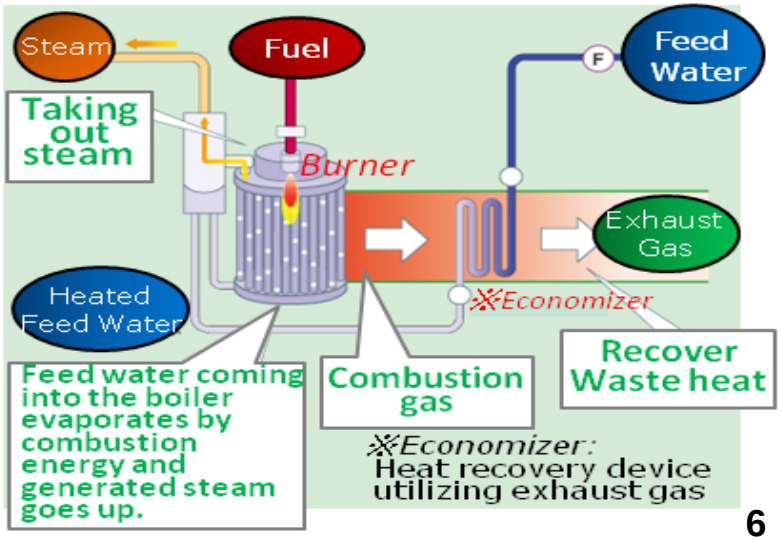
1.3.2. Old Boiler (#1 factory boiler)

- Model: Fire Tube Boiler
- Fuel: Natural Gas
- Efficiency: 89 %
- Capacity: 4000 L /hour

1.4. Install The Facility of JCM Model Project

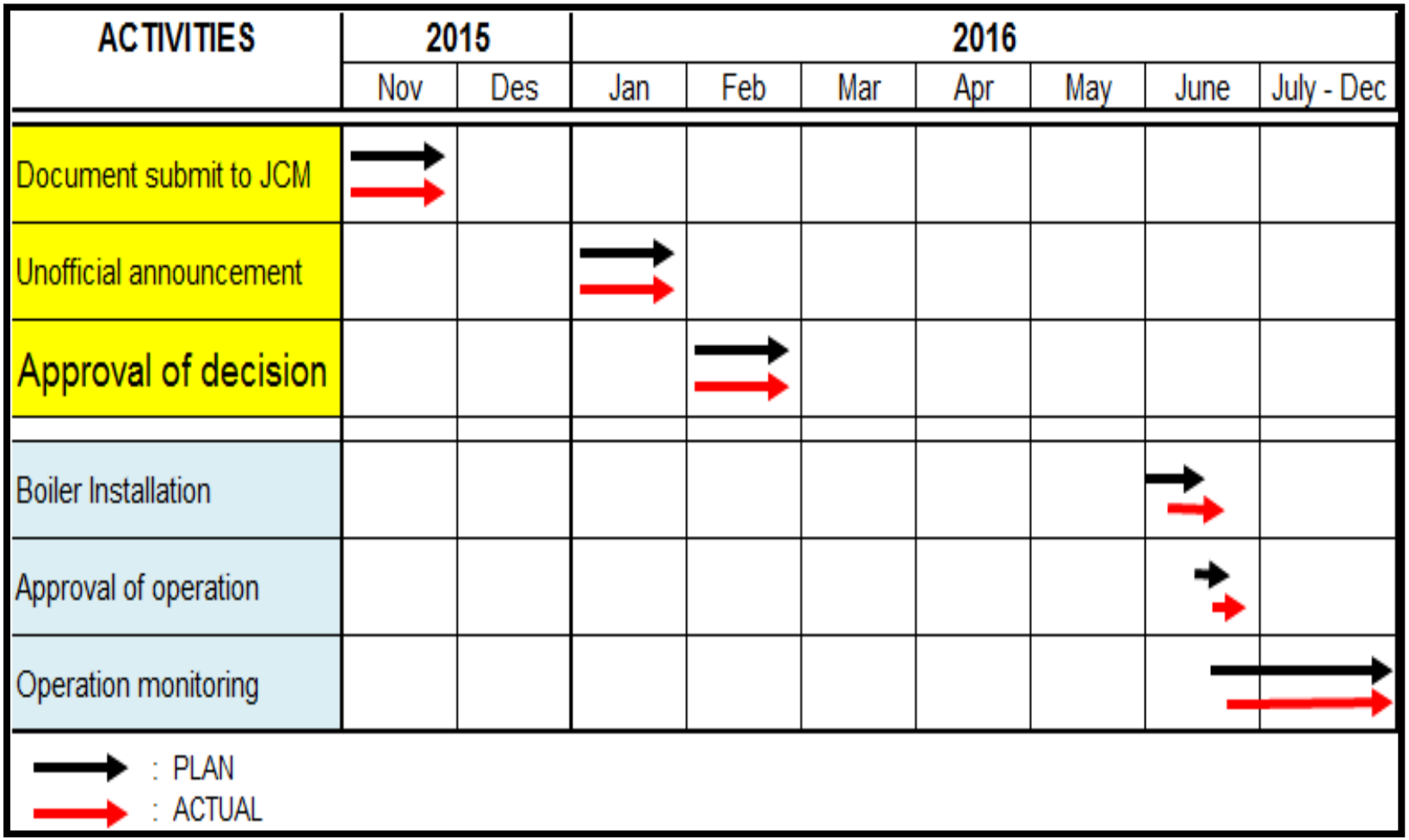
- A high efficiency (95%) once through boiler will install at a Golf Ball factory
- The boiler reduces fuel consumption by incorporating gas single fuel type. Furthermore, electricity consumption is also reduced by inverter function of feed water pump and forced draft fan.





2. Project Implementation

2.1. Schedule of Project

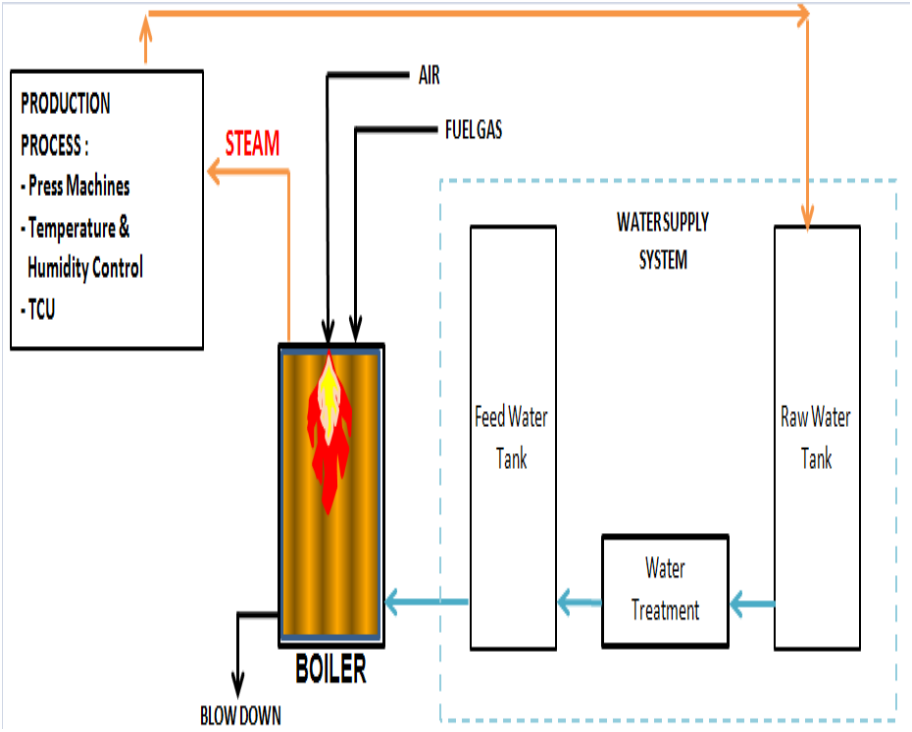


2.2. Installed Facility of JCM Model Project

- A high efficiency (95%) once through boiler is installed at a Golf Ball factory

BOILER SPECIFICATION

Boiler Model	Unit	Kawasaki IF Boiler IF-3000CMGE
Equivalent evaporation	kg/h	3000
Actual evaporation	kg/h	2516
Normal Pressure	Mpa	1.3
Used Fuel		Natural gas
Boiler Efficiency	%	95
Fuel consumption	m^3N/h	179
Feed Water Temperature	°C	90



2.3. Currrent Progress of Project

Since 18 June 2016, Boiler is already continuously running until now

2.4. Challanges of Project

This project have been done by cooperation between Indonesia company and Japanese company.

For getting faster effect, we did short time for installation and start up.

- We can Install for 4 month after project decide
- Short time delivery of boiler by japanese company
- Short time start up with Indonesia and Japanese company
- The Boiler is not same type with the previous boiler
- We must changed many piping by Indonesia company
- Tuning the boiler control to fulfill our factory demand only 3 days by two company

Install area is small for old type boiler

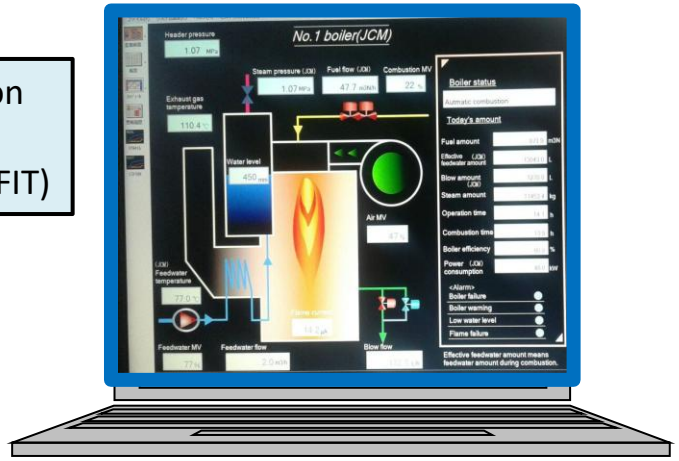
- Select one through boiler

2.2. Benefits of Project

- Get special cost support (50%)
- High boiler Efficiency (until 95%, Cost Reduction = USD 13,532 / year)
- Low electricity consumption (down 30%,Cost Reduction = USD 3,935/year)
- More environmental friendly (CO_2 reduction)
- Contribution to sustainable development of Indonesia
  (by technology transfer, energy saving activity, level up employee)
- Easy Operation for start, run and stop Boiler
- Easy monitoring for Boiler Operation / Performance

- *Fuel consumption*
- *Steam consumption*
- *Electricity consumption*
- *Water consumption*
- *others*

Automated data collection with Comprehensive monitoring system(EVERY FIT)



3. GHG Emission Reduction

Item	Unit	Reference Boiler	Project Boiler
Efficiency	%	89	95
Fuel Consumption	m3/h	79.61	71.23
	kg/year	1,122,797.00	1,004,607.00
Fuel Emission (A1)	tCO2/year	3,032	2,712
Electric Consumption	kWh/year	126,000	113,525
Electric Emission (A2)	tCO2/year	105.84	95.361
Total Emission (A1+A2)	**tCO2/year**	**3,137**	**2,808**
Expected CO2 Reduction	**tCO2/year**		**329.6**
Actual CO2 Reduction	**tCO2/year**		**212**

We have not achieved the target yet, because :

- The golf ball production is down compare with original plan
- Energy saving another activity, makes reduce steam consumption
- The JCM Boiler is running as main supply parallelly with another boiler to maintain normal steam, it does't make fully capacity.

  This condition is now improving with the project company

3. GHG Emission Reduction

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JCM Proposed Methodology Spreadsheet Form (Calculation Process Sheet)

[Attachment to Proposed Methodology Form]

1. Calculations for emission reductions	Fuel type	Value	Units	Parameter
Emission reductions during the period p		212	tCO_2/p	ER_p
2. Selected default values, etc.				
Efficiency of project boiler i		0.95	-	$\eta_{i,PJ}$
Efficiency of reference boiler		0.89	-	η_{RE}
Blow flow rate setting of project boiler		3.3	%	BF_{PJ}
Blow flow rate setting of reference boiler		9	%	BF_{RE}
3. Calculations for reference emissions				
Reference emissions during the period p		1,791.0	tCO_2/p	RE_p
Fuel consumption of project boiler i using the fuel type j (=natural gas or LPG) during the period p		788,493.0	Nm^3/p or t/p	$FC_{p,i,PJ}$
Fuel consumption of project boiler i using the fuel type j (=diesel oil) during the period p		0	t/p	$FC_{p,i,PJ}$
Net calorific value of fuel used by the project boiler during the period p (for natural or LPGgas ~~fuel~~)		0.0369	GJ/Nm^3 or GJ/t	$NCV_{i,j,PJ}$
Net calorific value of fuel used by the project boiler during the period p (for disele oil)		0.0000	GJ/t	$NCV_{i,j,PJ}$
CO_2 emission factor of reference fuel		0.0543	tCO_2/GJ	EF_{RE}
Efficiency of project boiler i		0.95	-	$\eta_{i,PJ}$
Efficiency of reference boiler		0.89	-	η_{RE}
Blow flow rate setting of project boiler		3.3	%	BF_{PJ}
Blow flow rate setting of reference boiler		9	%	BF_{RE}
4. Calculations of the project emissions				
Project emissions during the period p		1,579.0	tCO_2/p	PE_p
Fuel consumption of project boiler i using the fuel type j (=natural gas or LPG) during the period p		788,493.0	Nm^3/p or t/p	$FC_{p,i,PJ}$
Fuel consumption of project boiler i using the fuel type j (=diesel oil) during the period p		0	t/p	$FC_{p,i,PJ}$
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CO_2 emission factor of fuel used by the project boiler i for the fuel type j (for diesel oil)		0.0000	tCO_2/GJ	$EF_{i,j,PJ}$

4. Measurement, Reporting, Verification (MRV)

To keep these effect we do
- Maintenance program weekly, monthly and yearly done correctly
- Daily inspection use data logging system to easy control
- Boiler water conductivity and blowdown rate keep in range standard

To keep good environment
- Measuring data in every year to make sure O2, CO, NO_x emission in range standard

Progress of the JCM Project Cycle is not yet decided the Methodology and The JCM methodology is under development.

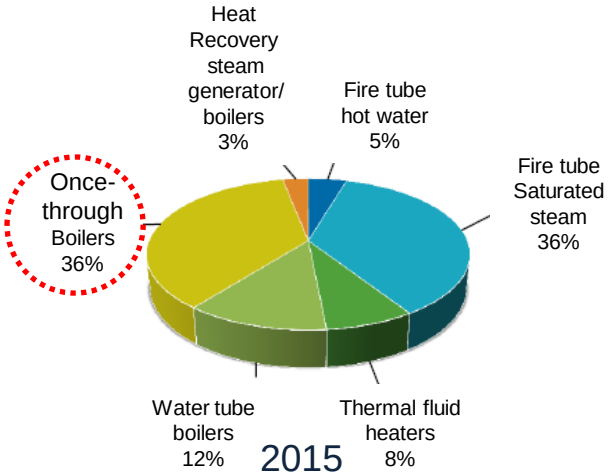
5. Next plan

1. In our company
we will change old type boiler to once through boiler
when renewal for #1 GB factory boiler and tire factory boiler.

2. In indonesia
It is said that annualy 1,000 unit of boilers are newly installed / replaced in Indonesia in many sectors.

(i) "**water tube boiler**" imported from China

(ii) Euroasiatic (leading) and other brands: "**fire tube boiler**"



Higher efficiency "**Once-through Boiler**" will have over 50% of share in near future from 36% in 2015

In Japan once through boiler share is already **89%(2013)**

THANK YOU