

Plant Operation & **Maintenance M**anagement **System**

Presented by KT Kim

Empowering Business in Real Time
PI Infrastructure for the Enterprise

Presentation Summary



- Threat & Strategy
 - What we need to win?
 - POMMS Configuration & Functions
 - V Conclusion

I . EWP – Who we are ?

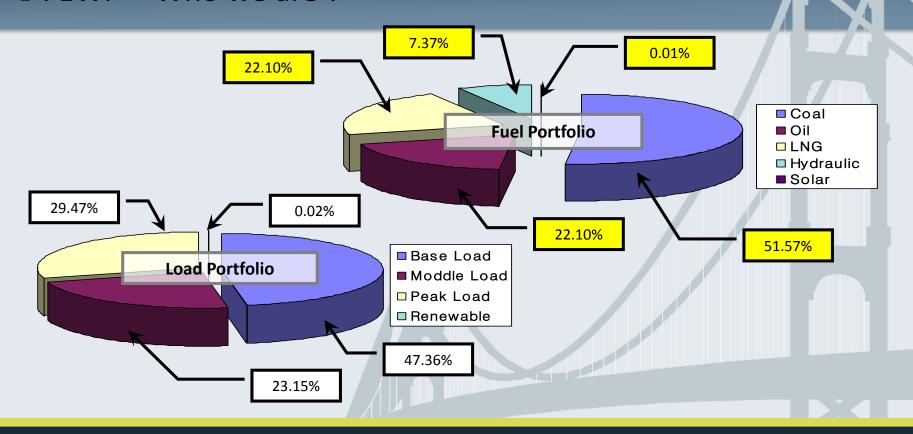




<Korea>

- 1,750 Units
- 71,989MW,
- Capacity Factor: 66.7%
- Efficiency : 39.82%
- One of Gen Companies as KEPCO group
- 6 Sites
- 39 Units
- 9,501MW,
- Capacity Factor: 60.6%
- Efficiency: 39.91%

I . EWP – Who we are ?



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II . Threat and Strategy

<Threat>

- Saturation of economic growth & power consumption
- High cost fuel as time passes
- Extreme competition among generation companies
- Penetration of electric market by domestic & overseas IPP
- Try to retrofit old power plant instead of building new power plant
- How to survive in this environment?

II. Threat and Strategy

<strategy>

- Increase Generation Capacity
 - Reduce forced outage hours → by optimization of work schedule
 - Prevent unforced outage → by early warning system
- Decrease maintenance costs
 - Purchase material

→ by statistically controlled BOM

- Lighten maintenance costs

→ by optimization of PM activities

- Overhaul costs

- → by moving from TBM to CBM
- How to monitor output ? → by NERC Index



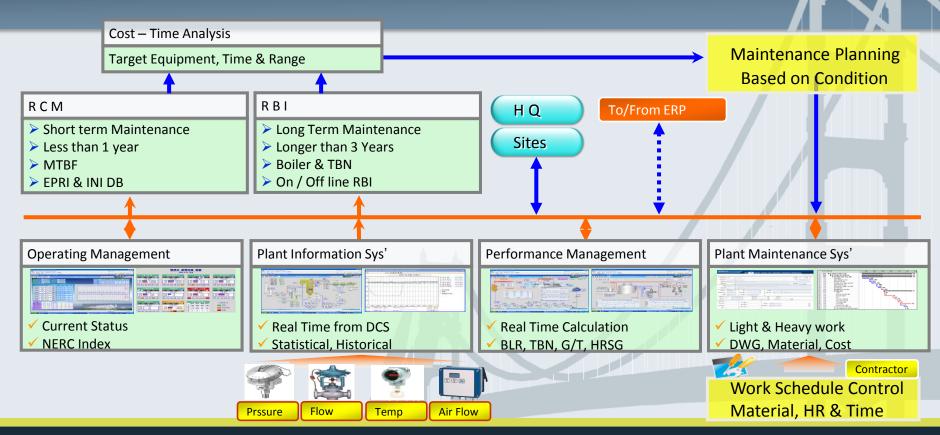


Ⅲ. What We Need to Win?

- How to increase competitiveness?
- Do we need any management system?
- What kind of management system?
- Other companies ?
 - ERP for what ? → Asset management PI for what ? → Monitoring & Early warning System
 - Other method ? → Preventive & Predictive maintenance
- What we need is
 - Economic decision-making support system based on reliability
 - Statistical plant maintenance management system
 - Predictable condition analysis and guide system



IV. POMMS Configuration & Functions



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IV. POMMS Configuration & Functions



Plant Information Sys

Performance Management Sys



P-Maintenance System

Status

Net Generation
By Unit

Emission Control

Atmosphere

Atmosphere

Outplanned Outage
CM Backlog

Unplanned Outage
CM Backlog

Unplanned Outage







RCM Analysis

Sys Fault Code FMEA & LTA

EPRI & INI PM DB MTBF

PM Optimization RCM Living



Material DB

Damage Analysis

Q & A Table

PMS Interface

On-Line RBI

Off-Line RBI



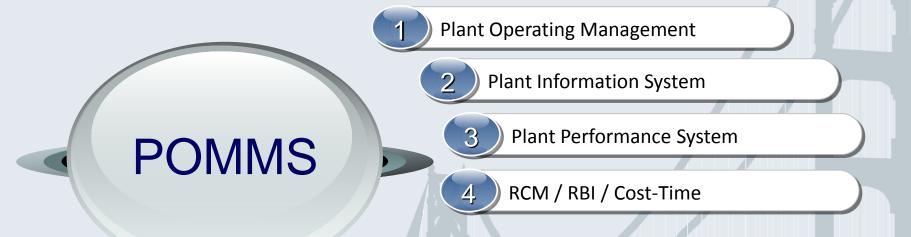
Inspection Time

Predictive Actual
Failure Cost Repair Cost

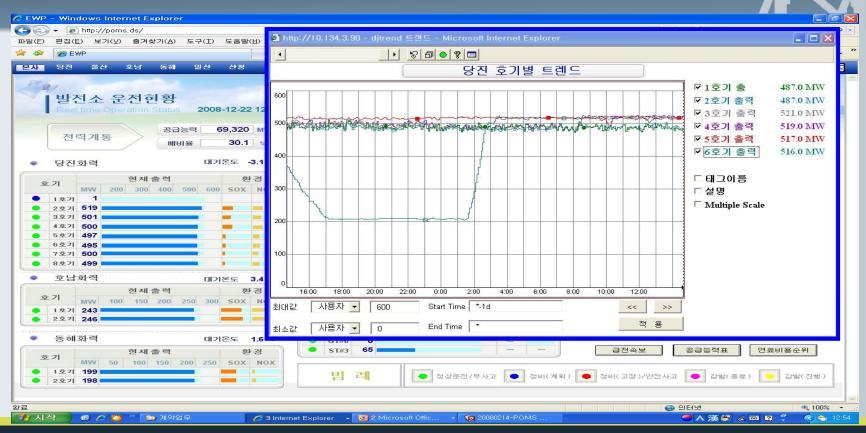
Optimize Next

PMS Interface

IV. POMMS Configuration & Functions



1. Plant Operating Management (Enterprise)



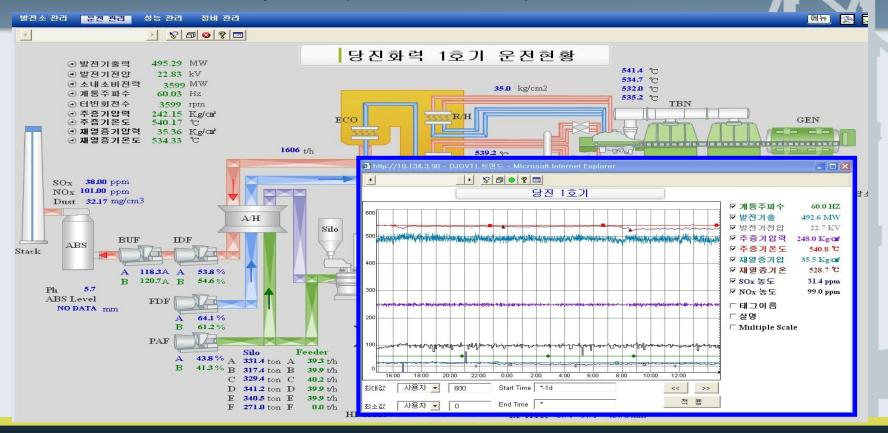
1. Plant Operating Management (Site)



1. Plant Operating Management (NERC Index)

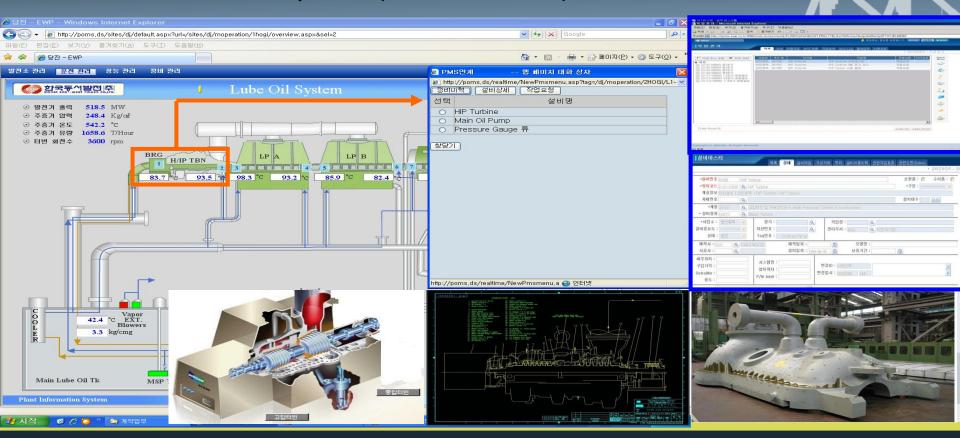


2. Plant Information System (Overall Status)



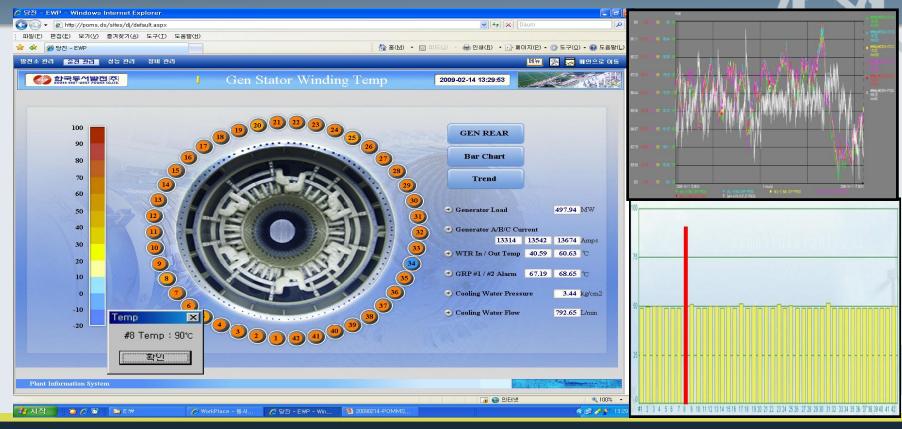
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2. Plant Information System (PMS Interface)

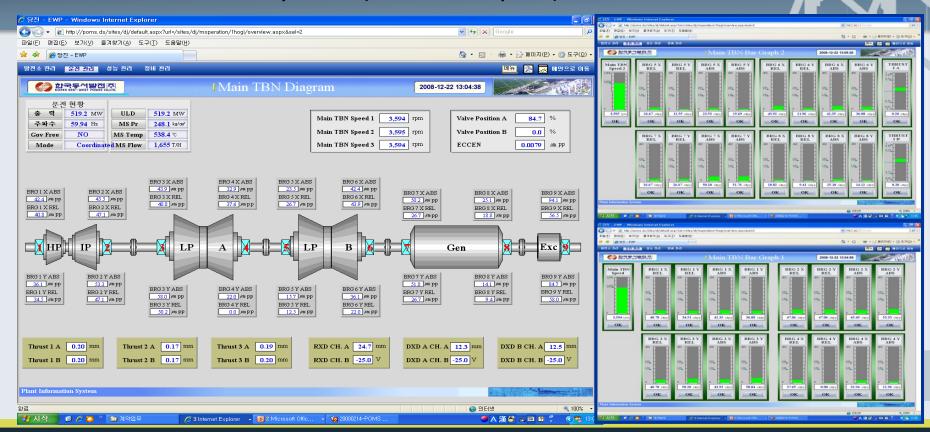


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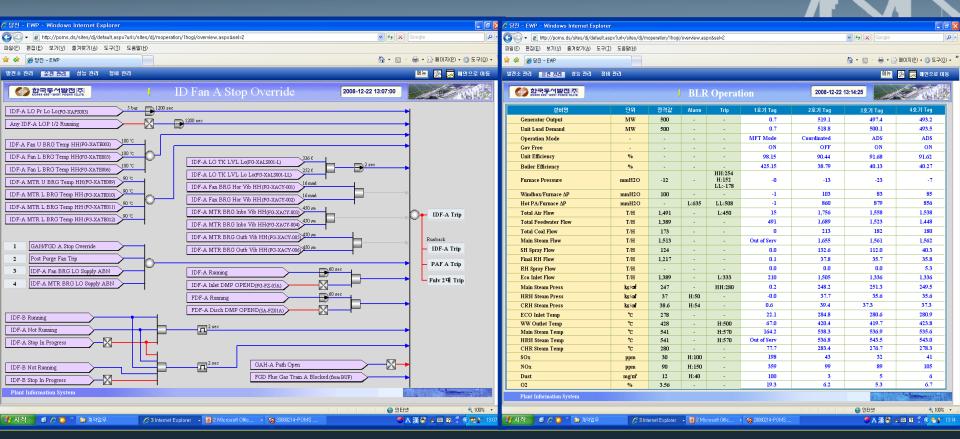
2. Plant Information System (for Gen Expert)



2. Plant Information System (for TBN Expert)

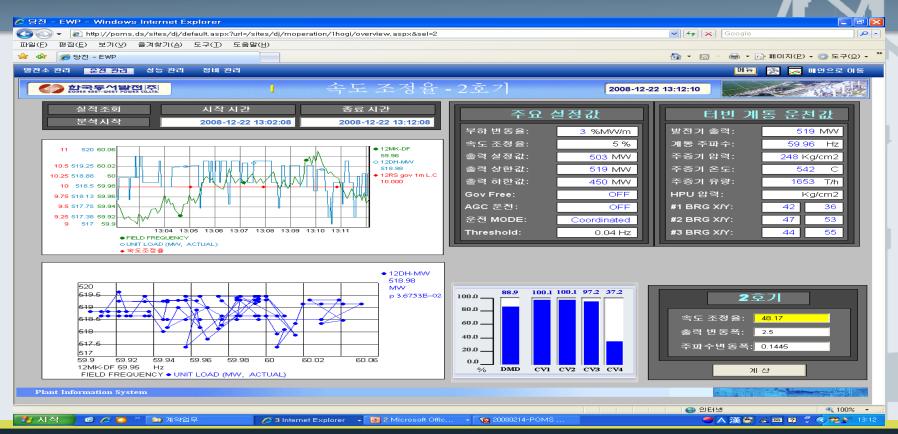


2. Plant Information System (for I&C Expert)

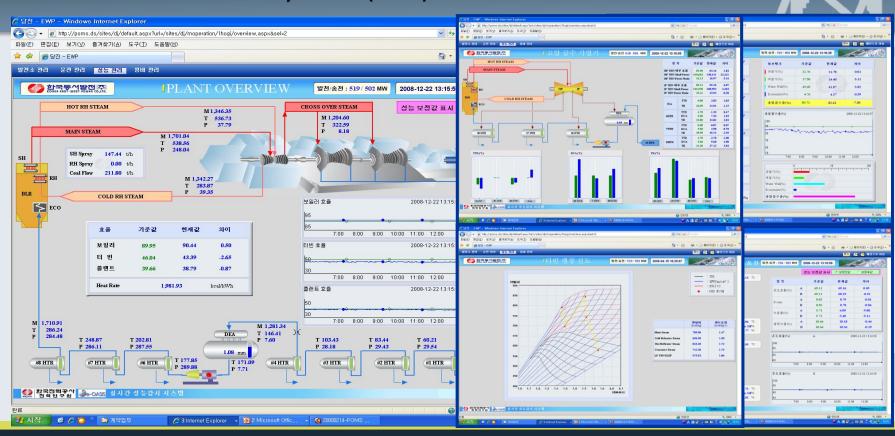


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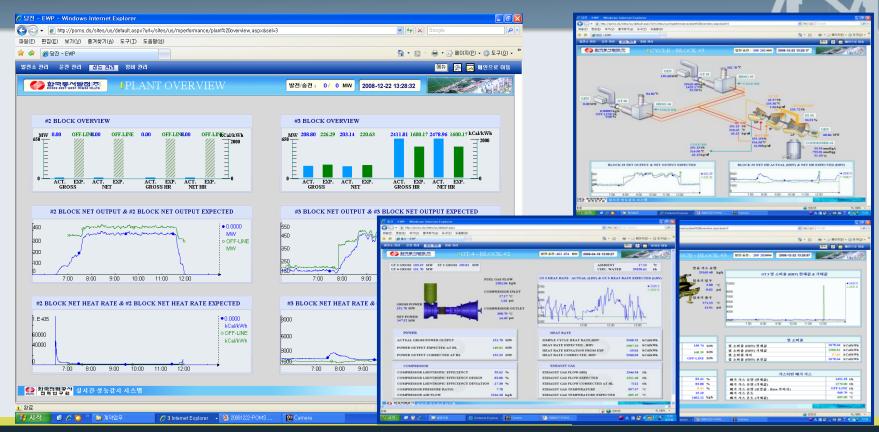
2. Plant Information System (Speed Regulation)



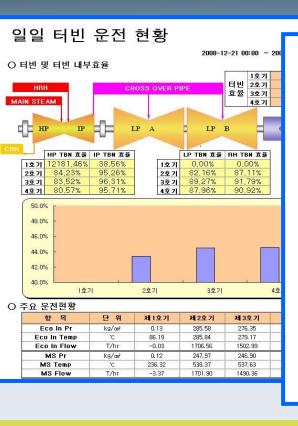
3. Plant Performance System (TPP)



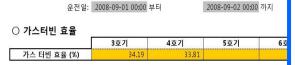
3. Plant Performance System (CC)



3. Plant Performance System (Report)



가스터빈 일일 운전 현황



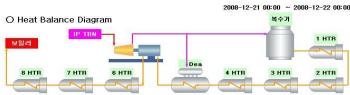
2008-09-02



○ 주요 운전 항목

3호기	4호기	5호기	65	
395.03	395.44			
84.69	86.29			
25,309.32	2,127.56			
588.73	598.29			
1,262.09	1,372.55			
	395.03 84.69 25,309.32 588.73	395.03 395.44 84.69 86.29 25,309.32 2,127.56 588.73 598.29	395.03 395.44 84.69 86.29 25,309.32 2,127.56 588.73 598.29	

급수가열기 일일 운전 현황



O Heater 주요 문전현황

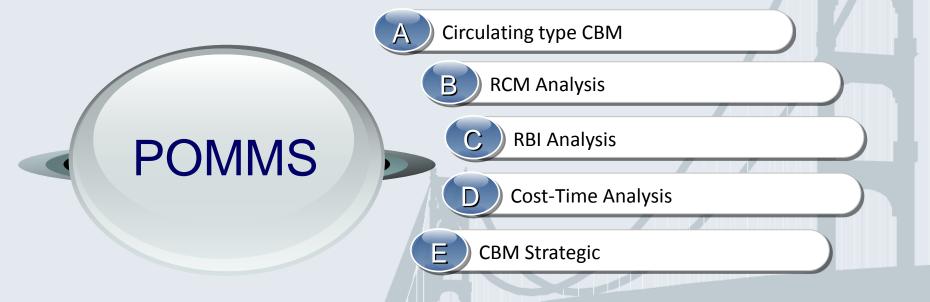
	항 목	단위	제 1	제 1호기		제 2호기		제 3호기		제 4호기	
망축		2 7	TTD	DCA	TTD	DCA	TTD	DCA	TTD	DCA	
HTR TTD & DCA	#8 HTR	*℃	20.39	-24.62	-2.58	9.39	-2.93	10.04	-1.01	9.15	
	#7 HTR	*C	15.16	-14.10	-0.01	4.81	1.17	6.83	5.20	7.36	
	#6 HTR	°C	20.36	-20.03	-1.19	7.10	-0.28	7.20	2.33	8.30	
	Dea	°C	20.39	~	-2.58	= 1	-2.93	720	-1.01	-	
	#4 HTR	*C	77.35	-1.75	3.46	11.03	2.05	8.43	1.78	2.38	
	#3 HTR	*C	77.70	3.37	6.44	9.35	5.45	3.75	4.42	4.41	
	#2 HTR	*C	78.53	0.83	7.25	8.36	1.77	7.93	6.58	7.51	
	#1 HTR	*C	76.28	0.13	5.13	6.13	7.78	1.69	5.45	0.11	



15.00 10.00 5.00

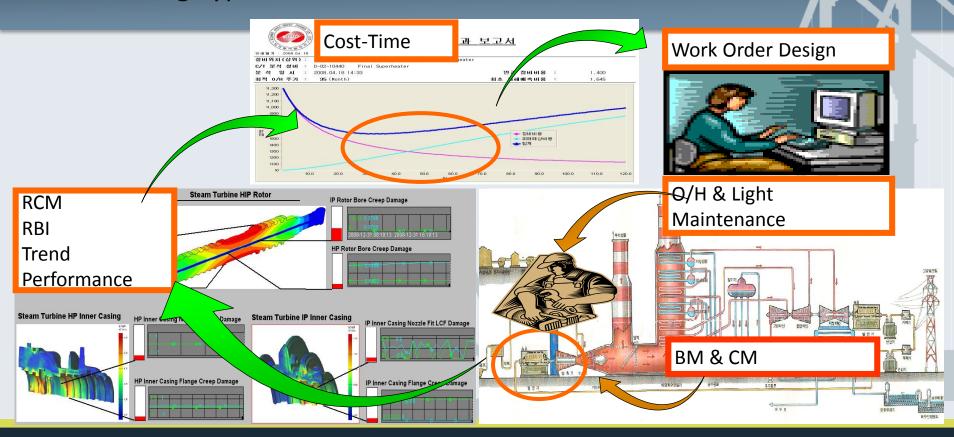
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4. RCM / RBI / Cost-Time



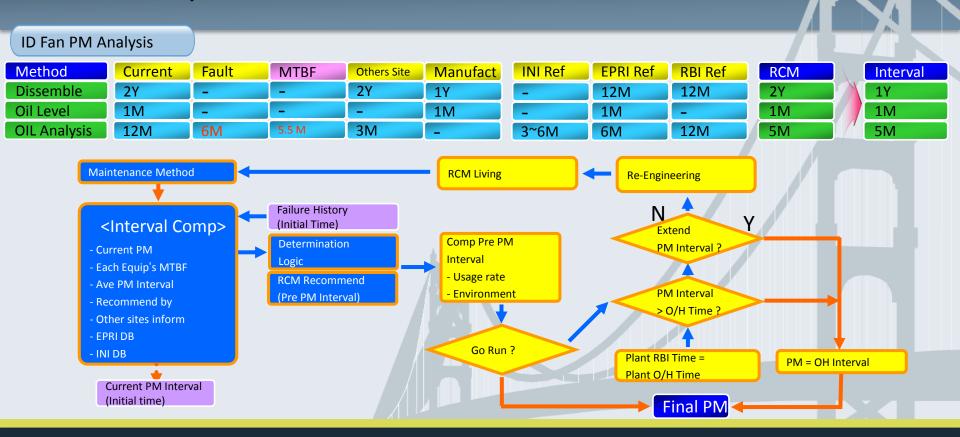
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A. Circulating Type CBM



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B. RCM Analysis

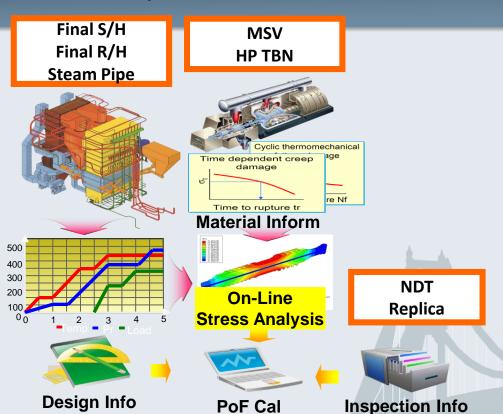


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B. RCM

- ⊌ Before
 - Do Light PM for all equipment
 - Limit : Maintenance Resource (HR, Material, Budget)
- - Run to Fail Equipment → Breakdown Maintenance
 - Concentrating resources on core equipments
 - Maximize ROI
- RCM Living
 - Interval : 2 Years
 - Tool for the improvement PM & putting off PM Interval

C. RBI Analysis









C. RBI Analysis



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C. RBI Analysis

Before

- Time Based Maintenance (TBM) for O/H
- Loss of resources and decrease of income

- Depend on the condition of TBN & BLR
 (A Class : HP TBN, B & C Class : BLR)
- Increase income & reliability
- Decrease maintenance cost





D. Cost-Time Analysis





C/T 분석 결과 보고서

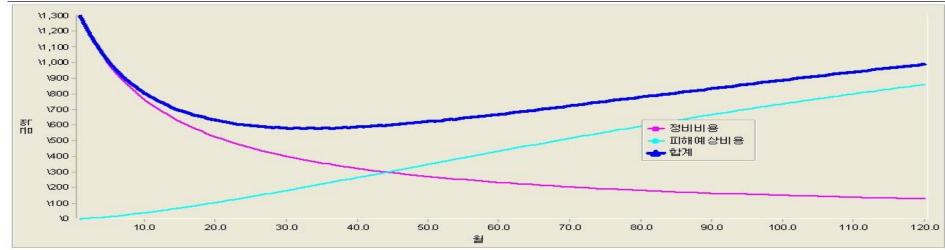
인쇄일자 : 2008.04.18

설비위치(상위): 제2호기 | 보일러설비 | 보일러본체 | Final Superheater

C/T 분석 설비 D-02-10440 Final Superheater

2008.04.18 14:33 연간 정비비용 1,400

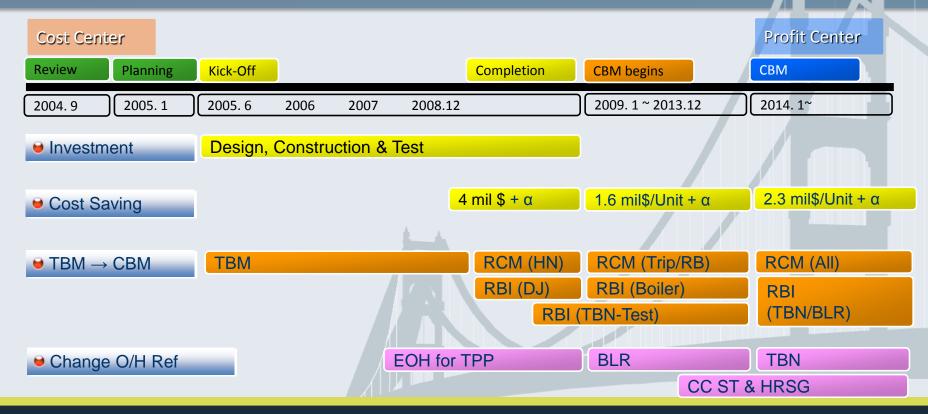
최적 0/H 주기 35 (Month) 최초 피해예측비용 1,645



V. Conclusion

- A EWP CBM Master Plan
 - B Operation & Performance Paradigm
 - Maintenance Paradigm
 - POMMS Center

A. EWP CBM Master Plan



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B. Operation & Performance Paradigm

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- Single Angle Monitoring (Central Control Room)
- ⊌ Paper Based Work & Analysis







Cost Saving

= 4 mil \$ + α



Patient

First Aid

General

Special











Expert

- 360° Angle Monitoring & Analysis Infra (CEO ~ Employee)
- ⊌ Web Based Work, Report & Analysis

After

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C. Maintenance Paradigm

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Organization

Paper

Individual

Different

22 Steps

Red/Yellow/Blue

No Tool

Disconnected

Disconnected

Disconnected

Closed

Can't

Equipment

Computer

Database

Unification

Max 10 Steps

Red

Real Time

Interfaced

Interfaced

ERP Interface

Open

Can

- Abolition all paper Works
- CMMS → Effortless
- Standardization → Simple



Cost Saving?



Pital

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Design

Information

Procedure

Permission

Tag

Project Control

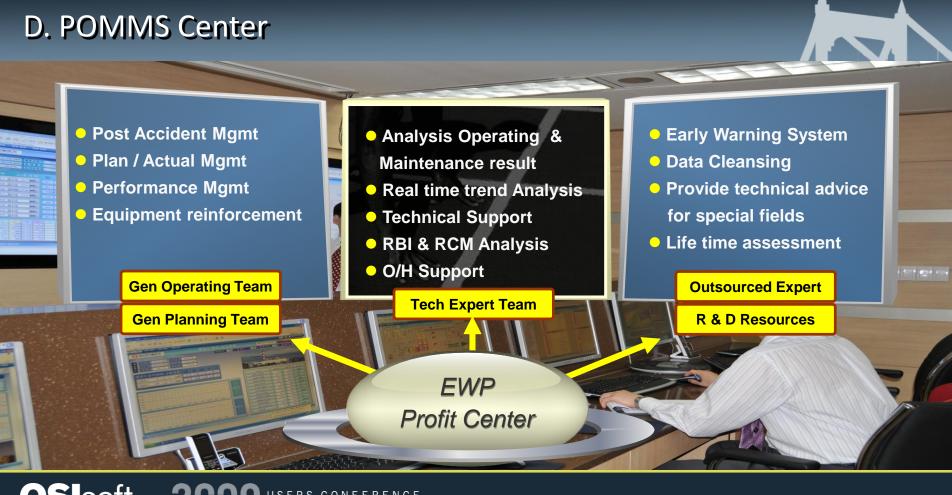
Material

Drawing

Budget

Labor

Analysis

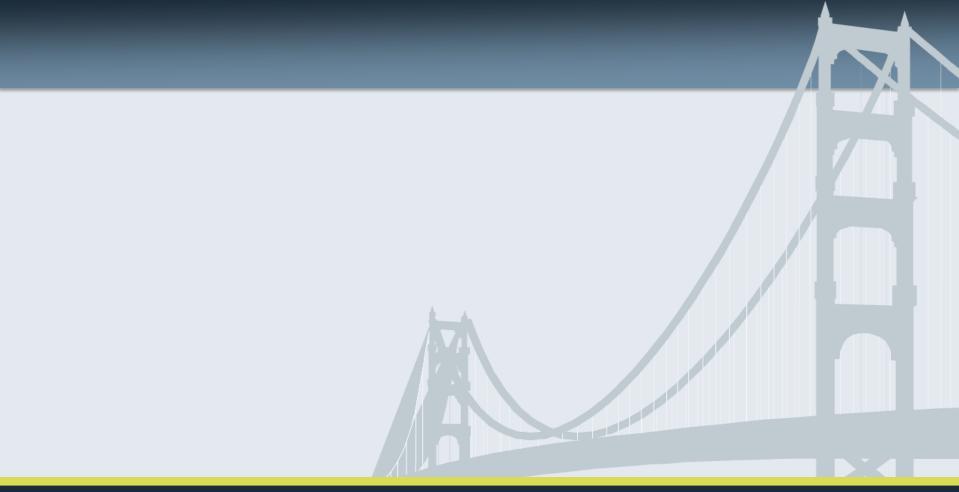


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Thank You

Any Questions?





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