



COMPANY PROFILE

CAZ (Thailand) Co., Ltd.

SEP. 2016



TABLE OF

CONTENTS



1.	Introduction	..... 3	Page
2.	Business Area & Management System	..... 6	Page
3.	Organization	..... 11	Page
4.	Man Power Capability	..... 12	Page
5.	Project Experience	..... 13	Page
6.	Execution Capacity of each Disciplines	..... 30	Page
7.	Shop Fabrication Division	..... 48	Page
8.	Major Facilities	..... 63	Page
9.	CAZ IT System	..... 69	Page
10.	Quality Assurance	..... 80	Page
11.	Safety Management System	..... 86	Page



1

Intro Introduction

As of **February 2014**, CAZ (Construction A to Z) Company has established from executives and managerial **staffs who has extensive experiences and has completed numerous project as a well recognized EPC contractor in Oil & Gas, Petrochemical, Chemical, Energy, Power plants segments.**

Focusing on EPC and Fabrication works, we certainly would have an edge over other competitors since we have being executed and achieved successfully in many project in Thailand as by a delivery in-time management and program to minimize all losses but maximize quality **at a shortest period concerned.**

With our extensive experience, **CAZ (Thailand) Co., Ltd. has been launched since February 2014 as the company name represent for "CONSTRUCTION A TO Z"**



CONSTRUCTION A TO Z 's major business range is Construction Total Service & Management System (Procurement ,Construction and Shop Fabrication) to provide clients with the best possible service in all phases of project from A to Z including Civil & Architectural, Structural, Tank & Vessel and Heaters Fabrication work, Piping & Mechanical erection, Electrical, Instrument work regardless of project amount.



Intro Introduction



Company Name

CAZ (Thailand) Co., LTD.

CEO Hong, Chung Sik
 Established Date Feb. 2014
 Area Land : 172,000 m²
 Shop : 30,000 m²

No. of Staff
 EPC Biz Div. 124
 Shop Biz Div. 24
 Supporting Div. 13
 Marketing 3
 Total 164

Office & Fabrication Shop

239 Huaypong-Nongbon Road, T. Huaypong A. Muangrayong 21150, Thailand.
 Tel : +66(0)38-119-224, Fax : +66(0)38-119-225

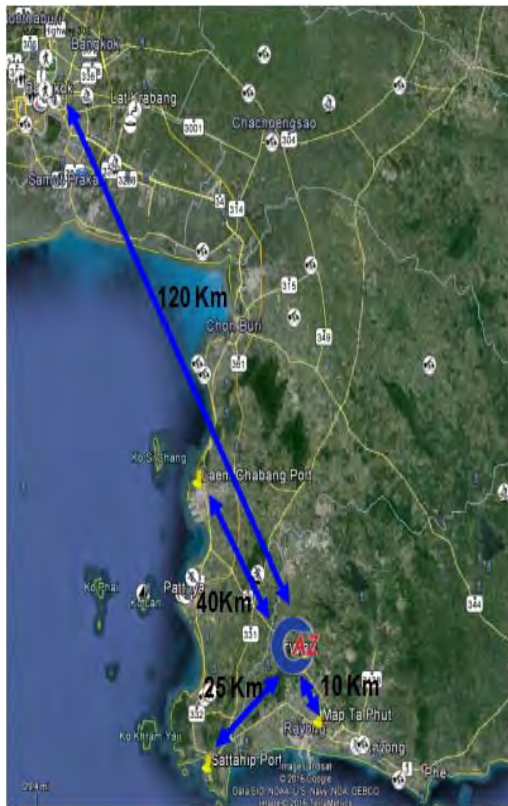
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Intro Introduction



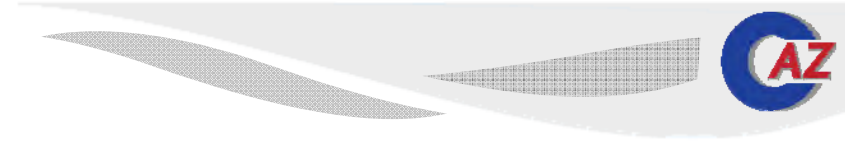
LaemChaBang	Sattahip	MapTaPhut
40 Km	25 Km	10 Km

- Office & Fabrication Shop
: Total Area(172,000 m²), Shop (30,000 m²)

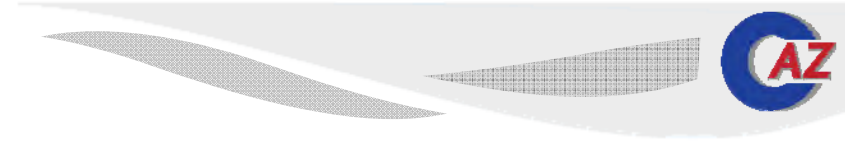


Business Area & Management System

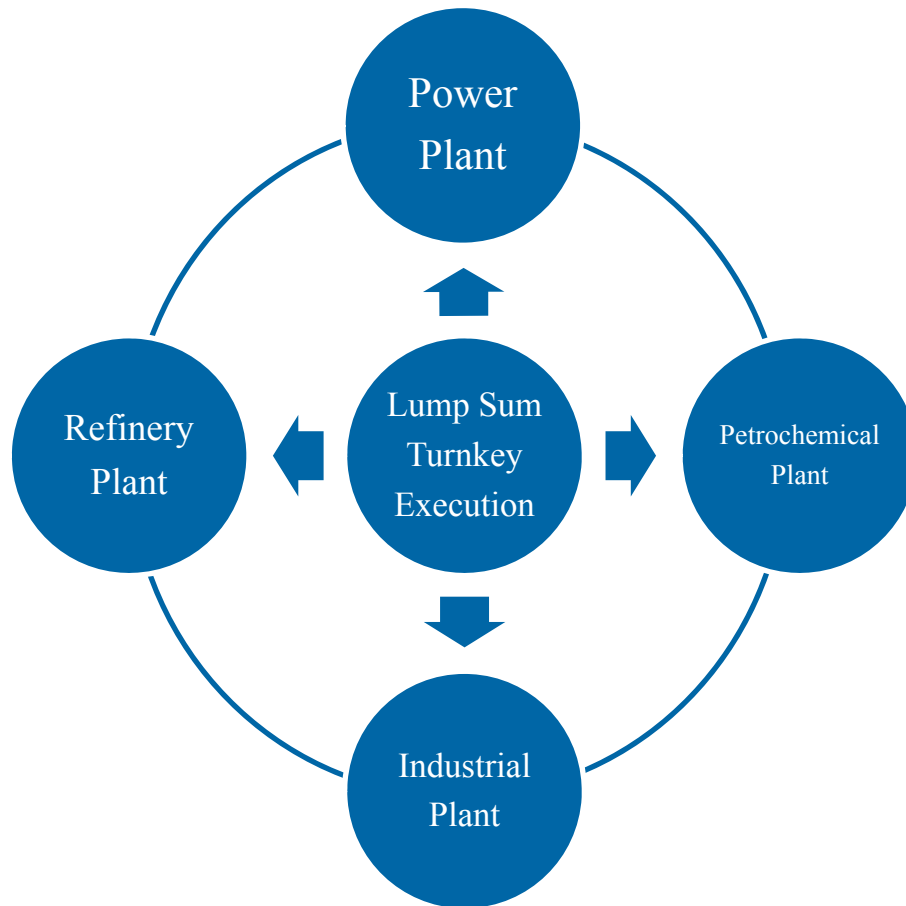
2. Business Area & Management System



2. Business Area & Management System



CAZ's Market and Services



2. Business Area & Management System



Total Construction Service

CAZ's unique Construction(Construction & Procurement & Shop Fabrication) system was created to provide clients with the best possible service in all phases of project planning, feasibility studies, procurement, construction management, shop fabrication, commissioning, operation and maintenance.

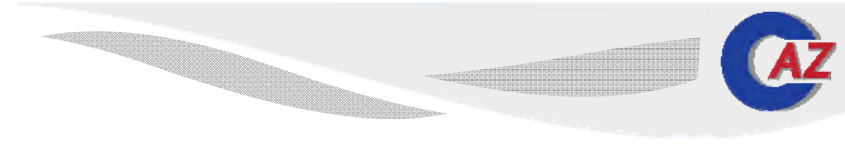
Project Management System

Our company provides clients with flexibility in project organization and custom-tailors services to the requirement of each individual project. The most efficient organization is designed and mobilized with a team of qualified experts for each task and discipline.

All key staffs possesses specialized knowledge and expertise and has been specially trained to understand clients' needs and to communicate with clients effectively to achieve the best possible results.



2. Business Area & Management System



Team Work for Quality Management

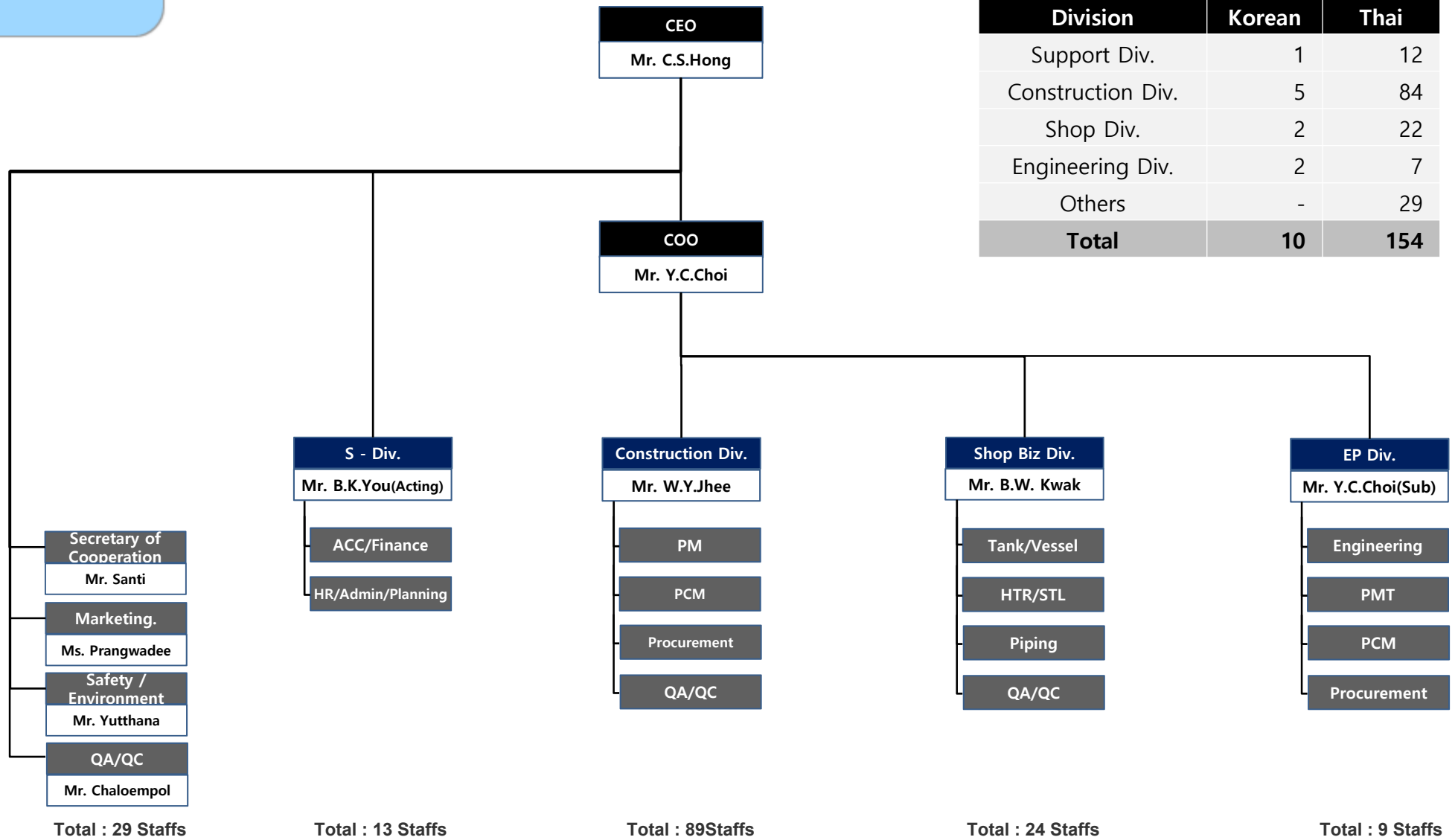
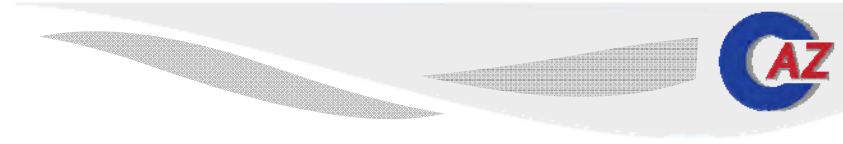
The team work strategy is the one of CAZ's management methods which focuses every resources of the company on each project.

TEAM stands for **T**ogether **E**veryone **A**chieves **M**ore. Therefore, TEAM Building with the clients is the most important aspect for every projects. CAZ instigates, assists and monitors each project with Quality Management Policy.

- ✓ **“CAZ” plan, do for client satisfaction.**
- ✓ **“CAZ” always deliver quality on time.**
- ✓ **“CAZ” are the best on Quality, Service and Price.**



Organization Chart



Division	Korean	Thai
Support Div.	1	12
Construction Div.	5	84
Shop Div.	2	22
Engineering Div.	2	7
Others	-	29
Total	10	154

Man Power Mobilization Capacity



DICIPLINE	MAX. MOB. CAPABILITY
CIVIL / ARCH.	1,100
STRUCTURE FAB.	500
PIPING	800
STRUCTURE / MECH . INSTALLATION	400
ELEC. / INSTRUMENT	700
PAINT / SCAFFOLDING	300
TOTAL	3,800



5

Experience



Project Experience of CAZ(Thailand) Co., Ltd.

5. Project Experience



Figure : Project Amount in million THB

Project	Owner/Client /Location	Description	Period	Contract Amount
TLAB PJT Build Package	Thai Oil Company Limited / Hyundai Eng'g Co., Ltd. / Sriracha	Building Work (Recycle and Make Up Gas Compressor Shelter, Recycle Compressor Shelter, Air Compressor Shelter, Chemical Injection Package Shelter, Substation, Field Auxiliary Room, Gantry Shelter, NG Metering Station Shelter, Expansion of Flow Computer Building)	S F May. '14 Aug. '15	113.5 M
TLAB PJT Civil Work	Thai Oil Company Limited / Hyundai Eng'g Co., Ltd. / Sriracha	Civil Work (Duct Bank and etc)	S F May. '14 Apr. '15	16.0 M
GSP#5 PJT WHRS Unit	PTT Public Co., Ltd. / Samsung Eng'g Co., Ltd. / Map Tha Phut	Structure & Mechanical & Piping Work For WHRS Unit	S F May. '14 Sep. '14	31.1 M
TLAB PJT Structure Fabrication & Erection	Thai Oil Company Limited / Hyundai Eng'g Co., Ltd. / Sriracha	Pipe Rack, Compressor Shelter Structure Fabrication & Field Erection (2,000 tons)	S F Jun. '14 July. '15	144.8 M
TLAB PJT Equipment Platform & Ladder Fabrication	Thai Oil Company Limited / Hyundai Eng'g Co., Ltd. / Sriracha	Platform & Ladder Fabrication for Vessel & Tower (305 tons)	S F Jun. '14 Jan. '15	24.0 M
KHAO BO YA LPG TERMINAL PJT E&I Work	PTT Public Co., Ltd. / Samsung C&T Co., Ltd. / Khao Bo Ya	Electrical & Instrument Work of Refrigerated Tank Facilities	S F Sep. '14 Jan. '16	157.4 M
PLE Purple Line Building Facade	Power Line Engineering /BKK	Building Façade Work Structure Fabrication & Field Erection	S F Sep. '14 Apr. '15	21.6 M

5. Project Experience



Figure : Project Amount in million THB

Project	Owner/Client /Location	Description	Period	Contract Amount
TOP 202MW Small Power Producer PJT Building Package	Thai Oil SPP Co., Ltd.(TOP) / CTCL(Thailand) Co., Ltd. / Sriracha	Building Work , Substation, GTG Control Building, STG Control Building	S Sep. '14 F Jan. '16	197.0 M
PTT LNG Receiving Terminal Expansion PJT Phase II	PTT LNG Co., Ltd. / POSCO Engineering Co., Ltd. / Map Ta Phut	Civil Work , Equipment Foundation, Pipe Rack Pre-casting, Road Paving, Drainage Work	S Nov. '14 F Mar. '16	83.9 M
PTT LNG Receiving Terminal Expansion PJT Phase II	PTT LNG Co., Ltd. / IHI Corporation / Map Ta Phut	Structure Fabrication & Field Erection Pipe Rack, Shelter, Platform (2,100 tons)	S Dec. '14 F May. '16	291.4 M
PTTGC Aromatic Debottlenecking Project	PTT Global Chemical / PTT ME / Map Ta Phut	Field Piping Work (20,000 DB) & Structure Work	S Apr. '15 F Oct. '15	61.7 M
PTTME Annapurna Project	Vencorex Chemicals / PTTME / Map Ta Phut	Steel Structure Installation Work (400 Tons)	S May. '15 F Jul. '15	5.9 M

5. Project Experience



Figure : Project Amount in million THB

Project	Owner/Client /Location	Description	Period	Contract Amount
PTT ASAHI SAR Project	PTT ASHAI / Map Ta Phut	Civil, Structure, Equipment Erection & Piping work	S F Jul .'15 Dec. '15	18.6 M
PTT Midline compressor project	PTT / CPP / Khao hin son	Structure, Equipment Erection & Piping, E&I work	S F Apr. '16 Apr. '17	450.0 M
IRPC PPE Project	IRPC / Rayong	Civil Work (Earthing & Lighting Work)	S F Feb.'16 Dec. '16	85.0 M
TSE ATV Project	Samsung Electronic / Samsung Engineering / Sriracha	Civil, Structure Work	S F Feb.'16 Apr. '16	90.0 M
PTTGC TA Project	PTTGC / Rayong	Piping Hot (PPH) and Piping Cold (PPC) Repair Work	S F May.'16 Jun. '16	14.9 M

5. Project Experience



- TLAB PJT Build Package

Contract Amount : 113.5 Mil THB



- Substation BLDG
- FAR BLDG
- Recycle and Make Up Gas Compressor Shelter
- Recycle Compressor Shelter
- Air Compressor Shelter
- Chemical Injection Package Shelter
- Field Auxiliary Room Gantry Shelter
- NG Metering Station Shelter
- Expansion of Flow Computer Building
- **Work Period : May. '14 ~ Aug. '15**

Major Work Volume :

- | | |
|--|--|
| • Excavation : 8,245 m ³ | • Masonry Work : 2,502 m ² |
| • Form Work : 14,111 m ² | • Painting Work : 8,200 m ² |
| • Rebar Work : 668 Tons | • Tile Work : 1,230 m ² |
| • Concrete Work : 4,876 m ³ | • Roofing Work : 2,082 m ² |



5. Project Experience

- TLAB PJT Civil Work

Contract Amount : 16.0 Mil THB



Major Work Volume(Duck Bank) :

- Excavation : 1,392 m³
- Form Work : 810 m²
- Rebar Work : 45 Tons
- Concrete Work : 650 m³
- PVC Pipe Work : 9,000 m³
- **Work Period : May. '14 ~ Apr. '15**



5. Project Experience



- GSP#5 PJT WHRS Unit

Contract Amount : 31.1 Mil THB



Installation of Waste Heat Recovery

- Heater : Total 620 Tons
- Include Fuel Gas Skid, Blowers

Fabrication & Erection of Piping

- Total 3,000 DB

Painting Works

Work Period : May. '14 ~ Sep. '14

5. Project Experience

- TLAB PJT Structure Fabrication & Erection

Contract Amount : 144.8 Mil THB

Total : 1,400 Tons

- Pipe Rack(Unit 58300) : 580 Tons
- Pipe Rack(Unit 58200) : 520 Tons
- Shelter Structure : 300 Tons
- **Work Period : Jun. '14 ~ May. '15**



5. Project Experience

- TLAB PJT Equip. Platform & Ladder Fabrication

Contract Amount : 24.0 Mil THB



Sets of Platform/Ladder 36 sets for Column, Reactor and Vessel (Total : 285 Tons)

- Platform : 136 Tons
- Handrail & Ladder : 86 Tons
- Grating : 63 Tons
- **Work Period : Jun. '14 ~ Jan. '15**



5. Project Experience

- KHAO BO YA LPG Terminal PJT E&I work



Contract Amount : 157.4 Mil THB

Total : 285,781 M

- Electrical : 134,781 M (Cable length)
- Instrument : 151,000 M (Cable length)
- **Work Period : Sep. '14 ~ Jan. '16**

Electrical

- Electrical Construction Management
- Supply labors, Consumables, equipment and tools for Construction Works
- Electrical Equipment Installation Works
- Cable Tray Works
- Lighting Fixture Installation Work
- Support Fabrication and Installation
- Cable Laying
- Cable Test and Termination
- Pre-Commissioning Work

Instrument

- Electrical Construction Management
- Supply labors, Consumables, equipment and tools for Construction Works
- Instrument System Installation Works
- Cable Tray Works
- Instrument Calibration Works
- Instrument Installation Works
- Support Fabrication and Installation
- Cable Laying
- Cable Test and Termination
- Pre-Commissioning Work



5. Project Experience

- PLE Purple Line Building Facade

Contract Amount : 21.6 Mil THB



Total : 390 Tons

Work Period : Sep. '14 ~ Apr. '15

PR1

- Bang Yai Park & Ride
- 146 Tons

PR2

- Tha It Park & Ride
- 117 Tons

PR3

- Yeak Nonthaburi Park & Ride
- 46 Tons



5. Project Experience

- TOP 202MW Small Power Producer PJT Building Package

Contract Amount : 197.0 Mil THB



- Substation 80
- Substation 81
- GTG Control BLDG 2EA
- STG Control BLDG 2EA
- **Work Period : Sep. '14 ~ Jan. '16**

Major Work Volume :

- Pile Cutting : 471 ea
- Excavation : 1,014.00 m³
- Back Fill : 537.00 m³
- Rebar : 375.04 Tons
- Form Work : 19,050.50 m²
- Concrete Work : 2,181.00 m³
- Demolition Work : 175.09 m³
- Masonry Work : 4,288.50 m²



5. Project Experience

- PTT LNG Receiving Terminal Expansion PJT Civil Work

Contract Amount : 83.9 Mil THB



- BOG Compressor Shelter
- HP LNG Shelter
- Send-Out Compressor Shelter
- BOG Operation Station
- Utility Station
- **Work Period : Nov. '14 ~ Mar. '16**

Major Work Volume :

- Excavation : 16,852.98 m³
- Back Fill : 13,460.01 m³
- Concrete : 5,991.78 m³
- Rebar : 950.55 Tons
- Form Work : 21,324.44 m²
- Pile Head Cut : 611 ea
- Asphalt Paving : 493.90 m³
- Concrete Paving : 1,799.52 m³
- Demolition Work : 175.09 m³
- Painting Work : 2,924.96 m²

5. Project Experience

- PTT LNG Receiving Terminal Expansion PJT STR Work

Contract Amount : 291.4 Mil THB



Total : 2,000 Tons

- Process Structure : 1,500 Tons
- Cable Tray Support : 500 Tons
- **Work Period : Nov. '14 ~ May. '16**



5. Project Experience

- PTT GC Aromatic Debottlenecking PJT Piping Work

Contract Amount : 61.7 Mil THB



Major Work Volume

- Field Piping Work 20,000 DB
- Piping Support 37 Tons
- Field Painting
- **Work Period : Apr. '15 ~ Oct. '15**



5. Project Experience

- PTT ME Annapurna PJT STR Work

Contract Amount : 5.9 Mil THB



Total : 400 Tons

- Equipment Structure : 350 Tons
- Stair Tower : 40 Tons
- **Work Period : May. '15 ~ Jul. '15**



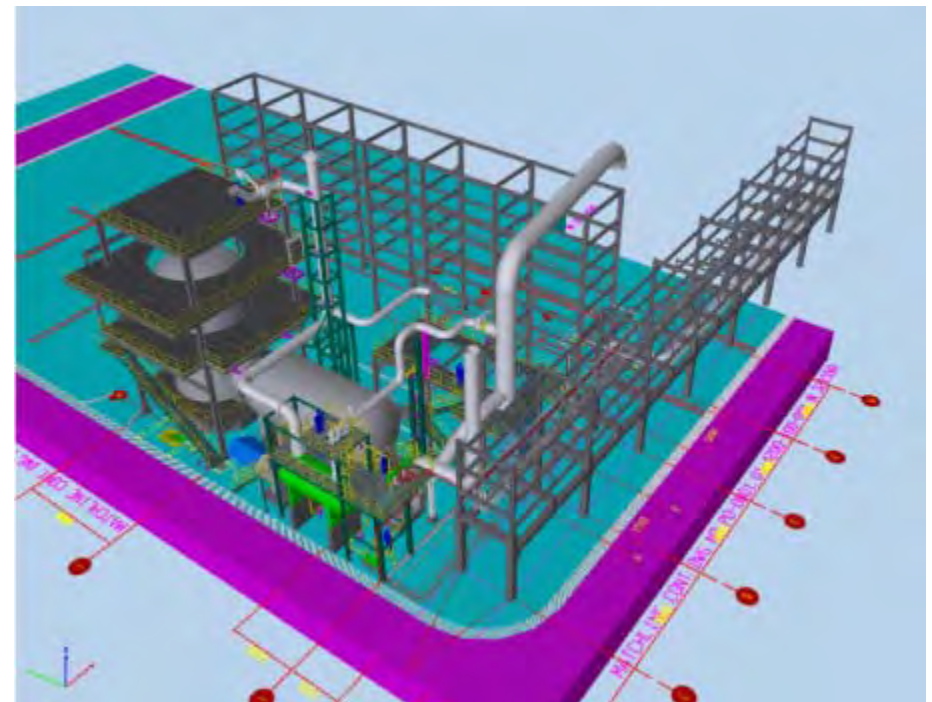
5. Project Experience



- **PTT ASHAI**
- **SAR Emergency Vent Gas Project**
Contract Amount : 18.6 Mil THB



- Civil, Structure, Equipment Work, Piping, Painting & Insulation



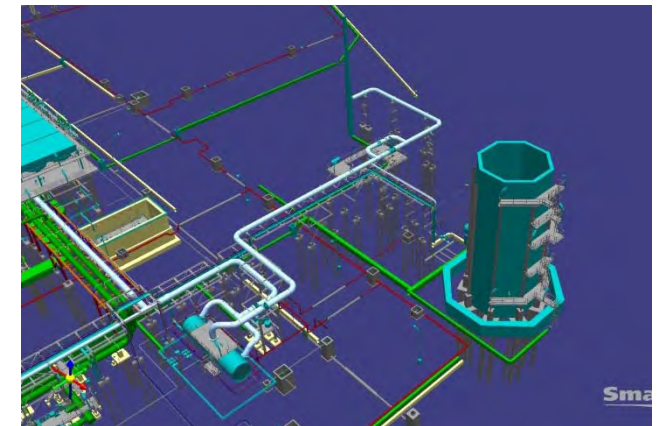
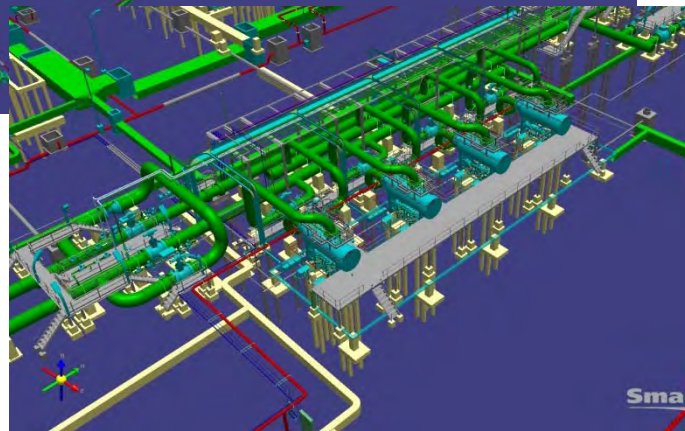
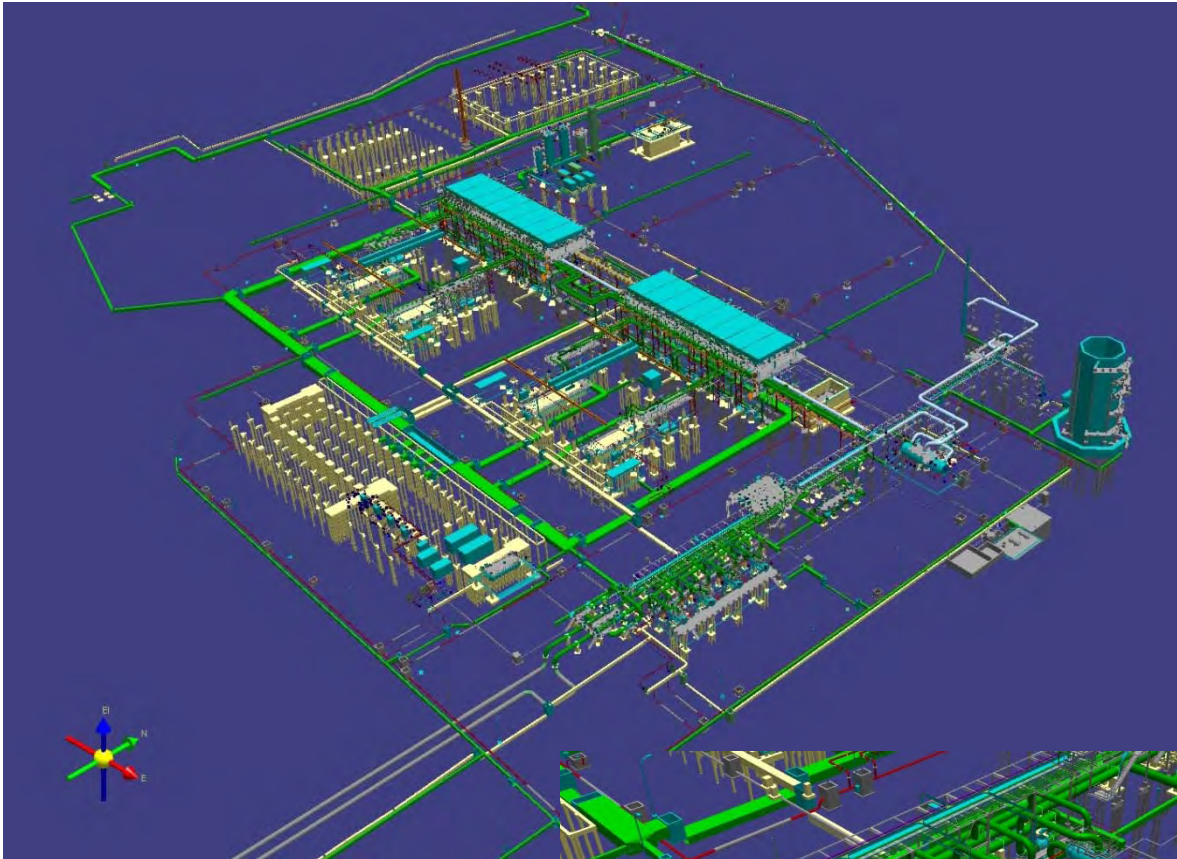
5. Project Experience

- **PTT Midline Compressor Station**
- **Consulting Work**



Contract Amount : 6.8 Mil THB

- Project Management
 - Project Management Documents
 - Overall Schedule
- Engineering Documents review
- Procurement Document review



5. Project Experience



Structure Fabrication
& Erection



- PTT Midline Compressor Station



Contract Amount : 450 Mil THB

- Structure : 800 tons for Equipment Structure, pipe rack & Platform, Ladder
- Equipment Work :
 - Turbine compressor 4 sets
 - Fire fighting system
 - Air compressor, flare stack, Gas filter, Pig launcher & Receiver, Slop Oil Tank and Nitrogen Package & etc.
- Piping (110,000 DB)
 - Heavy wall (18"~ 46"), General piping
- Painting, Insulation
- Electric & Instrument Work

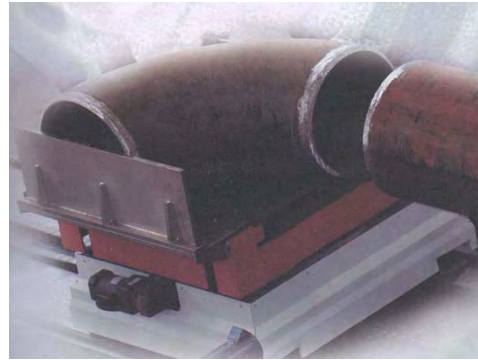
5. Project Experience

Piping Ship Fabrication

- PTT Midline Compressor Station



Contract Amount : 450 Mil THB



Piping Cutting/ Beveling
MC : 12"~46" (5 sets)

Piping Fit up MC : 18"~46"

Piping Auto Welding MC
: 18"~46" (3 sets)

Hydraulic Bolt Torque MC
: 3 sets

Execution

Capacity of each Disciplines

6-1

Execution
Capacity



Civil & Building Discipline



6-1. Execution Capacity of Civil & Building Discipline



Civil Work

- Piling (Bored / Driven / Non-Pollution Pile)
- Equipment Foundation
- Tank Foundation (Concrete Type)
- Tank Foundation (Earth Type)
- Pre-Casting Concrete Pipe Rack
- Concrete Fire Proofing
- Water Storage Pond & Pit
- Concrete Dike & Earth Bund-wall
- U/G Drainage Manhole & Box
- Trench & U-Ditch with Grating Cover
- Pipe Support & Pipe Sleeper
- Cooling Tower (4 Cell Basin & Con'c structure)

Building Work

- Central Control Building
- Pelletizing Building
- Compressor Building
- Sub-Station Building

Manpower Mob. Capability : 1,100 Workers (Current 400 Workers)

6-1. Team Experience for Civil & Building



Year	Project Name	Volume
2013	Thai Oil EIPSA3 Project	Concrete : 5,500 m ³
2013	PTT SAIYOK Compressor Station 4 Project	Concrete : 1,350 m ³
2013	BangChak TGTU Project	Concrete : 1,020 m ³
2012	PTT Onshore Compressor Station #4 Project	Concrete : 15,020 m ³
2011	BST NB Latex Project	Concrete : 9,200 m ³
2010	PTT Tank Terminal Project	Concrete : 14,700 m ³
2009	PTTAR Clean Fuel Project	Concrete : 10,410 m ³
2008	PTT FRT Tank Project	Concrete : 1,520 m ³
2008	SCG THPP #3 Project	Concrete : 15,000 m ³
2008	MOC ARU Project	Concrete : 8,700 m ³
2008	PTT Chem Furnace, EOT & GHU Project	Concrete : 410 m ³
2008	PTT Chem Diversion Pit Project	Concrete : 990 m ³
2007	PTTAR Complex #2 Project	Concrete : 6,900 m ³
2007	PTTAR Diesel Tank Project	Concrete : 2,700 m ³
2006	PTTAR Condensate Tank Project	Concrete : 11,300 m ³

6-2

Execution
Capacity



Structure Discipline



6-2. Execution Capacity of “Structure Discipline”



Major Work

- Pipe rack, Equipment Structure & Shelter Structure Work
- Furnace & Heater Fabrication Work
- Platform & Ladder Fabrication Work
- Flare Stack Fabrication Work

Structure Production Capability : 50~60 ton/Day

Manpower Mob. Capability

- Total 500 Workers (Current 190 Workers)



6-2. Team Experience for **Structure**



Year	Project Name	Volume
2013	PTT GSP 5 PJT	400 tons
2013	PTT Saiyok compressor Station Unit 4 PJT	350 tons
2012	BANGCHAK TGTU PJT	850 tons
2011	PTT Onshore compressor Station 4 PJT	1600 tons
2011	BST NB Latex PJT	1350 tons
2010	PTT Tank Terminal PJT	350 tons
2009	PTTAR Clean Fuel PJT	1,800 tons
2008	MOC Furnace Cracker PJT	9,800 tons
2008	SCG THPP #3 PJT	2,800 tons
2008	MOC ARU PJT	600 tons
2008	RRC Upgrading	1,600 tons
2007	PTT Chem Furnace	600 tons
2007	PTTAR Complex #2 PJT	450 tons
2006	ATC FRC Project	340 tons

6-3

Execution
Capacity



Piping Discipline



6-3. Execution Capacity of “Piping Discipline”



General Welding

- Carbon Steel Pipe
- A333 Gr. 1 & 6
- A335 P11 & P22/P91
- A312 TP304/304L, A312 TP316/316L
- A312 TP321H, A312 TP347H

Special Welding

- Carbon Steel Pipe
- KHR32C (Kubota Steel)
- 35Cr-45Ni
- 25Cr-35Ni
- 20Cr-32Ni

Piping Work Capability

- Shop Fabrication Work : 1000 DB/Day
- Field Erection Work : 1000 DB/Day

Manpower Mob. Capability

- Welders : 100 workers(Current 30 workers)
- Workers : 700 workers(Current 200 workers)

Dissimilar Welding

- A351-CF8C + SA 312 TP321H
- SA 312 TP321H + A335 Gr.P22
- KHR32C + Alloy 800H
- 35Cr-45Ni + 25Cr-35Ni
- SA 312 TP321H + 25Cr-35Ni
- 35Cr-45Ni + 20Cr-32Ni
- GX10NiCrNb3220 + 20Cr-32Ni
- 20Cr-10NiCb + SA 312 TP321H,347H

6-3. Team Experience for Piping



Year	Project Name	Volume
2013	PTT GSP 5 PJT	42,000 DB
2013	PTT Saiyok compressor Station Unit 4 PJT	22,000 DB
2012	BANGCHAK TGTU PJT	38,000 DB
2011	PTT Onshore compressor Station 4 PJT	48,000 DB
2011	BST NB Latex PJT	90,000 DB
2010	PTT Tank Terminal Project	128,000 DB
2009	PTTAR Clean Fuel Project	160,000 DB
2009	PTT Chem. Power Plan	86,000 DB
2009	DOW Offsite Pipeline Project	120,000 DB
2008	MOC ARU Project	196,000 DB
2008	MOC Furnace Cracker Unit	65,000 DB
2007	PTTAR Complex #2 Project	98,000 DB
2007	ROC Furnace Q Project	20,000 DB
2006	ATC FRC Project	55,000 DB
2005	ROC M4 Project	28,000 DB
2004	ATC Debottlenecking Stage 2 Project	45,000 DB

6-4

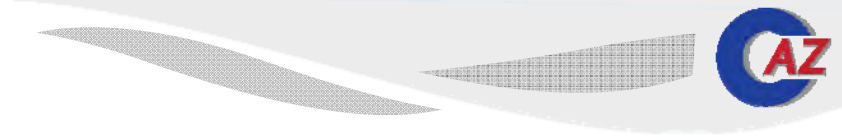
Execution
Capacity



Equipment Discipline



6-5. Execution Capacity of Equipment



Equipment Shut Down Work

- Replacement of Air Fan Cooler
- Re-tray work (UOP 3 to 4 tray, Packing tray & etc.)
- Heater Modification Work
(Burner replacement, Radiant Coil replacement Work)
- Heat Exchanger & Bundle Replacement Work
- Pump Modification Work
(Impeller, Motor, Pump replacement)

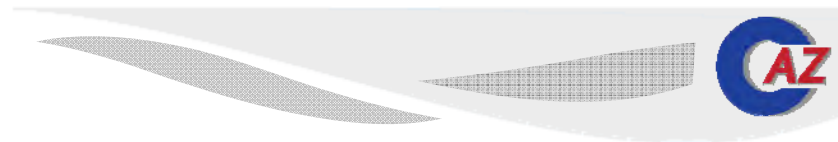
Special Equipment Work

- Reciprocating Compressor, Centrifugal Compressor Installation work
- Heater, Furnace Installation Work
- Rotating Pump Installation Work
- Cooling Tower, Clarifier Installation Work
- Air Fan Cooler assembly and Installation Work

Manpower Mob. Capability

- Workers : 400 workers

6-4. Team Experience for Equipment



Year	Project Name	Volume
2013	PTT GSP 5 PJT	29 sets/ 620 tons
2013	PTT Saiyok compressor Station Unit 4 PJT	10 sets/ 350 tons
2012	BANGCHAK TGTU PJT	45 sets/ 1,130 tons
2011	PTT Onshore compressor Station 4 PJT	50 sets/ 930 tons
2011	BST NB Latex PJT	483 sets/ 10,075 tons
2010	PTT Tank Terminal PJT	70 sets/ 2,470 tons
2009	PTTAR Clean Fuel PJT	90 sets/ 3,558 tons
2008	SCG THPP #3 PJT	12 sets/ 1,080 tons
2008	MOC ARU PJT	10 sets/ 1,200 tons
2008	MOC Furnace Cracker Unit	48 sets/ 4,300 tons
2007	PTTAR Complex #2 PJT	4 sets/ 320 tons
2007	ROC Furnace Q	1 sets/ 20 tons
2006	ATC FRC Project	4 sets/ 340 tons
2005	ROC M4 PJT	20 sets/ 450 tons
2004	ATC Bottlenecking Stage 2	11 sets/ 920 tons

6-5

Execution
Capacity



Electrical & Instrument Discipline



6-5. Execution Capacity of **Electrical & Instrument**



Electrical Work

- Motor Solo Run Test
- Grounding / Cathodic Work & Testing
- Cable Tray & Conduit Work
- Electrical Equipment Installation
- SWGR / MCC Trouble Shooting



E&I Work Capability

- Instruments Calibration & Loop Testing
- Electrical Installation; i.e. HV & LV SWGR, MCC, TR, cabling work, etc., Motor Solo Run Testing



Manpower Mob. Capability

- 700 Manpower (Currently 350 MP)



6-5. Team Experience for **Electrical & Instrument**



Year	Project Name	Volume
2013	PTT OCS4 Project	Cable : 164,000 m
2012	BST NB Latex Project	Cable : 190,000 m
2010	PTT Tank Terminal Project	Cable : 197,000 m
2009	PTTAR Clean Fuel Project	Cable : 227,523 m
2009	SCG THPP #3 Project	Cable : 368,380 m
2008	MOC ARU Project	Cable : 219,410 m
2008	MOC Furnace Cracker Unit	Cable : 18,410 m
2007	PTTAR Complex #2 Project	Cable : 202,758 m
2007	ROC Furnace Q Project	Cable : 48,451 m
2006	ATC FRC Project	Cable : 12,941 m
2005	MOC M4 Project	Cable : 6,478 m
2004	ATC Debottlenecking Stage 2 Project	Cable : 46,785 m

6-6

Execution
Capacity



Painting & Scaffolding Discipline



6-6. Execution Capacity of Painting & Scaffolding



Metal Grid Blasting Work

- 600 m²/ day

Painting Manpower Mob. Capability

- Total 150 painters

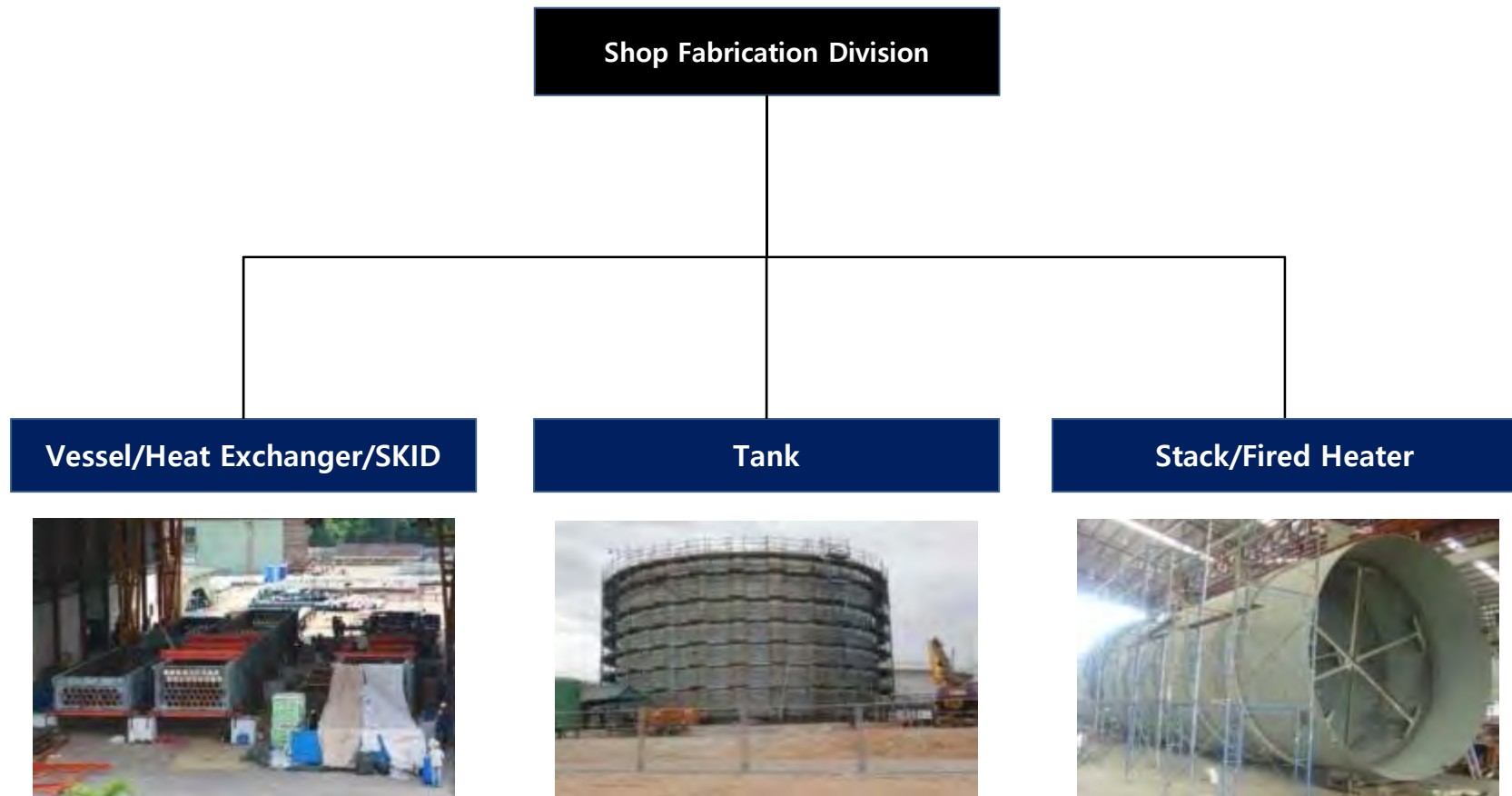
Scaffolding Manpower Mob. Capability

- Total 150 Workers



Shop Fab. Division

The Organization of Shop Fab. Division



1. Fabrication Items

Pressure Vessel, Heat Exchanger, Column & Tower

2. Capability

- 1) Thickness : Max. 75 m/m
- 2) Handling Weight : Max. 120 Ton/unit
- 3) Handling Length : Max. 50 m
- 4) Max Capability : 200 Tons / Month (Pressure Vessel)

3. Material

- 1) Carbon Steel : A36/A283,5/A516/A537
- 2) Stainless Steel : A312 TP304(L)/316(L)/310(H)/321(H)/347(H)
- 3) Alloy Steel : A387/Kubota Steel
- 4) CLAD Material : SS+CS



7-1

Execution
Capacity

Pressure Vessel / Heat Exchanger / Column / Tower



- CNC Cutting



- Auto Welding



- Head Forming



- Heat Exchanger



7-1. Team Experience for Vessel / Heat Exchanger Fabrication



Project	Equipment Name	Type	Dimension	Material	Period	Remark
PTT OCS#4 Project (PTT Public Co.,Ltd.)	Flar Blow Down Drum	Horizontal	ID3500 x 12000TL x 21t	SA516-60N+S5	2012	Stamp "U"
	Slop Tank	Horizontal	ID3000 x 12000TL x 13t	SA516-60N+S5	2012	Stamp "U"
	Instrument Air Receiver	Vertical	ID3600 x 10000TL x 20t	SA240-304	2012	Stamp "U"
	Utility Air Accumulator	Vertical	ID1500 x 4000TL x 11t	SA516-70	2012	Stamp "U"
	Desel Oil Tank	Horizontal	ID1800 x 5000TL x 9t	A283-C	2012	Stamp "U"
Bayer Public Co.,Ltd.	Vacuum package	BEM	ID400 x 2500L x 12t	A240-316Ti/A312-TP316Ti	2012	Stamp "U"
	Spare Charge heater	BEU	ID1020 x 3782TL x 14t	A516-60N/A179	2012	Stamp "U"
	Vent Cooler	BEU	ID389 x 3800TL x 11t	A516-60N/A179	2012	Stamp "U"
BCP TGTU Project (The Bangchak Petroleum Public Co.,Ltd.)	Quench Column	Column	ID1600 x 14700TL x 9t	A240-316L	2012	
	Absorber	Column	ID1200 x 15800TL x 13t	A516-60N	2012	
	Regenerator	Column	ID1100 x 19350TL x 11t	A516-60N/A240-316L	2012	
	Hydrogeneration Reactor	Horizontal	ID2100 x 3800TL x 13t	A516-60N	2012	
	Tail Gas Preheater	BEU	ID1020 x 3782TL x 14t	A516-60N/A179	2012	
	Tail Gas Heater A	BEU	ID1016 x 5998TL x 13t	A516-60N/A179	2012	
	Tail Gas Heater B	BEU	ID1016 x 5998TL x 13t	A516-60N/A179	2012	
	Recycle Gas Preheater	BEU	ID489 x 3800TL x 11t	A516-60N/A179	2012	
PTTGC 2 and 3 Project	Reboiler	BKU	ID1550 x 5657TL x 10t	A240-316L/A312-TP316L	2012	
	AC Filter A	Vertical	ID2100 x 4700TL x 15t	A516-60	2012	
	AC Filter B	Vertical	ID2100 x 4700TL x 15t	A516-60	2012	
	AC Filter C	Vertical	ID2100 x 4700TL x 15t	A516-60	2012	
	Absorber Column V63	Vertical	ID970 x 3315TL x 15t	A516-60	2012	
	Absorber Column V4	Vertical	ID970 x 3315TL x 15t	A516-60	2012	

7-1. Team Experience for Vessel / Heat Exchanger Fabrication



Project	Equipment Name	Type	Dimension	Material	Period	Remark
BST NB Latex Project Pressure Vessel New Fabrication (Bangkok Synthetics Co.,Ltd)	PMHP Tank	Vertical	OD762 x 1219H	A240-316L	2011	
	Reducer Tank	Vertical	OD1270 x 1829H	A240-316	2011	
	Initial Charge Tank A	Vertical	OD2133.6 x 5181.6H	A240-316	2011	
	Initial Charge Tank B	Vertical	OD2438 x 3352.8H	A240-316L	2011	
	Aqueous Feed Tank Train A	Vertical	OD1524 x 3080H	A240-316	2011	
	Catalyst Feed Tank Train A	Vertical	OD1524 x 3080H	A240-316	2011	
	Aqueous Feed Tank Train B	Vertical	OD1524 x 3080H	A240-316	2011	
	Catalyst Feed Tank Train B	Vertical	OD1524 x 3080H	A240-316	2011	
	Aqueous Feed Tank Train C	Vertical	OD1524 x 1981.2H	A240-316	2011	
	Catalyst Feed Tank Train C	Vertical	OD1676.4 x 2606.8	A240-316	2011	
	FeSO4 Premix Tank A	Vertical	ID500 x 750H	A240-316L	2011	
	Persulfate Catalyst Premix Tank	Vertical	OD1372.6 x 406.4H	A240-316	2011	
	White Water Tank AB	Vertical	OD3657.6 x 6096H	A240-304	2011	
	Intermediate Latex Tank A	Vertical	OD3660 x 11000H	A240-304	2011	
	Intermediate Latex Tank B	Vertical	OD3650 x 9470H	A240-304	2011	
BST NB Latex Project Heat Exchanger (Bangkok Synthetics Co.,Ltd)	Stripper Jacket Heater Train C	BEM	OD8" Pipe x 2297.2L	A106-B , A240-304L	2011	
	AN Scrubber Water Cooler	H-Double Pipe	400W x 5305.7L x 1500H	A106-B	2011	
	First BD Condenser	BEM	ID450 x 5039L	A516-70	2011	
	Deaerator Water Cooler	BEM	ID700 x 7920L	A516-70	2011	
	Hot Water Heater	BEM	OD8" Pipe x 2527.2L	A106-B	2011	
	First BD Condenser	BEM	OD8" Pipe x 3033L	A106-B	2011	
	AN Recycle Cooler	H-Double Pipe	400W x 5305.7L x 1500H	A312-304 , A106-B	2011	
	Vent Condenser	BEM	OD16" Pipe x 3264.8L	A106-B	2011	
	Vent Condenser	BEU	OD10" Pipe x 2209L	A106-B	2011	
	Reactor Jacket Heater Train CDEF	BEM	OD12" Pipe x 2228.8L	A106-B , A240-304	2011	
	Initial Charge Heater AB	BEM	OD10" Pipe x 2448L	A106-B , A240-316L	2011	
	Dodecyl Benzene Sulfonic (DDBSA) Tank Heater	H-Double Pipe	400W x 4011.3L x 1900H	A312-316 , A106-B	2011	
	MAA Cooler	BEM	OD16" Pipe x 2002.8L	A106-B , A312-316L	2011	
	Stripper Overhead Condenser Train AB	BEM	Shell ID1044 x 5156.2H	S/T=CS , Tube=304SS	2011	

7-1. Team Experience for Vessel / Heat Exchanger Fabrication



Project	Equipment Name	Type	Dimension	Material	Period	Remark
BST NB Latex Project Pressure Vessel Fabrication (Bangkok Synthetics Co.,Ltd)	Screener Collection Tank Train A/B/C	Vertical	ID762 x 915TL	A516-70 + Teflon Coating	2011	
	Condensate Flush Drum	Vertical	ID1000 x 3200TL	A516-70	2011	
	Process Air Receiver Drum	Vertical	ID2800 x 6500TL	A516-70	2011	
	Instrument Air Receiver Drum	Vertical	ID3200 x 10000TL	A516-70	2011	
	Flare K.O. and Blow Down Drum	Horizontal	ID3400 x 7000TL	A516-70	2011	
	Recovered an Storage Tank	Horizontal	ID2200 x 3850TL	A516-70	2011	
	Na2SO3 Hopper	Vertical	920W x 920L x 810H	A240-316L	2011	
	Bruggoglite Bag Dump Hood	Vertical	900W x 910L x 810H	A240-316L	2011	
	O2 Scavenger Bag Dump Hood	Vertical	500W x 500L x 510H	A240-316	2011	
	Compound Tank B/C	Vertical	ID3048 x 5182TL	A240-304L	2011	
	Emergency Killing Agent Tank	Vertical	ID700 x 1050TL	A240-304	2011	
	Hot Water Drum	Vertical	ID750 x 2100TL	A516-70	2011	
	Compound Tank Train A	Vertical	OD3657.6 x 6832.6H	CS + Glass lined	2011	
	Blowdown Tank Train A/B	Vertical	ID3810 x 6769.1H	CS + Glass lined	2011	
	Blowdown Tank Train C	Vertical	ID3810 x 6807.2H	CS + Glass lined	2011	
	Stripper Train A	Vertical	ID3658/3810 x 4744H	CS + Glass lined	2011	
	Stripper Train B	Vertical	ID3658/3810 x 4744H	CS + Glass lined	2011	
	Stripper Train C	Vertical	ID3658/3810 x 4673.6H	CS + Glass lined	2011	
	Reactor Train A	Vertical	ID2590.8 x 4673.6H	CS + Glass lined	2011	
	Reactor Train B	Vertical	ID2590.8 x 4673.6H	CS + Glass lined	2011	
	Reactor Train C	Vertical	ID2600/2700 x 5247.9H	CS + Glass lined	2011	
	Scrubber Solution Prep Tank	Vertical	OD1371.6 x 1660H	A240-316L	2011	
	AN Storage Tank	Saddle	ID3048 x 9067.8L	A240-304L	2011	
	TDDM Day Tank	Vertical	OD3048 x 4877H	A240-304L	2011	
	PTZ Solution Charge Tank	Vertical	ID600 x 610H	A240-304	2011	
	DDBSA Storage Tank	Vertical	OD2895.6 x 6705.6H	A240-316	2011	
	Caustic Tank	Vertical	OD2743.2 x 7426H	A240-304	2011	
	NH40H Tank	Vertical	OD3200 x 6000H	A240-316	2011	
	Chainguard Tank	Vertical	ID1270 x 2600H	A240-316L	2011	

7-2

Execution
Capacity

Tank Fabrication / Erection



- FRT Tank



- DRT / CRT Tank



7-2. Team Experience for Tank Fabrication / Erection



Project	Owner/Client/Location	Description	Period	Remark
SAKC Expansion PJT	SAK CHASIDHI / Map ta phut	Expansion Storage Tank 11 ea	S Oct. 13 F Mar. 15	
KaoBoYa LNG Tank PJT	PTT/Sriracha Chonburi	EPC Lump Sum for LNG Tank (3,000 Tons, 2 Sets)	S Oct. 13 F Feb. 15	
JAC Storage Tank PJT	JAC/Singapore	JAC C1 Storage Tank 22 Sets	S Jul. 12 F Mar. 13	
PTT Tank Terminal PJT	PTT Tank Terminal Co., Ltd. / Map ta phut	EPC Lump Sump Contract for Tank Terminal 1 Spherical Tank	S Jul. 10 F May. 11	
OCS#4 Project	PTT Public Co.,Ltd. / Map Ta Phut	EPC Lump Sump Contract for Field Erection Tanks for OCS#4 (2 Tanks)	S April 12 F Sep. 12	
Thai Growth Project Field Fab. Tank Project	DOW Chemical Co., Ltd. / AIE/Rayong	EPC Lump Sump Contract for Field Erection Tanks for PG (6 Tanks)	S June. 11 F Apr. 12	
PTTAR Biodiesel Tank	PTT AR (Public) Co., Ltd. / Map Ta Phut	Bio-Diesel Tank Fabrication/Erection (2 Tank)	S Feb. 11 F Nov. 11	
PTT Tank Terminal PJT	PTT Tank Terminal Co., Ltd. / Map ta phut	EPC Lump Sum for Propylene Sphere Tank (3000 Tons)	S Oct. 10 F July. 11	

7-2. Team Experience for Tank Fabrication / Erection



Project	Owner/Client/Location	Description	Period	Remark
PTT Tank Terminal PJT	PTT Tank Terminal Co., Ltd. / Map ta phut	EPC Lump Sump Contract for Tank Terminal including 8 CRT tanks	S May. 10 F Apr. 11	
MOC Aromatic Recovery Unit	MOC/ Map Ta Phut	Construction Lump Sum & Solvent Tank Fab. / Erection	S Oct. 07 F Dec. 09	
PTT CHEM EPS POWER PLANT	PTT Chemical (Public) Co., Ltd. / Map Ta Phut	114 MW Cogeneration Power Plant Construction & Tank Fabrication/Erection (5 Tank)	S Jan. 09 F Sep. 10	
PTT Sriracha Terminal Expansion Project (FRT Tank)	PTT Public Co., Ltd./ Sriracha Chonburi	EPC Lump Sum for FRT Tank (Capa. 70,000 m ³ x 1 set)	S Oct. 08 F Sep. 09	

7-3 Fired Heater, Stack(steel/flare), SKID Unit

Execution
Capacity



7-3 Fired Heater, Stack(steel/flare), SKID Unit

Execution
Capacity



7-3. Team Experience for Fired Heater, Stack(steel/flare), SKID Unit



Project	Owner/Client/Location	Description	Period	Remark
PTT GSP5 WHRU Project	PTTGC / E-Tech / Thailand	WHRU - Coil material A335P11/P22(Pin tube Type)	S Dec. '13 F Jun. '14	F / 3.3 M
Aramco Project	Aramco/KTI/Saudi	Steel work - Radiant / Convection / Stack	S Dec. '13 F May. '14	F / 1.8 M
CILACAP Project	GSEC/Linde/Indonesia	Fired Heatet (2 Sets, 430 tons) - Coil material A335P11/P22 TP304H/321H	S Aug. '13 F Feb. '14	F / 1.8 M
UHV Project	IRPC/ITT/Thailand	Fired Heatet (4 Sets, 400 tons) - Coil material A335P11/P22	S Oct. '13 F Mar. '14	F / 1.4 M
SAMUR Project	PETRONAS/ITT/Malaysia	Reformer (1 Set, 1,150 tons) - Coil material A335P11/P22/ TP304H/321H	S Jul. '12 F Mar. '13	F / 40.0 M
West Qurma II Project	SECL/ITT/IRAQ	Hot oil heater (8 Sets, 880 tons with Modularization) - Coil material A106B	S Jul. '12 F Dec. '12	F / 2.2 M
Algiers Refinery Project	AADR/ITT/Algeria	Atmospheric & Fired Heater (6 Sets, 1,780 Tons) - Coil material A335P5/P9/P11/P22	S Mar. '12 F Nov. '12	F / 30.0 M
South Par Project	NIOC/ITT/Iran	Fired heater (6 Sets, 256 tons) - Coil material A106B	S Feb. '12 F Aug. '12	F / 0.8 M

7-3. Team Experience for Fired Heater, Stack(steel/flare), SKID Unit



Project	Owner/Client/Location	Description	Period	Remark
RMP Project	Petron Bataan / ITT / Philippines	Fired heater (2 Sets, 515 tons with Modularization) - Coil material A335P9/P11/TP347H	S Mar. '12 F Oct. '12	F / 1.2 M
JAC Project	SKEC / ITT /Singapore	Reformer & Charge heater & Re-boiler (13 Sets, 7,800 Tons with Modularization) - Coil material A335P9/P11/P22/TP304H/TP321H/TP347H	S Jan. '12 F Oct '12	FME / 26.0 M
Tianjin China Project	TBCO / ITT / China	Reactor charge heater (1 Set, 880 Tons) - Coil material A335P11/TP321/TP347	S Oct. '11 F Jun. '12	F / 2.0 M
PTTAR Clean Fuel Project	PTTAR Co., Ltd. / CDI / Map ta phut	Fuel Steel Stack - 1sets - Duel Wall Type 5Stage (80 m)	S Mar. 10 F Sep. 10	
SIPCO 160MW Co-Generation Project	Siam Power/Generation (Public) Co., Ltd./ Ban Kay	Main Stack Fabrication	S Mar.09 F Aug.09	
Technip MOC Cracking Furnace	Technip & MOC / Map Ta Phut	Erection of Ethylene Cracking Furnace and Furnace Piping Work (8 Sets, 9,700 Tons) - KUBOTA STEEL/P11/P12, 68,000DB	S Sep. '07 F Aug. '09	
Plant 2 Bottleneck Project Cracking Furnace Unit	PTT Chemical (Public) Co., Ltd. / Map Ta Phut	Cracking Furnace (1 Set, 480 Tons) - Coil material P11, P12 Alloy	S Dec. '06 F Nov. '08	
ROC Furnace Q Project	Rayong Olefins Co., Ltd. / Map Ta Phut	Cracking Furnace (1 Set, 600 Tons) - Coil material P11, P12 Alloy LPG	S Sep. '05 F Mar. '07	

7-3. Team Experience for Coil & Piping Fabrication



Year	Project Name	Volume
2012	SAMUR Project	P11/P22/TP304H/321H / 18,800 DB
2012	West Qurma II Project	A106B / 6,000 DB
2012	Algiers Refinery Project	P5/P9/P11/P22 / 11,500 DB
2012	South Par Project	A106B / 2,800 DB
2012	RMP Project	P9/P11/TP347H / 4,600 DB
2011	JAC Project	P9/P11/P22/TP304H/TP321H/TP347H / 51,000 DB
2011	Tianjin China Project	P11/TP321/TP347 / 9,600 DB
2009	MOC Cracking Furnace	KUBOTA STEEL/P11/P12 / 68,000 DB
2008	PTT Chem. LPG Cracking Furnace	P11/P12 / 18,000 DB
2007	PTT Tank Terminal Project (ROC Ethylene Cracking Furnace)	P11/P12 / 24,000 DB

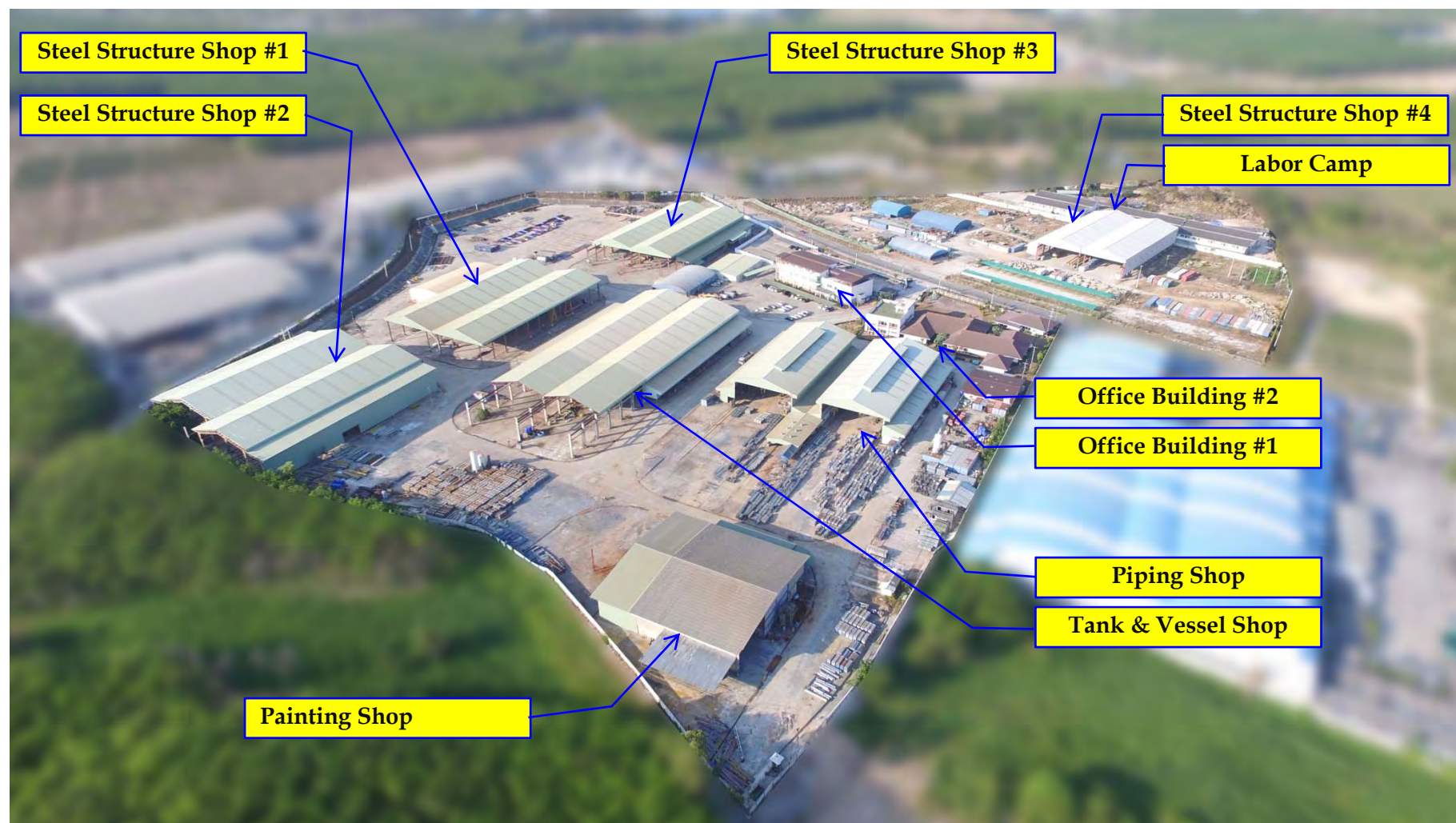
Major Facilities

8. Office & Fabrication Shop

- Office & Shop Panorama



Total Area : 172,000 m2, Shop Area : 30,000 m2



8. Office & Fabrication Shop

- Major Shop Equip. & Tools



Equipment Category	Q'ty	Unit	Equipment Category	Q'ty	Unit
PLASMA CUTTING MACHINE	1	Set	Plate Bending Roller (~ 25 T)	1	Set
CNC Shape Drill Cutting Machine (Auto)	2	Set	Plate Bending Roller (~ 50 T)	1	Set
CNC Plate Cutting Machine	3	Set	CNC Pipe Cutting Machine	1	Set
CNC Band Saw (High Speed)	1	Set	Hydraulic Press Machine (1,500 Tons)	1	Set
CNC Plate Drill Machine (~100mm)	4	Ea	Overhead Crane (30 Tons)	2	Ea
Band Saw (Amada) ~600 mm	1	Ea	Overhead Crane (10 Tons)	14	Ea
Band Saw (Shoper) ~ 300 mm	1	Ea	Overhead Crane (5 Tons)	10	Ea
CNC Beveling & Scallop M/C	1	Set	Gantry Crane (10 Tons)	6	Ea
Pipe & Shape Steel Hydraulic Rolling M/C	1	Set	Gantry Crane (5 Tons)	2	Ea
PWHT MACHINE: MH-RG60 1 SET	8	Set	Blasting Tool Set	4	Set
Auto Welding Manipulator	2	Set	Painting Spay Tool Set	6	Set
Welding M/C (CO2 FCAW)	106	Ea			Ea
Welding M/C (SMAW / Mig / Tig)	125	Ea			

8. Office & Fabrication Shop

- Major Shop Equipment



Pipe & Shape Hydraulic Rolling M/C



CNC Plate Cutting M/C



Hydraulic Press M/C (1,500 Tons)



CNC Scallop M/C



CNC Shape Drill Cutting M/C



Plate Bending Roller



CO2 FCAW Welding M/C



CNC Band Saw



Auto WELDING MANIPULATOR



8. Office & Fabrication Shop

- Major Construction Equip.



Equipment Category	Q'ty	Unit
HIAP TRUCK (5 TON)	4	Ea
Crane (25 Ton)	1	Ea
Folk Lift (5 Ton)	3	Ea
JCB	1	Ea
Back Hoe	1	Ea
Air Compressor	1	Ea
5 ton Truck (Songtaew)	1	Ea
Compact Roller	1	Ea
Water Truck	1	Ea
Oil Tank Truck	1	Ea
Office Container	25	Ea
Mobile Toilet	4	Ea
Labor Camp	240	Room

8. Office & Fabrication Shop

- Major Construction Equip.



HIAP Truck



Crane (25 Ton)



Back Hoe



Compaction Roller 10 ton



Folk Lift (5 Ton)



Air Compressor



Labor Camp



JCB

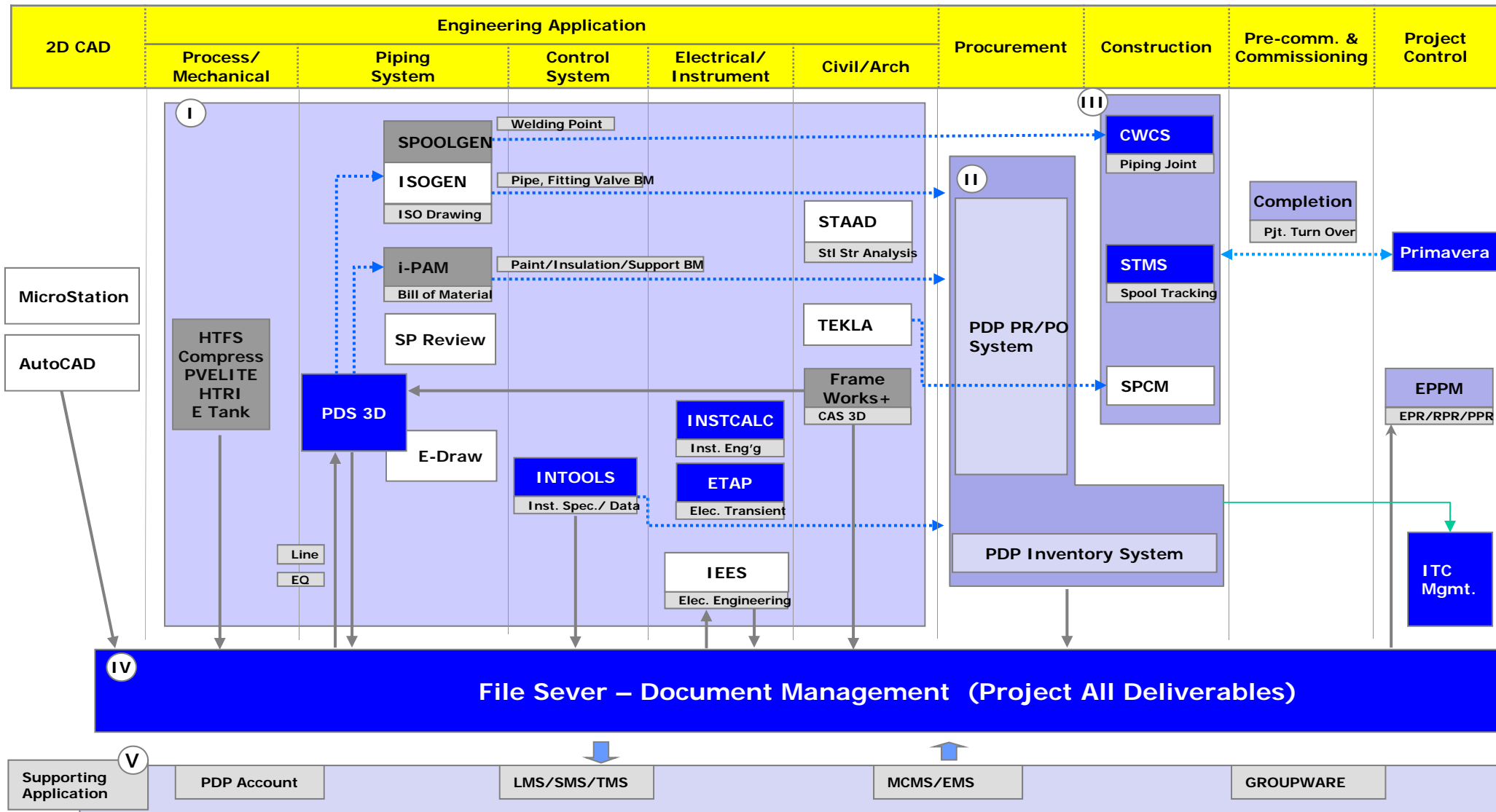


5 Tons Truck (Songtaew)



CAZ IT System

Overall Application Architecture



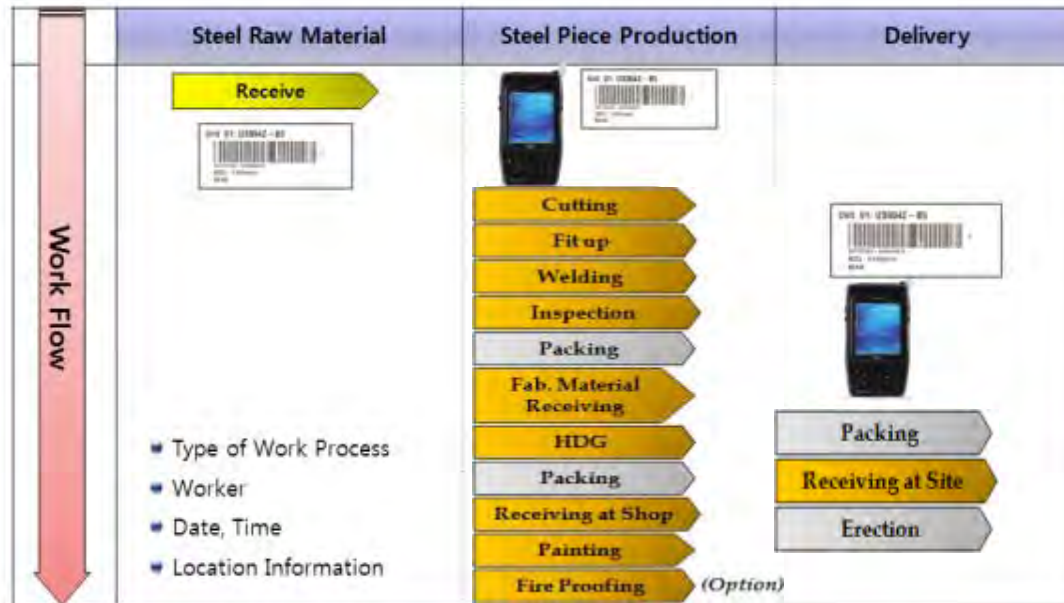
IT System for Construction

9-1. IT System for Construction

- STR. Production Control System (SPCM)



System is based on Bar-Code & GPS System



- Data Management for Raw Materials
- Production Management for Steel Members
- Delivery Management for Steel Members
- Searching & Reporting for Status of Production
- Operating of Each Project



GPS

Input Work Count: 3

ARRIVAL

SCAN PACKAGE BARCODE

Barcode: T001SPCM0002-0011

DateTime: 11-05-28 2:10:56:37

Worker: admin

Work Process	Package Barcode
Arrival	T001SPCM0002-0006
Arrival	T001SPCM0002-0002
Arrival	T001SPCM0002-0011

MAIN BACK

Select Work PROC

FAB	FAB Inspection
PAINT	PAINT Inspection
Packing	

NEXT

MAIN SELECT

Select Work PROC

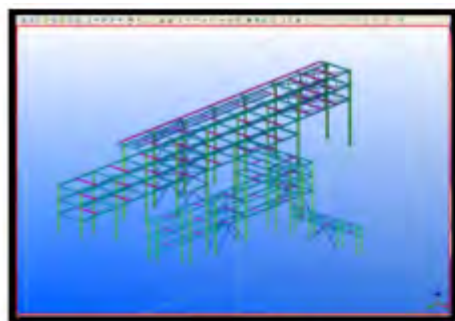
Delivery	Arrival
At Site	Install
Final Inspection	

PREVIOUS

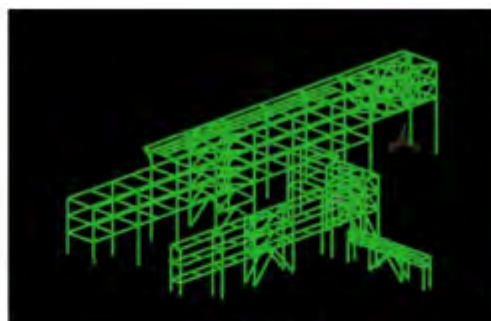
MAIN SELECT



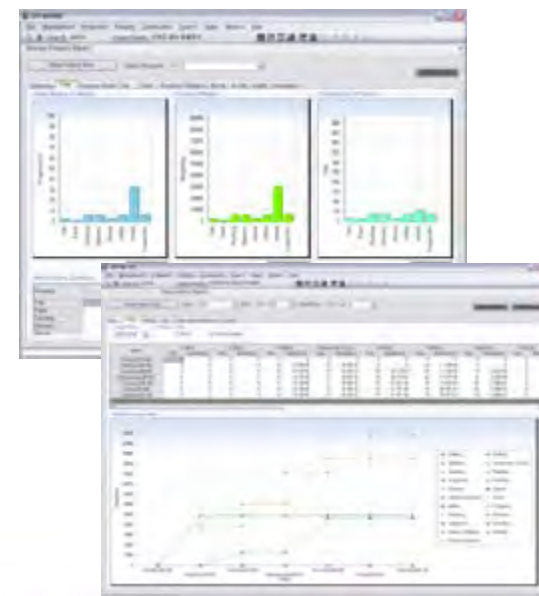
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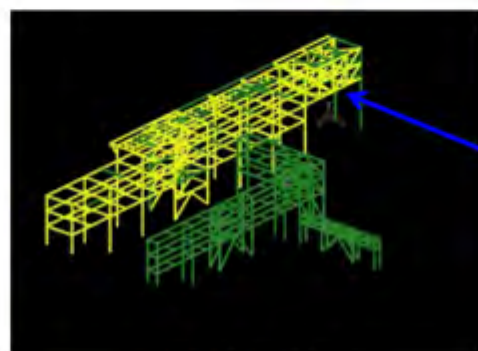
< TEKLA3D >



< SPCM 3D >



< Automation Report >



< 4D Search >

Yellow : Completed
(Checking Function by process & color)

- Cutting
- Fitup
- Welding
- Inspection
- Painting
- Fab. Material Receiving
- HDR
- Packing
- Receiving at Shop
- Painting
- Fire Proofing
- Packing
- Receiving at Site
- Erection

9-1. IT System for Construction

- System is based on Web Version

Log-In Screen

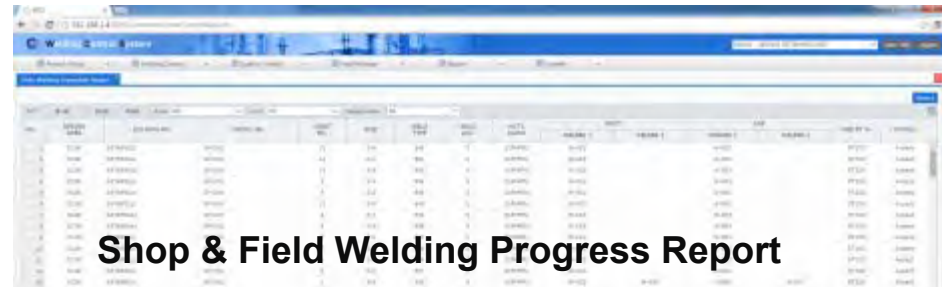


Report List

- Progress Report : 5 kinds
- Inspection Report : 3 kinds
- Spool Report : 3 kinds
- NDE Report : 9 kinds
- Welder Report : 5 kinds

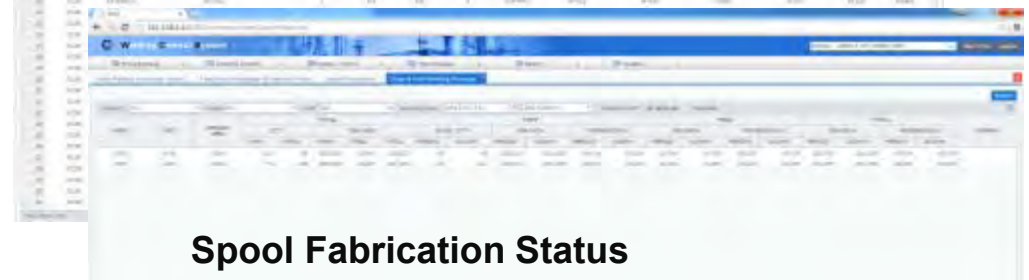
- CAZ Welding Control System(CWCS)

Daily Welding Inspection Report



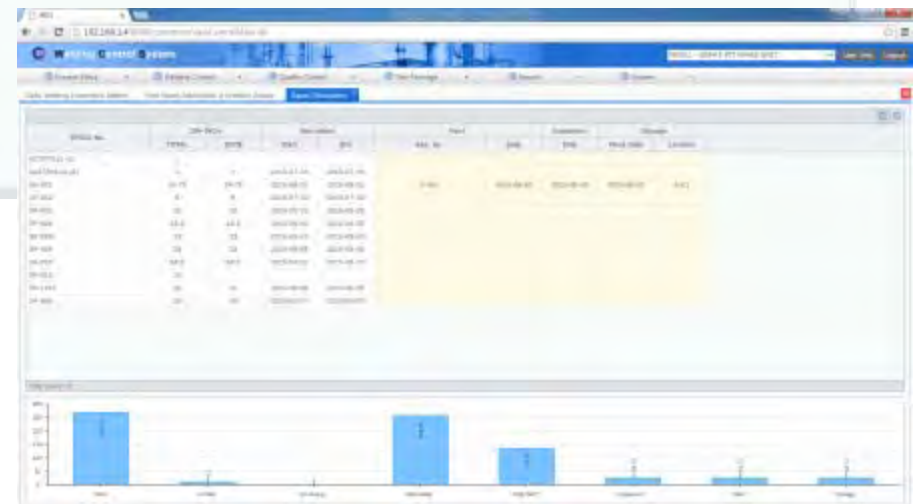
Date	Shift	Welder	Welding	Inspection	Result	Remarks
2018-01-01	01	W1	Welding	Inspection	Pass	
2018-01-01	02	W2	Welding	Inspection	Pass	
2018-01-01	03	W3	Welding	Inspection	Pass	
2018-01-01	04	W4	Welding	Inspection	Pass	
2018-01-01	05	W5	Welding	Inspection	Pass	

Shop & Field Welding Progress Report



Date	Shift	Welder	Welding	Progress	Result	Remarks
2018-01-01	01	W1	Welding	Progress	Pass	
2018-01-01	02	W2	Welding	Progress	Pass	
2018-01-01	03	W3	Welding	Progress	Pass	
2018-01-01	04	W4	Welding	Progress	Pass	
2018-01-01	05	W5	Welding	Progress	Pass	

Spool Fabrication Status



9-1. IT System for Construction

- CAZ Welding Control System(CWCS)



Test Package Report

[illegible]

Status for Welder Efficiency

Region		Country		Year		Population		GDP		GDP per capita		GDP per capita		GDP per capita		GDP per capita		GDP per capita		GDP per capita		
Region	Country	Year	Population	GDP	GDP per capita	GDP	GDP per capita	GDP	GDP per capita	GDP	GDP per capita	GDP	GDP per capita	GDP	GDP per capita	GDP	GDP per capita	GDP	GDP per capita	GDP	GDP per capita	
North America	USA	2010	310,932,000	14,505,300,000,000	46,650	14,505,300,000,000	46,650	14,505,300,000,000	46,650	46,650	14,505,300,000,000	46,650	14,505,300,000,000	46,650	46,650	14,505,300,000,000	46,650	14,505,300,000,000	46,650	46,650	14,505,300,000,000	46,650
North America	Canada	2010	33,491,000	1,460,900,000,000	43,616	1,460,900,000,000	43,616	1,460,900,000,000	43,616	43,616	1,460,900,000,000	43,616	1,460,900,000,000	43,616	43,616	1,460,900,000,000	43,616	1,460,900,000,000	43,616	43,616	1,460,900,000,000	43,616
South America	Brazil	2010	192,506,000	5,466,600,000,000	28,398	5,466,600,000,000	28,398	5,466,600,000,000	28,398	28,398	5,466,600,000,000	28,398	5,466,600,000,000	28,398	28,398	5,466,600,000,000	28,398	5,466,600,000,000	28,398	28,398	5,466,600,000,000	28,398
South America	Argentina	2010	40,091,000	530,900,000,000	13,242	530,900,000,000	13,242	530,900,000,000	13,242	13,242	530,900,000,000	13,242	530,900,000,000	13,242	13,242	530,900,000,000	13,242	530,900,000,000	13,242	13,242	530,900,000,000	13,242
Europe	Germany	2010	82,168,000	3,581,400,000,000	43,598	3,581,400,000,000	43,598	3,581,400,000,000	43,598	43,598	3,581,400,000,000	43,598	3,581,400,000,000	43,598	43,598	3,581,400,000,000	43,598	3,581,400,000,000	43,598	43,598	3,581,400,000,000	43,598
Europe	France	2010	64,388,000	2,775,400,000,000	43,116	2,775,400,000,000	43,116	2,775,400,000,000	43,116	43,116	2,775,400,000,000	43,116	2,775,400,000,000	43,116	43,116	2,775,400,000,000	43,116	2,775,400,000,000	43,116	43,116	2,775,400,000,000	43,116
Europe	Italy	2010	60,725,000	2,145,400,000,000	35,330	2,145,400,000,000	35,330	2,145,400,000,000	35,330	35,330	2,145,400,000,000	35,330	2,145,400,000,000	35,330	35,330	2,145,400,000,000	35,330	2,145,400,000,000	35,330	35,330	2,145,400,000,000	35,330
Europe	Spain	2010	45,751,000	1,795,400,000,000	39,246	1,795,400,000,000	39,246	1,795,400,000,000	39,246	39,246	1,795,400,000,000	39,246	1,795,400,000,000	39,246	39,246	1,795,400,000,000	39,246	1,795,400,000,000	39,246	39,246	1,795,400,000,000	39,246
Europe	UK	2010	61,083,000	2,435,400,000,000	39,886	2,435,400,000,000	39,886	2,435,400,000,000	39,886	39,886	2,435,400,000,000	39,886	2,435,400,000,000	39,886	39,886	2,435,400,000,000	39,886	2,435,400,000,000	39,886	39,886	2,435,400,000,000	39,886
Europe	Sweden	2010	9,298,000	485,400,000,000	52,312	485,400,000,000	52,312	485,400,000,000	52,312	52,312	485,400,000,000	52,312	485,400,000,000	52,312	52,312	485,400,000,000	52,312	485,400,000,000	52,312	52,312	485,400,000,000	52,312
Europe	Netherlands	2010	16,499,000	525,400,000,000	31,846	525,400,000,000	31,846	525,400,000,000	31,846	31,846	525,400,000,000	31,846	525,400,000,000	31,846	31,846	525,400,000,000	31,846	525,400,000,000	31,846	31,846	525,400,000,000	31,846

RT Shooting Status Report

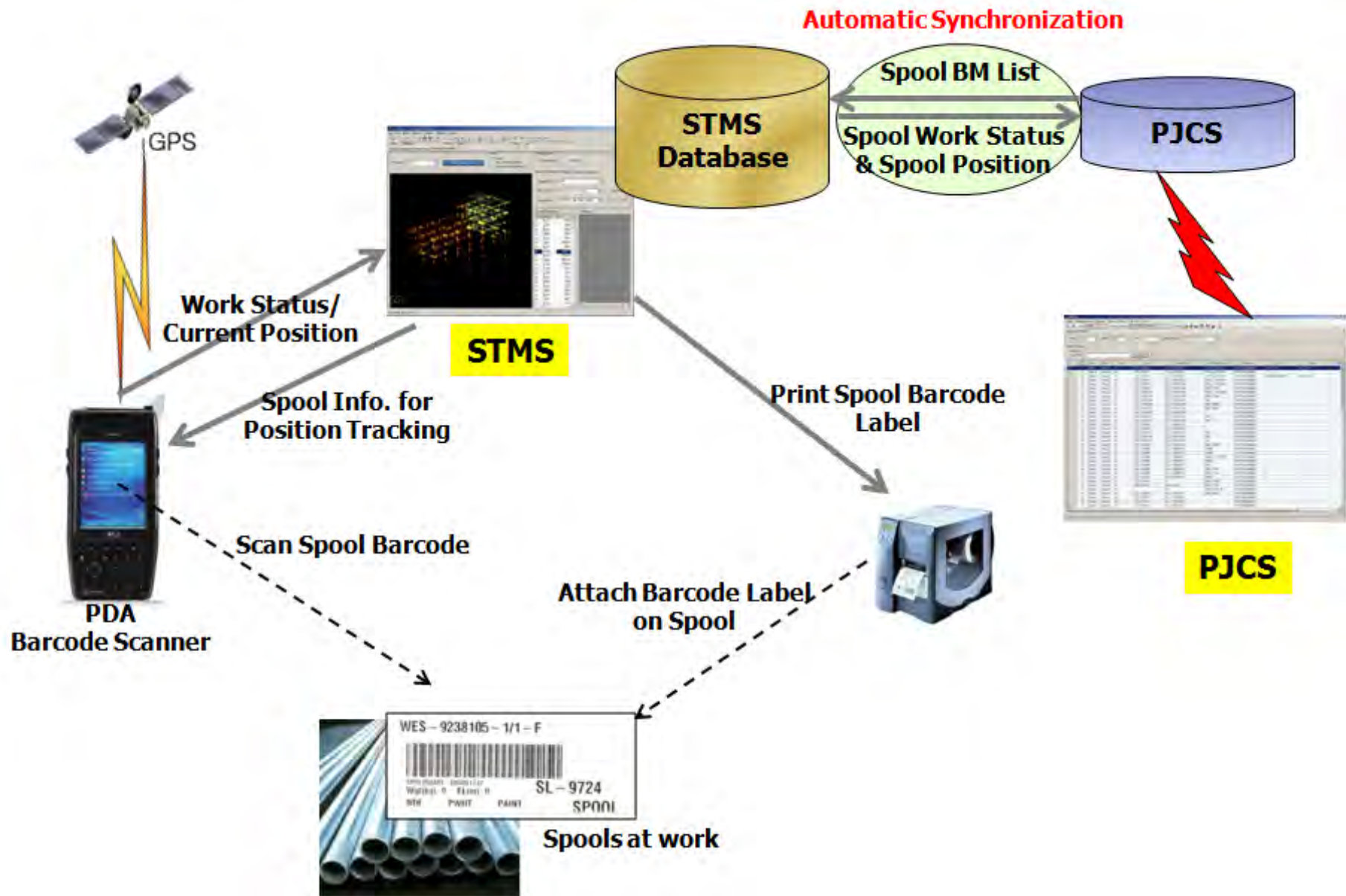
[illegible]

NDE Request Report

[illegible]

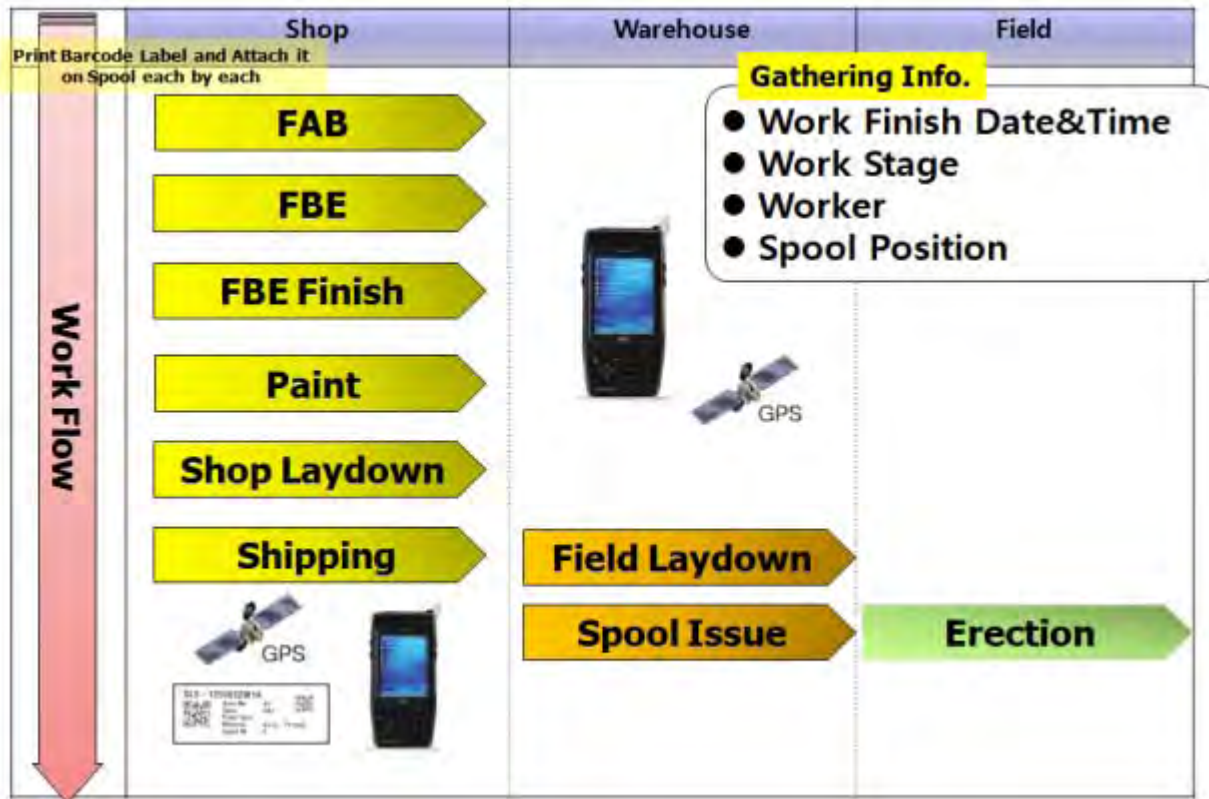
9-1. IT System for Construction

- Spool Tracking Mgmt. System(STMS)



9-1. IT System for Construction

- Spool Tracking Mgmt. System(STMS)



TRACK MATERIAL

Mem. No. **Search**

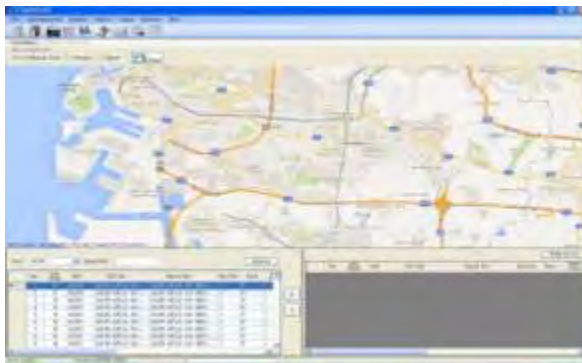
Area	F	Spool No.
A1	2	
A1	3	
A1	4	

☐ View only unfound Members

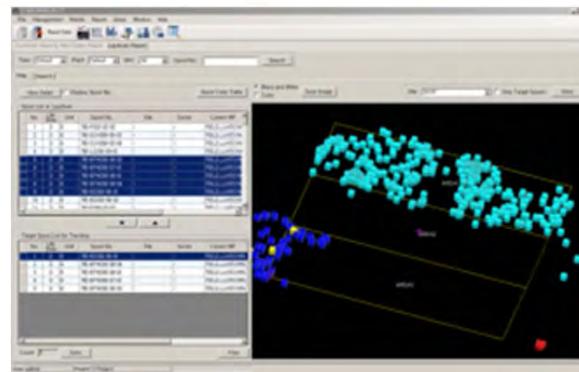
Total **3** F **0** R **3**

MAIN **TRACKING**

Tracking by PDA with GPS



STMS Google Map



STMS 3D Map

[AREA2 / SITE1]

>> D: 48 m **GPS Active**

NONE **PAN** **ROTATE** **ZOOM** **Z.All**

M.Punch No.: 2
Distance: E -41.33 m N -24.4 m

AREA2
ME
Spool
AREA1

MAIN **BACK**

IT System for Engineering

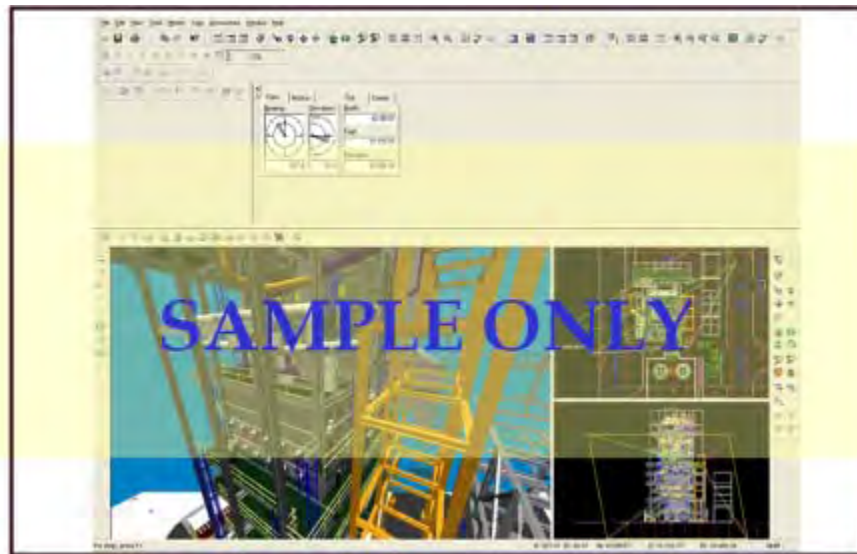
9-2. IT System for Engineering

- Piping Engineering



Program	Description
PDS	PLANT DESIGN SYSTEM Intergraph Software
MicroStation	Software by Bentley working with PDS
Caesar II	Piping Structural Stress Analysis
ACAD 2D, 3D	Piping Geometric drawing, Isometric drawing
Pro DSMS	AutoCAD Developed Program for Piping Designer

PDS (Plant Design System)



MicroStation



9-2. IT System for Engineering

- **Civil/Str./Arch. Engineering**

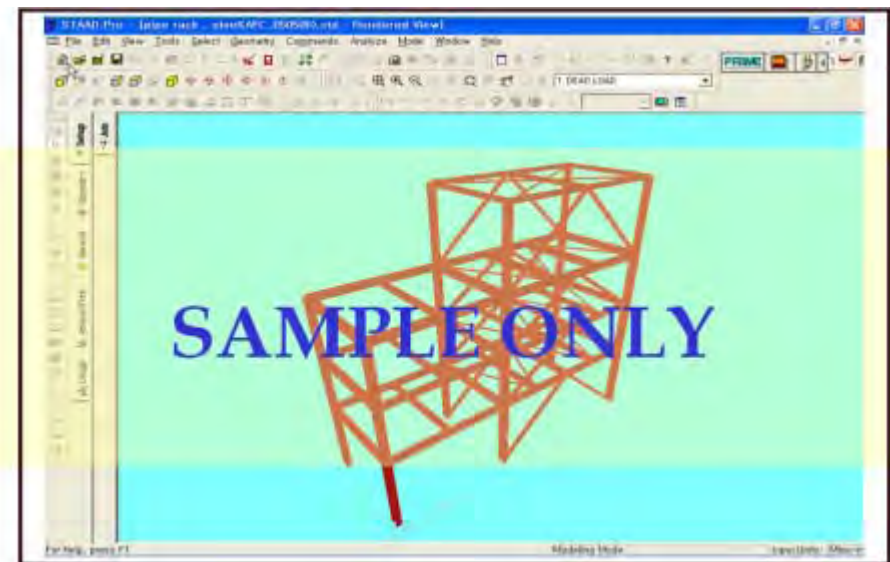


Program	Description
AFES	Automatic Foundation Engineering System
STAAD/PRO2001	Concrete & Steel Str. Cal. & Design Analysis
TEKLA, SPCM	Generate Structure Shop drawing
ACAD 2D, 3D	Generate Civil, Structure & Arch. Drawing
TAMP	TWRE AUTO MTO PROGRAM

AFES – Auto. FDN.



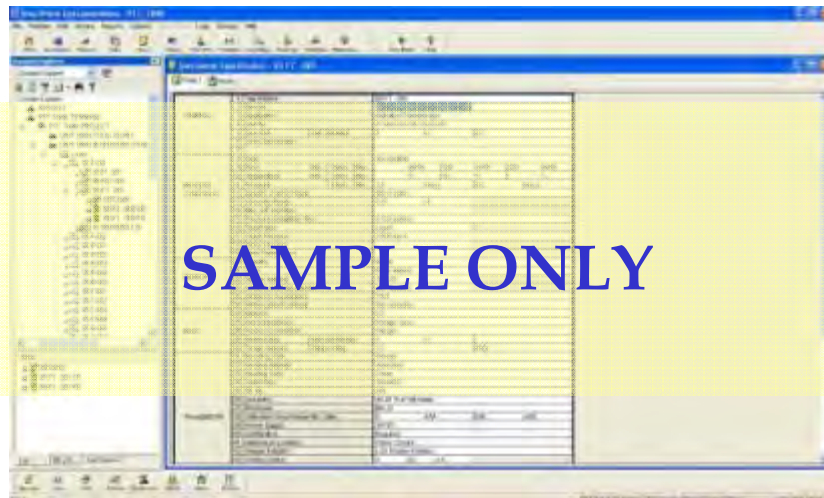
STAAD/PRO2001 – Concrete/Steel STR. Calc



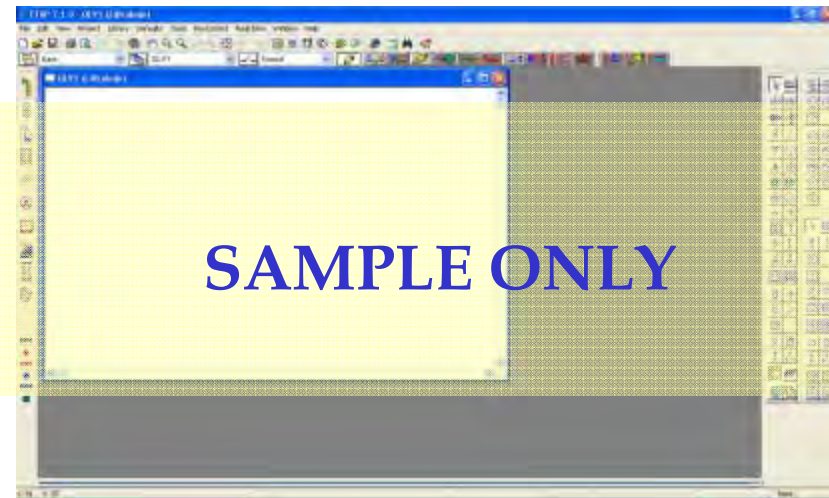
9-2. IT System for Engineering

Program	Description
SP Instrumentation/INTOOLS	Software by Intergraph for Cable routing work with PDS software
ACAD 2D, 3D	AutoCAD generic E&I layout drawing and hook-up diagram etc.
TWRE ORIFICE CALC.	Orifice Sizing Calculation
EE – POWER	TWRE Voltage Drop Calc.
ETAP	TWRE Cable Sizing Calculation

INTOOLS



ETAP



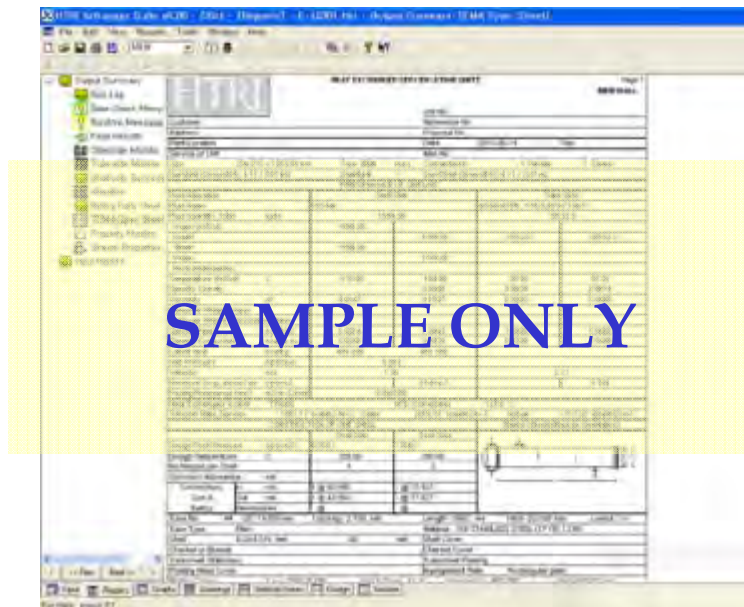
9-2. IT System for Engineering

- Tank/Vessel Engineering

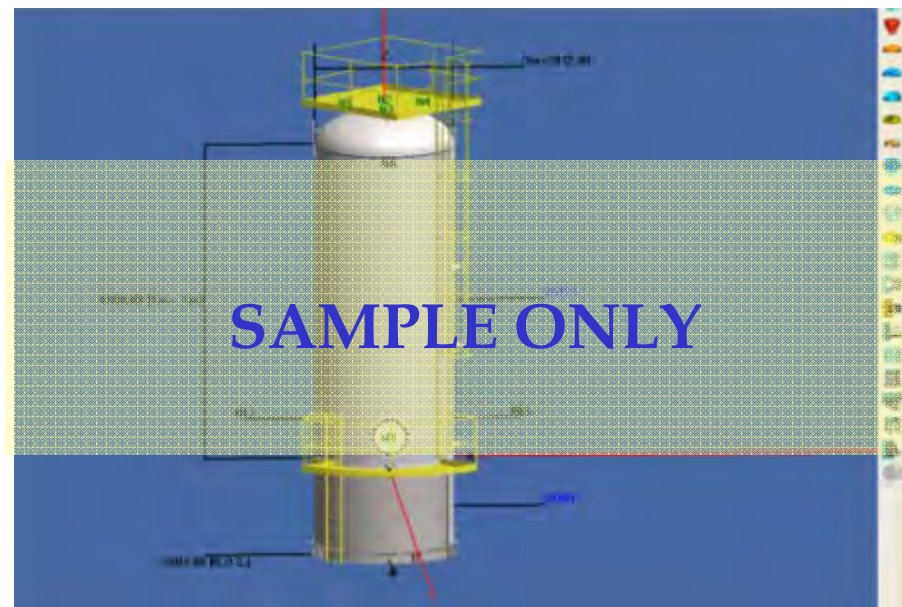


Program	Description
HTFS	Heat Exchanger Thermal rating Program
COMPRESS	Pressure Vessel & H-Ex. Calculation
PVELITE	Pressure vessel & H-Ex. Calculation
HTRI	Heat Exchanger Thermal rating Program
E TANK	Storage Tank Calculation

HTRI



COMPRESS



Quality Assurance

10. Quality Assurance

1) Quality Policy



- Quality Policy -

CAZ Co., Ltd. has established its quality policy in totally committed and takes pride in offering a construction work to clients in terms of cost, schedule, quality, standard and safe through our service with an excellence team work, to satisfy our customers through continual improvement approach. Our short slogan is defined as follow

To ensure this the following strategic and scheme are required to implement with effectiveness.

- ✓ Establish a quality management system
- ✓ Provide quality construction work with highly standard, safety and on-time deliver performance to meet our customer's standard and requirements
- ✓ A training program has been established to increase potential capability and performance of our personnel.
- ✓ Establish the company strategic annual objectives and quantifiable targets and review its continuing suitability through management review activity

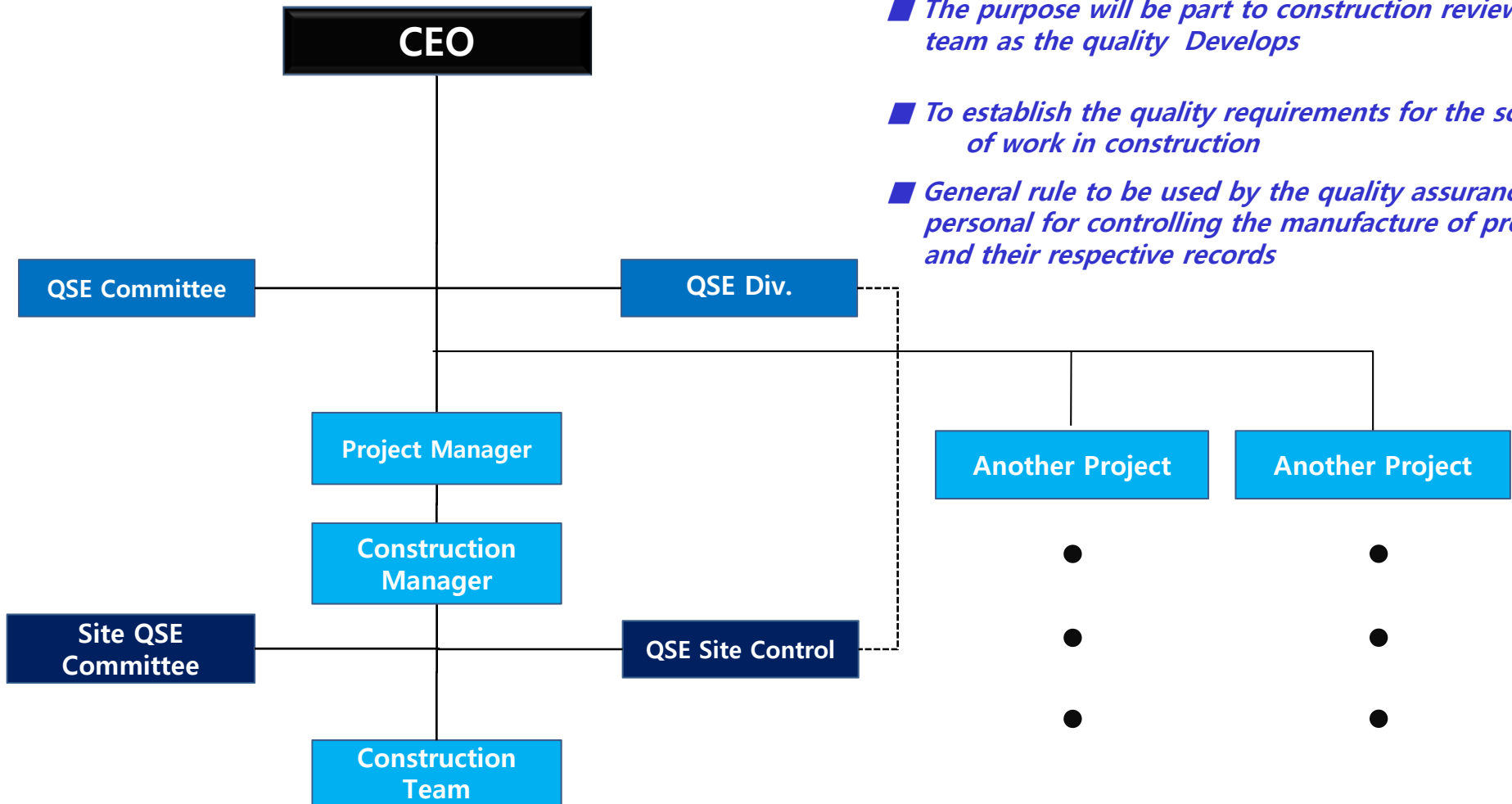
All personnel are required to understand and have responsibilities to implement, maintain and improve its performance to achieve this policy continually.



10. Quality Assurance

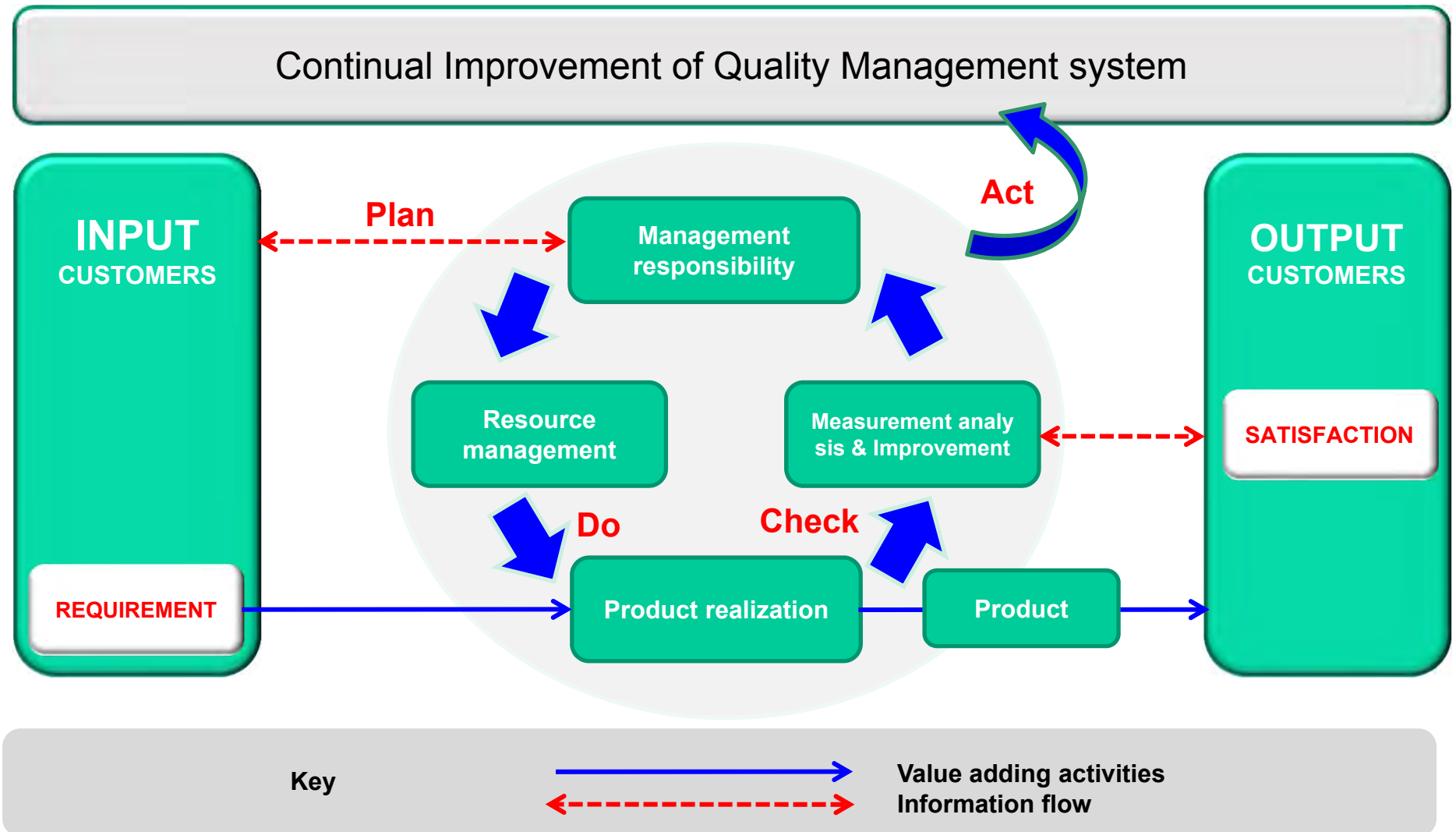
2) QSE Organization

- The purpose will be part to construction review team as the quality Develops
- To establish the quality requirements for the scope of work in construction
- General rule to be used by the quality assurance personal for controlling the manufacture of products and their respective records



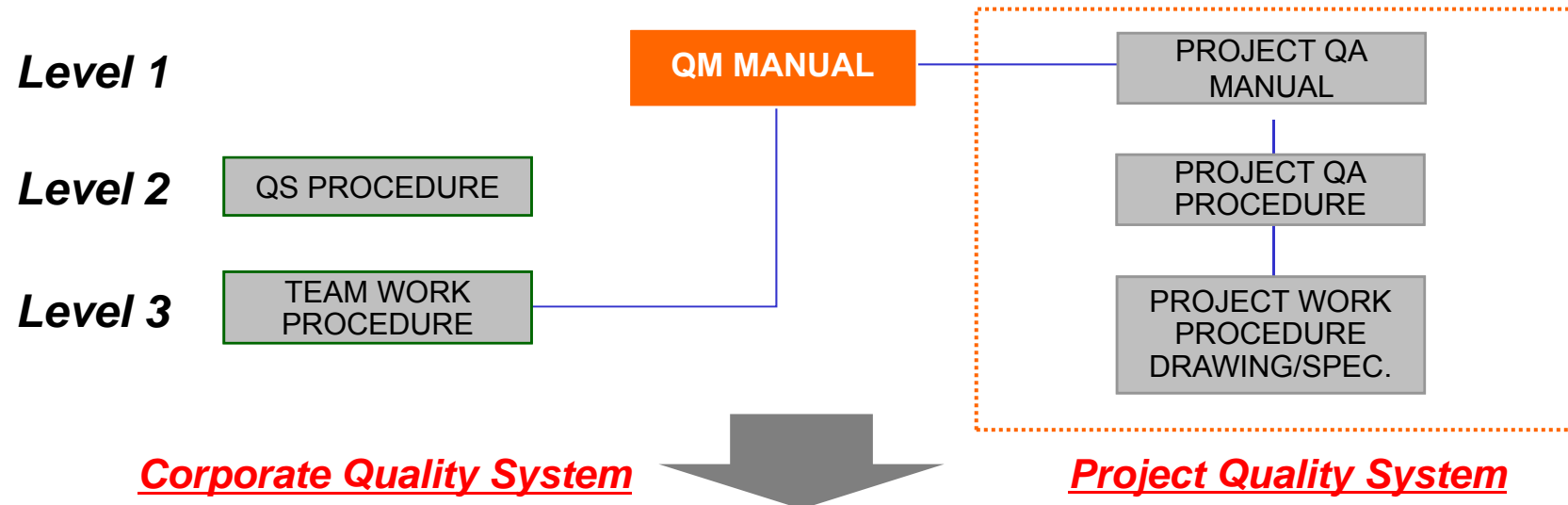
10. Quality Assurance

3) Quality Management System



10. Quality Assurance

4) Structure of Quality Document System



Quality Record

Project Files - Contract/Purchase Order - Contract Specification - Project Correspondence - Route/Process Sheet - Inspection/Test Plan & Report - As-built Drawings - Material Test Reports - Calibration Data Nonconformance Reports	Training Records Qualification Records	Internal Quality Audit Reports	Management Review Reports	Contract Review Reports	Vendor/ Subcontractor Control Data
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10. Quality Assurance

5) ISO 9001:2008 Certificate

- CAZ has developed Quality Management System to control Total Quality which is included Quality Assurance, Quality Control and Quality Audit
- Achieved Certificate of ISO 9001:2008 on 12. Jan. 2015



Safety Management System

11. Safety Management System

1) Safety Policy

- Safety Policy -

CAZ (Thailand) Co., Ltd. is committed to providing a healthy and safe work environment for its workers and preventing occupational illness and injury. To express that commitment, we issue the following policy on occupational health and safety.

As the employer, CAZ (Thailand) Co., Ltd. is responsible for the health and safety of its workers. CAZ (Thailand) Co., Ltd. will make every effort to provide a healthy and safe work environment. We are dedicated to the objective of eliminating the possibility of injury and illness.

As CAZ (Thailand) Co., Ltd., I give you my personal promise to take all reasonable precautions to prevent harm to workers.

Supervisors will be trained and held responsible for ensuring that the workers, under their supervision, follow this policy. They are accountable for ensuring that workers use safe work practices and receive training to protect their health and safety.

Supervisors also have a general responsibility for ensuring the safety of equipment and facility. CAZ (Thailand) Co., Ltd. through all levels of managements, will cooperate with the joint occupational health and/or the representative and workers to create a healthy

and safe work environment, cooperation should also be extended to others such as contractors, owners, officers , etc.

The workers of CAZ (Thailand) Co., Ltd. will be required to support this organization health and safety initiative and to cooperate with the occupational health and safety committee or representative and with others exercising authority under the applicable laws.

It is the duty of each worker to report to the supervisor of manager, as soon as possible, any hazardous conditions , injury, accident or illness related to the workplace. Also, workers must protect their health and safety by complying with applicable acts and regulations and to follow policies, procedures, rules and instructions as prescribed by CAZ (Thailand) Co., Ltd.

CAZ (Thailand) Co., Ltd. will, where possible, eliminate hazards and, thus, the need for personal protective equipment. If that is not possible, and where there is a requirement, workers will be required to use safety equipment, clothing, devices and materials for personal protection.

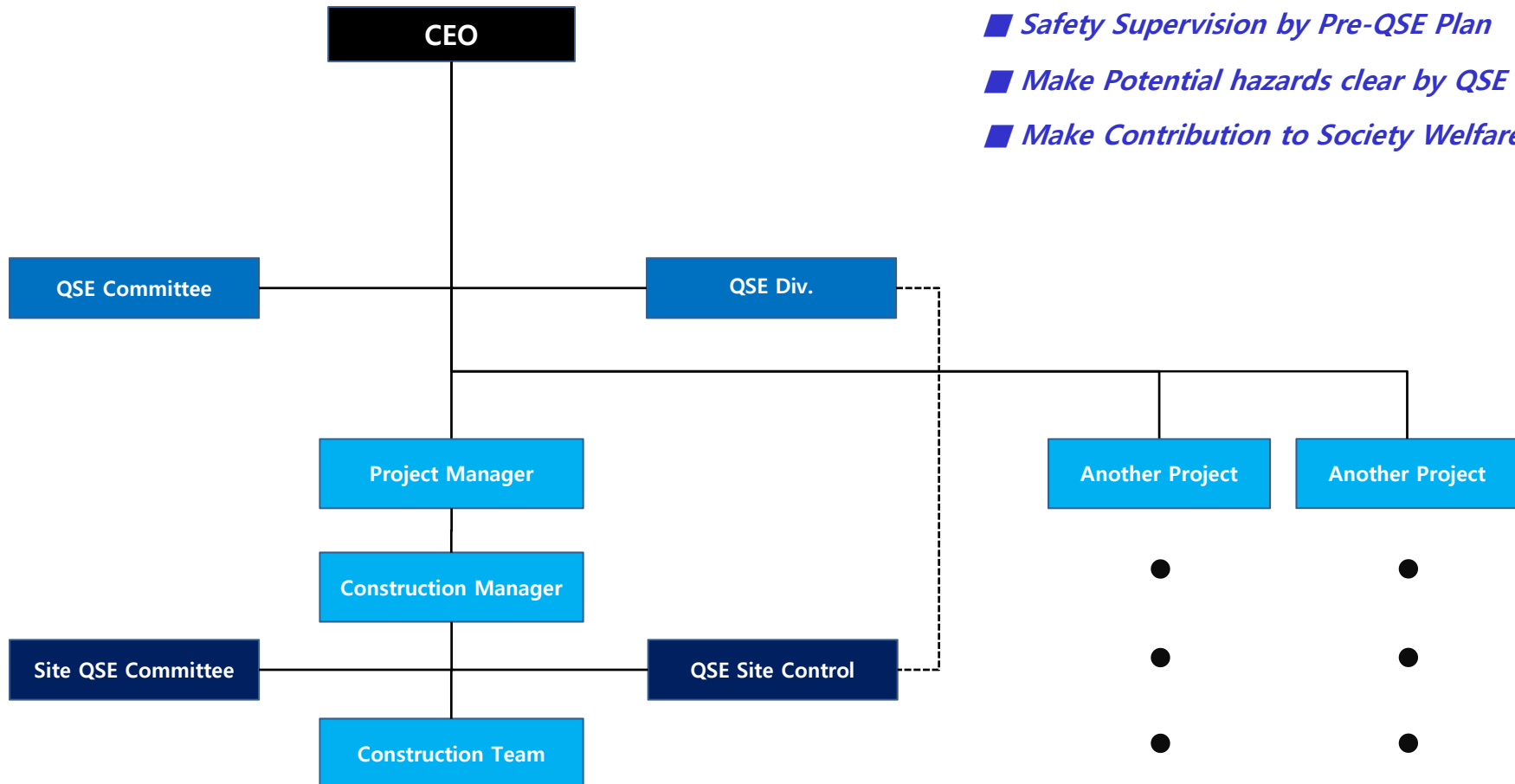
CAZ (Thailand) Co., Ltd. recognizes the workers duty to identify hazards and supports and encourages workers to play an active role in identifying hazards and to offer suggestions or ideas to improve the health and safety program.



11. Safety Management System

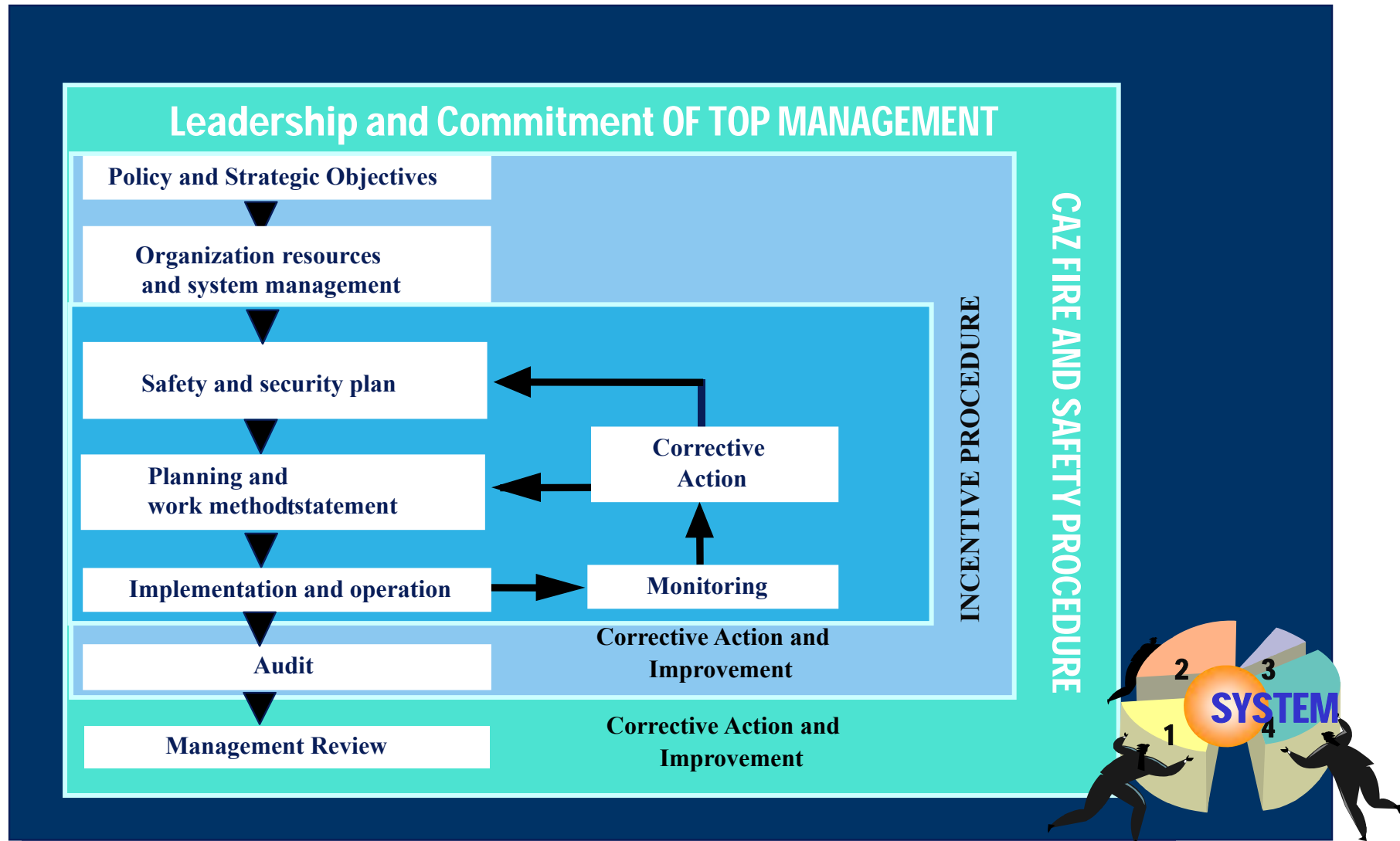
2) Safety Organization

- *Safety Supervision by Pre-QSE Plan*
- *Make Potential hazards clear by QSE Operation*
- *Make Contribution to Society Welfare*



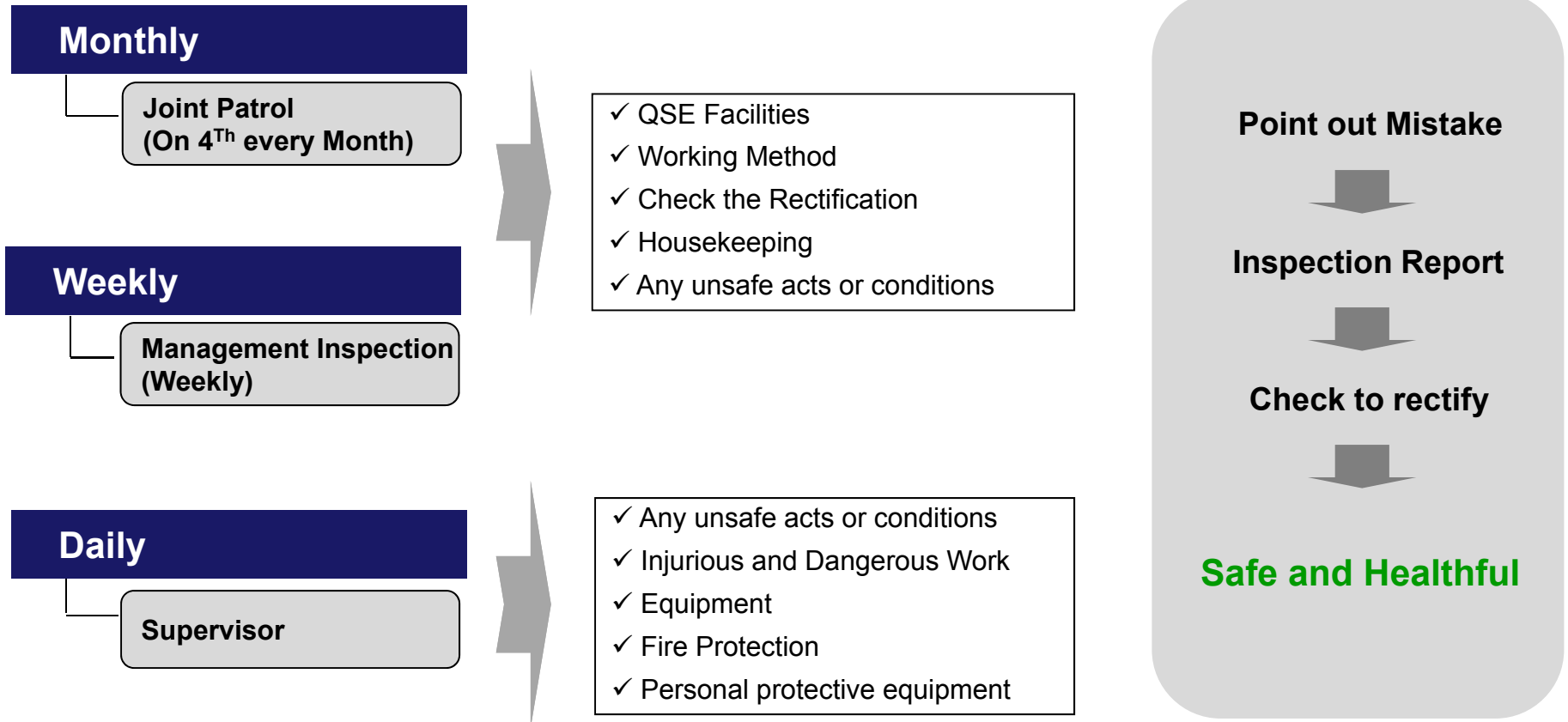
11. Safety Management System

3) Structure of the Safety Management System



11. Safety Management System

4) Audit Plan



11. Safety Management System

5) Safety Rewards

Achieving	2,000,000	Safe Man hours on PTTGC Aromatics Debottlenecking Project
Achieving	6,000,000	Safe Man hours on TOP SPP Project





THANK YOU



CAZ(THAILAND)CO.,LTD.