

Strategies of Maintenance Management in CCPP

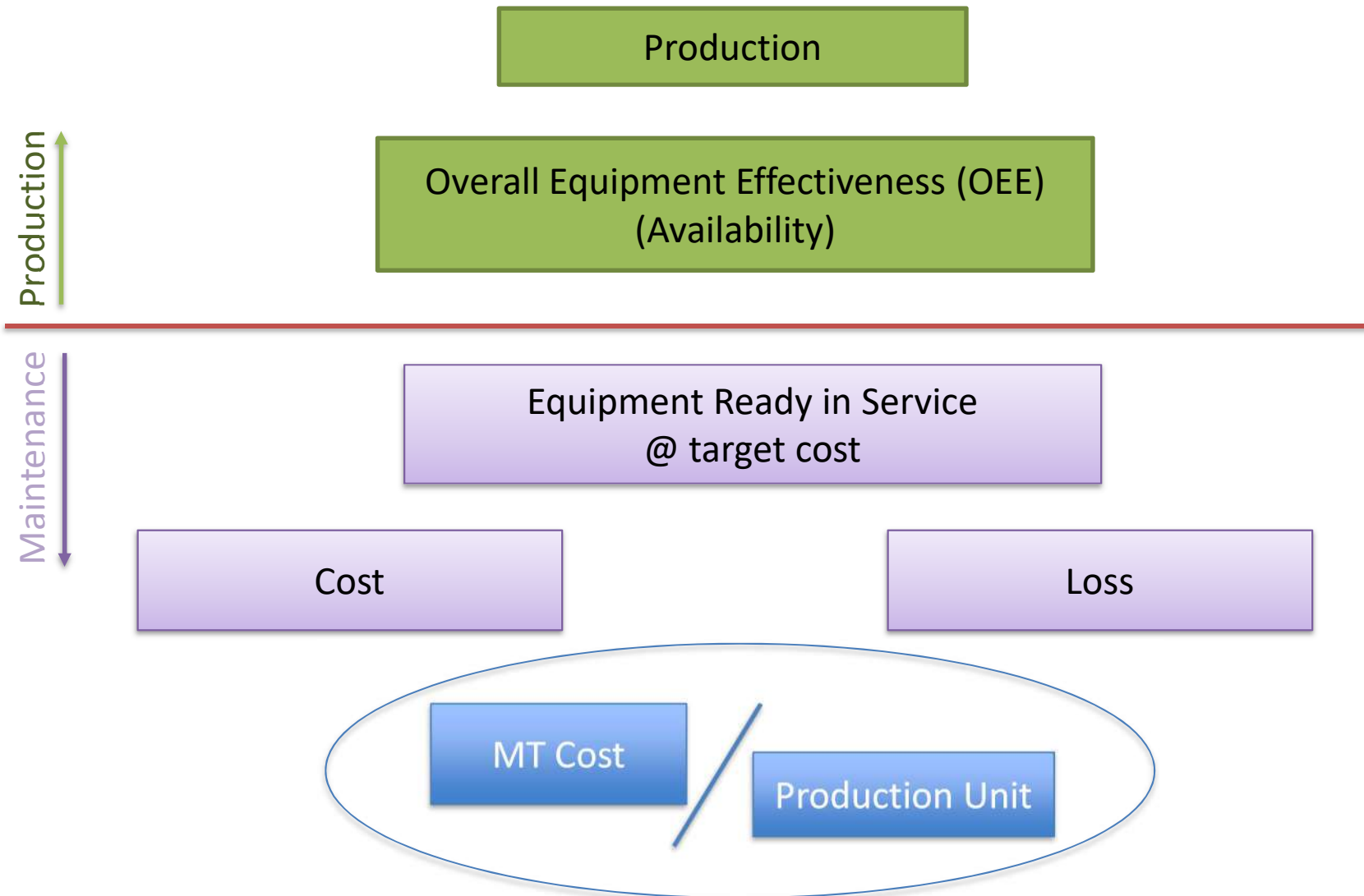
Author:

- Panida Boonyaritdachochai
- Paveena Ketwong
- Patcharachai Kaewwanna

Agenda

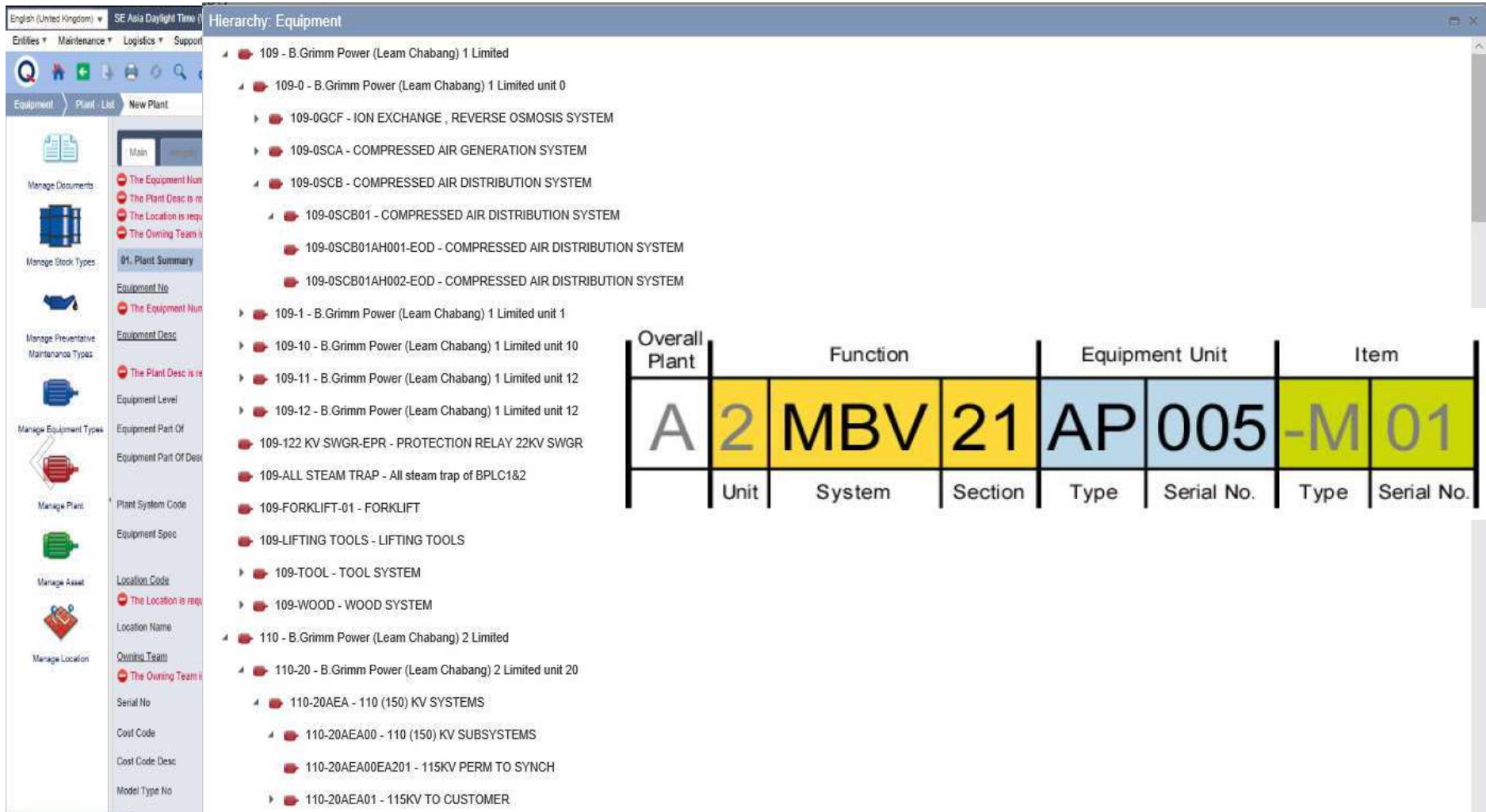
- Relation between O&M VS plant performance
- Strategies in Maintenance Management
 - Register Asset
 - Planning Preventive Maintenance
 - Recording Data
 - Reporting Maintenance Performance
 - Maintenance Budgeting
- Summary

O&M for Plant Performance



Strategies:

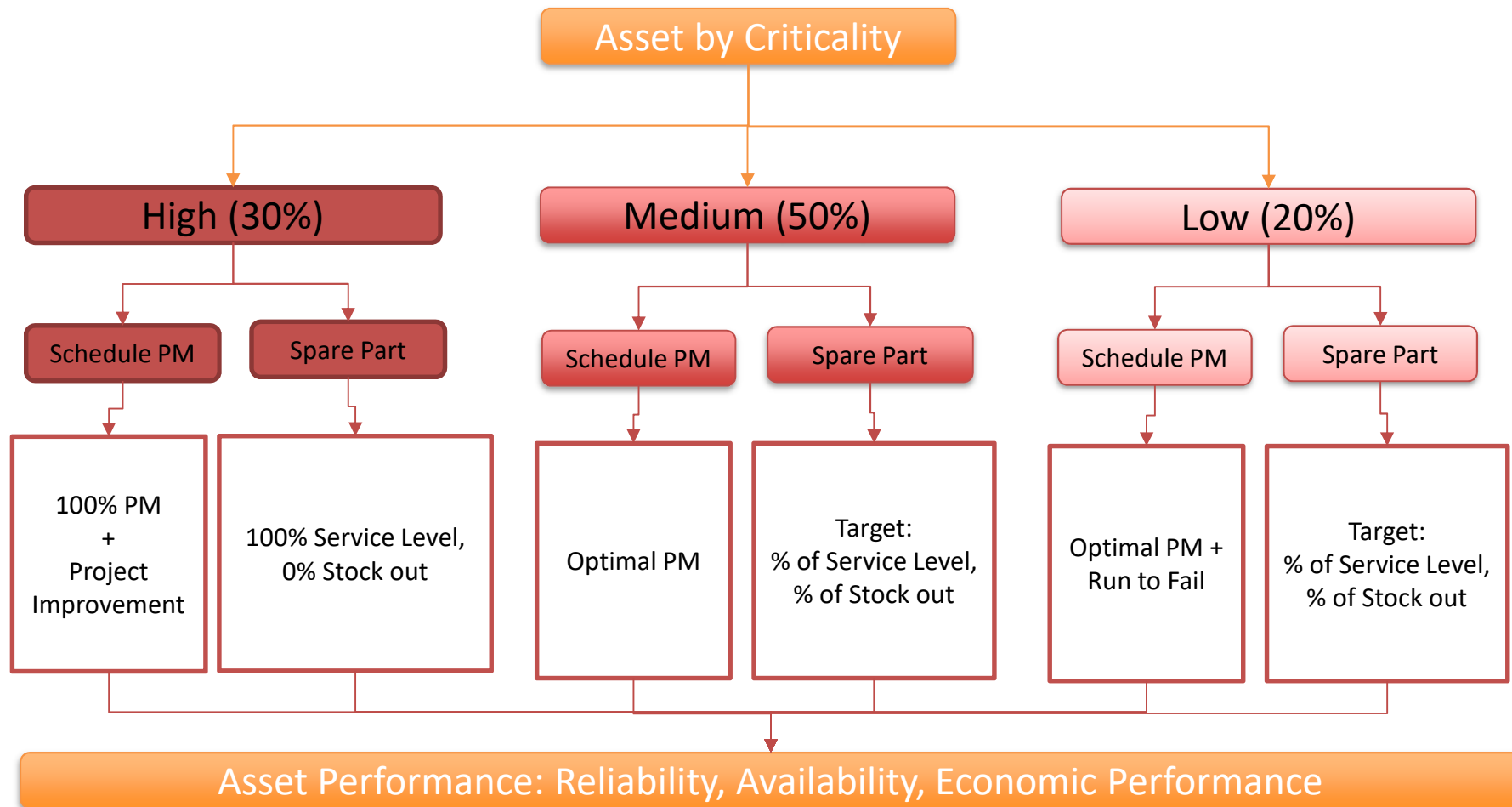
Asset Registration and Management



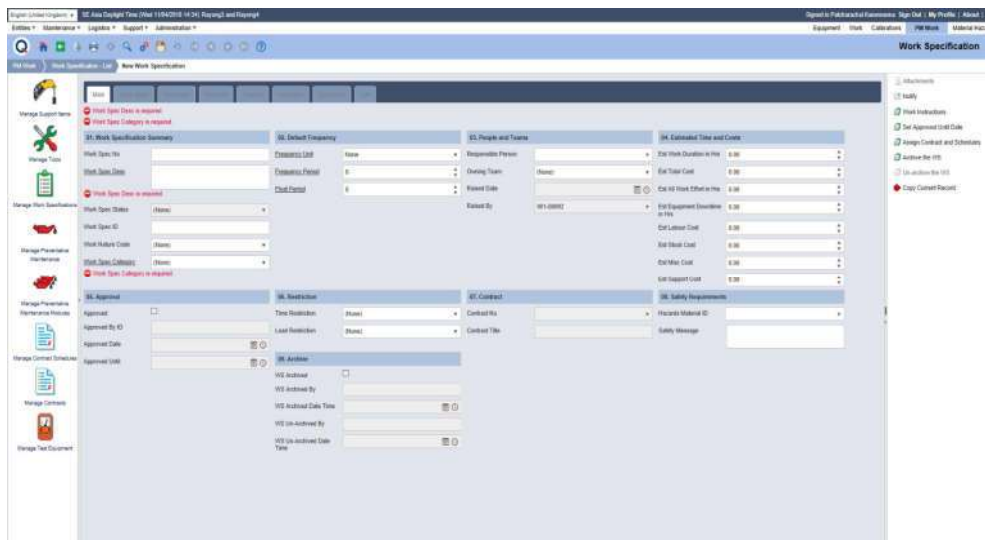
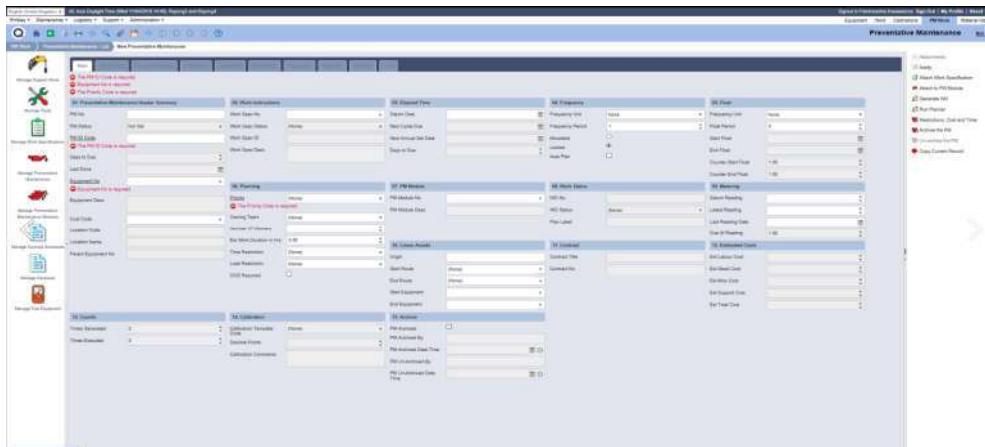
The screenshot displays the 'Hierarchy: Equipment' window in the software. The left sidebar contains various management tools like 'Manage Documents', 'Manage Stock Types', and 'Manage Preventive Maintenance Types'. The main area shows a tree view of equipment assets, including units and specific systems like 'ION EXCHANGE, REVERSE OSMOSIS SYSTEM' and 'COMPRESSED AIR DISTRIBUTION SYSTEM'.

Overall Plant	Function			Equipment Unit		Item	
A	2	MBV	21	AP	005	-M	01
	Unit	System	Section	Type	Serial No.	Type	Serial No.

Asset Registration and Management

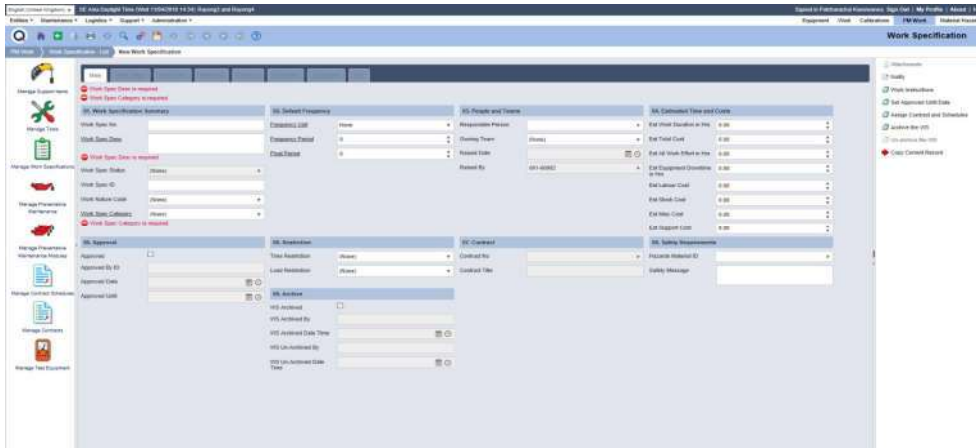


PM Management



- PM Name
- Equipment
- Task
- Activity
- Failure Mode
- Interval
- PM Priority

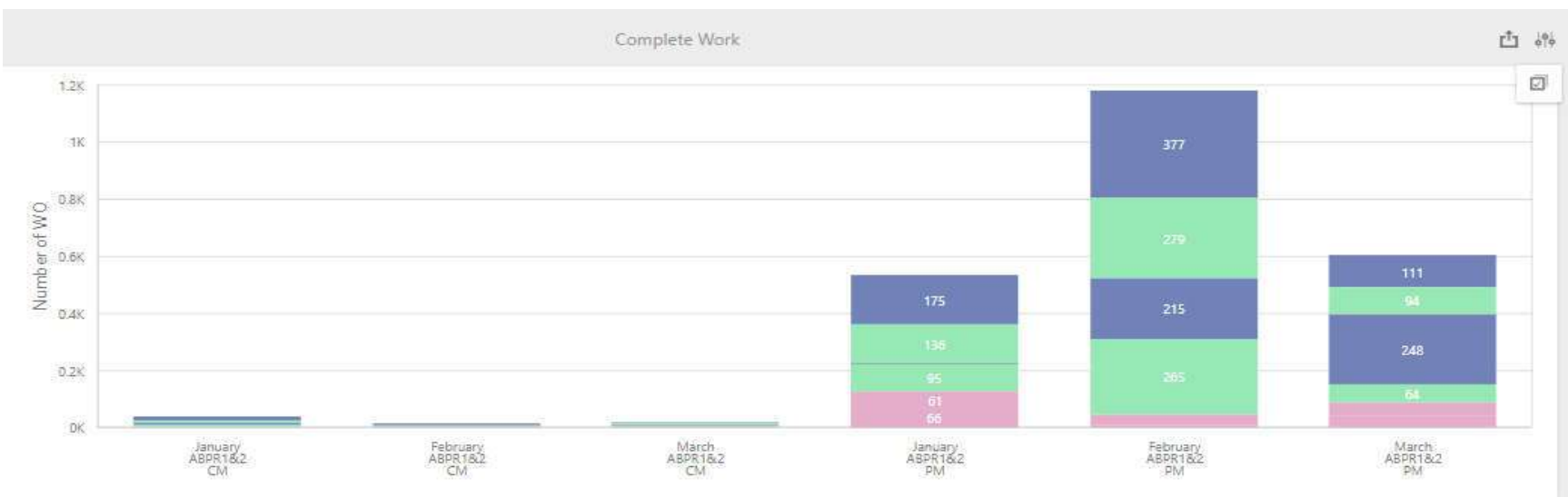
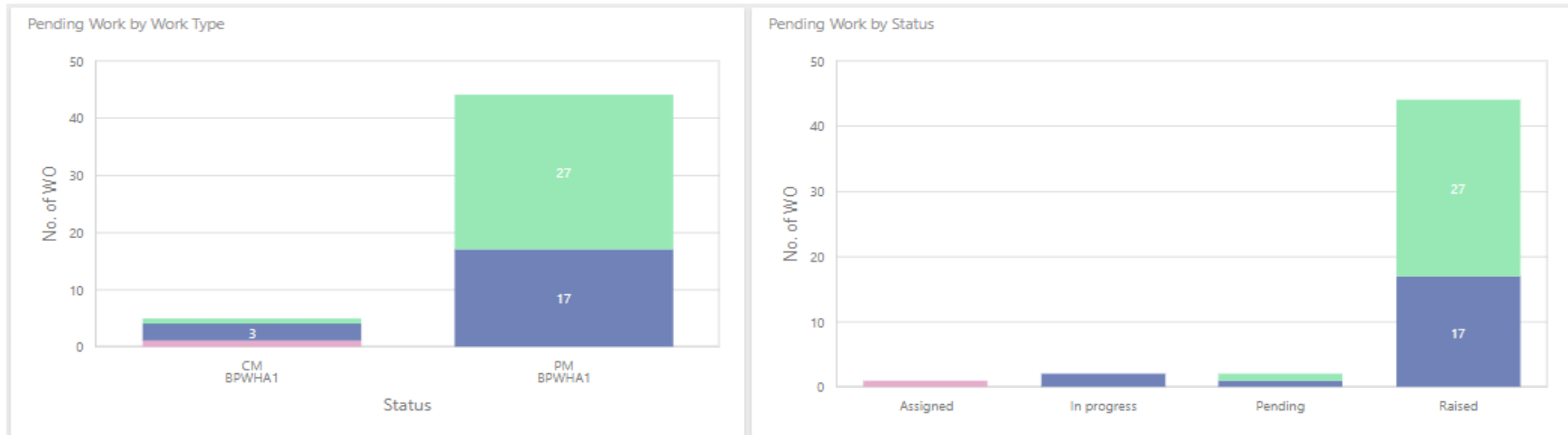
Recording Data



- WO No.
- Equipment
- Working Team
- Man-Hr & Man-Hr Cost
- Spare Part & Cost
- Outsource & Cost
- Activity
- Failure Mode/Cause
- Action

Cause			Action
Battery overcharging	Fail to reading	Need to verify	Adjusted
Bearing problem	Fail to regulate	Network card fail	Alignment
Breakdown	Fail to synchronise	No cooling water	Calibrated
Broken	Fire panel alarm	Noise	Checked
Capacity drop	Fire trouble alarm	None	Cleaned
Capacity high output	Fluctuate reading	OPERATION WORK	Drained
Capacity Low output	Hand wheel problem	Over torque limit	Fill up
Cavitation	High Reading	Overheating	Inspected
Control boards fail	HMI fail	Overload trip	Modified
Control Module fail	Hydraulic oil leak	Packing leak	Overhauled
Control system alarm	Impeller damage	Parameter deviation	Repaired
Corrosion	Impulse line leaking	Pipe stress	Replaced
Crack	INSTRUMENT WORK	Plugged/choked	Rewinding
Data not update	Instrument Air leak	Reagents empty	Tested
Diagnostic alarm	Insulation damage	Shaft breakage	
Discharge air block	Internal leakage	Short circuit	
Discharge line block	Loss of power	Signal cables damage	
Discharge line leak	Loss of redundancy	Spurious stop	
Distilled water low	Low reading	Suction line block	
ELECTRICAL WORK	Malfunction	Suction line leak	
Erosion	MECHANICAL WORK	Synch relay fault	
External leakage	Mecnaical seal leak	Tap Changer fault	
Fail to connect	Misalignment	Valve body crack	
Fail to control	Need to Recalibrate	Valve leaking	
		Valve passing	
		Valve position error	
		Vibration	

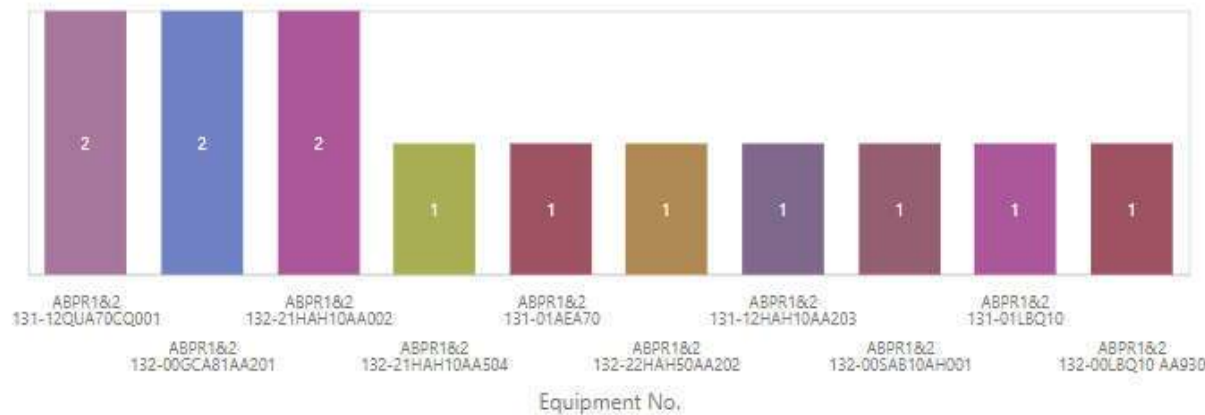
Report: Work Control



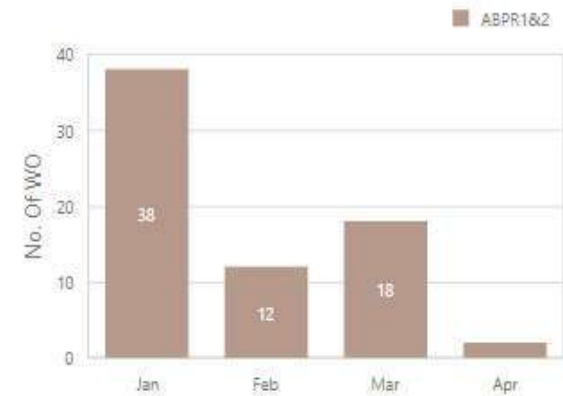
Report: Reliability Control

Top 10 - Equipment Failure

Top 10- Equipment Failure Chart

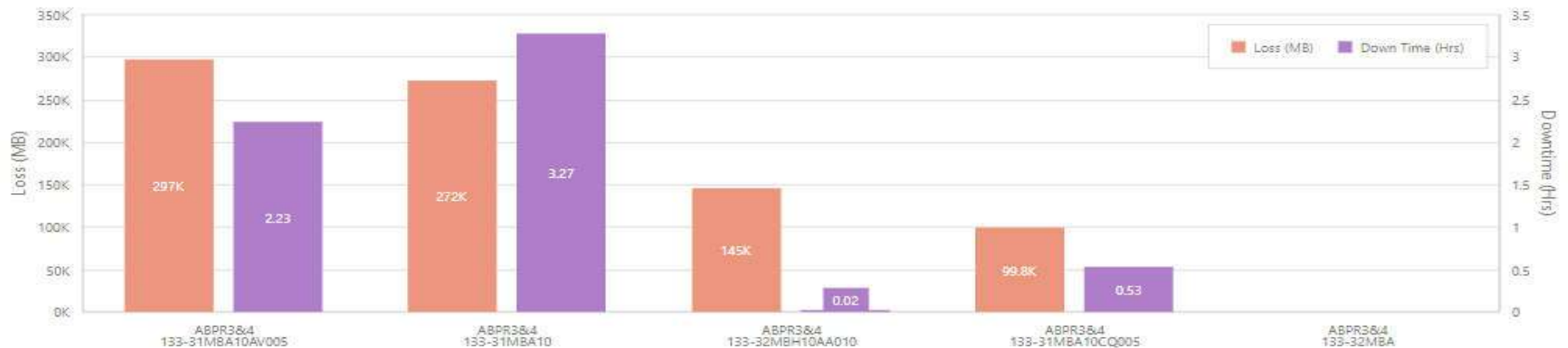


Equipment Failure Summary by Month



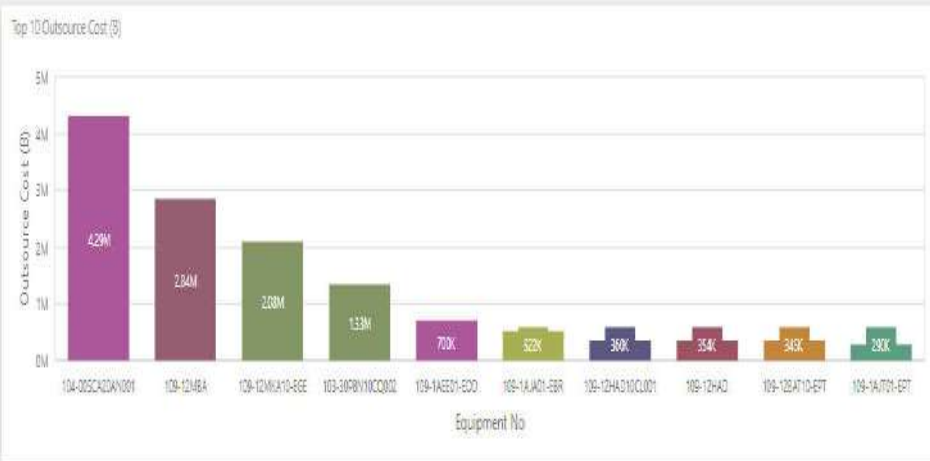
Top 10 - Loss & Downtime

Loss & Downtime

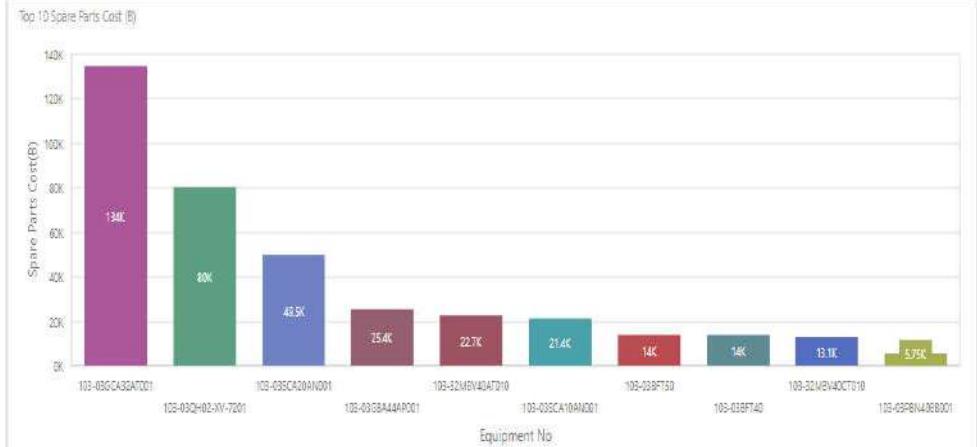


Report: Cost Control

Top 10 - Outsource Cost



Top 10 - Spare Part Cost



Top 10 - Man Hrs Cost

Top 10 Man Hrs & Man Hrs Cost



Maintenance Budgeting

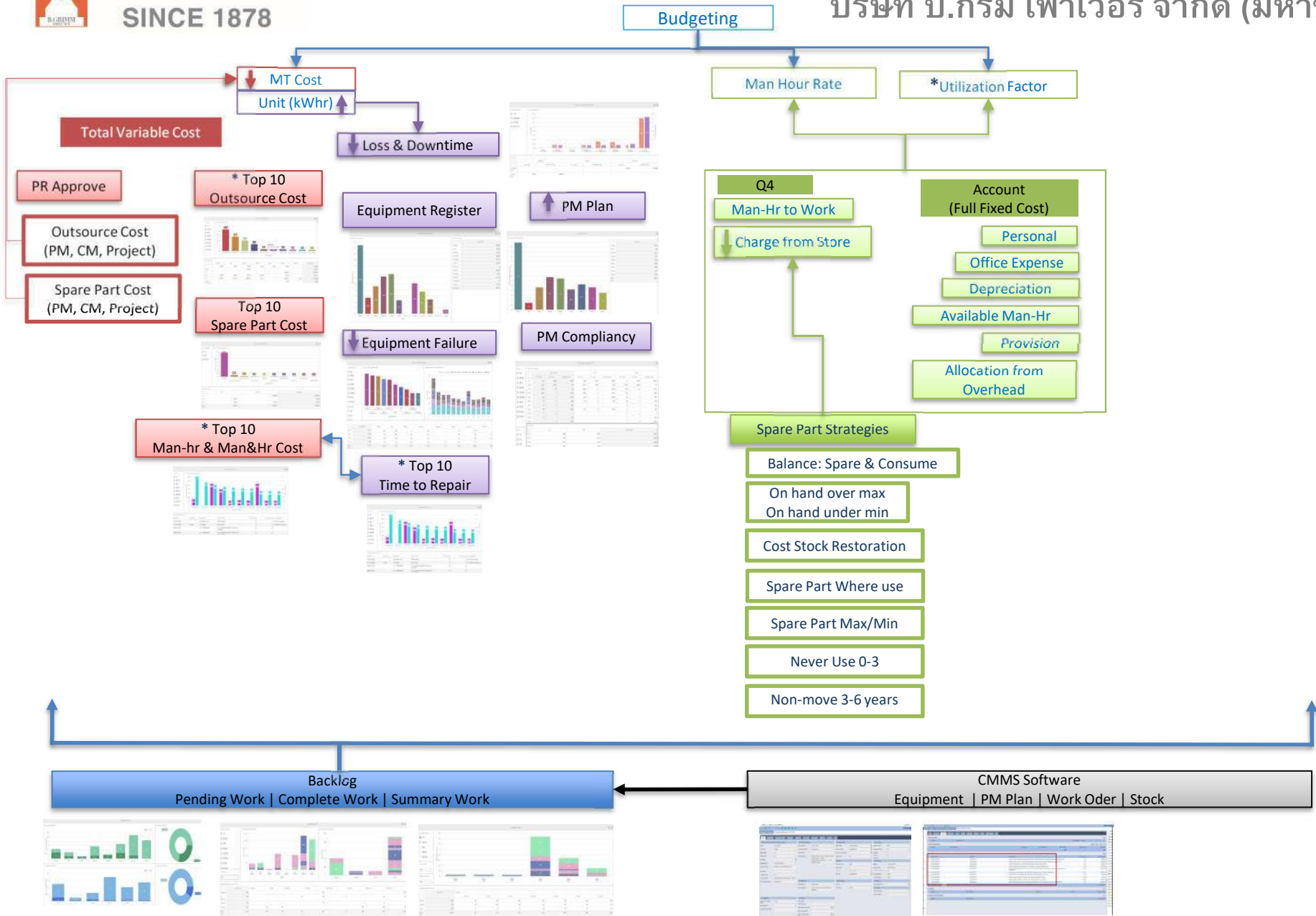
Fixed Cost

- Personal
- Depreciation
- Office Expense
- Allocations
- Provision
- **Charge from Store**
 - On Hand Over Max
 - On Hand Under Min
 - Cost of Stock Restoration
 - Spare Part Never User
 - Spare Part Non Move more than 3 years

Variable Cost

- Spare Part
 - For PM
 - ~~Stock~~
 - Direct Purchase
 - For CM
 - Stock
 - ~~Direct Purchase~~
- Outsource Cost
 - For PM
 - ~~For CM~~
 - For Modification

**Strategies
CMMS Report**



Summary

- Proper maintenance management could help encourage plant performance operation and better utilize asset and resource.
- Strategies to manage maintenance are as follow
 - Asset hierarchy and criticalilty, priority (PM, Spare Part)
 - Reports:
 - Work Control
 - Reliability Control
 - Cost Control
 - Maintenance Budgeting
 - Maintenance Cost/Production Unit
 - Man Hour Rate and Utilization Factor