

Asset Management System for Water & Wastewater Facilities

March, 2019



Nihon Suido Consultants Co., Ltd.
Water and Environmental Consultants

Asset Management System (Blitz GROW) for Water and Wastewater Facilities

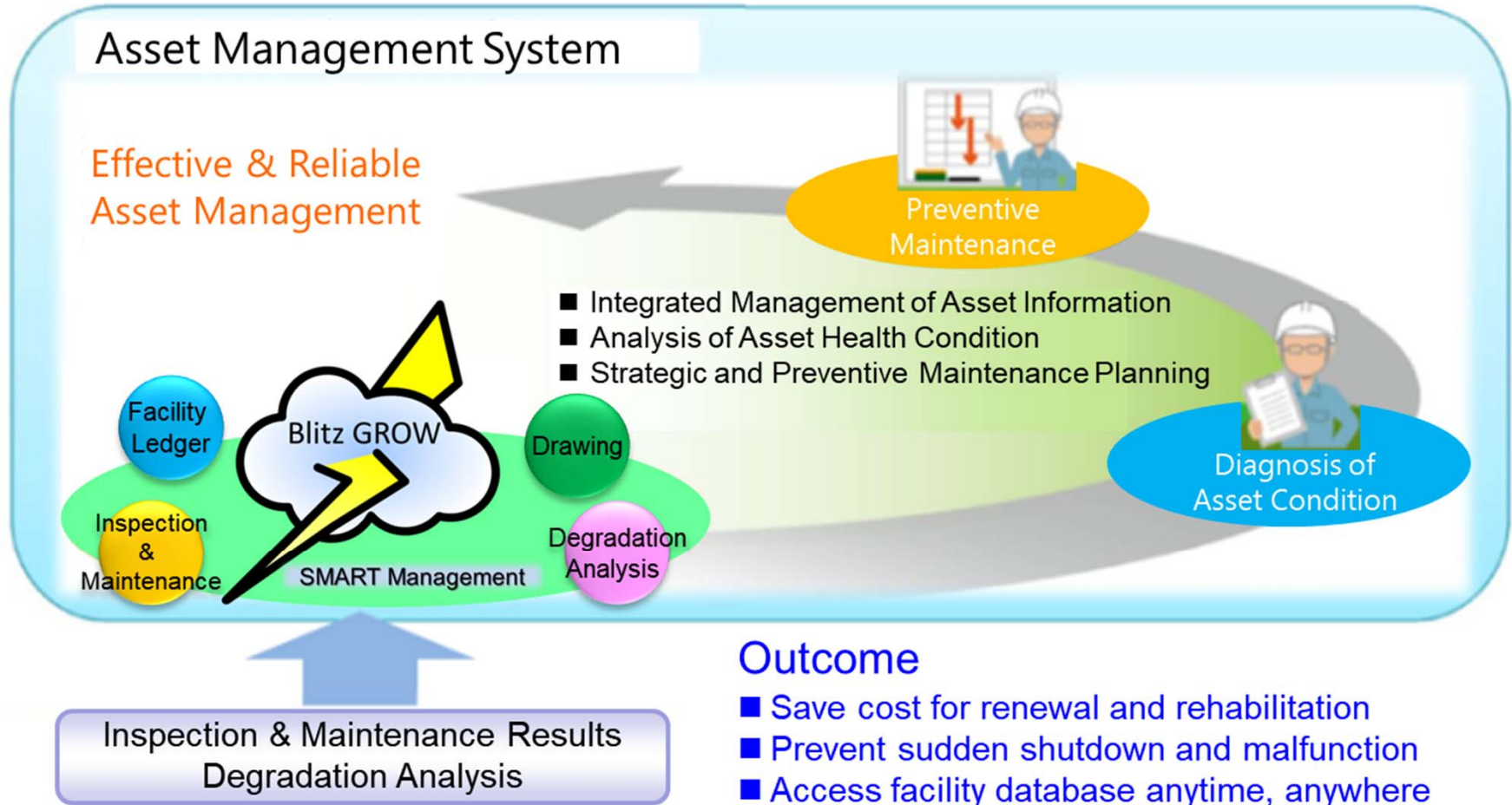


Facility Ledger / Inventory

Inspection & Maintenance

Degradation Analysis & Renewal Plan

Drawing Storage



Facility Ledger / Inventory

- Ledger/inventory of facility and equipment can be easily checked and updated on Cloud System.

Inspection & Maintenance

- Daily and periodical inspection and maintenance can be scheduled and recorded on Cloud System.

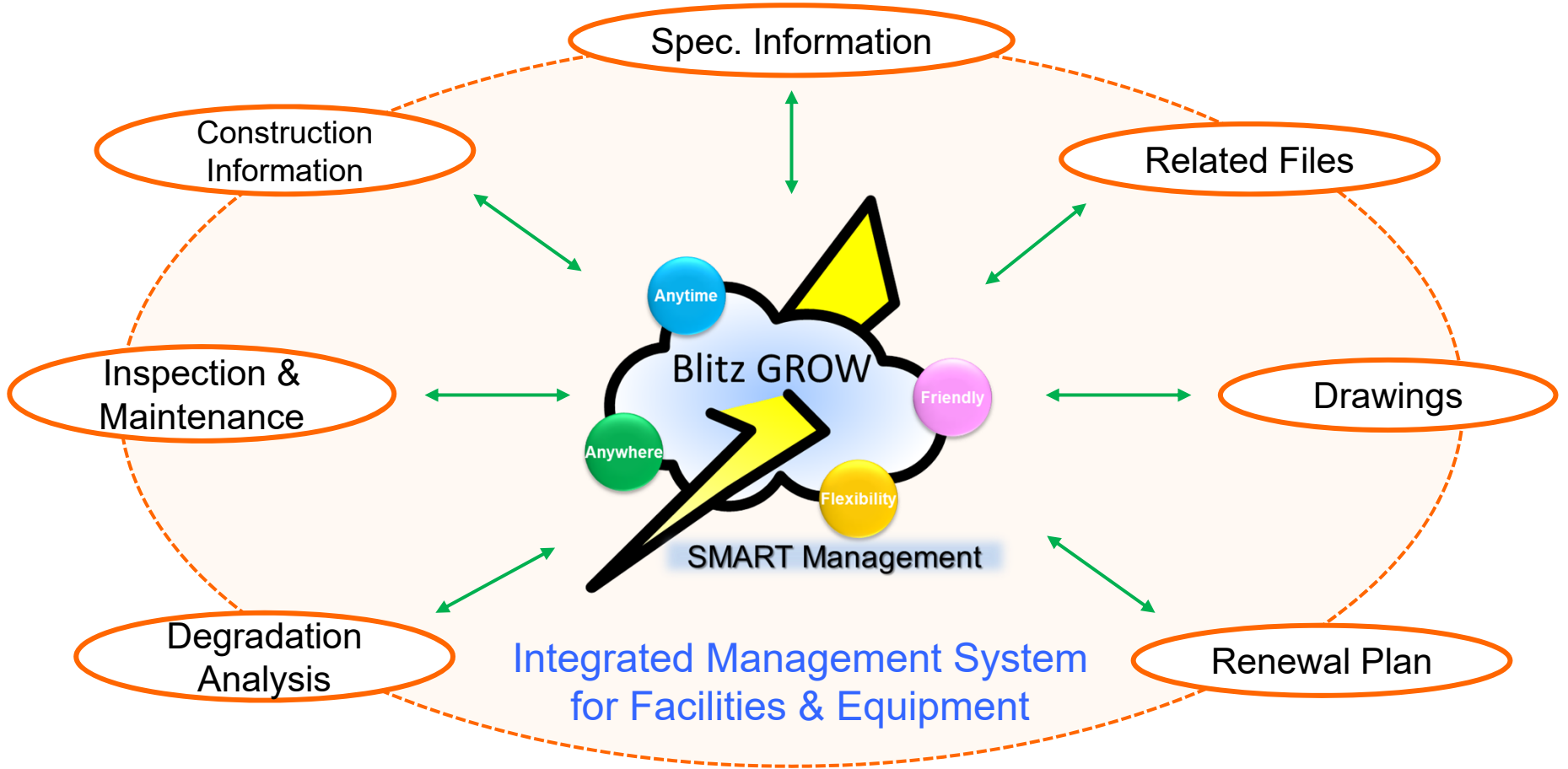
Degradation Analysis & Renewal Plan

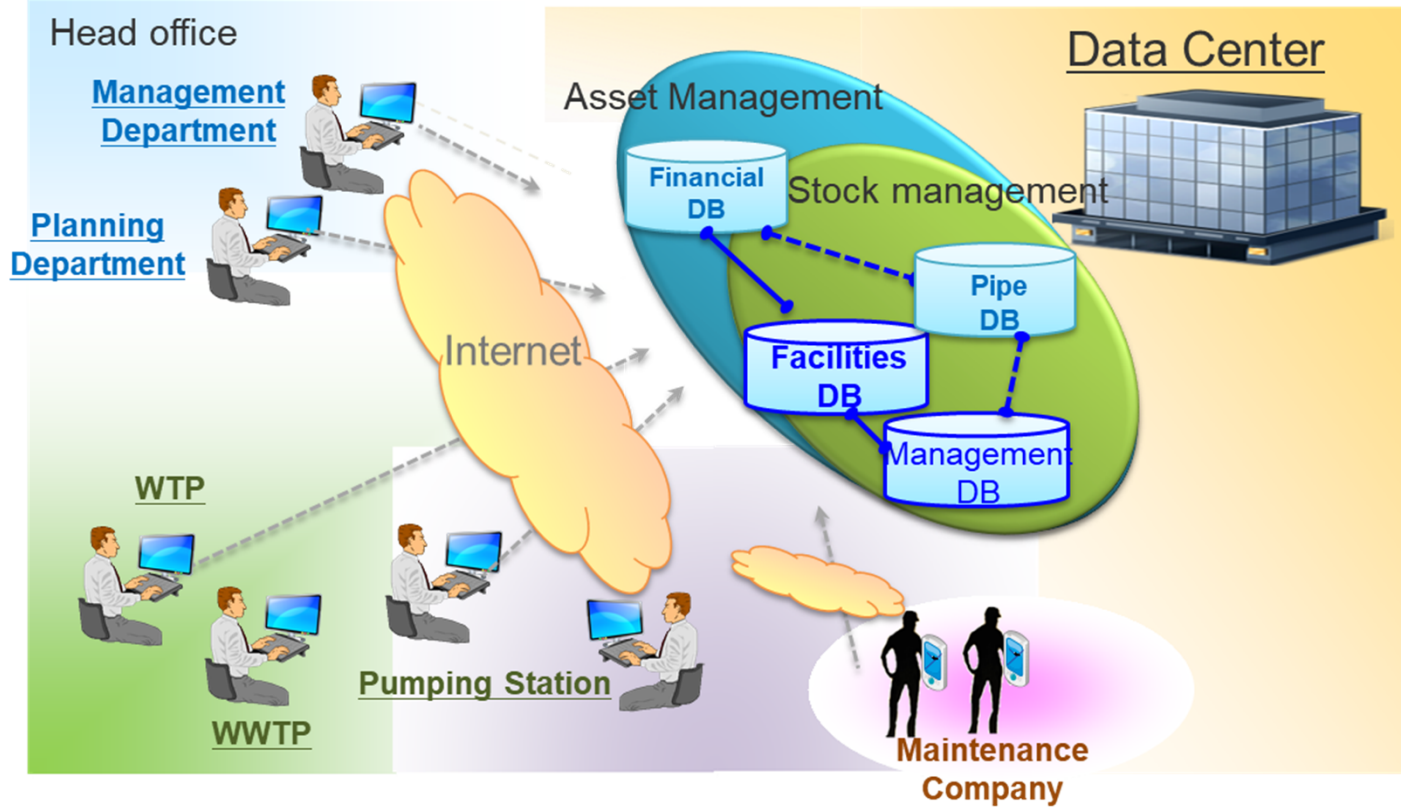
- Degradation progress can be predicted according to soundness evaluation.
- LCC(Life Cycle Cost) and various scenario on renewal can be evaluated.

Drawing Storage

- Every drawings of facility and equipment can be stored and updated associating with their ledger/inventory.

Outline of the Technology (Blitz GROW)





Anytime, Anywhere Available on Cloud Server

Introduction of Service Menu

The image displays two overlapping browser windows. The left window shows the 'Blitz GROW' login page with a logo and input fields for Project ID (growdemoeng), User ID (nsc-tobe), and Password. The right window shows the 'Facility Detail' page for 'Raw Water Pump No.1'.

Facility Detail - Google Chrome
https://www.blitzgrow.com/Grow_eng/setubiDetail/init?setubild=1&returnFlg=0

Plant A > > Pump Building > B1F > >
[1] ★ Raw Water Pump No.1

Facility Detail | Maintenance History | Related Construction Works | Current Drawing | Diagnosis/Renewal

Facility Information - Facility Free Item - Equipment Information - File Information

Replication Registration | Ledger Output(Photograph) | Ledger Output(Component of Equipment) | Delete

Facility Information

Item	Content
Facility ID	1
Facility Name	★Raw Water Pump No.1
Facility Category	Machine
Project	Water Supply
Area(Catchment)	Area 1
Plant Category	Water Treatment Plant
Plant	Plant A
Building House	Pump Building
Floor	B1F

Facility Information Free Item

Item	Content
Free Item	Demo

Facility Information Free Item[Access Restriction]

Item	Content
------	---------

Equipment Information (3Number)

Display removed Equipment | Addition of Equipment

Equipment Category	Name of Equipment	Model Number	Manufacturing Company	Serial Number	Date of Manufacture	Weight(kg)
S101_Pump	Pump	CEM	Nihon Suido Consultant	P-2018-1112	1980	
S108_Electric Motor	Electric motor	ADK	Nihon Suido Consultant	EM-2018-1112	1980	
S157_Solenoid Valve	Solenoid valve	SV	Nihon Suido Consultant	SV-2018-1112	1980	

File Information (6Number)

Document Category: All

File Name	Category	Comment	Registration Date
P1110028.JPG	Photo		2018/11/09 18:04

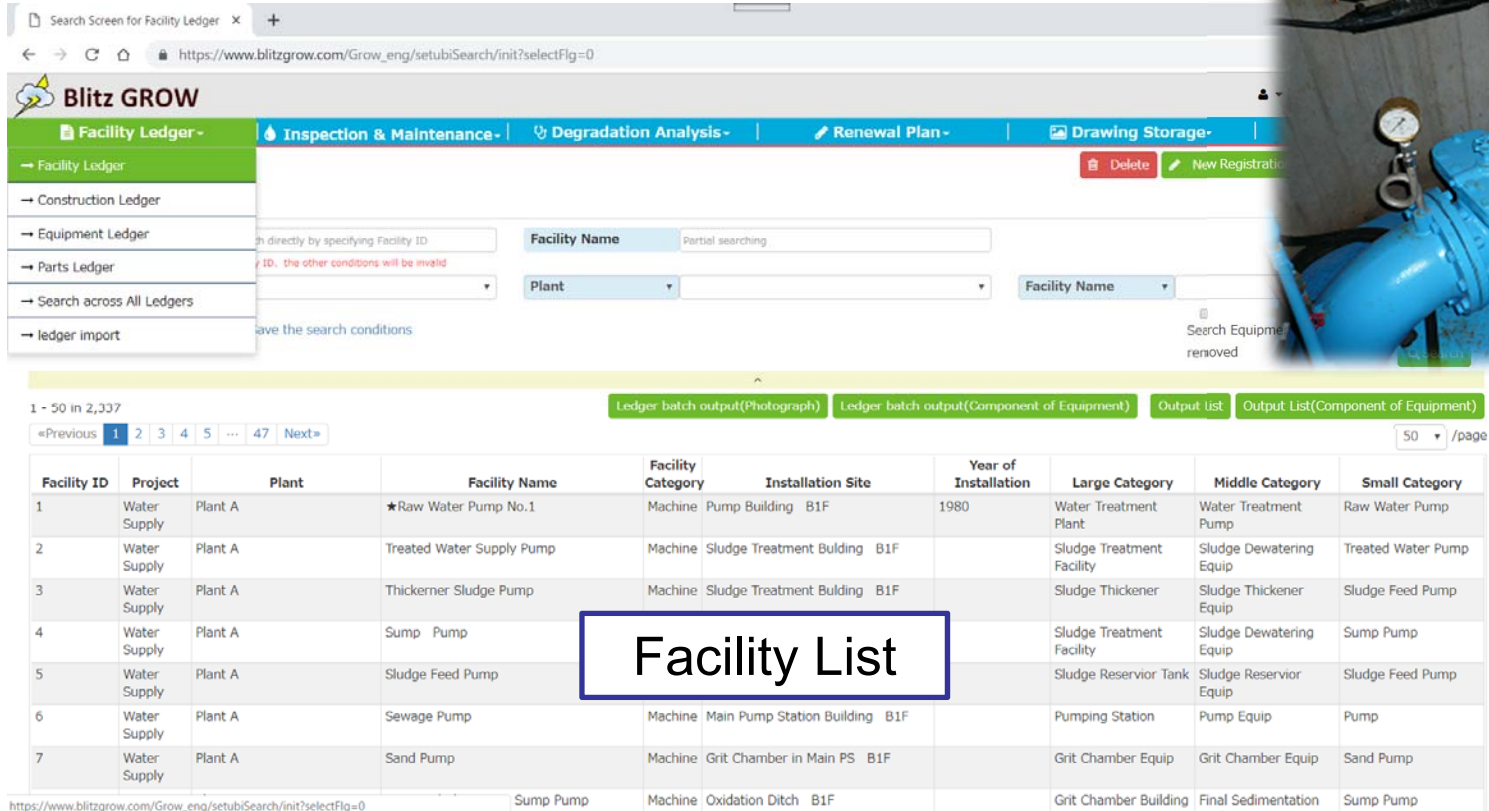
Timeline

- 1980 Installation
- 1980 Construction Works
- 1980 Commencement of Operation
- 1997 Repair
- 1998 Construction Works
- 2009 Repair
- 2010 Target useful life

Over 30 Experiences in Japan

Service Menu 1: Facility Ledger / Inventory

- Every ledger/inventory of facility, equipment and parts are integrated in Blitz GROW.



Search Screen for Facility Ledger x +
 https://www.blitzgrow.com/Grow_eng/setubiSearch/init?selectFlg=0

Blitz GROW

Facility Ledger - Inspection & Maintenance - Degradation Analysis - Renewal Plan - Drawing Storage -

Facility Ledger - Construction Ledger - Equipment Ledger - Parts Ledger - Search across All Ledgers - ledger import

Facility Name: Partial searching
 Plant: [Dropdown]
 Facility Name: [Dropdown]

1 - 50 in 2,337
 «Previous 1 2 3 4 5 ... 47 Next» 50 /page

Facility ID	Project	Plant	Facility Name	Facility Category	Installation Site	Year of Installation	Large Category	Middle Category	Small Category
1	Water Supply	Plant A	★Raw Water Pump No.1	Machine	Pump Building B1F	1980	Water Treatment Plant	Water Treatment Pump	Raw Water Pump
2	Water Supply	Plant A	Treated Water Supply Pump	Machine	Sludge Treatment Building B1F		Sludge Treatment Facility	Sludge Dewatering Equip	Treated Water Pump
3	Water Supply	Plant A	Thickener Sludge Pump	Machine	Sludge Treatment Building B1F		Sludge Thickener	Sludge Thickener Equip	Sludge Feed Pump
4	Water Supply	Plant A	Sump Pump				Sludge Treatment Facility	Sludge Dewatering Equip	Sump Pump
5	Water Supply	Plant A	Sludge Feed Pump				Sludge Reservoir Tank	Sludge Reservoir Equip	Sludge Feed Pump
6	Water Supply	Plant A	Sewage Pump	Machine	Main Pump Station Building B1F		Pumping Station	Pump Equip	Pump
7	Water Supply	Plant A	Sand Pump	Machine	Grit Chamber in Main PS B1F		Grit Chamber Equip	Grit Chamber Equip	Sand Pump
			Sump Pump	Machine	Oxidation Ditch B1F		Grit Chamber Building	Final Sedimentation	Sump Pump

https://www.blitzgrow.com/Grow_eng/setubiSearch/init?selectFlg=0



Service Menu 1: Facility Ledger / Inventory

Facility Detail - Google Chrome
https://www.blitzgrow.com/Grow_eng/setubiDetail/init?setubild=1&returnFlg=0

Plant A > - > Pump Building > B1F > -
[1] ★ Raw Water Pump No.1

Facility Detail | Maintenance History | Related Construction Works | Current Drawing | Diagnosis/Renewal

Facility Information - Facility Free Item - Equipment Information - File Information

Replication Registration | Ledger Output(Photograph) | Ledger Output(Component of Equipment) | Delete

Facility Information

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Facility Category	Machine
Project	Water Supply
Area(Catchment)	Area 1
Plant Category	Water Treatment Plant
Plant	Plant A
Building House	Pump Building
Floor	B1F

Facility Information Free Item

Item	Content
Free Item	Demo

Facility Information Free Item[Access Restriction]

Item	Content
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Equipment Information (3Number)

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File Information (6Number)

File Name	Category	Comment	Registration Date
P1110028.JPG	Photo		2018/11/09 18:04

Timeline

- 1980 Installation
- 1980 Construction Works
- 1980 Commencement of Operation
- 1997 Repair
- 1998 Construction Works
- 2009 Repair
- 2010 Target useful life

Photo



Facility Information

Equipment Information

Related Files

Service Menu 2: Drawing Storage

- Every drawings of facility and equipment are associated with their ledger/inventory and can be checked quickly.

Current drawing Management in detail - Google Chrome
https://www.blitzgrow.com/Grow_eng/zumenDetail/init?zumenId=10

Floor Plan of Sludge Disposal Building 1F (Machine) Close

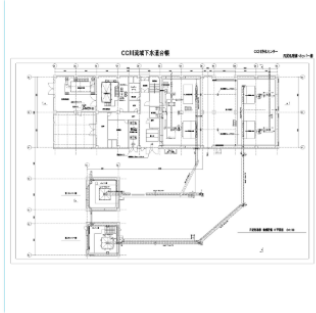
Drawing information Delete Edit Display drawing

Item	Content		
Drawing No.	10		
Project	Water Supply		
Plant	Plant A		
Facility Category	Machine		
Title	Floor Plan of Sludge Disposal Building 1F (Machine)		
File Name	Floor Plan of Sludge Disposal Building 1F (Machine).dxf		
Category	Plan/Section		
Keyword			
Registration Date	2019/01/08 16:00	Registrant	System Administrator
Updated Date	2019/01/08 16:00	Renewal Contractor	System Administrator

Facility Link Drawing Link Version History Addition of Link

List of Equipment Link For selected objects: Delete Link

About the selected target :	Facility ID	Project	Plant	Facility Name
<input checked="" type="radio"/>	682	Water Supply	Plant A	★No.1 Air Supply Fan



List of Facility and Drawings

Service Menu 3: Inspection & Maintenance

- Daily and periodical inspection can be scheduled for every facilities.

The screenshot displays the 'Blitz GROW' web application interface. The main navigation bar includes 'Facility Ledger', 'Inspection & Maintenance', 'Degradation Analysis', 'Renewal Plan', 'Drawing Storage', and 'Administration'. The 'Inspection & Maintenance' section is active, showing a dropdown menu for 'Inspection Plan' with options: 'Inspection Unit', 'Inspection Calendar', 'Inspection Plan', 'Inspection Record', 'Abnormal/Repair Record', and 'Work Record'. The 'Inspection Plan' option is highlighted. Below the menu is a calendar grid for the month of June, with columns for days 6 through 28. The grid shows inspection schedules for various equipment, with checkmarks indicating scheduled inspections. A blue box highlights the text 'Inspection Schedule' in the center of the grid.

Inspection category	Inspection unit	Inspection frequency	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Monthly Report
			Wed.	Thurs.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thurs.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thurs.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thurs.	
Daily Inspection	Pump Equipment Daily Inspection	Everyday	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<input type="checkbox"/>
Periodical Inspection	Water Supply Pump Periodical Inspection	3times/Month		✓						✓							✓									<input type="checkbox"/>
Daily Inspection	Plant A Electrical Equipment Inspection	Everyday	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<input type="checkbox"/>
Periodical Inspection	Sludge Collector Periodical Inspection	2times/Month	✓														✓									<input type="checkbox"/>
Daily Inspection	Fan Equipment Daily Inspection	Everyday	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<input type="checkbox"/>
Periodical Inspection	Plant A Filter Equipment Periodical Inspection	Every week	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<input type="checkbox"/>
Daily Inspection	Plant A Sensor Equipment Daily Inspection	Everyday	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<input type="checkbox"/>
Daily Inspection	Plant A Flocculation Equipment Daily	Everyday	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	<input type="checkbox"/>

Service Menu 3: Inspection & Maintenance

➤ Daily and periodical inspection items can be set for every facilities.

Inspection item List

Replication Registration Output Delete

Inspection unit information Edit

Inspection unit Pump Equipment Daily Inspection Creation Date 2018/11/09 Preparer System Administrator
Inspection cycle: Do every day Updated Date 2019/01/11 Renewer: System Administrator
Comment

Inspection target information Addition of Facility Addition of Equipment Replication Registration Delete Sort

Selection	Facility ID	Plant-Facility	Facility Name	Equipment CategoryID	Name of Equipment	
●	1	Plant A	★Raw Water Pump No.1	Machine	Main Body	
Inspection item information Add Replication Registration Sort						
			Inspection item	ThresholdLower limiting	ThresholdCap	Unit
			Visual Inspection			
			Vibration	0.00	100.00	mm
			Abnormal Noise			
			Abnormal Odor			
			Temperature			
			Damage			
			Overheat			
			Oil Leakage			
			Grease Condition			

● 2 Plant A Treated Water Supply Pump Machine
● 3 Plant A Thickener Sludge Pump Machine Main Body
● 5 Plant A Sludge Feed Pump Machine Main Body
● 6 Plant A Sewage Pump Machine Main Body
● 7 Plant A Sand Pump Machine Main Body
● 699 Plant A No.1 Water Supply Pump Machine Main Body
● 700 Plant A No.2 Water Supply Pump Machine Main Body
● 705 Plant A No.1 Water Supply Pump Valve Machine Main Body
● 706 Plant A No.2 Water Supply Pump Valve Machine Main Body
● 856 Plant A Rapid Sand Filter Sampling Pump Machine Main Body
● 857 Plant A Clean Water Reservoir Sampling Pump Machine Main Body

Setting of Inspection Items & Threshold

Service Menu 3: Inspection & Maintenance

- Inspection results can be recorded by tablet/mobile and linked on Blitz GROW.



Inspection
at site

Input of Inspection Result			
Inspection	Name		
Inspection Item	Last Time	Same as Last	This Time
Transmission Pump No.1			
Operation Mode			
Inspection Target	Yes		
Others			
Pump (Vibration, Abnormal Noise)	No	<input checked="" type="checkbox"/>	No
Pump (Bearing Temperature)	Normal	<input type="checkbox"/>	Normal
Pump (Bearing Grease Amount)	Adequate	<input type="checkbox"/>	Adequate
Pump (Sealing Water Amount)	Normal	<input type="checkbox"/>	Normal
Pump (Other Abnormal)	Normal	<input type="checkbox"/>	Normal
Gauge: Current	2.00 (A)	<input type="checkbox"/>	2.00 (A)
Transmission Pump No.2			
Operation Mode			
Inspection Target			
Others			
Discharge Electric Valve (Transmission Pump No.1)			
Operation Mode			

Recording by Tablet



Service Menu 3: Inspection & Maintenance

➤ Inspection results can be linked on Blitz GROW.

Inspection Record

Inspection information

Inspection name	Pump Equipment Daily Inspection	Inspection category	Daily Inspection
Scheduled Inspection day	2019/02/01~2019/02/01	Scheduled Person of Inspection	Tatsuya Tobe
Target Plant	Plant A	Remarks	
Cycle Schedule	Period:2019/01/01~2019/12/31	Inspection cycle:	Everyday

Inspection target information

Selection	Facility ID	Plant-Facility	Facility Name	Inspection Target	Operation Status	Normal / Abnormal	Date of Inspection	Remarks
1		Plant A	★Raw Water Pump No.1					

Inspection item information

Inspector Equipment	Inspection item	Unit	Rating	Upper Value	Lower Value	Inspection record	Abnormal	Status Level	Trouble Pattern	Note
Main Body	Visual Inspection					Normal				ATTACHED FILE
Main Body	Vibration	mm		0.00	100.00					ATTACHED FILE
Main Body	Abnormal Noise					Normal				ATTACHED FILE
Main Body	Abnormal Odor					Normal				ATTACHED FILE
Main Body	Temperature					Normal				ATTACHED FILE
Main Body	Damage					Normal				ATTACHED FILE
Main Body	Overheat					Normal				ATTACHED FILE
Main Body	Oil Leakage					Normal				ATTACHED FILE
Main Body	Grease Condition					Normal				ATTACHED FILE

Inspection results can be automatically stored on Blitz GROW

Service Menu 3: Inspection & Maintenance

- Every malfunction and repair for the facility and equipment can be accumulated on Blitz GROW.

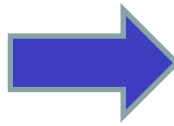
The screenshot shows the Blitz GROW web application interface. The top navigation bar includes 'Facility Ledger', 'Inspection & Maintenance', 'Degradation Analysis', 'Renewal Plan', 'Drawing Storage', and 'Administration'. The 'Inspection & Maintenance' menu is expanded, showing options like 'Inspection Unit', 'Inspection Calendar', 'Inspection Plan', 'Inspection Record', 'Abnormal/Repair Record', and 'Work Record'. The 'Abnormal/Repair Record' option is highlighted in green.

1 - 27 in 27

< Previous 1 Next >

No.	Status	Date of Failure	Urgency	Application Status	Plant	Facility Name	Name of Equipment	Scheduled Date of Repair	Date of Repair
1	Abnormal	2019/01/02			Plant A	★Raw Water Pump No.1	Main Body		
2	Abnormal	2019/01/02			Plant A	★Raw Water Pump No.1	Main Body		
3	Abnormal	2019/01/02			Plant A	★Raw Water Pump No.1	Main Body		
4	Repaired				Plant A	★Relay Terminal Panel	Main Body	2018/04/01~ 2018/04/01	2018/04/01
5	Repaired				Plant A	★Relay Terminal Panel	Main Body	2017/04/01~ 2017/04/01	2017/04/01
6	Repaired				Plant A	★Relay Terminal Panel	Main Body	2007/04/01~ 2007/04/01	2007/04/01
7	Repaired						Main Body	2002/04/01~ 2002/04/01	2002/04/01
8	Repaired						Main Body	2018/10/10~ 2018/10/10	2018/10/10

List of Malfunction/Repair



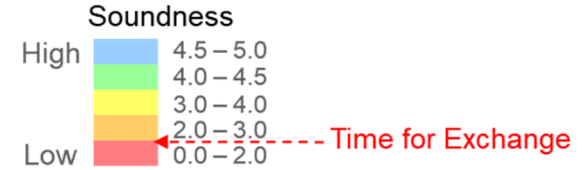
The screenshot shows the 'Detail of Repair' page. It includes a breadcrumb trail: 'Basic information - Inspection information - Contents of Repair - Parts - Cost Information - Related Files'. The page is divided into sections: 'Basic information' (Repair Form No, Name, Scheduled Date of Repair, Date of Repair, Orderer, Date Repair Completed, Person in charge (Main), Reporting Date), 'Inspection information' (Inspection category, Inspection name, Plant, Facility Name, Name of Equipment, Inspection item, Inspection record, Date of Inspection, Remarks), and 'Contents of Repair' (Category of Repair, Contents of Works, Cause, Result of Counter-Plan). The 'Inspection information' section is highlighted in green.

Detail of Repair Result

Service Menu 4: Degradation Analysis & Renewal Plan

- The degradation progress and LCC (Life Cycle Cost) can be compared based on various scenario on life extension and renewal.

Scenario 1: Renewal based on Useful Life



Facility	Equipment Unit	Installation Year	Renewal Cost (US\$)	Useful Life	Soundness Weight	Category	(Year)									
							2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Raw Water Pump No.1	Casing	1980	500,000	30Year	0.35	Soundness	3.00	2.90	2.80	2.70	5.00	4.90	4.80	4.70	4.60	4.50
						Exchange					○					
						Life Extension										
	Impeller	1980	500,000	10Year	0.20	Soundness	2.70	2.40	2.10	1.80	5.00	4.70	4.40	4.10	3.80	3.50
						Exchange					○					
						Life Extension										
	Motor	1980	100,000	20Year	0.30	Soundness	2.85	2.70	2.55	2.40	5.00	4.85	4.70	4.55	4.40	4.25
						Exchange					○					
						Life Extension										
	Guide Pipe	1980	100,000	30Year	0.05	Soundness	3.00	2.90	2.80	2.70	5.00	4.90	4.80	4.70	4.60	4.50
						Exchange					○					
						Life Extension										
	Removable Device	1980	80,000	30Year	0.10	Soundness	3.70	3.60	3.50	3.40	5.00	4.90	4.80	4.70	4.60	4.50
						Exchange					○					
						Life Extension										
	Total		1,280,000		1.00	Soundness	3.05	2.90	2.75	2.60	5.00	4.85	4.70	4.55	4.40	4.25

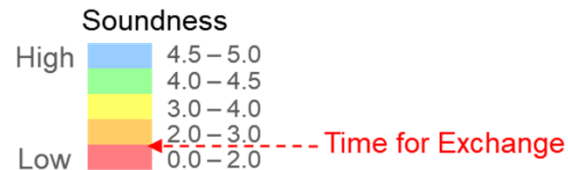
Composing Equipment in Raw Water Pump No.1

Useful Life Soundness Weight

Prediction of Degradation (Soundness)

Service Menu 4: Degradation Analysis & Renewal Plan

Senario2: Life Extension



Facility	Equipment Unit	Installation Year	Renewal Cost (US\$)	Useful Life	Soundness Weight	Category	(Year)									
							2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Raw Water Pump No.1	Casing	1980	500,000	30Year	0.35	Soundness	3.00	2.90	2.80	2.70	2.60	2.50	2.40	2.30	2.20	2.10
						Exchange										
						Life Extension										
	Impeller	1980	500,000	10Year	0.20	Soundness	2.70	2.40	2.10	1.80	5.00	4.70	4.40	4.10	3.80	3.50
						Exchange				○						
						Life Extension										
	Motor	1980	100,000	20Year	0.30	Soundness	2.85	2.70	2.55	2.40	2.25	2.10	1.95	5.00	4.85	4.70
						Exchange							○			
						Life Extension										
	Guide Pipe	1980	100,000	30Year	0.05	Soundness	3.00	2.90	2.80	2.70	2.60	2.50	2.40	2.30	2.20	2.10
						Exchange										
						Life Extension										
Removable Device	1980	80,000	30Year	0.10	Soundness	3.70	3.60	3.50	3.40	3.30	3.20	3.10	3.00	2.90	2.80	
					Exchange											
					Life Extension											
	Total		1,280,000		1.00	3.05	2.90	2.75	2.60	3.15	3.00	2.85	3.34	3.19	3.04	

Composing Equipment in Raw Water Pump No.1

Useful Life Soundness Weight

Prediction of Degradation (Soundness)

Service Menu 4: Degradation Analysis & Renewal Plan

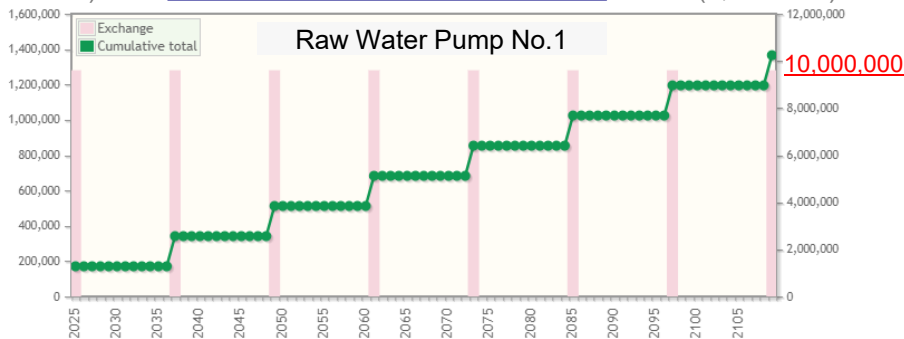
Scenario 1: Renewal based on Useful Life

Scenario 2: Life Extension

Life Cycle Cost (LCC)

Cumulative Total Cost (1,000 JPY)

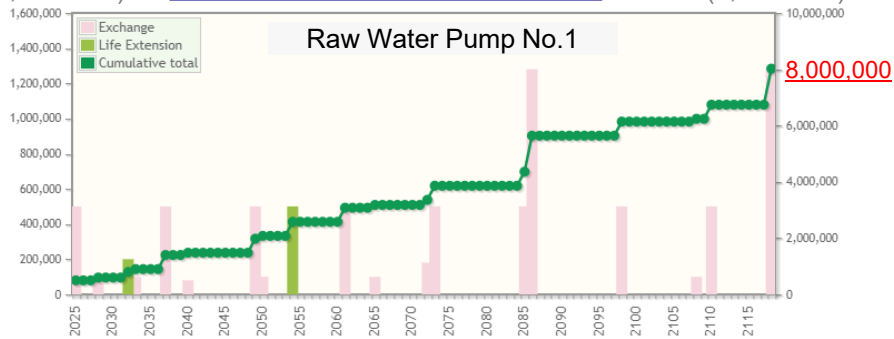
Yearly Cost (1,000 JPY)



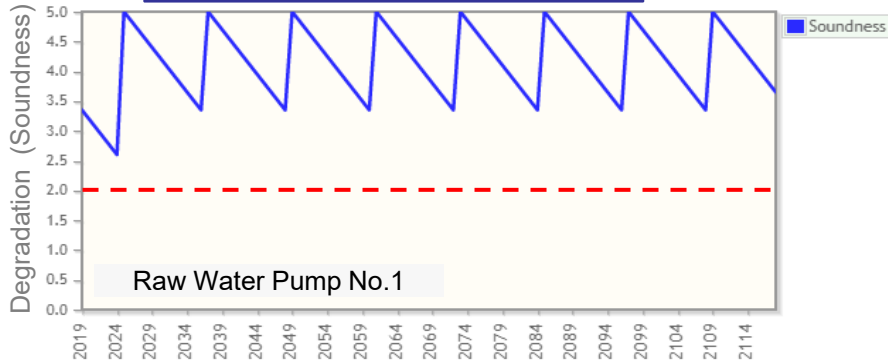
Life Cycle Cost (LCC)

Cumulative Total Cost (1,000 JPY)

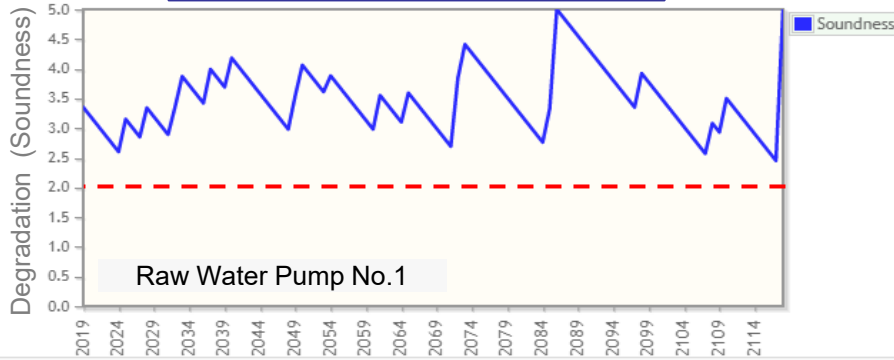
Yearly Cost (1,000 JPY)



Degradation / Soundness

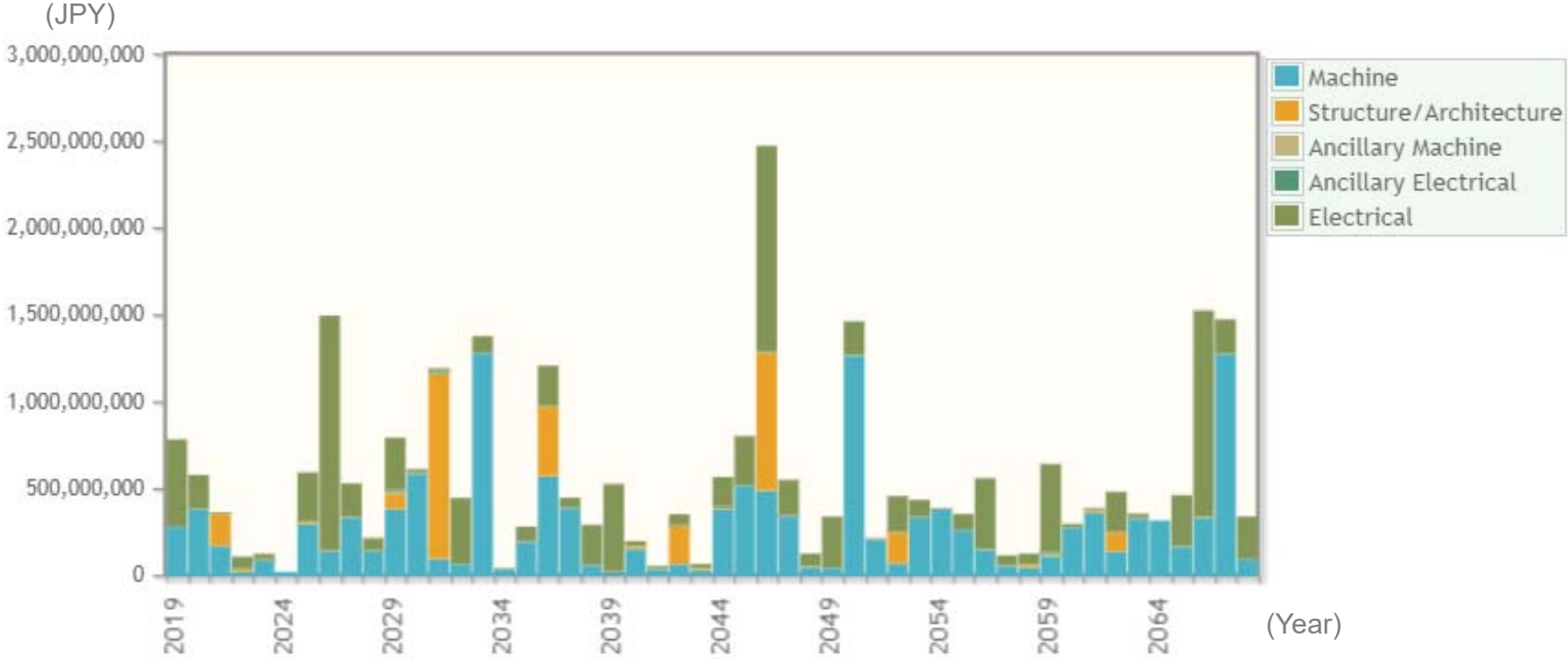


Degradation / Soundness



Service Menu 4: Degradation Analysis & Renewal Plan

Overall Renewal Cost for Every Facilities according to Adopted Scenario



Evaluation of Asset Management Scenario

	Scenario-1 No Limitation of Budget	Scenario-2 Limitation of Budget	Scenario-3 Limitation of Budget
Cost	<p>High Cost</p>	<p>Low Cost</p>	<p>Middle Cost</p>
Soundness	<p>Soundness: Level 3 to 5</p>	<p>Soundness: Level 1 to 5</p>	<p>Soundness: Level 2 to 5</p>
Risk	<p>Low Risk</p>	<p>High Risk</p>	<p>Middle Risk</p>
Evaluation	<p style="text-align: center;">✗ Difficulty of Budget</p>	<p style="text-align: center;">✗ High Risk</p>	<p style="text-align: center;">○ Desirable Preventive Maintenance</p>

- Every information related to water and wastewater facilities is integrated into user-friendly Blitz GROW.
- Daily and periodical inspection and maintenance can be scheduled and recorded on Blitz GROW.
- Users can estimate degradation trend and Life Cycle Cost for every facilities based on various scenario of life extension and renewal.



Preventive Maintenance Approach

- Save cost for renewal and rehabilitation
- Prevent sudden shutdown and malfunction





Creating the Future of Water

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