

# Inventory Optimization Sharing

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Maintenance Planning & Management Division

ส่วนบริหารแผนงานบำรุงรักษา

และ

Warehouse Management Section

แผนกบริหารพัสดุ



**POWERING LIFE**  
with **FUTURE ENERGY** and **BEYOND**

ขับเคลื่อนทุกชีวิตด้วยพลังแห่งอนาคต

# Inventory Optimization

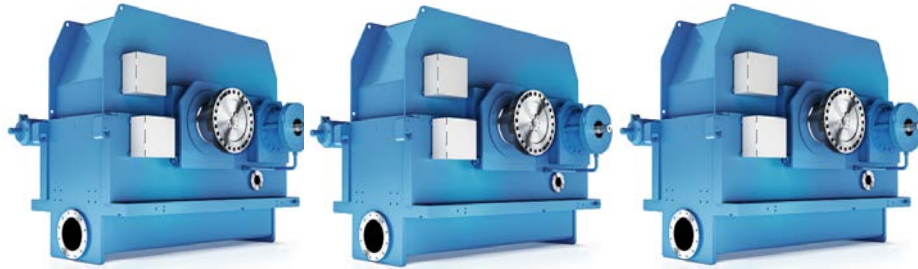


# Spare Parts Interchangeability Record (SPIR)

\*New Entry EQ



FLENDER  
Gearbox  
Model  
T71X/3C



ESP Gen-6

ESP Gen-7

GSP6 Gen-8

Total  
Used-q'ty

พิจารณาโอกาส หยุด  
ซ่อมอุปกรณ์พร้อมกัน

TA ESP

Max

Min

1

1

1

3

2

1

Bearing Set

1

1

1

3

2

1

Laby. Seal Set

Manufacturer Recommendation Spare Part List  
Break Down & CM History

IA ระหว่าง  
Maint./Warehouse/  
MP&M

# Spare Parts Interchangeability Record (SPIR)



## Spare Part List For Flender Gearbox PTT GSP

										Plant	ESP	ESP	ESP	ESP	GSP#5	GSP#5	GSP#6	GSP#6
										No.	1	1	1	1	1	1	1	1
										TAG.	3203C002	3225PGX001,002	3225PGX002	3225PGX003	3525PGX01	3525PGX02	3625PGX01	3602C01
										SERIAL NO.	10093	9586	9587	12050	7571	7572	10152	10094
										MODEL TYPE	TX56/7C	TX71/3C	TX71/3C	TX71/3C	TX63/3C	TX63/3C	TX71/3C	TX40/7C
										UNIT	Recycle Gas Comp.	GEN 6	GEN 7	GEN 9	GEN 4	GEN 5	GEN 8	Regen Gas Comp
Count	PTT		On	Stock	Total	Desc.	Position Tag.	Type	Total	PTT MESC	Rec. Qty. per Unit	Rec. Qty. per Unit	Rec. Qty. per Unit	Rec. Qty. per Unit	Rec. Qty. per Unit	Rec. Qty. per Unit	Rec. Qty. per Unit	Rec. Qty. per Unit
Code	MAX	MIN	Hand	Check	Use													
N	1	1	2	1	1	LS Bearing 02N921 05G963	B110	BD1T370CY195	1	5872540953				1				
N	1	1	2	1	1	LS Bearing 02N921 05F887	B120	EP380CY190R	1	5872540963				1				
N	1	1	2	1	1	HS Bearing 02N921 02550	B210	DN250	1	5872540973				1				
N	1	1	2	1	1	HS Bearing 02N921 05L590	B220	RR2500F250	1	5872540983				1				
N	1	1	2	1	1	LS Labyrinth Oil Seal 02N921 03AH658	K110	340-380	1	5872540993				1				
N	1	1	2	1	1	HS Labyrinth Oil Seal 02N921 03AH632	K210	220-250	1	5872541003				1				
Y	3	2	3	1	3	Steimel Gear Pump TFL10-160KR *For Gen6,7,8	M100	TFL10-160KR	3	5872541013		1	1				1	
N	1	1	1	0	1	Steimel Gear Pump TFL10-160KR *For Gen9		TFL10-160KR	1	5872541033				1				
Y	2	1	2	1	2	Steimel Gear Pump TFL18/170	M100	TFL18/170	2	5872541023					1	1		
Y	2	1	2	1	2	LS Bearing & Pin dwg. 05J799-3	B110	BD 1T 280 CY 220	2	5872540823				1	1			
Y	2	1	2	1	2	LS Bearing & Pin dwg. 05F712-3	B120	EP 280 CY 210 RR OO	2	5872540813				1	1			
Y	2	1	2	1	2	HS Adjustable ASS'Y Bearing dwg. 02D478	B210	DN200	2	5872540703				1	1			
Y	2	1	2	1	2	HS Bearing & Pin dwg. 05F013-3	B220	EP 200 OF 200 RR OO	2	5872540723				1	1			
Y	2	1	2	1	2	LS Labyrinth Oil Seal dwg. 03AJ072-3	K110	-	2	5872540893				1	1			
Y	2	1	2	1	2	HS Labyrinth Oil Seal dwg. 03V245-3	K210	-	2	5872540733				1	1			
Y	2	1	2	1	3	LS Bearing dwg. 05F450	B110	BD1T 360CY 90	3	5872540883		1	1				1	
Y	2	1	2	1	3	LS Bearing dwg. 05F449	B120	RR310CY240	3	5872540873		1	1				1	
Y	2	1	3	2	3	HS Adjustable ASS'Y dwg. 02D548	B210	DN230	3	5872540693		1	1				1	
Y	2	1	2	1	3	HS Bearing dwg. 05F448	B220	EP 230OF230RR00	3	5872540713		1	1				1	
Y	2	1	2	1	3	LS Labyrinth Seal dwg. 03AH654	K110	340-360	3	5872540923		1	1				1	
Y	2	1	3	2	3	HS Labyrinth Seal dwg. 03AH628	K210	220-230	3	5872540763		1	1				1	
N	1	1	1	0	1	LS Bearing dwg. 05F404 B110	B110	EP160CY80RR00	1	5872540853	1							
N	1	1	2	1	1	LS Bearing dwg. 05F404 B120	B120	EP160CY80RR00	1	5872540863	1							
N	1	1	1	0	1	LS Thrust Bearing ASS'Y BECDOCE152 B150	B150	BECDOCE152	1	5872540933	1							
N	1	1	1	0	1	HS Tilting Pads Bearing ASS'Y dwg 02D274	B210	RGR 5TP 90x63	1	5872540803	1							
N	1	1	1	0	1	HS Tilting Pads Bearing dwg 02D267	B220	5TP 90x63	1	5872540793	1							
N	1	1	1	0	1	LS Labyrinth Seal dwg. 03AH614	K110	100-160-228-40	1	5872540913	1							
N	1	1	1	0	1	HS Labyrinth Seal dwg. 03AH600	K220	050-090-150-30	1	5872540753	1							
N	1	1	1	0	1	LS Bearing dwg. 05B303 B110	B110	EP110CY55RR00	1	5872540833								1
N	1	1	1	0	1	LS Bearing dwg. 05B303 B120	B120	EP110CY55RR00	1	5872540843								1
N	1	1	1	0	1	LS Thrust Bearing ASS'Y DOCE130 B150	B150	DOCE130	1	5872540943								1
N	1	1	1	0	1	HS Tilting Pads Bearing ASS'Y dwg 02D095	B210	RGR5TP 70x49	1	5872540773								1
N	1	1	1	0	1	HS Tilting Pads Bearing dwg 02D094	B220	5TP 70x49	1	5872540783								1
N	1	1	1	0	1	LS Labyrinth Seal dwg. 03AH604	K110	100-100-178-40	1	5872540903								1
N	1	1	1	0	1	HS Labyrinth Seal dwg. 03AH596	K220	050-070-130-30	1	5872540743								1

# Dynamic Max, Min and Safety Stock

## Background

- To optimize and reduce spare part inventory cost, to be closer to better half RAM EI peers.
- Better half RAM EI peers = 0.7% / PTT Rayong GSP = 3%

## To-do.

- Review max stock of slow-moving spare part.
- Adjust max stock to be up-to-date and realistic with maintenance history
- Slow-moving can be dealt with instantly, do not have to wait until write-off process (Dead Stock = 10 years).
- Prevent overstock purchase, restricted by adjusted max stock.

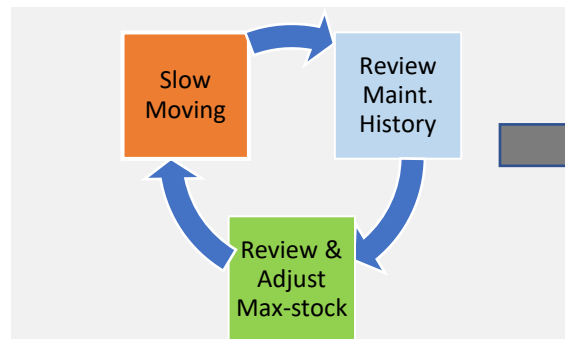
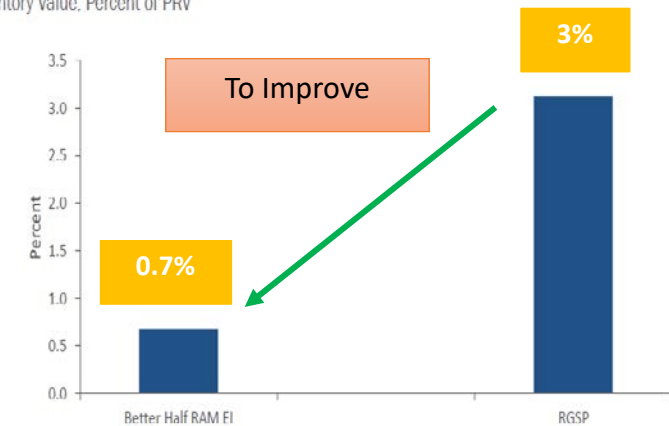
PRV = 112.2 BTHB  
1%PRV = 1.1 BTHB  
0.1%PRV = 100 MTHB  
\*PRV = Plant Replacement Value  
\*B = Billion



## MRO Inventory

MRO : Maintenance, Repair and Operation

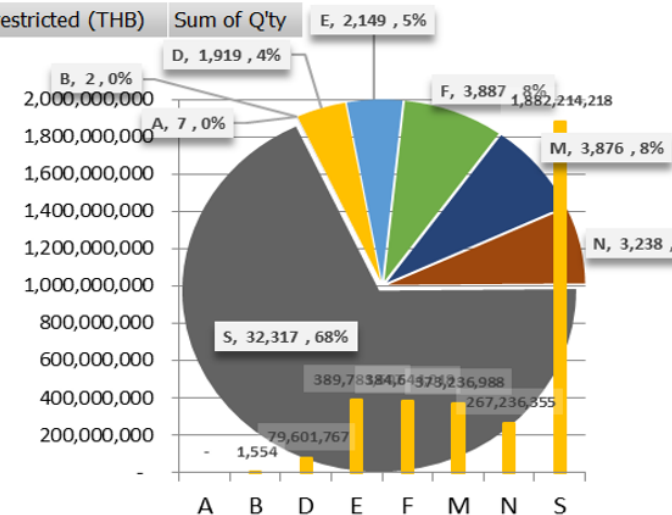
Inventory Value, Percent of PRV



Group	Slow-moving
Mech.	1,189 MB
Inst.	306 MB
Elec.	141 MB
<b>Total</b>	<b>1,636 MB</b>

Sum of Value Unrestricted (THB)

Sum of Q'ty



## As-is

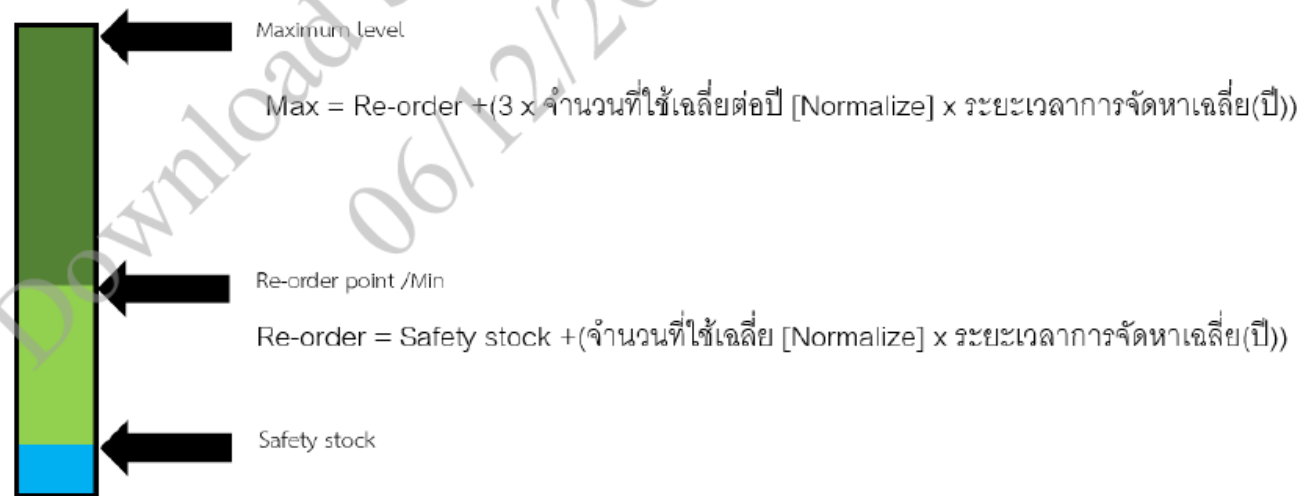
D : Dead Stock  
E : Emergency & Insurance Part [SCE,A]  
F : Fast-moving  
M : Medium-moving  
S : Slow-moving  
N : New MESC



# Dynamic Max, Min and Safety Stock

- จำนวน Spare Part สำหรับการจัดการเพื่อสำรองคลังหลังหากมีประวัติการเบิกใช้งานแล้ว เป็นไปตามสูตรนี้
  - **Safety Stock** = (จำนวนที่ใช้สูงสุดในปี x ระยะเวลาการจัดหาสูงสุด (ปี)) - (จำนวนที่ใช้เฉลี่ย [Normalize] x ระยะเวลาการจัดหาเฉลี่ย (ปี))
  - **Re-order** = Safety stock + (จำนวนที่ใช้เฉลี่ย [Normalize] x ระยะเวลาการจัดหาเฉลี่ย(ปี))
  - **Max** = Re-order + (3 x จำนวนที่ใช้เฉลี่ยต่อปี [Normalize] x ระยะเวลาการจัดหาเฉลี่ย (ปี))

## Max, Min and safety stock



$$\text{Safety stock} = (\text{จำนวนที่ใช้สูงสุดในปี} \times \text{ระยะเวลาการจัดหาสูงสุด(ปี)}) - (\text{จำนวนที่ใช้เฉลี่ย [Normalize]} \times \text{ระยะเวลาการจัดหาเฉลี่ย(ปี)})$$

# Dynamic Max, Min and Safety Stock



Material		Material Description				Plnt	Name 1
SLoc	MvT	S	Mat. Doc.	Item	Pstng Date	Quantity in UnE	EUn
5872540693		HS Adjustable ASSY 02S236 02D548				2300	Rayong Separation Plant
2361	101		5000777860	9	22.12.2022	1	PC
2361	511		4006152002	1	27.08.2022	1	PC
2361	261		4004891386	3	11.09.2021	1-	PC
2361	261		4003725768	3	10.07.2021	1-	PC
2361	262		4002185634	2	21.04.2021	1	PC
2361	261		4000452629	3	27.01.2021	1-	PC
2361	101		5000104525	1	27.02.2020	2	PC
2361	101		5000483668	9	19.11.2016	1	PC
5872540703		HS Adjustable ASSY Bearing 02R040 02D478				2300	Rayong Separation Plant
2351	101		5000777860	3	22.12.2022	1	PC
2351	262		4005643223	2	13.12.2018	1	PC
2351	261		4004853223	3	27.10.2018	1-	PC
2351	262		4003208261	1	05.08.2017	1	PC
2351	261		4002829960	3	11.07.2017	1-	PC
2351	101		5000483668	3	19.11.2016	1	PC
5872540713		HS Bearing 02S236 05F448				2300	Rayong Separation Plant
2361	101		5000777860	10	22.12.2022	2	PC
2361	261		4004891386	4	11.09.2021	1-	PC
2361	261		4003725768	4	10.07.2021	1-	PC
2361	261		4000452629	4	27.01.2021	1-	PC
2361	101		5000104525	2	27.02.2020	2	PC
2361	101		5000483668	10	19.11.2016	1	PC

MB51 : Movement

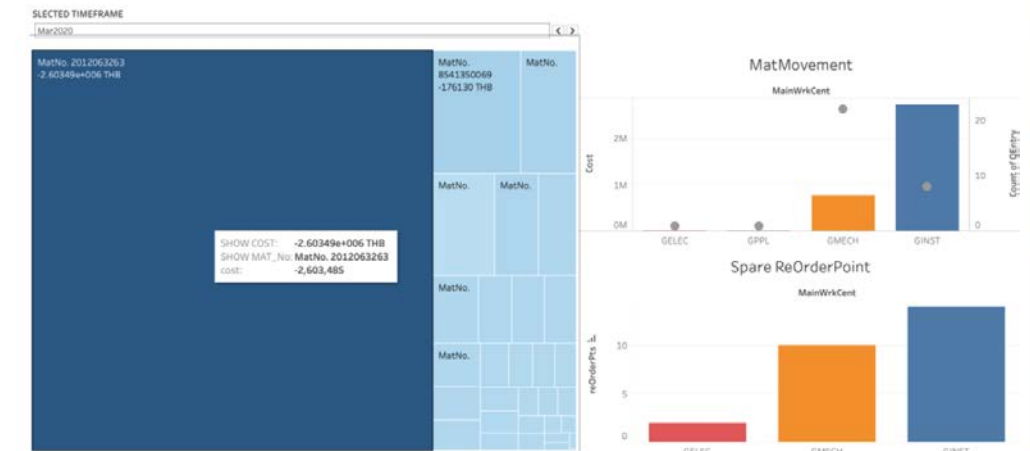
Spare Type	Brand	Procurement	Delivery Time	ตรวจรับ	Total
GG & PT Part	Siemens	60	240	5	305
Gas Turbine Part	Solar Turbines	60	240	5	305
Compressor	Mitsubishi	60	270	5	335
Compressor	Man Turbo	45	240	5	290
Gearbox	Flender	45	240	5	290
Gearbox	Allen	30	270	5	305
Gearbox	Nippon Gear	30	270	5	305
Gearbox	VOITH	30	240	5	275
Turbo Expander	Atlas Copco Mafi-Trench	30	240	5	275
Screw Air Comp.	Atlas Copco	30	180	5	215
Compressor & Gas Engine	Cooper	30	240	5	275
Air Compressor	Ingersoll-Rand	30	180	5	215
Compressor	Kobelco	75	300	5	380
Compressor	Dresser-Rand	60	300	5	365
Compressor	Burckhardt	30	240	5	275
Compressor	Ebara	90	300	5	395
HEPA Filter	Freudenberg	30	180	5	215

Procurement +  
Delivery Time

# Dynamic Max, Min and Safety Stock

Forecast Inventory Cost Change (THB)		(65,295,544.14)	Status Review (Q'ty)		5,120	Status In-progress (Q'ty)	5,279	Total MESC M01	10,399	%Progress							
Material	Description	Brand	ระยะเวลา จัดหาสูงสุด (Day)	ระยะเวลา จัดหาสูงสุด (Year)	ระยะเวลา จัดเก็บเฉลี่ย (Day)	ระยะเวลา จัดเก็บเฉลี่ย (Year)	Safety Stock (Round)	Existing Max	New Max (Round)	Existing Min	New Min (Round)	Qty Unrestricted	Movement *ยอดคลี่ 10 ปี	ค่าสินค้า Max *ครอบคลุม 10 ปี	ค่าสินค้าเฉลี่ย 10 ปี	Period (Year)	Diff. Max
1985212093	Seal Rectangular P/N 3014304	Gas Turbine Part - Solar Turbines	305	0.84	275	0.75	0.00	4	1	2	1.00	2	0	0	0	10	-3
1988051053	Guide Bridge 650-120-000 7.1-1.1G	Gas Engine Cooper	275	0.75	245	0.67	10.00	16	13	6	8.00	0	-26	-16	-2.6	10	-3
1988051243	Pickup Magnetic P/N 033-428-003	Gas Engine Cooper	275	0.75	245	0.67	0.00	4	1	1	1.00	4	0	0	0	10	-3
1988051463	PACKING / BUSHING P/N 653-757-000	Gas Engine Cooper	275	0.75	245	0.67	0.00	4	1	1	1.00	6	0	0	0	10	-3
1988051483	MANIFOLD TO BELLOW GASKET PN 035-420	Gas Engine Cooper	275	0.75	245	0.67	0.00	4	1	1	1.00	13	0	0	0	10	-3
1988051513	GASKET P/N 035-420-091	Gas Engine Cooper	275	0.75	245	0.67	0.00	4	1	1	1.00	8	0	0	0	10	-3
1988051523	WASTEGATE TO FLANGEGASKET PN 035-420	Gas Engine Cooper	275	0.75	245	0.67	1.00	4	1	1	1.00	1	-2	-1	-0.2	10	-3
1988051583	Push Rod 650-604-000 7.4-1.1	Gas Engine Cooper	275	0.75	245	0.67	11.00	16	13	6	10.00	16	-16	-16	-1.6	10	-3
1988051643	SEAL O-RING P/N RSF3153-21000	Gas Engine Cooper	275	0.75	245	0.67	1.00	4	1	1	1.00	1	-2	-1	-0.2	10	-3
1988051653	SEAL O-RING P/N RSF3153-09500 Dwg no. 7	Gas Engine Cooper	275	0.75	245	0.67	1.00	4	1	1	1.00	1	-2	-1	-0.2	10	-3
1988051793	Lockwasher LWF2515-12000 7.4-1.5	Gas Engine Cooper	275	0.75	245	0.67	0.00	440	1		1.00	440	0	0	0	10	-439
1988051893	Plate Thrust Bearing 650-906-001 7.6-1.2	Gas Engine Cooper	275	0.75	245	0.67	1.00	4	1	1	1.00	8	-2	-2	-0.2	10	-3

As-is (Excel based)



For future [Web-based Application]  
MM Dashboard \*Enhance phase



# GSP Procurement & Material Management Systems

## Procurement 2 Pay Process Enhancements

1. Fully Integrated Smart Procurement\*
2. Define GI Criteria in Technical Qualification\*
3. Material Received Work Process Standardization and Tracking\*

## Knowledge Enhancement Programs

1. MM & Procurements Knowledge Enhancement
2. In-house Coaching by Procurement & Warehouse Expert\*
3. Recognition Programs for Procurement & Acceptance Committee

## Supplier Relationship Management System

1. Supplier Relationship Development Program\*
2. Status tracking for International Purchasing\*

## Transparency in Process

1. CCMS Compliance Monitoring
2. GSP One Goal, One Standard\*

## GSP Procurement Strategic

1. Automate Purchase Order for PM Order
2. Strategic Procurement from data Analytics
  - 2.1 GSP Long Term Contracts
  - 2.2 PTT Group MOU

## GSP Asset Utilization

1. Material Master Data Reliability\*
2. Implement Asset Lifecycle Process\*
3. Standard Price for Property Disposal\*
4. AMS Data Verification\*

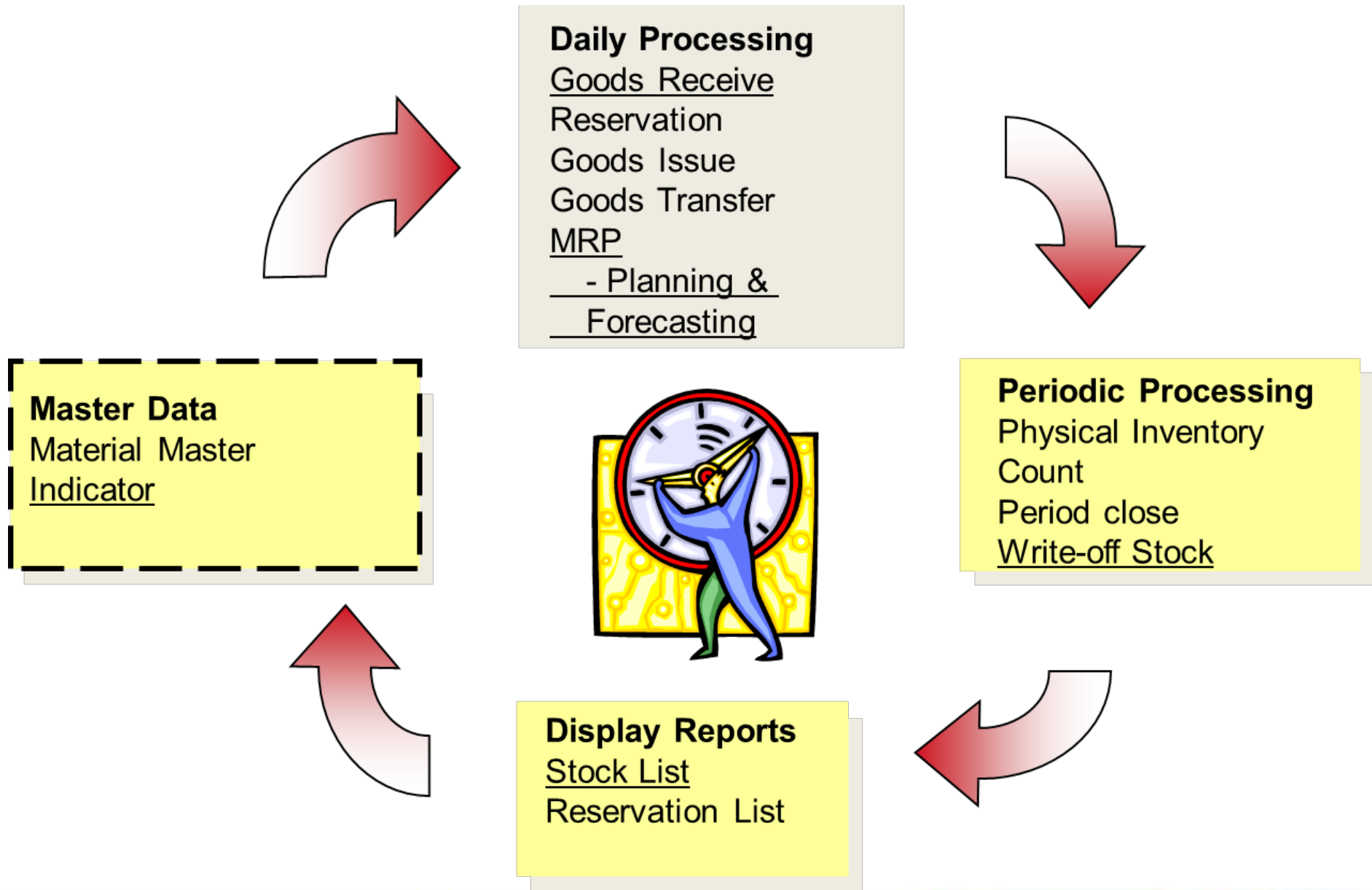
## Spare Parts & Warehouse Management

1. Write Off Stock in GSP1\*
2. Relocation of Dead Stock from MT (Survey 2020)\*
3. Optimization of Replenishment Spare Part Strategy\*



## Digitalization System

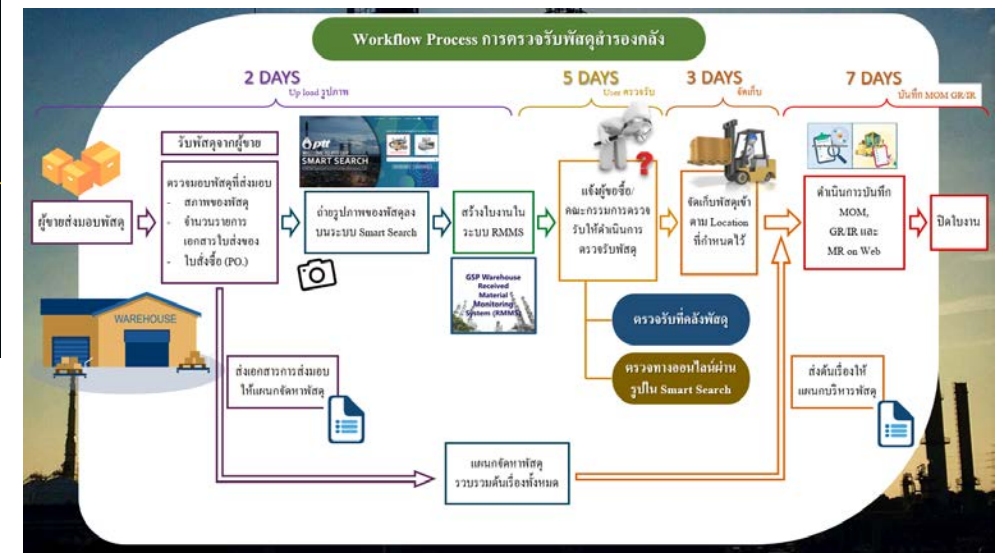
1. Set-up GSP procurement Work Process Platform\*
2. GSP P2P Excellent Tracking – Mobile Application
3. Office Supply Online
4. Improve Smart Search System (Phase II)



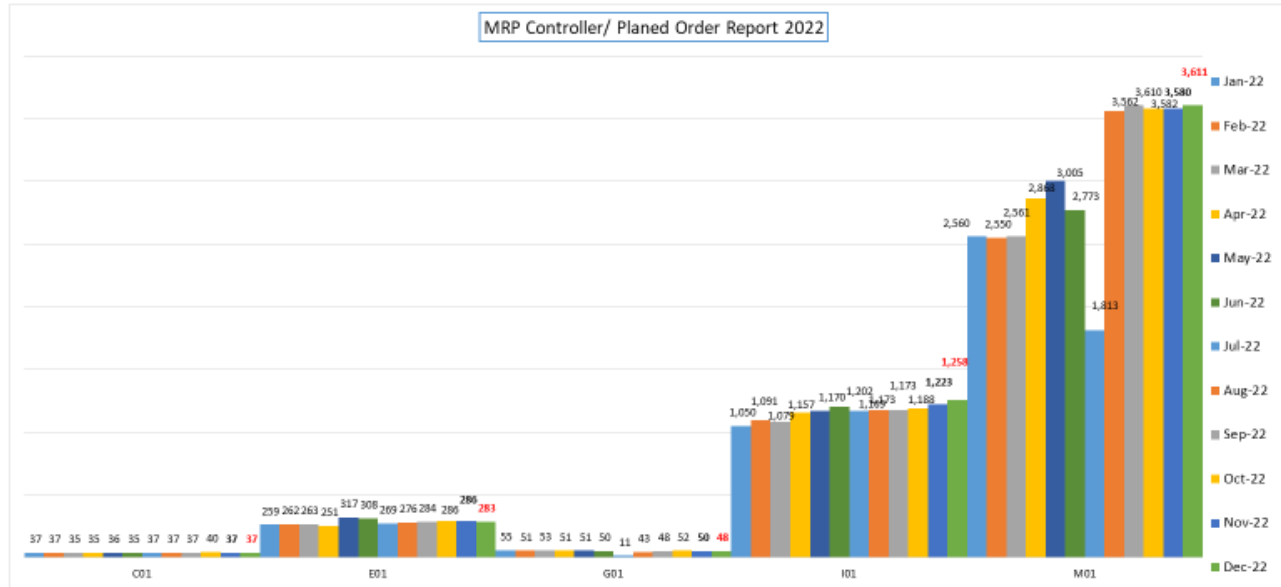
# RMMS

## (GSP Warehouse Received Material Monitoring System)

**GSP  
Warehouse  
Received  
Material  
Monitoring  
System (RMMS)**

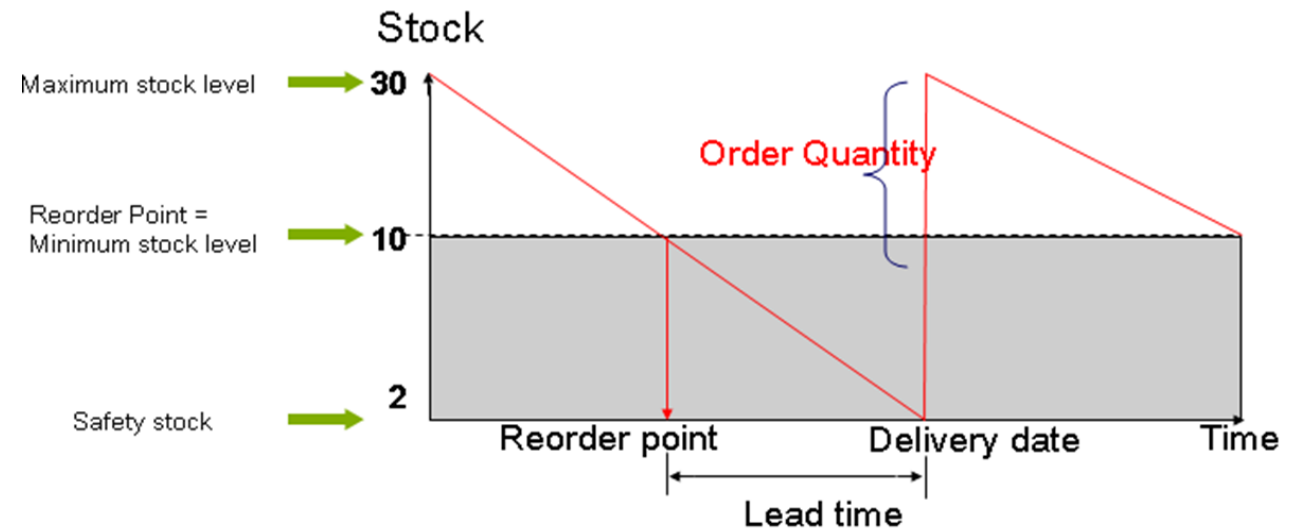


### 3. Material Requirements Planning (MRP)

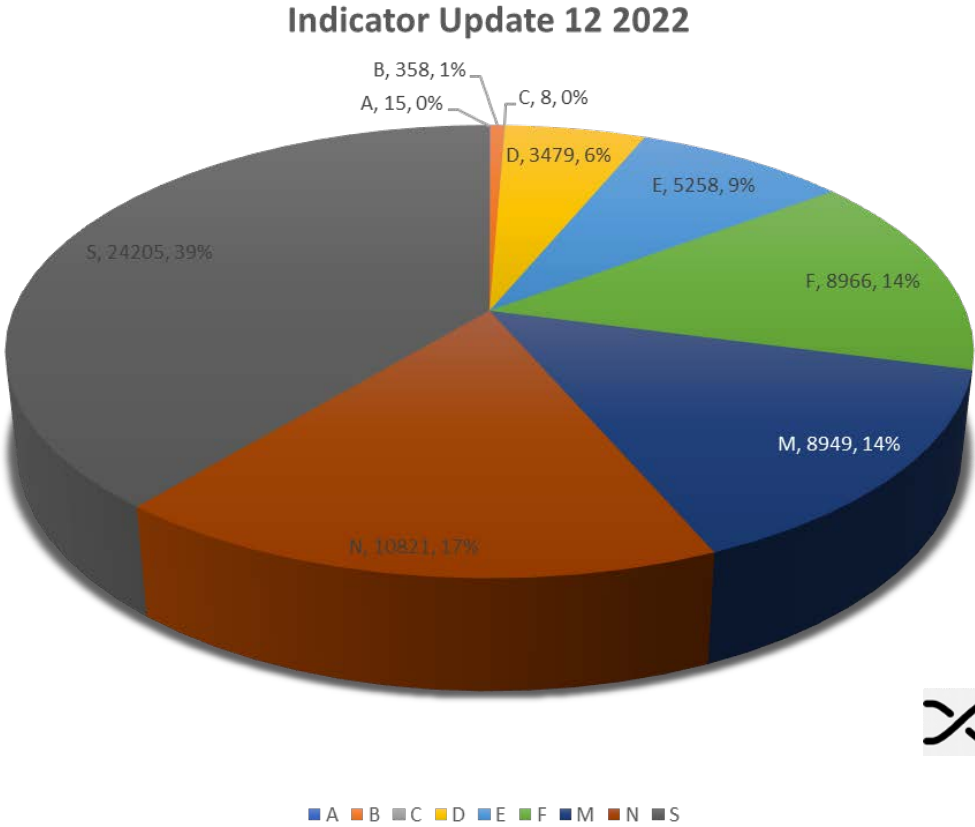


# MRP

Report for Verify



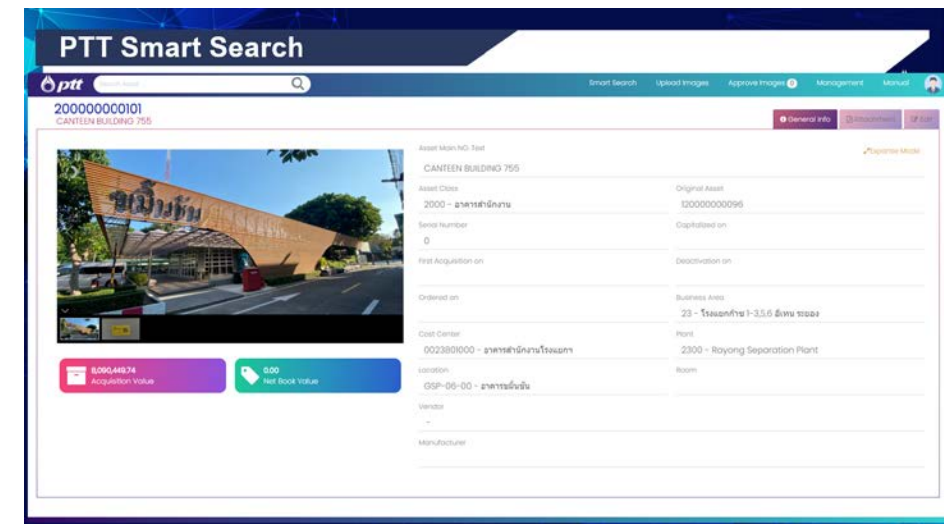
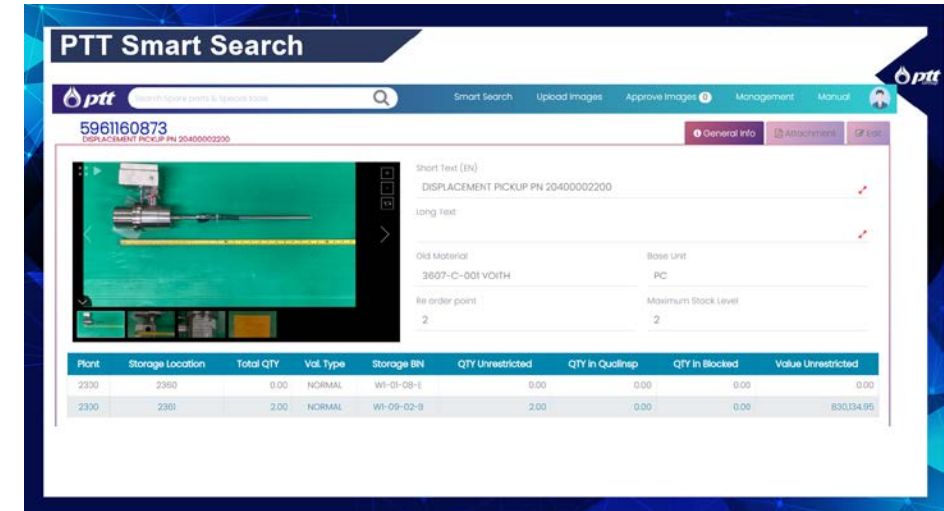
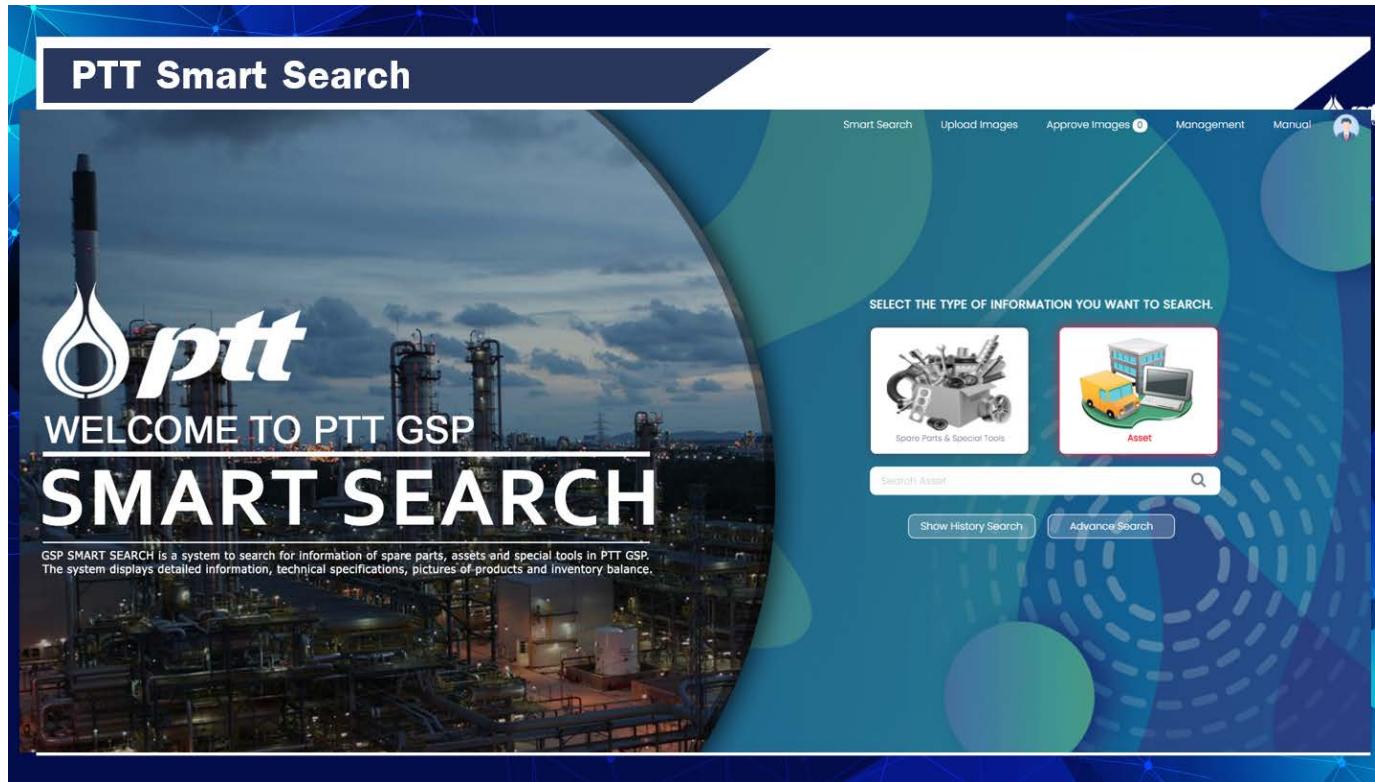
# Indicator



INDICATOR	QTY.
SIGNIFICANT MATERIAL (A)	15
MATERIAL - MEDIUM SIGNIFICANCE (B)	358
MATERIAL - LOW SIGNIFICANCE (C)	8
DEAD STOCK (D)	3,479
EMERGENCY& INSURANCE (E)	5,258
FAST-MOVING (F)	8,966
MEDIUM-MOVING (M)	8,949
NEW ITEM (N)	10,821
SLOW-MOVING (S)	24,205

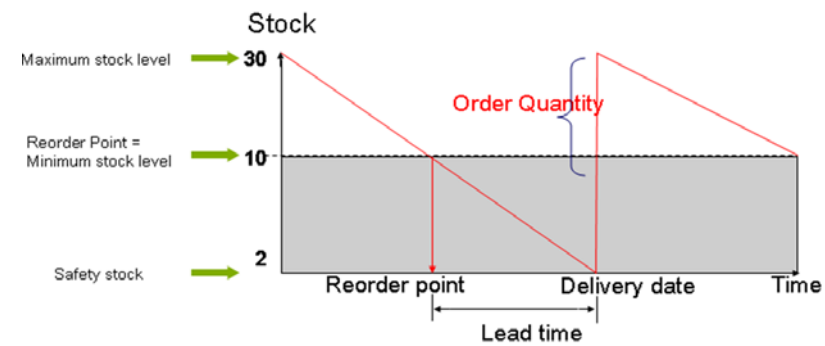
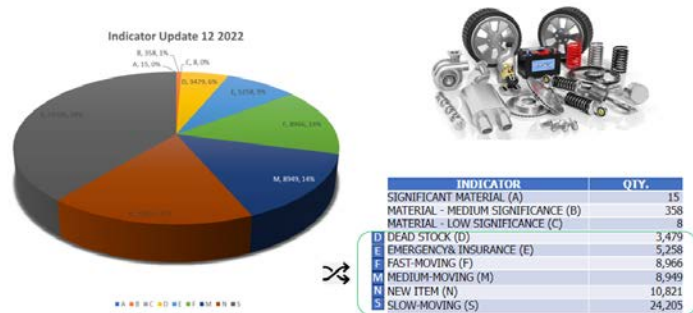


# Smart search

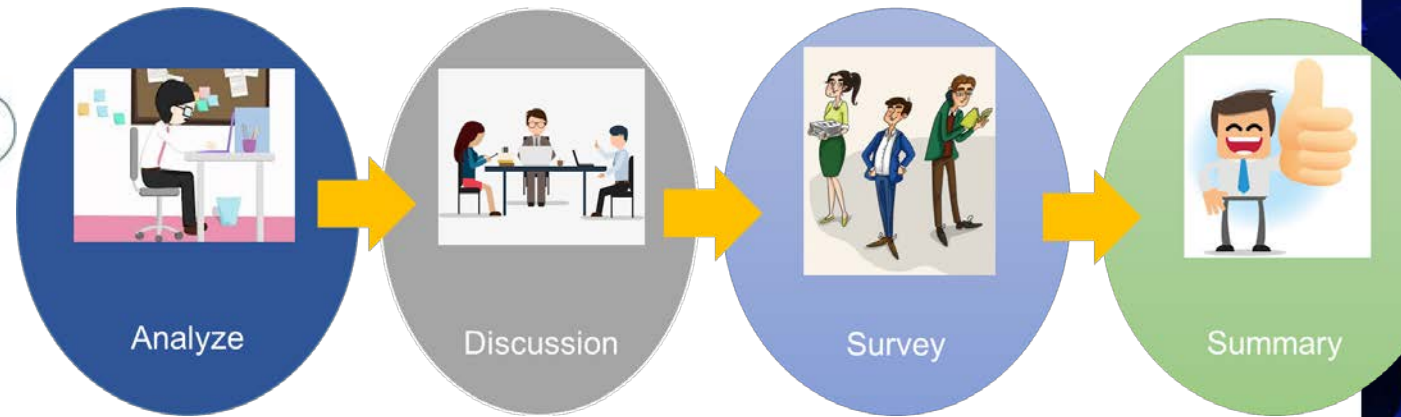
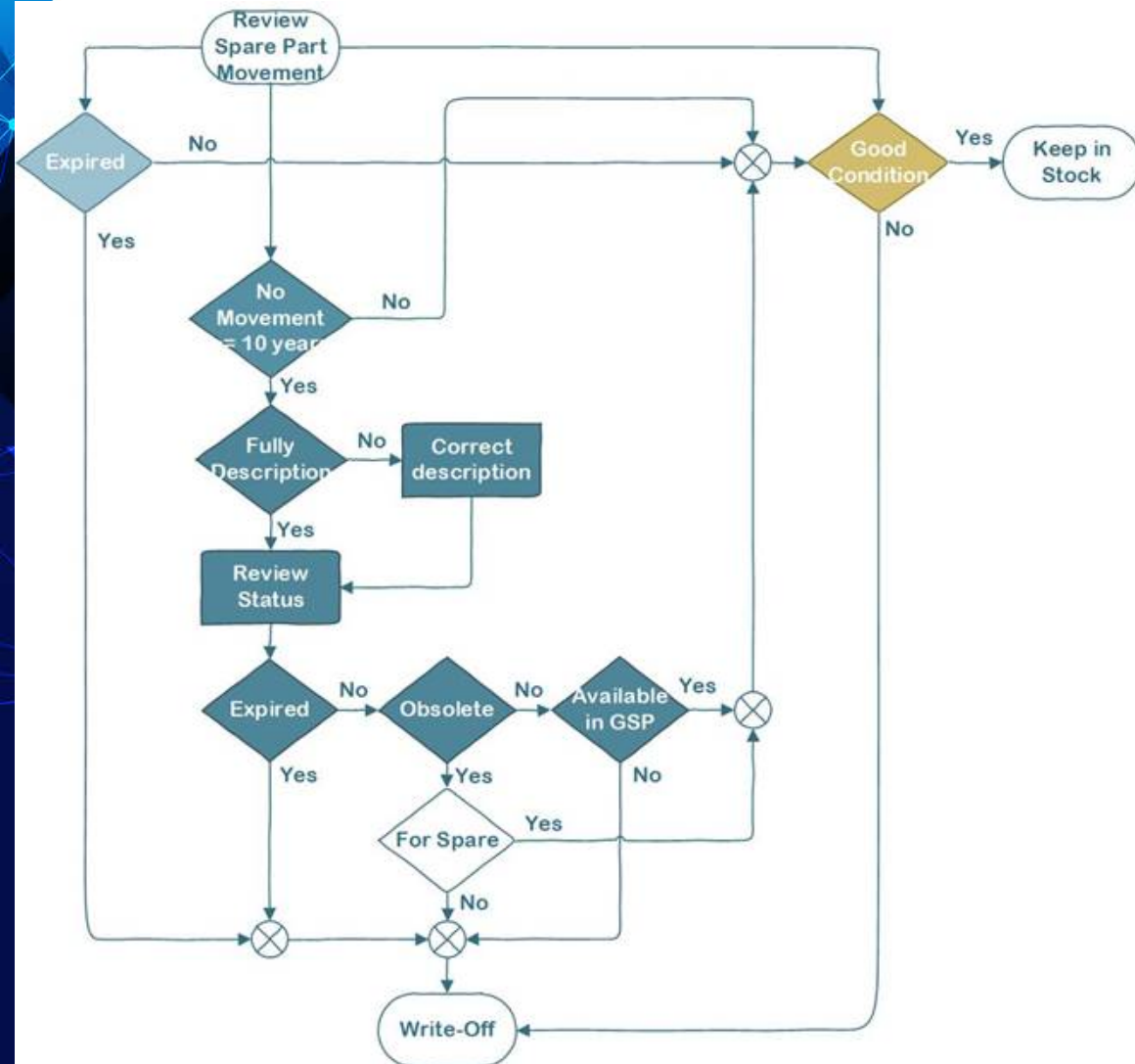


# Longterm contract

## Indicator



# Write-off



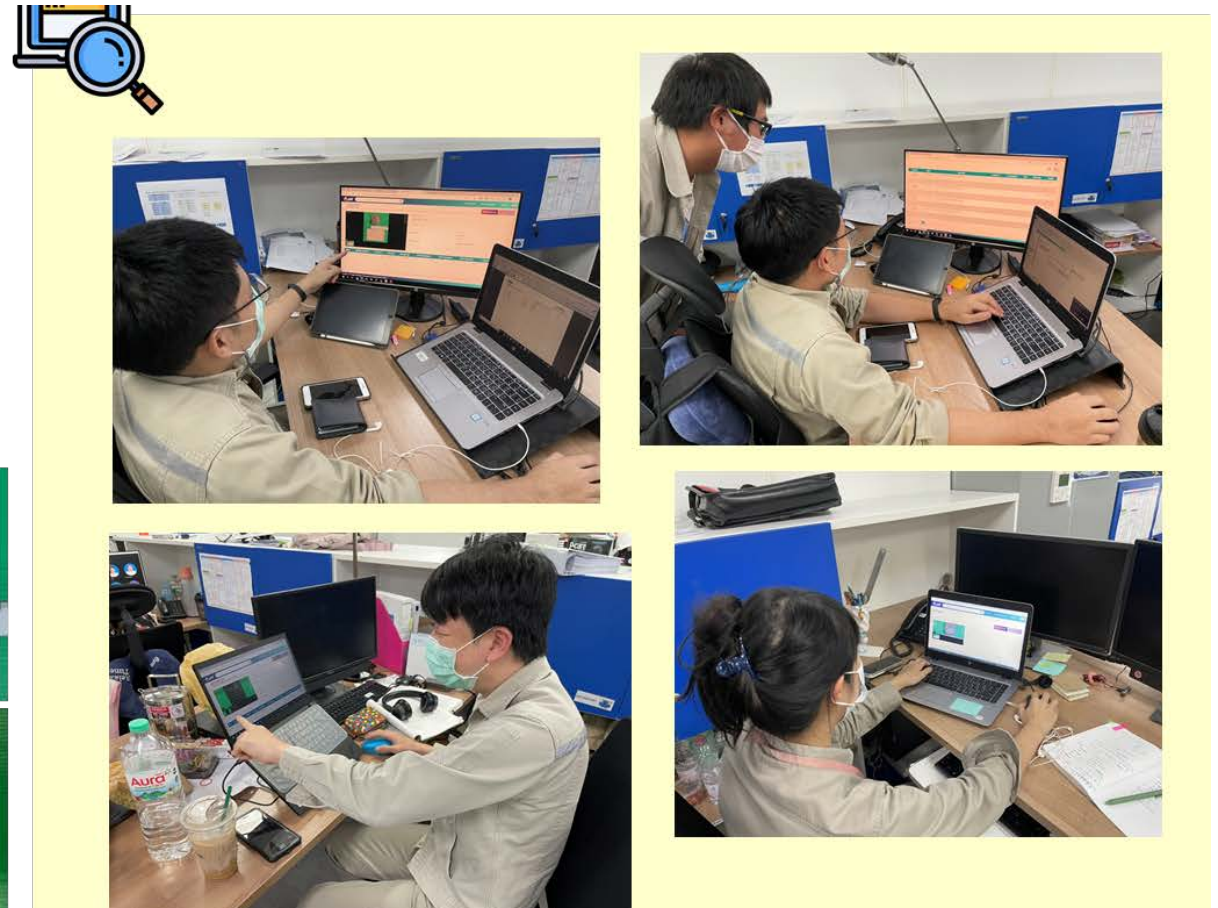
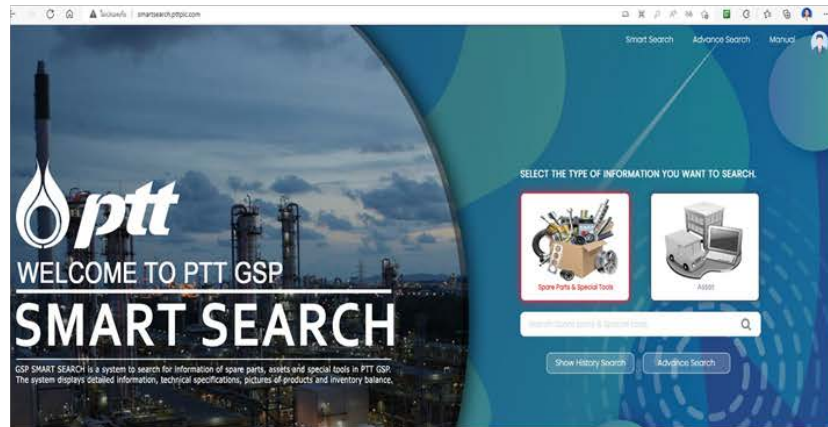
## Criteria

- None movement  $\geq 10$  years
- Expired
- Obsolete
- Unavailable in GSP
- Damage



# Write-off

- Survey ผ่าน Web-based Application Smart Search





# Write-off

- Survey สภาพอะไหล่จริง พื้นที่ Warehouse สำหรับรายการอะไหล่ที่ยังไม่สามารถตัดสินใจ Write-off ได้ จากขั้นตอน Smart Search



Survey



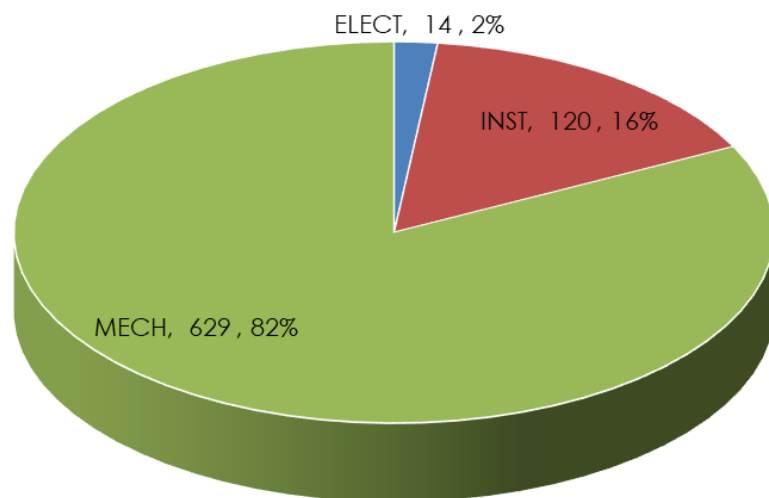


# Write-off [2022]

Group	Survey	Write-Off	Keep for Stock	Write-Off Value Unrestricted (THB)
Mechanical	3,545	629	2,916	7,649,866.10
Electrical	967	14	953	481,212.87
Instrument	1,471	120	1,351	1,983,346.69
<b>All</b>	<b>5,983</b>	<b>763</b>	<b>5,220</b>	<b>10,114,425.66</b>

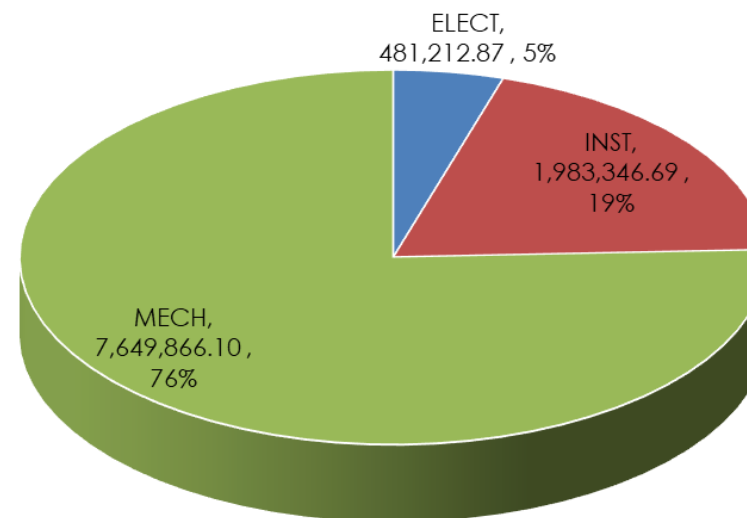
\* รายการและมูลค่านำมาสำรวจโดยผ่านตาม Criteria Write-off Spare Part

## Write-off Stock $\geq 10$ Y (Qty.)



■ ELECT ■ INST ■ MECH

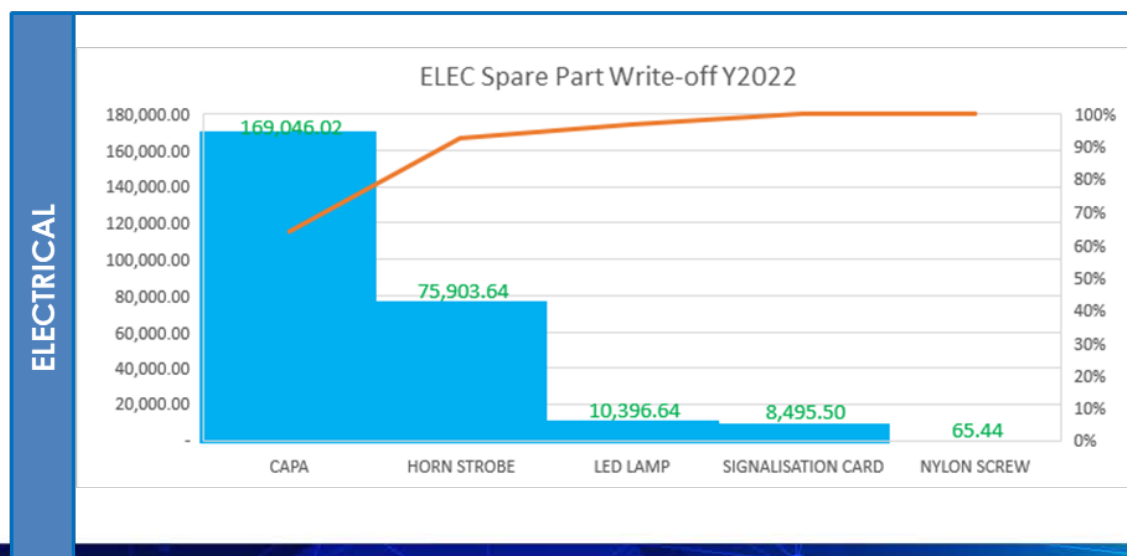
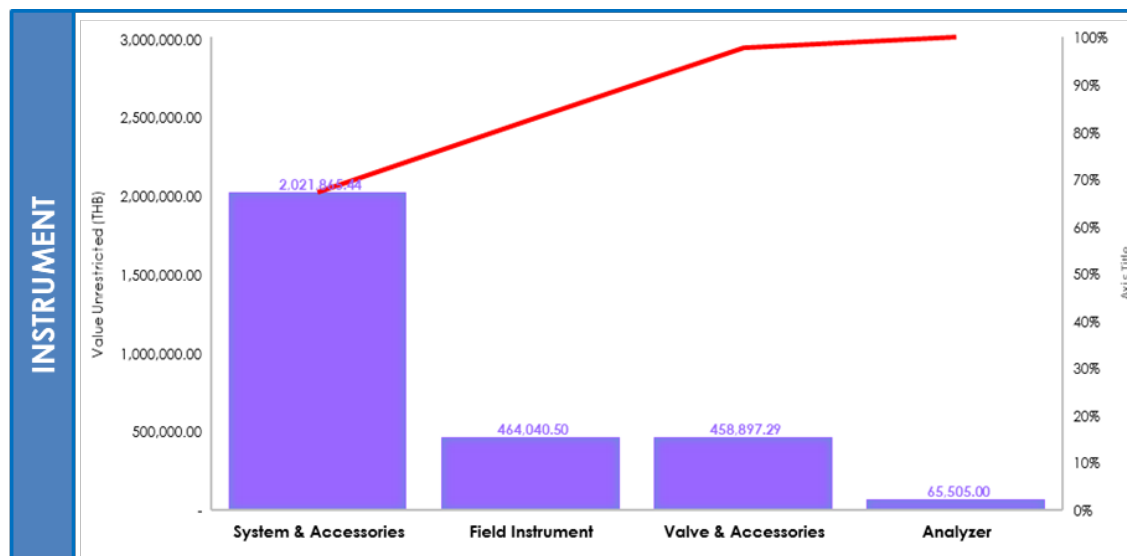
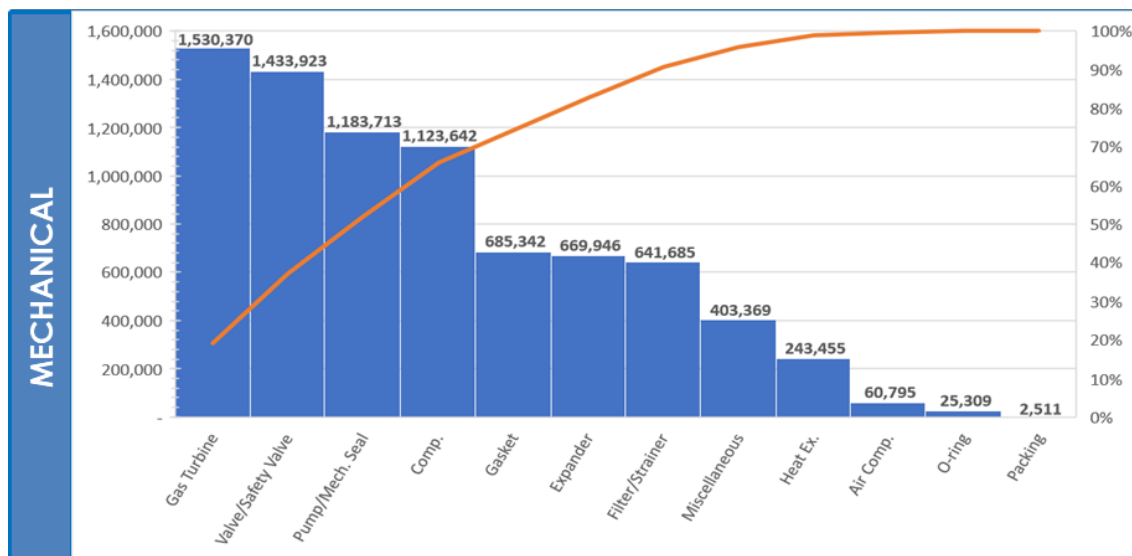
## Write-off Stock $\geq 10$ Y (Val.)



■ ELECT ■ INST ■ MECH

# Write-off [2022]

## Categorized by Eq. Group

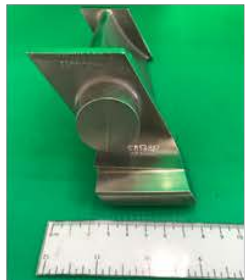


# Write-off [Mech.]



## GG/PT

- 1<sup>st</sup> Nozzle Vane
- 2<sup>nd</sup> Bearing
- 3<sup>rd</sup> Coupling
- 4<sup>th</sup> Expansion Joint
- 5<sup>th</sup> Labyrinth



## Pump/Mech. Seal

- 1<sup>st</sup> Shaft
- 2<sup>nd</sup> Impeller & Bowl Wear Ring
- 3<sup>rd</sup> Coupling



## Centrifugal Comp.

- 1<sup>st</sup> Labyrinth Seal
- 2<sup>nd</sup> Journal & Thrust Bearing
- 3<sup>rd</sup> Shaft Seal & impeller Seal [Major OH Part]



# Write-off [Inst.]



## Breakdown by Largest Value

### Valve & Accessories

- 1 Actuator
- 2 Cage
- 3 Plug Stem



### Field Instrument

- 1 Regulator
- 2 Controller
- 3 Sensor/Detector



### System & Accessories

- 1 Computer System
- 2 Display
- 3 Item in UCP





# Write-off [Elec.]



## Breakdown by Largest Value

### Switch gear



On-Off Breaker



Metering

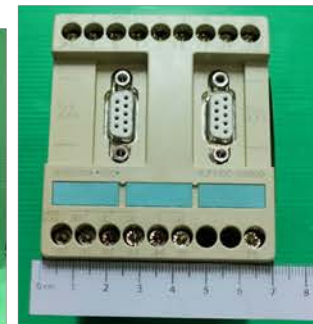
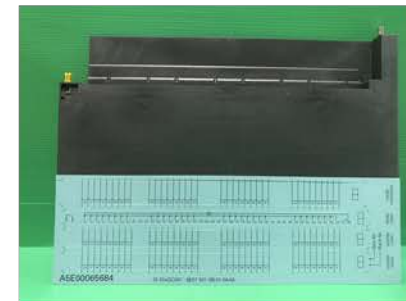


Protection Relay

### UPS



### Cards







**POWERING LIFE**  
with **FUTURE ENERGY** and **BEYOND**  
ขับเคลื่อนทุกชีวิตด้วยพลังแห่งอนาคต

# Thank you

