MiBs (Miwa Intermittent Boiling System) for Batch Vacuum Pan

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Miwa Electric Industrial Co., Ltd

Boiling Pan Business Summary

- Developed and evolved Intermittent Boiling System and Consistency Meter based on accumulated know-how during a half a century (50 years) of Product development, sales, service and maintenance work involvement
- On the basis of above experience; we are conducting Boiling Operation Consulting for the purpose of "long-term operation of the factory, better productivity and Panman's skill up"

1967 Automatic Boiling Pan System

1973~ Consistency Meter / Intermittent Boiling System

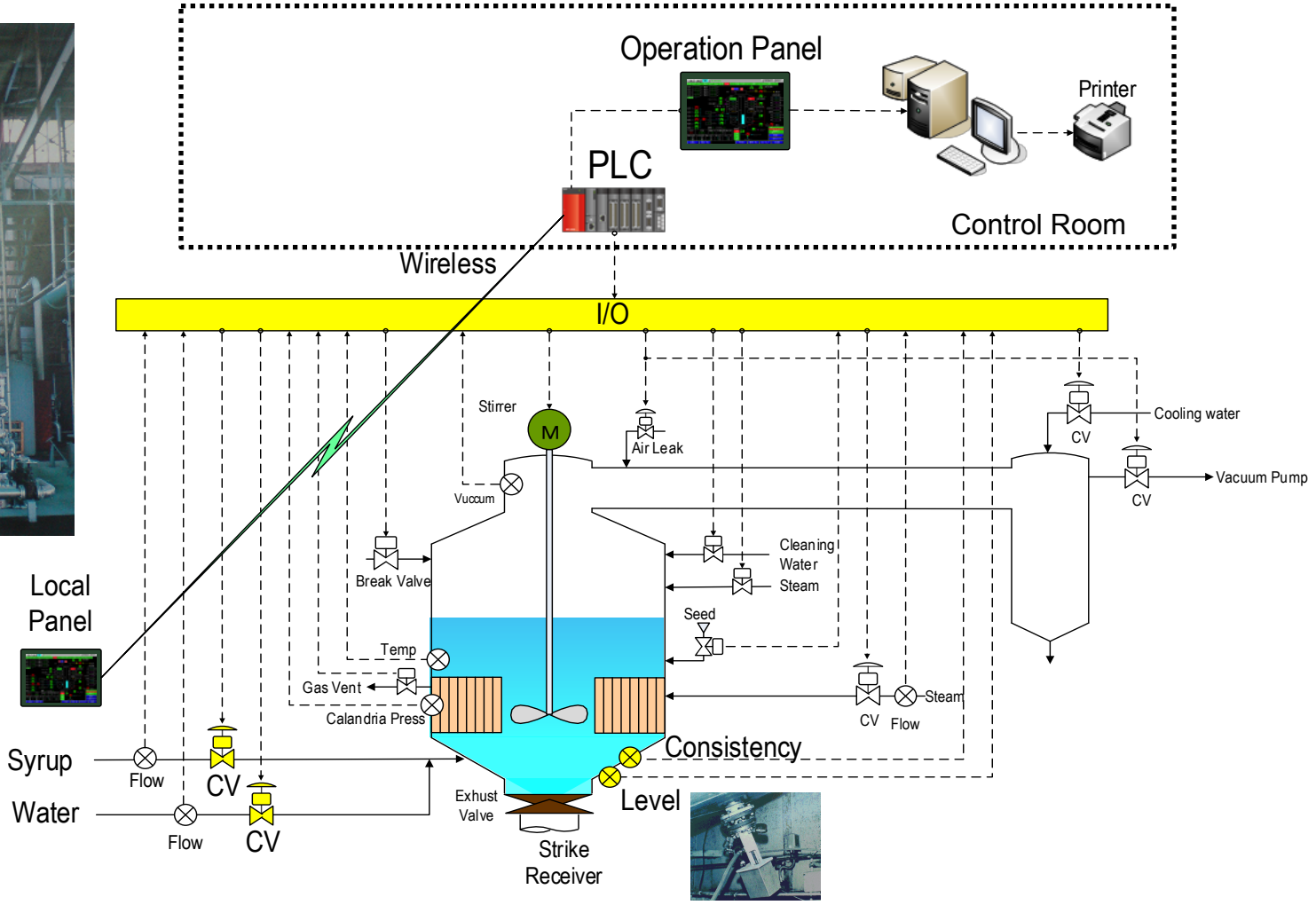
1974~ PCS for Entire Sugar Process Control

1984~ Boiling Operation Consulting

2008 MiBs (Miwa Intermittent Boiling System)

2011

Miwa Intermittent Boiling system (MiBs)



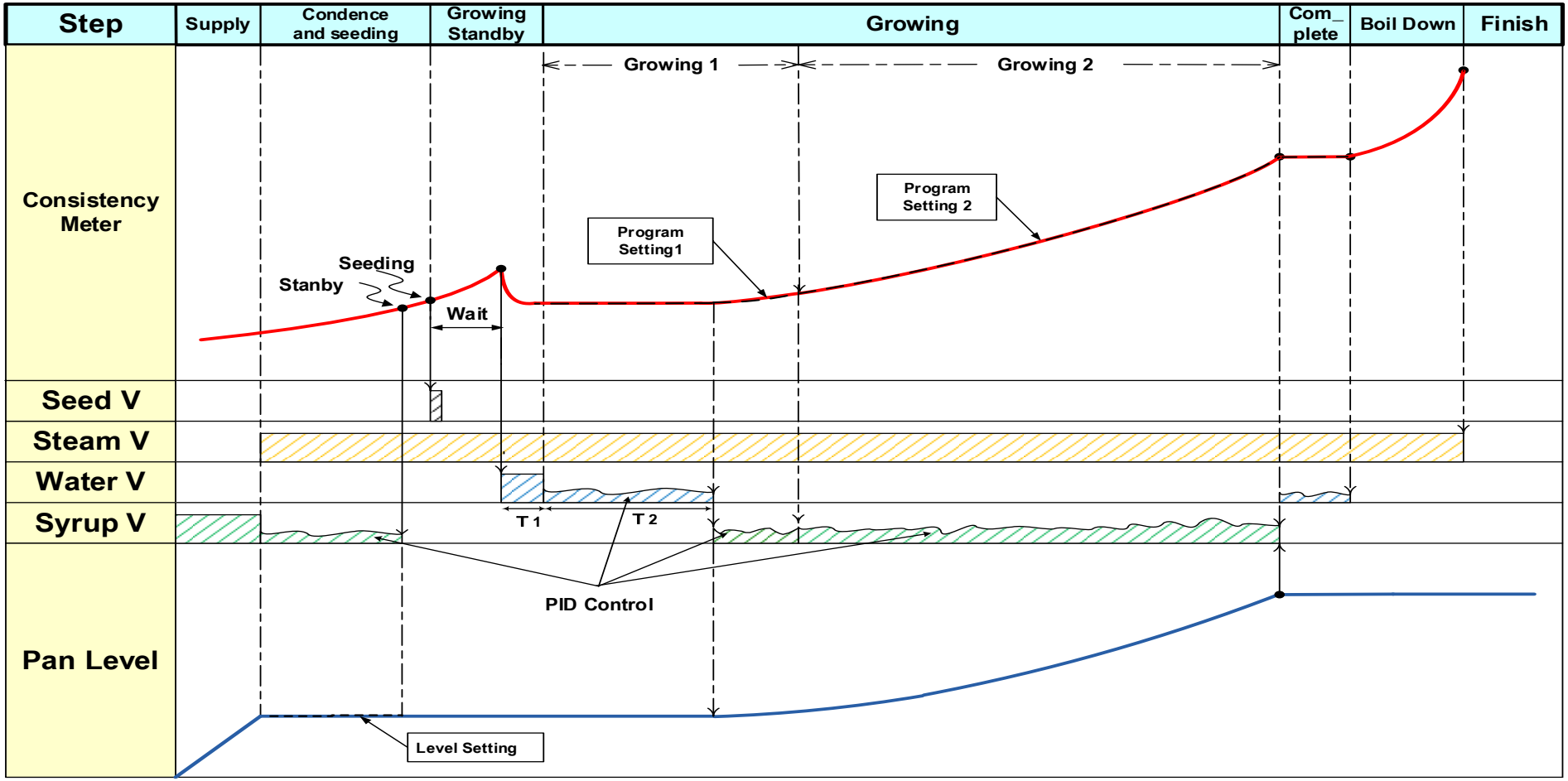
Intermittent Boiling gives supersaturating operation (shorten boiling cycle, Save material / energy) and high quality product

Our achievement from Japanese mills by MiBs

- Refined Sugar yield increased by **2.3%** : product/massecuite
- Raw sugar yield increased by **2.1%** : Recovery ratio of solid in massecuite
- Crystallization time was reduced by **5%**
- Reduction of the consumption of steam, re-melting and wash water

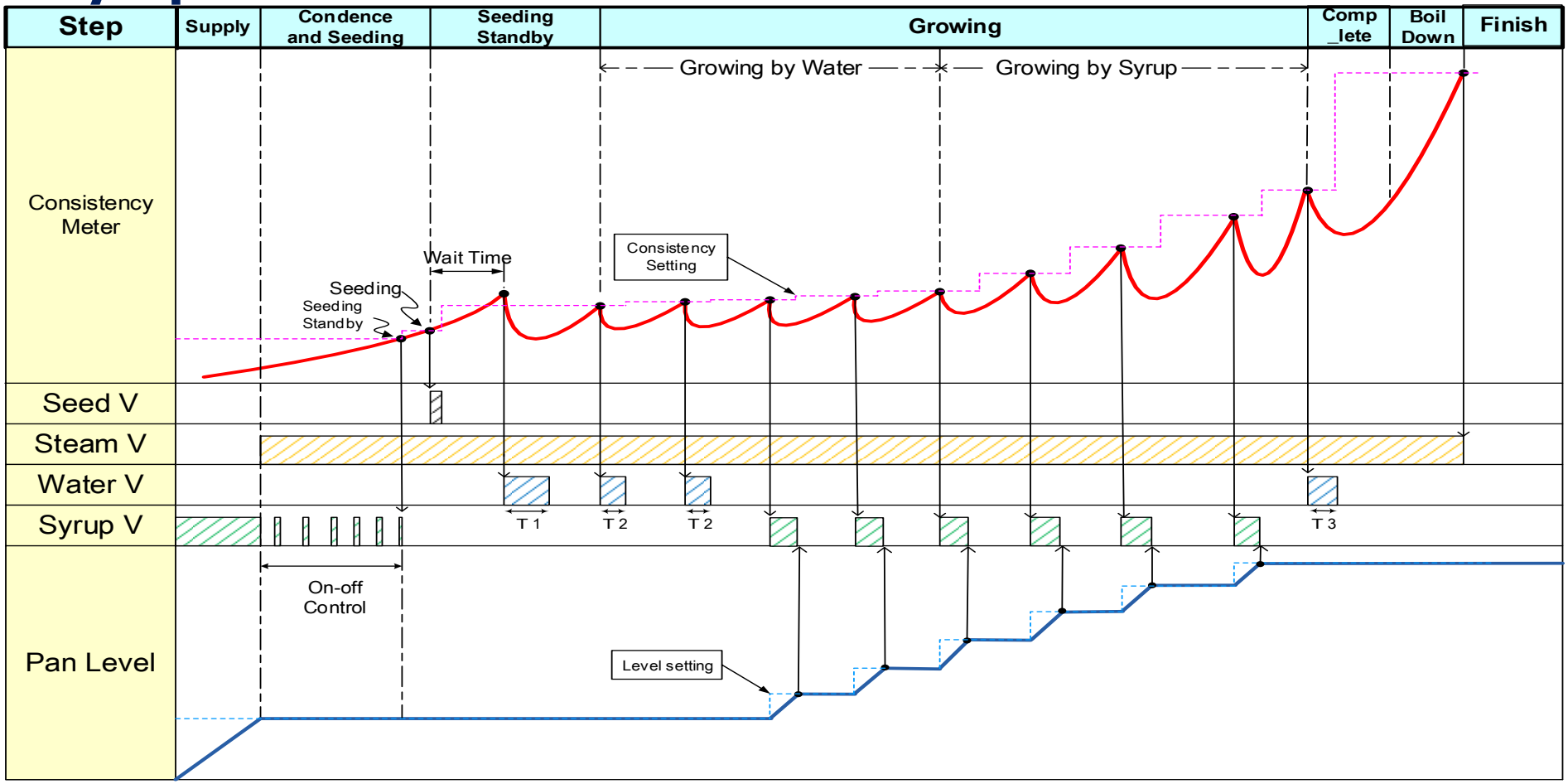
Continuous Boiling in Batch Vacuum Pan

Feed Syrup and Water are continuously supplied by using PID controller to control the Syrup valve and Water valve

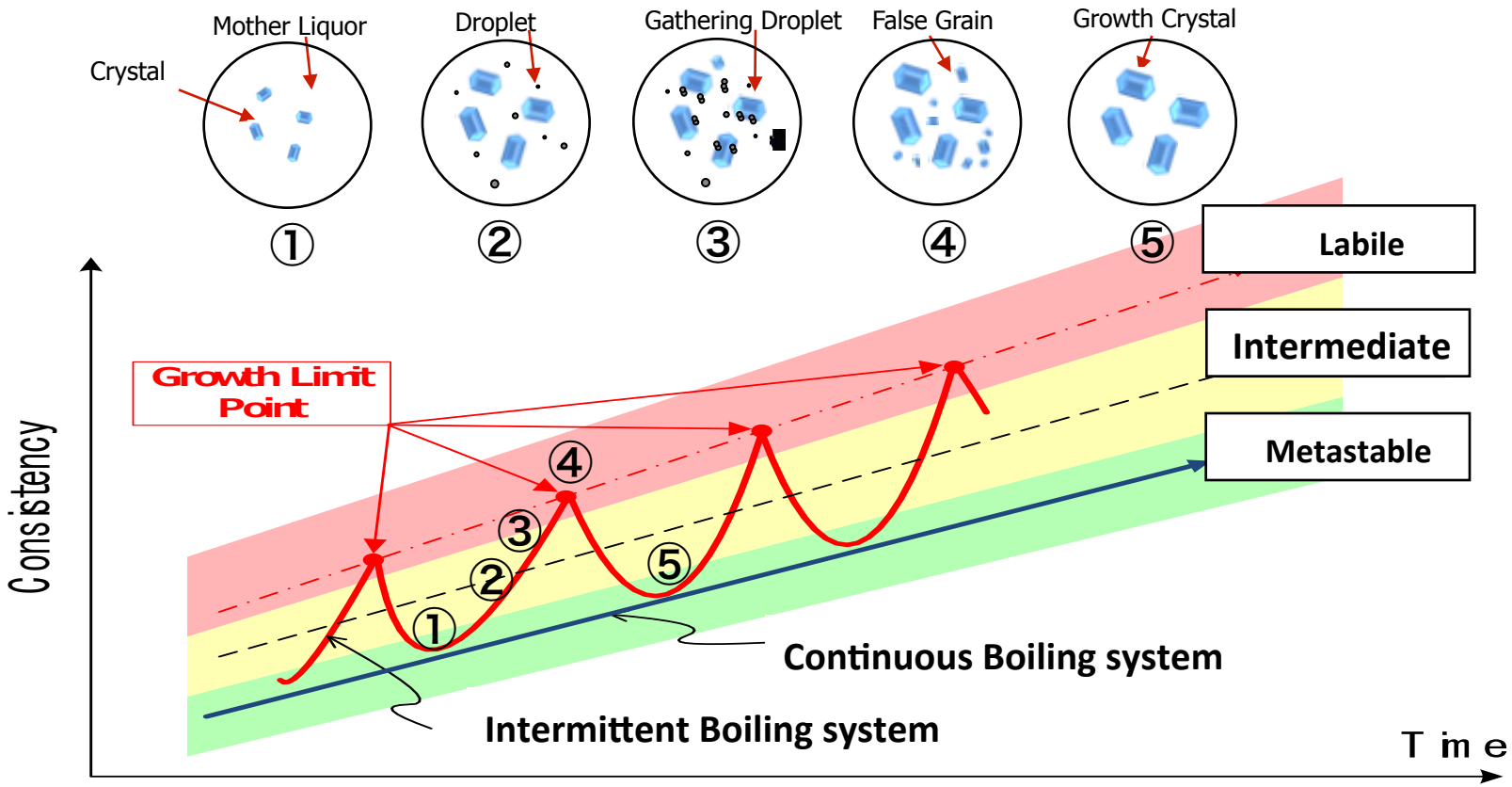


Intermittent Boiling in Batch Vacuum Pan

Feed Syrup and water are intermittently supplied to the solution, controlled by MiBs, by opening & closing the Syrup valve and Water valve



Main difference



- Metastable zone: nearest saturation; existing crystals increase in size but new crystal cannot form
- Intermediate zone: new crystals can be formed but only in the presence of existing crystals
- Labile zone: existing crystals grow; And new crystals can form even in the absence of existing crystal seeds

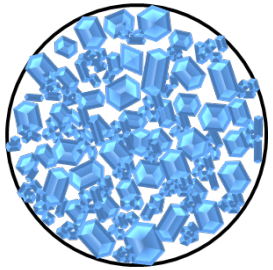
Merits of Intermittent Boiling

- **Reduction of False Grains, Twin Grains and Clustered Grains**

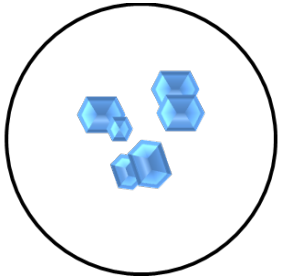
Fine Crystal

- Raise **Market Value of the product**
- Improve **Color Value**
- Shorten **Curing time,**
- **reduce washing water**
- Reduce sugar dust -> less **Dryer fan and Cooler breakdown**
- **Better Sieve process**
- **Better Packing speed** ry)

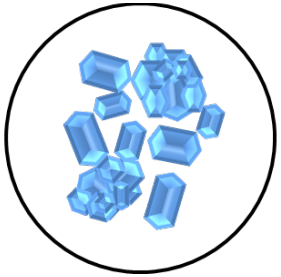
False Grains



Twin Grains



Clustered Grains



Merits of Intermittent Boiling

- Increase in yield due to higher crystal ratio in Massecuite
  - Shorter Boiling Time
  - Less number of Boiling Batches
  - Lower Purity in Final Molasses
  - Reduction of Steam Consumption
  - Due to less number of boiling batches, Non-Sucrose% become less

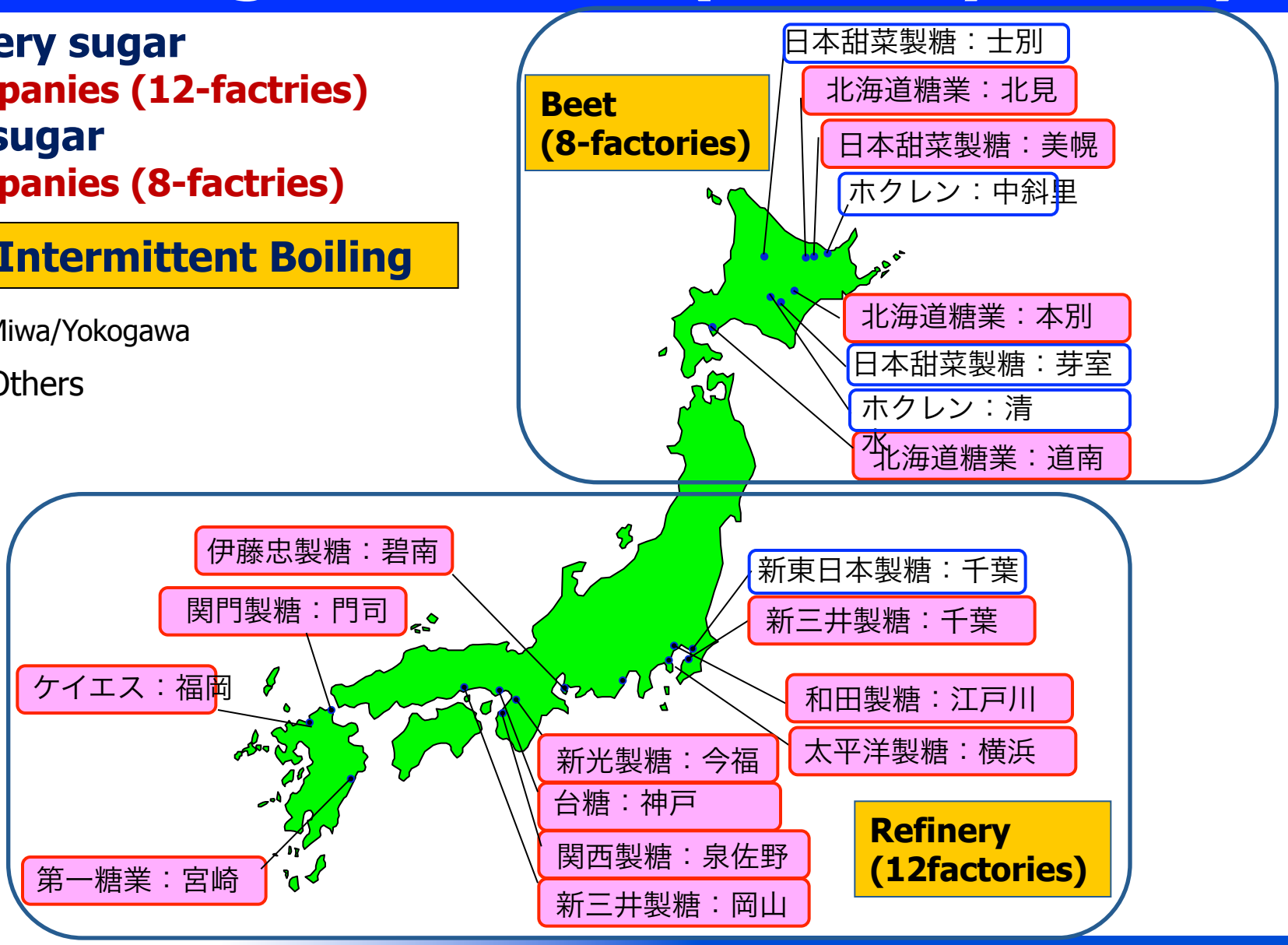
Japanese Sugar Factories (Refinery・Beet)

- **Refinery sugar**
  9-companies (12-factries)
- **Beet sugar**
  3-companies (8-factries)

ALL use Intermittent Boiling

Miwa/Yokogawa

Others



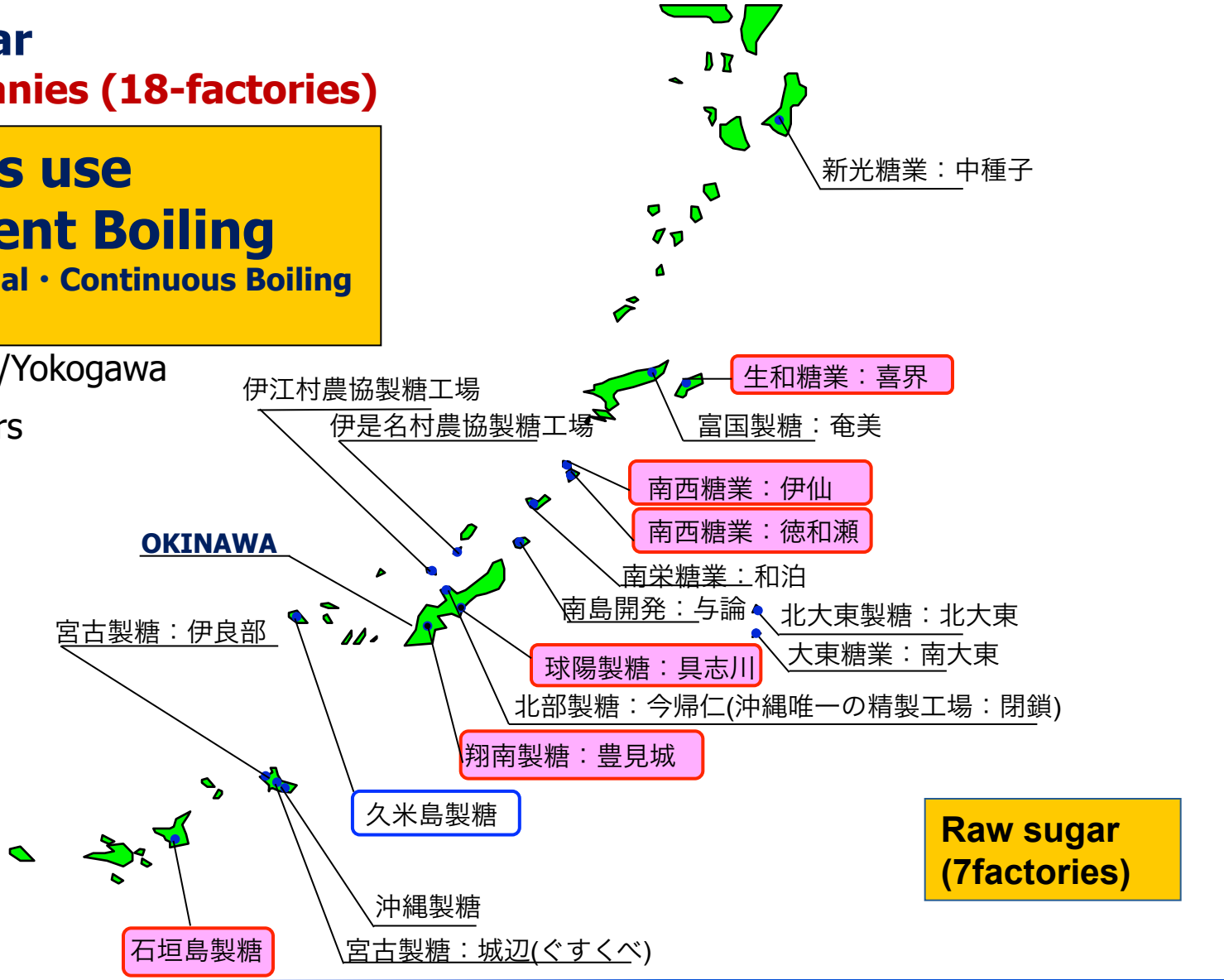
Japan･Okinawa Sugar Factories (Raw Sugar)

- **Raw sugar**
  15-companies (18-factories)

7 factories use Intermittent Boiling
(Others by Manual・Continuous Boiling in Batch Pans)

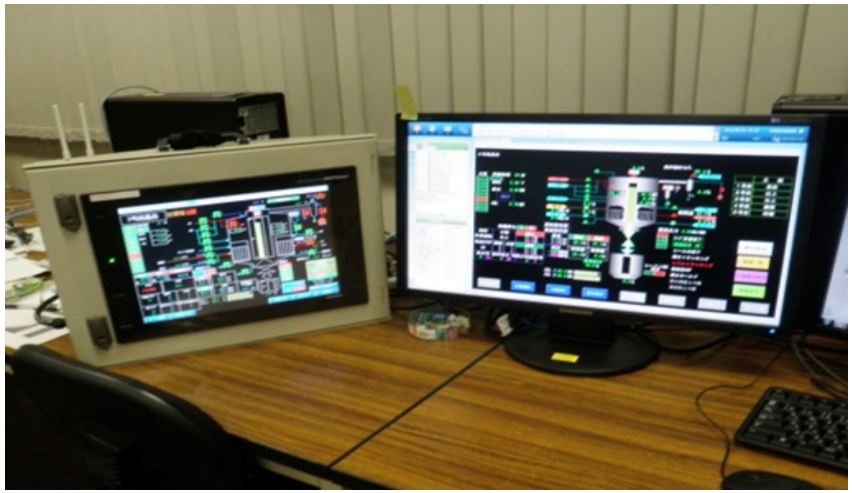
Miwa/Yokogawa

Others

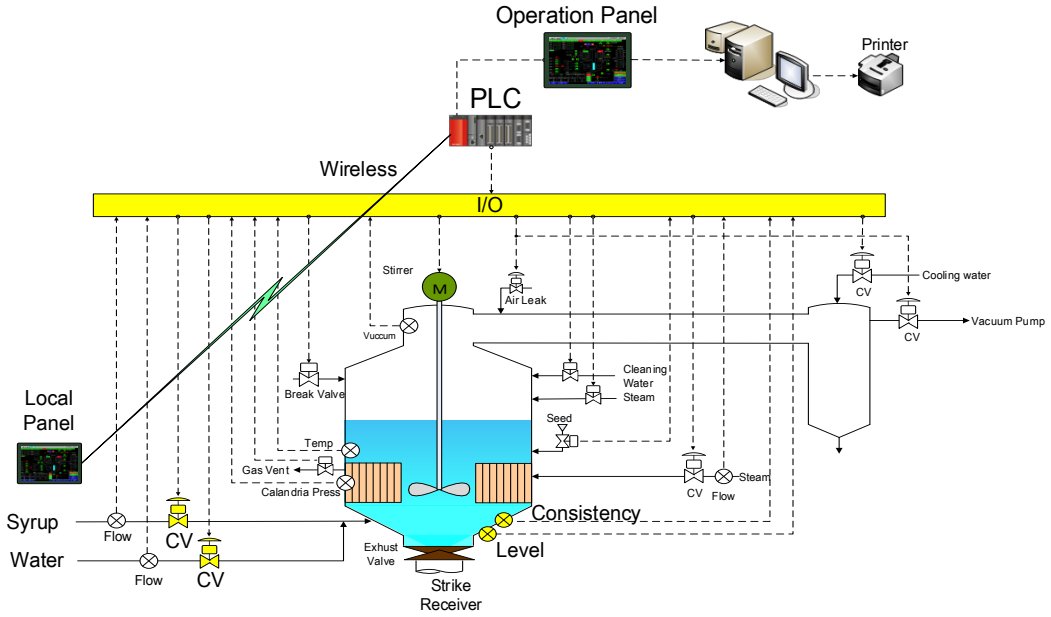


Raw sugar (7factories)

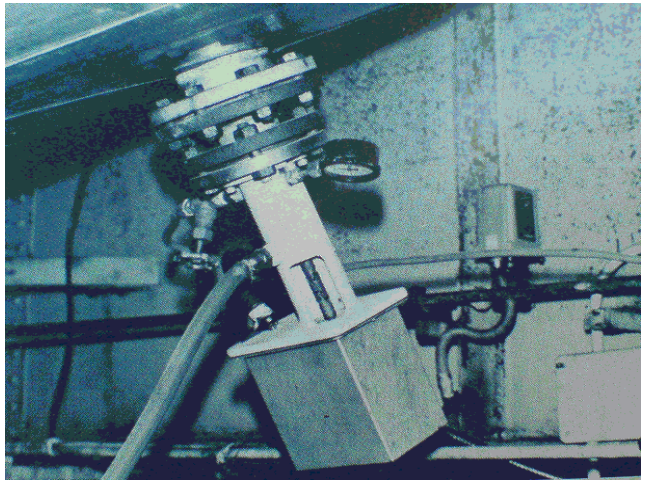
User Friendly System



- PLC Operation
- Touch Panel Operation
- Operation beside Pan
- Flexible Programming
- Simulator function
- Boiling data back up
- Integration with DCS



Field Operation panel & Consistency Meter



Boiling Operations consulting for MiBs

- Professional Team onsite consulting
- To enhance Panman's skill and improve productivity;
  - Boiling Operation Technical Seminar/Workshop
  - Hands-on guidance

  Total 7 working days

- Expected outcome
  - Enhanced Panman's Skill
  - Better quality of the product
  - Enhanced entire plant capacity
  - Cost Reduction

Our Professional Team

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Sample Computation of Benefits

Sample Computation		
Rated Capacity	10,000	TCD
Raw Sugar Yield	100	kg/ton-cane
Production Period	180	days
Yield Improvement	**2.1%**	
Yield Increase	2.1	kg/ton-cane
Daily Yield Increase	21,000	kg per day
Total Yield Increase	3,780,000	kg/season
1-LKG bag	50	kg/LKg-bag
price per LKG as of June 2015	1600	PhP/LKg-bag
Increase in Raw Sugar Sales	120,960,000	PhP/season
Mill share (30%)	36,288,000	PhP/season

Sample Computation of Potential Power Generation

Energy Consumption Savings	5%		
steam consumption at vacuum pan	115	ton-steam/hr	
5% reduction	5.75	ton-steam/hr	
steam generation (assumption)	1.98	ton-steam/ton-bagasse	
surplus bagasse	2.90	ton-bagasse	
if surplus bagasse is used in power generation (using existing system)			
power generation per ton-steam	59	kWh/ton-steam	
	30	kWh/ton-bagasse	
from saved bagasse, we can generat	87	kWh/ton-surplus bagasse	
for the season	373,829	kWh	
at FIT (PhP6.63/kWh)	2,478,488	PhP/season	
if surplus bagasse is used in power generation (using mid-pressure, CEST system)			
power generation per ton-steam	109	kW/ton-steam	
	55	kW/ton-bagasse	
mid-pressure, CEST system power generation			
from saved bagasse, we can generat	160	kWh/ton-surplus bagasse	
for the season	690,634	kWh	
at FIT (PhP6.63/kWh)	4,578,901	PhP/season	

MiBs will contribute to the better operation in the factory.

END

Contact Information

Please feel free to contact us at any time if you are interested in MiBs Technologies.

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