Modularization of HPAL and POX Units in Nickel & Cobalt Industries

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Morimatsu Energies & Materials

Solutions by Morimatsu to HPAL and POX Projects:

Autoclaves, Preheaters, and Flash Vessels

Detail design and fabrication, including autoclaves, preheaters, and flash vessels, etc.

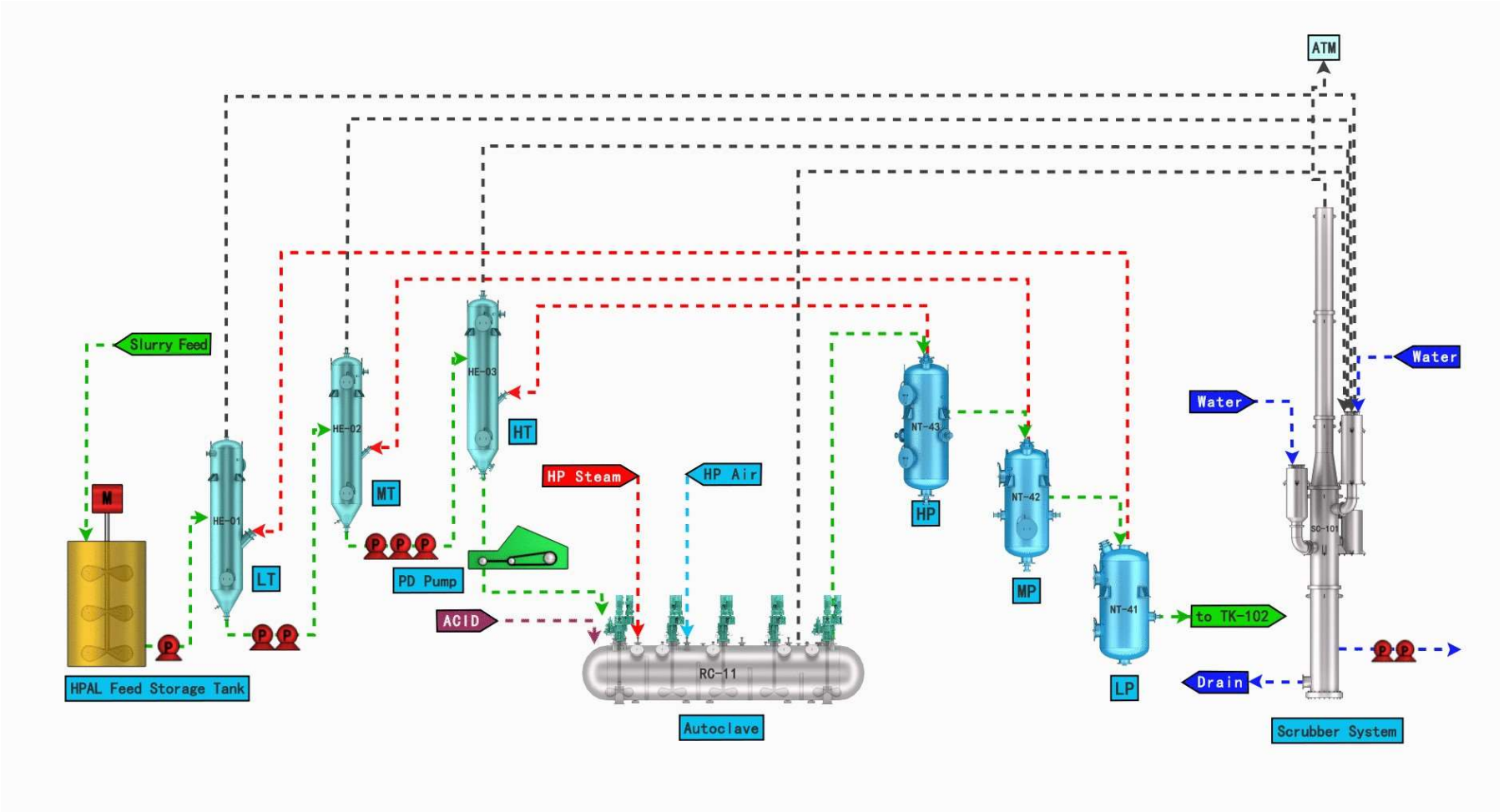
Agitators

Detail design and fabrication of Agitating system, including agitator blade, shaft, mechanical seal, flushing system, cooling system, etc.

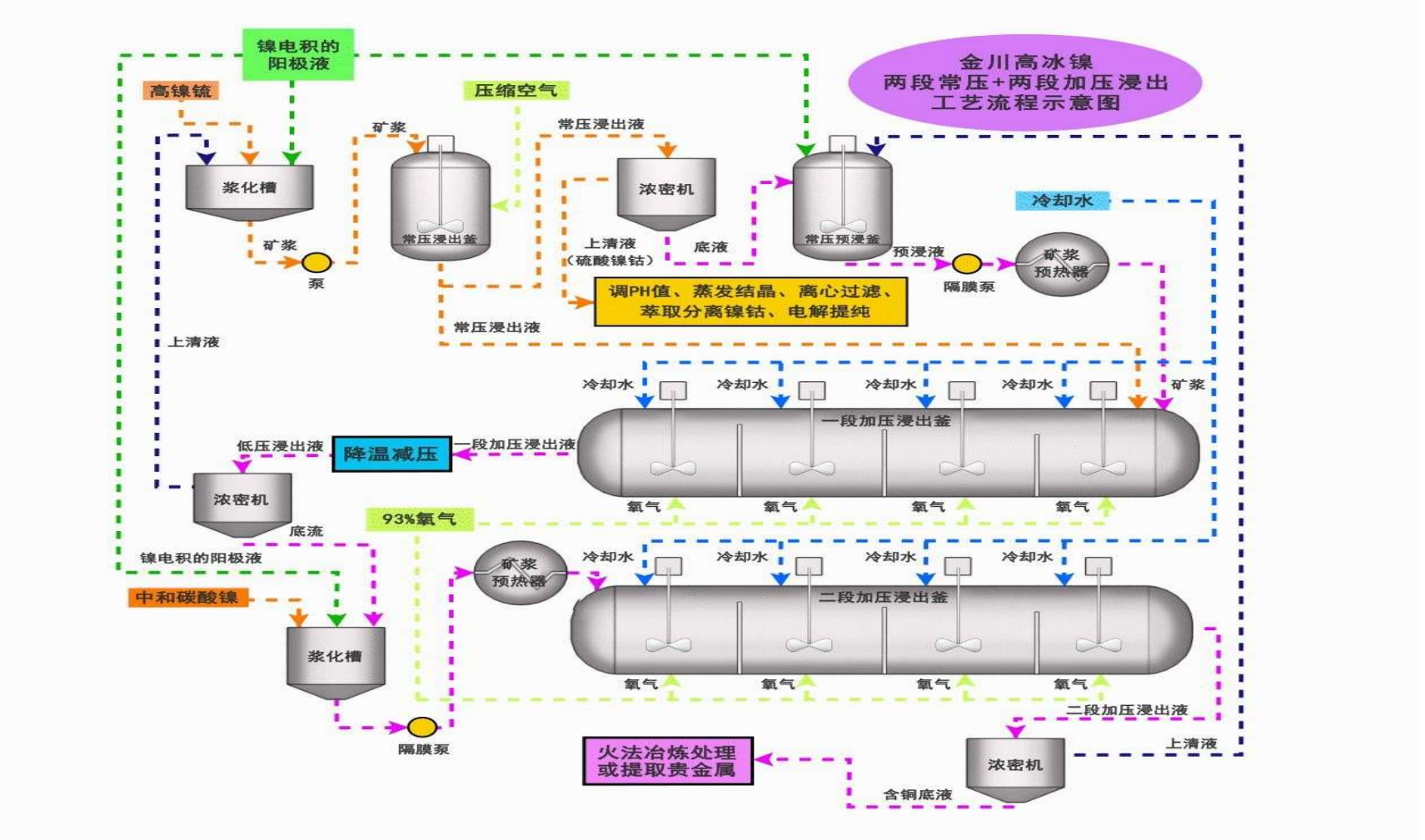
Modules

Modularization of HPAL and POX system, including module design, fabrication, and pre-assembly. Detail design of piping, pumps, valves, steel structures and E&I.

HPAL-High Pressure Acid Leaching of Laterite



POX - Pressure Oxidation of Ni Matte



Autocalves for Amabtovy & Ramu HPAL Projects

Size： ID5230xL42400x(118+8)t

Material： SA-516 Gr.70N+SB-265 Gr.17

Delivered in 2008, Madagascar

Size： ID5100xL39300x(118+8)t

Material： SA-516 Gr.70N+SB-265 Gr.17

Delivered in 2009, Papua New Guinea

Autoclave for Meta Gordes HPAL Project

Size: ID5200xL32500x(118+8)t

Material: SA-516 Gr.70N+SB-265 Gr.17

Delivered in 2013, Turkey

Autocalves and Agitators for Lygend HPAL Project

Size: ID5300xL41500x(126+6)t

Material: SA-516 Gr.70N+SB-265 Gr.17

Delivered in 2020, OBI Island, Indonesia

Autoclaves for Huayue and Huafei HPAL Projects

Size: ID5300xL41500x(126+6)t

Material: SA-516 Gr.70N+SB-265 Gr.17

Delivered in 2020, Morowali, Indonesia

Size: ID5900xL44200x(140+8)t

Material: SA-516 Gr.70N+SB-265 Gr.2

Delivered in 2022, Weda Bay, Indonesia

Autoclaves and Agitators for QMB HPAL Projects

Size: ID4800xL33000x(115+6)t

Material: SA-516 Gr.70N+SB-265 Gr.17

Delivered in 2021, Morowali, Indonesia

Size: ID5900xL44900x(138+6)t

Material: SA-516 Gr.70N+SB-265 Gr.17

Delivered in 2023, Morowali, Indonesia

Autocalves and Agitators for Jinchuan Ni/Co POX Projects

Feedstock: Ni matte, MSP, Ni/Cu alloy, Co alloy



Size: ID1800xTT6800 Materials: Q345R+TA1
Size: ID2500xTT8600 Materials : Q345R+TA1
Size: ID3200xTT6500 Materials : Q345R+TA1
Size: ID3800xTT19000 Materials : Q345R+TA1

Autocalves and Agitators for Huayou Ni/Co POX Projects

Feedstock: Ni matte, MSP, Co/Cu Sulphide, Co alloy

Size: ID3900xTT20000 Materials: Q345R+TA2
Size: ID3400xTT13500 Materials: Q345R+TA2
Delivered in 2021 and 2022, China

Size: ID3900xTT24000 Materials: Q345R+Bricks
Size: ID3900xTT18000 Materials: Q345R+Bricks
Delivered in 2014 and 2021, China

Autocalves and Agitators for Nickel Matte POX Projects

Feedstock: Ni matte

Size: ID3900xTT20000 Materials: Q345R+TA2
Delivered in 2023, South Korea

Size: ID3900xTT20000 Materials: Q345R+TA2
Delivered in 2023, China

HPAL Modules for QMB Project

Size: 18m(L) ×20m(W) ×30m(H)

Capacity: 2 KTA, Laterite

Location: Indonesia

Delivered: 2020

Morimatsu Scope

Engineering

Feasibility Study

Basic Design

Detail & Shop Design

Procurement

Static & Rotary EQ

E&I, Piping, Valve

Structure Steel

Construction

Fabrication, Assembly

Inspection, FAT

Erec., Com Support

HPAL Modules for Excellen-Silo Project

Size: 24m(L) ×22m(W) ×38m(H)

Capacity: 10 KTA Ni, Laterite

Location: Indonesia

Delivered: 2023

Morimatsu Scope

Engineering

Feasibility Study

Basic Design

Detail & Shop Design

Procurement

Static & Rotary EQ

E&I, Piping, Valve

Structure Steel

Construction

Fabrication, Assembly

Inspection, FAT

Erec., Com Support

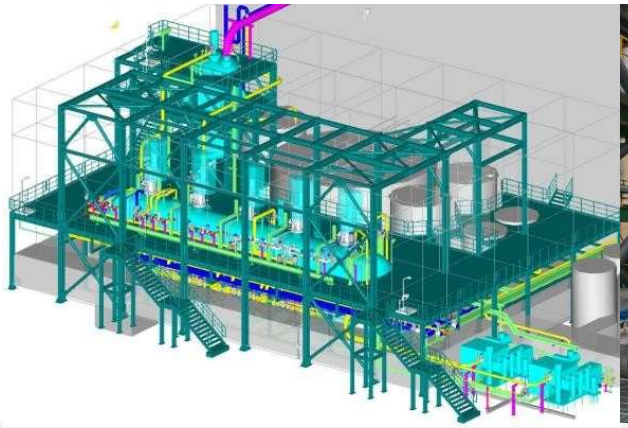
Ni Matte POX Modules for GEM Project

Size: 25m(L) ×20m(W) ×24m(H)

Capacity: 20 KTA Ni, Matte

Location: China

Delivery: 2023



Morimatsu Scope

Engineering

Feasibility Study

Basic Design

Detail & Shop Design

Procurement

Static & Rotary EQ

E&I, Piping, Valve

Structure Steel

Construction

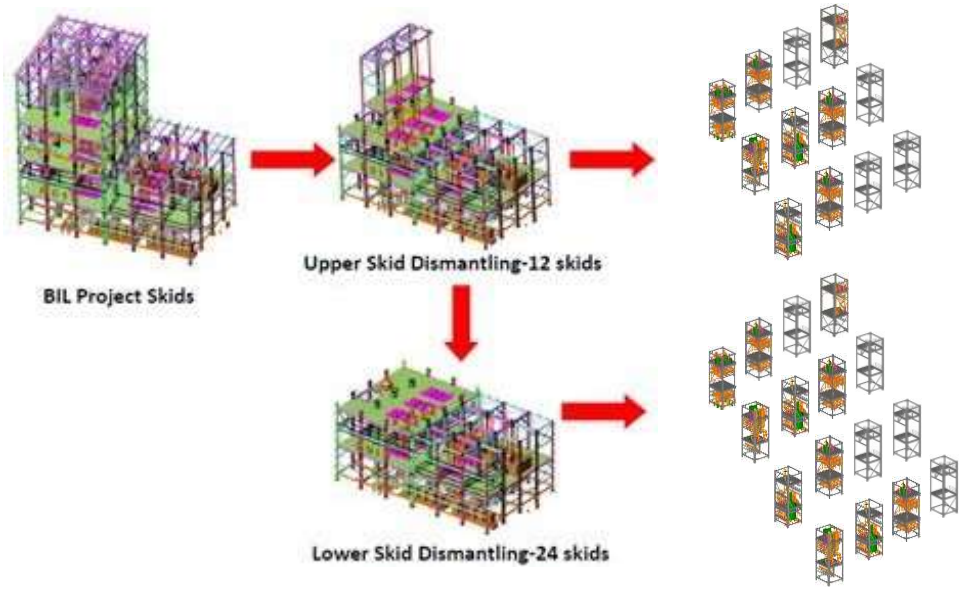
Fabrication, Assembly

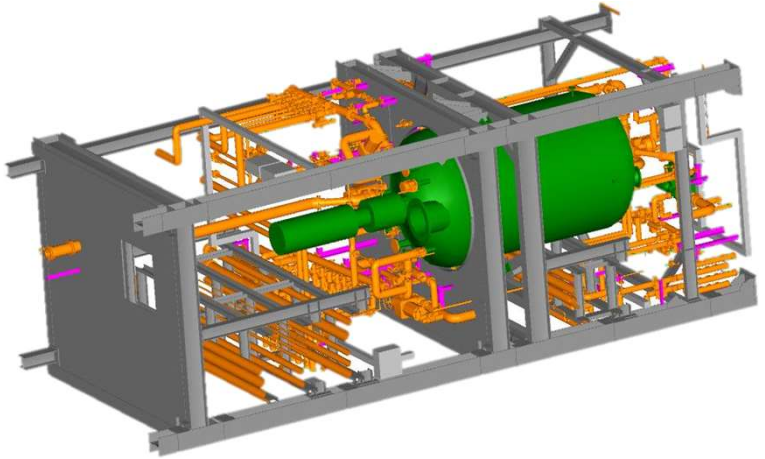
Inspection, FAT

Erec., Com Support

Modularization

- ✓ Modularize the building in order to install the process and utilities to one functional unit.
- ✓ Modularize the process into a functional skid.
- ✓ Pre-installation of equipment, piping, electrical and HVAC in the workshop.
- ✓ The numbers of interfaces and installation on site will be minimized.
- ✓ Pre-testing of the modular building with process installations before shipping to final site.
- ✓ Disassembling and re-assembling on site.





Business Drivers for Modularization

✓ Schedule Certainty

- Shorten Schedule through Parallel Activities
- 80-90% of the fabrication is completed at Morimatsu Workshop

✓ Transplantable & Compatible

- Easy for disassembly and reassembly
- Facilitate Maintenance & Convenient for renewal
- Possible for relocation to meet global market strategy

✓ Competitive Cost

- Economic Return for Early Operation
- Cost Reduction for Repeated Projects

Business Drivers for Modularization

✓ Benefits of Offsite Construction----Improved Quality & Safety

Cleaner and safer environment

Skilled worker team

Avoid the conflict with other construction teams at client site

Reduced site labor and peak

Shorter installation time on site

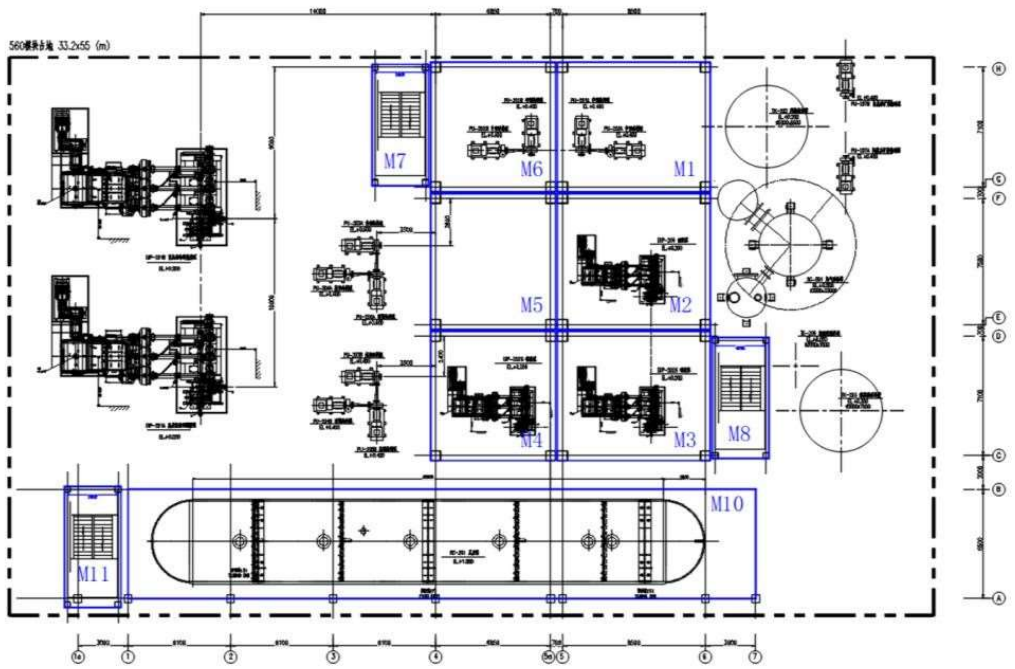
Easy to do commissioning at workshop

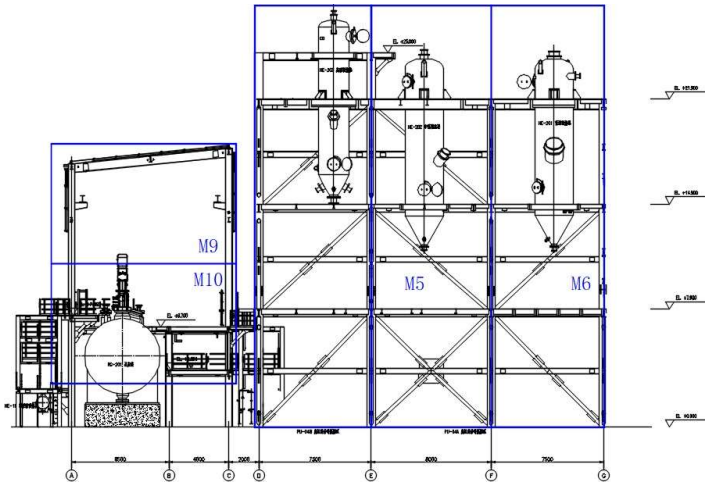
Lower environmental/socioeconomic impact

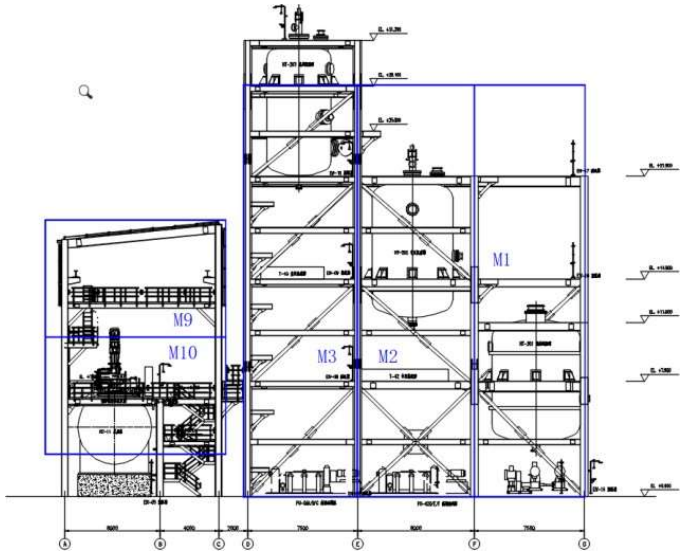
Less disturbance by local situation

- Bad Environment
- Poor Infrastructure
- Inefficient / Expensive Local Team
- Unstable Political Environment

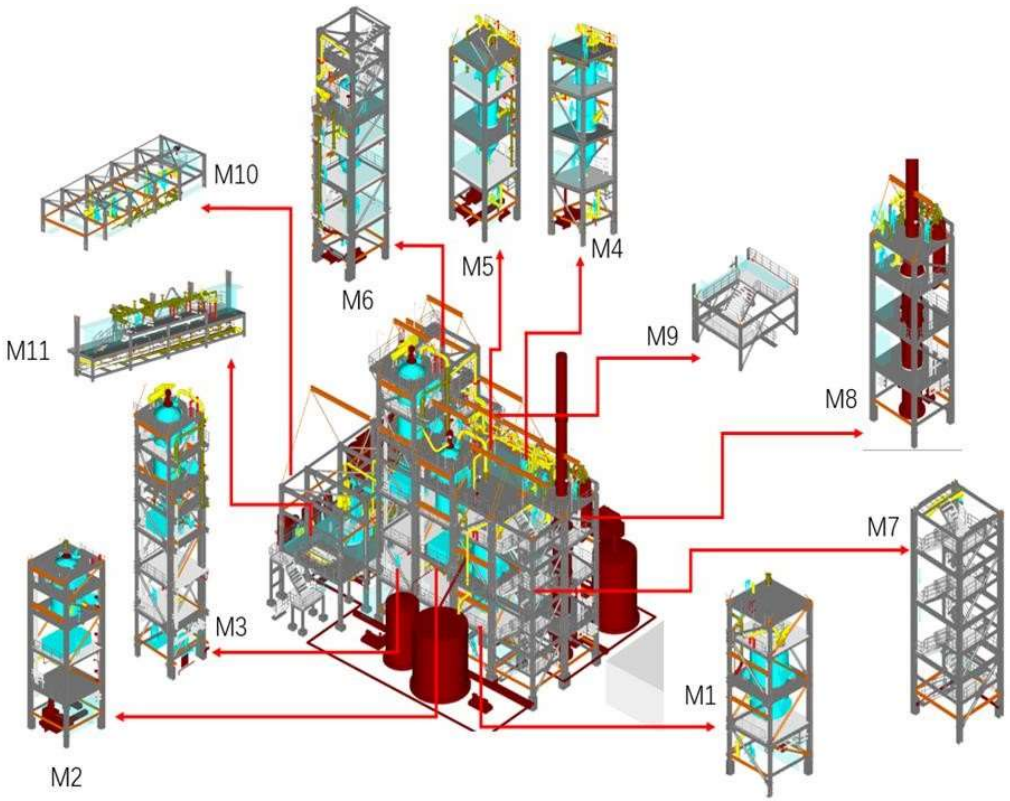
Layout and Modularization plan for HPAL Plants



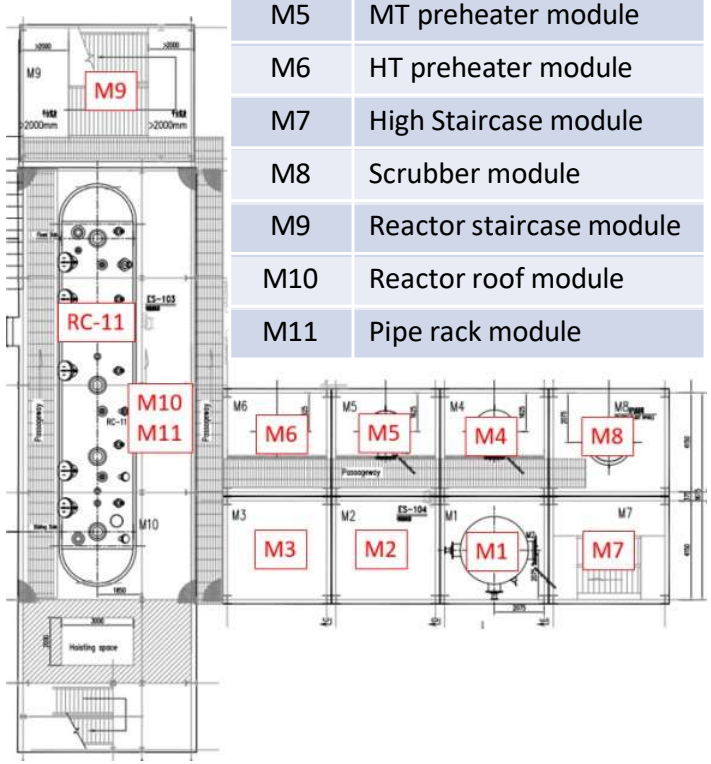




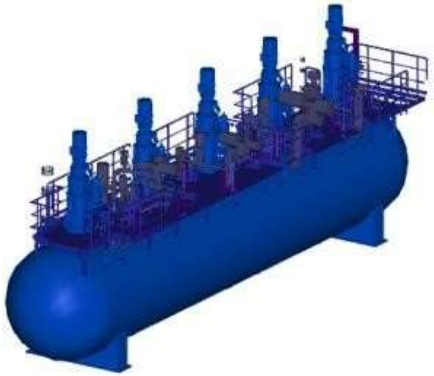
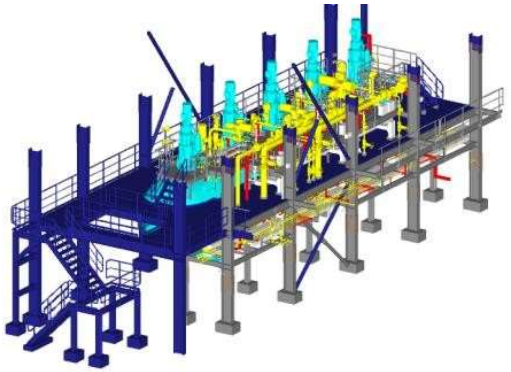
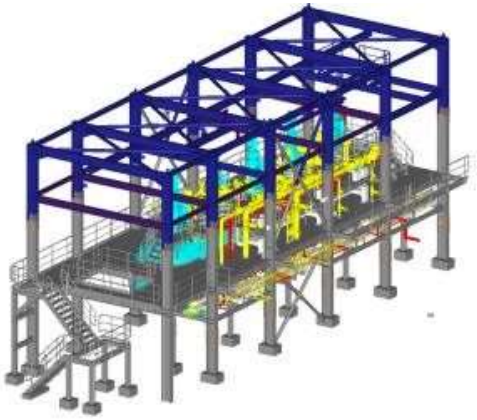
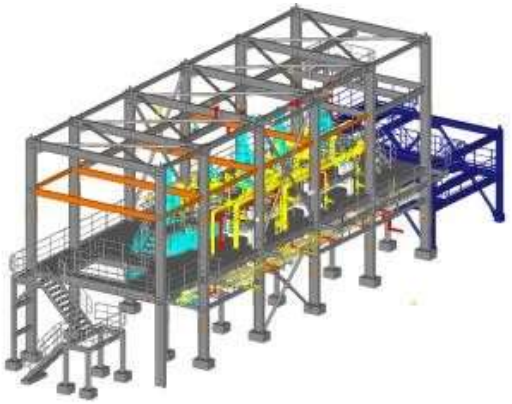
Layout and Modularization plan for HPAL Plants



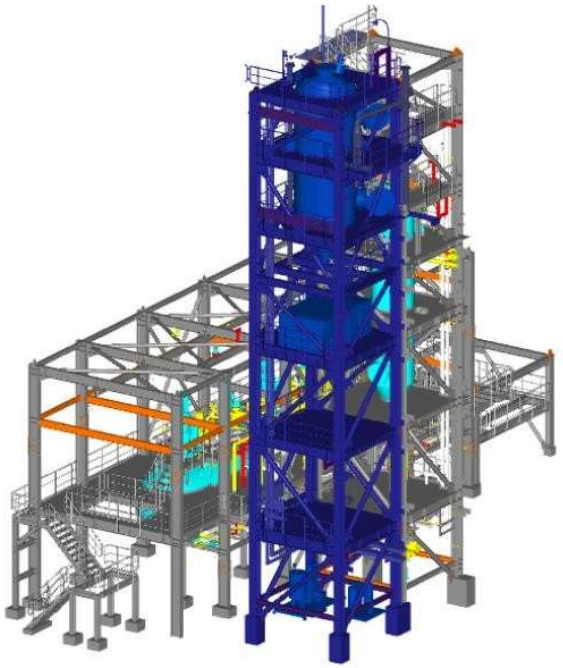
Module List	
M1	LP flash vessel module
M2	MP flash vessel module
M3	HP flash vessel module
M4	LT preheater module
M5	MT preheater module
M6	HT preheater module
M7	High Staircase module
M8	Scrubber module
M9	Reactor staircase module
M10	Reactor roof module
M11	Pipe rack module



Assembling Plan for HPAL Modules

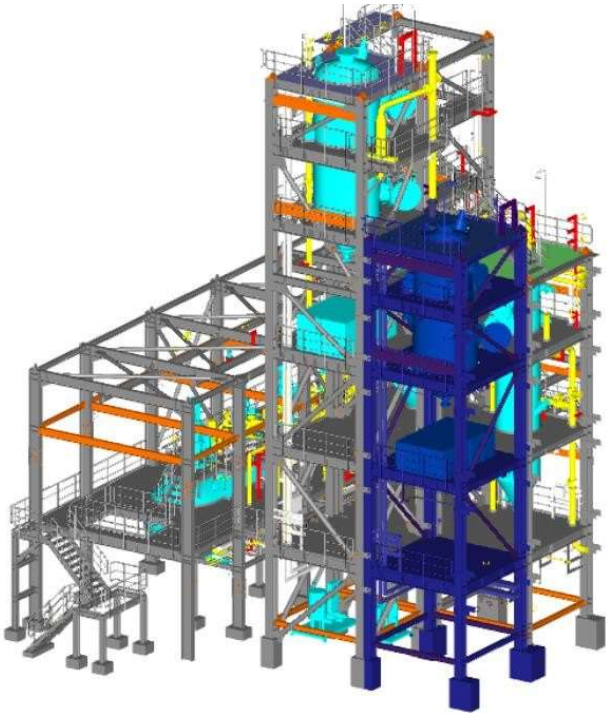
Step 1: Autoclave	Step 2: M11 Pipe rack module
	
Step 3: M10 Reactor roof module	**Step 4: M9 Reactor staircase module**
	

Assembling Plan of HPAL Modules

Step 5: M6 HT preheater module	Step 6: M3 HP flash vessel module
	

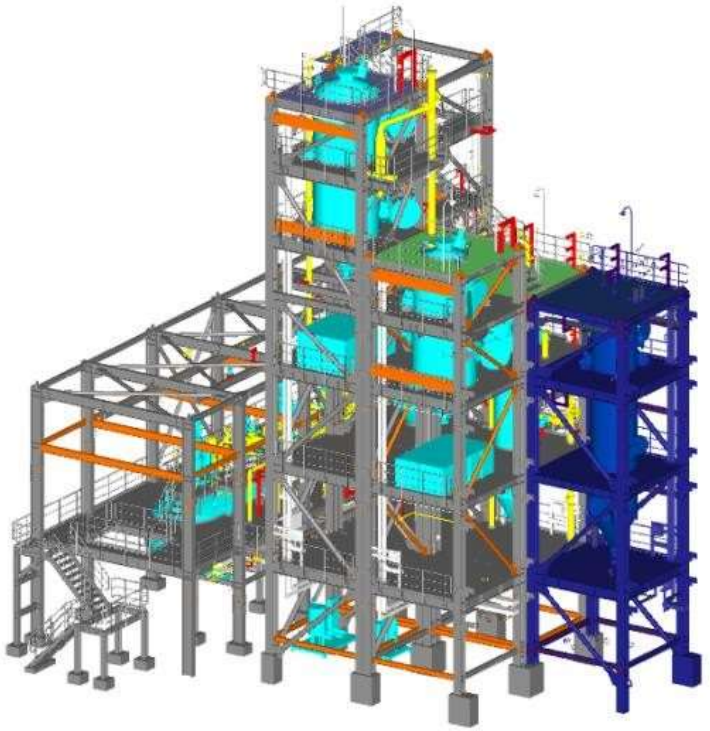
Assembling Plan of HPAL Modules

Step 7: M5 MT preheater module	Step 8: M2 MP flash vessel module

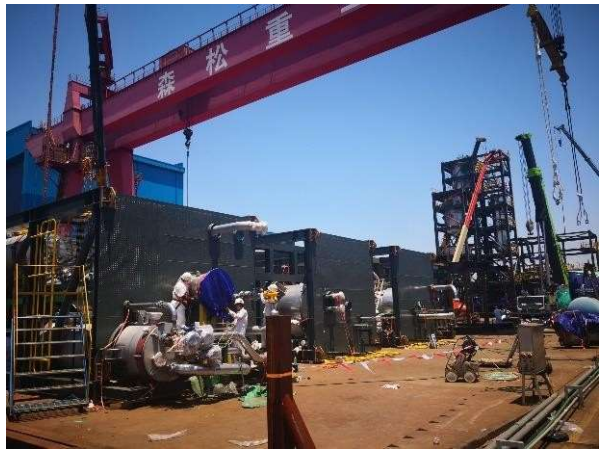


Assembling Plan of HPAL Modules

Step 9: M4 LT preheater module	Step 10: M1 LP flash vessel module



•Assembling and disassembling at Morimatsu workshop



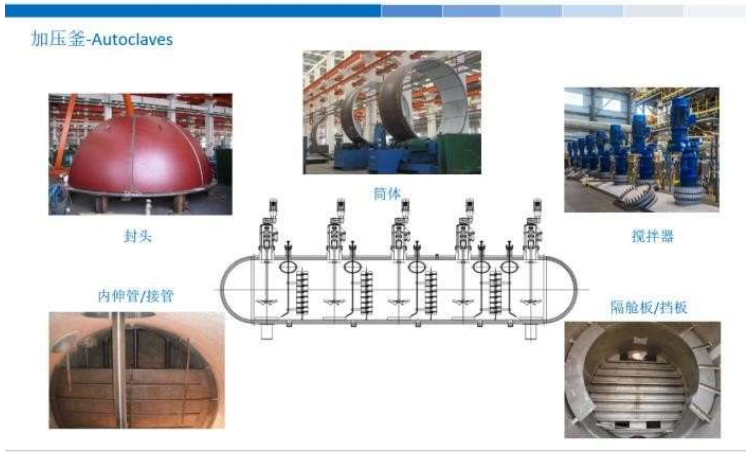
•Re-assembling on site

Modular site installation:
7 days, with 2 units of cranes (100+300) tons.

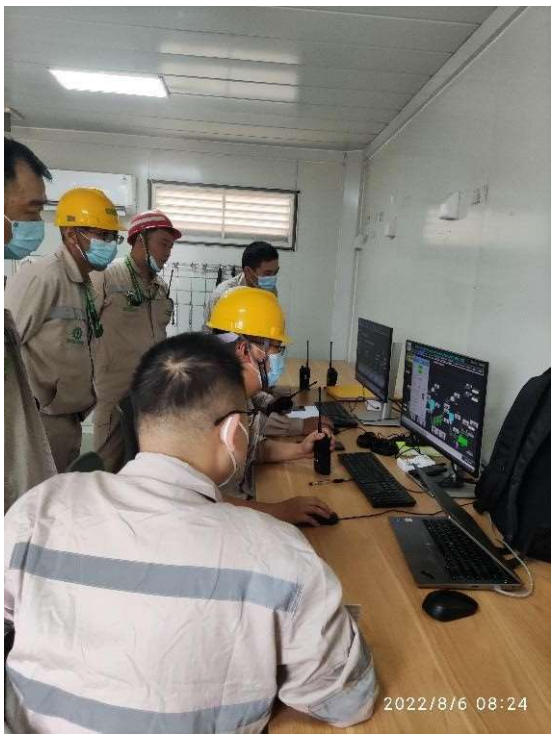
Installation of miscellaneous:
3 weeks, with two units of 50-ton cranes.

Morimatsu supervision:
4 weeks with 3 Engineers on site

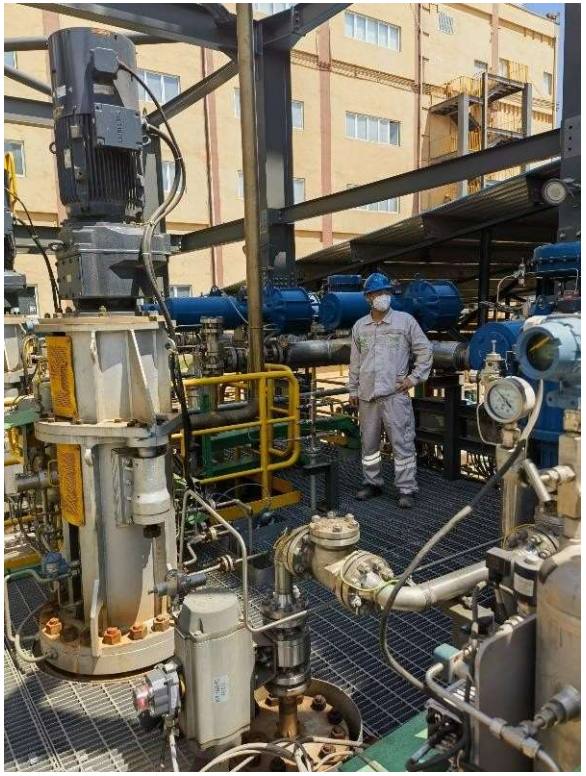
•Commissioning and operation training on site



•Commissioning supervision on site

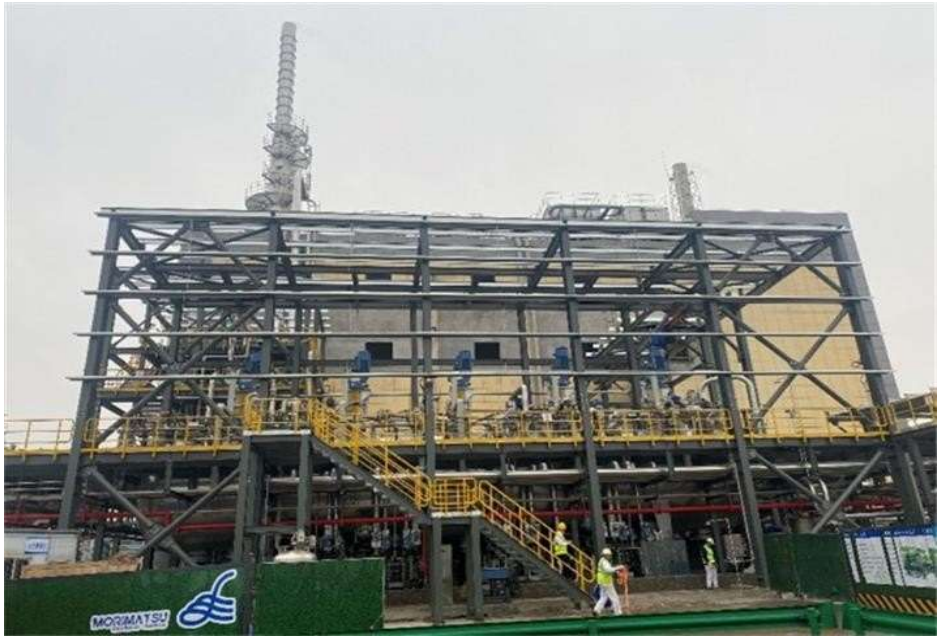


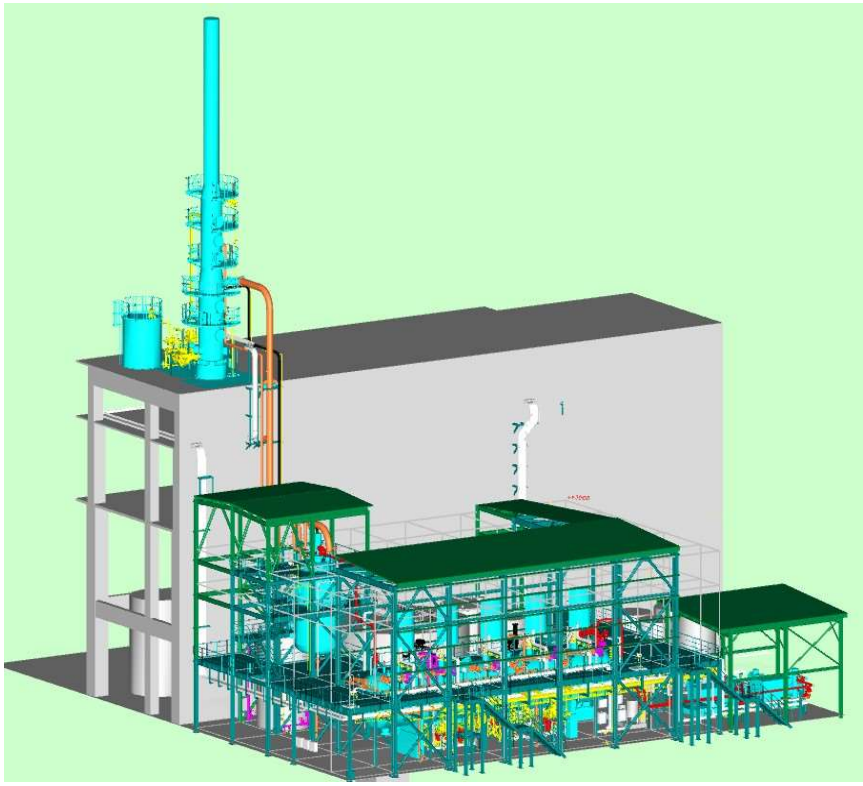
•Commissioning supervision on site



- Successful Commissioning and ramp up

Highly Prefabrication： Alternative solution to modularization of HPAL and POX





- Successful Commissioning and ramp up

THANKS!

Come to visit us at Booth 30!

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www.mori-matsu.com

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